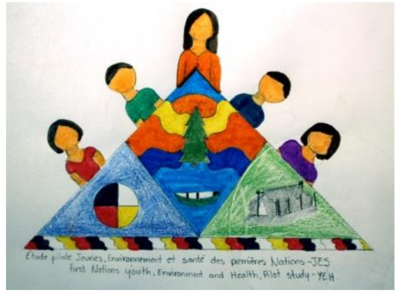


JES!-YEH!

First Nations Youth, Environment and Health Pilot Project

Projet pilote Jeunes, Environnement et Santé des Premières Nations

Report for Health Canada - 2015

Introduction, Objectives, Methodology and Descriptive Results (Objectives 1 to 3)

CHU de Québec
Centre de recherche
Université Laval
NASIVVIK
Chaire de recherche en approches écosystémiques de la santé nordique | Nasivvik Research Chair in Ecosystem Approaches to Northern Health
CSSSPNQL • FNQLHSSC
Institut national de santé publique Québec
Health Canada Santé Canada

This report may be cited as follows:
Lemire M, Jodoin S, Tahir E, Bradette-Laplante M, Gagné É, Guedes JC, Anassour LS E, Community of Lac Simon, Community of Winneway – Long Point First Nation, Community of Nutashkuan - CSSS Tshukuminu Kanani de Nutashkuan, Community of Unamen Shipu, Bruneau S, McHugh GL N, Lucas M, Riva M, Muckle G, Ayotte P. 2019. JES!-YEH! Projet pilote Jeunes, Environnement et Santé des Premières Nations - First Nations Youth, Environment and Health Pilot Project. Report for Health Canada - 2015, 654p.

The use of the masculine form in this document is solely for the sake of conciseness and is in no way intended to be discriminatory toward women.

The report is available electronically on the following websites:
Nasivvik.chaire.ulaval.ca
FNQLHSSC
Health Canada

Report Publication Date

January 10, 2019

Table of Contents

List of Abbreviations and Acronyms

List of Abbreviations

Assembly of First Nations (AFN)
Canadian Health Measures Survey (CHMS)
Centre de toxicologie du Québec (CTQ)
Centre for Disease Control and Prevention (CDC)
Centre hospitalier de l'université Laval (CHUL)
First Nations Biomonitoring Initiative (FNBI)
First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC)
First Nations Regional Health Survey (RHS)
First Nations Youth, Environment and Health Pilot Project (JES!-YEH!)
Health Canada First Nations and Inuit Health Branch (FNIHB)
Household Food Security Survey Module (HFSSM)
Institut national de santé publique du Québec (INSPQ)
Institut universitaire de cardiologie et de pneumologie de Québec (IUCPQ)
International Obesity Task Force (IOTF)
Notifiable Diseases (ND)
United States Department of Agriculture (USDA)
World Health Organization (WHO)

List of Acronyms

2,4-Dichlorophenol (2,4-DCP)
2,4-dichlorophenoxyacetic acid (2,4-D)
2,5-Dichlorophenol (2,5-DCP)
3-phenoxybenzoic acid (3-PBA)
4-fluoro-3-phenoxybenzoic acid (4-F-3-PBA)
95% confidence interval (95% CI or IC 95%)
Arithmetic mean (AM or MA)
Arsenic (As)
Bisphenol A (BPA)
Body mass index (BMI)
Boron (B)
Cadmium (Cd)
Cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DBCA)
Cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DCCA)
Coefficient of variation (CV)
Diethylphosphate (DEP)
Diethylthiophosphate (DETP)
Dimethyldithiophosphate (DMDTP)
Dimethylphosphate (DMP)
Dimethylthiophosphate (DMTP)
Docosahexaenoic acid (DHA)
Docosapentaenoic acid (DPA)
Eicosapentaenoic acid (EPA)
Geometric mean (GM or MG)
Lead (Pb)
Limit of detection (LD)
Manganese (Mn)
Mercury (Hg)
Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)
Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)
Mono-2-ethylhexyl phthalate (MEHP)
Mono-3-carboxypropyl phthalate (MCPP)
Mono-methyl phthalate (MMP)
Mono-*n*-butyl phthalate (M*n*BP)
Mono-*n*-octyl phthalate (MOP)
Monobenzyl phthalate (MBzP)
Monocyclohexyl phthalate (MCHP)
Monoethyl phthalate (MEP)
Monoisobutyl phthalate (MiBP)
Monoisononyl phthalate (MiNP)
Nickel (Ni)
Number (n)
Organochlorine pesticides (OC)
Organophosphate pesticides (OP)
Perfluorinated compounds (PFC)
Perfluorohexane sulfonate (PFHxS)
Perfluorononanoic acid (PFNA)
Perfluorooctane sulfonate (PFOS)
Perfluorooctanoic acid (PFOA)
Persistent organic pollutants (POP)
Polybromodiphenylethers (PBDE)
Polychlorinated biphenyls (BPC)
Polycyclic aromatic hydrocarbons (PAH)
Selenium (Se)
Thyroid-stimulating hormone (TSH)
Thyroxine (T_4)
Trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (trans-DCCA)
Uranium (U)

1. JES!-YEH! Project Team and Acknowledgements

1.1. Research Team

Principal Investigator:

Mélanie Lemire, PhD. Nasivvik Research Chair in Ecosystem Approaches to Northern Health. Assistant professor, Department of Social and Preventive Medicine, Université Laval; Investigator, Population Health and Optimal Health Practices Arm, CHU de Québec Research Centre – Université Laval.

Co-investigators:

Pierre Ayotte, PhD. Full professor, Department of Social and Preventive Medicine, Université Laval; Investigator, Population Health and Optimal Health Practices Arm, CHU de Québec Research Centre – Université Laval; Chief of the Research Division, Centre de Toxicologie du Québec (CTQ), Institut national de santé publique du Québec (INSPQ).

Gina Muckle, PhD. Full professor, School of Psychology, Université Laval; Investigator, Population Health and Optimal Health Practices Arm, CHU de Québec Research Centre – Université Laval.

Mylène Riva, PhD. Assistant professor, Institute for Health and Social Policy, Department of Geography, McGill University.

Michel Lucas, DtP., PhD. Associate professor, Department of Social and Preventive Medicine, Université Laval; Investigator, Population Health and Optimal Health Practices Arm, CHU de Québec Research Centre – Université Laval.

Research assistants and graduate students from the Population Health and Optimal Health Practices Arm, CHU de Québec Research Centre – Université Laval involved in the project:

Laura Atikessé, PhD., Stéphanie Jodoin, MSc., Emad Tahir, Maude Bradette-Laplante, DtP., MSc., Élisabeth Gagné, João Carlos Guedes, MSc., Annie Caron, MSc., Julien Vachon, MSc., Joannie Gray-Roussel, Olivia Drescher, MSc., Annie Turgeon, MSc., Suzanne Côté, MSc.

Statistician: **Elhadji Anassour L. Sidi**, MSc. Population Health and Optimal Health Practices Arm, CHU de Québec Research Centre – Université Laval.

Contributors:

Suzanne Bruneau, MSc., Executive counsellor, Aboriginal Health, INSPQ.

Nancy Gros-Louis McHugh, Jean-Denis Gill: Acting managers of the research sector, First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC).

1.2. Community Partners and Co-Investigators

Community of Lac Simon

Community of Winneway – Long Point First Nation

Community of Nutashkuan - CSSS Tshukuminu Kanani de Nutashkuan

Community of Unamen Shipu

1.3. Funding and Technical Advisors

This research was made possible thanks to the financial contribution and technical support of Health Canada, the Government of Canada and the Nasivvik Research Chair in Ecosystem Approaches to Northern Health. The information provided and the opinions expressed in this publication are those of the authors and investigators and do not necessarily represent the official viewpoint of Health Canada.

Contact persons at Health Canada:
For 2014-2015: Maria Ooi; For 2015-2017: Harold Schwartz, PhD. and Jennifer Mercer, Environmental Public Health Division, First Nations and Inuit Health Branch (FNIHB) of Health Canada.

1.4. Contact Person

Principal Investigator
Mélanie Lemire, PhD.: melanie.lemire@crchudequebec.ulaval.ca, 418-525-4444, ext. 81967.

1.5. Acknowledgements

A big thank you to the children, youth and their parents who participated in the project. Ti-Meegwetch! Tshinashkumitin! We would also like to extend a warm thank you to our recruiters (Kathy St-Denis, Josyanne Minonik Anichinapeo, Yvonne Mesteneapeo, Normand Junior Bellefleur), childcare workers and cooks, without whom this project would not have been such a success. A special thank you to Réal Brazeau, Geneviève Tremblay, Karen Morency, Mélanie Dumont, Rose Dumont, Joan Wabanonik, Nour Attalah, Dave Lefebvre, Luc Létourneau, Jerry Polson, Sylvie Bernier, Priscilla Polson, Henry Rogers, Jason Matthias, Frank Webb, Thérèse Courtois, Marie-Reine Malec, Nancy Boucher, Rémy Blanchette, Adèle Bellefleur, Gérard Ishpatao, Nathalie Lapierre, Magella Landry, Sylvie Malec, Normand Morin, Jean-François Vincent, Vivette, Matthieu and Jacinthe Boivin, Édith McKlintock, François Massicotte, Catherine Drouin, Jeannot Mullen and Maryline Tremblay for their invaluable advice and support throughout this project. It was a great pleasure to work with your teams and we hope to have the opportunity to continue to work with your wonderful communities. Thank you for hosting us in your communities. Congratulations on your great community initiatives, you are an inspiration!
Ti-Meegwetch! Tshinashkumitin!

We would like to thank Alain Leblanc, Pierre Dumas and Éric Gaudreau from the CTQ as well as Richard Bélanger, Donna Mergler, Benoît Lévesque, Antonio Menezes and Huguette Turgeon-O'Brien for their scientific and technical expertise on environmental contaminants, obesity and anemia. We would also like to thank the following partners: Sophie Picard, Mathieu-Olivier Côté and Alexandra Picard-Sioui from the FNQLHSSC; Christian Noël, Jean-Pierre Couture, Thanh-Van Nguyen, Serge Desrosiers, Oumar Ba and Constantine Tikhonov from Health Canada; Frédéric Bilodeau, Stéphane Bessette, Annie Vienney, Éric Lampron-Goulet, Lyse Landry, Stéphane Trépanier and Jean-Daniel Trottier of the Public Health Branches of Abitibi-Témiscamingue and the North Shore.

This report is dedicated to the memory of Éric Dewailly, initially the Principal Investigator on this project. Highly driven by the desire to bring to the forefront the importance of partnerships and the collaboration between university researchers, communities and local organizations, Dr. Éric Dewailly was one of the environmental and Aboriginal health research pioneers in the North and elsewhere in the world. Co-founder of Nasivvik, the Centre for Inuit Health and Changing Environments, he contributed to reinforcing the skills of Indigenous communities in research. Internationally renowned, Dr. Dewailly's research focused in large part on the impact of the oceans on health: the contamination of the aquatic food chain and the exposure of local communities to metals and persistent organic pollutants (POP), the effects of these contaminants on the reproductive, immune, cardiovascular and nervous systems, microbiologic contamination, marine toxins, nutrition and the benefits of seafood diets on population health. In the 1980s, he was one of the first to shed light on the impact of polychlorinated biphenyls (PCB) and organochlorine (OC) pesticides on the health of Inuit and coastal communities of the North Shore. During his career, he contributed in a concrete and sustainable fashion to improving population health, particularly that of the Nordic regions. He also contributed to the production of several documentaries and outreach tools based on the results of his research, Indigenous wisdom and the realities of the communities who live off the sea. Following his premature death in June 2014, Melanie Lemire took on full responsibility for the project in collaboration with the co-investigators, the research assistants, the FNQLHSSC, the INSPQ, Health Canada and the communities involved in the project.

2. JES!-YEH! Project Summary

The goal of the First Nations Youth, Environment and Health (JES!-YEH!) pilot project was to document exposure to 88 environmental contaminants, nutritional status, certain health indicators and a few determinants of health in four First Nations communities in Quebec. It was conducted in collaboration with two Anishinabeg communities located in the Abitibi-Témiscamingue region and two Innu communities in the Minganie and Lower-North-Shore regions. Data was collected from May to June 2015 and September to October 2015. In all, 198 children and youth aged 3 to 19 years participated in the project. The majority of them were chosen randomly (63% of participants). However, in two communities (one in each nation), 21 participants were recruited voluntarily (11% of all participants). That being said, the volunteer participants were chosen based on the distribution of the number of children and youth in these communities, broken down by age group and gender. In April 2016, the results were presented to the participants and their parents in person. The overall results were presented to stakeholders and representatives of the participating communities.

Important Note forthe Reader

Since this pilot project needed to include volunteer participants in two of the four project communities, <u>the data for the population aged 3 – 19 years in these communities is not necessarily representative and should be read with caution</u>. Furthermore, since the four communities that participated in the project were not chosen randomly, but were invited to participate voluntarily, these communities do not necessarily represent the nations to which they belong. Nevertheless, some significant trends emerge and are worthy of mention.

Below are the key results of this project:

2.1. Environmental Contaminants

For the metals measured in the JES!-YEH! study (arsenic, cadmium, lead, mercury, nickel, and uranium), the results were similar to or below the data in the Canadian Health Measures Survey (CHMS). Only the blood cadmium levels in participants 12-19 years old were significantly higher than in the CHMS. Furthermore, very few participants had levels of exposure to these metals that exceeded the limits established by Quebec or Canada.

According to the results for urine cotinine levels, 83% of participants were non-smokers, 3% were non-smokers with high exposure to second-hand smoke or were occasional smokers, and 14% were smokers. Levels of urine cotinine could not be compared to the levels in the CHMS because more than 40% of participants had results below the limit of detection.

As reported by the CHMS and the First Nations Biomonitoring Initiative (FNBI), the majority of old persistent organic pollutants (POP), i.e. organochlorine pesticides (OC) and polychlorinated biphenyls (PCBs), were practically undetected (40% to 100% below the limit of detection). Only PCB 153 was detected at levels greater than 40% in participants from the Innu communities involved in the project, but the concentrations were still 1000 times lower than those reported in fishermen in this region of the North Shore in 1990.

Urine concentrations of 2,5-dichlorophenol (2,5-DCP), bisphenol A (BPA), and diethylphosphate (DEP) were significantly higher than in the CHMS in participants 6-11 and 12-19 years old. Levels of perfluorononanoic acid (PFNA) and 2-hydroxynaphtalene were significantly higher than in the CHMS in participants 12-19 years old. Urine concentrations of monobenzyl phthalate were significantly higher than those in the CHMS for all three age groups. However, with the exception of bisphenol A, all of these results should be interpreted with caution, since the coefficients of variation associated with these contaminants fluctuated between 16.6 and 33.3%. In addition, the phthalates were measured only in a subsample of participants. In adults in the FNBI, urine BPA and monobenzyl phthalate levels were as significantly higher as they were in the CHMS (elevated BPA in women only).

Abnormally high levels of 2,5-DCP and PFNA were observed in some communities. The source of exposure to 2,5-DCP in one of the communities was most likely the mothballs used in the toilets at one school. The mothballs were quickly removed from the establishment when the janitors noticed that the youths were eating them. As for the PFNA, research is underway to identify the potential sources in the community. It should be noted that in 2016, just after the JES!-YEH! project was completed, the Government of Canada amended the Prohibition of Certain Toxic Substances Regulations to add long-chain perfluorinated compounds, including PFNA.

2.2. Nutritional Status and Health Indicators

The prevalence of iron deficiency and anemia (20.7% and 17.6%, respectively) were generally higher than in the CHMS. The situation was concerning in young girls 12 to 19 years old since nearly half were iron deficient (42.9%) and one-quarter (26.2%) were anemic, especially in the participating Anishinabeg communities (52.4% and 33.3%, respectively). The proportion of anemia in boys 6-11 years old was also high (20.9%). However, these results should be interpreted with caution by gender, age and nation, since their coefficients of variation were between 16.6 to 33.3%. According to the categories proposed by the World Health Organization (WHO), the prevalence of anemia in girls 12-19 years old and boys 6-11 years old in the JES!-YEH! project, which was between 20 and 39% and is a moderate public health problem.

Participants also had blood manganese levels 1 to 2 times higher than the levels in the CHMS (CHMS, 2013), as observed for adults in the FNBI. Almost 12% of participants had levels that exceeded the Quebec threshold for blood manganese in force at the time of the study in 2015, although these thresholds were withdrawn in 2016. The percentage of participants with elevated manganese levels was similar in both the Anishinabeg and Innu communities involved in the project. Low concentrations of manganese in hair and in drinking water in the communities, as well as the various investigations carried out with community and regional partners and Health Canada, support the hypothesis that there is no environmental source of manganese in the communities involved in the project. However, certain divalent metals, including manganese, cobalt, cadmium, lead, and zinc are known to interact with iron, because they share and compete for common routes of absorption. Consequently, iron deficiency can cause increased absorption of these metals when they are present, particularly if they are present in sufficient concentrations in food, which is generally the case for manganese, cobalt, and zinc. In fact, a negative correlation was observed between blood manganese and serum ferritin. It should be noted that the participants also had levels of urine cobalt that were higher than those in the CHMS, and that their levels of plasma zinc tended to be high.

Almost 40% (39.1%) of participants in the JES!-YEH! project had urine iodine deficiencies (mild, moderate, and severe). Furthermore, 43.8% of participants (especially those 3-5 years old) had insufficient levels of vitamin A. For vitamin D, 29.2% had insufficient levels and 17.7% were deficient, especially youths 12-19 years old in the participating Innu communities. In addition, participants 12-19 years old had significantly more vitamin D deficiency or insufficiency than those of the same age in the CHMS.

Data on body weight showed a very high proportion of overweight and obese participants (27.0% and 40.8%, respectively), especially in participants 12-19 years old. Furthermore, obesity affected a higher number of boys, and the prevalence of obesity was particularly high in the participating Innu communities. Overall, this prevalence was 2 to 5 times higher than in the CHMS. In addition, more than 90% of participants 3-5 years old had a waist-height ratio associated with abdominal obesity. The highest proportions of abdominal obesity were measured in the project's Innu communities. Glycated hemoglobin and random glucose assays also identified two new probable cases of diabetes and one case of prediabetes among the participants in the JES!-YEH! study. In total, five potential or previously diagnosed cases of diabetes were observed in project participants.

2.3. Health Determinants

The proportion of housing overcrowding and household food insecurity among participants in the Anishinabeg communities involved in the JES!-YEH! project was concerning (34.9% and 42.9%, respectively). The prevalence of overcrowding was considerably higher than the prevalence reported for the Anishinabeg nation in 2008 in the Quebec First Nations Regional Health Survey (RHS) and for First Nations living on reserves in Canada in the 2011 National Household Survey. However, the prevalence of food insecurity was similar to the proportion reported in the RHS for Anishinabeg adults living in households with infants in 2008, but was higher than that of Indigenous households in Canada, as reported in the Canadian Community Health Survey in 2004.

Although the proportion of participants who consumed traditional food seemed high, the frequency of consumption was nevertheless rather low. It should be emphasized that on average, participants in Anishinabeg communities consumed game and those in Innu communities consumed fish more than once a week (0.18 and 0.19 times/day, respectively).

For the participating Anishinabeg communities, the most consumed food group was starches (5.14 times/day). In contrast, fruit and vegetable consumption was lower (3.44 times/day), or slightly more than meat and alternatives (2.98 times/day) and “other foods” (2.98 times/day). Traditional recipes were consumed 0.24 times per day on average, and the frequency of consumption for all traditional foods on an annual basis was 0.37 times per day. For the participating Innu communities, the average frequency of consumption for food in the “other foods” category (4.34 times/day), i.e. sweets and junk food, was very high, while starches were consumed somewhat more frequently, i.e. 4.86 times/day. In contrast, meat and alternatives, as well as fruits and vegetables, were the least-consumed store-bought foods (2.70 and 2.39 times/day, respectively), and the total amount for traditional food was on average 0.58 times per day on an annual basis. Traditional recipes were rarely consumed, i.e. 0.06 times per day. Furthermore, compared to the current recommendations, the participants’ water consumption was insufficient, while the frequency of consumption of powdered juice was very high for both the Innu and Anishinabeg communities involved in the project.

In summary, data from the JES!-YEH! study show that traditional food seemed to be consumed rather rarely in general, while ultra-processed food, such as processed meat (e.g., sausages and other deli meats), sweets, junk food (e.g., chips, pastries, poutine) and powdered juice, was consumed frequently. These foods are often of inferior nutritional quality and their plastic packaging may contain several chemical contaminants that migrate into food and, among other things, act as endocrine disruptors in humans. Increased consumption of these foods is associated with malnutrition, obesity, and several chronic diseases. Some of these risk factors and health problems were identified in the participants and communities involved in the project, such as a higher proportion of iron deficiency, anemia, obesity, and diabetes.

These results highlight the importance of better understanding the determinants for healthy food environments in the communities and of implementing preventive measures at the individual, community, regional, and national level in order to promote traditional activities and consumption of traditional foods, minimize exposure to environmental contaminants and curb the rapid increase of chronic illnesses in First Nations youth.

3. Introduction

Every day, humans are exposed to a wide range of contaminants in their environment, i.e. in the air, drinking water, food, or even through products that come into direct contact with the skin. It is generally accepted that Indigenous communities living in remote regions are at greater risk of exposure to contaminants due to their close relationship with their territory. In fact, traditional foods are of exceptional quality and represent a dietary intake that is essential for health, in addition to being significant for First Nations and Inuit culture and well-being (INSPQ, 2015). However, some traditional foods may contain high concentrations of contaminants, which accumulate in wildlife and in the people who consume them (Donaldson et al., 2010; INSPQ, 2015). Furthermore, several First Nations and Inuit partners are concerned about industrial development near their communities, which may impact the environment, wildlife, water, air quality and their health.

Environmental contaminants may be natural or anthropogenic in origin. Some contaminants may travel over long distances following the major air and ocean currents, and may reach remote areas that are far from the main anthropogenic sources (NCP, 2013; NCP, forthcoming). A large number of contaminants may bioaccumulate in living organisms and biomagnify at the top of aquatic food chains. These phenomena increase the levels of these contaminants, mainly in predatory species, such as marine mammals and piscivorous fish, including lake trout, walleye, and pike. These fish are important traditional foods for several Indigenous nations, who in turn may be exposed to higher levels of environmental contaminants (Donaldson et al., 2010). Exposure to these contaminants as a fetus, in childhood, or as an adult is associated with several effects on the neurological, endocrine, immune, and cardiometabolic systems (AMAP, 2015). Various national and international measures, such as the Stockholm Convention, have stopped the production and use of several POPs (including organochlorine (OC) pesticides and polychlorinated biphenyls (PCBs)). Scientific literature reports that these chemical products are now decreasing in ecosystems and in human populations both in Canada and elsewhere in the world (AMAP, 2015; APN, 2013; ECMS, 2010; NCP 2013; NCP, forthcoming; Nieboer et al., 2013). The Minamata Convention, which came into force on August 16, 2017, should also help reduce emissions and mercury levels in ecosystems in order to protect the environment and human health against the negative effects of this contaminant (PNUE, 2013).

Exposure to certain contaminants, including mercury and lead, still occurs. Although the levels of exposure to these contaminants have greatly decreased over the years, exposure and vulnerability may be higher in populations that practice subsistence hunting and fishing (INSPQ, 2015; NCP, forthcoming; Nieboer et al., 2013). Poor water quality or poor housing conditions may also increase exposure to contaminants (Government of Canada, 2011). Several other chemical molecules produced by humans are also found in varying concentrations in the environment and may affect wildlife and human populations. Aside from metals and polycyclic aromatic hydrocarbons (PAH) that may occur naturally in the environment, most contaminants come from human activities, such as mining and oil extraction, landfill sites, agriculture, and the production of consumer goods. These contaminants include flame retardants (polybromodiphenylethers (PBDEs)), perfluorinated compounds (PFCs), pesticides (pyrethroids, organophosphates (OPs), and chlorophenols), phthalates, and environmental phenols (bisphenol A) (Government of Canada, 2017).

Children are particularly exposed and vulnerable to environmental contaminants due to their size, physiology, and behaviours, and also because their organs are still developing (Government of Canada, 2011). Pregnant women are also an at-risk group with regard to contaminants because the fetus could be exposed via the placenta. Breastmilk is also a source of exposure to certain contaminants for babies and infants (Government of Canada, 2011).

First Nations communities are facing several environmental and socio-cultural changes. Their traditional diet is often being replaced by an increasing proportion of store-bought foods, particularly ultra-processed foods (Chan et al., 2011; 2012; 2014; 2016). This dietary transition is even more significant in the youngest generations, despite the fact that to date, there have been few studies documenting this issue among First Nations (INSPQ, 2015). Ultra-processed foods are generally higher in sugar and added salt, saturated fatty acids and trans fats. Their packaging may contain certain industrial contaminants such as bisphenol A, phthalates and perfluorinated compounds that enter food and can impact the human endocrine system, among other things (NIEHS, 2017; Zota et al., 2016). This highly palatable food also contains less dietary fibre, protein, vitamins and essential elements (Moubarac and Batal, 2016). Consuming ultra-processed foods has been associated with an increased incidence of insulin resistance and metabolic syndrome in Cree adults from *Eeyou Istchee* (Johnson-Down et al., 2015; Lavigne-Robichaud et al., 2017). A deficiency in certain elements resulting from a dietary transition could also make the body more vulnerable to the harmful effects of contaminants (Chapman and Chan, 2000). For example, studies suggest that low selenium intake could make the body more susceptible to the harmful effects of mercury and a low iron intake could increase the absorption and toxicity of lead or manganese (Flanagan et al., 1980; Lemire et al., 2010; 2011; Pirkle et al., 2016; Ye et al., 2017). In brief, the dietary transition currently underway in First Nations children and youth could contribute to multiple diseases such as malnutrition (in terms of quantity and quality), an increase in anemia, obesity, diabetes and other chronic diseases, as well as greater exposure and sensitivity to various environmental contaminants (Government of Canada, 2011; INSPQ, 2015).

4. JES!-YEH! Project Objectives

This pilot project is in response to two extensive Canadian health surveys: the Canadian Health Measures Survey (CHMS) and the First Nations Biomonitoring Initiative (FNBI) (AFN, 2013; Health Canada 2010; 2013; 2015). The CHMS is a survey conducted by Statistics Canada in collaboration with Health Canada and the Public Health Agency of Canada. Started in 2007, this survey includes eight survey cycles and evaluates the Canadian population (3-79 years of age) by gathering general health information. Exposure to environmental contaminants is analysed by collecting biological samples. Other general information on physical health and nutrition is collected from interviews, which are also used to carry out various anthropometric measurements. However, the CHMS does not include members of First Nations, Metis and Inuit living on reserves and other Indigenous settlements. As for the IBPN, it is the result of a partnership between the Assembly of First Nations (AFN) and Health Canada's First Nations and Inuit Health Branch (FNIHB). Data collection took place in 2011. The IBPN was designed to generate new information regarding exposure to environmental contaminants among adults (20 years of age and over) from First Nations located south of the 60th parallel across Canada. Children and youth aged 3 to 19 years old were excluded due to budgetary restrictions (APN, 2013). Compared to the CHMS, the results of the IBPN identified that levels of exposure to several POPs, mercury and lead were generally low, while the other contaminants were considerably higher, particularly blood concentrations of cadmium and manganese, and urine levels of cotinine (in smokers), bisphenol A (in women) and monobenzyl phthalate (AFN, 2013).

To date, no national biomonitoring studies have been conducted on First Nations children and youth, one of Canada's most vulnerable sub-populations with high risks of exposure to environmental contaminants. The JES!-YEH! pilot project had five specific objectives:

1. Measure exposure to more than 80 environmental contaminants (metals, POPs and other contaminants);
2. Document nutritional status (essential elements, vitamins and fatty acid profile) and certain health indicators including anemia, obesity, diabetes and thyroid status;
3. Document certain health determinants, such as housing conditions, food security, consumption of traditional and store-bought foods, water consumption and the practice of traditional activities;
4. Study the relationship between exposure to environmental contaminants, health indicators, and health determinants.
5. Assess feasibility and best research practices in anticipation of the next National First Nations Child Biomonitoring Health Survey, while taking the following points into consideration:
    - Appropriate plan for communication between researchers, participants, parents, and communities;
    - Mobilization plan required to encourage youth participation and to help develop youth capacity in terms of environment and health-related issues in their communities;
    - Participation of children and young adults in a health survey (respond to questionnaires and provide biological samples);
    - Logistical and operational aspects in remote communities versus those located closer to cities (for example, transportation of material, sending samples, etc.);
    - Human resources, financial costs, as well as the time required to deal with all aspects of the survey.

This report presents the descriptive results for the first 3 objectives of the project. The recruiter manual and the data collection manual are available upon request. Statistical analyses to meet Objective #4 will be carried out at a later date. The report documenting feasibility and best research practices in anticipation of the next National First Nations Child Biomonitoring Health Survey (Objective #5) has been sent to Health Canada, the communities, and the FNQLHSSC.

5. YEH! – JES! Project Methodology

5.1. Consultations and Selection of Communities

In the fall of 2014, the research team and representatives of the FNQLHSSC and the Institut national de santé publique du Québec (INSPQ) decided to launch the pilot project among two separate First Nations in Quebec: the Anishinabe Nation based in the Abitibi-Témiscamingue region and the Innu Nation located in Lac St-Jean, Minganie and on the Lower-North-Shore. To ensure a minimum number of participants in each community, only communities with more than 500 inhabitants were invited to participate (total of six Anishinabeg communities and seven Innu communities). The research team visited the interested communities in December 2014 and February 2015. The objectives of this initial consultation were: (i) meet with health centres and Band Councils, answer questions and assess communities' interest in participating in the study; (ii) discuss environmental and nutritional issues and health research priorities; (iii) assess the feasibility of the study in each community; and (iv) meet with other partners who could play an important role in the project (schools, child care centres, the environmental and natural resources sector, etc.).

In response to the interest expressed by the communities, the research team and representatives of the FNQLHSSC, INSPQ and Health Canada met in March 2015 to choose four communities, i.e. two Anishinabeg communities and two Innu communities. The choice of communities was based on the following factors: the various traditional foods consumed; language used (French versus English); remoteness or proximity to urban centres; methods of access (road, boat, plane); the built and physical environment; feasibility and the needs expressed in terms of strengthening environmental health skills. The project protocol (objectives and research methodology, list of contaminants, nutrients, health indicators and other health determinants) was adjusted to better respond to the needs and concerns expressed by the chosen communities. The concerns reported included possible sources of contaminants near the communities, anemia, obesity, diabetes, food security, housing conditions, the importance of traditional versus store-bought food, and the practice of traditional activities by children and youth.

Each environmental contaminant, essential element, vitamin, and health indicator in the study was chosen based on the following considerations:

- The results and contaminants of interest in the CHMS and the FNBI, and in studies carried out with *Eeyou Istchee* Cree and Inuit in Nunavik (APN, 2013; Dewailly et al., 2007a; 2007b; ECMS, 2010; 2013; 2015; Nieboer et al., 2013);
- The known or presumed effects of the contaminant on health;
- Evidence that human populations are exposed to it or that there are known potential local sources;
- The level of concern of the populations and the health priorities expressed by health authorities in the communities;
- Public health priorities;
- The ability of laboratories to detect and measure the chemical or its degradation products in humans;
- Valid comparisons with chemicals studied as part of the CHMS and the FNBI;
- The cost of the analyses;
- The possibility of biological interactions between the environmental contaminants and nutritional bioindicators and the health condition.

A second round of consultations was conducted in the communities a few weeks before the start of the project. Youth mobilization activities (e.g. logo competition) and information sessions were held, and information factsheets about the project were distributed (Appendix A). Consent forms were also revised and modified based on partner recommendations (Appendix B). The questionnaires were tested and then adapted to the context of each nation (Appendices C and D) and posters with photos and names of locally-consumed animal and vegetable species were developed (in English, French, Latin, and in Anishinabe or Innu). Local staff (recruiters, childcare workers and cooks) were recruited and the site where the study would be conducted was chosen. On one occasion, it was also possible to hire a nurse from the community. A Facebook page for the JES!-YEH! project was created. All project documents were written in French and English.

5.2. Ethics

The project was approved by the Research Ethics Boards of the CHU de Québec – Université Laval (C14-08-2105) and Health Canada (2014-0043). Minor modifications to the documents during the second round of consultations with the communities were also submitted to the ethics boards. Research agreements, developed using the suggested template in the First Nations of Quebec and Labrador Research Protocol (AFNQL, 2014), were signed with partners from all four communities.

5.3. Recruitment, Consent and Participation in the Project

To ensure that the participating communities are properly represented and that the research objectives are met, a total of 200 participants 3 to 19 years old were targeted for the project overall. For each community, participants had to be chosen randomly based on the list provided by the Band Council or the health centre. Demographic data from Indigenous and Northern Affairs Canada dating from 2014 were used to obtain the number of participants per community, based on gender and the 3-5, 6-11, and 12-19 age groups. To be eligible for the project, participants had to be between 3 and 19 years old and had to live in the study community. Only pregnant adolescents or young women were excluded. To facilitate recruitment, and for logistical reasons, the participants did not have to fast.

So as not to interfere with the hunting or fishing season or other cultural events in the communities, the dates for collecting data were chosen with the partners. The project was carried out in May and June 2015 in the Anishinabeg communities and in September and October 2015 in the Innu communities involved in the project. Based on the availability of space in the communities, data collection was done in the family house, the health centre or the daycare centre.

Lists of potential participants were generated randomly (1 to 3 lists as necessary). These potential participants were contacted by the local recruiter by telephone, in person or via Facebook Messenger. The recruiter explained the project to them, invited them to participate and scheduled an appointment for data collection. If the child or youth selected was under 18 years of age (age of majority in Quebec), the recruiter contacted the biological parent or legal guardian with whom they spent most of their time. If the youth was 18 or 19 years old, the recruiter contacted them directly. The recruiter manual is available upon request.

At the beginning of the data collection and before participants signed the consent form, the goal and objectives of the study was explained to them, as were the implications of their participation in the project. The research team answered any questions that they had. If the participant was between 3 and 17 years old, they needed to be accompanied by their parent or guardian, who signed the consent form (Appendix B). The research team also explained the project in simple terms and ensured that they understood what the project involved and that they gave verbal consent to participate. Participants 14-17 years of age were also required to sign the consent form. If the participant was 18 or 19 years old, they completed these steps themselves.

A total of 279 people were contacted using a random sampling procedure. Of this number, 177 individuals agreed to participate (63% participation). It is important to note that participation in the project was more difficult in two communities (one in each nation), for various reasons (lack of time, mistrust of institutions, other recent research in the community, etc.). To solve this problem, 21 volunteers were recruited (convenience sampling), for a total number of 198 participants in the JES!-YEH! study. These additional volunteers represented 11% of the total number of participants. To ensure that the communities were properly represented, the recruitment of volunteer participants had to follow the gender and age group distribution of the target population. In the end, 95% of participants from the two Anishinabeg communities were chosen randomly (5% were volunteer participants), while

82% of participants from the two Innu communities were chosen randomly (18% were volunteer participants). For more details on the percentages of the population per community, see Appendix E.

Important Note for the Reader

Since this pilot project needed to include volunteer participants in two of the four project communities, <u>the data for the population aged 3 – 19 years in these communities is not necessarily representative and should be read with caution</u>. Furthermore, since the four communities that participated in the project were not chosen randomly, but were invited to participate voluntarily, these communities do not necessarily represent the nations to which they belong. Nevertheless, some significant trends emerge and are worthy of mention.

5.4. Data Collection

For the data collection, parents or guardians accompanied minor participants throughout the entire meeting and answered the questionnaires (in French or in English). Participants who were 18 or 19 years old completed all of these steps on their own.

Firstly, qualified nurses took anthropometric measurements (height, waist, weight, etc.) and collected biological samples (urine, blood, and strands of hair taken close to the scalp in the occipital region). The blood and urine collection schedule is given in Appendix F. Hemoglobin was measured on site using a HemoCue Hb 201+ analyzer. The collection manual is available upon request. The questionnaires to collect data on participants' health perceptions and medical history were also administered by the nurses.

Secondly, the research assistants administered the questionnaires on sociodemographic data, housing conditions, household food security, practicing traditional activities, consumption of traditional and store-bought foods and water consumption. Participants 14 to 17 years of age were invited to answer questions about their eating habits and their practice of traditional activities, in the presence of their parent or guardian.

To facilitate participation and accommodate families during the data collection period, a local childcare worker was hired and meals were provided by the research team during the meeting. The meeting lasted approximately 1 ½ hours. As compensation, a $50 gift certificate to the local grocery store was given to the participant (or to his parent or guardian). Once the interview was complete, a copy of the signed consent form (Appendix G) and certain results (anthropometric measurements and hemoglobin) were given directly to the participant (or to their parent or guardian). If the hemoglobin result was abnormal (based on the values used by the on-site health centre) and if the participant (or their parent or guardian) had given prior consent, the participant was referred to the local nutritionist.

The biological samples (blood and urine) were kept frozen at -20°C for later transportation to Quebec, and then sent to various laboratories for analysis, i.e. the Centre de toxicologie (CTQ), the Institut universitaire de cardiologie et de pneumologie de Québec (IUCPQ), the Laboratoire Multidisciplinaire du Centre hospitalier de l'Université Laval (CHUL) and the Centre de recherche sur les maladies lipidiques du CHUL.

5.5. Laboratory Analyses

Table 1 presents the list of analyses (metals, essential elements, and other contaminants) carried out on blood, plasma, serum, or urine during the JES!-YEH! project. Table 1 specifies which analyses were also carried out during the FNBI and the CHMS. Serum lipid concentrations and urine creatinine were measured to adjust the concentrations of environmental contaminants, when necessary. Although old POPs, PFCs, PBDEs and lipids were measured in plasma in the CHMS and FNBI, these data are perfectly comparable with the JES!-YEH! study, which carried out these analyses using serum (CTQ, pers. comm.). Table 2 presents the list of analyses (other nutrients and health indicators) that were added to the JES!-YEH! project following consultations with partners in the participating communities. The chemicals analysed for all participants (n=198) are given under Stage 1. Given the high cost of laboratory analyses, some substances were measured only in a subsample of 50 participants (Stage 2). These 50 participants were randomly selected afterwards based on the size of the communities and the age and gender distribution of children and youth 3 to 19 years old in these communities. This met two objectives: (1) reduce laboratory fees and (2) determine whether these chemicals should be included in the next pancanadian phase of the project.

Environmental contaminants, essential elements, cotinine, serum lipids, and urine creatinine were analysed at CTQ. Vitamins, iron bioindicators, and cardiometabolic health indicators were analysed at IUCPQ, while thyroid hormones and other indicators associated with thyroid function were analysed at *the Laboratoire Multidisciplinaire* of the CHUL. The fatty acid profile was measured at the *Centre de recherche sur les maladies lipidiques* of the CHUL. The analysis methods and their limits of detection (LD) in 2015 are presented in Appendix H.

Table 1: List of Metals, Essential Elements and Other Contaminants Measured in the JES!-YEH! Project

				JES!-YEH! Project					
		FNBI	CHMS	Biological samples analysed				Stage 1	Stage 2
Chemical name	Acronym			Whole blood	Serum /plasma	Urine	Hair (1^{st} cm)	n = 198 participants	n = 50 participants
Metals and essential elements		Natural in origin or used in industrial activities							
Antimony	Sb	x							
Arsenic (total)	As	x	x			x		x	
Arsenite			x			x			*
Arsenate			x			x			*
Monomethylarsonic acid	MMA		x			x			*
Dimethylarsinic acid	DMA		x			x			*
Arsenocholine, Arsenobetaine			x			x			*
Cadmium	Cd	x	x	x		x		x	
Cobalt	Co		x	x		x		x	
Copper	Cu	x	x						
Chromium	Cr					x		x	
Boron	B					x			x
Iodine	I		x			x		x	
Iron (see Table 2)	Fe								
Lead	Pb	x	x	x				x	
Manganese	Mn	x	x	x			x	x	
Mercury (total)	Hg	x	x	x				x	
Methylmercury	MeHg	x	x	x					*
Molybdenum	Mo	x							
Nickel	Ni	x	x			x		x	
Selenium (total)	Se	x	x	x	x plasma			x	
Selenoneine				x					*
Uranium	U	x	x			x		x	
Vanadium	V	x							
Zinc	Zn	x	x urine		x plasma			x	
Old POPs									
Organochlorine pesticides	**OCs**	Formerly used as pesticides, now banned under the Stockholm Convention.							
Aldrine		x	N/A		x serum			x	
α-chlordane a-chlordane	α-chlordane	x	N/A		x serum			x	
γ-chlordane g-chlordane	γ-chlordane	x	N/A		x serum			x	
cis-Nonachlor		x	N/A		x serum			x	
trans-Nonachlor		x	N/A		x serum			x	
Oxychlordane		x	N/A		x serum			x	
β-Hexachlorocyclohexane	β-HCH	x	N/A		x serum			x	
γ -Hexachlorocyclohexane	γ-HCH	x	N/A		x serum			x	
p,p′-Dichlorodiphenyltrichloroethane	p,p′-DDT	x	N/A		x serum			x	
p,p′-Dichlorodiphenyldichloroethylene	p,p′-DDE	x	N/A		x serum			x	
Hexachlorobenzene	HCB	x	N/A		x serum			x	
Mirex		x	N/A		x serum			x	
Toxaphene parlar 26		x	N/A		x serum			x	
Toxaphene parlar 50		x	N/A		x serum			x	
Polychlorinated biphenyls	**PCBs**	Formerly used for various industrial uses, now banned under the Stockholm Convention.							
Aroclor 1260	Aroclor 1260	x	P		x serum			x	
2,4,4′-Trichlorobiphenyl	PCB 28	x	P						
2,2′,5,5′-Tetrachlorobiphenyl	PCB 52	x	P						
2,3′,4,4′-Tetrachlorobiphenyl	PCB 66	x	P						
2,4,4′,5-Tetrachlorobiphenyl	PCB 74	x	P						
2,2′,4,4′,5-Pentachlorobiphenyl	PCB 99	x	P						
2,2′,4,5,5′-Pentachlorobiphenyl	PCB 101	x	P						
2,3,3′,4,4′-Pentachlorobiphenyl	PCB 105	x	P						
2,3′,4,4′,5-Pentachlorobiphenyl	PCB 118	x	P		x serum			x	
2,2′,3,3′,4,4′-Hexachlorobiphenyl	PCB 128	x	P						
2,2′,3,4,4′,5′-Hexachlorobiphenyl	PCB 138	x	P		x serum			x	
2,2′,3,4′,5,5′-Hexachlorobiphenyl	PCB 146	x	P						
2,2′,4,4′,5,5′-Hexachlorobiphenyl	PCB 153	x	P		x serum			x	

Table 1 (continued): List of Metals, Essential Elements and Other Contaminants Measured in the JES!-YEH! Project

				JES!-YEH! Project					
		FNBI	**CHMS**	**Biological samples analysed**				**Stage 1**	**Stage 2**
Chemical name	Acronym			Whole blood	Serum /plasma	Urine	Hair (1st cm)	n = 198 participants	n = 50 participants
2,3,3’,4,4’,5-Hexachlorobiphenyl	PCB 156	x							
2,3,3’,4’,5,6-Hexachlorobiphenyl	PCB 163	x							
2,3’,4,4’,5,5’-Hexachlorobiphenyl	PCB 167	x	P						
2,2’,3,3’,4,4’,5-Heptachlorobiphenyl	PCB 170	x	P						
2,2’,3,3’,5,5’,6-Heptachlorobiphenyl	PCB 178	x	P						
2,2’,3,4,4’,5,5’-Heptachlorobiphenyl	PCB 180	x	P		x serum			x	
2,2’,3,4,4’,5’,6-Heptachlorobiphenyl	PCB 183	x	P						
2,2’,3,4’,5,5’,6-Heptachlorobiphenyl	PCB 187	x	P						
2,2’,3,3’,4,4’,5,5’-Octachlorobiphenyl	PCB 194	x	P						
2,2’,3,3’,4,5’,6,6’-Octachlorobiphenyl	PCB 201	x	P						
2,2’,3,4,4’,5,5’,6-Octachlorobiphenyl	PCB 203	x	P						
2,2’,3,3’,4,4’,5,5’,6-Nonachlorobiphenyl	PCB 206	x							
Other contaminants									
Chlorophenols		Used in air fresheners and as pesticides against mites and ticks and to fight mould, among other things. Can also form during chlorination of waste water and drinking water, as well as during the incineration of municipal waste.							
2,4-dichlorophenol	2,4-DCP	x	x			x		x	
2,5-dichlorophenol	2,5-DCP		x			x		x	
2,4,5-Trichlorophenol	2,4,5-TCP								
2,4,6-Trichlorophenol	2,4,6-TCP								
Pentachlorophenol	PCP								
Perfluorinated compounds	**PFCs**	Used as bond breaking, stain-resistant or impervious coatings in several products, such as teflon, cleaning products, in Gore-Tex® and several other consumer products. PFOS is included in the Stockholm Convention and PFOA and PFHxS are under review for inclusion as well.							
Perfluorobutanoic acid	PFBA	x	S						
Perfluorohexanoic acid	PFHxA	x	S						
Perfluorooctanoic acid	PFOA	x	S		x serum			x	
Perfluorononanoic acid	PFNA	x	S		x serum			x	
Perfluorodecanoic acid	PFDA	x	S		x serum				
Perfluoroundecanoic acid	PFUDA	x	S		x serum				
Perfluorobutane sulfonate	PFBS	x	S						
Perfluorohexane sulfonate	PFHxS	x	S		x serum			x	
Perfluorooctane sulfonate	PFOS	x	S		x serum			x	
Cotinine (metabolite)		Exposure through cigarette use or second-hand smoke							
Cotinine		x	x			x		x	
Phenoxy herbicide		Used as a selective herbicide. Widely used in grain-growing fields, pastures, industrial land, household lawns, sides of roads and against aquatic weeds, among other things.							
2,4-dichlorophenoxyacetic acid	2,4-D	x	x			x		x	
Polycyclic aromatic hydrocarbons (metabolites)	**PAHs**	Emitted through incomplete combustion of organic matter, such as forest fires, fossil fuel combustion, hydrocarbon spills, waste incineration and tobacco smoke.							
Benzo(a)pyrene metabolite									
3-Hydroxybenzopyrene			S			x			x
Metabolites of chrysene									
2-Hydroxychrysene			S			x			x
3-Hydroxychrysene			S			x			x
4-Hydroxychrysene			S			x			x
6-Hydroxychrysene			S			x			x
Fluoranthene metabolite									
3-Hydroxyfluoranthene			S			x			x
Fluorene metabolites									
2-Hydroxyfluorene			S			x			x
3-Hydroxyfluorene			S			x			x
9-Hydroxyfluorene			S			x			x
Naphthalene metabolites									
1-Hydroxynapththalene			S			x			x
2- Hydroxynapththalene			S			x			x

Table 1 (continued): List of Metals, Essential Elements and Other Contaminants Measured in the JES!-YEH! Project

				JES!-YEH! Project					
		FNBI	CHMS	Biological samples analysed				Stage 1	Stage 2
Chemical name	Acronym			Whole blood	Serum /plasma	Urine	Hair (1st cm)	n = 198 participants	n = 50 participants
Phenanthrene metabolites									
1-Hydroxyphenanthrene			S			x			x
2-Hydroxyphenanthrene			S			x			x
3-Hydroxyphenanthrene			S			x			x
4-Hydroxyphenanthrene			S			x			x
9-Hydroxyphenanthrene			S			x			x
Pyrene metabolite									
1-Hydroxypyrene			S			x			x
Environmental phenols		BPA: used in the manufacture of polycarbonate plastics and some epoxy resins and found in food and beverage containers, particularly the protective layer inside cans, and plasticized paper such as cash register receipts and other consumer products. Triclosan: used as a preservative and antibacterial agent in antiperspirants, hand sanitizers or some toothpastes, and in a wide range of other household products.							
Bisphenol A	BPA	x	x			x		x	
Triclocarban			x						
Triclosan						x		x	
Phthalates (metabolites)		Used as plasticizers to make plastics more flexible and resilient, particularly in polyvinyl chloride and soft plastics. They are also found in several consumer goods, such as plastic films and food packaging, toys, cosmetics, some biomedical items, vinyl floor covering, etc.							
Monobenzyl phthalate	MBzP	x	S			x			x
Mono-n-butyl phthalate	MnBP	x	S			x			x
Monocyclohexyl phthalate	MCHP	x	S			x			x
Monoethyl phthalate	MEP	x	S			x			x
Mono-isobutyl phthalate	MiBP	x	S			x			x
Mono-isononyl phthalate	MiNP	x	S			x			x
Mono-methyl phthalate	MMP	x	S			x			x
Mono-n-octyl phthalate	MOP	x	S			x			x
Mono-3-carboxypropyl phthalate	MCPP	x	S			x			x
Mono-2-ethylhexyl phthalate	MEHP	x	S			x			x
Mono-(2-ethyl-5-oxohexyl) phthalate	MEOHP	x	S			x			x
Mono-(2-ethyl-5-hydroxyhexyl) phthalate	MEHHP	x	S			x			x
Organophosphate pesticides (metabolites)	**OPs**	Used as pesticides in agriculture (for fruits and vegetables), for lawn maintenance, in forests to fight parasites, in buildings to fight insects and in some veterinary products to kill parasites in cats and dogs.							
Dimethylphosphate	DMP	x	S			x		x	
Dimethylthiophosphate	DMTP	x	S			x		x	
Dimethyldithiophosphate	DMDTP	x	S			x		x	
Diethylphosphate	DEP	x	S			x		x	
Diethylthiophosphate	DETP	x	S			x		x	
Diethyldithiophosphate	DEDTP	x	S			x		x	
Polybromodiphenylethers	**PBDEs**	Used as flame retardants in plastic, clothing, furniture and other consumer products.							
Polybromobiphenyl - congener 153	PBB 153	x							
Polybromodiphenylether- congener 15	PBDE 15	x							
Polybromodiphenylether - congener 17	PBDE17	x							
Polybromodiphenylether - congener 25	PBDE 25	x							
Polybromodiphenylether - congener 28	PBDE 28	x							
Polybromodiphenylether - congener 33	PBDE 33	x							
Polybromodiphenylether - congener 47	PBDE 47	x	P		x serum			x	
Polybromodiphenylether - congener 99	PBDE 99	x	P		x serum			x	
Polybromodiphenylether - congener 100	PBDE 100	x	P		x serum			x	
Polybromodiphenylether - congener 153	PBDE 153	x	P		x serum			x	
Polybromodiphenylether - congener 209	PBDE 209		P		x serum				x

Table 1 (continued): List of Metals, Essential Elements and Other Contaminants Measured in the JES!-YEH! Project

				JES!-YEH! Project					
		FNBI	CHMS	Biological samples analysed				Stage 1	Stage 2
Chemical name	Acronym			Whole blood	Serum /plasma	Urine	Hair (1st cm)	n = 198 participants	n = 50 participants
Pyrethroids (metabolites)		Used as insecticides in agriculture and in buildings and to fight mosquitoes or other parasites, such as lice.							
4-fluoro-3-phenoxybenzoic acid	4-F-3-PBA	x	S			x			x
cis-3-(2,2-Dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid	cis-DBCA	x	S			x			x
cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid	cis-DCCA	x	S			x			x
trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid	trans-DCCA	x	S			x			x
3-phenoxybenzoic acid	3-PBA	x	S			x			x
Lipids									
Total lipids		x	x		x serum			x	
Creatinine									
Creatinine		x	x			x		x	
		FNBI	CHMS					JES!-YEH! Project	
TOTAL		99	24 + 90P/S					52	36

Legend: x = done for all participants; P = done with *pooled* samples; S = done on a subsample

Colour code for metals and essential elements: Red = known to be toxic; Blue = essential, but may be toxic depending on the concentration and chemical forms involved; Green = essential and beneficial and known to be relatively non-toxic

Notes:

* These specification tests were initially intended only if the levels of total As, Hg and Se were high, but since they were low, these tests were not necessary.

Table 2: List of Other Nutrients and Health Indicators Measured in the JES!-YEH! Project

				JES!-YEH! Project					
		FNBI	CHMS	Biological samples analysed				Stage 1	Stage 2
Chemical name	Acronym			Whole blood	Serum /plasma	Urine	Hair (1st cm)	n = 198 participants	n = 50 participants
Vitamins									
Vitamin A (retinol)	Vit A				Serum			x	
Folate (B9)	Folate		Red blood cells	Red blood cells *				x	
Vitamin B12	Vit B12		Serum		Serum			x	
Vitamin D (25 Hydroxyvitamin D)	Vit D		Serum		Serum			x	
Fatty acid profile									
Saturated									
Myristic acid (14:0)			Red blood cells S		Red blood cells				x
Palmitic acid (16:0)			Red blood cells S		Red blood cells				x
Stearic acid (18:0)			Red blood cells S		Red blood cells				x
Arachidic acid (20:0)			Red blood cells S		Red blood cells				x
Behenic acid (24:0)			Red blood cells S		Red blood cells				x
Lignoceric acid (24:0)			Red blood cells S		Red blood cells				x
Monounsaturated									
Myristoleic acid (14:1n-5)			Red blood cells S		Red blood cells				x
Palmitoleic acid (16:1n-7)			Red blood cells S		Red blood cells				x
Cis-vaccenic acid (18:1n-7)			Red blood cells S		Red blood cells				x
Oleic acid (18:1n-9)			Red blood cells S		Red blood cells				x
Eicosenoic acid (20:1n-9)			Red blood cells S		Red blood cells				x
Docosenoic acid (22:1n-9)			Red blood cells S		Red blood cells				x
Nervonic acid (24:1n-9)			Red blood cells S		Red blood cells				x
Polyunsaturated									
Linoleic acid (18:2n-6)			Red blood cells S		Red blood cells				x
alpha-linolenic acid (18:3n-3)	ALA		Red blood cells S		Red blood cells				x
gamma-linolenic acid (18:3n-6)			Red blood cells S		Red blood cells				x
Eicosadienoic acid (20:2n-6)			Red blood cells S		Red blood cells				x

Table 2 (continued): List of Other Nutrients and Health Indicators Measured in the JES!-YEH! Project

				JES!-YEH! Project					
		FNBI	CHMS	Biological samples analysed				Stage 1	Stage 2
Chemical name	Acronym			Whole blood	Serum /plasma	Urine	Hair (1^{st} cm)	n = 198 participants	n = 50 participants
homo-gamma- linolenic acid (20:3n-6)			Red blood cells S		Red blood cells				x
Arachidonic acid (20:5n-3)			Red blood cells S		Red blood cells				x
Eicosapentanoic acid (20:5n-3)	EPA		Red blood cells S		Red blood cells				x
Docosatetraenoic acid (22:4n-6)			Red blood cells S		Red blood cells				x
Docosapentaenoic acid (22:5n-3)	DPA		Red blood cells S		Red blood cells				x
Docosapentaenoic acid (22:5n-6)			Red blood cells S		Red blood cells				x
Docosahexaenoic acid (22:6n-3)	DHA		Red blood cells S		Red blood cells				x
Trans fat acids			Red blood cells S		Red blood cells				x
Iron status bioindicators **									
Ferritin	FS		Serum		Serum			x	
Transferrin					Serum			x	
Iron (Body Iron)	Serum iron				Serum			x	
Unsaturated Iron Binding Capacity	UIBC				Serum			x	
Cardiometabolic bioindicators									
hs-CRP			Plasma		Plasma			x	
LDL			Serum*** S		Serum***			x	
HDL			Serum		Serum			x	
Total cholesterol			Serum		Serum			x	
Triglycerides			Serum S		Serum			x	
Glycated hemoglobin (HbA1c test)			Whole blood		Whole blood			x	
Random glucose			Serum		Serum			x	
Insulin			Serum S		Serum			x	
Thyroid status bioindicators									
Thyroglobulin					Serum			x	
Anti-thyroglobulin			Serum		Serum			x	
Anti-thyroperoxydase	Anti-TPO		Serum		Serum			x	
TSH	TSH		Serum		Serum			x	
Free thyroxine	T4		Serum		Serum			x	
		FNBI	CHMS					JES!-YEH! Project	
TOTAL			13 + 28 S					21	25

Legend: x = done for all participants; S = done on a sub-sample

Notes:

* Folates were first analyzed by mistake in whole blood, then adjusted taking into account the hemoglobin results using the formula: red blood cell folates = whole blood folates / (0.0127 + 0.002917 x Hb).

** *Total Iron Binding Capacity* – TIBC and transferrin saturation (TS) were calculated using the formulas:
TIBC = UIBC + serum iron; TS = serum iron / TIBC.

*** LDL calculated using the Friedewald formula.

5.6. Considerations for Interpreting Biomonitoring Data

Biomonitoring is used to quantify exposure to environmental contaminants at a specific moment, taking into account all routes of exposure (ingestion, inhalation, skin contact) and all possible sources of exposure (air, water, soil, food and consumer goods) (Government of Canada, 2015). The data collected provide benchmarks with regard to exposure to chemicals in the study population, which may be compared to other populations. Moreover, biomonitoring helps identify the chemicals involved that could help authorities better manage public health risks (Government of Canada, 2015).

Certain points should be taken into consideration when interpreting biomonitoring data. Firstly, the analysis methods used to measure chemicals in biological fluids are rapidly improving and the detection thresholds continue to decrease. Therefore, the presence of a chemical in the body does not necessarily mean that it will have an effect on health. Other factors, including quantity, duration, frequency, and time of exposure, as well as the toxicity of the chemical, should be taken into consideration when determining potential health effects. For chemicals such as lead or mercury, several previous studies have helped us understand the health risks associated with various blood concentrations, and consequently, reference values have been published by Health Canada and the INSPQ (Legrand et al., 2010; INSPQ, 2004; 2016). These reference values are often adjusted for sub-populations that more are vulnerable to these contaminants. However, for a large number of environmental contaminants that are often more recent as those found in the "Other Contaminants" section on page 21, more research is necessary to better understand their effects on health and to attempt to establish reference values for these contaminants.

5.7. Action Taken for Participants Who May Require Rapid Monitoring

In Quebec, the Public Health Act (Quebec, 2017) enables monitoring of public health and the population's state of health. Among other things, this Act makes it mandatory for testing laboratories to report to public health directors any results beyond the reference values for certain chemicals appearing on the List of Notifiable Diseases, Infections and Intoxications (NDs) (Ministère de la santé et des services sociaux du Québec, 2017). Among the contaminants measured in the JES!-YEH! project in 2015, a ND needed to be reported for each elevated result for arsenic, cadmium, lead, mercury, manganese, nickel, uranium, and organophosphate insecticide metabolites (INSPQ, 2004). Conversely, in January 2017, urine chromium and nickel, blood and urine manganese, blood cobalt, and urine organophosphate metabolites were withdrawn from this NDs list, and the reference value for lead in young children (<12 years old) was decreased (INSPQ, 2017).

When the CTQ identified an abnormal result for one of the contaminants on the List of NDs:

- The project's principal investigator was notified. She quickly contacted the Director of Health, the Chief of Nursing and the nutritionist in the affected community to give them the participant's name, contact information and the levels of the contaminant that exceeded the ND threshold. The research team also provided a document detailing the recommended action for each contaminant.
- At the same time, the regional public health branches (socio-health regions of Abitibi-Témiscamingue and the North-Shore) where informed by the CTQ. The principal investigator also kept them abreast of the actions taken with the health professionals in the affected communities.
- The community health professionals were eventually required to meet with the participant (or their parent or guardian, if the child was a minor), to start clinical follow-ups in order to reduce exposure to the relevant contaminant, if possible. The research team, the FNQLHSSC and the regional public health bodies were also available to support the health professionals, if necessary.

The principal investigator was also responsible for quickly communicating abnormal diabetes results to the director of the health centre, the head nurse and the nutritionist in the communities to ensure necessary follow-up.

5.8. Return of Preliminary Results to the Parents and the Communities

In April 2016, the individual results were delivered in person to the participants and their parents or guardians, if the participant was a minor. The template for the letter used to present the results can be found in Appendix J. This template was revised by all partners to find the best method of presenting the results and to establish a list of measures to be taken based on these results. These results were delivered confidentially. Overall, more than two thirds of participants were met, along with their parents. For participants who were absent, the results were placed in their mailbox in a sealed envelope.

If consent had previously been given, the participant's results were also sent to the health centre in their community, to be added to their medical record. A list was also sent to the health centres with the names and contact information of participants with abnormal results who may require clinical follow-up. As a guide for health professionals, this list was accompanied by clinical follow-up algorithms for participants with high levels of manganese and lead.

Several meetings with project partners in the communities (health centres, Band Councils and schools), the FNQLHSSC and members of the Abitibi-Témiscamingue Public Health Branch were held to discuss the overall results of the project.

The overall results for each community are also included in a confidential community report.

5.9. Statistical Data Analysis

Statistical analyses are based on data obtained from a single random sample, which was slightly modified by adding 21 volunteer participants to reach the target of 200 participants. The sample adheres to the age group (3-5, 6-11, and 12-19 years old) and gender (girls and boys) distribution based on the population in question. Note that the analysis of sociodemographic data (parental education, etc.) shows that in this data, there was no significant difference between the randomly-chosen participants and those who volunteered.

For each chemical, descriptive analyses were carried out (sample size (n), percentage of results below the limit of detection (%<LD), arithmetic mean (AM or MA), geometric mean (GM or MG), 10^{th}, 25^{th}, 50^{th}, 75^{th}, 90^{th}, and 95^{th} percentiles, 95% confidence intervals (95% CI or IC 95%), and coefficient of variation (CV)). The data for each chemical are listed in tables for the overall project, combined by gender and age and broken down by nation involved in the project. For the contaminants analyzed in a subsample (50 participants), the tables include only summary data.

Measurements under the LD have been assigned a value equal to one half of the LD. Note that each substance, if more than 40% of results were below the LD, the means (AM and GM) were not calculated, but the percentile distribution may be listed, if available.

The non-probabilistic nature of the sample implies that valid sample variance measures (the coefficient of variation (CV)) could not be produced. Therefore, the *Bootstrap* method was used to estimate CVs and to calculate confidence intervals for AM, GM, and percentiles. The data were re-sampled 1000 times with replacement. Using the percentile method (which is stronger when the numbers are lower), the 2.5 and 97.5 percentiles are considered to be the lower and upper limits of the corresponding statistic.

For analysis purposes, the GM was taken as an indicator of the true midpoint of the data distribution. Several substances are present in very small quantities in the human body and the resulting data distribution across the entire population is often asymmetrical, with a higher proportion of very small values under the LD compared to the higher values. The GM therefore provides the best estimate of the centre of the distribution compared to the AM, which is influenced more by extreme values. Furthermore, the CV is used to verify the accuracy of the estimates based on the Statistics Canada scale[1]: (i) estimate with a CV below 16.6% are considered reliable and may be used; (ii) estimates with a CV of 16.6% to 33.3% should be accompanied by a “use with caution” warning (E); and (iii) estimates with a CV above 33.3% are not considered reliable (F). Furthermore, for the percentiles, if the one-time CVs cannot be defined (undefined standard error), the estimate is considered undefined and is depicted with a period (.).

5.9.1. Environmental Contaminants and Essential Elements

The environmental contaminants and essential elements measured in whole blood, serum, or plasma are expressed in weight of the chemical per volume of whole blood, serum, or plasma (µg chemical product/L of whole blood, serum, or plasma). Lipophilic chemicals, such as PCBs and PBDEs, were measured in serum and are adjusted per kilogram of total serum lipids (µg of chemical/kg of lipids) in order to show how much is stored in the body’s adipose

1 https://www150.statcan.gc.ca/n1/pub/13f0026m/2007001/ch5-eng.htm

tissue (CHMS, 2010). As mentioned above, although the CHMS and the FNBI measured old POPs, PFCs, PBDEs, and lipids in plasma, these data are perfectly comparable to the JES!-YEH! study, which performed serum analyses (CTQ, pers. comm.). In the case of substances measured in urine, concentrations were expressed in terms of urine volume (µg of chemical/L of urine) and adjusted based on urine creatinine (µg of chemical product/g of creatinine). Urine creatinine is a byproduct of muscle metabolism, which is often used to correct the concentration (or dilution) in ad hoc urine samples, as the production and excretion of urine creatinine remain relatively constant over a period of 24 hours under homeostasis. If the behaviour of a measured chemical is comparable to its behaviour in kidney creatinine, the filtration rates for both substances will be comparable. This explains why expressing the chemical concentration per gram of creatinine allows us to account for the effects of urine dilution as well as certain differences in kidney function and low body mass (CHMS, 2010).

For contaminants and essential elements with reference values issued by Health Canada or the INSPQ, the percentages of participants who exceed the thresholds are listed in the text. Furthermore, for each contaminant and essential element measured in the CHMS, the data from the most recent cycle (Cycle 2 or Cycle 3) were presented in the descriptive tables for the same age groups (3-5, 6-11, and 12-19 years old). When the GMs were considered reliable or “to be used with caution” (E), the CIs for the JES!-YEH! project and the CHMS were compared in order to assess whether a chemical was present in significantly lower or higher concentrations based on the three age groups. The values for lipophilic contaminants and contaminants in urine were compared only to the adjusted values (based on serum lipids or urine creatinine). Therefore, if the CIs for the JES!-YEH! project and the CHMS overlapped, the results were not statistically different. If, on the other hand, the confidence intervals did not overlap, the results were statistically different.

5.9.2. Vitamins, Fatty Acids and Health Indicators

For the vitamin results, the proportions (%) and their CVs are presented for all participants, broken down by participating nation, gender, and age group in relation to the recommended values. Note that folate analyses were done in error using whole blood instead of red blood cells. The values for these analyses were adjusted based on the participants’ hemoglobin concentration. Despite this, several outliers limited the interpretation of the data, which is why the data are not given in this report.

For the fatty acid data, descriptive analyses were carried out (n, %<LD, AM, GM, the 10th, 25th, 50th, 75th, 90th, and 95th percentiles, their 95% CIs and CVs) based on the most relevant fatty acid health categories for all participants, per region, gender, and age group.

The hemoglobin (Hb) measurements and iron bioindicators were used to classify iron deficiency, anemia, and the types and severity of anemia. The decision-making algorithms to classify iron deficiency and anemia and the justification for these algorithms are presented in Appendix I and are based on the most recent knowledge of childhood anemia. The proportions (%) for iron deficiency and anemia and their CVs are presented for all participants, broken down by participating nation, gender, and age group. These data are presented by cross-tabulated gender and age group, since young girls 12 to 19 years old represent a sub-group that is at higher risk of iron deficiency and anemia for biological reasons.

Anthropometric measurements (weight, height, waist size) were used to calculate body mass index (BMI) and waist-height ratio. Waist size and height were measured twice, and if these two measurements differed by 0.3 and 0.5 cm respectively, a third measurement was taken. For the statistical analyses, the average of these measurements was used. BMI was then coded into four categories (underweight, normal weight, overweight, obese) based on the most recent characteristics of the *International Obesity Task Force* (IOTF), broken down by the participants’ age and gender (Cole and Lobstein, 2012). The IOTF classifications wee preferred over those of the World Health Organization (WHO) since they are based on anthropometric measurements in several countries. In addition, a recent study shows that the IOTF classifications seem to be more specific than those of the WHO and the Centre for Disease Control and Prevention (CDC) in identifying overweight and obese school-aged Inuit children (Medehenou et al., 2015). The waist-height ratio is considered to be another valid measurement to classify abdominal obesity, which is known to be a risk factor for cardiometabolic diseases (Mokha et al., 2010). For BMI and the waist-height ratio, the results are presented for all participants and are broken down by participating nation, gender, and age group in the form of prevalence (%) and their CVs.

The results for glycated hemoglobin, random glucose, and thyroid status were classified based on the recommended values. The prevalence (%) and their CVs are presented for all participants and are broken down by participating nation, gender, and age group.

5.9.3. Other Health Determinants

Health perception was measured with a question aimed at assessing perceived or self-assessed health on a scale ranging from "poor" to "excellent" and the data were presented based on the prevalence (%) of answers for each scale. Data on housing conditions were used to assess the prevalence (%) of overcrowding. To do so, the number of people per room in the dwelling inhabited by the participant was obtained by dividing the number of people who ate their meals and slept in the same dwelling (at least 4 nights a week) by the number of rooms in the dwelling. A ratio greater than 1 indicates an overcrowded dwelling. This indicator is also used by Statistics Canada[2] and in Indigenous contexts (Statistics Canada, 2015).

For household food security, the first six questions in the United States Department of Agriculture (USDA)[3] Food Security Survey Module (short version) were used to create a ranking from 0 to 6. This ranking assesses whether a household experienced food insecurity over the past 12 months, and assesses the severity of this insecurity. Therefore, the ranking is divided into 3 categories: a ranking of 0 to 1 indicates a household with food security, a raking of 2 to 4 indicates a household with moderate food insecurity, and a score of 5 to 6 means that the household is experiencing severe food insecurity. These six questions were also used by the Household Food Security Survey Module (HFSSM), the Canadian Community Health Survey (CCHS), and the Quebec First Nations Regional Health Survey (RHS) (RHS, 2008). However, the food insecurity severity score was ranked differently in the RHS (food security 0 to 1, moderate insecurity 2 to 3, severe insecurity 4 to 6).

Data on assessing health perceptions, housing conditions (overcrowding, need for repairs, and the presence of mould), household food security, practicing traditional activities, the frequency of consumption of traditional and store-bought food, and consumption of drinks are broken down by both participating nations, taking into consideration the diversity among these two nations and the traditional food available in their territory.

For the prevalence (%) and/or AMs, GMs, and percentiles of data on health perceptions, housing conditions, food security, practicing traditional activities, the frequency of consumption of traditional and store-bought food, and consumption of drinks, the GEE procedure (Generalized Estimating Equations) was used to account for potential correlations between subjects belonging to the same environment, because in certain cases, there was more than one participant from the same household (even though they were chosen randomly). It should be noted that the terms "dwelling" and "rooms" refer to physical spaces, while "household" refers to the people who live there.

The methods and analyses used to process the food frequency data are presented in detail in the section on Objective 3. Note that the data on the frequency of consumption of store-bought food for one participant (n=1) were excluded because all of this participant's responses were wildly overestimated or impossible. To analyse data on the frequency of consumption of store-bought food, a winsorization procedure was applied in order to mitigate

---

[2] http://www.statcan.gc.ca/fra/concepts/definitions/logement07;
http://www23.statcan.gc.ca/imdb/p3VD.pl?Function=getVDPage1&TVD=141835&db=imdb&dis=2&adm=8

[3] https://www.ers.usda.gov/topics/food-nutrition-assistance/food-security-in-the-us/survey-tools/#six

the impact of isolated outlier values (extreme values). Winsorization involves rescoring the extreme values to an acceptable value (for example to the value of the 98th or 99th percentile for higher values).

All of these descriptive analyses were carried out using the SAS Surveymeans (AM, GM and percentiles), as well as SAS Genmod and SUDAAN for analyses that required intra-household correlations to be taken into account.

5.10. Confidentiality, Ownership and Conservation of Data

All personal and community information gathered under this project is strictly confidential and all persons involved in the collection and analysis of these data are sworn to professional secrecy. During data collection, each participant was assigned a number. This number was then used to identify participants in the database, which does not contain names. The data belong to each participating community. These databases may also be housed on the FNQLHSSC intranet site, if the communities so request. The data are also stored safely and confidentially at the CHU du Québec Research Centre offices and access to them is strictly controlled.

The remaining blood, urine and hair samples will be kept in the CHU-CHUL laboratory in Quebec City until 2025. This will allow for verification analyses if necessary. In such cases, the permitted biological tests are those approved on the consent form. If the research team wishes to conduct additional tests, new approval from the participants and their parents or guardians would be required first. In 2025, the biological samples will be placed in biomedical waste boxes and will then be sterilized and destroyed by Stericyle, a company that specializes in the handling and destruction of biological samples.

References

AFN (2013). First Nations Biomonitoring Initiative: National Results (2011). Assembly of First Nations (AFN), Ottawa. 736p. Consulted online: http://www.afn.ca/uploads/files/afn_fnbi_en.pdf

AFNQL (2014). First Nations in Quebec and Labrador's Research Protocol. Assembly of First Nations of Quebec and Labrador (AFNQL), Wendake. 115p. Consulted online: https://carleton.ca/northernresearch/wp-content/uploads/anglais_web.pdf

AMAP (2015). AMAP assessment 2015: Human health in the Arctic. Arctic Monitoring Assessment Program (AMAP), Oslo, Norway. 178p. Consulted online: http://www.amap.no/documents/doc/AMAP-Assessment-2015-Human-Health-in-the-Arctic/1346

CCHS (2007). Nutrition (2004): Income-Related Household Food Security in Canada, Canadian Community Health Survey (CCHS), Cycle 2.2. Government of Canada, Health Canada, Ottawa. Consulted online: https://www.canada.ca/en/health-canada/services/food-nutrition/food-nutrition-surveillance/health-nutrition-surveys/canadian-community-health-survey-cchs/canadian-community-health-survey-cycle-2-2-nutrition-2004-income-related-household-food-security-cana

Chan L, Receveur O, Batal M, David W, Schwartz H, Ing A, et al. (2014) First Nations Food, Nutrition and Environment Study (FNFNES): Results from Ontario (2011/2012). University of Ottawa, Ottawa. 256p. Consulted online: http://www.fnfnes.ca/docs/FNFNES_Ontario_Regional_Report_2014_final.pdf

Chan L, Receveur O, Batal M, David W, Schwartz H, Ing A, et al. (2016) First Nations Food, Nutrition and Environment Study (FNFNES): Results from Alberta (2013). University of Ottawa, Ottawa. 180p. Consulted online: http://www.fnfnes.ca/docs/FNFNESReport-ALBERTA_June_30_2016.pdf

Chan L, Receveur O, Sharp D, Shchwartz H, Ing A, Fediuk K, et al. (2011) First Nations Food, Nutrition and Environment Study (FNFNES): Results from British Columbia (2008/2009). University of Northern British Columbia, Prince George. 216p. Consulted online: http://www.fnfnes.ca/docs/FNFNES_Report_BC_FINAL_PRINT_v2-lo.pdf

Chan L, Receveur O, Sharp D, Shchwartz H, Ing A, Fediuk K, et al. (2012) First Nations Food, Nutrition and Environment Study (FNFNES): Results from Manitoba (2010). University of Northern British Columbia, Prince George. 196p. Consulted online: http://www.fnfnes.ca/docs/MB Reports/FNFNES Report-MB_WEB_rev.pdf
Chapman L, Chan HM. (2000) The influence of nutrition on methylmercury intoxication. Environ Health Perspect 108 Suppl 1:29-56.

CHMS (2010) Report on Human Biomonitoring of Environmental Chemicals in Canada - Results of the Canadian Health Measures Survey (CHMS) Cycle 1 (2007 to 2009). Government of Canada, Ottawa. 292p. Consulted online: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/contaminants/chms-ecms/report-rapport-eng.pdf

CHMS (2013) Second Report on Human Biomonitoring of Environmental Chemicals in Canada - Results of the Canadian Health Measures Survey (CHMS) Cycle 2 (2009 to 2011). Government of Canada, Ottawa. 444p. https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/contaminants/chms-ecms-cycle2/chms-ecms-cycle2-eng.pdf

CHMS (2015) Third Report on Human Biomonitoring of Environmental Chemicals in Canada - Results of the Canadian Health Measures Survey (CHMS), Cycle 3 (2012 to 2013). Government of Canada, Ottawa. 182p.

Consulted online: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/contaminants/chms-ecms-cycle3/chms-ecms-cycle3-eng.pdf

Cole TJ, Lobstein T (2012) Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. Pediatr Obes 7:284-294.

Dewailly É, Ayotte P, Pereg D, Dery S, Dallaire R, Fontaine J, et al. (2007a) Qanuippitaa? How are we? Exposure to environmental contaminants in Nunavik: Metals. Institut national de santé publique (INSPQ) - Régie régionale de la santé et des services sociaux du Nunavik (RRSSN), Québec. 20p. Consulted online: https://www.inspq.qc.ca/pdf/publications/661_esi_contaminants.pdf

Dewailly É, Dallaire R, Pereg D, Ayotte P, Fontaine J, Dery S. (2007b) Qanuippitaa? How are we? Exposure to environmental contaminants in Nunavik: Persistent organic contaminants and new contaminants of concern. Institut national de santé publique (INSPQ) - Régie régionale de la santé et des services sociaux du Nunavik (RRSSN), Québec. 28p. Consulted online: https://www.inspq.qc.ca/pdf/publications/711_esi_exposure_env_cont.pdf

Donaldson SG, Van Oostdam J, Tikhonov C, Feeley M, Armstrong B, Ayotte P, et al. (2010). Environmental contaminants and human health in the Canadian Arctic. Sci Total Environ 408:5165-5234.

Flanagan, P.R., Haist, J., Valberg, L.S. (1980) Comparative effects of iron deficiency induced by bleeding and a low-iron diet on the intestinal absorptive interactions of iron, cobalt, manganese, zinc, lead and cadmium. J Nutr 110: 1754-63.

Government of Canada (2011) Environmental Contaminants – Vulnerable Populations. Health Canada, Ottawa. Consulted online: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/environmental-contaminants/vulnerable-populations.html

Government of Canada (2015) Human Biomonitoring of Environmental Chemicals. Health Canada, Ottawa. Consulted online: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/environmental-contaminants/human-biomonitoring-environmental-chemicals.html

Government of Canada (2017) Chemicals Management Plan – Chemicals at a Glance. Health Canada, Ottawa. Consulted online: https://www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/chemicals-glance.html

INSPQ (2004) Substances chimiques avec indicateur biologique: Seuils de déclaration par les laboratoires. Direction des risques biologiques, environnementaux et occupationnels, Institut national de santé publique du Québec (INSPQ), Québec. 14p. Consulted online: https://www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf [in French only]

INSPQ (2015) The Diet of Québec First Nations and Inuit Peoples. Institut national de santé publique du Québec (INSPQ), Québec. Consulted online: https://www.inspq.qc.ca/sites/default/files/publications/2065_diet_first_nations_inuits.pdf

INSPQ (2016) Maladies à déclaration obligatoire d’origine chimique: Révision des seuils de déclaration par les laboratoires. Direction des risques biologiques, environnementaux et occupationnels, Institut national de santé publique du Québec (INSPQ), Québec. 20p. Consulted online: https://www.inspq.qc.ca/publications/2151 [in French only]

Johnson-Down L, Labonte ME, Martin ID, Tsuji LJ, Nieboer E, Dewailly E, et al. (2015) Quality of diet is associated with insulin resistance in the Cree (*Eeyouch*) Indigenous population of Northern Quebec. Nutr Metab Cardiovasc Dis 25:85-92.

Lavigne-Robichaud M, Moubarac JC, Lantagne-Lopez S, Johnson-Down L, Batal M, Laouan Sidi EA, et al. (2017) Diet quality indices in relation to metabolic syndrome in an Indigenous Cree (Eeyouch) population in Northern Quebec,C. Public Health Nutr:1-9.

Legrand M, Feeley M, Tikhonov C, Schoen D, Li-Muller A. (2010) Methylmercury blood guidance values for Canada. Can J Public Health 101:28-31.

Lemire M, Fillion M, Frenette B, Mayer A, Philibert A, Passos CJ, et al. (2010) Selenium and mercury in the Brazilian Amazon: Opposing influences on age-related cataracts. Environ Health Perspect 118:1584-1589.

Lemire M, Fillion M, Frenette B, Passos CJ, Guimaraes JR, Barbosa F, Jr., et al. (2011) Selenium from dietary sources and motor functions in the Brazilian Amazon. Neurotoxicology 32:944-953.

Medehouenou TC, Ayotte P, St-Jean A, Meziou S, Roy C, Muckle G, et al. (2015) Overweight and obesity prevalence among school-aged Nunavik Inuit children according to three body mass index classification systems. J Adolesc Health 57:31-36.

Mokha JS, Srinivasan SR, Dasmahapatra P, Fernandez C, Chen W, Xu J, et al. (2010) Utility of waist-to-height ratio in assessing the status of central obesity and related cardiometabolic risk profile among normal weight and overweight/obese children: The Bogalusa heart study. BMC pediatrics 10:73.

Moubarac JC, Batal M (2016) La consommation d'aliments transformés et la qualité de l'alimentation au Québec - rapport soumis au Ministère de la Santé et des Services Sociaux du Québec (MSSS). Université de Montréal – Transnut, Montréal. 22p. Consulted online: http://www.rccq.org/wp-content/uploads/Qu%C3%A9bec-MSSS-consommation-daliments-ultra-transform%C3%A9s-et-qualit%C3%A9-de-lalimentation_Moubarac-et-Batal-2016.pdf [in French only]

NCP (2013) Canadian Arctic Contaminants Assessment Report III (CACAR): Persistent organic pollutants in Canada's North. 487p. Indigenous and Northern Affairs Canada, Ottawa, ON. Consulted online: http://pubs.aina.ucalgary.ca/ncp/79027.pdf

NCP (forthcoming) Canadian Arctic Contaminants Assessment Report V (CACAR). Indigenous and Northern Affairs Canada, Ottawa, ON.

Nieboer E, Dewailly E, Johnson-Down L, Sampasa-Kanyinga H, Château-Degat M-L, Egeland G, et al. (2013) Nituuchischaayihtitaau aschii multi-community environment-and-health study in *Eeyou Istchee* 2005-2009: Final technical report. Public Health Report Series 4 on the Health of the Population, Cree Board of Health and Social Services of James Bay, Chisasibi, 191p. Consulted online: http://www.creehealth.org/sites/default/files/E-and-H%20Technical%20Report.pdf

NIEHS (2017) Endrocrine disruptors. National Institute of Environmental Health Sciences (NIEHS), U.S. Department of Health and Human Services, Duram, NC, US. Consulted online: https://www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm

Pirkle CM, Muckle G, Lemire M. (2016) Managing mercury exposure in northern Canadian communities. CMAJ 188:1015-1023.

Quebec (2017) Chapter S-2.2 – Public Health Act. Éditeur officiel du Québec, Quebec. 36p. Consulted online: http://legisquebec.gouv.qc.ca/en/pdf/cs/S-2.2.pdf

RHS (2008) Chapter 7: Food and Physical Activity, Quebec First Nations Regional Health Survey (RHS). First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC), Wendake. 104p. Consulted online: http://www.cssspnql.com/docs/centre-de-documentation/chapitre-7-alimentation-activite-physique-eng-v2.pdf?sfvrsn=2

Statistics Canada (2015) Aboriginal Statistics at a Glance : 2nd edition. Statistics Canada, Ottawa. 34p. Consulted online: http://www.statcan.gc.ca/pub/89-645-x/89-645-x2015001-eng.pdf

UNEP (2013). Minamata Convention on Mercury. United Nations Environment Program (UNEP), Geneva, Switzerland. 62p. Consulted online: http://www.mercuryconvention.org/Portals/11/documents/Booklets/Minamata Convention on Mercury_booklet_English.pdf

Ye Q, Park JE, Gugnani K, Betharia S, Pino-Figueroa A, Kim J. (2017) Influence of iron metabolism on manganese transport and toxicity. Metallomics 9:1028-1046.

Zota AR, Phillips CA, Mitro SD (2016) Recent fast food consumption and bisphenol A and phthalates exposures among the U.S. population in NHANES, 2003-2010. Environ Health Perspect 124:1521-1528.

6. Results for Exposure to Environmental Contaminants

6.1. Metals

6.1.1. Arsenic

Arsenic is a natural element that is quite abundant in the Earth's crust. It is found naturally in ground water and soil (WHO, 2016 and Health Canada, 2006). Several commercial and industrial products that use arsenic compounds release particles into the environment, during the manufacturing process or when they decompose (Health Canada, 2006).

In the past, arsenic was used as a pesticide for processing wood, in the form of chromated copper arsenate. Since 2004, this arsenic compound has been banned for all residential use (e.g., decks, fences, and play structures for children). However, it is still permitted for industrial use (Health Canada, 2016).

Today, arsenic is used in alloys, as well as in the manufacture of glass, dyes, textiles, paper, metallic adhesives, ceramics, ammunition, and explosives. Arsenic compound are also used in leather tanning and also play a role in the manufacture of pesticides, animal feed additives, and pharmaceutical products, including veterinary medications (WHO, 2016 and Health Canada, 2006).

Humans are exposed to arsenic mainly through food. Drinking water, air, and soil are also other routes of exposure (Health Canada, 2006). Arsenic is found in two chemical forms: organic and inorganic. Inorganic arsenic is considered to be toxic to human health, while organic arsenic is less harmful (WHO, 2016). Chronic exposure to high levels of arsenic my increase the risk for certain cancers, and may also affect the gastrointestinal, hepatic, renal and pulmonary systems as well as the skin (Health Canada 2017). According to Health Canada (2017), the metabolism of arsenic in children is different than in adults and high exposure to inorganic arsenic during pregnancy or early childhood could have negative effects on development and could predispose children to cancer as adults. According to the WHO (2016), smokers are also exposed to arsenic through tobacco.

CTQ's reporting threshold for urine arsenic is 37 µg/L (0.5 µmol/L) (INSPQ, 2016). At the federal level, no toxicology level has been established for arsenic.

Results

Arsenic levels were measured in urine for all participants in the JES!-YEH! study and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 3 – 6). Arsenic levels measured in urine reflect recent exposure to this substance. A measurable level of arsenic does not necessarily mean that it will have negative health effects.

Of the 197 participants who provided a urine sample, only one had levels of urine arsenic slightly exceeding the CTQ's reporting threshold. Furthermore, urine arsenic levels adjusted for creatinine in the JES!-YEH! study were lower than those in the CHMS (Cycle 2) (Table 6) across all three age groups. However, due to overlapping confidence intervals for the geometric means, these differences were not significant.

Table 3: Arsenic – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and by gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0.5	6.23 5.51 – 7.01	4.63 4.16 – 5.16	1.71 1.46 – 2.00	2.79 2.34 – 3.14	4.68 4.23 – 5.31	7.48 6.64 – 8.10	11.58 9.96 – 13.01	13.70[E] 12.02 – 23.89
	Total	F	95	1.1	6.09 5.07 – 7.18	4.40 3.64 – 5.16	1.48[E] 0.65 – 1.96	2.60 2.08 – 3.32	4.68 3.86 – 5.53	7.27 6.25 – 8.76	11.86 8.78 – 13.08	13.20[E] 11.64 – 24.90
	Total	M	102	0	6.35 5.28 – 7.49	4.86 4.24 – 5.57	1.92 1.51 – 2.31	2.92 2.41 – 3.43	4.68 4.24 – 5.87	7.54 6.46 – 8.58	11.16 8.54 – 13.72	13.96[E] 10.73 – 24.23
	Anishinabe communities (2)	Total	110	0	6.85 5.90 – 7.79	5.51 4.87 – 6.22	2.20 1.89 – 2.82	3.62 2.98 – 4.33	5.39 4.72 – 6.28	7.98 7.29 – 9.68	11.99 9.76 – 13.44	13.67[E] 11.77 – 25.04
	Anishinabe communities (2)	F	55	0	6.97 5.63 – 8.39	5.59 4.60 – 6.72	2.19[E] 1.81 – 3.04	3.69 2.63 – 4.56	5.47 4.46 – 6.59	8.13 6.34 – 11.03	12.55 8.86 – 13.98	13.67 .
	Anishinabe communities (2)	M	55	0	6.73 5.41 – 8.14	5.43 4.58 – 6.37	2.13 1.66 – 2.92	3.37 2.60 – 4.42	5.21 4.44 – 6.40	7.89 6.39 – 9.17	10.86[E] 8.18 – 13.84	13.67 .
	Innu communities (2)	Total	87	1.1	5.44 4.33 – 6.78	3.72 3.08 – 4.46	1.43[E] 0.61 – 1.61	2.13 1.61 – 2.57	3.71 2.92 – 4.39	6.64 4.79 – 7.15	11.31 7.11 – 13.00	F
	Innu communities (2)	F	40	2.5	4.89[E] 3.37 – 6.77	3.16 2.33 – 4.19	0.61 .	1.57[E] 0.74 – 2.43	3.37[E] 2.27 – 4.29	6.52[E] 4.04 – 7.00	F	11.99 .
	Innu communities (2)	M	47	0	5.90 4.39 – 8.00	4.28 3.45 – 5.43	1.60[E] 1.00 – 2.05	2.38 1.90 – 3.03	4.12 2.92 – 5.07	6.72[E] 4.72 – 9.78	F	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 4: Arsenic (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and by gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0.5	9.01 7.78 – 10.32	6.35 5.72 – 7.10	2.67 2.29 – 3.01	3.83 3.44 – 4.09	5.97 5.08 – 6.62	10.11 8.33 – 11.37	18.96 13.25 – 23.77	27.27^{E} 20.37 – 37.01
	Total	F	95	1.1	9.75 7.81 – 11.94	6.82 5.77 – 8.00	3.07^{E} 1.78 – 3.66	4.13 3.67 – 4.59	6.13 5.52 – 7.56	10.46 8.02 – 12.56	19.73^{E} 12.55 – 26.89	27.46^{E} 18.29 – 46.35
	Total	M	102	0	8.31 6.79 – 10.09	5.95 5.16 – 6.90	2.39 2.16 – 2.77	3.43 2.79 – 3.91	5.11 4.29 – 6.58	9.04 7.42 – 11.20	16.55^{E} 11.39 – 23.49	24.10^{E} 14.90 – 35.00
	Anishinabe communities (2)	Total	110	0	11.18 9.28 – 13.09	8.46 7.41 – 9.56	3.55 3.25 – 4.17	5.07 4.23 – 5.87	7.54 6.53 – 9.04	12.38 10.16 – 15.31	23.65^{E} 16.38 – 29.98	32.27^{E} 23.62 – 43.23
	Anishinabe communities (2)	F	55	0	11.70 9.34 – 14.50	9.08 7.64 – 10.89	4.05 3.37 – 4.64	5.42 4.44 – 6.22	8.01 6.22 – 10.13	13.21^{E} 10.02 – 18.37	23.63^{E} 16.16 – 28.21	27.46 .
	Anishinabe communities (2)	M	55	0	10.66 8.12 – 13.74	7.87 6.50 – 9.75	3.29 2.60 – 3.91	4.67 3.64 – 5.86	7.30 5.70 – 8.62	10.97 8.44 – 13.49	21.57^{E} 12.37 – 34.57	34.38 .
	Innu communities (2)	Total	87	1.1	6.26 4.90 – 8.04	4.43 3.77 – 5.25	2.02^{E} 1.35 – 2.46	2.84 2.45 – 3.49	4.05 3.71 – 4.69	6.33 5.07 – 7.83	10.98^{E} 7.85 – 17.97	F
	Innu communities (2)	F	40	2.5	7.07^{E} 4.53 – 10.54	4.61 3.48 – 6.05	F	3.43^{E} 2.31 – 3.92	4.19 3.88 – 5.80	6.31 5.21 – 8.20	F	11.46 .
	Innu communities (2)	M	47	0	5.57 4.25 – 7.23	4.28 3.56 – 5.28	2.12 1.54 – 2.42	2.62 2.26 – 3.05	3.86 2.90 – 4.62	5.54^{E} 4.44 – 8.52	F	18.41 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 5: Arsenic – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0.5	6.23 5.51 – 7.01	4.63 4.16 – 5.16	1.71 1.46 – 2.00	2.79 2.34 – 3.14	4.68 4.23 – 5.31	7.48 6.64 – 8.10	11.58 9.96 – 13.01	13.70^{E} 12.02 – 23.89
	Total	3-5	38	0	6.19 4.55 – 8.13	4.60 3.57 – 5.80	1.63 .	2.36 1.77 – 3.26	4.49^{E} 3.01 – 5.81	7.49^{E} 5.06 – 11.49	F	13.56 .
	Total	6-11	79	1.3	5.68 4.76 – 6.64	4.26 3.54 – 5.05	1.47^{E} 0.56 – 2.18	2.73 2.14 – 3.36	4.55 3.74 – 5.35	7.01 5.68 – 8.76	10.90 8.16 – 13.33	13.50^{E} 10.39 – 15.86
	Total	12-19	80	0	6.78 5.48 – 8.37	5.05 4.31 – 5.95	1.95 1.47 – 2.26	2.92 2.24 – 4.02	4.79 4.14 – 6.36	7.58 6.79 – 8.21	11.61^{E} 8.15 – 14.53	F
	Anishinabe communities (2)	Total	110	0	6.85 5.90 – 7.79	5.51 4.87 – 6.22	2.20 1.89 – 2.82	3.62 2.98 – 4.33	5.39 4.72 – 6.28	7.98 7.29 – 9.68	11.99 9.76 – 13.44	13.67^{E} 11.77 – 25.04
	Anishinabe communities (2)	3-5	24	0	7.97 5.66 – 10.72	6.06 4.44 – 8.16	1.77 .	3.07^{E} 1.85 – 5.47	6.14^{E} 3.87 – 8.99	11.24 6.26 – 12.83	F	14.08 .
	Anishinabe communities (2)	6-11	46	0	5.91 4.77 – 7.30	4.87 4.05 – 5.89	2.22^{E} 1.43 – 3.00	3.13 2.55 – 4.17	4.87 3.82 – 5.61	7.30 5.45 – 8.66	10.04^{E} 7.77 – 12.78	12.28 .
	Anishinabe communities (2)	12-19	40	0	7.25 5.80 – 9.08	5.99 4.96 – 7.35	2.25^{E} 1.98 – 3.77	4.01 2.77 – 4.98	5.84 4.71 – 7.18	7.85 6.73 – 9.72	F	14.23 .
	Innu communities (2)	Total	87	1.1	5.44 4.33 – 6.78	3.72 3.08 – 4.46	1.43^{E} 0.61 – 1.61	2.13 1.61 – 2.57	3.71 2.92 – 4.39	6.64 4.79 – 7.15	11.31 7.11 – 13.00	F
	Innu communities (2)	3-5	14	0	3.14 2.39 – 4.04	2.86 2.27 – 3.69	1.56 .	1.87 .	2.55^{E} 1.89 – 3.41	3.45^{E} 2.51 – 4.88	4.85 .	5.48 .
	Innu communities (2)	6-11	33	3	5.36 4.01 – 6.89	3.53^{E} 2.45 – 4.86	0.51 .	1.80^{E} 0.66 – 2.90	3.97^{E} 2.60 – 5.69	6.62^{E} 4.62 – 10.86	11.76^{E} 6.63 – 14.08	13.50 .
	Innu communities (2)	12-19	40	0	6.31^{E} 4.24 – 9.01	4.26 3.25 – 5.54	1.47 .	2.25^{E} 1.53 – 3.11	4.12^{E} 2.70 – 5.24	6.89^{E} 4.41 – 8.50	F	12.73 .
CHMS (Cycle 2)	Total	3-5	573	2.27		6.6 5.1 – 8.4	F		6.3 4.7 – 8.0	11 7.8 – 14		41 31 – 51
	Total	6-11	1062	2.26		7.0 6.3 – 7.8	2.0 1.5 – 2.4		6.8 6.3 – 7.3	13 11 – 14		44 E 26 – 62
	Total	12-19	1041	2.21		7.2 5.8 – 8.9	1.9^{E} 1.1 – 2.7		6.4 5.3 – 7.4	14 10 – 17		52^{E} 17 - 88

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 6: Arsenic (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0.5	9.01 7.78 – 10.32	6.35 5.72 – 7.10	2.67 2.29 – 3.01	3.83 3.44 – 4.09	5.97 5.08 – 6.62	10.11 8.33 – 11.37	18.96 13.25 – 23.77	27.27^{E} 20.37 – 37.01
	Total	3-5	38	0	13.74 9.98 – 17.83	9.93 7.77 – 13.07	3.26 .	6.42^{E} 3.65 – 7.70	9.12 7.19 – 11.31	15.58^{E} 10.46 – 23.65	34.34^{E} 16.13 – 42.84	39.06 .
	Total	6-11	79	1.3	8.64 7.44 – 10.13	6.79 5.73 – 7.98	3.18^{E} 2.29 – 3.91	4.46 3.89 – 5.10	6.55 5.49 – 8.09	10.68 8.48 – 12.54	15.75^{E} 12.38 – 23.24	23.16 14.56 – 27.18
	Total	12-19	80	0	7.12 5.16 – 9.41	4.81 4.12 – 5.67	2.27 1.62 – 2.69	3.01 2.63 – 3.56	4.19 3.73 – 4.93	6.29 5.38 – 7.39	F	F
	Anishinabe communities (2)	Total	110	0	11.18 9.28 – 13.09	8.46 7.41 – 9.56	3.55 3.25 – 4.17	5.07 4.23 – 5.87	7.54 6.53 – 9.04	12.38 10.16 – 15.31	23.65^{E} 16.38 – 29.98	32.27^{E} 23.62 – 43.23
	Anishinabe communities (2)	3-5	24	0	18.10 13.09 – 24.65	14.13 10.56 – 19.19	6.62 .	7.54^{E} 6.64 – 10.41	11.92^{E} 8.10 – 18.20	23.61^{E} 12.53 – 35.72	36.93 .	44.74 .
	Anishinabe communities (2)	6-11	46	0	10.37 8.51 – 12.41	8.80 7.40 – 10.36	4.38 2.98 – 5.20	5.74 4.90 – 7.42	8.47 7.14 – 9.97	12.38 9.76 – 14.49	18.21^{E} 12.54 – 26.41	25.81 .
	Anishinabe communities (2)	12-19	40	0	7.96^{E} 5.51 – 11.19	5.94 4.92 – 7.29	3.22 .	3.84 3.35 – 4.35	5.20 4.18 – 6.17	6.81^{E} 5.74 – 9.73	F	20.42 .
	Innu communities (2)	Total	87	1.1	6.26 4.90 – 8.04	4.43 3.77 – 5.25	2.02^{E} 1.35 – 2.46	2.84 2.45 – 3.49	4.05 3.71 – 4.69	6.33 5.07 – 7.83	10.98^{E} 7.85 – 17.97	F
	Innu communities (2)	3-5	14	0	6.26 4.66 – 8.00	5.43 4.07 – 7.35	2.42 .	3.10 .	4.46^{E} 3.10 – 7.83	8.33^{E} 4.42 – 10.90	10.91 .	11.28 .
	Innu communities (2)	6-11	33	3	6.24 4.61 – 8.21	4.73 3.57 – 6.24	2.28 .	3.73 2.44 – 4.05	4.78 3.92 – 5.75	6.38^{E} 5.14 – 9.86	F	17.11 .
	Innu communities (2)	12-19	40	0	6.28^{E} 3.63 – 9.83	3.90 3.11 – 5.09	1.63^{E} 1.17 – 2.21	2.50 1.84 – 2.99	3.56 2.90 – 4.04	5.01 3.83 – 6.43	F	20.26 .
CHMS (Cycle 2)	Total	3-5	572	2.27		11 8.8 – 14	3.9^{E} <LD – 5.3		9.6 8.4 – 11	17 15 – 19		F
	Total	6-11	1058	2.27		7.9 7.1 – 8.8	2.9 2.6 – 3.2		6.6 6.1 – 7.1	13 10 – 16		54^{E} 27 – 80
	Total	12-19	1039	2.21		5.3 4.5 – 6.3	1.9 1.5 – 2.3		4.5 3.6 – 5.3	8.1 6.7 – 9.5		39^{E} 16 – 61

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca\\pdf\\publications\\2151_maladies_declaration_obligatoire_chimique.pdf

WHO (World Health Organization) (2016). Arsenic. Fact sheet No. 372. Source: http://www.who.int/news-room/fact-sheets/detail/arsenic

Health Canada (2006). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Arsenic. Water Quality and Health Bureau, Healthy Environments and Consumer Safety Branch, Health Canada, Ottawa (Ontario).

Health Canada (2016). Staying Safe around Treated Wood. Government of Canada. Consulted online: https://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/pesticides-pest-management/fact-sheets-other-resources/staying-safe-around-treated-wood.html

Health Canada (2017). Arsenic. Government of Canada. Consulted online: https://www.canada.ca/en/health-canada/services/food-nutrition/food-safety/chemical-contaminants/environmental-contaminants/arsenic.html

6.1.2.Boron

Boron is an element that is ubiquitous in the environment (drinking water, food, soil, air, and dust) (Health Canada, 2016). It is used in the manufacturing of glass, detergents, and flame retardants. It is also used in some cosmetics, pharmaceutical products, and certain pesticides and agricultural fertilizers (WHO, 2003). Boron is an essential element for plant development and growth. However, to date there is no scientific evidence that it plays an essential role in human health (Health Canada, 2007).

Humans are exposed to boron mainly through food. The most significant sources are fruits, vegetables, legumes, and nuts (WHO, 2003).

The toxicity threshold for chronic exposure to boron is unknown (Health Canada, 2007), and consequently, no reporting threshold or toxicology threshold has been established for boron at the provincial and federal levels.

Results

Boron levels were measured in urine for a subsample (n=50) of JES!-YEH! participants and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 7 et 8). Urine boron levels reflect recent exposure to this substance. A measurable level of boron does not necessarily mean that it will have negative health effects. Boron was not measured in any cycles of the CHMS.

Table 7: Boron – Levels measured in the urine (µmol/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age.

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	88.58 74.34 – 104.4	73.54 61.20 – 87.10	36.00^E^ 10.00 – 42.67	46.50 40.38 – 66.17	75.00 65.63 – 87.94	106.3 86.92 – 124.1	150.0^E^ 109.8 – 188.6	185.0^E^ 127.5 – 224.3
	Total	F	24	0	95.17 70.30 – 126.8	72.95^E^ 51.94 – 100.7	18.80 .	47.00^E^ 20.95 – 68.36	72.00 56.60 – 89.57	110.0^E^ 75.88 – 169.5	182.0 .	206.0 .
	Total	M	26	0	82.50 67.96 – 97.18	74.08 61.84 – 88.18	38.40 .	45.00^E^ 39.70 – 70.75	79.00 50.60 – 93.95	102.5 82.00 – 116.1	118.0 99.85 – 154.7	141.0 .
	Total	3-5	10	0	109.0^E^ 61.13 – 169.5	85.01^E^ 55.71 – 136.4	32.00 .	42.00 .	F	119.0 .	210.0 .	255.0 .
	Total	6-11	19	0	92.84 75.06 – 109.5	85.43 69.73 – 101.4	45.60 .	55.50 45.36 – 77.50	82.50 61.00 – 105.9	110.8 83.56 – 121.5	123.0 .	152.0 .
	Total	12-19	21	0	75.00 56.52 – 95.05	59.93^E^ 42.96 – 81.18	12.20 .	39.50^E^ 10.00 – 60.00	67.00 40.89 – 83.75	92.75^E^ 68.63 – 119.2	128.0 .	168.0 .
	Anishinabe communities (2)	Total	28	0	96.86 76.96 – 120.4	82.53 68.15 – 101.5	40.80 .	47.00^E^ 42.45 – 68.75	74.00 60.25 – 98.00	120.0^E^ 79.81 – 154.9	172.0 .	186.0 .
	Innu communities (2)	Total	22	0	78.05 60.08 – 98.41	63.49 45.59 – 85.38	14.40 .	F	76.50 45.92 – 89.00	101.7 78.64 – 112.4	114.0 .	119.5 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 8: Boron (adjusted for creatinine) – Levels measured in the urine (µmol/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age.

Population	Region	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	142.7 107.7 – 183.7	101.1 80.63 – 126.3	37.37[E] 17.68 – 51.54	62.96 39.93 – 75.44	91.62 73.81 – 116.0	173.4[E] 110.2 – 239.5	299.3[E] 186.0 – 406.8	405.8 .
	Total	F	24	0	171.1[E] 110.0 – 245.1	118.8[E] 86.83 – 162.2	38.62 .	61.99[E] 39.28 – 85.92	91.62[E] 67.92 – 171.7	207.4[E] 111.8 – 299.3	304.0 .	387.9 .
	Total	M	26	0	116.5[E] 82.11 – 155.7	87.01 64.98 – 116.0	27.41 .	56.56[E] 33.13 – 73.75	81.62 64.91 – 109.7	125.0[E] 93.17 – 186.4	206.4 .	353.1 .
	Total	3-5	10	0	297.0[E] 184.5 – 453.3	242.4[E] 163.0 – 375.0	92.10 .	145.6 .	235.8[E] 104.6 – 301.9	303.2 .	408.1 .	646.2 .
	Total	6-11	19	0	152.4 114.4 – 198.1	132.6 107.2 – 165.9	75.60 .	90.07 75.51 – 108.6	115.9 91.62 – 136.3	F	260.4 .	403.7 .
	Total	12-19	21	0	60.56 46.30 – 78.38	52.11 41.08 – 65.51	18.86 .	37.42[E] 19.71 – 50.32	56.87 37.56 – 64.89	70.62 57.40 – 79.00	79.65 .	87.99 .
	Anishinabe communities (2)	Total	28	0	174.7[E] 118.0 – 243.6	126.9 94.08 – 168.1	57.23 .	72.50 58.41 – 89.34	102.0[E] 77.38 – 139.2	F	404.4 .	409.1 .
	Innu communities (2)	Total	22	0	102.0[E] 69.46 – 137.3	75.66[E] 53.85 – 106.7	20.04 .	38.88[E] 22.60 – 70.52	75.79[E] 40.19 – 106.0	125.4[E] 77.73 – 198.7	223.6 .	262.3 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

WHO (World Health Organization) (2003). Boron in Drinking-water Background document for development of WHO Guidelines for Drinking-water Quality. Source: www.who.int/water_sanitation_health/dwq/boron.pdf

Health Canada (2007). Boron as a Medicinal Ingredient in Oral Natural Health Products. Natural Health Products Directorate. Health Canada. Government of Canada. Source: http://www.canada.ca/content/dam/hc-sc/migration/hc-sc/dhp-mps/alt_formats/hpfb-dgpsa/pdf/pubs/boron-bore-eng.pdf

Health Canada (2016). Boric Acid and its Salts (Boron). Government of Canada. Source: www.canada.ca/content/dam/hc-sc/migration/hc-sc/cps-spc/alt_formats/pdf/pubs/pest/_decisions/rvd2016-01/rvd2016-01-eng.pdf

6.1.3.Cadmium

Cadmium is a metal present in the Earth's crust and is often found in zinc, lead, or copper deposits (ATSDR, 2012). This metal is used especially in nickel-cadmium batteries, as a protective coating for metals, as a pigment in plastic, ceramics, and firework, as a stabilizer in polyvinyl chloride, etc. (INAC, 2010; CNESST, 2016).

Cadmium is released into the environment though natural processes such as volcanoes or erosion phenomena. Cadmium levels are generally low in the environment, but human activities greatly increase its concentration. The main anthropogenic sources of cadmium are cigarette smoke, mining activities, including refining of non-ferrous metals, smelting, fossil fuel combustion, incineration of household waste (especially batteries that contain cadmium and plastic), the manufacture of phosphate fertilizers, as well as recycling cadmium and electronic and electric waste (WHO, 2010). Cadmium can travel over long distances following its source of emissions.

Children and non-smoker adults are exposed to cadmium mainly through consumption of certain foods. Cadmium accumulates easily in certain organisms, such as seafood and molluscs, and in certain organs, especially the liver and kidneys in cervids. Lower concentrations are found in vegetables, starches, and cereals (WHO, 2010). Smokers have a higher risk of exposure to cadmium, as tobacco plants naturally accumulate cadmium from the soil. Non-smokers may also be exposed to this contaminant through second-hand smoke (ATSDR, 2012).

Although some authorities recommend avoiding or limiting consumption of moose and/or deer offal, studies carried out among the James Bay Cree and the Inuit in Nunavik did not demonstrate any significant relationship between the consumption of organs or meat from traditional foods and blood cadmium levels. Only cigarette consumption was significantly associated with concentrations of cadmium in the blood (Government of Northwest Territories, 2017; MAPAQ, 2014; Nieboer et al., 2013; Rey et al., 1997; Robillard et al., 2002).

Cadmium has a half-life of 10 to 35 years in humans. The target organ for cadmium toxicity is the kidney. The first signs of kidney lesions are an increase in low molecular weight proteins excretion (ATSDR, 2012; WHO, 2010).

The CTQ laboratories reporting threshold for blood cadmium in subjects with low exposure (non-smokers) is 5.05 µg/L (45 nmol/L). For urine cadmium, it is 7.30 µg/L (65 nmol/L) (INSPQ, 2016). At the federal level, no toxicological threshold has been established.

Results

Cadmium levels were measured in blood and urine for all JES!-YEH! participants and are reported in terms of µg/L of blood, µg/L for urine, and µg/g for creatinine (Tables 9 – 14). Cadmium levels measured in blood and urine reflect recent exposure to this substance. A measurable level of cadmium does not necessarily mean that it will have negative health effects.

Of the 194 participants who provided blood samples, three of them, all smokers, had cadmium levels that exceeded the CTQ's reporting threshold. As for urine cadmium, all participants (n=197) had levels below the CTQ's reporting threshold.

Compared to the CHMS (Cycle 3) data, the 12-19 year old participants in the JES!-YEH! study had significantly higher blood cadmium levels, while the 6-11 year old participants had relatively similar levels (Table 10). As for the 3-5 year old participants in the JES!-YEH! project, their levels were not compared due to the absence of results in the CHMS for this age group (Table 10).

Urine cadmium levels measured in the JES!-YEH! study were significantly lower than those in the CHMS (Cycle 2) for participants in the 12-19 age group (Table 14). The geometric means for participants 3-5 and 6-11 years old were not calculated because urine cadmium was not detected in more than 40% of participants.

Table 9: Cadmium – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	5.2	0.55 0.39 – 0.72	0.17 0.14 – 0.21	0.05 0.04 – 0.06	0.07 0.06 – 0.08	0.11 0.10 – 0.11	0.25E 0.19 – 0.38	1.44E 0.67 – 2.38	2.75E 1.98 – 4.50
	Total	F	92	4.3	0.61E 0.40 – 0.87	0.20 0.16 – 0.26	0.05 0.03 – 0.06	0.07 0.06 – 0.09	0.11 0.10 – 0.17	F	2.00E 1.04 – 2.49	F
	Total	M	102	5.9	0.48E 0.27 – 0.74	0.15 0.12 – 0.20	0.05 0.02 – 0.06	0.07 0.06 – 0.08	0.10 0.09 – 0.11	0.21E 0.16 – 0.31	F	F
	Anishinabe communities (2)	Total	107	1.9	0.28 0.21 – 0.38	0.16 0.13 – 0.19	0.06 0.05 – 0.07	0.08 0.07 – 0.10	0.11 0.10 – 0.16	0.21 0.18 – 0.30	F	F
	Anishinabe communities (2)	F	52	1.9	0.30E 0.20 – 0.43	0.17 0.13 – 0.22	0.06E 0.04 – 0.07	0.08 0.07 – 0.10	0.12 0.10 – 0.17	F	F	1.13 .
	Anishinabe communities (2)	M	55	1.8	0.26E 0.16 – 0.40	0.15 0.12 – 0.20	0.05 .	0.08 0.07 – 0.10	0.11 0.10 – 0.16	0.22E 0.16 – 0.32	F	0.64 .
	Innu communities (2)	Total	87	9.2	0.88E 0.54 – 1.24	0.20E 0.14 – 0.27	0.03E 0.02 – 0.05	0.06 0.05 – 0.08	0.10 0.09 – 0.11	F	3.25E 1.62 – 4.55	4.57E 2.60 – 6.28
	Innu communities (2)	F	40	7.5	1.03E 0.55 – 1.59	0.26E 0.15 – 0.45	0.04E 0.02 – 0.06	0.06E 0.05 – 0.10	0.11 0.09 – 0.27	F	F	4.61 .
	Innu communities (2)	M	47	10.6	F	0.15E 0.10 – 0.24	<LD	0.06E 0.04 – 0.08	0.09 0.08 – 0.11	F	F	4.26 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 10: Cadmium – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	5.2	0.55 0.39 – 0.72	0.17 0.14 – 0.21	0.05 0.04 – 0.06	0.07 0.06 – 0.08	0.11 0.10 – 0.11	0.25^{E} 0.19 – 0.38	1.44^{E} 0.67 – 2.38	2.75^{E} 1.98 – 4.50
	Total	3-5	36	13.9	0.10 0.07 – 0.13	0.08 0.06 – 0.10	<LD	0.05^{E} 0.02 – 0.06	0.07 0.06 – 0.09	0.10^{E} 0.08 – 0.15	0.16 0.11 – 0.19	0.18 .
	Total	6-11	78	5.1	0.11 0.10 – 0.13	0.10 0.08 – 0.11	0.05 0.02 – 0.06	0.06 0.06 – 0.07	0.09 0.08 – 0.10	0.11 0.11 – 0.15	0.19 0.14 – 0.21	F
	Total	12-19	80	1.3	1.17 0.83 – 1.58	0.45 0.34 – 0.60	0.09 0.07 – 0.10	0.11^{E} 0.10 – 0.19	0.29^{E} 0.20 – 0.53	1.40^{E} 0.75 – 2.30	3.48^{E} 2.20 – 4.64	4.61^{E} 2.96 – 6.52
	Anishinabe communities (2)	Total	107	1.9	0.28 0.21 – 0.38	0.16 0.13 – 0.19	0.06 0.05 – 0.07	0.08 0.07 – 0.10	0.11 0.10 – 0.16	0.21 0.18 – 0.30	F	F
	Anishinabe communities (2)	3-5	22	4.5	0.11^{E} 0.08 – 0.17	0.09 0.07 – 0.12	0.03 .	0.06^{E} 0.04 – 0.07	0.08 0.06 – 0.10	0.11 0.08 – 0.15	0.15^{E} 0.11 – 0.31	0.19 .
	Anishinabe communities (2)	6-11	45	2.2	0.13 0.11 – 0.16	0.11 0.09 – 0.13	0.05 .	0.08 0.06 – 0.09	0.10 0.09 – 0.11	0.15 0.11 – 0.18	0.20^{E} 0.17 – 0.24	F
	Anishinabe communities (2)	12-19	40	0	0.53^{E} 0.36 – 0.75	0.32 0.23 – 0.44	0.10 .	0.11^{E} 0.10 – 0.20	0.27^{E} 0.18 – 0.37	F	F	2.14 .
	Innu communities (2)	Total	87	9.2	0.88^{E} 0.54 – 1.24	0.20^{E} 0.14 – 0.27	0.03^{E} 0.02 – 0.05	0.06 0.05 – 0.08	0.10 0.09 – 0.11	F	3.25^{E} 1.62 – 4.55	4.57^{E} 2.60 – 6.28
	Innu communities (2)	3-5	14	28.6	0.07^{E} 0.05 – 0.10	0.06^{E} 0.04 – 0.08	<LD	<LD	0.06^{E} 0.02 – 0.09	0.09^{E} 0.04 – 0.13	0.13 .	0.16 .
	Innu communities (2)	6-11	33	9.1	0.09 0.07 – 0.12	0.08 0.07 – 0.09	0.02 .	0.06^{E} 0.03 – 0.06	0.08 0.06 – 0.09	0.10 0.08 – 0.11	0.11 0.10 – 0.18	0.14 .
	Innu communities (2)	12-19	40	2.5	1.80^{E} 1.15 – 2.49	0.63^{E} 0.38 – 1.03	0.08 .	0.11^{E} 0.09 – 0.21	F	2.59^{E} 1.43 – 4.43	4.61^{E} 3.05 – 6.52	5.84 .
CHMS (Cycle 3)	Total	3-5	471	43.52		–	<LD		0.091 <LD – 0.11		0.16 0.11 – 0.20	0.18^{E} <LD – 0.29
	Total	6-11	944	27.44		0.095 0.085 – 0.11	<LD		0.10 0.099 – 0.10		0.18 0.16 – 0.20	0.21 0.18 – 0.24
	Total	12-19	977	12.49		0.17 0.15 – 0.20	<LD		0.12^{E} <LD – 0.17		0.82^{E} 0.31 – 1.3	1.7^{E} 0.91 – 2.4

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 11: Cadmium – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	41.6	–	–	<LD	<LD	0.03^{E} 0.01 – 0.05	0.10 0.08 – 0.12	0.18 0.14 – 0.22	0.24^{E} 0.18 – 0.32
	Total	F	95	43.2	–	–	<LD	<LD	0.02^{E} 0.01 – 0.04	0.08 0.06 – 0.10	0.16^{E} 0.10 – 0.18	F
	Total	M	102	40.2	–	–	<LD	<LD	0.05^{E} 0.01 – 0.07	0.11 0.09 – 0.14	0.21^{E} 0.15 – 0.28	0.31^{E} 0.20 – 0.38
	Anishinabe communities (2)	Total	110	55.5	–	–	<LD	<LD	<LD	0.08 0.06 – 0.10	0.13^{E} 0.10 – 0.18	0.21^{E} 0.12 – 0.29
	Anishinabe communities (2)	F	55	54.5	–	–	<LD	<LD	<LD	0.07^{E} 0.03 – 0.08	F	0.16 .
	Anishinabe communities (2)	M	55	56.4	–	–	<LD	<LD	<LD	0.10 0.06 – 0.12	0.15^{E} 0.11 – 0.20	0.20^{E} 0.12 – 0.24
	Innu communities (2)	Total	87	24.1	0.10 0.08 – 0.12	0.05 0.04 – 0.07	<LD	0.01^{E} 0.01 – 0.03	0.06^{E} 0.04 – 0.08	0.14 0.09 – 0.17	0.21^{E} 0.17 – 0.27	0.28^{E} 0.19 – 0.40
	Innu communities (2)	F	40	27.5	0.08 0.05 – 0.10	0.04^{E} 0.03 – 0.06	<LD	<LD	F	0.11^{E} 0.07 – 0.16	0.17 0.12 – 0.19	0.18 .
	Innu communities (2)	M	47	21.3	0.11 0.08 – 0.15	0.06^{E} 0.05 – 0.09	<LD	F	0.07^{E} 0.05 – 0.10	0.14^{E} 0.09 – 0.20	0.27^{E} 0.16 – 0.39	0.37 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 12: Cadmium – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	41.6	–	–	<LD	<LD	0.03[E] 0.01 – 0.05	0.10 0.08 – 0.12	0.18 0.14 – 0.22	0.24[E] 0.18 – 0.32
	Total	3-5	38	65.8	–	–	<LD	<LD	<LD	F	0.09[E] 0.05 – 0.12	0.11 .
	Total	6-11	79	49.4	–	–	<LD	<LD	F	0.08 0.05 – 0.09	0.11 0.09 – 0.13	F
	Total	12-19	80	22.5	0.12 0.09 – 0.16	0.07 0.05 – 0.09	<LD	0.01[E] 0.01 – 0.04	0.08[E] 0.05 – 0.11	0.17 0.12 – 0.21	0.25[E] 0.19 – 0.38	F
	Anishinabe communities (2)	Total	110	55.5	–	–	<LD	<LD	<LD	0.08 0.06 – 0.10	0.13[E] 0.10 – 0.18	0.21[E] 0.12 – 0.29
	Anishinabe communities (2)	3-5	24	79.2	–	–	<LD	<LD	<LD	<LD	0.08 .	0.10 .
	Anishinabe communities (2)	6-11	46	65.2	–	–	<LD	<LD	<LD	0.06[E] 0.01 – 0.08	0.10 0.07 – 0.11	0.11 .
	Anishinabe communities (2)	12-19	40	30	0.11[E] 0.07 – 0.17	0.05[E] 0.04 – 0.08	<LD	<LD	F	0.13[E] 0.09 – 0.20	F	0.31 .
	Innu communities (2)	Total	87	24.1	0.10 0.08 – 0.12	0.05 0.04 – 0.07	<LD	0.01[E] 0.01 – 0.03	0.06[E] 0.04 – 0.08	0.14 0.09 – 0.17	0.21[E] 0.17 – 0.27	0.28[E] 0.19 – 0.40
	Innu communities (2)	3-5	14	42.9	–	–	<LD	<LD	F	F	0.09 .	0.12 .
	Innu communities (2)	6-11	33	27.3	0.07[E] 0.05 – 0.10	0.05[E] 0.03 – 0.06	<LD	<LD	0.04[E] 0.02 – 0.08	0.09[E] 0.06 – 0.13	F	0.17 .
	Innu communities (2)	12-19	40	15	0.14 0.10 – 0.18	0.08[E] 0.06 – 0.11	<LD	F	0.09[E] 0.05 – 0.16	0.18[E] 0.14 – 0.24	0.26[E] 0.18 – 0.42	0.39 .
CHMS (Cycle 2)	Total	3-5	573	10.99		0.23 0.19 – 0.28	<LD		0.25 0.21 – 0.30	0.40 0.33 – 0.47		F
	Total	6-11	1062	9.70		0.25 0.21 – 0.30	0.076 <LD – 0.095		0.27 0.21 – 0.32	0.43 0.33 – 0.54		0.86 0.64 – 1.1
	Total	12-19	1041	7.59		0.27 0.22 – 0.32	0.090 <LD – 0.12		0.30 0.24 – 0.36	0.47 0.38 – 0.56		0.81 0.68 – 0.94

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 13: Cadmium (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	41.6	–	–	<LD	<LD	0.06 0.04 – 0.08	0.11 0.10 – 0.14	0.26 0.19 – 0.34	0.36 0.31 – 0.42
	Total	F	95	43.2	–	–	<LD	<LD	0.05^{E} 0.03 – 0.08	0.11 0.09 – 0.13	0.24^{E} 0.13 – 0.34	0.35^{E} 0.22 – 0.39
	Total	M	102	40.2	–	–	<LD	<LD	0.06^{E} 0.04 – 0.08	0.14 0.10 – 0.19	0.25^{E} 0.19 – 0.36	0.38^{E} 0.24 – 0.51
	Anishinabe communities (2)	Total	110	55.5	–	–	<LD	<LD	<LD	0.12^{E} 0.09 – 0.22	0.35 0.23 – 0.39	0.42 0.34 – 0.55
	Anishinabe communities (2)	F	55	54.5	–	–	<LD	<LD	<LD	F	0.32^{E} 0.12 – 0.38	0.37 .
	Anishinabe communities (2)	M	55	56.4	–	–	<LD	<LD	<LD	0.19^{E} 0.08 – 0.31	0.37^{E} 0.22 – 0.48	0.47 .
	Innu communities (2)	Total	87	24.1	0.09 0.07 – 0.10	0.06 0.05 – 0.08	<LD	0.04 0.03 – 0.05	0.08 0.05 – 0.09	0.11 0.10 – 0.14	0.17 0.14 – 0.19	0.20^{E} 0.16 – 0.23
	Innu communities (2)	F	40	27.5	0.09 0.07 – 0.11	0.07 0.05 – 0.08	<LD	<LD	0.07^{E} 0.04 – 0.09	0.11 0.09 – 0.13	F	0.21 .
	Innu communities (2)	M	47	21.3	0.09 0.07 – 0.10	0.06 0.05 – 0.08	<LD	0.04^{E} 0.02 – 0.06	0.08 0.05 – 0.10	0.12 0.09 – 0.14	0.18 0.13 – 0.19	0.19 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 14: Cadmium (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	41.6	–	–	<LD	<LD	0.06 0.04 – 0.08	0.11 0.10 – 0.14	0.26 0.19 – 0.34	0.36 0.31 – 0.42
	Total	3-5	38	65.8	–	–	<LD	<LD	<LD	F	F	0.41 .
	Total	6-11	79	49.4	–	–	<LD	<LD	0.04^{E} 0.03 – 0.08	0.11^{E} 0.08 – 0.14	0.21^{E} 0.14 – 0.33	0.33^{E} 0.20 – 0.40
	Total	12-19	80	22.5	0.11 0.09 – 0.13	0.06 0.05 – 0.08	<LD	0.03^{E} 0.02 – 0.05	0.08 0.06 – 0.10	0.13 0.10 – 0.18	0.26^{E} 0.17 – 0.35	0.35^{E} 0.22 – 0.42
	Anishinabe communities (2)	Total	110	55.5	–	–	<LD	<LD	<LD	0.12^{E} 0.09 – 0.22	0.35 0.23 – 0.39	0.42 0.34 – 0.55
	Anishinabe communities (2)	3-5	24	79.2	–	–	<LD	<LD	<LD	<LD	0.38 .	0.55 .
	Anishinabe communities (2)	6-11	46	65.2	–	–	<LD	<LD	<LD	F	0.33^{E} 0.11 – 0.37	0.36 .
	Anishinabe communities (2)	12-19	40	30	0.12^{E} 0.08 – 0.17	0.05^{E} 0.03 – 0.09	<LD	<LD	0.08^{E} 0.02 – 0.11	F	0.35^{E} 0.20 – 0.42	0.41 .
	Innu communities (2)	Total	87	24.1	0.09 0.07 – 0.10	0.06 0.05 – 0.08	<LD	0.04 0.03 – 0.05	0.08 0.05 – 0.09	0.11 0.10 – 0.14	0.17 0.14 – 0.19	0.20^{E} 0.16 – 0.23
	Innu communities (2)	3-5	14	42.9	–	–	<LD	<LD	F	F	0.13 .	0.16 .
	Innu communities (2)	6-11	33	27.3	0.08 0.06 – 0.11	0.06 0.05 – 0.08	<LD	<LD	0.08^{E} 0.04 – 0.09	0.11 0.09 – 0.14	0.16^{E} 0.11 – 0.21	0.19 .
	Innu communities (2)	12-19	40	15	0.09 0.07 – 0.11	0.07 0.06 – 0.09	<LD	0.05^{E} 0.03 – 0.07	0.08 0.05 – 0.10	0.11E 0.09 – 0.15	0.18^{E} 0.13 – 0.20	0.19 .
CHMS (Cycle 2)	Total	3-5	572	11.01		0.39 0.33 – 0.47	<LD		0.42 0.36 – 0.49	0.58 0.50 – 0.66		F
	Total	6-11	1058	9.74		0.28 0.24 – 0.33	0.12 <LD – 0.15		0.28 0.24 – 0.32	0.42 0.34 – 0.51		0.80 0.67 – 0.94
	Total	12-19	1039	7.60		0.20 0.17 – 0.23	0.099 <LD – 0.12		0.20 0.18 – 0.23	0.27 0.23 – 0.32		0.46 0.34 – 0.58

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

INAC (Indigenous and Northern Affairs Canada) (2010). Metals of Concern, Fact Sheet Series. Cadmium. Consulted online: http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-YT/STAGING/texte-text/pubs-cfs-cadmium_1316123683181_eng.pdf

ATSDR (Agency for Toxic Substances Disease Registry) (2012). Toxicological profile for cadmium. Source: www.atsdr.cdc.gov/toxprofiles/tp5.pdf

CNESST (Commission des normes, de l'équité, de la santé et de la sécurité du travail (2016). Cadmium. Source: www.csst.qc.ca/prevention/reptox/Pages/fiche-complete.aspx?no_produit=4440

Government of Northwest Territories (2017). Moose organ consumption notice. Consulted online: www.hss.gov.nt.ca/sites/www.hss.gov.nt.ca/files/resources/moose-organ-consumption-notice.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

MAPAQ (Ministère de l'Agriculture, des Pêcheries et de l'Alimentation du Québec) 2014. La viande de gibier sauvage à l'intention des chasseurs. Government of Quebec. Consulted online: www.mapaq.gouv.qc.ca/fr/Publications/FIche_Gibier_public_web.pdf

WHO (World Health Organization) (2010). Exposure to cadmium: a major public health concern. Public Health and Environment. World Health Organization. Geneva, Switzerland. Consulted online: www.who.int/ipcs/features/cadmium.pdf?ua=1

Nieboer, E., Dewailly, E., Johnson-Down, L., Sampasa-Kanyinga, H., Château-Degat, M.-L., Egeland, G.M., Atikessé, L., Robinson, E., Torrie, J. (2013). Nituuchischaayihtitaau Aschii Multi-community Environment-and-Health Study in Eeyou Istchee 2005- 2009: Final Technical Report. Nieboer E, Robinson E, Petrov K, editors. Public Health Report Series 4 on the Health of the Population. Chisasibi QC: Cree Board of Health and Social Services of James Bay. Source: www.creehealth.org/sites/default/files/E-and-H%20Technical%20Report.pdf

Rey, M., Turcotte, F., Lapointe, C., Dewailly, E. (1997). High blood cadmium levels are not associated with consumption of traditional food among the Inuit of Nunavik. J. Toxicol. Environ Health. 51 (1), 5-14

Robillard, S., Beauchamp, G., Paillard, G., Bélanger, D. (2002) Levels of cadmium, lead, mercury and ^{137}caesium in caribou (Rangifer Tarandus) tissues from Northern Québec. Arctic, 55 (1), 1-9.

6.1.4. Mercury

Mercury is a metal found in the Earth's crust. It exists in various chemical forms (elementary, organic and inorganic) (Health Canada, 2009). Today, mercury is used in the manufacture of scientific instruments (thermometers, barometers, manometers), in the production of chlorine and caustic soda, in certain batteries, compact fluorescent bulbs, fluorescent lamps and tubes, and certain types of dental amalgam (grey fillings) (CNESST, 2016).

Mercury is naturally released into the environment by volcanoes and rock erosion and is found in the air, water and soil (WHO, 2017). Certain industries, such as carbon plants, incinerators and some mines can also release mercury into the environment (WHO, 2017). Hydroelectric dams, logging and oil sands development may also contribute to releasing mercury into the environment (Pirkle, 2016). The mercury may then be dispersed over long distances by wind and sea currents and accumulate in aquatic ecosystems further north and in the Arctic (AMAP, 2015).

In water, bacteria transform inorganic mercury into organic mercury (or methylmercury). Methylmercury will be bioaccumulated by aquatic organisms and biomagnified in organisms at the top of the aquatic food chain (UNEP, 2013). Human populations are exposed to methylmercury mainly through the consumption of piscivorous fish and marine mammals (AMAP, 2015). Mercury levels in fish vary depending on species, age, and habitat. Thus, piscivorous fish tend to accumulate more mercury in their flesh than insectivore species. It is also recognized that for a given species, the larger and older the fish, the more mercury it will accumulate. As for fish living in recently flooded hydroelectric reservoirs or downstream from these reservoirs, they will have a higher level of mercury contamination for few decades. This level will eventually decrease and return to a level similar to that which existed before the flooding (Laliberté, 2004).

Chronic exposure to mercury, even at low levels, can cause health issues, especially on neurological functions (Health Canada, 2009). Given their traditional lifestyle, Indigenous communities have a higher risk of exposure to mercury. Moreover, pregnant women (because the fetus is quite vulnerable), women of childbearing age and young children are particularly vulnerable to the effects of methylmercury, as it can cross the placenta and the blood-brain barrier (Pirkle et al., 2016). In populations with high exposure to mercury, such as the Inuit of Nunavik, mercury exposure during pregnancy is associated with premature births and is harmful to the normal development of the nervous system in children (intelligence, attention, memory, behaviour, vision). In childhood, exposure to mercury is also associated with decreased motor skills, while in adulthood, exposure is associated with high blood pressure, an impairment motor and visual functions and a decrease in the heart's ability to adjust to stress (Pirkle et al., 2016).

However, it is important to emphasize the numerous benefits of eating fish. Fish are an excellent source of protein, vitamins, minerals, and omega-3 polyunsaturated fatty acids. Fish are also low in saturated fat and cholesterol (MSSS, 2017). Canada's Food Guide recommends eating at least two fish meals per week (Health Canada, 2011).

For recommendations on fish consumption based on their mercury levels, consult the guides issued by regional or provincial authorities.

- Recommendations for fresh water fish from the various lakes and rivers in the province of Quebec are available on the following website: www.mddelcc.gouv.qc.ca/eau/guide/.

- Recommendations for fish species sold in stores in Canada are available at: https://www.canada.ca/en/health-canada/services/food-nutrition/food-safety/chemical-contaminants/environmental-contaminants/mercury/mercury-fish.html

CTQ's reporting threshold for blood mercury is 12 µg/L (60 nmol/L) (INSPQ, 2016). In Canada, a preliminary reference value of 8 µg/L of methylmercury has been issued for children, pregnant women, and women of childbearing age (Legrand et al., 2010).

Results

Levels of total mercury were measured in blood for all participants in the JES!-YEH! study and were reported in terms of µg/L of blood (Tables 15 and 16). In populations that regularly consume fish, the measurement of total mercury reflects exposure to methylmercury (Pirkle et al., 2016). Since methylmercury accumulates in red blood cells, levels of blood mercury reflect exposure to this substance over the past three months (Pirkle et al., 2016). A measurable level of mercury does not necessarily mean that it will have negative health effects.

All participants in the JES!-YEH! study had blood mercury levels below the CTQ's reporting threshold. However, three of them had mercury concentrations that exceeded the values established by Health Canada (between 8 and 12 µg/L). In the CHMS (Cycle 3), blood mercury was not detected in more than 40% of participants and the geometric means were not calculated. Therefore, it was not possible to compare the data from this study with the CHMS (Table 16). However, it should be noted that the percentage of participants with detectable levels of blood mercury was higher than in the CHMS (Cycle 3) across all three age groups.

Table 15: Mercury – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	13.9	1.10 0.87 – 1.35	0.47 0.39 – 0.57	<LD	0.18 0.12 – 0.20	0.48 0.41 – 0.60	1.11 0.93 – 1.38	2.67 1.99 – 3.37	4.44^{E} 3.02 – 6.85
	Total	F	92	16.3	1.22 0.87 – 1.61	0.51 0.38 – 0.67	<LD	0.19^{E} 0.08 – 0.32	0.56^{E} 0.40 – 0.77	1.22^{E} 0.89 – 1.71	2.79^{E} 1.75 – 4.57	4.93^{E} 2.67 – 7.40
	Total	M	102	11.8	0.99 0.70 – 1.32	0.44 0.34 – 0.57	<LD	0.18 0.12 – 0.20	0.44 0.34 – 0.53	1.05^{E} 0.69 – 1.39	2.17^{E} 1.46 – 3.36	3.40^{E} 2.02 – 6.76
	Anishinabe communities (2)	Total	107	14	1.47 1.09 – 1.90	0.57 0.43 – 0.75	<LD	0.18^{E} 0.11 – 0.32	0.61^{E} 0.44 – 0.89	1.43^{E} 1.07 – 2.21	4.27^{E} 2.43 – 6.30	6.88^{E} 3.72 – 8.29
	Anishinabe communities (2)	F	52	21.2	1.57^{E} 1.00 – 2.23	0.52^{E} 0.34 – 0.79	<LD	F	0.54^{E} 0.30 – 0.89	1.78^{E} 0.87 – 2.71	4.53^{E} 2.21 – 7.13	6.86 .
	Anishinabe communities (2)	M	55	7.3	1.37^{E} 0.91 – 1.91	0.63^{E} 0.45 – 0.89	0.09^{E} 0.05 – 0.17	0.24^{E} 0.14 – 0.44	0.63^{E} 0.41 – 0.97	F	F	5.22 .
	Innu communities (2)	Total	87	13.8	0.65 0.51 – 0.80	0.36 0.29 – 0.47	<LD	0.17^{E} 0.10 – 0.19	0.42^{E} 0.20 – 0.52	0.80^{E} 0.56 – 1.09	1.47^{E} 1.07 – 2.07	2.14^{E} 1.39 – 2.85
	Innu communities (2)	F	40	10	0.76 0.55 – 0.97	0.48^{E} 0.35 – 0.66	<LD	F	0.56^{E} 0.36 – 0.77	1.01 0.71 – 1.24	1.40^{E} 1.07 – 2.39	2.21 .
	Innu communities (2)	M	47	17	0.55^{E} 0.36 – 0.78	0.29^{E} 0.20 – 0.41	<LD	0.12^{E} 0.05 – 0.18	0.20 0.17 – 0.43	0.52^{E} 0.42 – 0.96	1.65^{E} 0.54 – 2.15	2.00 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 16: Mercury – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	13.9	1.10 0.87 – 1.35	0.47 0.39 – 0.57	<LD	0.18 0.12 – 0.20	0.48 0.41 – 0.60	1.11 0.93 – 1.38	2.67 1.99 – 3.37	4.44^{E} 3.02 – 6.85
	Total	3-5	36	30.6	0.91^{E} 0.44 – 1.46	0.28^{E} 0.17 – 0.49	<LD	<LD	0.19^{E} 0.10 – 0.40	F	F	4.05 .
	Total	6-11	78	7.7	1.31^{E} 0.88 – 1.83	0.57 0.43 – 0.77	0.11^{E} 0.05 – 0.17	0.20 0.15 – 0.34	0.52^{E} 0.41 – 0.75	1.17^{E} 0.86 – 2.11	F	F
	Total	12-19	80	12.5	0.98 0.72 – 1.28	0.49 0.36 – 0.64	<LD	F	0.53 0.43 – 0.73	1.07 0.85 – 1.43	1.97^{E} 1.38 – 3.25	F
	Anishinabe communities (2)	Total	107	14	1.47 1.09 – 1.90	0.57 0.43 – 0.75	<LD	0.18^{E} 0.11 – 0.32	0.61^{E} 0.44 – 0.89	1.43^{E} 1.07 – 2.21	4.27^{E} 2.43 – 6.30	6.88^{E} 3.72 – 8.29
	Anishinabe communities (2)	3-5	22	27.3	1.32^{E} 0.60 – 2.17	F	<LD	<LD	F	F	3.77 .	4.54 .
	Anishinabe communities (2)	6-11	45	4.4	1.72^{E} 0.98 – 2.56	0.71^{E} 0.47 – 1.06	0.11 .	F	0.67^{E} 0.39 – 1.04	1.82^{E} 0.92 – 2.96	F	8.07 .
	Anishinabe communities (2)	12-19	40	17.5	1.27^{E} 0.80 – 1.84	0.53^{E} 0.34 – 0.81	<LD	F	0.59^{E} 0.38 – 0.95	F	F	4.41 .
	Innu communities (2)	Total	87	13.8	0.65 0.51 – 0.80	0.36 0.29 – 0.47	<LD	0.17^{E} 0.10 – 0.19	0.42E 0.20 – 0.52	0.80^{E} 0.56 – 1.09	1.47^{E} 1.07 – 2.07	2.14^{E} 1.39 – 2.85
	Innu communities (2)	3-5	14	35.7	F	0.15^{E} 0.09 – 0.27	<LD	<LD	F	F	0.51 .	0.76 .
	Innu communities (2)	6-11	33	12.1	0.75^{E} 0.50 – 1.04	0.42^{E} 0.29 – 0.62	<LD	0.19^{E} 0.05 – 0.34	0.43^{E} 0.20 – 0.68	F	1.93E 0.86 – 2.60	2.42 .
	Innu communities (2)	12-19	40	7.5	0.70 0.52 – 0.93	0.44 0.32 – 0.61	0.09 .	0.19^{E} 0.13 – 0.38	0.48^{E} 0.27 – 0.70	0.94^{E} 0.59 – 1.24	F	2.01 .
CHMS (Cycle 3)	Total	3-5	471	59.45		–	<LD		<LD		1.3 1.0 – 1.7	1.7^{E} 0.88 – 2.5
	Total	6-11	944	54.77		–	<LD		<LD		1.2 0.78 – 1.7	1.9^{E} 0.91 – 2.9
	Total	12-19	977	52.61		–	<LD		<LD		1.6^{E} 0.62 – 2.6	2.8^{E} 1.3 – 4.4

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

AMAP (Arctic Monitoring Assessment Programme) (2015). Assessment 2015: Human Health in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. vii + 165 pp.

CNESST (Commission des normes, de l'équité, de la santé et de la sécurité du travail) (2016) Mercure. Source: www.csst.qc.ca/prevention/reptox/pages/fiche-complete.aspx?no_produit=4309

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

MSSS (Ministère de la Santé et des Services sociaux Government of Quebec (2017). Consommation de poisson et santé. Government of Quebec. Consulted online: sante.gouv.qc.ca/chroniques/consommation-de-poisson-et-sante/

Laliberté, D., (2004). Répertoire des données sur les teneurs en mercure dans la chair des poissons du Québec pour la période de 1976 à 1999 inclusivement, Québec, ministère de l'Environnement, Direction du suivi de l'état de l'environnement, Envirodoq n° ENV/2004/0375, collection n° QE/153, 66 p.

Legrand, M., Freeley, M., Tikhonov, C., Schoen, D., Li-Mueller, A. (2010). Methylmercury blood guidance values for Canada. Can J Public Health. 101 (1), 28-31.

WHO (World Health Organization) (2017) Mercury and health. Consulted online: http://www.who.int/mediacentre/factsheets/fs361/en/

Pirkle, C.M., Muckle, G., Lemire, M. (2016) Managing mercury exposure in northern Canadian communities. CMAJ. 188 (14), 1015-1023.

Health Canada (2009) Mercury and Human Health. Government of Canada. Source: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/environ/merc2008-eng.pdf

Health Canada (2011). Canada's Food Guide. Source: http://www.hc-sc.gc.ca/fn-an/alt_formats/hpfb-dgpsa/pdf/food-guide-aliment/view_eatwell_vue_bienmang-eng.pdf

UNEP (United Nations Environment Programme) (2013). Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport. UNEP Chemicals Branch, Geneva, Switzerland.

6.1.5.Nickel

Nickel is a metal present in the Earth's crust, and it is often associated with other metals such as sulphur, arsenic or antimony. In the 1990s, Canada was the second-biggest producer of nickel in the world. In particular, nickel is used to manufacture stainless steel, coins, and jewellery, not to mention its numerous applications in the chemical, electronic and medical industries (ATSDR, 2005; Environment Canada and Health Canada, 1994)

Nickel is released into the environment by natural processes. Furthermore, mines and industries, fossil fuel combustion, and incineration of household waste also release nickel into the environment (ATSDR, 2005).

Food is the main route of exposure to nickel for the population in general. Chocolate, soy, nuts, and wheat naturally contain high amounts of nickel. Water consumption, breathing, and cigarette smoke are other possible routes. Nickel exposure also takes place when touching coins or other metals that contain nickel (ATSDR, 2005).

Allergic dermatitis is the most commonly encountered effect of skin contact with nickel. Approximately 10 to 20% of the population are more vulnerable to the effects of nickel. Potentially harmful effects have also been recorded for the pulmonary and reproductive systems, but these impacts have been observed only in occupational exposure to nickel (ATSDR, 2005).

At the time of the JES!-YEH! study, the CTQ laboratories' reporting threshold for urine nickel was 15 µg/L (250 nmol/L) (INSPQ, 2004). However, this threshold was abolished in January 2017 (INSPQ, 2016). At the federal level, no toxicological threshold has been established.

Results

Nickel levels were measured in urine for all JES!-YEH! participants and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 17 – 20). Urine nickel levels reflect recent exposure to this substance. A measurable level of nickel does not necessarily mean that it will have negative health effects.

All participants in the JES!-YEH! study had urine nickel levels below the CTQ's reporting threshold (valid at the time of the study in 2015). Furthermore, these levels were similar to the averages in the CHMS (Cycle 2) (Table 20) across all three age groups.

Table 17: Nickel – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	3.6	1.75 1.55 – 1.96	1.21 1.06 – 1.38	0.37^{E} 0.20 – 0.53	0.77 0.58 – 0.92	1.32 1.16 – 1.53	2.21 1.93 – 2.49	3.63 2.89 – 4.12	4.31 3.94 – 5.95
	Total	F	95	3.2	1.73 1.46 – 2.02	1.14 0.93 – 1.39	0.22^{E} 0.14 – 0.47	0.58^{E} 0.48 – 0.89	1.25 1.01 – 1.55	2.35 1.81 – 2.80	3.93 2.81 – 4.22	4.29^{E} 3.60 – 6.48
	Total	M	102	3.9	1.77 1.49 – 2.09	1.29 1.06 – 1.52	0.54^{E} 0.21 – 0.71	0.86 0.72 – 0.98	1.41 1.13 – 1.59	2.15 1.80 – 2.48	3.32 2.46 – 4.19	4.27^{E} 3.23 – 5.92
	Anishinabe communities (2)	Total	110	4.5	1.89 1.62 – 2.19	1.28 1.07 – 1.54	0.45^{E} 0.12 – 0.58	0.83 0.59 – 0.98	1.43 1.17 – 1.86	2.44 2.12 – 2.86	3.93 2.90 – 4.42	4.70^{E} 3.44 – 6.81
	Anishinabe communities (2)	F	55	3.6	2.05 1.61 – 2.49	1.36 1.03 – 1.79	F	0.79^{E} 0.50 – 1.16	1.45^{E} 1.16 – 2.12	2.77 2.10 – 3.17	4.11^{E} 2.85 – 5.74	5.31 .
	Anishinabe communities (2)	M	55	5.5	1.73 1.37 – 2.12	1.21 0.90 – 1.54	F	0.81 0.55 – 0.99	1.37^{E} 0.96 – 1.84	2.18 1.82 – 2.84	3.20^{E} 2.27 – 4.08	4.02 .
	Innu communities (2)	Total	87	2.3	1.58 1.31 – 1.85	1.13 0.92 – 1.35	F	0.69 0.54 – 0.92	1.24 0.98 – 1.46	1.83 1.61 – 2.36	3.36 2.32 – 4.02	4.07^{E} 2.92 – 5.01
	Innu communities (2)	F	40	2.5	1.29 0.98 – 1.60	0.89 0.65 – 1.16	0.16 .	0.52^{E} 0.21 – 0.61	0.97^{E} 0.57 – 1.29	1.64^{E} 1.20 – 2.25	2.41^{E} 1.70 – 3.91	3.88 .
	Innu communities (2)	M	47	2.1	1.82 1.43 – 2.30	1.39 1.08 – 1.73	0.60^{E} 0.22 – 0.85	0.95 0.69 – 1.12	1.38 1.08 – 1.63	1.89 1.61 – 2.55	3.65^{E} 2.11 – 4.82	4.49 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 18: Nickel (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	3.6	3.29E 2.10 – 5.51	1.67 1.44 – 1.89	0.50 0.44 – 0.66	1.06 0.86 – 1.21	1.71 1.53 – 1.98	2.83 2.56 – 3.37	5.19 4.08 – 5.74	6.48 5.45 – 8.25
	Total	F	95	3.2	F	1.77 1.46 – 2.15	0.48E 0.34 – 0.76	1.08 0.80 – 1.25	1.93 1.42 – 2.34	2.97 2.48 – 3.66	5.06 3.66 – 5.86	F
	Total	M	102	3.9	2.31 1.92 – 2.71	1.57 1.27 – 1.91	0.52E 0.41 – 0.76	1.03 0.78 – 1.30	1.65 1.45 – 1.84	2.65 2.24 – 3.48	5.35 3.56 – 6.30	6.41 5.18 – 8.36
	Anishinabe communities (2)	Total	110	4.5	F	1.97 1.59 – 2.40	0.49E 0.34 – 0.78	1.31 0.93 – 1.61	2.30 1.81 – 2.63	3.59 2.94 – 4.43	5.50 4.56 – 7.03	7.46 5.46 – 8.65
	Anishinabe communities (2)	F	55	3.6	F	2.21 1.66 – 2.95	F	1.38E 0.61 – 1.92	2.57 1.89 – 2.98	3.71 2.96 – 4.87	5.35E 4.09 – 7.68	7.21 .
	Anishinabe communities (2)	M	55	5.5	2.63 2.10 – 3.20	1.75 1.27 – 2.30	F	1.19E 0.62 – 1.58	1.92 1.59 – 2.55	3.25E 2.54 – 4.61	5.67E 3.62 – 7.42	7.19 .
	Innu communities (2)	Total	87	2.3	1.81 1.51 – 2.15	1.35 1.13 – 1.59	0.53E 0.43 – 0.72	0.91 0.73 – 1.09	1.35 1.18 – 1.55	2.19 1.65 – 2.45	2.77E 2.39 – 5.47	5.53E 2.64 – 6.72
	Innu communities (2)	F	40	2.5	1.67 1.30 – 2.13	1.30 1.04 – 1.60	0.52E 0.23 – 0.79	0.86E 0.58 – 1.13	1.22 1.10 – 1.50	2.24 1.41 – 2.45	F	3.04 .
	Innu communities (2)	M	47	2.1	1.92 1.46 – 2.43	1.39 1.05 – 1.75	0.59E 0.28 – 0.80	0.93 0.69 – 1.17	1.44 1.09 – 1.62	2.07 1.58 – 2.64	3.79E 2.17 – 5.66	5.57 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 19: Nickel – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	3.6	1.75 1.55 – 1.96	1.21 1.06 – 1.38	0.37^{E} 0.20 – 0.53	0.77 0.58 – 0.92	1.32 1.16 – 1.53	2.21 1.93 – 2.49	3.63 2.89 – 4.12	4.31 3.94 – 5.95
	Total	3-5	38	0	1.63 1.20 – 2.23	1.20 0.94 – 1.54	0.43 .	0.73^{E} 0.53 – 0.96	1.15 0.87 – 1.54	1.97 1.35 – 2.26	F	4.31 .
	Total	6-11	79	2.5	1.80 1.54 – 2.09	1.34 1.09 – 1.63	0.49^{E} 0.18 – 0.64	0.87 0.61 – 1.06	1.44 1.11 – 1.85	2.48 2.05 – 2.92	3.29 2.88 – 3.99	4.00^{E} 3.23 – 4.36
	Total	12-19	80	6.3	1.76 1.42 – 2.14	1.11 0.86 – 1.39	F	0.59^{E} 0.52 – 0.92	1.29 0.98 – 1.52	2.00 1.65 – 2.58	4.05^{E} 2.48 – 4.86	4.93^{E} 3.88 – 6.99
	Anishinabe communities (2)	Total	110	4.5	1.89 1.62 – 2.19	1.28 1.07 – 1.54	0.45^{E} 0.12 – 0.58	0.83 0.59 – 0.98	1.43 1.17 – 1.86	2.44 2.12 – 2.86	3.93 2.90 – 4.42	4.70^{E} 3.44 – 6.81
	Anishinabe communities (2)	3-5	24	0	1.74^{E} 1.25 – 2.39	1.36 1.02 – 1.81	0.55 .	0.82^{E} 0.55 – 1.12	1.29^{E} 0.91 – 1.89	2.09 1.40 – 2.44	2.62 .	3.89 .
	Anishinabe communities (2)	6-11	46	4.3	1.85 1.50 – 2.21	1.32 0.97 – 1.76	0.47^{E} 0.06 – 0.68	0.79^{E} 0.53 – 1.11	1.47^{E} 1.05 – 2.25	2.83 2.16 – 3.07	3.31 2.91 – 4.09	4.02 .
	Anishinabe communities (2)	12-19	40	7.5	2.02 1.45 – 2.64	1.19^{E} 0.82 – 1.72	F	0.73^{E} 0.26 – 1.16	1.43^{E} 0.99 – 1.91	2.17^{E} 1.66 – 3.44	4.93^{E} 2.28 – 6.93	6.46 .
	Innu communities (2)	Total	87	2.3	1.58 1.31 – 1.85	1.13 0.92 – 1.35	F	0.69 0.54 – 0.92	1.24 0.98 – 1.46	1.83 1.61 – 2.36	3.36 2.32 – 4.02	4.07^{E} 2.92 – 5.01
	Innu communities (2)	3-5	14	0	1.45^{E} 0.82 – 2.56	0.97^{E} 0.64 – 1.59	0.23 .	0.55 .	0.94^{E} 0.54 – 1.35	F	2.13 .	3.80 .
	Innu communities (2)	6-11	33	0	1.73 1.31 – 2.18	1.36 1.05 – 1.71	0.51 .	0.92^{E} 0.53 – 1.14	1.32 1.01 – 1.73	2.06 1.60 – 2.46	F	3.69 .
	Innu communities (2)	12-19	40	5	1.50 1.13 – 1.88	1.03 0.73 – 1.39	0.26 .	0.58^{E} 0.33 – 0.90	1.17 0.80 – 1.50	1.73^{E} 1.39 – 2.54	3.88^{E} 1.76 – 4.13	4.11 .
CHMS (Cycle 2)	Total	3-5	573	4.36		1.4 1.3 – 1.6	0.58 0.45 – 0.72		1.4 1.2 – 1.6	2.3 2.0 – 2.6		4.5 3.4 – 5.6
	Total	6-11	1061	2.45		1.7 1.6 – 1.8	0.59 0.53 – 0.64		1.7 1.5 – 1.9	2.8 2.5 – 3.2		5.8 5.1 – 6.4
	Total	12-19	1041	3.07		1.6 1.5 – 1.8	0.56 0.46 – 0.67		1.7 1.5 – 1.8	2.7 2.5 – 3.0		4.7 4.1 – 5.3

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 20: Nickel (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	3.6	3.29^{E} 2.10 – 5.51	1.67 1.44 – 1.89	0.50 0.44 – 0.66	1.06 0.86 – 1.21	1.71 1.53 – 1.98	2.83 2.56 – 3.37	5.19 4.08 – 5.74	6.48 5.45 – 8.25
	Total	3-5	38	0	F	2.59 1.96 – 3.64	0.94 .	1.37 1.01 – 1.70	2.56 1.59 – 2.97	3.58^{E} 2.75 – 5.61	F	8.20 .
	Total	6-11	79	2.5	2.85 2.36 – 3.32	2.13 1.76 – 2.57	0.77^{E} 0.46 – 1.10	1.32 1.08 – 1.67	2.26 1.73 – 2.48	3.71 2.64 – 4.85	5.63 4.57 – 7.69	7.69 5.38 – 8.61
	Total	12-19	80	6.3	1.51 1.25 – 1.77	1.06 0.84 – 1.27	0.37^{E} 0.08 – 0.49	0.63^{E} 0.49 – 0.86	1.22 1.02 – 1.44	2.05 1.54 – 2.47	2.74 2.42 – 3.48	3.55^{E} 2.59 – 4.79
	Anishinabe communities (2)	Total	110	4.5	F	1.97 1.59 – 2.40	0.49^{E} 0.34 – 0.78	1.31 0.93 – 1.61	2.30 1.81 – 2.63	3.59 2.94 – 4.43	5.50 4.56 – 7.03	7.46 5.46 – 8.65
	Anishinabe communities (2)	3-5	24	0	F	3.17^{E} 2.15 – 5.19	1.10 .	1.61^{E} 1.12 – 2.59	2.73E 1.73 – 3.57	F	7.36 .	9.69 .
	Anishinabe communities (2)	6-11	46	4.3	3.19 2.57 – 3.79	2.39 1.83 – 3.07	F	1.69^{E} 0.96 – 2.29	2.62 2.21 – 3.45	4.11 3.04 – 5.09	5.63 4.35 – 8.31	7.97 .
	Anishinabe communities (2)	12-19	40	7.5	1.84 1.38 – 2.30	1.18^{E} 0.81 – 1.65	F	F	1.53^{E} 1.00 – 1.94	2.57 1.81 – 2.97	3.55^{E} 2.58 – 4.80	4.54 .
	Innu communities (2)	Total	87	2.3	1.81 1.51 – 2.15	1.35 1.13 – 1.59	0.53^{E} 0.43 – 0.72	0.91 0.73 – 1.09	1.35 1.18 – 1.55	2.19 1.65 – 2.45	2.77^{E} 2.39 – 5.47	5.53^{E} 2.64 – 6.72
	Innu communities (2)	3-5	14	0	2.25^{E} 1.50 – 3.18	1.83^{E} 1.33 – 2.60	0.85 .	1.01 .	1.54^{E} 1.01 – 2.64	F	4.57 .	5.47 .
	Innu communities (2)	6-11	33	0	2.37 1.70 – 3.11	1.82 1.44 – 2.34	0.84 .	1.16 0.88 – 1.41	1.66 1.30 – 2.14	F	5.36^{E} 2.37 – 7.48	6.75 .
	Innu communities (2)	12-19	40	5	1.19 0.97 – 1.39	0.95 0.70 – 1.18	0.46^{E} 0.11 – 0.57	0.63 0.48 – 0.81	1.11 0.77 – 1.32	1.45^{E} 1.22 – 2.06	2.31 1.52 – 2.47	2.45 .
CHMS (Cycle 2)	Total	3-5	572	4.37		2.4 2.1 – 2.7	1.0 0.75 – 1.3		2.4 2.0 – 2.8	3.5 3.2 – 3.9		6.1 5.0 – 7.2
	Total	6-11	1057	2.46		1.9 1.8 – 2.0	0.93 0.86 – 1.0		1.9 1.8 – 2.1	2.7 2.5 – 2.9		5.7 4.7 – 6.7
	Total	12-19	1039	3.08		1.2 1.1 – 1.3	0.58 0.51 – 0.46		1.1 1.1 – 1.2	1.8 1.6 – 2.0		3.0 2.7 – 3.3

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2005). Toxicological Profile for nickel. Source: www.atsdr.cdc.gov/ToxProfiles/tp15.pdf

Environment Canada and Health Canada (1994). Priority Substances List Assessment: Nickel and its Compounds. Government of Canada. Consulted online: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/environmental-contaminants/canadian-environmental-protection-act-priority-substances-list-assessment-report-nickel-compounds.html

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

6.1.6. Lead

Lead is found abundantly in the Earth's crust. Several countries mine this mineral, including Canada (Natural Resources Canada, 2017). Lead is used in batteries, ammunition (shot and bullets), fishing weights, computer and television screens, certain plumbing pipes, stained glass welding, and low-end jewellery, etc. It is also found in cigarettes. Lead has been banned from gasoline and paint for several years (Health Canada, 2009).

There is no safety threshold with regard to exposure to lead (WHO, 2016). Lead tends to accumulate mainly in the bones. Significant physiological changes, such as growth in children and pregnancy, release lead stored in the bones. It is also found in the blood and is then absorbed by various organs such as the brain, kidneys, and liver (WHO, 2016).

The general population is exposed to lead through food, drinking water, soil, ambient air and household dust (ATSDR, 2007). The scientific literature reports that even at low levels of exposure, lead can have harmful effects, particularly in children. Even mild exposure to lead can cause learning difficulties and behavioural problems in children (ACCLPP, 2012). Exposure to lead has also been associated with elevated blood pressure in adults (Fachehoun et al, 2015).

In 1999, Canada banned the use of lead shot to hunt migratory birds. This ban occurred following the discovery of harmful and fatal effects on birds and wildlife. However, other lead ammunition (e.g., lead bullets) is still available and remains legal for use in hunting. Furthermore, some Indigenous communities in Quebec sometimes still use lead shot when hunting. Meat from game hunted with lead ammunition contains fragments of lead, which increases the exposure of those who consume it (Couture et al., 2012; Nieboer et al., 2013). Lead shot, bullet fragments, and the carcasses and organs of animals that have been hunted with lead ammunition and abandoned in the environment may also contaminate the soil, waterways, and the wildlife and flora present there (Legagneux et al., 2014; Thomas, 1997).

Today, it is possible to hunt without using lead ammunition. Alternatives include steel, bismuth or tungsten shot instead of lead shot, and copper bullets instead of lead bullets.

In 2015, when the JES!-YEH! project was conducted, the reporting threshold for blood lead in Quebec was greater than or equal to 100 µg/L (INSPQ, 2004). However, since the effects of low concentrations of lead are now better known, this standard was recently lowered in Quebec (INSPQ, 2016). Thus, as of January 2017, the new reporting threshold for blood lead are:

- For children 0-11 years old: ≥ 50 µg/L (or 0.25 µmol/L)
- For youth 12 years and older: ≥ 100 µg/L (or 0.50 µmol/L)

As for Health Canada, it recommends a level of intervention of 10 µg/dl (or 100 µg/L) for blood lead. However, the federal government is in the process of revising this threshold because scientific data show that there may be harmful effects at levels below 10 µg/L and even below 5 µg/L (Health Canada, 2013). Moreover, in April 2017, Canadian authorities announced that they were considering lowering the Canadian threshold for lead in drinking water by half, and testing the water in schools and daycare centres once a year.[4]

[4] http://ici.radio-canada.ca/nouvelle/1027518/sante-canada-reduire-plomb-eau-surveillance-ecoles-garderies

Results

Lead levels were measured in blood for all participants in the JES!-YEH! project and were reported in terms of µg/L of blood (Tables 21 and 22). Measuring levels of lead in the blood is the method of choice for assessing lead exposure (recent and chronic) and its effects on health.

As explained above, the reporting thresholds for blood lead were changed in January 2017. Based on the thresholds in force at the time of the study in 2015, all participants in the JES!-YEH! study had blood lead levels below the level of action. However, if the JES!-YEH! project had taken place in 2017, there would have been one female participant who had lead levels slightly above the new Quebec threshold for the 0-11 year-old age group.

Blood lead levels measured in the JES!-YEH! study for the 3-5 year old age group tended to be higher than those in the CHMS (Cycle 3), although they were not significantly different. As for the 6-11 and 12-19 age groups, their blood lead levels measured in the JES!-YEH! study were significantly lower than those in the CHMS (Cycle 3) (Table 22).

Table 21: Lead – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	6.84 6.22 – 7.55	5.92 5.53 – 6.36	3.01 2.86 – 3.34	4.18 3.82 – 4.61	5.74 5.32 – 6.31	8.31 7.45 – 8.89	10.77 9.39 – 11.46	12.43 11.07 – 16.17
	Total	F	92	0	5.95 5.07 – 7.21	5.07 4.57 – 5.61	2.84 2.40 – 3.10	3.42 3.14 – 4.10	4.87 4.35 – 5.39	6.76 5.86 – 7.69	9.10 7.55 – 10.98	F
	Total	M	102	0	7.64 6.87 – 8.43	6.81 6.23 – 7.42	3.41 2.97 – 4.44	4.87 4.49 – 5.53	7.06 5.98 – 7.66	8.92 8.28 – 9.69	11.14 9.70 – 13.15	13.29[E] 11.10 – 18.32
	Anishinabe communities (2)	Total	107	0	6.42 5.58 – 7.53	5.55 5.04 – 6.13	3.02 2.73 – 3.42	4.10 3.45 – 4.47	5.24 4.72 – 5.93	7.41 6.42 – 8.70	9.70 8.69 – 11.13	11.14 9.56 – 15.90
	Anishinabe communities (2)	F	52	0	6.02 4.66 – 8.10	4.90 4.26 – 5.67	2.95 1.86 – 3.35	3.42 3.09 – 4.16	4.70 4.16 – 5.23	5.97 5.22 – 6.85	8.41[E] 6.07 – 10.88	10.30 .
	Anishinabe communities (2)	M	55	0	6.79 6.02 – 7.57	6.24 5.54 – 6.96	3.48 2.90 – 4.24	4.53 4.00 – 5.03	6.45 4.98 – 7.36	8.38 7.33 – 9.54	10.39 8.89 – 11.14	11.13 .
	Innu communities (2)	Total	87	0	7.37 6.50 – 8.25	6.41 5.78 – 7.11	2.98 2.77 – 3.37	4.69 3.36 – 5.33	6.54 5.70 – 7.32	8.84 8.06 – 9.46	11.34 9.42 – 12.96	13.16[E] 11.03 – 20.43
	Innu communities (2)	F	40	0	5.86 5.10 – 6.65	5.29 4.62 – 6.09	2.81 .	3.23 2.85 – 4.33	5.26 4.19 – 6.56	7.31 5.97 – 8.97	9.43 7.72 – 11.10	11.04 .
	Innu communities (2)	M	47	0	8.65 7.22 – 10.21	7.55 6.53 – 8.76	3.35[E] 2.67 – 5.33	5.66 4.84 – 6.24	7.78 6.09 – 8.53	9.33 8.47 – 11.37	F	17.61 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 22: Lead – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	6.84 6.22 – 7.55	5.92 5.53 – 6.36	3.01 2.86 – 3.34	4.18 3.82 – 4.61	5.74 5.32 – 6.31	8.31 7.45 – 8.89	10.77 9.39 – 11.46	12.43 11.07 – 16.17
	Total	3-5	36	0	9.71 7.72 – 12.67	8.38 7.24 – 9.86	4.59 .	5.70 4.94 – 7.08	7.81 6.59 – 9.32	10.15 8.92 – 12.14	F	17.28 .
	Total	6-11	78	0	6.65 5.93 – 7.44	6.05 5.51 – 6.63	3.56 3.19 – 4.17	4.52 4.15 – 4.95	5.91 5.08 – 6.49	7.97 6.94 – 8.91	9.39 8.83 – 11.14	F
	Total	12-19	80	0	5.74 4.98 – 6.61	4.96 4.43 – 5.55	2.82 2.32 – 2.94	3.15 2.93 – 3.63	4.72 3.95 – 5.50	7.31 6.06 – 8.20	8.85 8.05 – 10.84	F
	Anishinabe communities (2)	Total	107	0	6.42 5.58 – 7.53	5.55 5.04 – 6.13	3.02 2.73 – 3.42	4.10 3.45 – 4.47	5.24 4.72 – 5.93	7.41 6.42 – 8.70	9.70 8.69 – 11.13	11.14 9.56 – 15.90
	Anishinabe communities (2)	3-5	22	0	9.82[E] 6.98 – 14.58	8.05 6.60 – 10.43	4.45 .	5.37 4.47 – 6.81	7.31 5.66 – 9.23	9.72 7.76 – 11.33	11.83 .	16.38 .
	Anishinabe communities (2)	6-11	45	0	5.72 5.06 – 6.46	5.34 4.79 – 6.01	3.39 .	4.17 3.63 – 4.63	4.97 4.45 – 5.59	6.67 5.32 – 8.22	8.96 7.05 – 10.73	10.26 .
	Anishinabe communities (2)	12-19	40	0	5.32 4.44 – 6.31	4.72 4.04 – 5.49	2.82 1.82 – 2.99	3.03 2.84 – 3.93	4.66 3.46 – 5.86	6.46 5.30 – 7.55	8.16[E] 7.05 – 10.08	8.85 .
	Innu communities (2)	Total	87	0	7.37 6.50 – 8.25	6.41 5.78 – 7.11	2.98 2.77 – 3.37	4.69 3.36 – 5.33	6.54 5.70 – 7.32	8.84 8.06 – 9.46	11.34 9.42 – 12.96	13.16[E] 11.03 – 20.43
	Innu communities (2)	3-5	14	0	9.54 7.64 – 11.68	8.92 7.36 – 10.95	5.31 .	6.39 .	8.83 5.81 – 11.17	11.37[E] 8.03 – 13.12	13.14 .	15.00 .
	Innu communities (2)	6-11	33	0	7.92 6.58 – 9.49	7.16 6.19 – 8.25	4.46 .	5.77 4.71 – 6.09	6.99 5.95 – 8.24	8.79 7.34 – 9.40	F	12.82 .
	Innu communities (2)	12-19	40	0	6.15 4.97 – 7.68	5.21 4.43 – 6.15	2.78 2.45 – 3.04	3.15 2.82 – 3.91	4.85 3.62 – 6.09	8.00 5.46 – 9.04	F	10.86 .
CHMS (Cycle 3)	Total	3-5	471	0		7.7 7.3 – 8.2	4.0 3.3 – 4.7		7.2 6.8 – 7.7		14.0 10.0 – 18.0	22.0 14.0 – 29.0
	Total	6-11	944	0		7.1 6.7 – 7.6	3.9 3.6 – 4.2		6.7 6.4 – 7.1		13.0 11.0 – 15.0	16.0 13.0 – 19.0
	Total	12-19	977	0.10		6.4 6.0 – 6.9	3.4 3.2 – 3.6		6.0 5.6 – 6.4		12.0 11.0 – 14.0	15.0 13.0 – 16.0

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ACCLPP (Advisory Committee on Childhood Lead Poisoning Prevention) (2012). Low Level Lead Exposure Harms Children: A Renewed Call for Primary Prevention Report of the Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. Available at: www.cdc.gov/nceh/lead/acclpp/final_document_030712.pdf

ATSDR (Agency for Toxic Substances and Disease Registry). (2007). Toxicological Profile for Lead. Source: www.atsdr.cdc.gov/toxprofiles/tp13.html

Couture, A., Lévesque, B., Dewailly, E., Muckle, G., Déry, S., Proulx, J.-F. (2012). Lead exposure in Nunavik: from research to action. Int. J. Circumpolar Health. 71.

Fachehoun, R.C., Lévesque, B., Dumas, P., St-Louis, A., Dubé, M., Ayotte, P. (2015). Lead exposure through consumption of big game meat in Quebec, Canada: risk assessment and perception. Food Addit. Contam. Part A Chem. Anal. Control Expo. Risk Assess. 32 (9), 1501-11.

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Consulted online: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Consulted online: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

Legagneux, P., Suffice, P., Messier, J.-S., Lelièvre, F., Tremblay, J.A., Maisonneuve, C., Saint-Louis, R., Bêty, J. (2014). High risk of lead contamination for scavengers in an area with high moose hunting success. PLoS ONE 9(11): e111546. doi:10.1371/journal.pone.0111546)

Nieboer, E., Dewailly, E., Johnson-Down, L., Sampasa-Kanyinga, H., Château-Degat, M.-L., Egeland, G.M., Atikessé, L., Robinson, E., Torrie, J. (2013). Nituuchischaayihtitaau Aschii Multi-community Environment-and-Health Study in Eeyou Istchee 2005- 2009: Final Technical Report. Nieboer E, Robinson E, Petrov K, editors. Public Health Report Series 4 on the Health of the Population. Chisasibi QC: Cree Board of Health and Social Services of James Bay. Source: www.creehealth.org/sites/default/files/E-and-H%20Technical%20Report.pdf

WHO (World Health Organization) (2016). Lead poisoning and health. Consulted online: www.who.int/mediacentre/factsheets/fs379/en/

Natural Resources Canada (2017). Canadian Reserves of Selected Major Metals and Recent Production Decisions. Government of Canada. Consulted online: https://www.nrcan.gc.ca/mining-materials/exploration/8294

Health Canada (2009). Lead Information Package – Some Commonly Asked Questions About Lead and Human Health. Government of Canada. Consulted online: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/environmental-contaminants/lead/lead-information-package-some-commonly-asked-questions-about-lead-human-health.html

Health Canada (2013). Risk Management Strategy for Lead. Government of Canada. Source: http://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/contaminants/prms_lead-psgr_plomb/prms_lead-psgr_plomb-eng.pdf

Thomas, V.G. (1997). The environmental and ethical implications of lead shot contamination of rural lands in North America. The Journal of Agricultural & Environmental Ethics 10, 41–54.

6.1.7.Uranium

Uranium exists naturally in a mix of three radionuclides (uranium 238, uranium 235, and uranium 234), which in turn decompose and emit alpha and gamma radiation. Uranium is both a chemical and a radioactive element (WHO, 2012; Health Canada, 2001). Uranium (the chemical) is found naturally in the environment and in ground water (WHO, 2012). It is used mainly as fuel for nuclear plants and depleted uranium is used in military equipment (WHO, 2012). Uranium is also used in medicine, dentistry, and aviation (CCME, 2007).

Canada is the second-largest producer of uranium in the world (16% of global production) and mines are located mostly in Saskatchewan. In 2015, the Quebec *Bureau des audiences publiques sur l'environnement* ruled against mining uranium throughout its territory, after numerous consultations held across the province (BAPE, 2015).

Humans are exposed to uranium (the chemical) mainly through food and water consumption (ATSDR, 2013). Exposure may be more significant near sources of uranium such as uranium mines (including mining residue) or uranium refineries (CCME, 2007). Uranium's chemical toxicity is more concerning than its radioactivity. Although scientific studies show that there is little knowledge on the chronic effects of exposure to uranium, nephritis is considered to be the main chemical effect caused by this contaminant (Health Canada, 2001)

The CTQ laboratories' reporting threshold for urine uranium is 50 µg/L (210 nmol/L) (INSPQ, 2016).

Results

Uranium levels were measured in urine for all participants in the JES!-YEH! project and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 23 – 26). Urine uranium levels reflect recent and accumulated exposure (CDC, 2016). A measurable level of uranium does not necessarily mean that it will have negative health effects.

All participants in the JES!-YEH! study had levels of urine uranium below the CTQ's reporting threshold. Furthermore, more than 40% of participants had levels of urine uranium below the limit of detection, as was the case in the CHMS (Cycle 2) (Table 26).

Table 23: Uranium – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	80.2	–	–	<LD	<LD	<LD	<LD	0.02 0.01 – 0.02	F
	Total	F	95	82.1	–	–	<LD	<LD	<LD	<LD	0.02^{E} 0.01 – 0.02	F
	Total	M	102	78.4	–	–	<LD	<LD	<LD	<LD	0.02^{E} 0.01 – 0.02	F
	Anishinabe communities (2)	Total	110	71.8	–	–	<LD	<LD	<LD	0.01^{E} 0.00 – 0.01	F	F
	Anishinabe communities (2)	F	55	76.4	–	–	<LD	<LD	<LD	<LD	F	0.09 .
	Anishinabe communities (2)	M	55	67.3	–	–	<LD	<LD	<LD	0.01^{E} 0.00 – 0.02	F	0.05 .
	Innu communities (2)	Total	87	90.8	–	–	<LD	<LD	<LD	<LD	<LD	0.01^{E} 0.00 – 0.02
	Innu communities (2)	F	40	90	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Innu communities (2)	M	47	91.5	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 24: Uranium (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	80.2	–	–	<LD	<LD	<LD	<LD	0.02 0.02 – 0.03	F
	Total	F	95	82.1	–	–	<LD	<LD	<LD	<LD	F	F
	Total	M	102	78.4	–	–	<LD	<LD	<LD	<LD	0.02 0.02 – 0.03	F
	Anishinabe communities (2)	Total	110	71.8	–	–	<LD	<LD	<LD	0.02 0.02 – 0.02	F	F
	Anishinabe communities (2)	F	55	76.4	–	–	<LD	<LD	<LD	<LD	F	0.13 .
	Anishinabe communities (2)	M	55	67.3	–	–	<LD	<LD	<LD	0.02 0.01 – 0.02	F	0.08 .
	Innu communities (2)	Total	87	90.8	–	–	<LD	<LD	<LD	<LD	<LD	0.02 0.02 – 0.02
	Innu communities (2)	F	40	90	–	–	<LD	<LD	<LD	<LD	<LD	0.02 .
	Innu communities (2)	M	47	91.5	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 25: Uranium – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	80.2	–	–	<LD	<LD	<LD	<LD	0.02 0.01 – 0.02	F
	Total	3-5	38	76.3	–	–	<LD	<LD	<LD	<LD	F	0.02 .
	Total	6-11	79	83.5	–	–	<LD	<LD	<LD	<LD	F	F
	Total	12-19	80	78.8	–	–	<LD	<LD	<LD	<LD	F	F
	Anishinabe communities (2)	Total	110	71.8	–	–	<LD	<LD	<LD	0.01^{E} 0.00 – 0.01	F	F
	Anishinabe communities (2)	3-5	24	66.7	–	–	<LD	<LD	<LD	0.01^{E} 0.00 – 0.02	0.02 .	0.02 .
	Anishinabe communities (2)	6-11	46	76.1	–	–	<LD	<LD	<LD	<LD	F	0.06 .
	Anishinabe communities (2)	12-19	40	70	–	–	<LD	<LD	<LD	F	F	0.05 .
	Innu communities (2)	Total	87	90.8	–	–	<LD	<LD	<LD	<LD	<LD	0.01^{E} 0.00 – 0.02
	Innu communities (2)	3-5	14	92.9	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Innu communities (2)	6-11	33	93.9	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Innu communities (2)	12-19	40	87.5	–	–	<LD	<LD	<LD	<LD	F	0.01 .
CHMS (Cycle 2)	Total	3-5	573	90.58		—	<LD		<LD	<LD		0.012^{E} <LD – 0.019
	Total	6-11	1062	86.44		—	<LD		<LD	<LD		0.014 0.011 – 0.017
	Total	12-19	1041	76.56		—	<LD		<LD	<LD		0.022 0.020 – 0.024

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 26: Uranium (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	80.2	–	–	<LD	<LD	<LD	<LD	0.02 0.02 – 0.03	F
	Total	3-5	38	76.3	–	–	<LD	<LD	<LD	<LD	F	0.13 .
	Total	6-11	79	83.5	–	–	<LD	<LD	<LD	<LD	F	F
	Total	12-19	80	78.8	–	–	<LD	<LD	<LD	<LD	0.02[E] 0.01 – 0.03	F
	Anishinabe communities (2)	Total	110	71.8	–	–	<LD	<LD	<LD	0.02 0.02 – 0.02	F	F
	Anishinabe communities (2)	3-5	24	66.7	–	–	<LD	<LD	<LD	F	0.09 .	0.15 .
	Anishinabe communities (2)	6-11	46	76.1	–	–	<LD	<LD	<LD	<LD	F	0.09 .
	Anishinabe communities (2)	12-19	40	70	–	–	<LD	<LD	<LD	F	F	0.05 .
	Innu communities (2)	Total	87	90.8	–	–	<LD	<LD	<LD	<LD	<LD	0.02 0.02 – 0.02
	Innu communities (2)	3-5	14	92.9	–	–	<LD	<LD	<LD	<LD	<LD	0.02 .
	Innu communities (2)	6-11	33	93.9	–	–	<LD	<LD	<LD	<LD	<LD	0.02 .
	Innu communities (2)	12-19	40	87.5	–	–	<LD	<LD	<LD	<LD	0.02[E] 0.01 – 0.02	0.02 0.01 – 0.02
CHMS (Cycle 2)	Total	3-5	572	90.73		–	<LD		<LD	<LD		0.030[E] <LD – 0.044
	Total	6-11	1058	86.77		–	<LD		<LD	<LD		0.019 0.015 – 0.023
	Total	12-19	1039	76.71		–	<LD		<LD	<LD		0.018[E] 0.011 – 0.026

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2013). Natural & Depleted Uranium – ToxFAQs. Consulted online: www.atsdr.cdc.gov/toxfaqs/tfacts150.pdf

BAPE (Bureau d'audiences publiques sur l'environnement) (2015). Rapport 308. Les enjeux de la filière uranifère au Québec Rapport d'enquête et d'audience publique. Government of Quebec. Source: http://www.bape.gouv.qc.ca/sections/rapports/publications/bape308.pdf#page=11

CDC (Centers for Disease Control and Prevention) (2016). Biomonitoring Summary – Uranium. Consulted online: www.cdc.gov/biomonitoring/Uranium_BiomonitoringSummary.html

CCME (Canadian Council of Ministers of the Environment) (2007). Canadian Soil Quality Guidelines for Uranium: Environmental and Human Health. Scientific Supporting Document.

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

WHO (World Health Organization) (2012). Uranium in Drinking-water Background document for development of WHO Guidelines for Drinking-water Quality. World Health Organization. Geneva, Switzerland. Source: http://www.who.int/water_sanitation_health/publications/2012/background_uranium.pdf

Health Canada (2001). Guidelines for Canadian Drinking Water Quality: Supporting Documentation – Uranium. Government of Canada. Consulted online: www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/water-uranium-eau/alt/water-uranium-eau-eng.pdf

6.2. Old POPs

6.2.1.Organochlorine Pesticides (OCs)

Organochlorine contaminants are among the oldest persistent organic pollutants (POP). They began to be used after the industrial boom following the Second World War. These chemical products, known to be highly effective, were used in several sectors such as agricultural production, industry, and pest control (EPA, 2016). Furthermore, although these old POPs have not been used in Canada since the 1970s, particles may travel over long distances with the wind, sea currents, or migratory species, and are then dispersed across the planet, even in the Arctic (Wöhrnschimmel et al., 2016). Unfortunately, these contaminants are known to persist in the environment for many years and can easily accumulate in animal and human adipose tissue (INAC, 2010a; 2010b). Scientific studies have shown that exposure to these POPs is associated with several health problems (e.g., cancers, diabetes, neurological, cardiovascular, endocrine, and reproductive problems) (WHO, 2017).

However, due to the Stockholm Convention, adopted in 2001 and ratified in 2004 by 152 countries, the production and use of these old POPs has stopped across the world (Stockholm Convention, 2008). For several years, various studies have shown that the levels of these OCs have decreased, both in the environment and in human blood (AMAP, 2015).

The results for each of the OCs analysed in the JES!-YEH! study are presented in the following order:

- Aldrine;
- Alpha-chlordane and gamma-chlordane;
- Cis-nonachlor, trans-nonachlor, and oxychlordane;
- Beta-hexachlorocyclohexane and gamma-hexachlorocyclohexane;
- p,p'-dichlorodiphenyletrichloroethane and p,p'-dichlorodiphenyldichloroethylene;
- Hexachlorobenzene;
- Mirex;
- Toxaphene parlar 26 and toxaphene parlar 50;

For more details on each of these OCs, refer to the CHMS (Cycle 2) report (CHMS, 2013).

Results

OC levels were measured in serum for all participants in the JES!-YEH! project and were reported in terms of µg/L of serum and µg/kg of lipids (Tables 27 – 82). A measurable level of these contaminants does not necessarily mean that they will have negative health effects.

Levels for all OCs measured in the serum of JES!-YEH! project participants were not calculated, since more than 40% of the samples were below the limit of detection. In the CHMS, OCs were measured only in Cycle 1 and only in a subsample of 20 to 79 year-old participants. They were not measured in the subsequent cycles.

Table 27: Aldrine – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 28: Aldrine (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 29: Aldrine – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 30: Aldrine (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 31: Alpha-Chlordane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 32: Alpha-Chlordane (adjusted for lipids) – Levels measured in the serum (µg/Kg) des participants de JES!-YEH! 2015 broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 33: Alpha-Chlordane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 34: Alpha-Chlordane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 35: Gamma-Chlordane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 36: Gamma-Chlordane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 37: Gamma-Chlordane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 38: Gamma-Chlordane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 39: Cis-Nonachlor – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	99.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	99	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	98.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	97.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 40: Cis-Nonachlor (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	99.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	99	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	98.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	97.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 41: Cis-Nonachlor – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	99.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	98.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	98.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 42: Cis-Nonachlor (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	99.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	98.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	98.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 43: Trans-Nonachlor – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	98.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	97.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	99	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	96.6	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	97.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 44: Trans-Nonachlor (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	98.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	97.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	99	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	96.6	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	97.9	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 45: Trans-Nonachlor – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	98.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	98.7	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	96.6	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	97	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	95	–	–	<LD	<LD	<LD	<LD	<LD	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 46: Trans-Nonachlor (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	98.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	98.7	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	96.6	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	97	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 47: Oxychlordane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	91.3	–	–	<LD	<LD	<LD	<LD	<LD	0.01E 0.00 – 0.01
	Total	F	94	91.5	–	–	<LD	<LD	<LD	<LD	<LD	0.01E 0.00 – 0.01
	Total	M	102	91.2	–	–	<LD	<LD	<LD	<LD	<LD	0.01E 0.00 – 0.01
	Anishinabe communities (2)	Total	109	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	82.8	–	–	<LD	<LD	<LD	<LD	0.01E 0.00 – 0.01	0.01E 0.01 – 0.01
	Innu communities (2)	F	40	80	–	–	<LD	<LD	<LD	<LD	F	0.01 .
	Innu communities (2)	M	47	85.1	–	–	<LD	<LD	<LD	<LD	F	0.01 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 48: Oxychlordane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	91.3	–	–	<LD	<LD	<LD	<LD	<LD	0.83 0.65 – 1.13
	Total	F	94	91.5	–	–	<LD	<LD	<LD	<LD	<LD	0.75^{E} 0.60 – 1.08
	Total	M	101	91.2	–	–	<LD	<LD	<LD	<LD	<LD	0.90^{E} 0.64 – 1.21
	Anishinabe communities (2)	Total	108	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	82.8	–	–	<LD	<LD	<LD	<LD	0.81^{E} 0.61 – 1.14	1.25^{E} 0.78 – 2.08
	Innu communities (2)	F	40	80	–	–	<LD	<LD	<LD	<LD	0.75^{E} 0.52 – 1.31	F
	Innu communities (2)	M	47	85.1	–	–	<LD	<LD	<LD	<LD	0.83^{E} 0.60 – 1.30	1.21^{E} 0.64 – 2.11

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 49: Oxychlordane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	91.3	–	–	<LD	<LD	<LD	<LD	<LD	0.01^E^ 0.00 – 0.01
	Total	3-5	38	97.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	92.3	–	–	<LD	<LD	<LD	<LD	<LD	F
	Total	12-19	80	87.5	–	–	<LD	<LD	<LD	<LD	F	0.01^E^ 0.00 – 0.01
	Anishinabe communities (2)	Total	109	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	97.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	82.8	–	–	<LD	<LD	<LD	<LD	0.01^E^ 0.00 – 0.01	0.01^E^ 0.01 – 0.01
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	84.8	–	–	<LD	<LD	<LD	<LD	0.00^E^ 0.00 – 0.01	0.01 .
	Innu communities (2)	12-19	40	75	–	–	<LD	<LD	<LD	<LD	0.01^E^ 0.00 – 0.01	0.01 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 50: Oxychlordane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	91.3	–	–	<LD	<LD	<LD	<LD	<LD	0.83 0.65 – 1.13
	Total	3-5	38	97.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	92.3	–	–	<LD	<LD	<LD	<LD	<LD	0.65 0.58 – 0.76
	Total	12-19	80	87.5	–	–	<LD	<LD	<LD	<LD	0.79E 0.61 – 1.18	F
	Anishinabe communities (2)	Total	108	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	97.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	82.8	–	–	<LD	<LD	<LD	<LD	0.81E 0.61 – 1.14	1.25E 0.78 – 2.08
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	84.8	–	–	<LD	<LD	<LD	<LD	0.64 0.54 – 0.79	0.73 0.58 – 0.93
	Innu communities (2)	12-19	40	75	–	–	<LD	<LD	<LD	<LD	F	1.76E 0.89 – 2.19

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 51: Beta-Hexachlorocylcohexane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 52: Beta-Hexachlorocylcohexane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 53: Beta-Hexachlorocylcohexane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 54: Beta-Hexachlorocylcohexane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 55: Gamma-Hexachlorocylcohexane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 56: Gamma-Hexachlorocylcohexane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 57: Gamma-Hexachlorocylcohexane – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 58: Gamma-Hexachlorocylcohexane (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 59: p,p’- dichlorodiphenyltrichloroethane (DDT) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 60: p,p'- dichlorodiphenyltrichloroethane (DDT) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 61: p,p'- dichlorodiphenyltrichloroethane (DDT) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 62: p,p'- dichlorodiphenyltrichloroethane (DDT) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 63: p,p'- dichlorodiphenyldichloroethylene (DDE) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	71.4	–	–	<LD	<LD	<LD	0.09 0.05 – 0.10	0.12 0.11 – 0.14	0.15[E] 0.13 – 0.23
	Total	F	94	74.5	–	–	<LD	<LD	<LD	0.06[E] 0.05 – 0.10	0.12 0.10 – 0.14	0.14[E] 0.12 – 0.29
	Total	M	102	68.6	–	–	<LD	<LD	<LD	0.10 0.05 – 0.11	0.13 0.11 – 0.16	0.17[E] 0.12 – 0.21
	Anishinabe communities (2)	Total	109	79.8	–	–	<LD	<LD	<LD	<LD	0.11 0.09 – 0.13	0.13 0.11 – 0.16
	Anishinabe communities (2)	F	54	88.9	–	–	<LD	<LD	<LD	<LD	0.07[E] 0.05 – 0.11	0.10 .
	Anishinabe communities (2)	M	55	70.9	–	–	<LD	<LD	<LD	0.09[E] 0.05 – 0.11	0.13 0.10 – 0.16	0.16 .
	Innu communities (2)	Total	87	60.9	–	–	<LD	<LD	<LD	0.11 0.09 – 0.12	0.14[E] 0.12 – 0.25	0.26[E] 0.14 – 0.30
	Innu communities (2)	F	40	55	–	–	<LD	<LD	<LD	0.11 0.09 – 0.13	0.14[E] 0.12 – 0.29	0.29 .
	Innu communities (2)	M	47	66	–	–	<LD	<LD	<LD	0.10[E] 0.05 – 0.12	F	0.20 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 64: p,p'- dichlorodiphenyldichloroethylene (DDE) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	71.4	–	–	<LD	<LD	<LD	13.59 10.84 – 16.49	20.54 18.17 – 26.36	28.26 22.59 – 36.26
	Total	F	94	74.5	–	–	<LD	<LD	<LD	12.17 9.88 – 17.36	19.19 17.02 – 23.73	F
	Total	M	101	68.6	–	–	<LD	<LD	<LD	14.24 10.53 – 17.23	26.41 17.32 – 32.98	34.24^E^ 23.55 – 38.47
	Anishinabe communities (2)	Total	108	79.8	–	–	<LD	<LD	<LD	<LD	18.93^E^ 13.91 – 26.11	27.51 18.73 – 34.67
	Anishinabe communities (2)	F	54	88.9	–	–	<LD	<LD	<LD	<LD	13.74^E^ 10.59 – 19.29	18.41 .
	Anishinabe communities (2)	M	54	70.9	–	–	<LD	<LD	<LD	13.61^E^ 9.78 – 18.80	27.51^E^ 16.67 – 34.32	32.87 .
	Innu communities (2)	Total	87	60.9	–	–	<LD	<LD	<LD	16.27 11.44 – 18.33	24.70^E^ 18.24 – 31.99	31.59^E^ 21.53 – 56.83
	Innu communities (2)	F	40	55	–	–	<LD	<LD	<LD	18.00 11.73 – 20.58	F	25.45 .
	Innu communities (2)	M	47	66	–	–	<LD	<LD	<LD	14.68 10.65 – 17.55	F	31.59 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 65: p,p'- dichlorodiphenyldichloroethylene (DDE) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	71.4	–	–	<LD	<LD	<LD	0.09 0.05 – 0.10	0.12 0.11 – 0.14	0.15E 0.13 – 0.23
	Total	3-5	38	86.8	–	–	<LD	<LD	<LD	<LD	0.08E 0.05 – 0.10	0.10 .
	Total	6-11	78	82.1	–	–	<LD	<LD	<LD	<LD	0.11E 0.05 – 0.13	F
	Total	12-19	80	53.8	–	–	<LD	<LD	<LD	0.11 0.10 – 0.13	0.15E 0.12 – 0.24	0.25E 0.14 – 0.30
	Anishinabe communities (2)	Total	109	79.8	–	–	<LD	<LD	<LD	<LD	0.11 0.09 – 0.13	0.13 0.11 – 0.16
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	93.3	–	–	<LD	<LD	<LD	<LD	<LD	0.08 .
	Anishinabe communities (2)	12-19	40	55	–	–	<LD	<LD	<LD	0.11E 0.08 – 0.12	0.13 0.11 – 0.16	0.15 .
	Innu communities (2)	Total	87	60.9	–	–	<LD	<LD	<LD	0.11 0.09 – 0.12	0.14E 0.12 – 0.25	0.26E 0.14 – 0.30
	Innu communities (2)	3-5	14	71.4	–	–	<LD	<LD	<LD	0.06E 0.05 – 0.10	0.10 .	0.10 .
	Innu communities (2)	6-11	33	66.7	–	–	<LD	<LD	<LD	0.10E 0.05 – 0.12	F	0.14 .
	Innu communities (2)	12-19	40	52.5	–	–	<LD	<LD	<LD	0.12E 0.09 – 0.18	0.25E 0.13 – 0.30	0.29 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 66: p,p'- dichlorodiphenyldichloroethylene (DDE) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	71.4	–	–	<LD	<LD	<LD	13.59 10.84 – 16.49	20.54 18.17 – 26.36	28.26 22.59 – 36.26
	Total	3-5	38	86.8	–	–	<LD	<LD	<LD	<LD	15.59 E 9.81 – 18.38	17.73 .
	Total	6-11	77	82.1	–	–	<LD	<LD	<LD	<LD	16.75 E 10.94 – 19.78	19.63 13.55 – 25.81
	Total	12-19	80	53.8	–	–	<LD	<LD	<LD	18.46 15.99 – 22.22	31.58 E 20.32 – 38.65	37.50 E 26.66 – 56.84
	Anishinabe communities (2)	Total	108	79.8	–	–	<LD	<LD	<LD	<LD	18.93 E 13.91 – 26.11	27.51 18.73 – 34.67
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	93.3	–	–	<LD	<LD	<LD	<LD	<LD	11.72 .
	Anishinabe communities (2)	12-19	40	55	–	–	<LD	<LD	<LD	18.00 13.47 – 21.91	26.79 E 18.32 – 36.04	35.90 .
	Innu communities (2)	Total	87	60.9	–	–	<LD	<LD	<LD	16.27 11.44 – 18.33	24.70 E 18.24 – 31.99	31.59 E 21.53 – 56.83
	Innu communities (2)	3-5	14	71.4	–	–	<LD	<LD	<LD	12.75 E 8.30 – 17.08	16.91 .	18.10 .
	Innu communities (2)	6-11	33	66.7	–	–	<LD	<LD	<LD	12.15 E 9.78 – 18.07	18.29 E 12.18 – 24.42	23.30 .
	Innu communities (2)	12-19	40	52.5	–	–	<LD	<LD	<LD	18.46 E 13.46 – 25.63	F	56.82 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 67: Hexachlorobenzene – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	90.3	–	–	<LD	<LD	<LD	<LD	<LD	0.05 0.03 – 0.06
	Total	F	94	94.7	–	–	<LD	<LD	<LD	<LD	<LD	F
	Total	M	102	86.3	–	–	<LD	<LD	<LD	<LD	0.04^E^ 0.02 – 0.05	0.06 0.04 – 0.06
	Anishinabe communities (2)	Total	109	93.6	–	–	<LD	<LD	<LD	<LD	<LD	0.04^E^ 0.02 – 0.04
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	87.3	–	–	<LD	<LD	<LD	<LD	0.04^E^ 0.02 – 0.04	0.04 .
	Innu communities (2)	Total	87	86.2	–	–	<LD	<LD	<LD	<LD	0.04^E^ 0.02 – 0.06	0.06^E^ 0.04 – 0.08
	Innu communities (2)	F	40	87.5	–	–	<LD	<LD	<LD	<LD	F	0.07 .
	Innu communities (2)	M	47	85.1	–	–	<LD	<LD	<LD	<LD	0.05^E^ 0.02 – 0.06	0.06 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 68: Hexachlorobenzene (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	90.3	–	–	<LD	<LD	<LD	<LD	<LD	8.79 6.20 – 9.71
	Total	F	94	94.7	–	–	<LD	<LD	<LD	<LD	<LD	F
	Total	M	101	86.3	–	–	<LD	<LD	<LD	<LD	7.85 5.08 – 9.33	9.35 7.69 – 10.54
	Anishinabe communities (2)	Total	108	93.6	–	–	<LD	<LD	<LD	<LD	<LD	7.52 5.08 – 9.06
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	87.3	–	–	<LD	<LD	<LD	<LD	7.52 4.57 – 9.05	9.03 .
	Innu communities (2)	Total	87	86.2	–	–	<LD	<LD	<LD	<LD	7.06 E 4.52 – 9.48	9.65 E 5.13 – 12.04
	Innu communities (2)	F	40	87.5	–	–	<LD	<LD	<LD	<LD	F	6.93 .
	Innu communities (2)	M	47	85.1	–	–	<LD	<LD	<LD	<LD	8.27 E 4.76 – 10.65	10.39 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 69: Hexachlorobenzene – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	90.3	–	–	<LD	<LD	<LD	<LD	<LD	0.05 0.03 – 0.06
	Total	3-5	38	89.5	–	–	<LD	<LD	<LD	<LD	F	0.04 .
	Total	6-11	78	91	–	–	<LD	<LD	<LD	<LD	<LD	F
	Total	12-19	80	90	–	–	<LD	<LD	<LD	<LD	<LD	0.06[E] 0.02 – 0.07
	Anishinabe communities (2)	Total	109	93.6	–	–	<LD	<LD	<LD	<LD	<LD	0.04[E] 0.02 – 0.04
	Anishinabe communities (2)	3-5	24	91.7	–	–	<LD	<LD	<LD	<LD	<LD	0.04 .
	Anishinabe communities (2)	6-11	45	95.6	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	92.5	–	–	<LD	<LD	<LD	<LD	<LD	0.04 .
	Innu communities (2)	Total	87	86.2	–	–	<LD	<LD	<LD	<LD	0.04[E] 0.02 – 0.06	0.06[E] 0.04 – 0.08
	Innu communities (2)	3-5	14	85.7	–	–	<LD	<LD	<LD	<LD	0.03 .	0.05 .
	Innu communities (2)	6-11	33	84.8	–	–	<LD	<LD	<LD	<LD	F	0.05 .
	Innu communities (2)	12-19	40	87.5	–	–	<LD	<LD	<LD	<LD	0.06[E] 0.02 – 0.07	0.06 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 70: Hexachlorobenzene (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	90.3	–	–	<LD	<LD	<LD	<LD	<LD	8.79 6.20 – 9.71
	Total	3-5	38	89.5	–	–	<LD	<LD	<LD	<LD	6.25 E 4.27 – 8.23	7.56 .
	Total	6-11	77	91	–	–	<LD	<LD	<LD	<LD	<LD	7.82 E 4.81 – 8.86
	Total	12-19	80	90	–	–	<LD	<LD	<LD	<LD	<LD	F
	Anishinabe communities (2)	Total	108	93.6	–	–	<LD	<LD	<LD	<LD	<LD	7.52 5.08 – 9.06
	Anishinabe communities (2)	3-5	24	91.7	–	–	<LD	<LD	<LD	<LD	<LD	6.83 .
	Anishinabe communities (2)	6-11	44	95.6	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	92.5	–	–	<LD	<LD	<LD	<LD	<LD	7.86 .
	Innu communities (2)	Total	87	86.2	–	–	<LD	<LD	<LD	<LD	7.06 E 4.52 – 9.48	9.65 E 5.13 – 12.04
	Innu communities (2)	3-5	14	85.7	–	–	<LD	<LD	<LD	<LD	6.20 .	7.95 .
	Innu communities (2)	6-11	33	84.8	–	–	<LD	<LD	<LD	<LD	6.31 E 4.29 – 7.83	7.82 .
	Innu communities (2)	12-19	40	87.5	–	–	<LD	<LD	<LD	<LD	F	10.69 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 71: Mirex – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 72: Mirex (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 73: Mirex – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 74: Mirex (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 75: Toxaphene parlar 26 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 76: Toxaphene parlar 26 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 77: Toxaphene parlar 26 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 78: Toxaphene parlar 26 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 79: Toxaphene parlar 50 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 80: Toxaphene parlar 50 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	94	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	101	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 81: Toxaphene parlar 50 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	109	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 82: Toxaphene parlar 50 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	80	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	108	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

INAC (Indigenous and Northern Affairs Canada) (2010a). Persistent Organic Pollutants (POPs) Fact Sheet Series. PCBs – Polychlorinated Biphenyls. Government of Canada. Consulted online: http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-YT/STAGING/texte-text/pubs-cfs-PCBS_1316124350345_eng.pdf

INAC (Indigenous and Northern Affairs Canada) (2010b). Persistent Organic Pollutants (POPs) Fact Sheet Series. DDT – dichlorodiphenyltrichloroethane. Government of Canada. Consulted online: http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-YT/STAGING/texte-text/pubs-cfs-DDT_1316123838992_eng.pdf

AMAP (Arctic Monitoring Assessment Programme) (2015). Assessment 2015: Human Health in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. vii + 165 pp.

CHMS (Canadian Health Measures Survey (2013). Second Report on Human Biomonitoring of Environmental Chemicals in Canada. S. Canada. Ottawa, Government of Canada. Results of the Canadian Health Measures Survey (CHMS) Cycle 2 (2009 to 2011): 456p.

EPA (United States Environmental Protection Agency) (2016). Persistent organic pollutants: a global issue, a global response. Consulted online: www.epa.gov/international-cooperation/persistent-organic-pollutants-global-issue-global-response

WHO (World Health Organization) (2017). Persistent organic pollutants (POPs). Consulted online: www.who.int/foodsafety/areas_work/chemical-risks/pops/en/

Stockholm Convention (2008). Overview. Consulted online: chm.pops.int/TheConvention/Overview/tabid/3351/Default.aspx

Wöhrnschimmel, H., Scheringer, M., Bogdal, C., Hung, H., Salamova, A., Venier, M., Katsoyiannis, A., Hites, R.A., Hungerbuhler, K., Fiedler, H. (2016). Ten years after entry into force of the Stockholm Convention: What do air monitoring data tell about its effectiveness? Environ. Pollut. 217, 149-58.

6.2.2. Polychlorinated Biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) are also among the old POPs. The PCB family includes 209 congeners. These were used in industrial material (caulking and waterproofing products), such as paint additives, refrigeration agents, and lubricants for certain electric equipment such as transformers and capacitors. In 1977, Canada banned the manufacture and import of PCBs (Health Canada, 2005).

Like other POPs, PCBs are quite volatile. They can travel over long distances, accumulate in the environment for many years, and decompose very slowly. Food, air, and soil are routes of exposure to PCBs. Health problems are also associated with these contaminants, such as neurological problems, developmental and learning disorders, and problems with the reproductive and endocrine systems (INAC, 2010). As with OCs, PCB levels have considerably decreased, both in the environment and in human blood (AMAP, 2015).

Serum levels for five PCB compounds (Aroclor 1260, PCB 118, PCB 138, PCB 153 and PCB 180) were measured as part of the JES!-YEH! project.

Results

PCB levels (Aroclor 1260, PCB 118, PCB 138, PCB 153 and PCB 180) were measured in serum for all participants in the JES!-YEH! project and were reported in terms of µg/L of serum and µg/kg of lipids (Tables 83 – 102). A measurable level does not necessarily mean that they will have negative health effects.

The averages of the analysed PCB levels (Aroclor 1260, PCB 118, PCB 138, PCB 153, and PCB 180) were not calculated, since more than 40% of the samples were below the limit of detection. PCB 153 was detected in more than 40% of participants in the two Innu communities involved in the project, but these levels were nevertheless 1000 times lower than those reported in fishermen from the Lower North Shore in the 1990s (Dewailly et al., 1994).

Table 83: Aroclor 1260 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	72.4	–	–	<LD	<LD	<LD	0.09[E] 0.05 – 0.13	0.22 0.17 – 0.27	0.32[E] 0.24 – 0.50
	Total	F	94	71.3	–	–	<LD	<LD	<LD	0.11[E] 0.05 – 0.18	0.26 0.18 – 0.31	F
	Total	M	102	73.5	–	–	<LD	<LD	<LD	0.07[E] 0.05 – 0.14	0.18 0.14 – 0.22	F
	Anishinabe communities (2)	Total	109	91.7	–	–	<LD	<LD	<LD	<LD	<LD	0.11[E] 0.05 – 0.12
	Anishinabe communities (2)	F	54	92.6	–	–	<LD	<LD	<LD	<LD	<LD	0.10 .
	Anishinabe communities (2)	M	55	90.9	–	–	<LD	<LD	<LD	<LD	<LD	0.11 .
	Innu communities (2)	Total	87	48.3	–	–	<LD	<LD	0.08[E] 0.05 – 0.13	0.21 0.15 – 0.25	0.34[E] 0.25 – 0.55	0.58[E] 0.32 – 0.77
	Innu communities (2)	F	40	42.5	–	–	<LD	<LD	F	0.25 0.18 – 0.30	0.34[E] 0.26 – 0.65	0.61 .
	Innu communities (2)	M	47	53.2	–	–	<LD	<LD	<LD	0.16 0.11 – 0.21	F	0.51 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 84: Aroclor 1260 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	72.4	–	–	<LD	<LD	<LD	16.90 12.42 – 20.55	36.96 25.17 – 41.56	F
	Total	F	94	71.3	–	–	<LD	<LD	<LD	18.51[E] 12.01 – 24.34	39.20 24.18 – 47.19	F
	Total	M	101	73.5	–	–	<LD	<LD	<LD	16.29 11.52 – 20.77	28.89[E] 21.06 – 41.61	F
	Anishinabe communities (2)	Total	108	91.7	–	–	<LD	<LD	<LD	<LD	<LD	17.41 13.11 – 22.85
	Anishinabe communities (2)	F	54	92.6	–	–	<LD	<LD	<LD	<LD	<LD	16.29 .
	Anishinabe communities (2)	M	54	90.9	–	–	<LD	<LD	<LD	<LD	<LD	18.88 .
	Innu communities (2)	Total	87	48.3	–	–	<LD	<LD	16.30 10.99 – 20.37	34.12 22.65 – 39.61	F	F
	Innu communities (2)	F	40	42.5	–	–	<LD	<LD	19.38[E] 9.66 – 27.37	39.06 24.22 – 44.44	F	54.55 .
	Innu communities (2)	M	47	53.2	–	–	<LD	<LD	<LD	23.52[E] 18.15 – 37.25	F	97.67 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 85: Aroclor 1260 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	72.4	–	–	<LD	<LD	<LD	0.09^E^ 0.05 – 0.13	0.22 0.17 – 0.27	0.32^E^ 0.24 – 0.50
	Total	3-5	38	84.2	–	–	<LD	<LD	<LD	<LD	F	0.18 .
	Total	6-11	78	75.6	–	–	<LD	<LD	<LD	<LD	0.22^E^ 0.13 – 0.29	F
	Total	12-19	80	63.8	–	–	<LD	<LD	<LD	0.13^E^ 0.06 – 0.17	F	F
	Anishinabe communities (2)	Total	109	91.7	–	–	<LD	<LD	<LD	<LD	<LD	0.11^E^ 0.05 – 0.12
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	97.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	82.5	–	–	<LD	<LD	<LD	<LD	0.10^E^ 0.05 – 0.12	0.12 .
	Innu communities (2)	Total	87	48.3	–	–	<LD	<LD	0.08^E^ 0.05 – 0.13	0.21 0.15 – 0.25	0.34^E^ 0.25 – 0.55	0.58^E^ 0.32 – 0.77
	Innu communities (2)	3-5	14	64.3	–	–	<LD	<LD	<LD	F	0.17 .	0.21 .
	Innu communities (2)	6-11	33	45.5	–	–	<LD	<LD	0.10^E^ 0.05 – 0.17	0.22^E^ 0.12 – 0.28	F	0.47 .
	Innu communities (2)	12-19	40	45	–	–	<LD	<LD	0.10^E^ 0.05 – 0.16	0.23^E^ 0.15 – 0.35	F	0.61 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 86: Aroclor 1260 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	72.4	–	–	<LD	<LD	<LD	16.90 12.42 – 20.55	36.96 25.17 – 41.56	F
	Total	3-5	38	84.2	–	–	<LD	<LD	<LD	<LD	F	29.85 .
	Total	6-11	77	75.6	–	–	<LD	<LD	<LD	<LD	36.54 20.58 – 40.75	F
	Total	12-19	80	63.8	–	–	<LD	<LD	<LD	20.55 15.48 – 27.17	F	F
	Anishinabe communities (2)	Total	108	91.7	–	–	<LD	<LD	<LD	<LD	<LD	17.41 13.11 – 22.85
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	97.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	82.5	–	–	<LD	<LD	<LD	<LD	17.86^{E} 13.10 – 22.51	21.82 .
	Innu communities (2)	Total	87	48.3	–	–	<LD	<LD	16.30 10.99 – 20.37	34.12 22.65 – 39.61	F	F
	Innu communities (2)	3-5	14	64.3	–	–	<LD	<LD	<LD	F	30.80 .	40.29 .
	Innu communities (2)	6-11	33	45.5	–	–	<LD	<LD	16.45^{E} 10.28 – 23.81	34.26 20.67 – 40.24	F	51.59 .
	Innu communities (2)	12-19	40	45	–	–	<LD	<LD	18.52^{E} 10.99 – 23.77	39.06^{E} 20.54 – 55.20	F	119.6 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 87: 2,3',4,4',5-Pentachlorobiphenyl (PCB 118) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	89.3	–	–	<LD	<LD	<LD	<LD	0.01^{E} 0.01 – 0.01	0.02^{E} 0.01 – 0.02
	Total	F	94	85.1	–	–	<LD	<LD	<LD	<LD	0.01^{E} 0.01 – 0.02	0.02^{E} 0.01 – 0.02
	Total	M	102	93.1	–	–	<LD	<LD	<LD	<LD	<LD	F
	Anishinabe communities (2)	Total	109	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	98.1	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD	<LD	0.02^{E} 0.01 – 0.02	F
	Innu communities (2)	F	40	67.5	–	–	<LD	<LD	<LD	0.01^{E} 0.01 – 0.01	0.02^{E} 0.01 – 0.02	0.02 .
	Innu communities (2)	M	47	87.2	–	–	<LD	<LD	<LD	<LD	F	0.02 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 88: 2,3’,4,4’,5-Pentachlorobiphenyl (PCB 118) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	89.3	–	–	<LD	<LD	<LD	<LD	1.54 1.23 – 2.05	2.50 1.64 – 2.73
	Total	F	94	85.1	–	–	<LD	<LD	<LD	<LD	1.78[E] 1.23 – 2.35	2.43[E] 1.76 – 2.75
	Total	M	101	93.1	–	–	<LD	<LD	<LD	<LD	<LD	2.45[E] 1.27 – 3.20
	Anishinabe communities (2)	Total	108	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	98.1	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD	<LD	2.40 1.62 – 2.75	F
	Innu communities (2)	F	40	67.5	–	–	<LD	<LD	<LD	1.76[E] 0.97 – 2.01	2.36[E] 1.76 – 2.76	2.63 .
	Innu communities (2)	M	47	87.2	–	–	<LD	<LD	<LD	<LD	F	3.13 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 89: 2,3',4,4',5-Pentachlorobiphenyl (PCB 118) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	89.3	–	–	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.01	0.02[E] 0.01 – 0.02
	Total	3-5	38	97.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	78	89.7	–	–	<LD	<LD	<LD	<LD	F	F
	Total	12-19	80	85	–	–	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.02	0.02[E] 0.01 – 0.02
	Anishinabe communities (2)	Total	109	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD	<LD	0.02[E] 0.01 – 0.02	F
	Innu communities (2)	3-5	14	92.9	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Innu communities (2)	6-11	33	75.8	–	–	<LD	<LD	<LD	<LD	F	0.02 .
	Innu communities (2)	12-19	40	75	–	–	<LD	<LD	<LD	<LD	0.02[E] 0.01 – 0.02	0.02 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 90: 2,3',4,4',5-Pentachlorobiphenyl (PCB 118) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	89.3	–	–	<LD	<LD	<LD	<LD	1.54 1.23 – 2.05	2.50 1.64 – 2.73
	Total	3-5	38	97.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	77	89.7	–	–	<LD	<LD	<LD	<LD	1.37 E 1.15 – 1.83	F
	Total	12-19	80	85	–	–	<LD	<LD	<LD	<LD	2.12 E 1.28 – 2.75	2.78 E 1.77 – 3.85
	Anishinabe communities (2)	Total	108	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD	<LD	2.40 1.62 – 2.75	F
	Innu communities (2)	3-5	14	92.9	–	–	<LD	<LD	<LD	<LD	<LD	1.57 .
	Innu communities (2)	6-11	33	75.8	–	–	<LD	<LD	<LD	<LD	F	2.44 .
	Innu communities (2)	12-19	40	75	–	–	<LD	<LD	<LD	<LD	2.66 E 1.32 – 3.78	3.38 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 91: 2,2’,3,4,4’,5’-Hexachlorobiphenyl (PCB 138) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	82.7	–	–	<LD	<LD	<LD	<LD	0.01 0.01 – 0.02	0.02^{E} 0.02 – 0.03
	Total	F	94	80.9	–	–	<LD	<LD	<LD	<LD	0.02 0.01 – 0.02	0.02^{E} 0.02 – 0.03
	Total	M	102	84.3	–	–	<LD	<LD	<LD	<LD	0.01^{E} 0.01 – 0.02	F
	Anishinabe communities (2)	Total	109	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	63.2	–	–	<LD	<LD	<LD	0.01^{E} 0.01 – 0.02	0.02^{E} 0.02 – 0.03	0.03^{E} 0.02 – 0.05
	Innu communities (2)	F	40	55	–	–	<LD	<LD	<LD	0.02 0.01 – 0.02	0.02^{E} 0.02 – 0.04	0.03 .
	Innu communities (2)	M	47	70.2	–	–	<LD	<LD	<LD	0.01^{E} 0.01 – 0.01	F	0.03 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 92: 2,2',3,4,4',5'-Hexachlorobiphenyl (PCB 138) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	82.7	–	–	<LD	<LD	<LD	<LD	2.31 1.52 – 2.68	F
	Total	F	94	80.9	–	–	<LD	<LD	<LD	<LD	2.41 1.53 – 2.94	F
	Total	M	101	84.3	–	–	<LD	<LD	<LD	<LD	2.05E 1.31 – 2.73	F
	Anishinabe communities (2)	Total	108	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	54	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	54	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	63.2	–	–	<LD	<LD	<LD	1.89E 1.28 – 2.62	F	F
	Innu communities (2)	F	40	55	–	–	<LD	<LD	<LD	2.32E 1.39 – 2.82	F	3.46 .
	Innu communities (2)	M	47	70.2	–	–	<LD	<LD	<LD	1.35E 1.16 – 2.43	F	5.93 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 93: 2,2',3,4,4',5'- Hexachlorobiphenyl (PCB 138) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	82.7	–	–	<LD	<LD	<LD	<LD	0.01 0.01 – 0.02	0.02^{E} 0.02 – 0.03
	Total	3-5	38	89.5	–	–	<LD	<LD	<LD	<LD	F	0.01 .
	Total	6-11	78	83.3	–	–	<LD	<LD	<LD	<LD	0.01^{E} 0.01 – 0.02	F
	Total	12-19	80	78.8	–	–	<LD	<LD	<LD	<LD	0.02^{E} 0.01 – 0.03	F
	Anishinabe communities (2)	Total	109	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	45	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	63.2	–	–	<LD	<LD	<LD	0.01^{E} 0.01 – 0.02	0.02^{E} 0.02 – 0.03	0.03^{E} 0.02 – 0.05
	Innu communities (2)	3-5	14	78.6	–	–	<LD	<LD	<LD	<LD	0.01 .	0.01 .
	Innu communities (2)	6-11	33	60.6	–	–	<LD	<LD	<LD	0.01^{E} 0.01 – 0.02	F	0.03 .
	Innu communities (2)	12-19	40	60	–	–	<LD	<LD	<LD	F	F	0.04 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 94: 2,2',3,4,4',5'- Hexachlorobiphenyl (PCB 138) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	82.7	–	–	<LD	<LD	<LD	<LD	2.31 1.52 – 2.68	F
	Total	3-5	38	89.5	–	–	<LD	<LD	<LD	<LD	F	2.10 .
	Total	6-11	77	83.3	–	–	<LD	<LD	<LD	<LD	2.28^{E} 1.22 – 2.67	F
	Total	12-19	80	78.8	–	–	<LD	<LD	<LD	<LD	F	F
	Anishinabe communities (2)	Total	108	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	44	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	63.2	–	–	<LD	<LD	<LD	1.89^{E} 1.28 – 2.62	F	F
	Innu communities (2)	3-5	14	78.6	–	–	<LD	<LD	<LD	<LD	1.86 .	2.46 .
	Innu communities (2)	6-11	33	60.6	–	–	<LD	<LD	<LD	2.15^{E} 1.17 – 2.60	F	3.05 .
	Innu communities (2)	12-19	40	60	–	–	<LD	<LD	<LD	F	F	8.04 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 95: 2,2',4,4',5,5'- Hexachlorobiphenyl (PCB 153) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	62.8	–	–	<LD	<LD	<LD	0.01 0.01 – 0.02	0.03 0.02 – 0.03	0.04[E] 0.03 – 0.07
	Total	F	94	62.8	–	–	<LD	<LD	<LD	0.01[E] 0.01 – 0.02	0.03 0.02 – 0.04	F
	Total	M	102	62.7	–	–	<LD	<LD	<LD	0.01[E] 0.01 – 0.02	0.02[E] 0.02 – 0.03	F
	Anishinabe communities (2)	Total	109	81.7	–	–	<LD	<LD	<LD	<LD	0.01 0.01 – 0.01	0.01 0.01 – 0.01
	Anishinabe communities (2)	F	54	85.2	–	–	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.01	0.01 .
	Anishinabe communities (2)	M	55	78.2	–	–	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.01	0.01 .
	Innu communities (2)	Total	87	39.1	0.02 0.02 – 0.03	0.01 0.01 – 0.02	<LD	<LD	0.01[E] 0.01 – 0.02	0.03 0.02 – 0.03	0.04[E] 0.03 – 0.07	F
	Innu communities (2)	F	40	32.5	0.02 0.02 – 0.03	0.02 0.01 – 0.02	<LD	<LD	0.01[E] 0.01 – 0.03	0.03 0.02 – 0.04	0.04[E] 0.03 – 0.08	0.08 .
	Innu communities (2)	M	47	44.7	–	–	<LD	<LD	0.01[E] 0.01 – 0.02	0.02 0.02 – 0.03	F	0.07 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 96: 2,2’,4,4’,5,5’- Hexachlorobiphenyl (PCB 153) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	62.8	–	–	<LD	<LD	<LD	2.46 2.03 – 2.76	4.78 3.32 – 5.43	F
	Total	F	94	62.8	–	–	<LD	<LD	<LD	2.46 1.88 – 3.19	5.11 3.18 – 5.78	F
	Total	M	101	62.7	–	–	<LD	<LD	<LD	2.43 1.78 – 2.79	3.58^E 2.90 – 5.35	F
	Anishinabe communities (2)	Total	108	81.7	–	–	<LD	<LD	<LD	<LD	2.13 1.64 – 2.61	2.67 2.07 – 3.07
	Anishinabe communities (2)	F	54	85.2	–	–	<LD	<LD	<LD	<LD	1.96^E 1.24 – 2.45	2.39 .
	Anishinabe communities (2)	M	54	78.2	–	–	<LD	<LD	<LD	<LD	2.46^E 1.37 – 2.84	2.81 .
	Innu communities (2)	Total	87	39.1	3.59 2.75 – 4.56	2.26 1.91 – 2.73	<LD	<LD	2.27 1.59 – 2.68	4.64 3.03 – 5.20	F	F
	Innu communities (2)	F	40	32.5	3.57 2.56 – 4.73	2.46 1.89 – 3.24	<LD	<LD	2.58^E 1.57 – 3.48	4.84 3.03 – 5.77	F	7.09 .
	Innu communities (2)	M	47	44.7	–	–	<LD	<LD	2.13^E 1.11 – 2.59	3.16^E 2.51 – 4.89	F	12.90 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 97: 2,2',4,4',5,5'- Hexachlorobiphenyl (PCB 153) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	62.8	–	–	<LD	<LD	<LD	0.01 0.01 – 0.02	0.03 0.02 – 0.03	0.04^{E} 0.03 – 0.07
	Total	3-5	38	76.3	–	–	<LD	<LD	<LD	<LD	0.02^{E} 0.01 – 0.02	0.02 .
	Total	6-11	78	65.4	–	–	<LD	<LD	<LD	0.01^{E} 0.01 – 0.02	0.03^{E} 0.02 – 0.04	F
	Total	12-19	80	53.8	–	–	<LD	<LD	<LD	0.02^{E} 0.01 – 0.02	F	F
	Anishinabe communities (2)	Total	109	81.7	–	–	<LD	<LD	<LD	<LD	0.01 0.01 – 0.01	0.01 0.01 – 0.01
	Anishinabe communities (2)	3-5	24	87.5	–	–	<LD	<LD	<LD	<LD	0.01 .	0.01 .
	Anishinabe communities (2)	6-11	45	91.1	–	–	<LD	<LD	<LD	<LD	<LD	F
	Anishinabe communities (2)	12-19	40	67.5	–	–	<LD	<LD	<LD	0.01^{E} 0.01 – 0.01	0.01 0.01 – 0.01	0.01 .
	Innu communities (2)	Total	87	39.1	0.02 0.02 – 0.03	0.01 0.01 – 0.02	<LD	<LD	0.01^{E} 0.01 – 0.02	0.03 0.02 – 0.03	0.04^{E} 0.03 – 0.07	F
	Innu communities (2)	3-5	14	57.1	–	–	<LD	<LD	<LD	F	0.02 .	0.03 .
	Innu communities (2)	6-11	33	30.3	0.02^{E} 0.01 – 0.03	0.01 0.01 – 0.02	<LD	<LD	0.01^{E} 0.01 – 0.02	0.03^{E} 0.02 – 0.04	F	0.06 .
	Innu communities (2)	12-19	40	40	0.03^{E} 0.02 – 0.04	0.01 0.01 – 0.02	<LD	<LD	0.01^{E} 0.01 – 0.02	0.03^{E} 0.02 – 0.05	F	0.08 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 98: 2,2',4,4',5,5'- Hexachlorobiphenyl (PCB 153) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	62.8	–	–	<LD	<LD	<LD	2.46 2.03 – 2.76	4.78 3.32 – 5.43	F
	Total	3-5	38	76.3	–	–	<LD	<LD	<LD	<LD	F	3.68 .
	Total	6-11	77	65.4	–	–	<LD	<LD	<LD	2.18[E] 1.26 – 3.03	4.69 2.89 – 5.39	F
	Total	12-19	80	53.8	–	–	<LD	<LD	<LD	2.76 2.36 – 3.47	F	F
	Abitibi	Total	108	81.7	–	–	<LD	<LD	<LD	<LD	2.13 1.64 – 2.61	2.67 2.07 – 3.07
	Anishinabe communities (2)	3-5	24	87.5	–	–	<LD	<LD	<LD	<LD	1.78 .	1.96 .
	Anishinabe communities (2)	6-11	44	91.1	–	–	<LD	<LD	<LD	<LD	<LD	1.53 .
	Anishinabe communities (2)	12-19	40	67.5	–	–	<LD	<LD	<LD	2.03[E] 1.12 – 2.57	2.70 2.31 – 3.01	2.92 .
	Innu communities (2)	Total	87	39.1	3.59 2.75 – 4.56	2.26 1.91 – 2.73	<LD	<LD	2.27 1.59 – 2.68	4.64 3.03 – 5.20	F	F
	Innu communities (2)	3-5	14	57.1	–	–	<LD	<LD	<LD	F	4.05 .	5.17 .
	Innu communities (2)	6-11	33	30.3	3.46[E] 2.32 – 4.79	2.44 1.84 – 3.19	<LD	<LD	2.48[E] 1.80 – 3.18	4.45 2.91 – 5.22	F	6.80 .
	Innu communities (2)	12-19	40	40	4.27[E] 2.77 – 6.15	2.44 1.80 – 3.37	<LD	<LD	2.35[E] 1.17 – 3.08	F	F	14.90 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 99: 2,2',3,4,4',5,5'- Heptachlorobiphenyl (PCB 180) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	86.2	–	–	<LD	<LD	<LD	<LD	0.01 0.01 – 0.01	0.01^E 0.01 – 0.02
	Total	F	94	83	–	–	<LD	<LD	<LD	<LD	0.01^E 0.01 – 0.01	0.01^E 0.01 – 0.03
	Total	M	102	89.2	–	–	<LD	<LD	<LD	<LD	F	F
	Anishinabe communities (2)	Total	109	91.7	–	–	<LD	<LD	<LD	<LD	<LD	0.01^E 0.01 – 0.01
	Anishinabe communities (2)	F	54	90.7	–	–	<LD	<LD	<LD	<LD	<LD	0.01^E 0.01 – 0.01
	Anishinabe communities (2)	M	55	92.7	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	0.01^E 0.01 – 0.03	F
	Innu communities (2)	F	40	72.5	–	–	<LD	<LD	<LD	0.01^E 0.01 – 0.01	F	0.03 .
	Innu communities (2)	M	47	85.1	–	–	<LD	<LD	<LD	<LD	F	0.02 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 100: 2,2',3,4,4',5,5'- Heptachlorobiphenyl (PCB 180) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	86.2	–	–	<LD	<LD	<LD	<LD	1.77 1.27 – 2.17	F
	Total	F	94	83	–	–	<LD	<LD	<LD	<LD	1.77 E 1.25 – 2.23	F
	Total	M	101	89.2	–	–	<LD	<LD	<LD	<LD	1.50 E 1.16 – 2.39	F
	Anishinabe communities (2)	Total	108	91.7	–	–	<LD	<LD	<LD	<LD	<LD	1.97 E 1.29 – 2.44
	Anishinabe communities (2)	F	54	90.7	–	–	<LD	<LD	<LD	<LD	<LD	1.90 .
	Anishinabe communities (2)	M	54	92.7	–	–	<LD	<LD	<LD	<LD	<LD	1.69 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	F	40	72.5	–	–	<LD	<LD	<LD	1.11 E 0.94 – 1.76	F	2.50 .
	Innu communities (2)	M	47	85.1	–	–	<LD	<LD	<LD	<LD	F	5.08 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 101: 2,2’,3,4,4’,5,5’- Heptachlorobiphenyl (PCB 180) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	86.2	–	–	<LD	<LD	<LD	<LD	0.01 0.01 – 0.01	0.01[E] 0.01 – 0.02
	Total	3-5	38	94.7	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Total	6-11	78	89.7	–	–	<LD	<LD	<LD	<LD	F	F
	Total	12-19	80	78.8	–	–	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.02	F
	Anishinabe communities (2)	Total	109	91.7	–	–	<LD	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.01
	Anishinabe communities (2)	3-5	24	91.7	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Anishinabe communities (2)	6-11	45	97.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	85	–	–	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.01	0.01 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	0.01[E] 0.01 – 0.03	F
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	78.8	–	–	<LD	<LD	<LD	<LD	F	0.02 .
	Innu communities (2)	12-19	40	72.5	–	–	<LD	<LD	<LD	F	F	0.03 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 102: 2,2',3,4,4',5,5'- Heptachlorobiphenyl (PCB 180) (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	86.2	–	–	<LD	<LD	<LD	<LD	1.77 1.27 – 2.17	F
	Total	3-5	38	94.7	–	–	<LD	<LD	<LD	<LD	<LD	1.57 .
	Total	6-11	77	89.7	–	–	<LD	<LD	<LD	<LD	1.23 1.13 – 1.57	F
	Total	12-19	80	78.8	–	–	<LD	<LD	<LD	<LD	F	F
	Anishinabe communities (2)	Total	108	91.7	–	–	<LD	<LD	<LD	<LD	<LD	1.97 E 1.29 – 2.44
	Anishinabe communities (2)	3-5	24	91.7	–	–	<LD	<LD	<LD	<LD	<LD	1.98 .
	Anishinabe communities (2)	6-11	44	97.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	12-19	40	85	–	–	<LD	<LD	<LD	<LD	1.79 E 1.17 – 2.68	2.55 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	78.8	–	–	<LD	<LD	<LD	<LD	F	1.89 .
	Innu communities (2)	12-19	40	72.5	–	–	<LD	<LD	<LD	F	F	6.14 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

INAC (Indigenous and Northern Affairs Canada) (2010). Persistent Organic Pollutants (POPs) Fact Sheet Series. PCBs – Polychlorinated Biphenyls. Government of Canada. Consulted online: http://www.aadnc-aandc.gc.ca/DAM/DAM-INTER-YT/STAGING/texte-text/pubs-cfs-PCBS_1316124350345_eng.pdf

AMAP (Arctic Monitoring Assessment Programme) (2015). Assessment 2015: Human Health in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. vii + 165 pp. Consulted online: https://www.amap.no/documents/doc/AMAP-Assessment-2015-Human-Health-in-the-Arctic/1346

Dewaily, E., Ryan, J.J., Laliberté, C., Bruneau, S., Weber, J.R., Gingras, S., Carrier, G. (1994). Exposure of Remote Maritime Populations to Coplanar PCBs. Environmental Health Perspectives. 102 Suppl 1. 205-209.

Health Canada (2005). It's Your Health. PCBs. Government of Canada. Consulted online: http://www.canada.ca/content/dam/hc-sc/migration/hc-sc/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/environ/pcb-bpc-eng.pdf

6.3. Other Contaminants

6.3.1. Chlorophenols

Chlorophenols are organic compounds that include 19 congeners (including 2,4-dichlorophenol and 2,5-dichlorophenol). Although Canada no longer manufactures chlorophenols, it still imports them. In particular, they are used in phytosanitary products (Health Canada, 1984). They may contaminate the environment after use or when their chemicals decompose. Some of them may also be produced through chlorination of drinking water by reacting with organic matter (Health Canada, 1984).

Chlorophenols are rapidly absorbed through ingestion, inhalation, or skin contact. According to studies done on animals, they tend to accumulate mainly in the liver and kidneys, and in lower concentrations in the brain, muscles, and adipose tissue (Health Canada, 1984).

2,4-Dichlorophenol (2,4-DCP)

2,4-DCP is found in pesticides and pharmaceutical products (EPA, 2015). 2,4-DCP is one of the metabolites of a phenoxy-type herbicide called 2,4-dichlorophenoxyacetic acid (2,4-D) (see Section 8.3.4). 2,4-DCP is also produced following chlorination of organic material when treating waste water, when incinerating waste containing organochlorines, and when chlorinated compounds decompose in the environment (EPA, 2015).

There is very little information on the effects of 2,4-DCP on human health, especially in the concentrations measured in the environment.

2,5-Dichlorophenol (2,5-DCP)

2,5-DCP is the main metabolite of a contaminant called paradichlorobenzene (*p*-DCB) (CDC, 2016). *p*-DCB is used mainly in the manufacture of mothballs, urinal deodorizer blocks, and certain air fresheners. This contaminant is found mainly in closed environments such as homes and public buildings. *p*-DCB is white in colour and evaporates upon contact with ambient air. It is recognizable by its strong "mothball" odour and is liposoluble (ATSDR, 2006; Pubchem, 2005).

Exposure to *p*-DCB occurs mainly through inhalation and ingestion. According to a document from the Institut national de recherche scientifique de la France (2016), *p*-DCB poisoning occurs quite frequently in children who have ingested mothballs. The impacts are generally inconsequential (irritation of the digestive tract, nausea, and vomiting). However, if several mothballs are ingested (1 ball = 5 grams), neurological signs may occur, such as agitation and convulsions.

As of yet, there have been no studies on the effects of long term exposure to *p*-DCB. Following tests conducted on laboratory animals, *p*-DCB is recognized as being carcinogenic. In humans, *p*-DCB has been classified as a possible carcinogen (INRS, 2016).

When *p*-DCB is found in the body, it is metabolised (or transformed) in the liver and forms 2,5-DCP. 2,5-DCP is an excellent indicator for assessing exposure to *p*-DCP in the general population (INRS, 2016).

The chlorophenol levels measured in the urine of participants in the JES!-YEH! project are 2,4-DCP and 2,5-DCP. To date, no toxicity threshold has been issued by Quebec or Canadian authorities or by international organizations.

Results

Chlorophenol levels were measured in urine for all participants in the JES!-YEH! project and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 103 – 110). Chlorophenol levels reflect recent exposure to these substances. A measurable level does not necessarily mean that they will have negative health effects.

In general, 2,4-DCP levels measured in the urine of participants in the JES!-YEH! study were similar to the results of the CHMS (Cycle 2) for all three age groups in question (Table 106). However, it should be mentioned that the coefficients of variation of the geometric means for the 3-5 and 12-19 year old participants varied between 16.6 and 33.3%, so these results should be interpreted with caution.

Urine levels of 2,5-DCP for participants 3-5 years old were too uncertain to be published. As for participants in the 6-11 and 12-19 age groups, their measured levels were significantly higher than those in the CHMS (Cycle 2) (Table 110). Although their concentrations were more than three times higher than those in the CHMS, these results should be interpreted with a great deal of caution, as their coefficients of variation were between 16.6 and 33.3%.

In one of the Innu communities that participated in the JES!-YEH! project, several children had abnormally high concentrations of 2,5-DCP. After discussions with various partners, our research established a link with a possible source of exposure. The research team learned that the school janitors had seen children eating mothballs. The mothballs were used as deodorizers in the school's washrooms. After this was discovered, the janitors immediately removed the mothballs from the school. This occurred in the months that followed the data collection for the JES!-YEH! project. Eating mothballs was considered to be the likely source of this abnormally high exposure to 2,5-DCP.

Therefore, it is suggested that the use of mothballs be avoided in homes, schools, and hunting grounds (where they are used to keep animals away). Since mothballs may look like candy, young children might be tempted to eat them.

Table 103: 2,4-Dichlorophenol – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	24	8.79E 4.93 – 13.88	1.08 0.84 – 1.38	<LD	0.20E 0.15 – 0.42	0.79 0.61 – 0.99	2.43E 1.56 – 3.91	F	F
	Total	F	95	26.3	F	0.84E 0.60 – 1.18	<LD	<LD	0.59E 0.48 – 0.90	1.85E 0.98 – 2.90	F	F
	Total	M	101	21.8	10.57E 5.04 – 18.21	1.38E 0.96 – 1.97	<LD	0.32E 0.15 – 0.56	1.07E 0.70 – 1.37	3.71E 1.75 – 5.88	F	F
	Anishinabe communities (2)	Total	110	32.7	2.14E 0.99 – 3.65	0.57 0.45 – 0.72	<LD	<LD	0.53 0.42 – 0.61	0.98 0.80 – 1.32	F	F
	Anishinabe communities (2)	F	55	32.7	F	0.52 0.39 – 0.73	<LD	<LD	0.48E 0.28 – 0.59	0.91E 0.58 – 1.30	F	3.48 .
	Anishinabe communities (2)	M	55	32.7	F	0.62E 0.43 – 0.87	<LD	<LD	0.57E 0.35 – 0.83	1.16E 0.83 – 1.69	F	5.88 .
	Innu communities (2)	Total	86	12.8	17.30E 8.88 – 28.69	2.47E 1.65 – 3.81	<LD	0.63E 0.38 – 1.06	1.80E 1.24 – 3.15	F	F	F
	Innu communities (2)	F	40	17.5	F	1.61E 0.92 – 3.06	<LD	F	F	F	F	67.00 .
	Innu communities (2)	M	46	8.7	F	3.59E 2.06 – 6.44	F	1.15E 0.45 – 1.47	2.70E 1.40 – 4.10	F	F	94.40 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 104: 2,4-Dichlorophenol (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	24	8.53E 5.10 – 13.05	1.48 1.21 – 1.84	<LD	0.56 0.47 – 0.64	0.94 0.79 – 1.14	2.78E 2.00 – 4.31	F	F
	Total	F	95	26.3	F	1.30 0.99 – 1.74	<LD	<LD	0.82 0.66 – 1.13	2.78E 1.50 – 4.15	F	F
	Total	M	101	21.8	10.30E 4.91 – 17.40	1.67 1.20 – 2.28	<LD	0.62 0.44 – 0.74	1.03E 0.79 – 1.51	F	F	F
	Anishinabe communities (2)	Total	110	32.7	F	0.87 0.71 – 1.06	<LD	<LD	0.70 0.62 – 0.77	1.13E 0.87 – 1.97	4.14E 2.04 – 5.89	F
	Anishinabe communities (2)	F	55	32.7	1.76E 1.00 – 2.91	0.84 0.64 – 1.12	<LD	<LD	0.66 0.56 – 0.76	F	4.34E 1.53 – 5.48	5.39 .
	Anishinabe communities (2)	M	55	32.7	F	0.89 0.67 – 1.21	<LD	<LD	0.74 0.53 – 0.82	1.12E 0.83 – 2.02	F	7.29 .
	Innu communities (2)	Total	86	12.8	15.86E 8.37 – 25.26	2.92E 2.10 – 4.16	<LD	0.83 0.64 – 1.17	1.96E 1.42 – 2.77	F	F	F
	Innu communities (2)	F	40	17.5	F	2.35E 1.49 – 4.07	<LD	0.80E 0.48 – 1.13	1.60E 1.06 – 2.76	F	F	59.24 .
	Innu communities (2)	M	46	8.7	F	3.53E 2.14 – 5.93	0.60E 0.18 – 0.80	0.86E 0.70 – 1.51	F	F	F	75.16 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 105: 2,4-Dichlorophenol – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	24	8.79^{E} 4.93 – 13.88	1.08 0.84 – 1.38	<LD	0.20^{E} 0.15 – 0.42	0.79 0.61 – 0.99	2.43^{E} 1.56 – 3.91	F	F
	Total	3-5	38	36.8	F	0.80^{E} 0.45 – 1.51	<LD	<LD	F	F	F	19.10 .
	Total	6-11	78	24.4	3.11^{E} 1.46 – 5.26	0.82 0.60 – 1.15	<LD	F	0.75^{E} 0.49 – 0.98	F	F	F
	Total	12-19	80	17.5	13.96^{E} 7.23 – 23.34	1.63^{E} 1.06 – 2.52	<LD	0.42^{E} 0.15 – 0.61	1.10^{E} 0.73 – 1.58	F	F	F
	Anishinabe communities (2)	Total	110	32.7	2.14^{E} 0.99 – 3.65	0.57 0.45 – 0.72	<LD	<LD	0.53 0.42 – 0.61	0.98 0.80 – 1.32	F	F
	Anishinabe communities (2)	3-5	24	41.7	–	–	<LD	<LD	0.51^{E} 0.15 – 0.83	F	3.88 .	5.60 .
	Anishinabe communities (2)	6-11	46	30.4	F	0.50 0.36 – 0.70	<LD	<LD	0.48^{E} 0.34 – 0.64	0.93 0.59 – 1.12	F	1.97 .
	Anishinabe communities (2)	12-19	40	30	F	0.65^{E} 0.42 – 1.01	<LD	<LD	0.54^{E} 0.30 – 0.74	F	F	6.10 .
	Innu communities (2)	Total	86	12.8	17.30^{E} 8.88 – 28.69	2.47^{E} 1.65 – 3.81	<LD	0.63^{E} 0.38 – 1.06	1.80^{E} 1.24 – 3.15	F	F	F
	Innu communities (2)	3-5	14	28.6	F	F	<LD	<LD	F	F	15.40 .	89.90 .
	Innu communities (2)	6-11	32	15.6	4.95^{E} 2.36 – 8.62	1.65^{E} 0.99 – 2.96	<LD	F	F	F	F	14.70 .
	Innu communities (2)	12-19	40	5	25.67^{E} 12.44 – 44.19	4.13^{E} 2.24 – 7.84	F	1.00^{E} 0.56 – 1.35	F	F	F	F
CHMS (Cycle 2)	Total	3-5	523	13.00		1.2 0.99 – 1.5	<LD		1.0 0.84 – 1.2	2.1 1.6 – 2.6		F
	Total	6-11	513	12.09		1.1 0.94 – 1.4	<LD		0.99 0.85 – 1.1	2.0 1.4 – 2.6		9.5^{E} 4.7 – 14
	Total	12-19	508	6.30		1.5 1.3 – 1.8	0.41^{E} <LD – 0.57		1.2 0.93 – 1.5	3.0 2.1 – 3.8		12^{E} 7.4 – 17

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 106: 2,4-Dichlorophenol (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	24	8.53E 5.10 – 13.05	1.48 1.21 – 1.84	<LD	0.56 0.47 – 0.64	0.94 0.79 – 1.14	2.78E 2.00 – 4.31	F	F
	Total	3-5	38	36.8	F	1.72E 1.06 – 2.92	<LD	<LD	F	F	F	35.61 .
	Total	6-11	78	24.4	3.77E 1.91 – 6.08	1.30 1.00 – 1.72	<LD	0.60 0.42 – 0.74	1.02E 0.77 – 1.40	2.24E 1.54 – 3.22	F	F
	Total	12-19	80	17.5	F	1.56E 1.07 – 2.32	<LD	0.50 0.36 – 0.59	0.94E 0.69 – 1.45	F	F	F
	Anishinabe communities (2)	Total	110	32.7	F	0.87 0.71 – 1.06	<LD	<LD	0.70 0.62 – 0.77	1.13E 0.87 – 1.97	4.14E 2.04 – 5.89	F
	Anishinabe communities (2)	3-5	24	41.7	–	–	<LD	<LD	F	F	5.88 .	6.97 .
	Anishinabe communities (2)	6-11	46	30.4	F	0.91 0.70 – 1.25	<LD	<LD	0.77 0.62 – 0.95	1.27E 0.88 – 1.95	F	4.15 .
	Anishinabe communities (2)	12-19	40	30	F	0.64E 0.46 – 0.94	<LD	<LD	0.51 0.41 – 0.66	F	F	6.19 .
	Innu communities (2)	Total	86	12.8	15.86E 8.37 – 25.26	2.92E 2.10 – 4.16	<LD	0.83 0.64 – 1.17	1.96E 1.42 – 2.77	F	F	F
	Innu communities (2)	3-5	14	28.6	F	F	<LD	<LD	F	F	26.92 .	84.17 .
	Innu communities (2)	6-11	32	15.6	5.47E 2.77 – 8.52	2.18E 1.39 – 3.52	<LD	F	1.96E 1.18 – 2.88	F	F	30.46 .
	Innu communities (2)	12-19	40	5	F	3.78E 2.26 – 6.85	0.60E 0.38 – 0.93	1.04E 0.66 – 1.40	F	F	F	100.3 .
CHMS (Cycle 2)	Total	3-5	522	13.03		2.0 1.7 – 2.4	<LD		1.8 1.5 – 2.1	3.3 2.8 – 3.9		F
	Total	6-11	511	12.13		1.3 1.0 – 1.6	<LD		1.1 0.82 – 1.4	2.4E 1.5 – 3.4		10E 4.6 – 15
	Total	12-19	506	6.32		1.1 0.96 – 1.4	0.31 <LD – 0.40		0.96 0.80 – 1.1	2.1 1.5 – 2.6		9.7E 5.9 – 13

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 107: 2,5-Dichlorophenol – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	3	351.7^{E} 163.7 – 624.8	11.43^{E} 8.07 – 16.09	0.66^{E} 0.41 – 0.87	1.83^{E} 1.35 – 2.75	7.25^{E} 5.33 – 10.95	39.88^{E} 25.08 – 75.75	F	F
	Total	F	95	3.2	F	7.96^{E} 5.07 – 12.46	0.70^{E} 0.37 – 0.88	1.44^{E} 0.90 – 2.60	6.50^{E} 3.30 – 10.12	24.25^{E} 12.69 – 38.84	F	F
	Total	M	102	2.9	F	16.02^{E} 9.47 – 26.36	0.51^{E} 0.32 – 0.98	F	F	F	F	F
	Anishinabe communities (2)	Total	110	5.5	F	2.64 1.97 – 3.61	0.37^{E} 0.15 – 0.52	0.86^{E} 0.59 – 1.27	2.30^{E} 1.53 – 3.30	6.85^{E} 4.74 – 9.90	18.50^{E} 9.99 – 23.73	F
	Anishinabe communities (2)	F	55	5.5	4.88^{E} 3.32 – 6.66	2.25^{E} 1.59 – 3.15	0.41^{E} 0.15 – 0.72	0.85^{E} 0.58 – 1.23	2.00^{E} 1.28 – 3.10	5.83^{E} 3.17 – 9.92	12.00^{E} 8.42 – 19.40	18.00 .
	Anishinabe communities (2)	M	55	5.5	F	3.11^{E} 1.92 – 5.10	0.33^{E} 0.15 – 0.51	0.87^{E} 0.45 – 1.58	2.65^{E} 1.61 – 4.54	F	F	29.75 .
	Innu communities (2)	Total	87	0	755.1^{E} 339.3 – 1336	72.84^{E} 47.14 – 118.2	5.14^{E} 3.25 – 7.53	13.13^{E} 7.76 – 25.33	47.50^{E} 31.73 – 86.17	F	F	F
	Innu communities (2)	F	40	0	F	45.30^{E} 24.22 – 88.64	F	F	32.00^{E} 14.73 – 42.00	F	F	2300 .
	Innu communities (2)	M	47	0	F	109.1^{E} 57.70 – 208.0	F	F	F	F	F	3393 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 108: 2,5-Dichlorophenol (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
	Total	Total	197	3	336.3^{E} 167.9 – 567.4	15.68 11.48 – 21.01	1.12 0.86 – 1.66	3.36^{E} 1.99 – 4.57	9.88^{E} 7.19 – 13.80	57.14^{E} 31.62 – 83.74	F	F
	Total	F	95	3.2	F	12.35^{E} 8.26 – 18.65	1.11^{E} 0.81 – 1.76	2.91^{E} 1.88 – 4.70	9.51^{E} 6.47 – 13.46	F	F	F
	Total	M	102	2.9	F	19.58^{E} 12.10 – 31.07	1.29^{E} 0.70 – 1.86	3.59^{E} 1.89 – 4.95	F	F	F	F
	Anishinabe communities (2)	Total	110	5.5	F	4.05 3.11 – 5.30	0.84 0.66 – 1.11	1.59 1.11 – 1.96	4.16 2.67 – 5.03	8.02 5.43 – 9.88	14.74^{E} 10.20 – 22.85	F
JES!-YEH!	Anishinabe communities (2)	F	55	5.5	6.92^{E} 4.28 – 11.45	3.65 2.75 – 4.82	0.86^{E} 0.64 – 1.11	1.52^{E} 0.98 – 2.18	4.16^{E} 2.18 – 5.38	7.39 5.37 – 10.05	11.21^{E} 8.58 – 16.26	15.32 .
	Anishinabe communities (2)	M	55	5.5	F	4.51^{E} 2.95 – 7.06	0.74^{E} 0.39 – 1.31	1.60^{E} 0.95 – 2.49	4.14^{E} 2.31 – 5.14	8.24^{E} 5.14 – 12.53	F	37.76 .
	Innu communities (2)	Total	87	0	698.8^{E} 335.7 – 1180	86.66^{E} 58.56 – 130.3	10.18^{E} 6.08 – 14.01	21.78^{E} 13.91 – 32.95	62.91^{E} 37.87 – 85.52	F	F	F
	Innu communities (2)	F	40	0	F	66.07^{E} 38.95 – 119.6	11.61^{E} 5.68 – 14.15	15.51^{E} 11.91 – 31.58	41.61^{E} 28.89 – 73.83	F	F	2034 .
	Innu communities (2)	M	47	0	F	109.2^{E} 59.98 – 196.9	F	24.93^{E} 10.02 – 45.15	81.27^{E} 40.20 – 129.8	F	F	2864 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 109: 2,5-Dichlorophenol – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	3	351.7^{E} 163.7 – 624.8	11.43^{E} 8.07 – 16.09	0.66^{E} 0.41 – 0.87	1.83^{E} 1.35 – 2.75	7.25^{E} 5.33 – 10.95	39.88^{E} 25.08 – 75.75	F	F
	Total	3-5	38	7.9	F	F	0.21 .	F	F	F	F	713.0 .
	Total	6-11	79	0	F	11.61^{E} 7.57 – 18.24	0.90^{E} 0.79 – 1.62	2.48^{E} 1.57 – 4.64	7.65^{E} 5.05 – 11.90	F	F	F
	Total	12-19	80	3.8	F	16.82^{E} 8.94 – 31.41	F	F	F	F	F	F
	Anishinabe communities (2)	Total	110	5.5	F	2.64 1.97 – 3.61	0.37^{E} 0.15 – 0.52	0.86^{E} 0.59 – 1.27	2.30^{E} 1.53 – 3.30	6.85^{E} 4.74 – 9.90	18.50^{E} 9.99 – 23.73	F
	Anishinabe communities (2)	3-5	24	12.5	F	F	<LD	F	F	F	14.50 .	23.50 .
	Anishinabe communities (2)	6-11	46	0	F	4.03^{E} 2.76 – 6.31	0.83 0.57 – 1.32	1.45^{E} 0.88 – 2.32	3.30^{E} 2.27 – 5.10	F	F	21.40 .
	Anishinabe communities (2)	12-19	40	7.5	5.55^{E} 3.36 – 7.89	2.22^{E} 1.34 – 3.44	0.30^{E} 0.15 – 0.51	F	F	F	17.00^{E} 7.08 – 23.10	22.50 .
	Innu communities (2)	Total	87	0	755.1^{E} 339.3 – 1336	72.84^{E} 47.14 – 118.2	5.14^{E} 3.25 – 7.53	13.13^{E} 7.76 – 25.33	47.50^{E} 31.73 – 86.17	F	F	F
	Innu communities (2)	3-5	14	0	F	F	2.72 .	3.85 .	F	F	594.0 .	5569 .
	Innu communities (2)	6-11	33	0	198.2^{E} 86.97 – 337.1	50.70^{E} 28.61 – 95.52	6.27 .	F	F	F	F	840.0 .
	Innu communities (2)	12-19	40	0	1018^{E} 462.0 – 1773	F	F	24.00^{E} 12.86 – 39.94	F	F	F	4000 .
CHMS (Cycle 2)	Total	3-5	521	7.87		4.1^{E} 2.7 – 6.0	F		2.7^{E} 1.5 – 3.8	9.8^{E} 4.3 – 15		F
	Total	6-11	514	2.14		4.7^{E} 3.1 – 7.0	0.69^{E} 0.41 – 0.96		3.5^{E} 2.0 – 5.1	F		98^{E} 45 – 150
	Total	12-19	509	1.96		5.8^{E} 3.8 – 8.8	0.90^{E} 0.45 – 1.4		4.8^{E} 2.5 – 7.2	14^{E} 5.6 – 22		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 110: 2,5-Dichlorophenol (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	3	336.3^{E} 167.9 – 567.4	15.68 11.48 – 21.01	1.12 0.86 – 1.66	3.36^{E} 1.99 – 4.57	9.88^{E} 7.19 – 13.80	57.14^{E} 31.62 – 83.74	F	F
	Total	3-5	38	7.9	F	F	0.82 .	1.49^{E} 0.95 – 3.11	F	F	F	1219 .
	Total	6-11	79	0	F	18.51^{E} 12.96 – 27.26	3.86 2.45 – 4.68	5.14 4.67 – 6.23	9.88^{E} 7.24 – 19.09	F	F	F
	Total	12-19	80	3.8	F	16.02^{E} 9.01 – 28.84	0.84^{E} 0.62 – 1.13	1.84^{E} 1.11 – 3.39	F	F	F	F
	Anishinabe communities (2)	Total	110	5.5	F	4.05 3.11 – 5.30	0.84 0.66 – 1.11	1.59 1.11 – 1.96	4.16 2.67 – 5.03	8.02 5.43 – 9.88	14.74^{E} 10.20 – 22.85	F
	Anishinabe communities (2)	3-5	24	12.5	F	F	<LD	1.11^{E} 0.69 – 1.57	F	F	24.41 .	83.03 .
	Anishinabe communities (2)	6-11	46	0	F	7.28 5.43 – 10.35	2.58^{E} 2.06 – 4.02	4.50 2.81 – 5.07	5.38 5.00 – 7.49	9.45 7.05 – 12.00	F	22.98 .
	Anishinabe communities (2)	12-19	40	7.5	3.92^{E} 2.46 – 5.55	2.19^{E} 1.57 – 3.02	0.63^{E} 0.31 – 0.85	0.98^{E} 0.70 – 1.34	1.84^{E} 1.12 – 3.10	F	F	13.26 .
	Innu communities (2)	Total	87	0	698.8^{E} 335.7 – 1180	86.66^{E} 58.56 – 130.3	10.18^{E} 6.08 – 14.01	21.78^{E} 13.91 – 32.95	62.91^{E} 37.87 – 85.52	F	F	F
	Innu communities (2)	3-5	14	0	F	F	4.41 .	8.54 .	F	F	1005 .	4867 .
	Innu communities (2)	6-11	33	0	F	67.99^{E} 40.67 – 114.9	8.62 .	F	61.92^{E} 32.36 – 87.16	F	F	1133 .
	Innu communities (2)	12-19	40	0	F	116.9^{E} 65.93 – 226.4	13.26^{E} 5.68 – 22.47	29.89^{E} 13.91 – 38.21	F	F	F	4649 .
CHMS (Cycle 2)	Total	3-5	520	7.88		6.9^{E} 4.6 – 10	1.1^{E} <LD – 1.7		4.3^{E} 2.2 – 6.4	19^{E} 9.4 – 28		F
	Total	6-11	512	2.15		5.4^{E} 3.6 – 8.1	0.97^{E} 0.62 – 1.3		4.0^{E} 2.0 -6.1	F		F
	Total	12-19	507	1.97		4.4^{E} 2.8 – 6.7	0.69 0.45 – 0.93		3.7^{E} 2.0 – 5.5	11^{E} 5.2 – 18		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2006). Public health statement. Dichlorobenzenes. Source: www.atsdr.cdc.gov/ToxProfiles/tp10-c1-b.pdf

CDC (Centers for Disease Control and Prevention) (2016). Biomonitoring summary – 2,5-Dichlorophenol. Consulted online: www.cdc.gov/biomonitoring/25D_BiomonitoringSummary.html

EPA (United States Environmental Protection Agency) (2015). Update of Human Health Ambient Water Quality Criteria: 2,4-Dichlorophenol 120-83-2. Source: www.epa.gov/sites/production/files/2015-10/documents/final-2-4-dichlorophenol.pdf

INRS (Institut national de recherche scientifique de la France) (2016). 1,4-Dichlorobenzene. Fiche toxicologique n° 224. Source: www.inrs.fr/publications/bdd/fichetox/fiche.html?refINRS=FICHETOX_224

Pubchem (2005). 1,4-Dichlorobenzene. Consulted online: pubchem.ncbi.nlm.nih.gov/compound/1_4-dichlorobenzene#section=Top

Health Canada (1984). Chlorophenols. Government of Canada. Source: http://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/water-chlorophenols-eau/alt/water-chlorophenols-eau-eng.pdf

6.3.2. Perfluorinated Compounds (PFCs)

Perfluorinated compounds (PFCs) were invented around the 1950s (ATSDR, 2016). They are widely used in industry because they are resistant to high temperatures and water and repel stains, oils and fats (OECD, 2007). These compounds are found in a variety of consumer products. They are used as protective coatings for furniture, carpets, paper, cardboard packaging, and textiles (fabric and leather) (ATSDR, 2016; EPA, 2017). They are used as surfactants/detergents in certain cleaning products and cosmetics (Froome et al., 2009). They are used to waterproof outdoor clothing (e.g., Gore-Tex). Teflon, used in non-stick pots and pans, is also made from PFCs (Berryman et al., 2012).

There are approximately thirty perfluorinated chemical compounds, and they are present throughout the world. Unlike other POP, these compounds do not accumulate in fats. However, once they are in the human body, these contaminants remain there for many years. According to the ATSDR, the half-life of PFCs is approximately 4 years (Stein and Savitz, 2011). There are several sources of exposure: water, food, food packaging, carpets, furniture, clothing, household dust, waxes and some aerosols, and indoor and outdoor air (Gleason et al., 2015). To date, animal studies have shown that exposure to PFCs has negative effects on reproduction, development, the liver, and the kidneys, and also causes some cancers. The effects on human health are not yet very clear, but these negative effects have also been observed in certain populations exposed to PFCs (EPA, 2017).

The production and use of certain PFCs have decreased over the years, while other PFC molecules with longer carbon chains have progressively appeared on the market. In 2002, the large industries that manufactured perfluorooctane sulfonate (PFOS), one of the most common perfluorinated compounds in the environment at the time, voluntarily ceased production, although smaller producers continue to manufacture it in smaller quantities (Kato et al., 2011). Perfluorononanoic acid (PFNA) is one of the newest PFCs measured in the present study. In the years that followed, they were often detected in human populations. For example, in the United States, as part of a large national study between 1999 and 2008 (National Health and Nutrition Examination Survey – NHANES), PFNA had been detected in more than 95% of blood samples in participants 12 years or older, and a significant increase in this exposure had been observed in the early 2000s (Kato et al., 2011). In 2016, the Government of Canada amended the Prohibition of Certain Toxic Substances Regulations to add several PFCs, including PFOS, perfluorooctanoic acid (PFOA), and molecules with longer carbon chains such as PFNA (Health Canada, 2017).

Levels of perfluorooctanoic acid (PFOA), perfluorononanoic acid (PFNA), perfluorohexane sulfonate (PFHxS), and perfluorooctane sulfonate (PFOS) were analysed as part of the JES!-YEH! project. There are still no thresholds to assess the toxicity of these contaminants. Using modelling software, Gleason and his colleagues (2015) tried to develop a benchmark concentration for PFNA In human serum. This concentration was calculated using a benchmark concentration modelled after the weight of the liver in gestating rats, which were exposed to PFNA for 17 days. Thus, a concentration of 4.9 ng/ml (or µg/L) in human serum was used in this report to provide a level for comparison. That being said, this value should be used with caution, and in no case should be used as the recommended threshold for the general population.

Results

Levels of PFCs (PFOA, PFNA, PFHxS, and PFOS) were measured in serum for all participants in the JES!-YEH! project (Tables 111 – 118). A measurable level does not necessarily mean that they will have negative health effects.

Levels of serum PFOA, PFHxS, and PFOS measured in the JES!-YEH! project were significantly lower (almost 3 to 5 times lower) than those in the CHMS (Cycle 2) for the 12-19 age group (the only age group assessed in the CHMS) (Tables 112, 116 and 118). However, for the same age group, PFNA levels measured in the JES!-YEH! project were significantly higher (almost twice as high) as those in the CHMS (Cycle 2) (Table 114). Note that in the CHMS, PFCs were not measured in participants younger than 12 years old.

One of the Anishinabe communities in the JES!-YEH! project had PFNA levels that clearly exceeded the benchmark concentration proposed by Gleason and his colleagues (2015), especially in the 6-11 age group, where all of the children had levels that exceeded 4.9 µg/L. To date, in collaboration with partners from this community, the research team is trying to identify the potential source or sources that might explain these elevated levels. Analyses of tapwater show that PFCs were not detected in the community's drinking water. Several known sources were identified as possible sources of PFNA (cleaning products, floor waxes, furniture, carpets, etc.). After inspection, none of these products that might have contained PFNAs were used in the elementary school, by the Band Council or in homes. The investigation is ongoing.

Table 111: Perfluorooctanoic acid (PFOA) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	0.89 0.85 – 0.95	0.83 0.79 – 0.88	0.54 0.51 – 0.60	0.67 0.63 – 0.72	0.82 0.78 – 0.86	0.99 0.92 – 1.05	1.23 1.12 – 1.38	1.46 1.29 – 1.87
	Total	F	93	0	0.86 0.79 – 0.94	0.79 0.73 – 0.86	0.50 0.44 – 0.58	0.64 0.59 – 0.70	0.78 0.73 – 0.84	0.89 0.86 – 1.04	1.24 1.04 – 1.46	1.47 1.20 – 1.89
	Total	M	101	0	0.93 0.86 – 0.99	0.87 0.82 – 0.93	0.58 0.54 – 0.63	0.70 0.63 – 0.77	0.85 0.80 – 0.90	1.01 0.96 – 1.11	1.23 1.12 – 1.42	1.45E 1.23 – 1.86
	Anishinabe communities (2)	Total	108	0	0.95 0.87 – 1.03	0.88 0.81 – 0.95	0.54 0.48 – 0.61	0.71 0.62 – 0.75	0.86 0.80 – 0.89	1.07 0.97 – 1.17	1.37 1.19 – 1.51	1.56 1.36 – 1.96
	Anishinabe communities (2)	F	53	0	0.94 0.82 – 1.07	0.85 0.74 – 0.95	0.47E 0.35 – 0.59	0.67 0.53 – 0.75	0.84 0.74 – 0.88	1.05 0.88 – 1.24	1.44 1.09 – 1.86	1.84 .
	Anishinabe communities (2)	M	55	0	0.96 0.87 – 1.04	0.91 0.83 – 0.98	0.58 0.53 – 0.67	0.72 0.62 – 0.81	0.87 0.80 – 0.96	1.10 0.95 – 1.20	1.33 1.16 – 1.48	1.46E 1.25 – 1.68
	Innu communities (2)	Total	86	0	0.83 0.77 – 0.90	0.78 0.73 – 0.84	0.56 0.48 – 0.61	0.64 0.61 – 0.69	0.78 0.73 – 0.82	0.89 0.85 – 0.97	1.06 0.97 – 1.19	1.19 1.04 – 1.69
	Innu communities (2)	F	40	0	0.75 0.70 – 0.82	0.73 0.67 – 0.79	0.52 0.38 – 0.61	0.63 0.57 – 0.68	0.73 0.67 – 0.79	0.85 0.77 – 0.88	0.89 0.86 – 1.13	1.10 .
	Innu communities (2)	M	46	0	0.89 0.80 – 1.01	0.83 0.76 – 0.93	0.57 0.43 – 0.63	0.65 0.61 – 0.77	0.81 0.77 – 0.88	0.97 0.86 – 1.04	1.12E 0.99 – 1.49	1.27 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 112: Perfluorooctanoic acid (PFOA) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	0.89 0.85 – 0.95	0.83 0.79 – 0.88	0.54 0.51 – 0.60	0.67 0.63 – 0.72	0.82 0.78 – 0.86	0.99 0.92 – 1.05	1.23 1.12 – 1.38	1.46 1.29 – 1.87
	Total	3-5	37	0	0.91 0.76 – 1.08	0.82 0.72 – 0.95	0.54 .	0.59 0.54 – 0.65	0.76 0.62 – 0.84	0.89 0.82 – 1.25	1.43E 0.90 – 2.15	2.05 .
	Total	6-11	78	0	1.01 0.94 – 1.10	0.96 0.90 – 1.04	0.67 0.58 – 0.74	0.78 0.73 – 0.85	0.92 0.86 – 0.99	1.09 1.00 – 1.23	1.37 1.19 – 1.59	1.62 1.33 – 2.14
	Total	12-19	79	0	0.77 0.72 – 0.81	0.73 0.68 – 0.78	0.46 0.39 – 0.58	0.63 0.55 – 0.67	0.76 0.70 – 0.80	0.87 0.81 – 0.94	1.05 0.93 – 1.13	1.14 1.02 – 1.19
	Anishinabe communities (2)	Total	108	0	0.95 0.87 – 1.03	0.88 0.81 – 0.95	0.54 0.48 – 0.61	0.71 0.62 – 0.75	0.86 0.80 – 0.89	1.07 0.97 – 1.17	1.37 1.19 – 1.51	1.56 1.36 – 1.96
	Anishinabe communities (2)	3-5	23	0	0.99 0.74 – 1.27	0.85 0.70 – 1.07	0.53 .	0.56 0.53 – 0.64	0.72 0.59 – 0.87	F	1.85 .	2.26 .
	Anishinabe communities (2)	6-11	45	0	1.06 0.97 – 1.15	1.02 0.93 – 1.10	0.72 0.59 – 0.78	0.83 0.73 – 0.88	0.98 0.87 – 1.06	1.19 1.06 – 1.33	1.43 1.24 – 1.62	1.58 .
	Anishinabe communities (2)	12-19	40	0	0.80 0.71 – 0.88	0.75 0.66 – 0.84	0.44 .	0.65 0.46 – 0.73	0.80 0.72 – 0.86	0.92 0.85 – 1.01	1.10 0.93 – 1.18	1.17 1.01 – 1.32
	Innu communities (2)	Total	86	0	0.83 0.77 – 0.90	0.78 0.73 – 0.84	0.56 0.48 – 0.61	0.64 0.61 – 0.69	0.78 0.73 – 0.82	0.89 0.85 – 0.97	1.06 0.97 – 1.19	1.19 1.04 – 1.69
	Innu communities (2)	3-5	14	0	0.79 0.69 – 0.90	0.77 0.68 – 0.87	0.56 .	0.61 .	0.78 0.61 – 0.85	0.86 0.76 – 0.90	0.90 .	1.03 .
	Innu communities (2)	6-11	33	0	0.95 0.83 – 1.10	0.89 0.79 – 1.00	0.60 .	0.77 0.61 – 0.82	0.87 0.78 – 0.94	0.99 0.89 – 1.08	1.17E 0.99 – 2.11	1.72 .
	Innu communities (2)	12-19	39	0	0.73 0.67 – 0.79	0.71 0.65 – 0.77	0.49 .	0.62 0.53 – 0.65	0.70 0.64 – 0.77	0.81 0.75 – 0.87	0.96 0.81 – 1.12	1.10 .
CHMS (Cycle 2)	Total	12-19	507	0		2.1 1.9 – 2.3	1.2 1.0 – 1.4		2.1 1.9 – 2.3	2.6 2.4 – 2.8		4.1 3.6 – 4.5

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.

E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.

F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 113: Perfluorononanoic acid (PFNA) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	187	0	4.49 3.80 – 5.22	2.09 1.75 – 2.51	0.35 0.30 – 0.44	0.61 0.50 – 0.79	2.05[E] 1.40 – 2.75	7.08 5.38 – 8.80	11.55 10.33 – 12.64	13.16 11.87 – 15.20
	Total	F	90	0	4.39 3.39 – 5.41	2.05 1.56 – 2.70	0.33[E] 0.27 – 0.44	0.61 0.44 – 0.82	2.05[E] 1.05 – 3.64	6.88 4.45 – 8.59	11.00 8.34 – 12.53	12.63 10.81 – 15.40
	Total	M	97	0	4.58 3.64 – 5.71	2.13 1.64 – 2.81	0.35 0.20 – 0.51	0.59[E] 0.51 – 0.96	2.05[E] 1.28 – 3.25	7.55[E] 4.62 – 10.10	11.83 10.12 – 13.52	13.72 11.72 – 16.46
	Anishinabe communities (2)	Total	107	0	7.20 6.22 – 8.22	5.12 4.32 – 6.08	1.24[E] 0.79 – 1.93	2.54E 1.98 – 4.06	6.25 4.70 – 7.51	10.41 8.78 – 11.49	12.88 11.69 – 14.29	14.65[E] 12.81 – 20.80
	Anishinabe communities (2)	F	53	0	6.92 5.47 – 8.40	4.98 3.87 – 6.25	1.16[E] 0.70 – 2.04	2.53[E] 1.59 – 4.28	5.60 4.20 – 7.25	9.83 7.18 – 11.29	12.43 10.53 – 13.75	13.35 .
	Anishinabe communities (2)	M	54	0	7.47 6.10 – 8.95	5.26 4.05 – 6.84	1.30[E] 0.43 – 2.04	2.50[E] 1.89 – 4.53	6.70[E] 4.48 – 9.44	10.86 8.52 – 12.35	13.53 11.65 – 15.97	15.45 .
	Innu communities (2)	Total	80	0	0.87 0.70 – 1.07	0.63 0.54 – 0.76	0.20 0.20 – 0.31	0.36 0.31 – 0.45	0.55 0.48 – 0.65	0.98[E] 0.70 – 1.32	1.85[E] 1.20 – 2.50	2.50[E] 1.69 – 3.65
	Innu communities (2)	F	37	0	0.78 0.56 – 1.05	0.58 0.47 – 0.73	0.24 .	0.35 0.27 – 0.44	0.48 0.43 – 0.63	0.80[E] 0.54 – 1.14	F	2.14 .
	Innu communities (2)	M	43	0	0.95 0.70 – 1.25	0.69 0.55 – 0.88	0.20[E] 0.20 – 0.33	0.36[E] 0.28 – 0.53	0.59 0.52 – 0.79	1.13[E] 0.69 – 1.70	2.04[E] 1.21 – 2.64	2.47[E] 1.42 – 3.27

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 114: Perfluorononanoic acid (PFNA) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	187	0	4.49 3.80 – 5.22	2.09 1.75 – 2.51	0.35 0.30 – 0.44	0.61 0.50 – 0.79	2.05^{E} 1.40 – 2.75	7.08 5.38 – 8.80	11.55 10.33 – 12.64	13.16 11.87 – 15.20
	Total	3-5	36	0	3.88 2.73 – 5.11	2.25^{E} 1.53 – 3.22	0.31 .	1.50^{E} 0.43 – 1.91	2.40^{E} 1.81 – 3.50	F	9.58^{E} 4.49 – 12.40	12.20 .
	Total	6-11	74	0	6.88 5.50 – 8.30	3.69 2.77 – 4.89	0.52 0.37 – 0.69	1.05^{E} 0.65 – 1.84	4.90^{E} 3.05 – 7.62	10.92 8.45 – 12.14	13.20 11.83 – 16.64	16.60^{E} 12.90 – 23.20
	Total	12-19	77	0	2.48 1.78 – 3.20	1.18 0.91 – 1.55	0.28 0.20 – 0.36	0.43 0.34 – 0.53	0.86^{E} 0.61 – 1.20	F	7.07 5.19 – 8.82	8.71^{E} 6.89 – 10.58
	Anishinabe communities (2)	Total	107	0	7.20 6.22 – 8.22	5.12 4.32 – 6.08	1.24^{E} 0.79 – 1.93	2.54^{E} 1.98 – 4.06	6.25 4.70 – 7.51	10.41 8.78 – 11.49	12.88 11.69 – 14.29	14.65^{E} 12.81 – 20.80
	Anishinabe communities (2)	3-5	23	0	5.20^{E} 3.65 – 6.93	3.80^{E} 2.75 – 5.25	1.53 .	1.94^{E} 1.54 – 2.78	3.45^{E} 1.99 – 5.08	7.65^{E} 3.90 – 10.04	11.31 .	12.85 .
	Anishinabe communities (2)	6-11	45	0	10.64 9.11 – 12.32	9.44 8.14 – 10.93	4.35 3.97 – 5.71	6.55 4.51 – 7.93	10.25 7.67 – 11.33	12.35 11.10 – 13.49	15.00^{E} 12.72 – 22.18	21.00 .
	Anishinabe communities (2)	12-19	39	0	4.40 3.26 – 5.54	3.01 2.20 – 4.07	0.70 .	1.25^{E} 0.86 – 2.18	2.65^{E} 2.07 – 5.47	6.85 4.78 – 8.04	8.64^{E} 6.94 – 10.62	10.48 .
	Innu communities (2)	Total	80	0	0.87 0.70 – 1.07	0.63 0.54 – 0.76	0.20 0.20 – 0.31	0.36 0.31 – 0.45	0.55 0.48 – 0.65	0.98^{E} 0.70 – 1.32	1.85^{E} 1.20 – 2.50	2.50^{E} 1.69 – 3.65
	Innu communities (2)	3-5	13	0	1.53^{E} 0.78 – 2.27	0.89^{E} 0.46 – 1.63	0.20 .	0.25 .	F	2.35^{E} 0.53 – 3.56	3.57 .	3.71 .
	Innu communities (2)	6-11	29	0	1.06 0.79 – 1.36	0.86 0.69 – 1.09	0.36 .	0.52 0.37 – 0.66	0.76^{E} 0.56 – 1.06	1.28^{E} 0.87 – 1.73	1.92 .	2.32 .
	Innu communities (2)	12-19	38	0	0.51 0.43 – 0.60	0.45 0.39 – 0.53	0.20 0.20 – 0.29	0.31 0.20 – 0.41	0.45 0.35 – 0.52	0.61 0.50 – 0.73	0.83^{E} 0.62 – 0.98	0.96 .
CHMS (Cycle 2)	Total	12-19	507	1.18		0.71 0.62 - 0.81	0.33 0.27 - 0.38		0.69 0.63 - 0.75	0.94 0.83 - 1.0		1.7^{E} 0.47 - 2.9

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 115: Perfluorohexane sulfonate (PFHxS) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	0.47 0.42 – 0.53	0.37 0.34 – 0.41	0.16 0.15 – 0.18	0.22 0.20 – 0.25	0.36 0.31 – 0.40	0.55 0.50 – 0.58	0.91 0.68 – 1.06	1.17 0.99 – 1.50
	Total	F	93	0	0.43 0.36 – 0.50	0.35 0.31 – 0.40	0.16 0.15 – 0.20	0.22 0.20 – 0.26	0.32 0.28 – 0.38	0.51 0.44 – 0.56	0.67^{E} 0.56 – 1.02	1.05^{E} 0.62 – 1.41
	Total	M	101	0	0.51 0.43 – 0.61	0.39 0.34 – 0.45	0.17 0.10 – 0.18	0.22 0.19 – 0.27	0.39 0.34 – 0.48	0.57 0.51 – 0.72	0.99 0.75 – 1.28	1.39^{E} 0.98 – 1.63
	Anishinabe communities (2)	Total	108	0	0.63 0.55 – 0.72	0.53 0.48 – 0.59	0.28 0.26 – 0.30	0.35 0.31 – 0.39	0.49 0.46 – 0.55	0.66 0.57 – 0.84	1.06 0.87 – 1.45	1.48^{E} 1.05 – 2.05
	Anishinabe communities (2)	F	53	0	0.55 0.45 – 0.66	0.47 0.41 – 0.54	0.26 0.23 – 0.29	0.30 0.28 – 0.36	0.47 0.36 – 0.53	0.57 0.51 – 0.68	0.90^{E} 0.59 – 1.33	1.21 .
	Anishinabe communities (2)	M	55	0	0.71 0.59 – 0.84	0.60 0.52 – 0.69	0.32 0.26 – 0.36	0.38 0.35 – 0.48	0.54 0.48 – 0.58	0.79 0.59 – 1.00	1.25^{E} 0.95 – 1.58	1.56^{E} 1.05 – 2.35
	Innu communities (2)	Total	86	0	0.28 0.24 – 0.32	0.24 0.22 – 0.27	0.12 0.10 – 0.16	0.17 0.16 – 0.18	0.22 0.19 – 0.23	0.32 0.26 – 0.38	0.50 0.38 – 0.53	0.53 0.48 – 0.68
	Innu communities (2)	F	40	0	0.28 0.23 – 0.34	0.24 0.21 – 0.28	0.15 .	0.17 0.15 – 0.20	0.22 0.19 – 0.24	0.31 0.23 – 0.37	F	0.51 .
	Innu communities (2)	M	46	0	0.28 0.23 – 0.34	0.24 0.20 – 0.28	0.10^{E} 0.10 – 0.16	0.17 0.11 – 0.19	0.22 0.18 – 0.25	0.34^{E} 0.24 – 0.44	0.50^{E} 0.37 – 0.55	0.53^{E} 0.45 – 0.78

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 116: Perfluorohexane sulfonate (PFHxS) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	0.47 0.42 – 0.53	0.37 0.34 – 0.41	0.16 0.15 – 0.18	0.22 0.20 – 0.25	0.36 0.31 – 0.40	0.55 0.50 – 0.58	0.91 0.68 – 1.06	1.17 0.99 – 1.50
	Total	3-5	37	0	0.47^{E} 0.32 – 0.66	0.32 0.24 – 0.41	0.10^{E} 0.10 – 0.16	0.18 0.10 – 0.23	0.29 0.20 – 0.36	0.46^{E} 0.35 – 0.67	F	1.62 .
	Total	6-11	78	0	0.45 0.38 – 0.55	0.37 0.32 – 0.42	0.17 0.15 – 0.20	0.23 0.20 – 0.28	0.38 0.30 – 0.43	0.51 0.46 – 0.58	0.76^{E} 0.57 – 1.04	1.06^{E} 0.67 – 1.33
	Total	12-19	79	0	0.49 0.41 – 0.57	0.40 0.35 – 0.47	0.17 0.16 – 0.22	0.23 0.21 – 0.29	0.40 0.30 – 0.49	0.57 0.51 – 0.70	0.94^{E} 0.64 – 1.23	1.21 0.83 – 1.52
	Anishinabe communities (2)	Total	108	0	0.63 0.55 – 0.72	0.53 0.48 – 0.59	0.28 0.26 – 0.30	0.35 0.31 – 0.39	0.49 0.46 – 0.55	0.66 0.57 – 0.84	1.06 0.87 – 1.45	1.48^{E} 1.05 – 2.05
	Anishinabe communities (2)	3-5	23	0	0.67^{E} 0.46 – 0.95	0.51 0.40 – 0.69	0.25 .	0.32 0.26 – 0.36	0.38 0.34 – 0.54	F	1.38 .	2.18 .
	Anishinabe communities (2)	6-11	45	0	0.58 0.48 – 0.72	0.50 0.44 – 0.58	0.28 0.25 – 0.33	0.36 0.30 – 0.44	0.49 0.41 – 0.52	0.59 0.51 – 0.79	0.94^{E} 0.59 – 1.18	F
	Anishinabe communities (2)	12-19	40	0	0.66 0.54 – 0.79	0.57 0.49 – 0.68	0.29 0.23 – 0.34	0.38 0.30 – 0.49	0.56 0.48 – 0.64	0.77 0.57 – 0.99	1.10 0.78 – 1.52	1.50 .
	Innu communities (2)	Total	86	0	0.28 0.24 – 0.32	0.24 0.22 – 0.27	0.12 0.10 – 0.16	0.17 0.16 – 0.18	0.22 0.19 – 0.23	0.32 0.26 – 0.38	0.50 0.38 – 0.53	0.53 0.48 – 0.68
	Innu communities (2)	3-5	14	0	0.15 0.12 – 0.18	0.14 0.12 – 0.18	0.10^{E} 0.10 – 0.10	0.10^{E} 0.10 – 0.15	0.16 0.10 – 0.18	0.18 0.11 – 0.20	0.20 .	0.22 .
	Innu communities (2)	6-11	33	0	0.28 0.23 – 0.36	0.25 0.21 – 0.29	0.15 .	0.18 0.15 – 0.20	0.22 0.19 – 0.26	0.32 0.23 – 0.37	F	0.52 .
	Innu communities (2)	12-19	39	0	0.32 0.26 – 0.39	0.28 0.24 – 0.33	0.16 .	0.19 0.16 – 0.22	0.23 0.21 – 0.30	0.37 0.28 – 0.50	0.52^{E} 0.41 – 0.57	0.53 .
CHMS (Cycle 2)	Total	12-19	506	0.99		1.9 1.6 - 2.3	0.60 0.50 - 0.70		1.6 1.3 - 1.9	3.4 2.3 - 4.5		11^{E} 5.7 - 16

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 117: Perfluorooctane sulfonate (PFOS) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	1.12 1.04 – 1.22	1.00 0.93 – 1.07	0.50 0.44 – 0.59	0.68 0.63 – 0.80	0.98 0.94 – 1.01	1.23 1.15 – 1.33	1.73 1.49 – 2.04	2.26 1.83 – 2.86
	Total	F	93	0	1.11 0.99 – 1.23	0.98 0.89 – 1.09	0.49 0.40 – 0.58	0.66 0.59 – 0.81	0.98 0.88 – 1.04	1.21 1.11 – 1.35	1.71 1.36 – 2.14	2.21E 1.59 – 3.00
	Total	M	101	0	1.14 1.02 – 1.29	1.01 0.92 – 1.11	0.52 0.43 – 0.63	0.69 0.63 – 0.83	0.99 0.91 – 1.04	1.25 1.12 – 1.41	1.70 1.43 – 2.08	2.19E 1.65 – 2.91
	Anishinabe communities (2)	Total	108	0	1.16 1.04 – 1.27	1.03 0.94 – 1.12	0.54 0.43 – 0.64	0.75 0.65 – 0.87	0.99 0.94 – 1.06	1.25 1.14 – 1.42	1.82 1.47 – 2.39	2.49 1.77 – 2.96
	Anishinabe communities (2)	F	53	0	1.19 1.00 – 1.36	1.03 0.90 – 1.18	0.47 0.40 – 0.62	0.69 0.59 – 0.86	0.99 0.86 – 1.12	1.29 1.12 – 1.54	2.01 1.44 – 2.58	2.51E 1.75 – 3.24
	Anishinabe communities (2)	M	55	0	1.13 1.00 – 1.27	1.03 0.94 – 1.15	0.58 .	0.79 0.66 – 0.93	0.99 0.93 – 1.07	1.23 1.08 – 1.38	1.63E 1.29 – 2.10	2.03 .
	Innu communities (2)	Total	86	0	1.09 0.95 – 1.26	0.95 0.86 – 1.06	0.48 0.41 – 0.56	0.64 0.57 – 0.76	0.95 0.83 – 1.02	1.21 1.08 – 1.34	1.58 1.33 – 1.94	1.97E 1.55 – 2.93
	Innu communities (2)	F	40	0	1.00 0.87 – 1.15	0.92 0.81 – 1.04	0.50 0.34 – 0.60	0.63 0.54 – 0.82	0.95 0.76 – 1.04	1.17 0.99 – 1.28	1.35E 1.20 – 1.66	1.60 .
	Innu communities (2)	M	46	0	1.16 0.93 – 1.43	0.98 0.84 – 1.15	0.45 .	0.64 0.52 – 0.80	0.95 0.75 – 1.09	1.28 1.05 – 1.55	1.74E 1.37 – 2.29	2.14 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 118: Perfluorooctane sulfonate (PFOS) – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	1.12 1.04 – 1.22	1.00 0.93 – 1.07	0.50 0.44 – 0.59	0.68 0.63 – 0.80	0.98 0.94 – 1.01	1.23 1.15 – 1.33	1.73 1.49 – 2.04	2.26 1.83 – 2.86
	Total	3-5	37	0	1.11 0.92 – 1.35	0.98 0.85 – 1.14	0.54 .	0.65 0.58 – 0.78	0.88 0.70 – 0.99	1.19 0.96 – 1.42	F	2.78 .
	Total	6-11	78	0	1.14 1.04 – 1.25	1.05 0.97 – 1.15	0.61 0.44 – 0.73	0.81 0.69 – 0.94	1.03 0.96 – 1.11	1.29 1.15 – 1.50	1.71 1.46 – 1.92	1.91 1.60 – 2.43
	Total	12-19	79	0	1.11 0.95 – 1.29	0.95 0.85 – 1.07	0.44 0.36 – 0.53	0.61 0.53 – 0.74	0.96 0.84 – 1.00	1.20 1.06 – 1.32	1.72E 1.29 – 2.40	F
	Anishinabe communities (2)	Total	108	0	1.16 1.04 – 1.27	1.03 0.94 – 1.12	0.54 0.43 – 0.64	0.75 0.65 – 0.87	0.99 0.94 – 1.06	1.25 1.14 – 1.42	1.82 1.47 – 2.39	2.49 1.77 – 2.96
	Anishinabe communities (2)	3-5	23	0	1.24 0.93 – 1.61	1.05 0.84 – 1.34	0.52 .	0.66 0.52 – 0.82	0.89 0.70 – 1.14	F	2.46 .	3.13 .
	Anishinabe communities (2)	6-11	45	0	1.17 1.05 – 1.34	1.09 0.97 – 1.22	0.68 .	0.87 0.75 – 0.95	1.03 0.95 – 1.14	1.28 1.12 – 1.53	1.65E 1.37 – 2.26	2.05 .
	Anishinabe communities (2)	12-19	40	0	1.09 0.91 – 1.26	0.97 0.83 – 1.12	0.40 0.40 – 0.62	0.66 0.51 – 0.89	0.99 0.86 – 1.06	1.23 1.00 – 1.44	1.70E 1.25 – 2.21	2.10 .
	Innu communities (2)	Total	86	0	1.09 0.95 – 1.26	0.95 0.86 – 1.06	0.48 0.41 – 0.56	0.64 0.57 – 0.76	0.95 0.83 – 1.02	1.21 1.08 – 1.34	1.58 1.33 – 1.94	1.97E 1.55 – 2.93
	Innu communities (2)	3-5	14	0	0.91 0.77 – 1.05	0.87 0.74 – 1.01	0.52 .	0.60 .	0.87 0.63 – 0.98	0.99E 0.77 – 1.24	1.26 .	1.36 .
	Innu communities (2)	6-11	33	0	1.10 0.96 – 1.24	1.01 0.86 – 1.16	0.53 .	0.73 0.57 – 0.92	1.04 0.82 – 1.15	1.29 1.08 – 1.57	1.67 1.30 – 1.87	1.84 .
	Innu communities (2)	12-19	39	0	1.14 0.88 – 1.50	0.93 0.79 – 1.14	0.45 .	0.56 0.49 – 0.75	0.88 0.65 – 1.04	1.18 0.97 – 1.38	F	2.91 .
CHMS (Cycle 2)	Total	12-19	507	0.20		4.6 4.0 – 5.2	2.1 1.9 – 2.4		4.6 3.9 – 5.3	6.6 5.7 – 7.5		11 9.2 – 13

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2016). Per- and Polyfluoroalkyl Substances and Your Health. Available at: www.atsdr.cdc.gov/pfc/index.html

Berryman, D., Salhi, C., Bolduc, A., Deblois, C., Tremblay, H. (2012). Les composés perfluorés dans les cours d'eau et l'eau potable du Québec méridional, Québec, Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs, Direction du suivi de l'état de l'environnement, ISBN 978-2-550-65565-7 (PDF), 35 p. and 2 appendices.

EPA (United States Environmental Protection Agency) (2017). Per- and Polyfluoroalkyl Substances (PFASs) in Your Environment – includes information on Perfluorooctanoic Acid (PFOA), Perfluorooctyl Sulfonate (PFOS), and all other PFASs, and on PFCs. Source: www.epa.gov/pfas

Froome, H., Schlummer, M., Möller, A., Gruber, L., Wolz, G., Ungewiss, J., Böhmer, S., Dekant, W., Mayer, R., Liebl, B., Twardella, D. (2009). Exposure of an adult population to perfluorinated substances using duplicate diet portions and biomonitoring data. Environ. Sci. Technol. 41 (22), 7928-33.

Kato, K., Wong, L.Y., Jia, L.T., Kuklenyik, Z., Calafat, A.M. (2011). Trends in exposure to polyfluoroalkyls chemicals in the U.S. Population: 1999-2008. Environ. Sci. Technol. 45 (19), 8037-45.

Gleason, J.A., Cooper, K.R., Klotz, J.B., Post, G.B., Van Orden, G. (2016). Health-Based Maximum Contaminant Level Support Document: Perfluorooctanoic Acid (PFOA). New Jersey Drinking Water Quality Institute Health Effects Subcommittee. Available at: www.nj.gov/dep/watersupply/pdf/pfna-health-effects.pdf

OECD (Organisation for Economic Co-operation and Development (2007). Environment, Health and Safety Publications Series on Risk Management, No. 21. Lists of PFOS, PFAS, PFOA, PFCA, Related Compounds and Chemicals that may degrade to PFCA (as revised in 2007). Available at: www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=env/jm/mono(2006)15&doclanguage=en

Health Canada (2017). Prohibition of Certain Toxic Substances Regulations (2012) (DORS/2012-285). Available at: www.ec.gc.ca/lcpe-cepa/eng/regulations/DetailReg.cfm?intReg=207

Stein, C.R., Savitz, D.A. (2011). Serum perfluorinated compound concentration and attention deficit/hyperactivity disorder in children 5-18 years of age. Environ. Health Perspect. 119 (10), 1466-71.

6.3.3. Cotinine

Smoking is a major public health concern. Tobacco use leads to numerous health problems, such as cardiovascular disease and cancers, and can also affect fetal development. Second-hand smoke is also harmful to non-smokers (CDC, 2016). Tobacco contains several contaminants, including nicotine. Nicotine may be inhaled, ingested (through chewing gum or lozenges containing nicotine) and it can be absorbed by the skin (through nicotine patches). Once metabolized in the body, nicotine produces several metabolites, the most significant of which is called cotinine (CDC, 2016; Health Canada, 2014). Cotinine can be measured in blood and urine and is a reliable measurement for assessing exposure to tobacco. It has a half-life of 16 to 20 hours (Wong et al., 2012).

The CTQ reference values (INSPQ, pers. comm.) for urine cotinine levels are as follows:

- Non-smoker: <30 µg/L
- High exposure to second-hand smoke or occasional smoker: 30-100 µg/L
- Smoker: >100 µg/L

Results

Cotinine levels were measured in urine for all participants in the JES!-YEH! project, and are reported in terms of µg/L of urine and µg/g of creatinine (Tables 119 – 122). Cotinine levels measured in urine reflect recent exposure to this substance. A measurable level of cotinine does not necessarily mean that it will have negative health effects.

As part of the JES!-YEH! study, urine cotinine levels were used to categorize non-smokers, non-smokers with high exposure to second-hand smoke or occasional smokers, and smokers. This decision was made due to a certain amount of inconsistency in the answers obtained from some participants regarding their tobacco use habits. Among those who participated in the study and according to urinary cotinine, 164 (83.2%) were non-smokers, 5 (2.5%) were non-smokers with high exposure to second-hand smoke or occasional smokers, and 28 (14.2%) were smokers.

As shown in Tables 120 and 122, urine cotinine levels were not calculated, as more than 40% of the samples were below the limit of detection.

Table 119 :Cotinine – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	47.7	–	–	<LD	<LD	1.33[E] 0.55 – 2.04	F	F	964.5[E] 367.0 – 1313
	Total	F	95	49.5	–	–	<LD	<LD	F	F	F	F
	Total	M	102	46.1	–	–	<LD	<LD	1.40[E] 0.55 – 2.13	F	F	F
	Anishinabe communities (2)	Total	110	63.6	–	–	<LD	<LD	<LD	2.00[E] 1.29 – 3.26	F	F
	Anishinabe communities (2)	F	55	65.5	–	–	<LD	<LD	<LD	F	F	162.5 .
	Anishinabe communities (2)	M	55	61.8	–	–	<LD	<LD	<LD	F	F	210.0 .
	Innu communities (2)	Total	87	27.6	208.4[E] 113.2 – 317.0	9.65[E] 5.59 – 16.72	<LD	<LD	F	F	918.0[E] 250.0 – 1250	1330[E] 500.0 – 1813
	Innu communities (2)	F	40	27.5	311.6[E] 119.8 – 527.0	F	<LD	<LD	F	F	F	1700 .
	Innu communities (2)	M	47	27.7	F	F	<LD	<LD	6.05[E] 2.09 – 9.97	F	F	939.0 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 120: Cotinine (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	47.7	–	–	<LD	<LD	2.72 1.89 – 3.47	13.21E 8.39 – 19.35	F	1096E 356.4 – 1519
	Total	F	95	49.5	–	–	<LD	<LD	2.78E 1.87 – 4.20	F	F	F
	Total	M	102	46.1	–	–	<LD	<LD	2.68E 1.19 – 3.94	F	F	F
	Anishinabe communities (2)	Total	110	63.6	–	–	<LD	<LD	<LD	4.11E 3.02 – 7.48	F	F
	Anishinabe communities (2)	F	55	65.5	–	–	<LD	<LD	<LD	F	F	103.2 .
	Anishinabe communities (2)	M	55	61.8	–	–	<LD	<LD	<LD	F	F	164.0 .
	Innu communities (2)	Total	87	27.6	296.8E 132.4 – 503.0	11.48E 6.48 – 19.41	<LD	<LD	F	F	F	F
	Innu communities (2)	F	40	27.5	F	F	<LD	<LD	F	F	F	1608 .
	Innu communities (2)	M	47	27.7	F	F	<LD	<LD	6.73E 1.88 – 9.63	F	F	628.9 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 121: Cotinine – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	47.7	–	–	<LD	<LD	1.33E 0.55 – 2.04	F	F	964.5E 367.0 – 1313
	Total	3-5	38	47.4	–	–	<LD	<LD	F	F	F	10.02 .
	Total	6-11	79	55.7	–	–	<LD	<LD	<LD	F	F	F
	Total	12-19	80	40	284.8E 178.0 – 415.2	F	<LD	<LD	F	F	1000E 476.0 – 1433	1450E 976.5 – 1938
	Anishinabe communities (2)	Total	110	63.6	–	–	<LD	<LD	<LD	2.00E 1.29 – 3.26	F	F
	Anishinabe communities (2)	3-5	24	54.2	–	–	<LD	<LD	<LD	1.70E 0.64 – 2.51	2.56 .	3.16 .
	Anishinabe communities (2)	6-11	46	73.9	–	–	<LD	<LD	<LD	F	F	3.14 .
	Anishinabe communities (2)	12-19	40	57.5	–	–	<LD	<LD	<LD	F	F	840.0 .
	Innu communities (2)	Total	87	27.6	208.4E 113.2 – 317.0	9.65E 5.59 – 16.72	<LD	<LD	F	F	918.0E 250.0 – 1250	1330E 500.0 – 1813
	Innu communities (2)	3-5	14	35.7	6.12E 3.13 – 9.99	F	<LD	<LD	F	F	11.12 .	15.90 .
	Innu communities (2)	6-11	33	30.3	8.43E 4.69 – 12.73	3.18E 1.96 – 5.34	<LD	<LD	F	F	F	39.40 .
	Innu communities (2)	12-19	40	22.5	444.2E 257.5 – 662.4	F	<LD	F	F	F	1400E 794.0 – 1915	1700 U

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 122: Cotinine (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	47.7	–	–	<LD	<LD	2.72 1.89 – 3.47	13.21E 8.39 – 19.35	F	1096E 356.4 – 1519
	Total	3-5	38	47.4	–	–	<LD	<LD	2.99E 1.85 – 4.23	7.66E 3.39 – 10.44	F	28.50 .
	Total	6-11	79	55.7	–	–	<LD	<LD	<LD	7.01E 3.36 – 9.98	15.16E 9.25 – 20.00	F
	Total	12-19	80	40	376.4E 198.5 – 596.6	F	<LD	<LD	F	F	1297E 540.2 – 1634	F
	Anishinabe communities (2)	Total	110	63.6	–	–	<LD	<LD	<LD	4.11E 3.02 – 7.48	F	F
	Anishinabe communities (2)	3-5	24	54.2	–	–	<LD	<LD	<LD	3.77E 2.93 – 7.16	7.33 .	8.56 .
	Anishinabe communities (2)	6-11	46	73.9	–	–	<LD	<LD	<LD	2.83E 1.91 – 4.08	F	9.08 .
	Anishinabe communities (2)	12-19	40	57.5	–	–	<LD	<LD	<LD	F	F	602.9 .
	Innu communities (2)	Total	87	27.6	296.8E 132.4 – 503.0	11.48E 6.48 – 19.41	<LD	<LD	F	F	F	F
	Innu communities (2)	3-5	14	35.7	11.72E 5.69 – 18.65	F	<LD	<LD	F	F	30.21 .	33.60 .
	Innu communities (2)	6-11	33	30.3	9.75E 6.34 – 13.57	4.27E 2.50 – 6.92	<LD	<LD	6.67E 1.92 – 9.95	14.66E 7.59 – 18.92	F	27.52 .
	Innu communities (2)	12-19	40	22.5	633.5E 299.0 – 1034	F	<LD	F	F	F	F	1941 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

CDC (Centers for Disease Control and Prevention) (2016). Biomonitoring summary – Cotinine. Consulted online: www.cdc.gov/biomonitoring/Cotinine_BiomonitoringSummary.html

Health Canada (2014). Nicotine and Its Major Metabolites as Biomarkers of Exposure to Tobacco. Government of Quebec. Consulted on August 15 2017: https://www.canada.ca/en/health-canada/services/publications/healthy-living/nicotine-major-metabolites-as-biomarkers-exposure-tobacco.html

Wong, S.L., Shields, M., Leatherdale, S., Malaison, E., Hammond, D. (2012). Assessment of validity of self-reported smoking status. Health Rep. 23 (1). 47-53.

6.3.4. Phenoxy-Type Herbicides

2,4-dichlorophenoxyacetic acid, commonly called 2,4-D, is a selective herbicide that is widely used in Canada. It is used to kill weeds in cereal crop fields, pasture land, industrial land, household lawns, and roadsides, and also to destroy aquatic weeds (ATSDR, 2017; CAREX Canada, 2009; Health Canada, 1993).

2,4-D is present in the environment due to human activity (CAREX Canada, 2009). Once in the environment, 2,4-D decomposes into various metabolites, including 2,4-dichlorophenol (2,4-DCP) (Health Canada, 1993).

Exposure to 2,4-D may occur when it is applied (through inhalation or skin contact), especially if the exposed person eats without washing their hand or smokes when it is being sprayed. Contact may also occur while walking or playing near lawns, gardens, golf courses, and parks treated with 2,4-D. People and animals walking on areas treated with 2,4-D may carry this herbicide inside houses (ATSDR, 2017).

2,4-D is also absorbed through consumption of water and food contaminated with the herbicide. The intestinal tract may absorb practically all 2,4-D and it may enter the bloodstream within a few hours. A small amount of 2,4-D may enter through the skin and there is still very little information on how much can enter through the lungs. 2,4-D cannot accumulate in the body; it is excreted in urine approximately 24 hours after exposure (ATSDR, 2017).

2,4-D has been classified as a possible carcinogen for humans, according to the International Agency for Research on Cancer (INSPQ, 2002). To date, no toxicity threshold has been established at the provincial, federal, or international level.

Results

Levels of 2,4-D were measured in urine for all participants in the JES!-YEH! study and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 123 – 126). Urine levels of 2,4-D reflect recent exposure to this substance. A measureable level does not necessarily mean that it will have negative health effects.

Urine levels of 2,4-D for participants in the JES!-YEH! project were not calculated for the 6-11 and 12-19 age groups, as more than 40% of samples were below the limit of detection, as was the case for the CHMS (Cycle 2). As for the young 3-5 year old participants, their levels of urine 2,4-D were similar to the concentrations in the CHMS (Cycle 2) (Table 126).

Table 123: 2,4-dichlorophenoxyacetic acid – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	49.2	–	–	<LD	<LD	0.14[E] 0.10 – 0.22	0.33 0.29 – 0.36	0.50 0.39 – 0.54	0.58[E] 0.52 – 0.91
	Total	F	95	53.7	–	–	<LD	<LD	<LD	0.33 0.24 – 0.36	0.41 0.36 – 0.50	0.51 0.39 – 0.54
	Total	M	102	45.1	–	–	<LD	<LD	0.21[E] 0.10 – 0.25	0.33 0.28 – 0.39	0.56[E] 0.39 – 0.88	0.91[E] 0.55 – 1.11
	Anishinabe communities (2)	Total	110	50.9	–	–	<LD	<LD	<LD	0.33 0.25 – 0.36	0.40 0.37 – 0.55	0.56[E] 0.40 – 0.96
	Anishinabe communities (2)	F	55	50.9	–	–	<LD	<LD	<LD	0.33 0.23 – 0.36	0.37 0.34 – 0.41	0.40 .
	Anishinabe communities (2)	M	55	50.9	–	–	<LD	<LD	<LD	0.32[E] 0.24 – 0.40	0.56[E] 0.37 – 0.95	0.95 .
	Innu communities (2)	Total	87	47.1	–	–	<LD	<LD	0.20[E] 0.10 – 0.26	0.33 0.28 – 0.40	0.53 0.40 – 0.58	F
	Innu communities (2)	F	40	57.5	–	–	<LD	<LD	<LD	0.33[E] 0.18 – 0.45	0.52 0.35 – 0.55	0.54 .
	Innu communities (2)	M	47	38.3	0.30 0.22 – 0.41	0.22 0.18 – 0.27	<LD	<LD	0.24[E] 0.10 – 0.28	0.33 0.27 – 0.45	F	0.77 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 124: 2,4-dichlorophenoxyacetic acid (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	49.2	–	–	<LD	<LD	0.26 0.22 – 0.29	0.45 0.41 – 0.52	0.73E 0.59 – 1.00	1.20E 0.76 – 1.77
	Total	F	95	53.7	–	–	<LD	<LD	<LD	0.44 0.40 – 0.55	0.75E 0.55 – 1.20	F
	Total	M	102	45.1	–	–	<LD	<LD	0.25 0.21 – 0.30	0.45 0.36 – 0.53	0.71E 0.54 – 1.01	1.06E 0.68 – 1.77
	Anishinabe communities (2)	Total	110	50.9	–	–	<LD	<LD	<LD	0.44 0.39 – 0.52	0.68E 0.54 – 0.90	0.97E 0.65 – 1.72
	Anishinabe communities (2)	F	55	50.9	–	–	<LD	<LD	<LD	0.43 0.36 – 0.61	F	1.02 .
	Anishinabe communities (2)	M	55	50.9	–	–	<LD	<LD	<LD	0.49 0.36 – 0.55	F	0.79 .
	Innu communities (2)	Total	87	47.1	–	–	<LD	<LD	0.21E 0.16 – 0.30	0.45 0.38 – 0.57	0.82E 0.55 – 1.22	F
	Innu communities (2)	F	40	57.5	–	–	<LD	<LD	<LD	0.47E 0.40 – 0.62	F	1.22 .
	Innu communities (2)	M	47	38.3	0.41E 0.24 – 0.63	0.22 0.16 – 0.30	<LD	<LD	0.20E 0.14 – 0.27	0.40E 0.24 – 0.62	F	1.15 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 125: 2,4-dichlorophenoxyacetic acid – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	49.2	–	–	<LD	<LD	0.14^E 0.10 – 0.22	0.33 0.29 – 0.36	0.50 0.39 – 0.54	0.58^E 0.52 – 0.91
	Total	3-5	38	39.5	0.26 0.20 – 0.33	0.21 0.17 – 0.26	<LD	<LD	0.23^E 0.10 – 0.27	0.31 0.25 – 0.36	0.49^E 0.33 – 0.76	0.57 .
	Total	6-11	79	45.6	–	–	<LD	<LD	0.21^E 0.10 – 0.25	0.38 0.30 – 0.43	0.52^E 0.41 – 0.61	F
	Total	12-19	80	57.5	–	–	<LD	<LD	<LD	0.30 0.22 – 0.35	0.38 0.34 – 0.52	F
	Anishinabe communities (2)	Total	110	50.9	–	–	<LD	<LD	<LD	0.33 0.25 – 0.36	0.40 0.37 – 0.55	0.56^E 0.40 – 0.96
	Anishinabe communities (2)	3-5	24	45.8	–	–	<LD	<LD	0.21 0.10 – 0.23	0.25 0.22 – 0.30	0.33 .	0.36 .
	Anishinabe communities (2)	6-11	46	50	–	–	F	F	<LD	0.35 0.23 – 0.40	0.50^E 0.36 – 0.76	0.69 .
	Anishinabe communities (2)	12-19	40	55	–	–	<LD	<LD	<LD	0.35 0.21 – 0.37	F	0.57 .
	Innu communities (2)	Total	87	47.1	–	–	<LD	<LD	0.20^E 0.10 – 0.26	0.33 0.28 – 0.40	0.53 0.40 – 0.58	F
	Innu communities (2)	3-5	14	28.6	0.36^E 0.23 – 0.51	0.28^E 0.18 – 0.42	<LD	<LD	F	0.44^E 0.29 – 0.74	0.73 .	0.88 .
	Innu communities (2)	6-11	33	39.4	0.32^E 0.22 – 0.47	0.23 0.17 – 0.30	<LD	<LD	0.23^E 0.10 – 0.35	0.40 0.26 – 0.50	F	0.59 .
	Innu communities (2)	12-19	40	60	–	–	<LD	<LD	<LD	0.26^E 0.10 – 0.32	0.33^E 0.27 – 0.48	0.46 .
CHMS (Cycle 2)	Total	3-5	523	36.33		0.26 0.23 – 0.30	<LD		0.26 0.20 – 0.31	0.46 0.37 – 0.55		1.1 0.81 – 1.4
	Total	6-11	512	42.38		–	<LD		0.26 0.22 – 0.30	0.45 0.38 – 0.53		1.2^E 0.78 – 1.7
	Total	12-19	511	41.68		–	<LD		0.23 <LD – 0.26	0.40 0.30 – 0.50		0.98 0.73 – 1.2

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 126: 2,4-dichlorophenoxyacetic acid (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	49.2	–	–	<LD	<LD	0.26 0.22 – 0.29	0.45 0.41 – 0.52	0.73E 0.59 – 1.00	1.20E 0.76 – 1.77
	Total	3-5	38	39.5	0.69E 0.43 – 1.12	0.44 0.35 – 0.59	<LD	<LD	0.42 0.29 – 0.48	0.66E 0.45 – 1.06	F	1.69 .
	Total	6-11	79	45.6	–	–	<LD	<LD	0.33 0.26 – 0.39	0.51 0.43 – 0.59	F	F
	Total	12-19	80	57.5	–	–	<LD	<LD	<LD	0.24E 0.20 – 0.35	0.43E 0.31 – 0.60	0.62E 0.42 – 0.78
	Anishinabe communities (2)	Total	110	50.9	–	–	<LD	<LD	<LD	0.44 0.39 – 0.52	0.68E 0.54 – 0.90	0.97E 0.65 – 1.72
	Anishinabe communities (2)	3-5	24	45.8	–	–	<LD	<LD	0.38 0.27 – 0.44	F	0.70 .	1.48 .
	Anishinabe communities (2)	6-11	46	50	–	–	0.13E 0.09 – 0.22	0.25 0.17 – 0.28	<LD	0.51 0.38 – 0.59	F	1.12 .
	Anishinabe communities (2)	12-19	40	55	–	–	<LD	<LD	<LD	F	0.52E 0.26 – 0.66	0.62 .
	Innu communities (2)	Total	87	47.1	–	–	<LD	<LD	0.21E 0.16 – 0.30	0.45 0.38 – 0.57	0.82E 0.55 – 1.22	F
	Innu communities (2)	3-5	14	28.6	0.70E 0.45 – 1.00	0.53E 0.33 – 0.82	<LD	<LD	F	0.96E 0.46 – 1.32	1.31 .	1.50 .
	Innu communities (2)	6-11	33	39.4	0.51E 0.29 – 0.81	0.31 0.22 – 0.42	<LD	<LD	0.30E 0.17 – 0.45	0.52 0.36 – 0.66	F	1.51 .
	Innu communities (2)	12-19	40	60	–	–	<LD	<LD	<LD	0.24E 0.17 – 0.32	F	0.42 .
CHMS (Cycle 2)	Total	3-5	522	36.40		0.45 0.39 – 0.52	<LD		0.40 0.30 – 0.51	0.82 0.68 – 0.96		2.2 1.5 – 2.9
	Total	6-11	510	42.55		–	<LD		0.28 0.24 – 0.60	0.51 0.42 – 0.60		1.2 0.79 – 1.6
	Total	12-19	509	41.85		–	<LD		0.16 <LD – 0.20	0.30 0.21 – 0.40		0.68E 0.43 – 0.93

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.;
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2017). Toxicological Profile for 2,4-Dichlorophenoxyacetic Acid (2,4-D) Draft for Public Comment. Source: www.atsdr.cdc.gov/toxprofiles/tp210.pdf

CAREX Canada (2009). Carcinogenics – 2,4-D. Source: https://www.carexcanada.ca/en/2,4-d/

INSPQ (Institut national de santé publique du Québec) (2002). Les risques à la santé associés à l'utilisation de pesticides à des fins esthétiques. Government of Quebec. Source: www.inspq.qc.ca/es/node/1120

Health Canada (1993). 2,4-dichlorophenoxyacetic acid. Government of Canada. Source: http://www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/publications/healthy-living-vie-saine/water-dichlorophenoxyacetic-eau/alt/water-dichlorophenoxyacetic-eau-eng.pdf

6.3.5. Polycyclic Aromatic Hydrocarbons (PAHs)

Polycyclic aromatic hydrocarbons (PAHs) are molecules found throughout the environment. PAHs are produced naturally (e.g., forest fires, volcanoes) or anthropogenically, either through culinary practices (fried or smoked food, or food cooked on a barbecue or over charcoal) or by industries (aluminum production, coal plants, waste incinerators, spills, and combustion of petroleum products). Cigarette smoke also contains PAHs (ATSDR, 1996; INSPQ, 2000; Urbancova et al., 2017). Whether natural or anthropogenic, PAHs are produced mainly by incomplete combustion or high pressure processes, or through pyrolysis of organic matter (ATSDR, 1995; Environment Canada and Health Canada, 1994).

Exposure to PAHs occurs mainly through food and inhalation (ambient air, cigarette smoke, or smoke from wood) (ATSDR, 1996; Urbancova et al., 2017). In animal studies, relationships have been reported between the appearance of cancers and exposure to certain PAHs, including benzo[a]pyrene. Furthermore, certain PAHs have been classified as possibly carcinogenic for humans (ATSDR, 1995; Environment Canada and Health Canada, 1994). Other negative effects may also be associated with these contaminants, such as hormone problems and obesity (Urbancova et al., 2017).

PAHs undergo two transformations in the human body before their metabolites are excreted in urine or feces. These transformations vary depending on several factors (age, gender, body mass index) and certain lifestyle habits (cigarettes, alcohol consumption, level of physical activity, etc.) (Urbancova et al., 2017).

The PAH metabolites that were measured in a subsample of participants in the JES!-YEH! project are presented below. Note that there is no toxicity threshold established for these contaminants.

Benzo[a]pyrene metabolite:
- 3-Hydroxy benzo[a]pyrene;

Chrysene metabolites:
- 2-Hydroxychrysene
- 3-Hydroxychrysene
- 4-Hydroxychrysene
- 6-Hydroxychrysene

Fluoranthene metabolite:
- 3-Hydroxyfluoranthene

Fluorene metabolites:
- 2-Hydroxyfluorene
- 3-Hydroxyfluorene
- 9-Hydroxyfluorene

Naphthalene metabolites:
- 1-Hydroxynaphthalene
- 2-Hydroxynaphthalene

Phenanthrene metabolites:

- 1-Hydroxyphenanthrene
- 2-Hydroxyphenanthrene
- 3-Hydroxyphenanthrene
- 4-Hydroxyphenanthrene
- 9-Hydroxyphenanthrene

Pyrene metabolite:

- 1-Hydroxypyrene

Results

PAH levels were measured in the urine of a subsample (n=50) of participants in the JES!-YEH! study and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 127 – 160). Urine levels of PAH metabolites reflect recent exposure to these substances. A measureable level does not necessarily mean that they will have negative health effects.

Urine levels of 3-hydroxybenzo[a]pyrene, 2-hydroxychrysene, 3-hydroxychrysene, 4-hydroxychrysene, 6-hydroxychrysene, and 3-hydroxyfluoranthene were not calculated since more than 40% of the analyses were below the limit of detection (Tables 128, 130, 132, 134, 136, and 138).

The levels of 2-hydroxyfluorene measured in the JES!-YEH! study were significantly lower than those in the CHMS (Cycle 3) for participants 6-11 years old. Although no significant difference was observed in youth 3-5 and 12-19 years old, it should be noted that the coefficients of variation were between 16.6 and 33.3% for the respective geometric means (Table 140).

The levels of 3-hydroxyfluorene measured in the urine of participants in the JES!-YEH! study tended to be lower than those in the CHMS (Cycle 3) for the 3-5 and 6-11 year old age groups. However, these differences were not significant, and the coefficients of variation for the 3-5 age group varied between 16.6 and 33.3%. For youth 12 to 19 years old, there was no significant difference between the results of the JES!-YEH! project and the CHMS (Cycle 3) (Table 142).

There were no significant differences in the levels of 9-hydroxyfluorene and 1-hydroxynaphthalene between the JES!-YEH! study and the CHMS (Cycle 3) (Tables 144 and 146). However, the coefficients of variation for these two contaminants were between 16.6 and 33.3% for all three age groups in the study.

Urine levels of 2-hydroxynaphthalene measured in the JES!-YEH! study were significantly higher than those in the CHMS (Cycle 3) for youth aged 12-19 years old (Table 148). No significant difference was observed for the other two age groups (3-5 and 6-11 years). Note that the coefficients of variation were between 16.6 and 33.3% for the geometric mean of participants 3-5 years old.

Urine levels of 1-hydroxyphenanthrene were significantly lower in the JES!-YEH! study than those in the CHMS (Cycle 3) for participants 3-5 and 6-11 years old. However, no significant difference was observed in youth 12-19 years old (Table 150).

Levels of 2-hydroxyphenanthrene and 1-hydroxypyrene measured in the JES!-YEH! study were not significantly different from the CHMS (Cycle 3) for the three age groups under study (Tables 152 and 160).

Levels of 3-hydroxyphenanthrene measured in JES!-YEH! study participants were significantly lower than those in the CHMS (Cycle 3) for the 3-5 age group. A similar trend emerged for participants 6-11 years old, but they were not significant. For youth aged 12 to 19 years, there was no significant difference between the JES!-YEH! project and the CHMS (Cycle 3) (Table 154).

Urine levels of 4-hydroxyphenanthrene analysed in JES!-YEH! project participants did not show any significant difference compared to the results of the CHMS (Cycle 3) across all three age groups in question (3-5, 6-11, and 12-19 years old) (Table 156). However, the comparison of the geometric means for the 12-19 age group should be interpreted with caution, since the coefficient of variation in the JES!-YEH! study was between 16.6 and 33.3%.

The levels of 9-hydroxyphenanthrene measured in JES!-YEH! project participants were not significantly different compared to the results of the CHMS (Cycle 3) across all three age groups in question (3-5, 6-11, and 12-19 years old) (Table 158). However, the comparison of the geometric means for the 3-5 and 12-19 age groups should be interpreted with caution, since the coefficient of variation in the JES!-YEH! study was between 16.6 and 33.3%.

Table 127: 3-Hydroxybenzo[a]pyrene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	42	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	20	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	7	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	453	100		–	<LD		<LD		<LD	<LD
	Total	6-11	468	100		–	<LD		<LD		<LD	<LD
	Total	12-19	486	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 128: 3-Hydroxybenzo[a]pyrene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	42	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	20	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	7	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	452	100		–	<LD		<LD		<LD	<LD
	Total	6-11	468	100		–	<LD		<LD		<LD	<LD
	Total	12-19	486	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 129: 2-Hydroxychrysene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	492	100		–	<LD		<LD		<LD	<LD
	Total	6-11	496	100		–	<LD		<LD		<LD	<LD
	Total	12-19	504	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 130: 2-Hydroxychrysene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	491	100		–	<LD		<LD		<LD	<LD
	Total	6-11	496	100		–	<LD		<LD		<LD	<LD
	Total	12-19	504	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 131: 3-Hydroxychrysene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	492	99.80		–	<LD		<LD		<LD	<LD
	Total	6-11	496	99.80		–	<LD		<LD		<LD	<LD
	Total	12-19	505	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 132: 3-Hydroxychrysene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	491	99.80		–	<LD		<LD		<LD	<LD
	Total	6-11	496	99.80		–	<LD		<LD		<LD	<LD
	Total	12-19	505	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 133: 4-Hydroxychrysene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	492	99.39		–	<LD		<LD		<LD	<LD
	Total	6-11	496	100		–	<LD		<LD		<LD	<LD
	Total	12-19	505	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 134: 4-Hydroxychrysene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	18	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	491	99.39		–	<LD		<LD		<LD	<LD
	Total	6-11	496	100		–	<LD		<LD		<LD	<LD
	Total	12-19	505	100		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 135: 6-Hydroxychrysene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	48	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	23	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	17	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	27	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	492	100		–	<LD		<LD		<LD	<LD
	Total	6-11	494	100		–	<LD		<LD		<LD	<LD
	Total	12-19	504	99.80		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 136: 6-Hydroxychrysene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	48	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	23	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	25	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	17	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	27	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	491	100		–	<LD		<LD		<LD	<LD
	Total	6-11	494	100		–	<LD		<LD		<LD	<LD
	Total	12-19	504	99.80		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 137: 3-Hydroxyfluoranthene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	42	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	20	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	8	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	15	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	19	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	27	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	15	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	435	97.93		–	<LD		<LD		<LD	<LD
	Total	6-11	450	98.67		–	<LD		<LD		<LD	<LD
	Total	12-19	469	98.08		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 138: 3-Hydroxyfluoranthene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	42	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	20	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	8	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	15	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	19	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	27	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	15	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 3)	Total	3-5	434	97.93		–	<LD		<LD		<LD	<LD
	Total	6-11	450	98.67		–	<LD		<LD		<LD	<LD
	Total	12-19	469	98.08		–	<LD		<LD		<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 139: 2-Hydroxyfluorene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.29E 0.18 – 0.44	0.15 0.11 – 0.20	F	0.07E 0.05 – 0.12	0.16 0.12 – 0.20	0.23E 0.20 – 0.33	F	0.96 .
	Total	F	24	0	F	0.13E 0.08 – 0.22	0.02 .	0.07E 0.02 – 0.10	0.15E 0.07 – 0.21	F	0.60 .	0.88 .
	Total	M	26	0	0.28E 0.15 – 0.46	0.16E 0.11 – 0.23	0.03 .	0.12E 0.03 – 0.14	0.16 0.12 – 0.21	0.24E 0.17 – 0.35	0.39 .	0.83 .
	Total	3-5	10	0	0.13E 0.06 – 0.21	F	0.01 .	0.03 .	F	0.21 .	0.27 .	0.31 .
	Total	6-11	19	0	0.12 0.09 – 0.14	0.10 0.07 – 0.13	0.04 .	0.07E 0.04 – 0.10	0.12E 0.07 – 0.14	0.15 0.11 – 0.17	0.17 .	0.21 .
	Total	12-19	21	0	0.52E 0.27 – 0.87	0.29E 0.19 – 0.47	0.08 .	0.18E 0.08 – 0.21	0.22E 0.19 – 0.34	F	0.99 .	2.14 .
	Anishinabe communities (2)	Total	28	0	0.17 0.13 – 0.23	0.12E 0.08 – 0.17	0.03 .	0.07E 0.03 – 0.11	0.13E 0.08 – 0.21	0.22 0.17 – 0.25	0.28 .	0.34 .
	Innu communities (2)	Total	22	0	F	0.19E 0.11 – 0.32	0.03 .	F	0.16 0.11 – 0.20	F	0.98 .	2.08 .
CHMS (Cycle 3)	Total	3-5	496	0		0.16 0.13 – 0.18	0.045 0.029 – 0.060		0.17 0.13 – 0.21		0.41 0.32 – 0.51	0.61 0.41 – 0.81
	Total	6-11	502	0		0.19 0.17 – 0.21	0.062 0.045 – 0.078		0.18 0.16 – 0.21		0.49 0.38 – 0.60	0.66 0.53 – 0.78
	Total	12-19	506	0		0.28 0.23 – 0.33	0.079 0.063 – 0.095		0.25 0.19 – 0.31		1.0E 0.52 – 1.5	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 140: 2-Hydroxyfluorene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.29^{E} 0.21 – 0.40	0.20 0.17 – 0.25	0.09 0.07 – 0.12	0.13 0.10 – 0.15	0.17 0.15 – 0.20	0.26^{E} 0.19 – 0.44	F	0.80 .
	Total	F	24	0	0.35^{E} 0.20 – 0.55	0.22^{E} 0.16 – 0.32	0.08 .	0.11^{E} 0.08 – 0.15	0.16^{E} 0.13 – 0.25	F	0.74 .	1.44 .
	Total	M	26	0	0.23 0.17 – 0.29	0.19 0.16 – 0.24	0.11 .	0.13 0.11 – 0.16	0.17 0.14 – 0.19	F	0.42 .	0.58 .
	Total	3-5	10	0	0.24 0.17 – 0.31	0.21^{E} 0.15 – 0.29	0.07 .	0.13 .	0.25^{E} 0.12 – 0.27	0.28 .	0.33 .	0.40 .
	Total	6-11	19	0	0.17 0.13 – 0.23	0.16 0.13 – 0.19	0.09 .	0.12 0.09 – 0.13	0.14 0.12 – 0.18	0.19^{E} 0.14 – 0.23	0.24 .	0.28 .
	Total	12-19	21	0	0.41^{E} 0.23 – 0.63	0.26^{E} 0.18 – 0.39	0.08 .	0.14^{E} 0.08 – 0.18	0.19^{E} 0.15 – 0.29	F	0.83 .	1.55 .
	Anishinabe communities (2)	Total	28	0	0.22 0.17 – 0.27	0.19 0.15 – 0.23	0.10 .	0.13 0.10 – 0.15	0.17 0.13 – 0.20	0.26^{E} 0.19 – 0.34	0.37 .	0.53 .
	Innu communities (2)	Total	22	0	0.37^{E} 0.20 – 0.59	0.22^{E} 0.16 – 0.35	0.08 .	0.12^{E} 0.08 – 0.16	0.17 0.13 – 0.21	F	0.82 .	1.52 .
CHMS (Cycle 3)	Total	3-5	495	0		0.30 0.28 – 0.33	0.16 0.15 – 0.18		0.28 0.26 – 0.31		0.57 0.50 – 0.65	0.77 0.58 – 0.95
	Total	6-11	502	0		0.24 0.21 – 0.27	0.12 0.11 – 0.13		0.22 0.18 – 0.26		0.55 0.44 – 0.66	0.67 0.58 – 0.75
	Total	12-19	506	0		0.21 0.18 – 0.24	0.099 0.091 – 0.11		0.17 0.15 – 0.20		0.58^{E} 0.33 – 0.83	1.1^{E} 0.37 – 1.8

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 141: 3-Hydroxyfluorene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.11^{E} 0.07 – 0.17	0.06 0.04 – 0.08	F	0.03^{E} 0.02 – 0.05	0.06 0.04 – 0.07	0.09^{E} 0.07 – 0.13	F	0.31 .
	Total	F	24	0	F	0.05^{E} 0.03 – 0.08	0.01 .	0.02^{E} 0.01 – 0.04	0.06^{E} 0.02 – 0.08	F	0.21 .	0.34 .
	Total	M	26	0	0.10^{E} 0.06 – 0.15	0.06^{E} 0.04 – 0.09	0.01 .	0.04^{E} 0.01 – 0.05	0.06 0.05 – 0.07	0.08^{E} 0.06 – 0.15	0.18 .	0.25 .
	Total	3-5	10	0	0.05^{E} 0.02 – 0.09	F	0.00 .	0.01 .	F	0.06 .	0.08 .	0.13 .
	Total	6-11	19	0	0.05 0.04 – 0.06	0.04 0.03 – 0.05	0.02 .	0.02^{E} 0.02 – 0.04	0.04^{E} 0.03 – 0.05	0.06^{E} 0.04 – 0.07	0.08 .	0.09 .
	Total	12-19	21	0	0.19^{E} 0.10 – 0.32	0.10^{E} 0.07 – 0.17	0.02 .	0.06^{E} 0.02 – 0.08	0.08^{E} 0.07 – 0.14	F	0.35 .	0.68 .
	Anishinabe communities (2)	Total	28	0	0.07^{E} 0.05 – 0.09	0.05^{E} 0.03 – 0.06	0.01 .	0.03^{E} 0.01 – 0.04	0.05^{E} 0.03 – 0.07	0.08^{E} 0.06 – 0.09	0.11 .	0.21 .
	Innu communities (2)	Total	22	0	F	0.07^{E} 0.04 – 0.12	0.01 .	F	0.07^{E} 0.05 – 0.09	F	0.33 .	0.67 .
CHMS (Cycle 3)	Total	3-5	496	0		0.064 0.054 – 0.075	0.016^{E} 0.0076 – 0.024		0.068 0.052 – 0.083		0.18 0.13 – 0.23	0.26 0.18 – 0.34
	Total	6-11	501	0		0.077 0.067 – 0.089	0.023 0.016 – 0.031		0.080 0.073 – 0.087		0.25^{E} 0.16 – 0.35	0.36^{E} 0.21 – 0.52
	Total	12-19	506	0		0.10 0.088 – 0.12	0.028 0.019 – 0.037		0.088 0.074 – 0.10		0.59^{E} 0.24 – 0.93	0.94^{E} 0.31 – 1.6

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 142: 3-Hydroxyfluorene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.11^E 0.08 – 0.16	0.08 0.06 – 0.10	0.03^E 0.02 – 0.05	0.05 0.04 – 0.06	0.06 0.06 – 0.08	0.10^E 0.08 – 0.13	F	0.39 .
	Total	F	24	0	0.14^E 0.08 – 0.22	0.08^E 0.06 – 0.13	0.03 .	0.04^E 0.03 – 0.06	0.06^E 0.05 – 0.11	F	0.28 .	0.58 .
	Total	M	26	0	0.09^E 0.06 – 0.13	0.07 0.06 – 0.09	0.04 .	0.05 0.04 – 0.06	0.07 0.05 – 0.07	0.08 0.07 – 0.09	0.10 .	0.20 .
	Total	3-5	10	0	0.09^E 0.07 – 0.13	0.08^E 0.06 – 0.11	0.03 .	0.06 .	0.07^E 0.05 – 0.11	0.11 .	0.13 .	0.18 .
	Total	6-11	19	0	0.07 0.05 – 0.09	0.06 0.05 – 0.08	0.03 .	0.05 0.03 – 0.06	0.06 0.05 – 0.07	0.08^E 0.06 – 0.09	0.09 .	0.12 .
	Total	12-19	21	0	0.16^E 0.09 – 0.25	0.09^E 0.06 – 0.15	0.02 .	0.05^E 0.02 – 0.06	0.07^E 0.05 – 0.10	F	0.45 .	0.64 .
	Anishinabe communities (2)	Total	28	0	0.09^E 0.06 – 0.13	0.07 0.06 – 0.09	0.04 .	0.05 0.04 – 0.06	0.06 0.05 – 0.08	F	0.15 .	0.22 .
	Innu communities (2)	Total	22	0	0.14^E 0.07 – 0.23	0.08^E 0.06 – 0.13	0.03 .	0.05^E 0.03 – 0.06	0.07^E 0.05 – 0.09	F	0.30 .	0.61 .
CHMS (Cycle 3)	Total	3-5	495	0		0.12 0.11 – 0.14	0.062 0.053 – 0.072		0.11 0.10 – 0.13		0.27 0.23 – 0.30	0.40 0.27 – 0.53
	Total	6-11	501	0		0.099 0.083 – 0.12	0.044 0.038 – 0.050		0.085 0.070 – 0.10		0.25^E 0.11 – 0.38	0.43^E 0.23 – 0.62
	Total	12-19	506	0		0.079 0.069 – 0.090	0.033 0.028 – 0.038		0.065 0.056 – 0.074		F	0.61^E 0.25 – 0.96

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 143: 9-Hydroxyfluorene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.19^{E} 0.13 – 0.26	0.11 0.09 – 0.15	0.03^{E} 0.03 – 0.05	0.06^{E} 0.04 – 0.08	0.10 0.08 – 0.11	0.20^{E} 0.10 – 0.31	F	0.61 .
	Total	F	24	0	F	0.09^{E} 0.06 – 0.14	0.03 .	0.05^{E} 0.03 – 0.08	0.09 0.05 – 0.10	F	0.25 .	0.46 .
	Total	M	26	0	0.21^{E} 0.14 – 0.29	0.14^{E} 0.10 – 0.20	0.03 .	0.08^{E} 0.03 – 0.09	F	F	0.56 .	0.62 .
	Total	3-5	10	0	F	0.06^{E} 0.04 – 0.11	0.02 .	0.03 .	F	0.09 .	0.11 .	0.25 .
	Total	6-11	19	0	0.16^{E} 0.09 – 0.26	0.11^{E} 0.07 – 0.15	0.03 .	0.07^{E} 0.03 – 0.09	0.10 0.07 – 0.10	F	0.31 .	0.59 .
	Total	12-19	21	0	0.26^{E} 0.15 – 0.40	0.17^{E} 0.11 – 0.25	0.05 .	0.09^{E} 0.05 – 0.11	0.13^{E} 0.09 – 0.23	F	0.55 .	0.64 .
	Anishinabe communities (2)	Total	28	0	0.11^{E} 0.07 – 0.17	0.08 0.06 – 0.11	0.03 .	0.05^{E} 0.03 – 0.08	0.08 0.07 – 0.10	0.10^{E} 0.09 – 0.13	0.16 .	0.19 .
	Innu communities (2)	Total	22	0	0.29^{E} 0.17 – 0.42	0.17^{E} 0.11 – 0.28	0.03 .	0.08^{E} 0.04 – 0.13	0.21^{E} 0.09 – 0.30	0.36^{E} 0.22 – 0.56	0.57 .	0.63 .
CHMS (Cycle 3)	Total	3-5	490	0		0.084 0.070 – 0.099	0.029 0.022 – 0.0.36		0.085 0.065 – 0.10		0.22 0.15 – 0.28	0.29 0.21 – 0.37
	Total	6-11	498	0		0.091 0.082 – 0.10	0.038 0.030 – 0.045		0.081 0.072 – 0.090		0.24 0.19 – 0.30	0.34 0.26 – 0.42
	Total	12-19	505	0		0.13 0.12 – 0.15	0.047 0.039 – 0.055		0.13 0.11 – 0.15		0.38^{E} 0.23 – 0.54	0.58 0.40 – 0.77

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 144: 9-Hydroxyfluorene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.25E 0.17 – 0.35	0.16 0.12 – 0.20	0.06 0.05 – 0.08	0.08 0.06 – 0.10	0.13 0.10 – 0.16	0.21E 0.16 – 0.34	F	0.89 .
	Total	F	24	0	0.25E 0.14 – 0.39	0.15E 0.10 – 0.22	0.06 .	0.08 0.06 – 0.09	0.11E 0.08 – 0.18	F	0.75 .	0.96 .
	Total	M	26	0	0.25E 0.15 – 0.39	0.16 0.12 – 0.22	0.06 .	0.10 0.06 – 0.13	0.14 0.10 – 0.18	F	0.40 .	0.64 .
	Total	3-5	10	0	0.24E 0.12 – 0.37	0.17E 0.11 – 0.28	0.06 .	0.08 .	F	0.27 .	0.47 .	0.60 .
	Total	6-11	19	0	F	0.16E 0.11 – 0.24	0.06 .	0.10E 0.06 – 0.12	0.14E 0.10 – 0.18	F	0.37 .	0.76 .
	Total	12-19	21	0	0.24E 0.12 – 0.39	0.14E 0.10 – 0.22	0.06 .	0.08 0.06 – 0.09	0.10E 0.08 – 0.17	F	0.72 .	0.99 .
	Anishinabe communities (2)	Total	28	0	0.19E 0.11 – 0.32	0.13 0.10 – 0.17	0.06 .	0.08 0.06 – 0.10	0.11 0.09 – 0.14	0.15E 0.12 – 0.19	0.21 .	0.54 .
	Innu communities (2)	Total	22	0	0.32E 0.19 – 0.46	0.21E 0.14 – 0.31	0.06 .	F	0.18E 0.11 – 0.30	F	0.76 .	0.98 .
CHMS (Cycle 3)	Total	3-5	489	0		0.16 0.14 – 0.18	0.065 0.058 – 0.072		0.15 0.12 – 0.18		0.44 0.36 – 0.52	0.54 0.45 – 0.64
	Total	6-11	498	0		0.12 0.10 – 0.13	0.046E 0.029 – 0.063		0.11 0.096 – 0.13		0.27 0.22 – 0.31	0.43 0.30 – 0.56
	Total	12-19	505	0		0.10 0.087 – 0.12	0.042 0.035 – 0.048		0.088 0.077 – 0.098		0.25 0.17 – 0.34	0.37E 0.22 – 0.51

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 145: 1-Hydroxynaphthalene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	6	1.09[E] 0.57 – 1.88	0.48 0.36 – 0.66	0.14[E] 0.05 – 0.22	0.24 0.17 – 0.30	0.42[E] 0.30 – 0.55	0.88[E] 0.53 – 1.45	1.67[E] 1.20 – 2.46	2.30 .
	Total	F	24	12.5	F	0.47[E] 0.27 – 0.88	<LD	F	0.38[E] 0.23 – 0.60	F	2.34 .	6.82 .
	Total	M	26	0	0.66 0.48 – 0.85	0.50 0.37 – 0.66	0.18 .	0.26[E] 0.19 – 0.35	0.45[E] 0.29 – 0.71	0.85[E] 0.49 – 1.36	1.48 .	1.64 .
	Total	3-5	10	10	F	F	<LD	0.15 .	F	0.76 .	1.30 .	1.90 .
	Total	6-11	19	5.3	0.55[E] 0.34 – 0.79	0.37[E] 0.24 – 0.55	0.11 .	0.23[E] 0.10 – 0.28	0.29[E] 0.24 – 0.45	F	1.42 .	1.61 .
	Total	12-19	21	4.8	F	0.67[E] 0.39 – 1.20	0.23 .	0.31[E] 0.22 – 0.42	0.45[E] 0.32 – 0.87	F	2.06 .	7.61 .
	Anishinabe communities (2)	Total	28	7.1	0.56[E] 0.38 – 0.80	0.37[E] 0.26 – 0.53	0.11 .	0.23E 0.12 – 0.29	0.32 0.25 – 0.43	F	1.34 .	1.62 .
	Innu communities (2)	Total	22	4.5	F	0.69[E] 0.40 – 1.22	0.15 .	F	F	F	2.02 .	7.32 .
CHMS (Cycle 3)	Total	3-5	495	1.82		0.69 0.54 – 0.88	0.19[E] 0.12 – 0.26		0.68 0.53 – 0.82		2.9 2.1 – 3.8	4.2 2.7 – 5.7
	Total	6-11	502	2.19		0.75 0.63 – 0.90	0.23 0.16 – 0.30		0.68 0.55 – 0.82		3.0[E] 1.8 – 4.2	F
	Total	12-19	505	2.57		0.95 0.70 – 1.3	0.19[E] 0.12 – 0.26		0.74 0.50 – 0.98		7.2 4.8 – 9.6	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 146: 1-Hydroxynaphthalene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	6	1.41E 0.78 – 2.25	0.67 0.51 – 0.91	0.24 0.15 – 0.27	0.29 0.25 – 0.42	0.55 0.41 – 0.66	1.09E 0.64 – 1.84	F	5.92 .
	Total	F	24	12.5	F	0.76E 0.47 – 1.32	<LD	0.27E 0.16 – 0.46	F	F	6.42 .	9.23 .
	Total	M	26	0	0.80E 0.53 – 1.11	0.59 0.44 – 0.80	0.24 .	0.29 0.24 – 0.43	0.48E 0.33 – 0.66	F	1.76 .	2.40 .
	Total	3-5	10	10	1.34E 0.86 – 1.95	1.13E 0.81 – 1.66	<LD	0.68 .	F	1.50 .	2.31 .	2.86 .
	Total	6-11	19	5.3	0.77E 0.49 – 1.08	0.58E 0.41 – 0.81	0.23 .	0.34E 0.22 – 0.47	0.51E 0.37 – 0.65	F	1.52 .	2.00 .
	Total	12-19	21	4.8	F	0.58E 0.35 – 1.10	0.17 .	0.25 0.18 – 0.31	0.35 0.26 – 0.48	F	7.90 .	9.38 .
	Anishinabe communities (2)	Total	28	7.1	0.82E 0.54 – 1.20	0.56 0.42 – 0.78	0.23 .	0.27E 0.25 – 0.39	0.45E 0.31 – 0.67	F	1.64 .	2.88 .
	Innu communities (2)	Total	22	4.5	F	0.83E 0.51 – 1.41	0.22 .	0.36E 0.22 – 0.49	F	F	7.21 .	9.33 .
CHMS (Cycle 3)	Total	3-5	494	1.82		1.3 1.1 – 1.6	0.46 0.34 – 0.57		1.2 1.1 – 1.4		4.9 3.6 – 6.2	6.7 4.8 – 8.6
	Total	6-11	502	2.19		0.96 0.76 – 1.2	0.30 0.26 – 0.34		0.79 0.61 – 0.98		4.1E 2.5 – 5.8	5.8E 3.2 – 8.5
	Total	12-19	505	2.57		0.72 0.56 – 0.92	0.15E 0.089 – 0.22		0.67 0.46 – 0.88		4.7E 1.3 – 8.2	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 147: 2-Hydroxynaphthalene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	6.99E 4.92 – 9.59	4.08 3.07 – 5.49	F	2.10E 1.29 – 2.85	4.70E 2.78 – 6.10	7.30 6.05 – 10.44	F	F
	Total	F	24	0	7.32E 3.93 – 12.09	3.79E 2.42 – 6.03	0.65 .	F	F	F	13.10 .	17.30 .
	Total	M	26	0	6.69E 4.42 – 9.62	4.37E 3.05 – 6.23	0.85 .	2.25E 0.94 – 4.09	5.60E 2.57 – 6.45	7.20E 5.74 – 10.70	11.80 .	13.70 .
	Total	3-5	10	0	F	F	0.63 .	0.82 .	F	6.15 .	13.00 .	15.50 .
	Total	6-11	19	0	4.24E 2.72 – 5.92	2.81E 1.68 – 4.45	0.40 .	F	2.75E 1.59 – 5.48	6.20E 2.78 – 9.30	10.05 .	10.53 .
	Total	12-19	21	0	10.39E 6.05 – 15.52	7.01E 5.04 – 9.83	2.44 .	3.43E 2.39 – 5.71	6.10E 4.02 – 7.80	F	17.60 .	35.10 .
	Anishinabe communities (2)	Total	28	0	7.12E 4.22 – 11.00	3.82E 2.44 – 5.81	0.58 .	F	4.10E 2.53 – 6.65	7.50E 5.65 – 10.69	11.40 .	16.00 .
	Innu communities (2)	Total	22	0	6.82E 4.08 – 10.64	4.44E 3.05 – 6.65	1.32 .	2.15E 1.30 – 3.38	4.70E 2.35 – 6.29	F	13.40 .	17.60 .
CHMS (Cycle 3)	Total	3-5	494	0		3.2 2.6 – 4.0	0.72 0.50 – 0.93		3.4 2.7 – 4.1		12E 6.7 – 16	19E 12 – 26
	Total	6-11	498	0		3.2 2.8 – 3.7	0.84 0.60 – 1.1		3.2 2.6 – 3.8		10E 6.3 – 14	14 9.6 – 18
	Total	12-19	505	0		5.3 4.6 – 6.2	1.2 0.77 – 1.7		5.0 3.8 – 6.2		23 15 – 23	36 30 – 43

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 148: 2-Hydroxynaphthalene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	7.16 5.79 – 8.69	5.61 4.61 – 6.82	2.42 1.60 – 2.74	3.06 2.54 – 4.16	5.61 4.10 – 7.39	9.39 7.29 – 10.30	12.81^E 9.85 – 18.77	18.07 .
	Total	F	24	0	8.26 5.76 – 11.01	6.17 4.50 – 8.55	2.58 .	3.09^E 2.59 – 4.31	6.11^E 3.38 – 9.39	9.88^E 7.22 – 17.06	18.27 .	22.56 .
	Total	M	26	0	6.16 4.87 – 7.44	5.13 4.08 – 6.44	2.11 .	2.64^E 2.20 – 4.67	5.60^E 3.37 – 7.11	7.57^E 5.82 – 9.93	10.93 .	12.64 .
	Total	3-5	10	0	9.79^E 5.49 – 14.32	7.57^E 4.79 – 11.69	2.49 .	3.85 .	F	12.15 .	19.07 .	21.78 .
	Total	6-11	19	0	5.33 3.88 – 6.93	4.37 3.23 – 5.88	1.87 .	2.87^E 1.73 – 3.52	3.79^E 2.97 – 5.92	7.79^E 3.92 – 9.88	9.90 .	10.19 .
	Total	12-19	21	0	7.58 5.64 – 9.96	6.09 4.58 – 8.10	2.54 .	F	6.40^E 3.60 – 8.40	9.52^E 6.74 – 11.42	12.08 .	16.84 .
	Anishinabe communities (2)	Total	28	0	7.90 5.72 – 10.25	5.87 4.37 – 7.92	1.89 .	2.93^E 2.02 – 5.43	6.69^E 3.37 – 7.55	9.88^E 7.08 – 13.01	16.58 .	21.69 .
	Innu communities (2)	Total	22	0	6.23 4.76 – 7.97	5.29 4.18 – 6.83	2.50 .	3.19 2.51 – 4.34	4.76^E 3.40 – 7.66	8.52^E 4.99 – 9.89	10.42 .	12.08 .
CHMS (Cycle 3)	Total	3-5	493	0		6.3 5.4 – 7.3	2.2 1.7 – 2.7		5.8 4.8 – 6.8		19 13 – 25	27^E 17 – 37
	Total	6-11	498	0		4.1 3.4 – 5.0	1.5 1.1 – 1.9		3.9 3.3 – 4.5		11 8.3 – 14	13^E 4.5 – 22
	Total	12-19	505	0		4.1 3.7 – 4.4	1.4 1.1 – 1.7		3.6 3.2 – 4.0		12 9.6 – 15	15 11 – 20

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 149: 1-Hydroxyphenanthrene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.12 0.09 – 0.16	0.08 0.06 – 0.10	0.02^E 0.01 – 0.04	0.05^E 0.03 – 0.07	0.08 0.06 – 0.10	0.14 0.10 – 0.16	F	0.35 .
	Total	F	24	0	0.10^E 0.07 – 0.13	0.07^E 0.04 – 0.10	0.02 .	0.04^E 0.02 – 0.06	0.07^E 0.05 – 0.09	0.11E 0.07 – 0.15	0.16 .	0.30 .
	Total	M	26	0	0.14^E 0.09 – 0.20	0.09^E 0.07 – 0.13	0.02 .	0.06^E 0.03 – 0.08	0.09^E 0.06 – 0.12	0.15^E 0.10 – 0.19	0.20 .	0.34 .
	Total	3-5	10	0	0.07^E 0.03 – 0.10	0.05^E 0.02 – 0.08	0.01 .	0.02 .	F	0.10 .	0.14 .	0.16 .
	Total	6-11	19	0	0.08 0.06 – 0.10	0.07 0.05 – 0.09	0.03 .	0.05^E 0.02 – 0.06	0.07^E 0.05 – 0.10	0.11^E 0.07 – 0.13	0.14 0.10 – 0.15	0.15 .
	Total	12-19	21	0	0.17^E 0.11 – 0.26	0.12^E 0.08 – 0.17	0.04 .	0.07^E 0.04 – 0.09	0.10^E 0.08 – 0.15	F	0.37 .	0.39 .
	Anishinabe communities (2)	Total	28	0	0.09 0.07 – 0.11	0.07 0.05 – 0.09	0.02 .	0.04^E 0.02 – 0.06	0.08^E 0.05 – 0.10	0.12 0.08 – 0.15	0.15 .	0.17 .
	Innu communities (2)	Total	22	0	0.15^E 0.09 – 0.24	0.09^E 0.06 – 0.15	0.02 .	0.06^E 0.02 – 0.07	0.09^E 0.06 – 0.13	F	0.34 .	0.39 .
CHMS (Cycle 3)	Total	3-5	490	0		0.092 0.079 – 0.11	0.031 0.021 – 0.042		0.097 0.086 – 0.11		0.27 0.22 – 0.31	0.36 0.30 – 0.42
	Total	6-11	501	0.20		0.11 0.094 – 0.12	0.031^E 0.015 – 0.047		0.11 0.092 – 0.12		0.26 0.21 – 0.30	0.36 0.30 – 0.42
	Total	12-19	505	0		0.15 0.13 – 0.18	0.050 0.035 – 0.066		0.14 0.11 – 0.17		0.53 0.40 – 0.65	0.76^E 0.41 – 1.1

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 150: 1-Hydroxyphenanthrene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.12 0.11 – 0.14	0.11 0.09 – 0.12	0.06^E 0.04 – 0.07	0.08 0.06 – 0.08	0.10 0.08 – 0.12	0.16 0.11 – 0.18	0.21 0.17 – 0.28	0.25 .
	Total	F	24	0	0.13 0.10 – 0.16	0.11 0.09 – 0.14	0.05 .	0.08 0.05 – 0.08	0.10^E 0.08 – 0.15	0.17^E 0.10 – 0.19	0.21 .	0.28 .
	Total	M	26	0	0.12 0.10 – 0.14	0.11 0.09 – 0.13	0.06 .	0.08 0.06 – 0.10	0.10 0.08 – 0.11	0.15 0.11 – 0.18	0.20 .	0.21 .
	Total	3-5	10	0	0.14 0.11 – 0.17	0.13 0.10 – 0.16	0.08 .	0.08 .	0.11^E 0.08 – 0.18	0.18 .	0.19 .	0.20 .
	Total	6-11	19	0	0.12 0.09 – 0.15	0.11 0.09 – 0.13	0.06 .	0.07 0.06 – 0.09	0.10^E 0.07 – 0.14	0.15 0.11 – 0.16	0.16 .	0.20 .
	Total	12-19	21	0	0.12 0.09 – 0.16	0.10 0.08 – 0.13	0.04 .	0.08^E 0.04 – 0.08	0.09 0.08 – 0.11	0.14^E 0.09 – 0.22	0.22 .	0.28 .
	Anishinabe communities (2)	Total	28	0	0.12 0.10 – 0.14	0.11 0.09 – 0.12	0.06 .	0.08 0.06 – 0.08	0.10 0.08 – 0.11	0.15 0.10 – 0.18	0.19 .	0.20 .
	Innu communities (2)	Total	22	0	0.13 0.10 – 0.16	0.11 0.09 – 0.14	0.04 .	0.08^E 0.05 – 0.10	0.11^E 0.08 – 0.15	0.16^E 0.11 – 0.22	0.22 .	0.28 .
CHMS (Cycle 3)	Total	3-5	489	0		0.18 0.17 – 0.19	0.088 0.073 – 0.10		0.16 0.14 – 0.18		0.38 0.33 – 0.43	0.53 0.42 – 0.64
	Total	6-11	501	0.20		0.13 0.12 – 0.15	0.068 0.060 – 0.077		0.12 0.10 – 0.14		0.29 0.20 – 0.38	0.37 0.28 – 0.45
	Total	12-19	505	0		0.11 0.097 – 0.13	0.052 0.040 – 0.064		0.099 0.090 – 0.11		0.29 0.22 – 0.35	0.37^E 0.10 – 0.64

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 151: 2-Hydroxyphenanthrene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.05 0.03 – 0.06	0.03 0.03 – 0.04	0.01 0.01 – 0.01	0.02^E^ 0.01 – 0.03	0.03 0.03 – 0.04	0.05 0.04 – 0.06	F	0.15 .
	Total	F	24	0	0.04^E^ 0.03 – 0.06	0.03 0.02 – 0.04	0.01 .	0.02^E^ 0.01 – 0.03	0.03E 0.02 – 0.04	0.04^E^ 0.03 – 0.07	0.07 .	0.09 .
	Total	M	26	0	0.05^E^ 0.03 – 0.07	0.04 0.03 – 0.05	0.01 .	0.02^E^ 0.01 – 0.03	0.04 0.03 – 0.04	0.05^E^ 0.04 – 0.07	0.08 .	0.16 .
	Total	3-5	10	0	0.02^E^ 0.02 – 0.03	0.02^E^ 0.01 – 0.03	0.01 .	0.01 .	F	0.04 .	0.04 .	0.04 .
	Total	6-11	19	0	0.03 0.02 – 0.04	0.03 0.02 – 0.03	0.01 .	0.02^E^ 0.01 – 0.02	0.03 0.02 – 0.03	0.03^E^ 0.03 – 0.04	0.05 .	0.05 .
	Total	12-19	21	0	0.07^E^ 0.05 – 0.10	0.05 0.04 – 0.07	0.02 .	0.03^E^ 0.02 – 0.04	0.05^E^ 0.03 – 0.07	F	0.18 .	0.21 .
	Anishinabe communities (2)	Total	28	0	0.03 0.03 – 0.04	0.03 0.02 – 0.03	0.01 .	0.02^E^ 0.01 – 0.02	0.03^E^ 0.02 – 0.04	0.04^E^ 0.03 – 0.05	0.06 .	0.07 .
	Innu communities (2)	Total	22	0	0.06^E^ 0.04 – 0.09	0.04^E^ 0.03 – 0.06	0.01 .	0.03^E^ 0.01 – 0.03	0.04 0.03 – 0.05	F	0.17 .	0.21 .
CHMS (Cycle 3)	Total	3-5	490	0		0.033 0.028 – 0.038	0.014 0.010 – 0.018		0.031 0.028 – 0.035		0.074 0.067 – 0.081	0.090 0.076 – 0.10
	Total	6-11	500	0		0.041 0.036 – 0.045	0.018 0.014 – 0.022		0.040 0.034 – 0.047		0.090 0.073 – 0.11	0.12 0.085 – 0.17
	Total	12-19	505	0		0.064 0.054 – 0.075	0.024 0.017 – 0.032		0.061 0.051 – 0.071		0.16 0.12 – 0.20	0.26^E^ 0.13 – 0.38

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 152: 2-Hydroxyphenanthrene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.05 0.04 – 0.06	0.05 0.04 – 0.05	0.02 0.02 – 0.03	0.03 0.03 – 0.04	0.04 0.04 – 0.05	0.06 0.05 – 0.07	0.10^{E} 0.06 – 0.14	0.13 .
	Total	F	24	0	0.06 0.04 – 0.08	0.05 0.04 – 0.06	0.03 .	0.03 0.03 – 0.04	0.04 0.03 – 0.05	F	0.13 .	0.15 .
	Total	M	26	0	0.05 0.04 – 0.05	0.04 0.04 – 0.05	0.02 .	0.03 0.02 – 0.04	0.04 0.04 – 0.05	0.05 0.05 – 0.07	0.07 .	0.08 .
	Total	3-5	10	0	0.06^{E} 0.05 – 0.09	0.06 0.05 – 0.08	0.04 .	0.04 .	0.05^{E} 0.04 – 0.06	0.06 .	0.09 .	0.13 .
	Total	6-11	19	0	0.04 0.03 – 0.06	0.04 0.03 – 0.05	0.02 .	0.03^{E} 0.02 – 0.04	0.04 0.03 – 0.05	0.05^{E} 0.04 – 0.07	0.07 .	0.07 .
	Total	12-19	21	0	0.06 0.04 – 0.07	0.05 0.04 – 0.06	0.02 .	0.03 0.02 – 0.04	0.04 0.03 – 0.05	F	0.10 .	0.14 .
	Anishinabe communities (2)	Total	28	0	0.05 0.04 – 0.06	0.04 0.03 – 0.05	0.02 .	0.03 0.02 – 0.04	0.04 0.03 – 0.05	0.05 0.04 – 0.06	0.06 .	0.10 .
	Innu communities (2)	Total	22	0	0.06 0.05 – 0.08	0.05 0.04 – 0.07	0.02 .	0.04 0.02 – 0.04	0.04 0.04 – 0.07	0.07^{E} 0.05 – 0.10	0.10 .	0.14 .
CHMS (Cycle 3)	Total	3-5	489	0		0.063 0.056 – 0.071	0.034 0.027 – 0.040		0.058 0.051 – 0.064		0.13 0.11 – 0.15	0.17 0.14 – 0.19
	Total	6-11	500	0		0.052 0.045 – 0.060	0.027 0.020 – 0.034		0.048 0.039 – 0.058		0.10 0.085 – 0.12	0.13 0.10 – 0.16
	Total	12-19	505	0		0.048 0.040 – 0.058	0.024 0.020 – 0.028		0.045 0.036 – 0.053		0.099 0.072 – 0.13	0.13^{E} 0.060 – 0.21

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 153: 3-Hydroxyphenanthrene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.07 0.05 – 0.09	0.05 0.04 – 0.06	F	0.03E 0.02 – 0.04	0.05 0.04 – 0.06	0.08 0.06 – 0.09	F	0.19 .
	Total	F	24	0	0.06E 0.04 – 0.09	0.04E 0.03 – 0.06	0.01 .	0.03E 0.01 – 0.04	0.04E 0.03 – 0.05	F	0.10 .	0.19 .
	Total	M	26	0	0.08E 0.05 – 0.11	0.06 0.04 – 0.08	0.02 .	0.04E 0.02 – 0.05	0.05 0.04 – 0.07	0.08E 0.06 – 0.09	0.11 .	0.15 .
	Total	3-5	10	0	0.04E 0.03 – 0.07	0.03E 0.02 – 0.06	0.00 .	0.01 .	F	0.07 .	0.08 .	0.09 .
	Total	6-11	19	0	0.05 0.03 – 0.06	0.04 0.03 – 0.05	0.01 .	0.03E 0.01 – 0.04	0.04 0.03 – 0.05	0.05E 0.04 – 0.07	0.07 .	0.09 .
	Total	12-19	21	0	0.10E 0.06 – 0.15	0.07E 0.05 – 0.10	0.03 .	0.04E 0.03 – 0.06	0.07 0.04 – 0.08	F	0.21 .	0.27 .
	Anishinabe communities (2)	Total	28	0	0.06 0.04 – 0.07	0.04 0.03 – 0.06	0.01 .	0.03E 0.02 – 0.04	0.04E 0.03 – 0.06	0.08 0.05 – 0.08	0.09 .	0.11 .
	Innu communities (2)	Total	22	0	0.09E 0.05 – 0.14	0.06E 0.04 – 0.08	0.01 .	0.03E 0.01 – 0.05	0.05E 0.04 – 0.07	F	0.16 .	0.26 .
CHMS (Cycle 3)	Total	3-5	490	0		0.065 0.058 – 0.074	0.020 0.015 – 0.024		0.067 0.059 – 0.075		0.19 0.16 – 0.22	0.28 0.22 – 0.34
	Total	6-11	501	0		0.069 0.059 – 0.081	0.021 0.014 – 0.029		0.073 0.059 – 0.087		0.17 0.13 – 0.21	0.22 0.16 – 0.28
	Total	12-19	505	0		0.091 0.081 – 0.10	0.028E 0.015 – 0.040		0.089 0.075 – 0.10		0.28 0.19 – 0.38	0.42 0.30 – 0.55

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 154: 3-Hydroxyphenanthrene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.07 0.06 – 0.09	0.07 0.06 – 0.08	0.03 0.02 – 0.04	0.04 0.04 – 0.06	0.06 0.06 – 0.08	0.09 0.07 – 0.11	0.12 0.09 – 0.16	0.16 .
	Total	F	24	0	0.08 0.06 – 0.10	0.07 0.05 – 0.08	0.03 .	0.04 0.03 – 0.05	0.06^E^ 0.04 – 0.08	0.10^E^ 0.06 – 0.14	0.15 .	0.16 .
	Total	M	26	0	0.07 0.06 – 0.08	0.07 0.06 – 0.08	0.03 .	0.06 0.03 – 0.06	0.06 0.06 – 0.08	0.08 0.07 – 0.11	0.11 .	0.12 .
	Total	3-5	10	0	0.09 0.08 – 0.11	0.09 0.07 – 0.11	0.04 .	0.07 .	0.09 0.06 – 0.11	0.11 .	0.12 .	0.12 .
	Total	6-11	19	0	0.07 0.05 – 0.09	0.06 0.05 – 0.08	0.03 .	0.04 0.03 – 0.06	0.06 0.04 – 0.07	0.07^E^ 0.06 – 0.08	0.08 .	0.12 .
	Total	12-19	21	0	0.07 0.06 – 0.09	0.06 0.05 – 0.08	0.03 .	0.04^E^ 0.03 – 0.05	0.06 0.04 – 0.07	0.08^E^ 0.06 – 0.15	0.15 .	0.16 .
	Anishinabe communities (2)	Total	28	0	0.07 0.06 – 0.09	0.07 0.06 – 0.08	0.04 .	0.04 0.04 – 0.06	0.06^E^ 0.05 – 0.07	0.09 0.06 – 0.11	0.11 .	0.12 .
	Innu communities (2)	Total	22	0	0.08 0.06 – 0.10	0.07 0.05 – 0.09	0.03 .	0.04^E^ 0.03 – 0.07	0.07 0.05 – 0.08	0.08^E^ 0.07 – 0.14	0.15 .	0.16 .
CHMS (Cycle 3)	Total	3-5	489	0		0.13 0.12 – 0.14	0.065 0.056 – 0.074		0.11 0.097 – 0.12		0.28 0.24 – 0.31	0.41 0.31 – 0.51
	Total	6-11	501	0		0.088 0.076 – 0.10	0.043 0.038 – 0.048		0.082 0.064 – 0.10		0.18 0.13 – 0.24	0.24 0.17 – 0.30
	Total	12-19	505	0		0.069 0.062 – 0.072	0.034 0.029 – 0.038		0.060 0.051 – 0.068		0.15 0.11 – 0.19	0.24^E^ 0.13 – 0.36

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 155: 4-Hydroxyphenanthrene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.02^{E} 0.01 – 0.02	0.01 0.01 – 0.02	0.00^{E} 0.00 – 0.01	0.01^{E} 0.00 – 0.01	0.01^{E} 0.01 – 0.02	0.02 0.02 – 0.02	F	0.05 .
	Total	F	24	0	F	0.01^{E} 0.01 – 0.01	0.00 .	0.01^{E} 0.00 – 0.01	0.01^{E} 0.01 – 0.01	0.02^{E} 0.01 – 0.02	0.02 .	0.03 .
	Total	M	26	0	0.02^{E} 0.01 – 0.03	0.01 0.01 – 0.02	0.00 .	0.01^{E} 0.00 – 0.01	0.02^{E} 0.01 – 0.02	0.02 0.02 – 0.03	0.03 .	0.05 .
	Total	3-5	10	0	0.01^{E} 0.01 – 0.02	0.01^{E} 0.00 – 0.01	0.00 .	0.00 .	F	0.02 .	0.02 .	0.02 .
	Total	6-11	19	0	0.01 0.01 – 0.01	0.01 0.01 – 0.01	0.00 .	0.01^{E} 0.00 – 0.01	0.01^{E} 0.01 – 0.01	0.02 0.01 – 0.02	0.02 .	0.02 .
	Total	12-19	21	0	0.03^{E} 0.02 – 0.04	0.02^{E} 0.01 – 0.03	0.01 .	0.01^{E} 0.01 – 0.01	0.02^{E} 0.01 – 0.02	F	0.06 .	0.07 .
	Anishinabe communities (2)	Total	28	0	0.01 0.01 – 0.02	0.01 0.01 – 0.01	0.00 .	0.01^{E} 0.00 – 0.01	0.01^{E} 0.01 – 0.01	0.02^{E} 0.01 – 0.02	0.02 0.02 – 0.03	0.02 .
	Innu communities (2)	Total	22	0	0.03^{E} 0.01 – 0.04	0.02^{E} 0.01 – 0.02	0.00 .	0.01^{E} 0.00 – 0.01	0.02^{E} 0.01 – 0.02	F	0.06 .	0.07 .
CHMS (Cycle 3)	Total	3-5	488	4.30		0.014 0.012 – 0.016	0.0045 0.0031 – 0.0059		0.013 0.011 – 0.016		0.047 0.038 – 0.056	0.062 0.051 – 0.073
	Total	6-11	500	4.40		0.014 0.013 – 0.017	0.0046 0.0033 – 0.0059		0.015 0.012 – 0.018		0.041 0.032 – 0.050	0.062 0.050 – 0.073
	Total	12-19	504	4.56		0.021 0.018 – 0.024	0.0068 0.0053 – 0.0083		0.018 0.015 – 0.021		0.077 0.052 – 0.10	0.11^{E} 0.070 – 0.16

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 156: 4-Hydroxyphenanthrene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.02 0.02 – 0.02	0.02 0.01 – 0.02	0.01 0.01 – 0.01	0.01 0.01 – 0.01	0.02 0.01 – 0.02	0.02 0.02 – 0.03	F	0.05 .
	Total	F	24	0	0.02E 0.01 – 0.03	0.02 0.01 – 0.02	0.01 .	0.01 0.01 – 0.01	0.01E 0.01 – 0.02	F	0.05 .	0.07 .
	Total	M	26	0	0.02 0.02 – 0.02	0.02 0.01 – 0.02	0.01 .	0.01E 0.01 – 0.02	0.02 0.01 – 0.02	0.02 0.02 – 0.03	0.03 .	0.03 .
	Total	3-5	10	0	0.02E 0.02 – 0.03	0.02 0.02 – 0.03	0.01 .	0.01 .	0.02E 0.01 – 0.03	0.03 .	0.03 .	0.04 .
	Total	6-11	19	0	0.02 0.01 – 0.02	0.02 0.01 – 0.02	0.01 .	0.01 0.01 – 0.01	0.02E 0.01 – 0.02	0.02 0.02 – 0.02	0.02 .	0.03 .
	Total	12-19	21	0	0.02E 0.01 – 0.03	0.02E 0.01 – 0.02	0.01 .	0.01 0.01 – 0.01	0.01E 0.01 – 0.02	F	0.05 .	0.07 .
	Anishinabe communities (2)	Total	28	0	0.02 0.01 – 0.02	0.01 0.01 – 0.02	0.01 .	0.01 0.01 – 0.01	0.01 0.01 – 0.02	0.02E 0.02 – 0.03	0.03 .	0.03 .
	Innu communities (2)	Total	22	0	0.02E 0.02 – 0.03	0.02 0.02 – 0.03	0.01 .	0.01E 0.01 – 0.02	0.02 0.01 – 0.02	F	0.05 .	0.07 .
CHMS (Cycle 3)	Total	3-5	487	4.30		0.026 0.024 – 0.029	0.011 0.010 – 0.012		0.023 0.019 – 0.027		0.068 0.062 – 0.074	0.095 0.075 – 0.12
	Total	6-11	500	4.40		0.018 0.016 – 0.021	0.0078 0.0066 – 0.0089		0.017 0.014 – 0.020		0.045 0.040 – 0.050	0.052 0.043 – 0.061
	Total	12-19	504	4.56		0.016 0.014 – 0.018	0.0070 0.0060 – 0.0080		0.013 0.011 – 0.016		0.036 0.025 – 0.047	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 157: 9-Hydroxyphenanthrene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	46	0	0.03^{E} 0.02 – 0.05	0.02 0.02 – 0.03	0.01 .	0.01 0.01 – 0.02	0.02 0.02 – 0.02	0.03^{E} 0.02 – 0.05	F	0.06 .
	Total	F	22	0	F	0.02 0.02 – 0.03	0.01 .	0.01 0.01 – 0.02	0.02 0.01 – 0.02	F	0.05 .	0.06 .
	Total	M	24	0	0.03 0.02 – 0.04	0.02 0.02 – 0.03	0.01 .	0.02^{E} 0.01 – 0.02	0.02 0.02 – 0.02	0.04^{E} 0.02 – 0.05	0.05 .	0.05 .
	Total	3-5	8	0	0.02^{E} 0.01 – 0.03	0.02^{E} 0.01 – 0.03	0.01 .	0.01 .	F	0.02 .	0.03 .	0.04 .
	Total	6-11	17	0	0.02 0.02 – 0.03	0.02 0.02 – 0.02	0.01 .	0.01 0.01 – 0.02	0.02 0.01 – 0.02	0.02^{E} 0.02 – 0.03	0.03 .	0.05 .
	Total	12-19	21	0	0.05^{E} 0.02 – 0.08	0.03^{E} 0.02 – 0.04	0.01 .	0.02 0.01 – 0.02	0.02^{E} 0.02 – 0.03	0.04^{E} 0.02 – 0.06	0.06 .	0.11 .
	Anishinabe communities (2)	Total	27	0	0.02 0.02 – 0.02	0.02 0.02 – 0.02	0.01 .	0.01 0.01 – 0.02	0.02 0.01 – 0.02	0.02 0.02 – 0.02	0.03 .	0.03 .
	Innu communities (2)	Total	19	0	0.05^{E} 0.03 – 0.09	0.03^{E} 0.02 – 0.05	0.01 .	0.02 .	0.03^{E} 0.02 – 0.05	F	0.07 .	0.12 .
CHMS (Cycle 3)	Total	3-5	426	4.46		0.019 0.017 – 0.022	0.0069^{E} <LD – 0.0099		0.019 0.015 – 0.023		0.057 0.042 – 0.072	0.072 0.051 – 0.093
	Total	6-11	447	4.92		0.019 0.017 – 0.022	0.0058^{E} <LD – 0.0091		0.021 0.019 – 0.023		0.048 0.041 – 0.054	F
	Total	12-19	480	3.75		0.026 0.021 – 0.031	0.0070^{E} 0.0040 – 0.0099		0.022 0.018 – 0.026		0.10 0.066 – 0.13	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 158: 9-Hydroxyphenanthrene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	46	0	0.04 0.03 – 0.06	0.03 0.03 – 0.04	0.01 0.01 – 0.02	0.02 0.02 – 0.02	0.03 0.02 – 0.03	0.05^{E} 0.03 – 0.06	F	0.12 .
	Total	F	22	0	0.06^{E} 0.03 – 0.08	0.03^{E} 0.02 – 0.05	0.01 .	0.02 0.01 – 0.02	0.03^{E} 0.02 – 0.04	F	0.12 .	0.18 .
	Total	M	24	0	0.03 0.03 – 0.04	0.03 0.02 – 0.04	0.01 .	0.02^{E} 0.01 – 0.02	0.03 0.02 – 0.04	0.04^{E} 0.03 – 0.06	0.06 .	0.07 .
	Total	3-5	8	0	F	0.05^{E} 0.03 – 0.09	0.02 .	0.03 .	F	0.06 .	0.11 .	0.19 .
	Total	6-11	17	0	0.04 0.03 – 0.05	0.03 0.03 – 0.04	0.01 .	0.02^{E} 0.01 – 0.03	0.03^{E} 0.02 – 0.04	0.05^{E} 0.03 – 0.06	0.07 .	0.08 .
	Total	12-19	21	0	0.04^{E} 0.02 – 0.06	0.03^{E} 0.02 – 0.04	0.01 .	0.02 0.01 – 0.02	0.02 0.02 – 0.03	F	0.11 .	0.12 .
	Anishinabe communities (2)	Total	27	0	0.04^{E} 0.02 – 0.06	0.03 0.02 – 0.03	0.01 .	0.02 0.01 – 0.02	0.02 0.02 – 0.03	F	0.06 .	0.08 .
	Innu communities (2)	Total	19	0	0.05^{E} 0.04 – 0.08	0.04 0.03 – 0.06	0.02 .	0.03^{E} 0.02 – 0.03	0.04^{E} 0.03 – 0.06	F	0.12 .	0.12 .
CHMS (Cycle 3)	Total	3-5	425	4.46		0.037 0.035 – 0.040	0.017 0.013 – 0.020		0.036 0.032 – 0.040		0.081 0.066 – 0.095	0.10 0.086 – 0.12
	Total	6-11	447	4.92		0.025 0.022 – 0.028	0.012 0.0086 – 0.015		0.023 0.020 – 0.025		0.057 0.046 – 0.069	0.082^{E} 0.037 – 0.13
	Total	12-19	480	3.75		0.019 0.017 – 0.022	0.0087 0.0071 – 0.010		0.016 0.014 – 0.018		0.056^{E} 0.030 – 0.082	0.097^{E} 0.042 – 0.15

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 159: 1-Hydroxypyrene – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	0	0.10 0.08 – 0.12	0.07 0.06 – 0.09	0.02^E^ 0.01 – 0.03	0.05 0.03 – 0.06	0.08 0.05 – 0.10	0.12 0.10 – 0.13	0.16^E^ 0.13 – 0.23	0.23 .
	Total	F	24	0	0.10^E^ 0.07 – 0.14	0.07^E^ 0.05 – 0.10	0.02 .	0.04^E^ 0.02 – 0.05	0.08^E^ 0.05 – 0.11	0.12^E^ 0.08 – 0.17	0.18 .	0.29 .
	Total	M	25	0	0.09 0.07 – 0.12	0.07 0.06 – 0.10	0.02 .	0.05^E^ 0.02 – 0.07	0.08^E^ 0.06 – 0.10	0.12 0.09 – 0.13	F	0.16 .
	Total	3-5	10	0	0.08^E^ 0.04 – 0.12	F	0.01 .	0.02 .	F	0.13 .	0.16 .	0.18 .
	Total	6-11	19	0	0.08 0.06 – 0.10	0.07 0.05 – 0.09	0.03 .	0.04^E^ 0.03 – 0.06	0.06^E^ 0.04 – 0.09	0.10^E^ 0.06 – 0.13	0.13 .	0.14 .
	Total	12-19	20	0	0.12^E^ 0.09 – 0.16	0.10 0.07 – 0.13	0.03 .	F	0.10^E^ 0.06 – 0.12	0.12^E^ 0.10 – 0.19	0.23 .	0.32 .
	Anishinabe communities (2)	Total	28	0	0.09 0.07 – 0.12	0.07 0.05 – 0.09	0.02 .	0.05^E^ 0.02 – 0.05	0.08^E^ 0.05 – 0.10	0.12 0.08 – 0.15	0.16 .	0.18 .
	Innu communities (2)	Total	21	0	0.10^E^ 0.07 – 0.14	0.08 0.06 – 0.11	0.03 .	0.04^E^ 0.03 – 0.07	0.08^E^ 0.05 – 0.11	0.12 0.09 – 0.13	0.14 .	0.23 .
CHMS (Cycle 3)	Total	3-5	493	0		0.093 0.077 – 0.11	0.029 0.023 – 0.036		0.098 0.081 – 0.12		0.26 0.21 – 0.31	0.31 0.25 – 0.37
	Total	6-11	501	0		0.092 0.084 – 0.10	0.032 0.024 – 0.039		0.097 0.088 – 0.11		0.21 0.16 – 0.26	0.28 0.22 – 0.33
	Total	12-19	473	0		0.12 0.097 – 0.14	0.040^E^ 0.024 – 0.057		0.11 0.092 – 0.13		0.34 0.24 – 0.43	0.47 0.34 – 0.60

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 160: 1-Hydroxypyrene (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	49	0	0.11 0.10 – 0.13	0.10 0.09 – 0.12	0.05 0.04 – 0.07	0.07 0.06 – 0.09	0.10 0.09 – 0.11	0.14 0.11 – 0.16	0.19 0.15 – 0.24	0.23 .
	Total	F	24	0	0.13 0.10 – 0.16	0.12 0.09 – 0.14	0.05 .	0.08 0.06 – 0.10	0.11 0.09 – 0.14	0.15ᴱ 0.11 – 0.23	0.23 .	0.25 .
	Total	M	25	0	0.10 0.08 – 0.12	0.09 0.08 – 0.11	0.04 .	0.07 0.05 – 0.09	0.09 0.07 – 0.11	0.11 0.09 – 0.15	0.16 .	0.17 .
	Total	3-5	10	0	0.16 0.12 – 0.19	0.15 0.12 – 0.18	0.09 .	0.10 .	0.14ᴱ 0.09 – 0.18	0.19 .	0.22 .	0.24 .
	Total	6-11	19	0	0.11 0.09 – 0.14	0.10 0.08 – 0.12	0.04 .	0.08 0.04 – 0.09	0.09 0.09 – 0.11	0.12ᴱ 0.10 – 0.15	0.15 .	0.17 .
	Total	12-19	20	0	0.10 0.08 – 0.12	0.09 0.07 – 0.11	0.05 .	0.06 0.05 – 0.07	0.07ᴱ 0.06 – 0.11	0.11ᴱ 0.08 – 0. 14	0.15 .	0.19 .
	Anishinabe communities (2)	Total	28	0	0.12 0.10 – 0.14	0.11 0.09 – 0.13	0.05 .	0.07 0.06 – 0.09	0.09 0.08 – 0.12	0.14ᴱ 0.10 – 0.18	0.20 .	0.24 .
	Innu communities (2)	Total	21	0	0.11 0.09 – 0.13	0.10 0.08 – 0.12	0.05 .	0.07ᴱ 0.04 – 0.09	0.10ᴱ 0.07 – 0.13	0.14 0.11 – 0.15	0.15 .	0.19 .
CHMS (Cycle 3)	Total	3-5	492	0		0.18 0.16 – 0.20	0.094 0.078 – 0.11		0.17 0.15 – 0.20		0.34 0.28 – 0.41	0.43 0.38 – 0.49
	Total	6-11	501	0		0.12 0.11 – 0.13	0.066 0.057 – 0.074		0.11 0.091 – 0.12		0.21 0.17 – 0.25	0.27 0.23 – 0.31
	Total	12-19	473	0		0.089 0.073 – 0.11	0.044 0.031 – 0.057		0.087 0.074 – 0.10		0.19ᴱ 0.12 – 0.26	0.26ᴱ 0.15 – 0.37

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.”-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (1995). Public health statement. Polycyclic Aromatic Hydrocarbons (PAHs). Source: www.atsdr.cdc.gov/ToxProfiles/tp69-c1-b.pdf

ATSDR (Agency for Toxic Substances and Disease Registry) (1996). Polycyclic Aromatic Hydrocarbons (PAHs) – ToxFAQs. Source: www.atsdr.cdc.gov/toxfaqs/tfacts69.pdf

Environment Canada and Health Canada (1994). Priority Substances List. Assessment Report. Polycyclic Aromatic Hydrocarbons. Government of Canada. Source: http://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/contaminants/psl1-lsp1/hydrocarb_aromat_polycycl/hydrocarbons-hydrocarbures-eng.pdf

INSPQ (Institut national de santé publique du Québec) (2000). Les hydrocarbures aromatiques polycycliques: exposition et risques dans la population générale. Government of Quebec. Consulted online: www.inspq.qc.ca/es/node/1137

Urbancova, K., Lankova, D., Rossner, P., Rossnerova, A., Svecova, V., Tomaniova, M., Veleminsky, M.Jr., Sram, R.J., Hajslova, J., Pulkrabova, J. (2017). Evaluation of 11 polycyclic aromatic hydrocarbons metabolites in urine of Czech mothers and newborns. Sci. Total Environ. 577. 212-219.

6.3.6. Environmental Phenols

Bisphenol A

Bisphenol A (or BPA) is a synthetic chemical compound used in the production of polycarbonate plastic (hard plastic) and epoxy resins. BPA can be found in food and drinks if their packaging or containers are made of polycarbonate plastics or contain epoxy resins (e.g., epoxy resins are used as a protective layer in tin cans). BPA is also used in several products, such as personal care products, construction materials, DVDs, electronic devices, certain medical instruments, as well as sports and protective equipment (National Toxicology Program, 2010).

Exposure to BPA occurs mainly through food. Exposure through drinking water and the air is also possible, as well as by skin contact with the products listed above (Rochester, 2013).

Exposure to BPA raises some concerns, especially in the early stages of life (fetus, babies, and young children), because it could have negative long-term effects on health. BPA mimics estrogen and may lead to problems wih the reproductive system as well as behavioural, and developmental problems (Myridakis et al., 2016).

Triclosan

Triclosan is an industrial chemical contaminant with antibacterial and antifungal properties. It is used as a preservative or an antimicrobial ingredient in multiple cosmetic and personal care products, as well as over-the-counter medication and natural products (Government of Canada, 2011; U.S. Food and Drug Administration, 2016). Triclosan is also found in clothing, textiles, toys, and plastic kitchen utensils (Calafat et al., 2008). The use of these products introduces triclosan byproducts into waste water treatment systems. Since waste treatment cannot completely eliminate triclosan, it may be found in surface water (Health Canada, 2016).

The general population is exposed to triclosan mainly through the use of products that contain this substance. Drinking water, breastmilk, and household dust are also routes of exposure. Following an assessment conducted by Environment and Climate Change Canada and Health Canada, the Canadian government recognizes that triclosan may affect the health of aquatic organisms (including algae, amphibians, and fish, among others), even at low levels. Despite this, the Government of Canada concluded that triclosan was not dangerous to human health at current levels of exposure (Environment and Climate Change Canada and Health Canada, 2016).

In this report, bisphenol A and triclosan were measured in the urine of participants in the JES!-YEH! project. As of yet, there is no toxicity threshold established for these two contaminants.

Results

Bisphenol A and triclosan levels were measured in urine for all participants in the JES!-YEH! study and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 161 – 168). Urine levels of bisphenol A and triclosan reflect recent exposure to these substances. A measureable level does not necessarily mean that they will have negative health effects.

Urine BPA levels in the 3-5 year old age group in the JES!-YEH! project were similar to those in the CHMS (Cycle 3). Urine BPA levels in participants 6-11 and 12-19 years old were 1.5 to 2 times higher than those in the CHMS (Cycle 3) (Table 164) and the differences were significant.

Urine triclosan levels in the JES!-YEH! study were not calculated, since more than 40% of samples were below the limit of detection (Table 168).

Table 161: Bisphenol A – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	2.6	3.56 2.61 – 4.70	1.63 1.39 – 1.92	0.41 0.29 – 0.51	0.78 0.63 – 0.97	1.50 1.33 – 1.82	2.80 2.45 – 3.61	5.98[E] 4.65 – 8.90	12.20[E] 6.74 – 18.72
	Total	F	94	4.3	4.17[E] 2.70 – 6.10	1.68 1.29 – 2.17	0.27[E] 0.12 – 0.46	0.66[E] 0.47 – 1.04	1.60 1.29 – 2.15	3.25[E] 2.47 – 5.12	9.96[E] 5.14 – 13.78	F
	Total	M	102	1	2.99[E] 1.91 – 4.45	1.59 1.32 – 1.92	0.50 0.36 – 0.64	0.82 0.65 – 1.03	1.43 1.19 – 1.81	2.55 2.12 – 3.38	4.27E 3.45 – 6.04	F
	Anishinabe communities (2)	Total	109	1.8	4.30[E] 2.68 – 6.33	1.71 1.37 – 2.13	0.43[E] 0.24 – 0.60	0.80 0.63 – 1.01	1.46 1.23 – 1.85	2.74 2.18 – 3.71	F	F
	Anishinabe communities (2)	F	54	1.9	5.27[E] 2.97 – 8.21	1.98[E] 1.41 – 2.81	F	0.83[E] 0.55 – 1.21	1.70[E] 1.19 – 2.30	F	11.80[E] 5.30 – 18.90	18.60 .
	Anishinabe communities (2)	M	55	1.8	F	1.48 1.15 – 1.96	0.48[E] 0.27 – 0.63	0.74 0.58 – 1.01	1.36 0.97 – 1.81	2.25[E] 1.73 – 3.12	3.73[E] 2.64 – 6.45	5.78 .
	Innu communities (2)	Total	87	3.4	2.63 2.01 – 3.39	1.54 1.22 – 1.91	0.39[E] 0.17 – 0.51	0.69[E] 0.50 – 1.00	1.62 1.24 – 2.03	2.86 2.43 – 4.11	5.16[E] 3.99 – 6.94	F
	Innu communities (2)	F	40	7.5	2.70[E] 1.72 – 3.93	1.35[E] 0.90 – 1.97	F	0.48[E] 0.30 – 0.97	1.50[E] 0.69 – 2.23	2.90[E] 1.89 – 4.82	F	7.50 .
	Innu communities (2)	M	47	0	2.57[E] 1.84 – 3.50	1.73 1.36 – 2.20	0.54[E] 0.34 – 0.80	0.91[E] 0.63 – 1.24	1.65[E] 1.16 – 2.29	2.75[E] 2.22 – 4.18	F	6.36 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 162: Bisphenol A (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	2.6	4.25 3.32 – 5.40	2.24 1.95 – 2.58	0.60 0.50 – 0.71	1.13 0.84 – 1.25	2.07 1.68 – 2.49	3.80 3.20 – 4.94	7.88[E] 6.02 – 13.54	15.05[E] 8.96 – 26.34
	Total	F	94	4.3	4.99[E] 3.48 – 7.00	2.61 2.11 – 3.22	0.62 0.48 – 0.93	1.23 0.89 – 1.62	2.29 1.86 – 3.03	5.23[E] 3.35 – 6.86	10.31[E] 6.78 – 14.69	F
	Total	M	102	1	3.58[E] 2.54 – 4.79	1.94 1.62 – 2.32	0.54 0.48 – 0.72	0.90 0.72 – 1.21	1.77 1.31 – 2.35	3.18 2.93 – 3.98	F	F
	Anishinabe communities (2)	Total	109	1.8	5.16[E] 3.54 – 7.05	2.62 2.18 – 3.19	0.78[E] 0.62 – 1.07	1.26 1.12 – 1.63	2.30 1.80 – 2.92	4.07 3.09 – 5.47	F	F
	Anishinabe communities (2)	F	54	1.9	6.30[E] 3.78 – 9.63	3.22 2.44 – 4.24	0.92[E] 0.65 – 1.24	1.63 1.14 – 2.01	2.76 1.98 – 3.58	6.49[E] 3.34 – 8.32	F	18.53 .
	Anishinabe communities (2)	M	55	1.8	4.05[E] 2.47 – 6.25	2.14 1.70 – 2.82	0.68[E] 0.50 – 0.99	1.19[E] 0.83 – 1.57	1.82 1.56 – 2.77	3.05 2.65 – 4.22	F	20.53 .
	Innu communities (2)	Total	87	3.4	3.12 2.36 – 4.07	1.84 1.49 – 2.28	0.49 0.43 – 0.59	0.78 0.59 – 1.08	1.65[E] 1.22 – 2.37	3.66[E] 2.72 – 4.88	6.44[E] 4.46 – 11.17	11.17[E] 6.15 – 14.45
	Innu communities (2)	F	40	7.5	3.23[E] 2.25 – 4.48	1.97 1.46 – 2.74	0.49 0.42 – 0.61	0.83[E] 0.56 – 1.40	1.98[E] 1.31 – 2.79	3.47[E] 2.31 – 6.24	F	11.79 .
	Innu communities (2)	M	47	0	3.02[E] 1.96 – 4.41	1.73 1.28 – 2.29	0.49 0.39 – 0.64	0.75[E] 0.54 – 1.04	1.31[E] 0.97 – 2.41	3.66[E] 2.19 – 4.63	F	8.85 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 163: Bisphenol A – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	2.6	3.56 2.61 – 4.70	1.63 1.39 – 1.92	0.41 0.29 – 0.51	0.78 0.63 – 0.97	1.50 1.33 – 1.82	2.80 2.45 – 3.61	5.98^{E} 4.65 – 8.90	12.20^{E} 6.74 – 18.72
	Total	3-5	37	2.7	1.68 1.24 – 2.15	1.21 0.88 – 1.60	0.34 .	0.64^{E} 0.41 – 0.86	1.28^{E} 0.79 – 1.99	2.28 1.62 – 2.78	3.26^{E} 2.29 – 3.75	3.72 .
	Total	6-11	79	2.5	3.38^{E} 1.99 – 5.44	1.55 1.22 – 2.00	0.42^{E} 0.19 – 0.56	0.66 0.55 – 1.04	1.45 1.24 – 1.88	2.73^{E} 2.12 – 3.90	F	F
	Total	12-19	80	2.5	4.61^{E} 2.94 – 6.63	1.97 1.51 – 2.53	0.38^{E} 0.19 – 0.80	0.97 0.68 – 1.16	1.70 1.30 – 2.25	3.80^{E} 2.63 – 5.36	F	F
	Anishinabe communities (2)	Total	109	1.8	4.30^{E} 2.68 – 6.33	1.71 1.37 – 2.13	0.43^{E} 0.24 – 0.60	0.80 0.63 – 1.01	1.46 1.23 – 1.85	2.74 2.18 – 3.71	F	F
	Anishinabe communities (2)	3-5	23	4.3	1.75^{E} 1.17 – 2.42	1.16^{E} 0.76 – 1.75	0.23 .	0.64^{E} 0.23 – 0.92	1.10^{E} 0.69 – 2.05	2.33^{E} 1.25 – 3.46	3.61 .	3.79 .
	Anishinabe communities (2)	6-11	46	0	F	1.61 1.21 – 2.24	0.48 .	0.73^{E} 0.57 – 1.23	1.43 1.10 – 1.84	2.30^{E} 1.81 – 4.00	F	10.23 .
	Anishinabe communities (2)	12-19	40	2.5	6.45^{E} 3.22 – 10.41	2.28^{E} 1.48 – 3.47	F	1.00^{E} 0.64 – 1.22	1.70^{E} 1.08 – 2.53	F	F	39.00 .
	Innu communities (2)	Total	87	3.4	2.63 2.01 – 3.39	1.54 1.22 – 1.91	0.39^{E} 0.17 – 0.51	0.69^{E} 0.50 – 1.00	1.62 1.24 – 2.03	2.86 2.43 – 4.11	5.16^{E} 3.99 – 6.94	F
	Innu communities (2)	3-5	14	0	1.56 1.06 – 2.05	1.28^{E} 0.88 – 1.80	0.50 .	0.60 .	1.60^{E} 0.58 – 1.94	2.08^{E} 1.09 – 2.68	2.68 .	2.92 .
	Innu communities (2)	6-11	33	6.1	2.92^{E} 1.61 – 4.74	1.48^{E} 0.98 – 2.24	0.30 .	F	1.50^{E} 0.70 – 2.48	2.78^{E} 2.27 – 4.45	F	8.19 .
	Innu communities (2)	12-19	40	2.5	2.76 1.97 – 3.60	1.70^{E} 1.20 – 2.31	F	0.96^{E} 0.40 – 1.26	1.70^{E} 1.18 – 2.47	4.05^{E} 2.03 – 4.95	F	7.50 .
CHMS (Cycle 3)	Total	3-5	521	5.76		1.2 0.87 – 1.6	0.29^{E} <LD – 0.47		1.2 0.95 – 1.5		4.0 2.6 – 5.4	6.0 4.3 – 7.7
	Total	6-11	1004	5.58		1.2 1.1 – 1.4	0.39 0.30 – 0.49		1.2 1.0 – 1.3		3.8 2.8 – 4.8	5.3^{E} 3.0 – 7.6
	Total	12-19	992	6.15		1.3 1.1–1.6	0.30^{E} <LD – 0.46		1.4 1.3 – 1.6		4.8 3.4 – 6.2	8.0^{E} 4.1 – 12

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 164: Bisphenol A (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	2.6	4.25 3.32 – 5.40	2.24 1.95 – 2.58	0.60 0.50 – 0.71	1.13 0.84 – 1.25	2.07 1.68 – 2.49	3.80 3.20 – 4.94	7.88^{E} 6.02 – 13.54	15.05^{E} 8.96 – 26.34
	Total	3-5	37	2.7	3.75^{E} 2.52 – 5.55	2.63 2.04 – 3.35	0.97 .	1.29^{E} 1.13 – 2.12	2.85 1.84 – 3.25	3.98 3.03 – 5.33	F	7.47 .
	Total	6-11	79	2.5	4.94^{E} 3.06 – 7.43	2.48 1.99 – 3.13	0.78 0.54 – 1.05	1.29 1.00 – 1.60	2.10 1.64 – 3.01	3.75^{E} 3.09 – 5.39	F	F
	Total	12-19	80	2.5	3.81^{E} 2.71 – 5.20	1.88 1.47 – 2.37	0.49 0.41 – 0.56	0.72^{E} 0.55 – 0.96	1.65^{E} 1.14 – 2.11	F	11.29^{E} 5.45 – 14.83	F
	Anishinabe communities (2)	Total	109	1.8	5.16^{E} 3.54 – 7.05	2.62 2.18 – 3.19	0.78^{E} 0.62 – 1.07	1.26 1.12 – 1.63	2.30 1.80 – 2.92	4.07 3.09 – 5.47	F	F
	Anishinabe communities (2)	3-5	23	4.3	4.03^{E} 2.43 – 6.69	2.77 2.06 – 3.71	1.08 .	1.56^{E} 1.10 – 2.72	2.85 1.76 – 3.15	3.51^{E} 2.88 – 4.98	5.33 .	6.79 .
	Anishinabe communities (2)	6-11	46	0	5.99^{E} 3.05 – 10.09	2.91 2.20 – 3.96	1.14 0.81 – 1.48	1.56 1.23 – 1.71	2.21^{E} 1.65 – 3.09	3.76^{E} 3.04 – 6.45	F	25.91 .
	Anishinabe communities (2)	12-19	40	2.5	4.86^{E} 2.88 – 7.30	2.26^{E} 1.56 – 3.27	0.52 0.41 – 0.71	0.81^{E} 0.58 – 1.22	1.99^{E} 1.14 – 2.44	F	F	17.68 .
	Innu communities (2)	Total	87	3.4	3.12 2.36 – 4.07	1.84 1.49 – 2.28	0.49 0.43 – 0.59	0.78 0.59 – 1.08	1.65^{E} 1.22 – 2.37	3.66^{E} 2.72 – 4.88	6.44^{E} 4.46 – 11.17	11.17^{E} 6.15 – 14.45
	Innu communities (2)	3-5	14	0	3.29^{E} 2.03 – 4.65	2.43^{E} 1.55 – 3.73	0.64 .	1.25 .	2.38^{E} 1.24 – 3.79	F	6.04 .	7.45 .
	Innu communities (2)	6-11	33	6.1	3.47^{E} 2.08 – 5.49	1.99^{E} 1.41 – 2.92	0.51 .	0.84^{E} 0.55 – 1.41	1.77^{E} 1.05 – 3.09	3.70^{E} 2.29 – 6.14	F	9.38 .
	Innu communities (2)	12-19	40	2.5	2.77^{E} 1.77 – 4.00	1.56 1.14 – 2.14	0.44 0.40 – 0.54	0.59^{E} 0.47 – 0.90	1.32^{E} 0.79 – 2.05	3.02^{E} 1.87 – 4.67	F	11.79 .
CHMS (Cycle 3)	Total	3-5	520	5.76		2.3 1.8 – 2.9	0.86^{E} 0.48 – 1.2		2.1 1.4 – 2.7		5.9 4.1 – 7.8	8.4 6.7 - 10
	Total	6-11	1004	5.58		1.5 1.3 – 1.7	0.58 0.46 – 0.69		1.4 1.1 – 1.6		3.9 2.6 – 5.2	5.3^{E} 2.0 – 8.6
	Total	12-19	991	6.15		1.0 0.85 – 1.2	0.35 0.25 – 0.44		0.95 0.82 – 1.1		3.0 2.3 – 3.8	5.4^{E} 2.6 – 8.2

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 165: Triclosan – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	66	–	–	<LD	<LD	<LD	3.97[E] 2.39 – 5.90	F	F
	Total	F	95	64.2	–	–	<LD	<LD	<LD	F	F	F
	Total	M	102	67.6	–	–	<LD	<LD	<LD	3.90[E] 1.50 – 6.48	F	F
	Anishinabe communities (2)	Total	110	56.4	–	–	<LD	<LD	<LD	6.88[E] 4.42 – 13.25	F	F
	Anishinabe communities (2)	F	55	54.5	–	–	<LD	<LD	<LD	F	F	162.5 .
	Anishinabe communities (2)	M	55	58.2	–	–	<LD	<LD	<LD	F	F	56.75 .
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	F	40	77.5	–	–	<LD	<LD	<LD	<LD	F	240.0 .
	Innu communities (2)	M	47	78.7	–	–	<LD	<LD	<LD	<LD	F	9.30 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 166: Triclosan (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	66	–	–	<LD	<LD	<LD	7.53 6.08 – 9.19	F	F
	Total	F	95	64.2	–	–	<LD	<LD	<LD	7.42[E] 6.05 – 12.00	F	F
	Total	M	102	67.6	–	–	<LD	<LD	<LD	7.42 4.06 – 8.86	F	F
	Anishinabe communities (2)	Total	110	56.4	–	–	<LD	<LD	<LD	F	F	F
	Anishinabe communities (2)	F	55	54.5	–	–	<LD	<LD	<LD	F	F	188.4 .
	Anishinabe communities (2)	M	55	58.2	–	–	<LD	<LD	<LD	F	F	53.03 .
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD<LD	<LD	F	F
	Innu communities (2)	F	40	77.5	–	–	<LD	<LD	<LD	<LD	F	132.6 .
	Innu communities (2)	M	47	78.7	–	–	<LD	<LD	<LD	<LD	F	8.84 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 167: Triclosan – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	66	–	–	<LD	<LD	<LD	3.97^{E} 2.39 – 5.90	F	F
	Total	3-5	38	60.5	–	–	<LD	<LD	<LD	F	F	47.80 .
	Total	6-11	79	72.2	–	–	<LD	<LD	<LD	2.06^{E} 1.50 – 4.10	F	F
	Total	12-19	80	62.5	–	–	<LD	<LD	<LD	F	F	F
	Anishinabe communities (2)	Total	110	56.4	–	–	<LD	<LD	<LD	6.88^{E} 4.42 – 13.25	F	F
	Anishinabe communities (2)	3-5	24	45.8	–	–	<LD	<LD	F	F	44.00 .	60.40 .
	Anishinabe communities (2)	6-11	46	63	–	–	<LD	<LD	<LD	F	F	45.10 .
	Anishinabe communities (2)	12-19	40	55	–	–	<LD	<LD	<LD	F	F	290.0 .
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	3-5	14	85.7	–	–	<LD	<LD	<LD	<LD	4.20 .	9.90 .
	Innu communities (2)	6-11	33	84.8	–	–	<LD	<LD	<LD	<LD	F	3.35 .
	Innu communities (2)	12-19	40	70	–	–	<LD	<LD	<LD	3.25^{E} 1.50 – 5.45	F	240.0 .
CHMS (Cycle 3)	Total	3-5	518	36.29		9.5 7.4 – 12	<LD		7.7^{E} <LD – 11		78^{E} 43 – 110	110^{E} 47 – 170
	Total	6-11	1001	36.26		11 8.4 – 16	<LD		7.2^{E} <LD – 10		F	340^{E} 190 – 500
	Total	12-19	984	28.35		19 14 – 26	<LD		10 7.2 – 13		510E 220 – 800	840 580 – 1100

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 168: Triclosan (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 3).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	66	–	–	<LD	<LD	<LD	7.53 6.08 – 9.19	F	F
	Total	3-5	38	60.5	–	–	<LD	<LD	<LD	F	F	90.32 .
	Total	6-11	79	72.2	–	–	<LD	<LD	<LD	6.72 4.42 – 8.06	F	F
	Total	12-19	80	62.5	–	–	<LD	<LD	<LD	F	F	F
	Anishinabe communities (2)	Total	110	56.4	–	–	<LD	<LD	<LD	F	F	F
	Anishinabe communities (2)	3-5	24	45.8	–	–	<LD	<LD	F	F	72.66 .	113.1 .
	Anishinabe communities (2)	6-11	46	63	–	–	<LD	<LD	<LD	8.05^{E} 5.59 – 11.64	F	58.95 .
	Anishinabe communities (2)	12-19	40	55	–	–	<LD	<LD	<LD	F	F	356.1 .
	Innu communities (2)	Total	87	78.2	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	3-5	14	85.7	–	–	<LD	<LD	<LD	<LD	8.43 .	24.86 .
	Innu communities (2)	6-11	33	84.8	–	–	<LD	<LD	<LD	<LD	7.25^{E} 3.47 – 8.21	7.97 .
	Innu communities (2)	12-19	40	70	–	–	<LD	<LD	<LD	3.93^{E} 2.27 – 5.63	F	132.6 .
CHMS (Cycle 3)	Total	3-5	517	36.29		18 15 – 23	<LD		13 8.8 – 17	110^{E} 47 – 180		260 170 – 350
	Total	6-11	1001	36.26		14 11 – 17	<LD		8.8 7.0 – 11	F		340^{E} 160 – 530
	Total	12-19	983	28.35		14 11 – 19	<LD		8.7 7.0 – 11	350^{E} 160 – 540		530 380 – 680

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

References

AFN (Assembly of First Nations) (2013). First Nations Biomonitoring Initiative: National Results (2011). Ottawa: Assembly of First Nations. Consulted online: http://www.afn.ca/uploads/files/afn_fnbi_en.pdf

Calafat, A.M., Ye, X., Wong, L.Y., Reidy, J.A., Needham, L.L. (2008). Urinary concentrations of triclosan in the U.S. population: 2003-2004. Environ. Health Perspect. 116 (3). 303-7.

Environment and Climate Change Canada and Health Canada (2016). Assessment Report. Triclosan. Government of Canada. Source: http://www.ec.gc.ca/ese-ees/65584A12-2B7D-4273-9F7A-38EDF916ECAF/EN_FSAR_Triclosan_with_ISBN.pdf

Government of Canada (2011). Triclosan – Questions and Answers. Consulted online: http://www.chemicalsubstanceschimiques.gc.ca/fact-fait/triclosan-eng.php

Myridakis, A., Chalkiadaki, G., Fotou, M., Kogevinas, M., Chatzi, L., Stephanou, E.G. (2016). Exposure of preschool-age Greek children (RHEA Cohort) to bisphenol , parabens, phthalates and organophosphates. Environ. Sci. Technol. 50 (2). 932-41.

National Toxicology Program (2010). Bisphenol A (BPA). Source: www.niehs.nih.gov/health/assets/docs_a_e/bisphenol_a_bpa_508.pdf

Rochester, J.R. (2013). Bisphenol A and human health: a review of the literature. Reprod. Toxicol. 42. 132-55.

Health Canada (2016). Triclosan (Phenol, 5-chloro-2-(2,4-dichlorophenoxy) Information Sheet. Government of Canada. Consulted online: https://www.canada.ca/en/health-canada/services/chemical-substances/fact-sheets/chemicals-glance/triclosan.html

U.S. Food and Drug Administration (2016). 5 Things to know about triclosan. Consulted online: www.fda.gov/ForConsumers/ConsumerUpdates/ucm205999.htm

6.3.7. Phthalates

Phthalates are chemical compounds that are incorporated into numerous consumer products. High molecular weight phthalates make plastics softer and more flexible and are found in vinyl flooring, shower curtains, and certain toys and food packaging. Low molecular weight phthalates are added mainly to cosmetic products such as lotions, nail polish, and perfumes (Preau et al., 2010; Zota et al., 2014).

Exposure to phthalates occurs though skin contact, inhalation, and ingestion (Saravanabhavan et al., 2013). Phthalates are non-persistent contaminants. Once in the human body, they are rapidly metabolized and excreted in the urine in less than 24 hours (Koch et al., 2017).

According to some studies, phthalates may potentially disturb the endocrine system and may be associated with obesity and reproductive problems, and may have negative effects on neurological development in children (Kasper-Sonnenberg et al., 2014). Concentrations of certain phthalates used in children's toys have been limited in Canada (Saravanabhavan et al., 2013). Under the Canada Consumer Product Safety Act, the Phthalate Regulations set a maximum of 1000 mg/kg (0.1%) for concentrations of 3 phthalates (di(2-ethylhexyl) phthalate, dibutyl phthalate, and benzyl and butyl phthalate) in vinyl resin toys and other items intended for children younger than 4 years old, which may be used for relaxation, sleep, hygiene, food, sucking, or teething (Health Canada, 2012).

The phthalate metabolites listed below were measured in urine for a subsample of the JES!-YEH! project. As of yet, there is no toxicity threshold established for these contaminants.

- Monobenzyl phthalate (MBzP)
- Mono-*n*-butyl phthalate (M*n*BP)
- Monocyclohexyl phthalate (MCHP)
- Monoethyl phthalate (MEP)
- Monoisobutyl phthalate (MiBP)
- Monoisononyl phthalate (MiNP)
- Mono-methyl phthalate (MMP)
- Mono-*n*-octyl phthalate (MOP)
- Mono-3-carboxypropyl phthalate (MCPP)
- Mono-2-ethylhexyl phthalate (MEHP)
- Mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP)
- Mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP)

Results

Phthalate metabolite levels were measured in urine for a subsample (n=50) of participants in the JES!-YEH! project and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 169 – 192). Urine levels of phthalate metabolites reflect recent exposure to these substances. A measureable level does not necessarily mean that they will have negative health effects.

Levels of monobenzyl phthalate (MBzP) were higher in urine for all three age groups in the JES!-YEH! study compared to the CHMS (Cycle 2) (Table 170). However, these results should be interpreted with caution, as their coefficients of variation were between 16.6 and 33.3%.

Urine levels of mono-*n*-butyl phthalate (M*n*BP) measured in the JES!-YEH! study (subsample) were not significantly different than the CHMS (Cycle 2) for participants 3-5 and 6-11 years old. Urine levels of M*n*BP for participants 12-19 years old were significantly lower than those in the CHMS (Cycle 2) (Table 172).

Urine levels of monocyclohexyl phthalate (MCHP) and mono-*n*-octyl phthalate (MOP) in a subsample of the JES!-YEH! study were not calculated since more than 40% of the analyses were below the limit of detection (Tables 174 and 184).

Urine levels of monoethyl phthalate (MEP) were too uncertain to be published for participants 3-5 and 6-11 years old. For the 12-19 year old participants, their levels of MEP were significantly lower in the JES!-YEH! project subsample than those in the CHMS (Cycle 2) (Table 176). However, the coefficients of variation associated with these results suggest that they should be interpreted with caution.

Urine levels of monoisobutyl phthalate (MiBP) measured in the JES!-YEH! project subsample were significantly lower than those in the CHMS (Cycle 2) across all three age groups (Table 178). However, these results should be interpreted with caution, given the enormous fluctuation in their coefficients of variation.

Urine levels of monoisononyl phthalate (MiNP) measured in the JES!-YEH! project subsample were not detected for the 6-11 year old participants. For the other participants, the levels tended to be higher for the 3-5 year old participants compared to the 12-19 year old participants, but this difference was not significant. These results should also be interpreted with caution, since the coefficients of variation were between 16.6 and 33.3% (Table 180). It was not possible to compare results with the CHMS data, since it was not detected in the majority of cases (Cycle 2).

Urine levels of monomethyl phthalate (MMP) measured in the JES!-YEH! project subsample decreased by age (Table 182). It was not possible to compare results with the CHMS data, since it was not detected in the majority of cases (Cycle 2).

Urine levels of mono-3-carboxypropyl phthalate (MCPP) measured in the JES!-YEH! study (subsample) were significantly lower than those in the CHMS (Cycle 2) for participants 6-11 and 12-19 years old. However, the results for the 12-19 year old youths should be interpreted with caution, since the coefficients of variations were between 16.6 and 33.3%. The levels for the 3-5 year old children were not significantly different from the CHMS and the coefficients of variations also fluctuated between 16.6 and 33.3% (Table 186).

Urine levels of mono-2-ethylhexyl phthalate (MEHP) measured in 3-5 and 6-11 year old youths in a subsample of the JES!-YEH! study were not significantly different from the levels in the CHMS (Cycle 2). For participants 12-19 years old, their average levels were significantly lower than those in the CHMS (Cycle 2) (Table 188).

Urine levels of mono-(2-ethyl-5-oxohexyl) phthalate (MEOHP) measured in the JES!-YEH! project subsample were significantly lower than those in the CHMS (Cycle 2) for the 3-5 and 12-19 year old participants (Table 190). No significant differences were detected in youths 6-11 years old.

Urine levels of mono-(2-ethyl-5-hydroxyhexyl) phthalate (MEHHP) measured in the JES!-YEH! project subsample were significantly lower than those in the CHMS (Cycle 2) for the 3-5 and 12-19 age groups (Table 192). Urine concentrations of MEHHP in participants in the 6-11 age group in the JES!-YEH! project were not significantly different than those in the CHMS (Cycle 2).

Table 169: Monobenzyl phthalate (MBzP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	26.12 18.99 – 34.49	14.97 10.99 – 20.40	3.35^E 0.85 – 5.95	6.45E 3.96 – 11.38	14.67^E 11.42 – 21.25	F	68.00^E 27.96 – 74.62	74.00 .
	Total	F	24	0	22.20^E 11.98 – 36.00	10.61^E 6.26 – 17.80	1.74 .	F	11.00^E 5.65 – 15.23	F	68.60 .	74.60 .
	Total	M	26	0	29.74^E 20.02 – 39.72	20.57^E 14.44 – 28.17	5.36 .	11.00E 5.66 – 16.44	20.50^E 12.65 – 26.76	38.00^E 22.63 – 55.50	61.40 .	68.70 .
	Total	3-5	10	0	F	F	0.90 .	4.65 .	F	62.50 .	75.00 .	97.50 .
	Total	6-11	19	0	25.95^E 16.69 – 36.26	17.33^E 11.09 – 26.93	3.50 .	F	17.50^E 7.99 – 23.83	F	55.50 .	69.20 .
	Total	12-19	21	0	20.66^E 11.77 – 33.28	12.40^E 7.80 – 19.62	3.30 .	F	12.50^E 8.33 – 16.88	22.00^E 12.93 – 27.63	27.90 .	60.30 .
	Anishinabe communities (2)	Total	28	0	34.00^E 22.62 – 47.01	20.14^E 13.30 – 30.64	3.98 .	F	F	54.00^E 24.88 – 68.38	69.80 .	87.10 .
	Innu communities (2)	Total	22	0	16.09^E 9.95 – 23.92	10.26^E 6.66 – 15.55	3.04 .	F	12.00^E 5.98 – 15.58	19.00^E 12.25 – 23.95	24.60 .	45.70 .
CHMS (Cycle 2)	Total	3-5	522	0		17 14 – 20	4.1^E 2.6 – 5.7		16 13 – 18	33 23 – 44		120 86 – 150
	Total	6-11	516	0		19 15 – 23	4.9 3.5 – 6.4		20 15 – 24	35 28 – 42		100 72 – 140
	Total	12-19	512	0		12 10 – 15	3.3 2.2 – 4.4		12 8.9 – 15	25 21 – 28		59 43 – 75

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 170: Monobenzyl phthalate (MBzP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	36.27E 24.50 – 50.48	20.57 15.25 – 27.96	5.53E 2.25 – 8.29	9.61E 6.84 – 12.96	17.19E 12.78 – 27.09	42.08E 26.66 – 74.47	F	104.5 .
	Total	F	24	0	29.76E 17.29 – 46.76	17.29E 11.49 – 26.22	4.10 .	8.84E 4.31 – 12.53	F	F	73.78 .	91.34 .
	Total	M	26	0	42.27E 24.88 – 62.63	24.16E 15.58 – 36.25	5.66 .	10.49E 5.72 – 16.83	F	51.49E 24.65 – 83.27	85.47 .	106.5 .
	Total	3-5	10	0	74.81E 31.57 – 123.4	48.07E 24.50 – 90.94	10.20 .	20.53 .	F	89.12 .	163.2 .	201.6 .
	Total	6-11	19	0	38.04E 25.36 – 52.54	26.89E 17.54 – 40.64	10.47 .	16.16E 9.15 – 21.68	23.71E 17.13 – 38.56	54.84E 24.01 – 76.69	78.83 .	89.71 .
	Total	12-19	21	0	16.31E 9.56 – 24.77	10.78E 7.65 – 15.69	3.68 .	6.08E 3.49 – 8.44	9.00E 6.82 – 13.01	F	31.97 .	49.61 .
	Anishinabe communities (2)	Total	28	0	49.28E 31.54 – 71.41	30.96E 21.33 – 44.67	8.49 .	14.00E 8.99 – 21.82	F	72.34E 29.47 – 85.25	93.60 .	143.7 .
	Innu communities (2)	Total	22	0	19.70E 11.40 – 30.16	12.23E 7.99 – 18.76	2.61 .	6.36E 2.67 – 10.14	10.94E 7.15 – 15.97	F	47.05 .	52.27 .
CHMS (Cycle 2)	Total	3-5	521	0		29 24 – 35	9.4 7.6 – 11		26 20 – 32	53 39 – 67		160 110 – 200
	Total	6-11	514	0		22 18 – 26	6.2 4.3 – 8.2		21 17 – 25	39 32 – 47		98 77 – 120
	Total	12-19	510	0		9.4 7.7 – 12	3.2 2.5 – 3.9		9.4 7.5 – 11	16 13 – 19		44 34 – 54

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 171: Mono-*n*-butyl phthalate (M*n*BP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	25.50 19.78 – 32.07	17.75 13.72 – 22.94	5.20^{E} 2.24 – 8.20	9.30^{E} 6.34 – 13.98	20.00 13.60 – 25.86	36.00 25.44 – 43.00	45.00^{E} 39.79 – 58.76	58.50 .
	Total	F	24	0	20.68 15.00 – 27.27	14.11^{E} 9.22 – 21.17	2.74 .	F	15.00^{E} 8.89 – 24.00	28.50^{E} 17.38 – 40.27	41.50 .	44.50 .
	Total	M	26	0	29.95^{E} 21.16 – 39.92	21.93 15.91 – 29.04	6.58 .	10.53^{E} 6.63 – 16.90	22.00^{E} 12.73 – 29.50	40.50^{E} 25.25 – 52.75	57.40 .	70.60 .
	Total	3-5	10	0	26.15^{E} 11.68 – 42.94	F	1.00 .	5.10 .	F	36.00 .	58.00 .	67.00 .
	Total	6-11	19	0	31.07^{E} 20.57 – 43.69	23.42^{E} 16.70 – 32.91	6.36 .	12.75^{E} 6.38 – 21.00	23.50^{E} 13.27 – 34.89	40.25^{E} 24.17 – 45.88	46.40 .	62.05 .
	Total	12-19	21	0	20.15 14.37 – 26.24	15.34^{E} 10.89 – 21.43	3.69 .	9.03^{E} 3.40 – 14.58	15.25^{E} 9.69 – 22.50	28.50^{E} 15.67 – 35.69	38.40 .	41.85 .
	Anishinabe communities (2)	Total	28	0	28.57 22.12 – 35.16	21.25^{E} 15.25 – 29.09	6.12 .	12.00^{E} 7.23 – 20.43	22.00^{E} 15.98 – 33.75	40.00^{E} 26.95 – 50.63	57.20 .	58.60 .
	Innu communities (2)	Total	22	0	21.60^{E} 13.13 – 33.16	14.11^{E} 9.56 – 20.66	3.76 .	F	13.50^{E} 7.44 – 22.33	25.50^{E} 13.90 – 35.67	40.20 .	44.70 .
CHMS (Cycle 2)	Total	3-5	522	0		32 28 – 37	11 8.0 – 14		30 26 – 56	56 43 – 69		130 110 – 150
	Total	6-11	515	0		36 30 – 44	9.7 7.7 – 12		32 26 – 37	58 45 – 72		F
	Total	12-19	512	0		28 25 – 33	9.1 7.0 – 11		28 23 – 33	50 42 – 59		110 81 – 130

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 172: Mono-*n*-butyl phthalate (M*n*BP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	33.05 26.28 – 41.32	24.39 19.53 – 30.79	8.29 6.10 – 11.44	12.76 8.77 – 16.13	23.27[E] 16.02 – 31.25	42.87[E] 30.86 – 61.66	71.23 50.66 – 94.21	91.53 .
	Total	F	24	0	30.51[E] 22.06 – 41.91	22.99 17.73 – 31.36	8.49 .	12.66[E] 8.51 – 17.67	20.28[E] 13.26 – 28.64	F	62.68 .	83.31 .
	Total	M	26	0	35.38 24.95 – 47.17	25.76 18.45 – 35.72	7.42 .	13.55[E] 7.71 – 19.50	27.37[E] 15.96 – 38.26	47.21[E] 31.80 – 66.62	73.05 .	88.99 .
	Total	3-5	10	0	49.58[E] 30.37 – 72.59	40.63[E] 27.36 – 62.31	16.19 .	25.45 .	F	66.22 .	94.65 .	104.2 .
	Total	6-11	19	0	44.27 32.79 – 56.14	36.34 26.04 – 49.40	13.17 .	24.70[E] 11.89 – 35.37	35.80[E] 27.05 – 53.87	59.81[E] 36.14 – 74.17	77.05 .	88.97 .
	Total	12-19	21	0	15.02 11.82 – 18.48	13.34 10.88 – 16.23	6.93 .	8.64 6.78 – 11.69	12.30 8.84 – 15.90	16.67[E] 12.65 – 21.48	22.43 .	32.24 .
	Anishinabe communities (2)	Total	28	0	40.98 31.39 – 51.75	32.67 25.38 – 42.74	11.70 .	20.05[E] 11.90 – 27.74	32.75[E] 22.07 – 47.27	58.95[E] 35.37 – 66.93	74.67 .	92.16 .
	Innu communities (2)	Total	22	0	22.95[E] 14.37 – 34.23	16.82 12.22 – 23.55	6.24 .	8.57[E] 6.25 – 14.23	15.96[E] 9.17 – 21.70	27.80[E] 15.98 – 33.44	35.12 .	71.83 .
CHMS (Cycle 2)	Total	3-5	521	0		56 49 – 64	27 23 – 30		52 46 – 59	79 63 – 95		170 110 – 230
	Total	6-11	513	0		42 36 – 48	17 15 – 19		35 30 – 40	58 47 – 70		F
	Total	12-19	510	0		22 19 – 25	10 9.1 – 12		20 17 – 23	30 26 – 35		62 48 – 75

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 173: Monocyclohexyl phthalate (MCHP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	98	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	26	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	19	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	95.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	522	68.20		–	<LD		<LD	0.13^{E} <LD – 0.22		F
	Total	6-11	516	67.25		–	<LD		<LD	0.15^{E} <LD – 0.23		1.3^{E} 0.46 – 2.0
	Total	12-19	507	73.37		–	<LD		<LD	F		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 174: Monocyclohexyl phthalate (MCHP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	98	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	26	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	19	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	95.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	521	68.33		–	<LD		<LD	0.34[E] <LD – 0.49		F
	Total	6-11	514	67.51		–	<LD		<LD	0.21[E] <LD – 0.29		F
	Total	12-19	505	73.66		–	<LD		<LD	<LD <LD – 0.14		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 175: Monoethyl phthalate (MEP) – Levels measured in the urine (μg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	2	F	14.11^{E} 9.35 – 21.41	1.67 .	5.95^{E} 3.75 – 7.60	10.00^{E} 7.50 – 14.00	F	F	210.0 .
	Total	F	24	4.2	F	9.97^{E} 5.59 – 18.83	1.13 .	F	9.80^{E} 5.36 – 12.97	F	44.60 .	50.60 .
	Total	M	26	0	F	19.43^{E} 11.22 – 34.34	4.20 .	6.65^{E} 4.36 – 8.22	F	F	172.0 .	218.0 .
	Total	3-5	10	10	F	F	<LD	1.50 .	F	12.50 .	16.00 .	103.0 .
	Total	6-11	19	0	F	F	1.45 .	5.80^{E} 1.48 – 8.58	F	F	297.0 .	915.0 .
	Total	12-19	21	0	30.62^{E} 15.42 – 49.64	16.97^{E} 10.92 – 27.71	4.57 U	7.21 4.40 – 8.74	F	F	78.80 .	89.60 .
	Anishinabe communities (2)	Total	28	3.6	F	13.11^{E} 7.11 – 24.18	1.40 .	5.50^{E} 1.72 – 7.55	F	F	110.0 .	214.0 .
	Innu communities (2)	Total	22	0	F	15.49^{E} 8.46 – 31.68	2.34 .	6.00^{E} 2.71 – 9.38	F	F	77.00 .	152.2 .
CHMS (Cycle 2)	Total	3-5	523	0		21 18 – 24	6.8 5.4 – 8.2		19 16 – 23	40 30 – 51		120 92 – 140
	Total	6-11	516	0		29 23 – 37	6.6 4.4 – 8.8		25E 14 – 36	65 42 – 88		240^{E} 110 – 380
	Total	12-19	512	0		51 43 – 61	10 7.1 – 14		47 38 – 57	110 95 – 130		490^{E} 270 – 710

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 176: Monoethyl phthalate (MEP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	2	F	19.39E 13.43 – 29.15	5.53 3.37 – 6.02	7.09 5.66 – 9.39	13.70E 9.27 – 17.98	F	F	281.5 .
	Total	F	24	4.2	F	16.24E 9.49 – 30.28	3.90 .	6.08E 4.24 – 8.37	12.63E 6.51 – 17.10	F	87.62 .	224.5 .
	Total	M	26	0	F	22.82E 13.91 – 38.14	5.53 .	8.70E 5.53 – 13.61	16.42E 9.60 – 23.64	F	146.4 .	285.7 .
	Total	3-5	10	10	F	F	<LD	10.97 .	F	19.60 .	34.19 .	133.8 .
	Total	6-11	19	0	F	F	5.44 .	7.89E 5.36 – 12.87	F	F	392.7 .	1169 .
	Total	12-19	21	0	26.27E 13.72 – 40.59	14.76E 9.41 – 24.15	4.23 .	6.19E 4.06 – 7.69	F	F	78.05 .	87.98 .
	Anishinabe communities (2)	Total	28	3.6	F	20.15E 12.41 – 34.95	5.53 .	7.53E 5.62 – 12.14	13.70E 8.41 – 18.46	F	237.6 .	286.8 .
	Innu communities (2)	Total	22	0	F	18.45E 10.86 – 34.56	4.20 .	5.93E 4.30 – 10.93	F	F	83.60 .	101.7 .
CHMS (Cycle 2)	Total	3-5	522	0		36 32 – 41	14 12 – 17		31 26 – 36	54E 33 – 75		180 130 – 230
	Total	6-11	514	0		34 27 – 42	11 8.7 – 12		28 20 – 36	64 45 – 84		230E 130 – 340
	Total	12-19	510	0		39 33 – 45	11 9.3 – 12		33 27 – 40	74 55 – 93		310 200 – 410

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 177: Monoisobutyl phthalate (MiBP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	12.68 9.94 – 15.75	9.11 7.20 – 11.42	3.00E 1.32 – 4.42	5.28E 3.57 – 6.89	8.60E 6.75 – 11.43	17.75 11.25 – 20.19	21.00E 18.85 – 29.00	28.50 .
	Total	F	24	0	12.03E 7.77 – 17.46	7.87E 5.34 – 11.49	1.74 .	F	7.70E 4.65 – 11.67	16.00E 8.48 – 20.08	20.60 .	23.40 .
	Total	M	26	0	13.28 9.80 – 16.85	10.43 7.79 – 13.46	3.86 .	5.38E 3.89 – 7.57	9.90E 5.79 – 15.24	18.50E 10.04 – 21.00	23.40 .	29.10 .
	Total	3-5	10	0	10.08E 4.99 – 16.13	F	0.66 .	3.90 .	F	12.20 .	20.00 .	25.00 .
	Total	6-11	19	0	12.72 9.05 – 17.33	9.99E 7.05 – 13.88	3.28 .	5.35E 3.16 – 8.52	9.30E 5.98 – 16.29	17.25E 9.76 – 21.44	21.30 .	24.70 .
	Total	12-19	21	0	13.89E 9.00 – 19.84	9.79E 6.86 – 13.85	2.28 .	5.43E 2.20 – 7.57	9.35E 5.79 – 15.23	17.75E 9.85 – 20.71	F	26.70 .
	Anishinabe communities (2)	Total	28	0	14.98 10.97 – 19.86	10.64E 7.42 – 14.57	3.08 .	5.80E 3.89 – 8.80	11.00E 7.14 – 16.85	19.00E 11.95 – 22.33	25.20 .	34.80 .
	Innu communities (2)	Total	22	0	9.75 6.91 – 12.94	7.48 5.40 – 10.25	2.36 .	3.85E 2.28 – 6.13	7.40E 4.17 – 9.84	14.00E 7.48 – 18.59	19.20 .	20.85 .
CHMS (Cycle 2)	Total	3-5	517	0		22 19 – 25	6.9 5.0 – 8.9		22 18 – 26	39 33 –		96 68 – 120
	Total	6-11	515	0		22 18 – 27	6.6 5.0 – 8.3		22 18 – 26	39 32 – 46		120E 67 – 160
	Total	12-19	508	0		18 16 – 21	5.6 4.0 – 7.2		18 16 – 20	31 28 – 35		83E 38 – 130

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 178: Monoisobutyl phthalate (MiBP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	15.50 12.53 – 19.11	12.52 10.45 – 15.05	5.24 3.81 – 6.53	7.53 6.11 – 9.72	11.56 9.56 – 14.92	18.39^{E} 14.99 – 24.61	30.32^{E} 18.74 – 36.75	34.42 .
	Total	F	24	0	15.95 11.80 – 21.28	12.82 10.07 – 16.44	6.05 .	6.56^{E} 6.06 – 9.99	13.10^{E} 8.33 – 16.44	18.24^{E} 15.14 – 27.25	27.86 .	30.84 .
	Total	M	26	0	15.08 11.33 – 19.51	12.25 9.57 – 15.48	4.99 .	7.79^{E} 5.09 – 10.87	11.37 9.11 – 14.78	16.73^{E} 11.98 – 28.78	30.69 .	35.52 .
	Total	3-5	10	0	21.20 15.23 – 27.72	18.77^{E} 13.16 – 26.30	6.72 .	12.33 .	18.24^{E} 9.22 – 28.68	28.76 .	31.24 .	34.30 .
	Total	6-11	19	0	19.06^{E} 13.25 – 25.95	15.50 11.62 – 20.67	5.19 .	11.00^{E} 5.17 – 14.78	15.12 11.20 – 18.52	F	33.19 .	49.38 .
	Total	12-19	21	0	9.57 7.56 – 11.91	8.51 6.97 – 10.38	4.01 .	6.11 3.87 – 7.29	8.64 6.17 – 10.12	11.09 8.93 – 13.52	13.91 .	14.87 .
	Anishinabe communities (2)	Total	28	0	19.49 15.35 – 24.69	16.35 13.35 – 20.32	6.49 .	11.22^{E} 7.57 – 14.16	15.33 11.98 – 18.38	20.88^{E} 15.99 – 31.07	32.65 .	44.16 .
	Innu communities (2)	Total	22	0	10.42 7.92 – 13.29	8.91 7.10 – 11.13	4.07 .	6.05 4.04 – 7.52	8.44 6.08 – 10.25	11.26^{E} 8.74 – 16.44	18.09 .	21.77 .
CHMS (Cycle 2)	Total	3-5	516	0		37 33 – 42	16 13 – 19		34 30 – 38	55 42 – 68		120 89 – 150
	Total	6-11	513	0		25 22 – 30	11 8.9 – 14		23 20 – 27	37 28 – 45		94^{E} 41 – 150
	Total	12-19	506	0		14 12 – 16	7.1 6.1 – 8.1		13 11 – 14	19 15 – 23		41^{E} 16 – 65

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 179: Monoisononyl phthalate (MiNP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	40	0.86^{E} 0.51 – 1.32	0.48 0.37 – 0.62	<LD	<LD	0.40^{E} 0.20 – 0.55	0.80 0.53 – 0.96	F	2.60 .
	Total	F	24	41.7	–	–	<LD	<LD	F	F	2.72 .	4.64 .
	Total	M	26	38.5	0.46 0.36 – 0.56	0.39 0.31 – 0.48	<LD	<LD	0.32 0.20 – 0.51	0.56^{E} 0.39 – 0.77	0.84 0.57 – 0.95	0.94 .
	Total	3-5	10	40	0.59^{E} 0.38 – 0.82	0.47^{E} 0.30 – 0.76	<LD	<LD	0.60^{E} 0.20 – 0.86	0.85^{E} 0.32 – 0.94	0.95 .	0.98 .
	Total	6-11	19	42.1	–	–	<LD	<LD	0.30^{E} 0.20 – 0.50	0.54^{E} 0.33 – 0.75	0.82 .	1.03 .
	Total	12-19	21	38.1	F	0.59^{E} 0.36 – 0.96	<LD	<LD	F	F	3.08 .	4.91 .
	Anishinabe communities (2)	Total	28	42.9	–	–	<LD	<LD	0.33^{E} 0.20 – 0.55	0.70^{E} 0.44 – 0.95	0.98^{E} 0.70 – 1.33	1.18 .
	Innu communities (2)	Total	22	36.4	F	0.56^{E} 0.36 – 0.90	<LD	<LD	0.45^{E} 0.20 – 0.70	F	1.90 .	4.70 .
CHMS (Cycle 2)	Total	3-5	522	99.04		–	<LD		<LD	<LD		<LD
	Total	6-11	514	99.42		–	<LD		<LD	<LD		<LD
	Total	12-19	511	99.41		–	<LD		<LD	<LD		<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 180: Monoisononyl phthalate (MiNP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	40	F	0.66 0.48 – 0.88	<LD	<LD	0.68^{E} 0.44 – 0.90	1.16^{E} 0.87 – 1.54	F	3.49 .
	Total	F	24	41.7	–	–	<LD	<LD	1.00^{E} 0.44 – 1.21	F	3.49 .	5.12 .
	Total	M	26	38.5	0.67^{E} 0.44 – 0.89	0.45^{E} 0.32 – 0.63	<LD	<LD	0.48^{E} 0.25 – 0.74	0.83^{E} 0.53 – 1.15	1.21 .	1.92 .
	Total	3-5	10	40	1.77^{E} 1.02 – 2.84	1.34^{E} 0.80 – 2.20	<LD	<LD	F	1.87 .	2.53 .	4.03 .
	Total	6-11	19	42.1	–	–	<LD	<LD	0.62^{E} 0.30 – 0.80	F	1.18 .	2.27 .
	Total	12-19	21	38.1	F	0.51^{E} 0.29 – 0.94	<LD	<LD	F	F	2.63 .	3.46 .
	Anishinabe communities (2)	Total	28	42.9	–	–	<LD	<LD	0.64^{E} 0.40 – 0.90	F	2.27 .	3.11 .
	Innu communities (2)	Total	22	36.4	F	0.67^{E} 0.39 – 1.20	<LD	<LD	0.74^{E} 0.31 – 1.14	F	2.69 .	3.42 .
CHMS (Cycle 2)	Total	3-5	521	99.23		–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	512	99.80		–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	509	99.80		–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 181: Monomethyl phthalate (MMP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	5.47 4.46 – 6.51	4.18 3.36 – 5.10	1.50E 0.60 – 2.03	2.45 1.77 – 3.01	4.30E 2.98 – 6.59	7.50 6.45 – 9.15	9.80E 7.93 – 11.89	11.75 9.13 – 15.11
	Total	F	24	0	5.22 3.73 – 6.80	3.89E 2.74 – 5.34	1.15 .	2.40E 1.25 – 3.25	3.70E 2.54 – 5.85	8.00E 3.80 – 9.80	10.52 .	11.80 .
	Total	M	26	0	5.70 4.30 – 7.12	4.48 3.24 – 5.84	1.51 .	2.45E 1.64 – 3.94	6.00E 2.60 – 6.83	6.95 6.26 – 8.52	9.05E 6.94 – 12.33	11.25 .
	Total	3-5	10	0	5.16E 3.46 – 7.18	4.02E 2.38 – 6.53	0.61 .	2.30 .	F	7.65 .	9.10 .	9.30 .
	Total	6-11	19	0	5.95 4.21 – 7.80	4.85 3.62 – 6.63	1.91 .	2.65E 1.94 – 3.78	3.95E 2.73 – 7.10	7.48E 4.02 – 9.79	10.02 .	12.25 .
	Total	12-19	21	0	5.18E 3.61 – 6.82	3.73E 2.52 – 5.42	0.96 .	1.78E 1.01 – 2.90	3.85E 2.04 – 6.60	6.88E 4.30 – 9.40	10.70 .	11.95 .
	Anishinabe communities (2)	Total	28	0	5.16 3.89 – 6.41	3.89 2.81 – 5.14	1.32 .	2.27E 1.50 – 2.98	3.70E 2.49 – 6.60	6.90E 4.30 – 9.14	9.56 .	10.52 .
	Innu communities (2)	Total	22	0	5.86 4.25 – 7.58	4.58 3.32 – 6.20	1.38 .	2.60E 1.40 – 4.22	4.80E 2.74 – 7.06	7.50E 4.86 – 9.56	10.26 .	11.86 .
CHMS (Cycle 2)	Total	3-5	523	43.98		–	<LD		<LD <LD – 5.9	8.4 7.5 – 9.3		F
	Total	6-11	515	42.33		–	<LD		<LD <LD – 6.5	8.7E <LD – 14		34E 19 – 49
	Total	12-19	512	53.91		–	<LD		<LD	6.4 5.5 – 7.3		18 12 – 24

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 182: Monomethyl phthalate (MMP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	7.95 5.90 – 10.56	5.75 4.53 – 7.20	1.55^{E} 1.13 – 2.83	3.26^{E} 2.47 – 4.98	5.98 4.46 – 7.53	8.90 7.18 – 11.60	F	18.31 .
	Total	F	24	0	9.62^{E} 5.69 – 14.83	6.33^{E} 4.36 – 9.41	1.64 .	F	5.82^{E} 3.89 – 8.52	F	18.60 .	28.71 .
	Total	M	26	0	6.42 5.12 – 7.79	5.26 3.94 – 6.88	1.36 .	3.29^{E} 1.45 – 5.57	5.98^{E} 3.76 – 7.93	8.44 6.33 – 10.93	11.28 .	11.82 .
	Total	3-5	10	0	12.92^{E} 9.18 – 17.58	11.47 8.52 – 16.04	5.56 .	7.23 .	11.43^{E} 5.96 – 13.58	13.59 .	16.86 .	23.90 .
	Total	6-11	19	0	8.08 6.67 – 9.81	7.53 6.41 – 8.83	4.42 .	5.82 4.42 – 6.65	7.02 5.86 – 8.42	8.63^{E} 7.19 – 10.63	10.99 .	13.59 .
	Total	12-19	21	0	F	3.24^{E} 2.31 – 4.91	1.21 .	1.60^{E} 1.21 – 2.76	2.92^{E} 1.77 – 3.65	4.31^{E} 2.94 – 6.34	6.58 .	8.73 .
	Anishinabe communities (2)	Total	28	0	7.60 5.86 – 9.44	5.98 4.38 – 7.93	1.53 .	4.42^{E} 1.55 – 6.02	6.63 4.59 – 8.60	9.24^{E} 7.35 – 12.33	13.68 .	16.26 .
	Innu communities (2)	Total	22	0	8.40^{E} 4.61 – 14.13	5.46^{E} 3.82 – 8.15	1.74 .	2.99^{E} 1.80 – 4.30	5.56^{E} 3.26 – 6.39	F	11.58 .	29.03 .
CHMS (Cycle 2)	Total	3-5	522	44.06		–	<LD		<LD <LD – 9.8	15 12 – 19		51^{E} 22 – 80
	Total	6-11	513	42.50		–	<LD		<LD <LD – 7.7	12 <LD – 16		34^{E} 16 – 52
	Total	12-19	510	54.12		–	<LD		<LD	5.1 4.0 – 6.1		13 10 – 15

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 183: Mono-*n*-octyl phthalate (MOP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	26	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	19	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	523	97.13		–	<LD		<LD	<LD		<LD
	Total	6-11	516	99.61		–	<LD		<LD	<LD		<LD
	Total	12-19	511	98.04		–	<LD		<LD	<LD		<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 184: Mono-*n*-octyl phthalate (MOP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	26	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	19	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	22	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	522	97.32		–	<LD		<LD	<LD		<LD
	Total	6-11	514	100		–	<LD		<LD	<LD		<LD
	Total	12-19	509	98.43		–	<LD		<LD	<LD		<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 185: Mono-3-carboxypropyl phthalate (MCPP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	2.66E 1.57 – 4.31	1.40 1.05 – 1.85	0.43E 0.20 – 0.55	0.65E 0.50 – 0.92	1.30 0.87 – 1.63	2.45E 1.59 – 3.54	F	6.90 .
	Total	F	24	0	F	1.48E 0.94 – 2.44	0.35 .	0.58E 0.38 – 1.01	1.20E 0.74 – 1.85	F	5.34 .	10.82 .
	Total	M	26	0	1.93E 1.28 – 2.57	1.33E 0.96 – 1.81	0.40 .	0.65E 0.42 – 1.10	1.40E 0.77 – 1.65	F	4.02 .	6.06 .
	Total	3-5	10	0	F	F	0.20 .	0.58 .	F	4.80 .	7.20 .	20.60 .
	Total	6-11	19	0	2.09E 1.43 – 2.87	1.61E 1.15 – 2.21	0.46 .	0.81E 0.45 – 1.42	1.53E 0.82 – 1.95	F	4.26 .	4.89 .
	Total	12-19	21	0	1.79E 0.95 – 2.98	1.08E 0.71 – 1.63	0.26 .	0.53E 0.27 – 0.81	0.98E 0.56 – 1.48	1.78E 0.99 – 2.99	3.08 .	3.58 .
	Anishinabe communities (2)	Total	28	0	F	1.36E 0.92 – 2.05	0.28 .	F	1.30E 0.73 – 1.65	F	4.68 .	6.96 .
	Innu communities (2)	Total	22	0	2.26E 1.29 – 3.41	1.46E 0.99 – 2.14	0.47 .	0.68E 0.46 – 1.13	1.30E 0.76 – 1.88	F	4.48 .	5.97 .
CHMS (Cycle 2)	Total	3-5	517	0.39		3.2 2.8 – 3.7	0.94 0.63 – 1.2		3.1 2.6 – 3.6	5.6 4.3 – 6.8		14E 8.5 – 19
	Total	6-11	515	0.78		3.3 2.8 – 4.0	1.0 0.80 – 1.2		3.4 2.9 – 3.9	5.5 4.3 – 6.8		15 11 – 19
	Total	12-19	509	0.79		2.6 2.2 – 3.1	0.65E 0.34 – 0.97		2.5 2.2 – 2.8	4.7 3.6 – 5.8		16E 8.0 – 24

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 186: Mono-3-carboxypropyl phthalate (MCPP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	4.01^E 2.18 – 6.63	1.93 1.41 – 2.59	0.52^E 0.30 – 0.67	0.76^E 0.60 – 1.15	2.10^E 1.04 – 2.61	3.50^E 2.55 – 4.84	F	8.65 .
	Total	F	24	0	F	2.41^E 1.51 – 3.97	0.65 .	F	2.42^E 1.04 – 2.72	F	7.60 .	29.84 .
	Total	M	26	0	2.44^E 1.59 – 3.31	1.57^E 1.05 – 2.27	0.34 .	F	1.68^E 0.88 – 2.95	3.42^E 1.80 – 4.27	4.80 .	7.56 .
	Total	3-5	10	0	F	5.36^E 3.23 – 9.92	1.99 .	2.56 .	4.36^E 2.41 – 6.60	6.62 .	8.84 .	27.55 .
	Total	6-11	19	0	3.03 2.26 – 3.92	2.49 1.78 – 3.28	0.89 .	1.99^E 0.79 – 2.42	2.55 2.07 – 3.06	F	4.23 .	7.50 .
	Total	12-19	21	0	F	0.94^E 0.66 – 1.47	0.37 .	0.57^E 0.36 – 0.69	0.76 0.61 – 0.99	F	1.24 .	3.80 .
	Anishinabe communities (2)	Total	28	0	F	2.09^E 1.40 – 3.27	0.57 .	F	2.24^E 0.92 – 3.32	3.87^E 2.51 – 5.49	6.11 .	8.69 .
	Innu communities (2)	Total	22	0	F	1.74^E 1.10 – 2.72	0.48 .	0.86^E 0.47 – 1.16	1.25^E 0.96 – 2.56	F	6.68 .	7.68 .
CHMS (Cycle 2)	Total	3-5	516	0.39		5.6 4.8 – 6.4	2.5 2.1 – 2.8		5.5 4.6 – 6.5	7.7 6.5 – 8.8		21^E 12 – 30
	Total	6-11	513	0.78		3.8 3.4 – 4.3	1.5 1.1 – 1.9		3.7 3.3 – 4.1	6.2 5.2 – 7.2		16 11 – 20
	Total	12-19	507	0.79		2.0 1.8 – 2.3	0.78 0.59 – 0.98		1.7 1.5 – 2.0	3.1 2.6 – 3.5		11^E 4.2 – 18

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 187: Mono-2-ethylhexyl phthalate (MEHP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	2	1.92 1.53 – 2.31	1.39 1.06 – 1.77	F	0.83^{E} 0.53 – 1.13	1.50^{E} 1.13 – 2.23	2.75 2.06 – 3.44	3.90 2.88 – 4.37	4.20 .
	Total	F	24	4.2	1.68 1.20 – 2.26	1.13^{E} 0.74 – 1.77	0.28 .	F	F	2.60^{E} 1.30 – 3.14	3.22 .	3.54 .
	Total	M	26	0	2.14 1.62 – 2.65	1.68 1.24 – 2.20	0.57 .	1.04^{E} 0.69 – 1.32	1.60^{E} 1.16 – 2.27	3.00^{E} 1.74 – 3.92	3.97^{E} 2.59 – 4.47	4.28 .
	Total	3-5	10	10	1.90^{E} 1.09 – 2.86	F	<LD	0.63 .	F	2.80 .	3.60 .	3.80 .
	Total	6-11	19	0	2.18^{E} 1.45 – 2.92	1.59^{E} 1.05 – 2.32	0.38 .	F	1.65^{E} 0.79 – 2.68	2.90^{E} 1.68 – 4.30	4.43 .	4.74 .
	Total	12-19	21	0	1.69 1.25 – 2.16	1.35 0.98 – 1.81	0.46 .	0.81^{E} 0.43 – 1.17	1.25^{E} 0.89 – 1.88	2.30^{E} 1.35 – 2.99	3.08 .	3.77 .
	Anishinabe communities (2)	Total	28	3.6	2.00 1.57 – 2.51	1.55^{E} 1.10 – 2.14	0.67 .	1.10^{E} 0.74 – 1.37	1.70^{E} 1.17 – 2.30	2.50^{E} 1.92 – 3.69	3.84 .	4.24 .
	Innu communities (2)	Total	22	0	1.81^{E} 1.17 – 2.46	1.22^{E} 0.78 – 1.79	0.26 .	F	F	2.95^{E} 1.22 – 3.53	3.78 .	3.99 .
CHMS (Cycle 2)	Total	3-5	512	0.39		2.7 2.4 – 3.2	0.94 0.77 – 1.1		2.7 2.3 – 3.1	4.7 3.9 – 5.5		F
	Total	6-11	508	0		2.7 2.3 – 3.1	0.85^{E} 0.53 – 1.2		2.5 2.1 – 2.9	4.8 4.1 – 5.4		11 8.3 – 14
	Total	12-19	501	0.60		2.4 2.0 – 2.8	0.64 0.52 – 0.76		2.4 2.0 – 2.8	4.3 3.6 – 4.9		13^{E} 7.7 – 18

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 188: Mono-2-ethylhexyl phthalate (MEHP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	2	2.81E 2.01 – 3.93	1.91 1.51 – 2.45	0.66E 0.25 – 1.04	1.20 0.78 – 1.47	1.77 1.41 – 2.17	3.12E 2.09 – 4.93	F	6.40 .
	Total	F	24	4.2	2.25 1.73 – 2.90	1.85 1.44 – 2.39	0.75 .	1.22E 0.77 – 1.54	1.71 1.30 – 2.13	2.62E 1.83 – 4.29	4.61 .	4.98 .
	Total	M	26	0	3.33E 1.89 – 5.18	1.98E 1.31 – 2.88	0.46 .	1.18E 0.52 – 1.63	1.98E 1.25 – 2.69	3.27E 2.10 – 5.38	6.08 .	8.51 .
	Total	3-5	10	10	3.99E 2.58 – 5.59	3.30E 2.16 – 4.89	<LD	1.57 .	3.30E 1.38 – 4.93	4.94 .	6.05 .	7.66 .
	Total	6-11	19	0	3.80E 2.11 – 6.25	2.47E 1.56 – 3.76	1.11 .	1.48E 0.96 – 1.98	2.02E 1.50 – 3.61	F	5.75 .	7.52 .
	Total	12-19	21	0	1.36 1.09 – 1.64	1.17 0.91 – 1.50	0.54 .	0.73E 0.54 – 1.09	1.22E 0.77 – 1.66	1.88 1.26 – 2.20	2.26 .	2.57 .
	Anishinabe communities (2)	Total	28	3.6	3.47E 2.18 – 5.30	2.38 1.74 – 3.33	0.76 .	1.38E 0.86 – 1.93	2.03E 1.51 – 2.86	3.90E 2.23 – 5.30	5.72 .	7.98 .
	Innu communities (2)	Total	22	0	1.98E 1.34 – 2.68	1.45E 0.99 – 2.09	0.32 .	0.94E 0.33 – 1.32	1.42 1.12 – 1.94	F	3.99 .	4.90 .
CHMS (Cycle 2)	Total	3-5	511	0.39		4.7 4.1 – 5.4	1.8 1.4 – 2.3		4.5 4.0 – 5.0	7.3 5.3 – 9.2		19E 12 – 26
	Total	6-11	506	0		3.1 2.7 – 3.6	1.2 0.94 – 1.4		2.9 2.4 – 3.3	5.4 4.1 – 6.6		11 8.6 – 14
	Total	12-19	499	0.60		1.8 1.6 – 2.0	0.64 0.56 – 0.72		1.8 1.6 – 2.1	2.9 2.5 – 3.4		6.4E 3.0 – 9.7

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 189: Mono (2-ethyl-5-oxohexyl) phthalate (MEOHP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	8.87 6.61 – 11.41	6.17 4.73 – 7.83	2.00E 0.62 – 2.78	3.75E 2.62 – 5.21	6.55 5.19 – 8.30	9.67E 8.40 – 14.24	15.67E 9.94 – 22.90	21.00 .
	Total	F	24	0	7.07E 4.60 – 10.24	4.59E 2.99 – 6.86	0.75 .	F	5.30E 2.73 – 7.16	8.30E 5.53 – 13.53	14.80 .	16.80 .
	Total	M	26	0	10.52E 7.30 – 14.40	8.13 6.22 – 10.43	3.10 .	5.00E 3.23 – 6.88	8.30 6.23 – 9.22	9.83E 8.73 – 15.15	F	22.30 .
	Total	3-5	10	0	9.99E 5.75 – 14.00	F	0.59 .	3.20 .	10.00E 2.57 – 14.61	15.00E 4.20 – 16.22	16.00 .	16.50 .
	Total	6-11	19	0	12.12E 7.40 – 18.05	8.70E 6.19 – 12.45	2.78 .	5.20E 2.76 – 7.72	8.13 5.37 – 9.49	F	25.70 .	33.05 .
	Total	12-19	21	0	5.39 4.17 – 6.61	4.31E 3.06 – 5.93	0.97 .	F	5.50E 2.79 – 6.55	6.83 5.70 – 9.22	9.29 .	9.59 .
	Anishinabe communities (2)	Total	28	0	8.99 6.65 – 11.96	6.59 4.81 – 8.95	2.24 .	3.60E 2.41 – 5.61	6.45E 4.64 – 9.44	10.00E 7.59 – 15.61	16.20 .	21.80 .
	Innu communities (2)	Total	22	0	8.71E 5.31 – 13.73	5.68E 3.68 – 8.52	0.99 .	F	6.50E 4.19 – 8.33	8.90E 6.78 – 12.24	13.20 .	15.80 .
CHMS (Cycle 2)	Total	3-5	523	0		17 15 – 19	6.0 4.7 – 7.2		17 15 – 20	29 23 – 35		67E 38 – 95
	Total	6-11	516	0		15 13 – 18	4.7 3.4 – 6.1		16 12 – 20	27 22 – 31		57 50 – 65
	Total	12-19	512	0		10 8.6 – 12	3.2E 1.7 – 4.7		9.9 8.6 – 11	19 16 – 22		44 30 – 59

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 190: Mono (2-ethyl-5-oxohexyl) phthalate (MEOHP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	12.61 9.37 – 16.85	8.49 6.62 – 10.94	2.41^E^ 1.77 – 3.56	4.14 2.72 – 5.57	8.25^E^ 5.12 – 12.69	15.64 12.46 – 20.07	F	32.75 .
	Total	F	24	0	9.74 7.20 – 12.46	7.47 5.43 – 10.19	2.44 .	3.59^E^ 2.46 – 5.83	8.25^E^ 4.45 – 12.75	13.85^E^ 9.22 – 17.69	18.83 .	21.45 .
	Total	M	26	0	15.25^E^ 9.31 – 22.41	9.55^E^ 6.51 – 13.57	2.22 .	4.15^E^ 2.23 – 6.80	8.00^E^ 5.00 – 14.26	18.54^E^ 11.59 – 28.27	32.61 .	39.52 .
	Total	3-5	10	0	20.80 16.37 – 26.29	19.52 15.64 – 24.39	9.52 .	16.53 .	19.65 15.45 – 21.53	21.60 .	23.13 .	32.61 .
	Total	6-11	19	0	17.75^E^ 11.37 – 26.48	13.51 9.61 – 18.06	6.83 .	9.71^E^ 5.91 – 12.40	12.70 10.13 – 14.24	F	32.18 .	35.94 .
	Total	12-19	21	0	4.06 3.42 – 4.69	3.75 3.16 – 4.43	1.81 .	2.56^E^ 1.84 – 3.62	3.92 2.77 – 4.76	5.04 4.02 – 5.94	6.17 .	6.26 .
	Anishinabe communities (2)	Total	28	0	15.13^E^ 9.92 – 22.07	10.13^E^ 7.23 – 14.50	2.60 .	5.05^E^ 3.06 – 7.43	12.33^E^ 6.17 – 14.81	16.75^E^ 13.67 – 22.35	24.91 .	38.08 .
	Innu communities (2)	Total	22	0	9.40^E^ 6.31 – 13.11	6.77^E^ 4.75 – 9.78	2.28 .	3.18 2.28 – 4.61	F	11.89^E^ 6.82 – 18.48	19.66 .	22.71 .
CHMS (Cycle 2)	Total	3-5	522	0		30 27 – 33	13 11 – 16		28 25 – 31	43 35 – 50		90^E^ 55 – 130
	Total	6-11	514	0		17 16 – 19	7.7 6.6 – 8.9		17 15 – 19	25 20 – 30		53 41 – 65
	Total	12-19	510	0		7.8 6.9 – 8.9	3.3 2.9 – 3.7		7.7 6.6 – 8.8	12 10 – 13		25^E^ 15 – 36

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 191: Mono (2-ethyl-5-hydroxyhexyl) phthalate (MEHHP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	13.31 9.88 – 17.45	9.28 7.17 – 11.76	3.20^{E} 1.06 – 4.45	5.45^{E} 3.98 – 7.84	9.80 7.77 – 11.58	15.25 11.71 – 19.33	F	31.50 .
	Total	F	24	0	10.61^{E} 6.86 – 15.67	6.95^{E} 4.59 – 10.34	1.42 .	F	7.80^{E} 4.07 – 10.38	11.67^{E} 7.99 – 19.29	20.20 .	24.20 .
	Total	M	26	0	15.80^{E} 11.02 – 21.93	12.14 9.34 – 15.75	4.52 .	7.50^{E} 4.57 – 10.18	11.00 8.53 – 14.95	16.50 13.17 – 20.58	22.60 .	34.10 .
	Total	3-5	10	0	13.34^{E} 7.89 – 18.65	F	0.87 .	4.70 .	14.00^{E} 4.41 – 19.40	19.50 .	21.00 .	23.00 .
	Total	6-11	19	0	19.16^{E} 11.59 – 28.73	13.39^{E} 9.33 – 19.53	3.84 .	8.60^{E} 3.79 – 10.88	11.50^{E} 9.20 – 15.97	F	39.60 .	55.45 .
	Total	12-19	21	0	7.99 6.24 – 9.66	6.60 4.80 – 8.65	1.91 .	F	7.90^{E} 4.39 – 9.59	10.25 8.04 – 12.43	12.90 9.73 – 14.53	13.95 .
	Anishinabe communities (2)	Total	28	0	13.39 9.74 – 18.34	9.66 7.00 – 13.22	3.28 .	4.80^{E} 3.36 – 7.77	9.80^{E} 6.89 – 13.69	16.00^{E} 10.73 – 21.93	F	32.80 .
	Innu communities (2)	Total	22	0	13.20^{E} 8.19 – 20.70	8.83^{E} 5.87 – 12.78	1.92 .	F	9.50^{E} 6.89 – 11.98	13.50^{E} 9.94 – 17.97	18.60 .	19.90 .
CHMS (Cycle 2)	Total	3-5	523	0		27 23 – 30	8.6 6.4 – 11		25 21 – 30	48 36 – 61		99^{E} 59 – 140
	Total	6-11	516	0		24 20 – 28	7.0 5.4 – 8.7		24 19 – 29	43 34 – 52		97 73 – 120
	Total	12-19	512	0		16 14 – 20	4.6^{E} 2.4 – 6.8		16 13 – 20	32 26 – 39		68 49 – 87

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 192: Mono (2-ethyl-5-hydroxyhexyl) phthalate (MEHHP) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	19.11 14.00 – 25.89	12.76 9.97 – 16.41	3.82 2.85 – 5.18	5.99 4.40 – 7.92	12.47^{E} 7.63 – 20.20	23.19 19.75 – 25.87	F	50.56 .
	Total	F	24	0	14.71 10.64 – 18.98	11.31 8.31 – 15.39	4.02 .	5.60^{E} 4.08 – 7.93	F	22.34 13.73 – 24.43	24.97 .	32.33 .
	Total	M	26	0	23.17^{E} 14.11 – 34.92	14.25^{E} 9.68 – 20.47	3.02 .	6.73^{E} 3.09 – 10.48	12.47^{E} 7.72 – 21.56	24.77^{E} 18.65 – 42.75	50.19 .	56.99 .
	Total	3-5	10	0	28.81 22.49 – 36.86	27.04 21.99 – 33.62	15.64 .	22.22 .	24.04^{E} 21.95 – 30.00	30.08 .	35.96 .	47.45 .
	Total	6-11	19	0	28.25^{E} 17.88 – 42.66	20.78^{E} 14.42 – 28.46	8.27 .	14.87^{E} 7.41 – 19.54	20.06 15.83 – 22.46	F	49.07 .	56.71 .
	Total	12-19	21	0	6.22 5.23 – 7.33	5.74 4.84 – 6.78	2.89 .	4.34 2.90 – 5.28	5.75 4.41 – 6.68	7.23^{E} 5.89 – 9.31	10.42 .	10.87 .
	Anishinabe communities (2)	Total	28	0	22.48^{E} 14.35 – 33.72	14.85^{E} 10.81 – 21.18	4.18 .	6.76^{E} 4.68 – 10.77	18.79^{E} 8.84 – 21.77	22.37^{E} 19.81 – 35.16	39.12 .	54.85 .
	Innu communities (2)	Total	22	0	14.82^{E} 10.02 – 20.57	10.52^{E} 7.25 – 15.32	3.27 .	4.82^{E} 3.28 – 7.05	F	22.28^{E} 10.53 – 25.21	25.46 .	34.92 .
CHMS (Cycle 2)	Total	3-5	522	0		46 41 – 51	21 18 – 24		42 37 – 47	67 54 – 80		130^{E} 66 – 190
	Total	6-11	514	0		27 24 – 30	12 10 – 14		25 23 – 28	40 33 – 47		90 66 – 110
	Total	12-19	510	0		13 11 – 14	5.1 4.2 – 6.0		12 11 – 14	19 16 – 23		37^{E} 15 – 60

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

References

AFN (Assembly of First Nations) (2013). First Nations Biomonitoring Initiative: National Results (2011). Ottawa: Assembly of First Nations. Consulted online: http://www.afn.ca/uploads/files/afn_fnbi_en.pdf

Kasper-Sonnenberg, M., Koch, H.M., Wittsiepe, J., Brüning, T., Wilhelm, M. (2014). Phthalate metabolites and bisphenol A in urines from German school-aged children: results of the Duisburg birth cohort and Bochum cohort studies. Int. J. Hyg. Environ. Health. 217 (8). 830-8.

Koch, H.M., Rüther, M., Schütze, A., Conrad, A., Pälmke, C., Apel, P., Brüning, T., Kolossa-Gehring, M. (2017). Phthalate metabolites in 24h-h urine samples of the German Environmental Specimen Bank (ESB) from 1988 to 2015 and a comparison with the US NHANES data from 1999 to 2012. Int. J. Hyg. Environ. Health. 220 (2 Part A). 130-141.

Preau, J.L. Jr., Wong, L.Y., Silva, M.J., Needham, L.L., Calafat, A.M. (2010). Variability over 1 week in the urinary concentrations of metabolites of diethyl phthalate and di(2-ethylhexyl) phthalate among eight adults: an observational study. Environ. Health Perspect. 118 (12). 1748-54.

Health Canada (2012). Industry Guide to Health Canada's Safety Requirements for Children's Toys and Related Products. Government of Canada. Consulted online: https://www.canada.ca/en/health-canada/services/consumer-product-safety/reports-publications/industry-professionals/industry-guide-safety-requirements-children-toys-related-products-summary.html

Saravanabhavan, G., Guay, M., Langlois, É., Giroux, S., Murray, J., Haines, D. (2013). Biomonitoring of phthalate metabolites in the Canadian population through the Canadian Health Measures Survey (2007-2009). Int. J. Hyg. Environ. Health. 216 (6). 652-61.

Zota, A.R., Calafat, A.M., Woodruff, T.J. (2014). Temporal trends in phthalate exposures: findings from the National Health and Nutrition Examination Survey, 2001-2010. Environ. Health Perspect. 122 (3). 235-41.

6.3.8. Organophosphorous Pesticides (OPs)

Organophosphorous pesticides (OPs) are widely used in agriculture (for fruits and vegetables), in forestry, and in lawn maintenance. These products are also found in houses to control insects (e.g., lice, ants, cockroaches, spiders, etc.) as well as in some veterinary products (Myridakis et al., 2016; EPA, 2013; Santé publique France, 2011). OPs are therefore found in the air, water, and soil, as well as in food. In Canada, several of these pesticides have been voluntarily abandoned or their residential use has become extremely regulated (Government of Canada, 2008).

Certain studies show that even in low doses, exposure to several OPs may be associated with negative health effects (e.g., cancers, neurological problems, infertility) (Santé publique France, 2011). In children exposed to these insecticides (during pregnancy), mobility and behavioural problems as well as learning disorders have been reported (Bouchard et al., 2011; Myridakis et al., 2016).

Despite these potentially harmful effects on health, there is no threshold in force to assess the population's level of exposure to these contaminants.

Once in the body, these contaminants rapidly transform into metabolites, which are then excreted in the urine after 24-48 hours (Myridakis et al., 2016). Metabolites measured in urine therefore represent recent exposure to OPs. However, given that these contaminants rapidly decompose in the body, the sources of exposure cannot be clearly identified from one single urine sample (as in this study). Furthermore, metabolites measured in urine may thus reflect exposure in the environment and/or direct exposure to metabolites found in food (Lu et al., 2005).

In the scientific literature, some authors have also measured the concentration of these metabolites in fruit juices (fresh orange and apple juice) at two exposure times (when opening the container, and 3 days later). It was observed that once the juice container was opened, the concentration of certain metabolites increased substantially after 72 hours (Lu et al., 2005). In other words, this therefore means that the longer the juice remained in the refrigerator, the more OP metabolites were able to form and the more consumers were exposed to them when drinking it (children and adults).

To date, there have been no data on the reference levels of exposure for the population of Quebec (INSPQ, 2004). At the time of the study in 2015, the Quebec Ministère de la santé et des services sociaux (MSSS) was using data from a study done on the general population in the United States in 2002, in order to verify whether OP metabolite levels in Quebec residents were high or low. These data established thresholds (called "sentinel" thresholds) and they should be used for information purposes only, to illustrate cases where abnormal exposure may have occurred (INSPQ, 2004). They do not represent official thresholds that associate OPs with health effects. That being said, since January 2017, the MSSS has decided to withdraw these "sentinel" thresholds for several reasons. Firstly, the metabolites measured in urine are commonly found in OPs, but are non-specific, i.e. there is no way to specify the OP pesticide to which the person was exposed. Secondly, since OP metabolites are excreted very quickly in urine, it is very difficult to interpret these results, as several factors may be at play (volume of urine, concentration of the contaminant, rate of urine excretion, which varies depending on water and salt intake, the time of day, etc.). Due to all of these elements, results may vary greatly in one individual and between individuals (Bradman et al., 2013; INSPQ, 2016).

The following OP metabolites were measured as part of the JES!-YEH! project:

- Dimethylphosphate (DMP)
- Dimethylthiophosphate (DMTP)
- Dimethyldithiophosphate (DMDTP)
- Diethyldithiophosphate (DEDTP)
- Diethylphosphate (DEP)
- Diethylthiophosphate (DETP)

Results

OP metabolite levels were measured in urine for all JES!-YEH! participants and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 193 – 216). Levels of these metabolites reflect recent exposure to these pesticides. A measureable level does not necessarily mean that they will have negative health effects.

For information purposes, there were a few participants in the JES!-YEH! project who exceeded the "sentinel" thresholds (used by the MSSS in 2015) for diethylphosphate (DEP) (6 participants) and diethylthiophosphate (DETP) (1 participant).

Urine levels of dimethylphosphate (DMP) measured in the JES!-YEH! study were two times lower than those in the CHMS (Cycle 2). These differences were significant for the 6-11 and 12-19 age groups (Table 196).

Urine levels of dimethylthiophosphate (DMTP) measured in the JES!-YEH! study were significantly lower than in the CHMS (Cycle 2), for the 6-11 and 12-19 age groups (Table 200). However, the results should be interpreted with caution for participants 6-11 years old, as their coefficients of variation were between 16.6 and 33.3%.

Dimethyldithiophosphate (DMDTP) and diethyldithiophosphate (DEDTP) levels were not calculated because more than 40% of the samples were below the limit of detection (Tables 204 and 216).

Urine levels of diethylphosphate (DEP) measured in the 3-5 year old participants in the JES!-YEH! project seemed to be higher than those in the CHMS (Cycle 2). However, their coefficients of variation were between 16.6 and 33.3%, and these results should be interpreted with caution. For the 6-11 and 12-19 year old age groups, urine levels of DEP were significantly higher, almost two times higher, than those in the CHMS (Cycle 2) (Table 208).

Urine levels of diethylthiophosphate (DETP) measured in participants in the JES!-YEH! project aged 3-5 and 6-11 years old were significantly different from the values for participants in the same age groups in the CHMS (Cycle 2). The geometric mean for the 12-19 age group could not be calculated for the JES!-YEH! study (Table 212).

Table 193: Dimethylphosphate (DMP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	28.4	4.58 3.54 – 5.63	2.12 1.80 – 2.48	<LD	<LD	1.85 1.56 – 2.53	4.93 4.10 – 5.67	9.29E 7.23 – 12.80	F
	Total	F	95	35.8	4.83E 3.18 – 6.60	1.97 1.51 – 2.60	<LD	<LD	1.65E 0.94 – 2.60	5.13 4.14 – 7.07	F	F
	Total	M	102	21.6	4.35 3.15 – 5.79	2.26 1.84 – 2.76	<LD	0.94E 0.50 – 1.43	2.20 1.59 – 2.99	4.35 3.54 – 5.79	8.30E 5.92 – 12.80	F
	Anishinabe communities (2)	Total	110	26.4	5.17 3.74 – 6.74	2.36 1.89 – 2.98	<LD	<LD	2.30E 1.60 – 3.25	5.13 4.15 – 6.55	F	20.50E 10.99 – 36.72
	Anishinabe communities (2)	F	55	32.7	5.82E 3.39 – 8.50	2.36E 1.61 – 3.39	<LD	<LD	F	5.45E 4.43 – 8.13	F	27.00 .
	Anishinabe communities (2)	M	55	20	4.52E 2.90 – 6.49	2.36 1.77 – 3.19	<LD	1.08E 0.50 – 1.58	2.30E 1.59 – 3.23	4.19E 3.09 – 6.13	F	16.25 .
	Innu communities (2)	Total	87	31	3.83E 2.61 – 5.41	1.84 1.47 – 2.32	<LD	<LD	1.58E 1.19 – 2.23	4.43E 2.88 – 5.89	7.83 5.81 – 9.65	F
	Innu communities (2)	F	40	40	3.47E 1.98 – 5.71	1.54E 1.09 – 2.21	<LD	<LD	F	4.20E 1.73 – 6.28	F	10.00 .
	Innu communities (2)	M	47	23.4	4.14E 2.54 – 6.64	2.15 1.58 – 2.98	<LD	0.69E 0.50 – 1.44	1.90E 1.37 – 3.45	4.43E 3.17 – 6.65	F	9.12 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 194: Dimethylphosphate (DMP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	28.4	5.74 4.61 – 6.95	2.90 2.46 – 3.43	<LD	<LD	2.75 2.13 – 3.10	6.63 5.15 – 8.32	12.65^E 9.70 – 17.65	19.79^E 13.83 – 31.66
	Total	F	95	35.8	5.94 4.38 – 7.61	3.06 2.37 – 3.92	<LD	<LD	2.81^E 1.99 – 4.31	7.06 5.12 – 9.41	13.83^E 9.34 – 19.59	F
	Total	M	102	21.6	5.54 4.05 – 7.43	2.76 2.22 – 3.45	<LD	1.13 0.91 – 1.56	2.60 2.02 – 3.16	5.91^E 4.15 – 8.32	10.89^E 8.42 – 17.65	F
	Anishinabe communities (2)	Total	110	26.4	6.78 5.22 – 8.49	3.63 2.90 – 4.55	<LD	<LD	3.05 2.60 – 4.29	7.73^E 5.07 – 10.59	16.95^E 10.91 – 21.72	26.55^E 16.00 – 35.31
	Anishinabe communities (2)	F	55	32.7	7.24^E 4.82 – 10.04	3.84 2.81 – 5.17	<LD	<LD	3.24^E 2.19 – 5.24	7.94^E 5.13 – 13.49	F	24.27 .
	Anishinabe communities (2)	M	55	20	6.32^E 4.32 – 8.71	3.42 2.51 – 4.59	<LD	1.67^E 1.11 – 2.53	2.99 2.45 – 4.08	7.03^E 3.82 – 10.79	F	24.14 .
	Innu communities (2)	Total	87	31	4.41^E 3.03 – 6.36	2.19 1.74 – 2.79	<LD	<LD	1.88 1.32 – 2.56	5.32^E 3.01 – 7.35	9.53^E 7.30 – 12.20	F
	Innu communities (2)	F	40	40	4.15^E 2.84 – 5.76	2.24^E 1.54 – 3.28	<LD	<LD	1.92^E 1.31 – 2.81	F	11.63^E 5.80 – 14.53	12.44 .
	Innu communities (2)	M	47	23.4	4.64^E 2.55 – 7.85	2.15^E 1.54 – 2.98	<LD	0.89 0.76 – 1.11	1.69^E 1.08 – 2.91	5.25^E 2.60 – 7.35	F	9.99 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 195: Dimethylphosphate (DMP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	28.4	4.58 3.54 – 5.63	2.12 1.80 – 2.48	<LD	<LD	1.85 1.56 – 2.53	4.93 4.10 – 5.67	9.29[E] 7.23 – 12.80	F
	Total	3-5	38	23.7	8.55[E] 5.01 – 12.80	3.39[E] 2.13 – 5.30	<LD	F	4.20[E] 1.49 – 5.63	F	F	39.60 .
	Total	6-11	79	24.1	3.79 2.83 – 5.03	2.17 1.71 – 2.76	<LD	F	2.13[E] 1.54 – 3.10	4.73[E] 3.50 – 6.78	8.44 6.27 – 9.59	F
	Total	12-19	80	35	3.48[E] 2.30 – 4.97	1.65 1.29 – 2.12	<LD	<LD	1.47[E] 0.81 – 2.07	3.60[E] 2.33 – 4.96	F	F
	Anishinabe communities (2)	Total	110	26.4	5.17 3.74 – 6.74	2.36 1.89 – 2.98	<LD	<LD	2.30[E] 1.60 – 3.25	5.13 4.15 – 6.55	F	20.50[E] 10.99 – 36.72
	Anishinabe communities (2)	3-5	24	25	9.50[E] 4.81 – 14.84	3.65[E] 2.01 – 6.71	<LD	<LD	F	F	26.40 .	36.80 .
	Anishinabe communities (2)	6-11	46	19.6	3.55 2.69 – 4.71	2.28 1.72 – 3.07	<LD	1.15[E] 0.50 – 1.56	2.20[E] 1.54 – 3.46	4.75[E] 3.10 – 6.95	8.20[E] 5.41 – 10.08	9.76 .
	Anishinabe communities (2)	12-19	40	35	4.44[E] 2.26 – 7.15	1.90[E] 1.32 – 2.75	<LD	<LD	F	4.10 2.60 – 5.14	F	17.00 .
	Innu communities (2)	Total	87	31	3.83[E] 2.61 – 5.41	1.84 1.47 – 2.32	<LD	<LD	1.58[E] 1.19 – 2.23	4.43[E] 2.88 – 5.89	7.83 5.81 – 9.65	F
	Innu communities (2)	3-5	14	21.4	F	F	<LD	0.95 .	F	F	7.78 .	20.16 .
	Innu communities (2)	6-11	33	30.3	4.11[E] 2.28 – 6.79	2.02[E] 1.34 – 2.98	<LD	<LD	F	4.43[E] 2.53 – 7.84	F	9.42 .
	Innu communities (2)	12-19	40	35	2.52[E] 1.62 – 3.54	1.44 1.05 – 1.95	<LD	<LD	1.23[E] 0.50 – 1.77	F	F	9.50 .
CHMS (Cycle 2)	Total	3-5	522	7.28		6.7 5.6 – 8.1	1.4 1.0 – 1.8		6.8 4.9 – 8.6	15 12 – 17		F
	Total	6-11	516	10.27		6.1 5.1 – 7.2	1.3E <LD – 2.0		5.9 4.6 – 7.3	13 9.5 – 17		F
	Total	12-19	512	10.74		3.8 3.2 – 4.5	<LD		4.0 3.2 – 4.8	8.2 6.6 – 9.7		30 19 – 41

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 196: Dimethylphosphate (DMP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	28.4	5.74 4.61 – 6.95	2.90 2.46 – 3.43	<LD	<LD	2.75 2.13 – 3.10	6.63 5.15 – 8.32	12.65^E^ 9.70 – 17.65	19.79^E^ 13.83 – 31.66
	Total	3-5	38	23.7	13.49^E^ 9.01 – 18.57	7.32^E^ 5.02 – 10.41	<LD	3.05^E^ 1.77 – 5.21	6.86^E^ 4.62 – 10.04	F	35.18^E^ 19.90 – 44.68	39.38 .
	Total	6-11	79	24.1	5.16 4.18 – 6.21	3.46 2.78 – 4.25	<LD	1.78 1.37 – 2.27	2.98^E^ 2.53 – 4.59	7.91 5.12 – 9.34	11.67 9.19 – 13.18	13.25 11.11 – 17.51
	Total	12-19	80	35	2.62 1.93 – 3.42	1.57 1.26 – 1.95	<LD	<LD	1.40 1.07 – 1.88	3.02^E^ 2.06 – 3.62	F	F
	Anishinabe communities (2)	Total	110	26.4	6.78 5.22 – 8.49	3.63 2.90 – 4.55	<LD	<LD	3.05 2.60 – 4.29	7.73^E^ 5.07 – 10.59	16.95^E^ 10.91 – 21.72	26.55^E^ 16.00 – 35.31
	Anishinabe communities (2)	3-5	24	25	14.87^E^ 9.28 – 20.70	8.50^E^ 5.23 – 13.45	<LD	<LD	F	21.74^E^ 7.79 – 34.45	35.79 .	37.75 .
	Anishinabe communities (2)	6-11	46	19.6	5.74 4.44 – 7.30	4.12 3.26 – 5.24	<LD	2.09 1.65 – 2.86	3.68 2.71 – 4.98	8.32^E^ 4.59 – 10.97	12.55^E^ 9.16 – 17.09	16.43 .
	Anishinabe communities (2)	12-19	40	35	3.13^E^ 2.11 – 4.45	1.88 1.38 – 2.53	<LD	<LD	1.88^E^ 1.12 – 2.63	3.32^E^ 2.54 – 4.72	F	9.39 .
	Innu communities (2)	Total	87	31	4.41^E^ 3.03 – 6.36	2.19 1.74 – 2.79	<LD	<LD	1.88 1.32 – 2.56	5.32^E^ 3.01 – 7.35	9.53^E^ 7.30 – 12.20	F
	Innu communities (2)	3-5	14	21.4	F	5.67^E^ 3.00 – 11.07	<LD	2.40 .	F	F	18.61 .	32.97 .
	Innu communities (2)	6-11	33	30.3	4.35 3.10 – 5.60	2.71^E^ 1.88 – 3.80	<LD	<LD	F	7.35^E^ 3.39 – 8.84	9.42 7.47 – 11.93	11.74 .
	Innu communities (2)	12-19	40	35	2.12^E^ 1.37 – 3.08	1.32 0.99 – 1.77	<LD	<LD	1.22 0.90 – 1.56	1.94^E^ 1.41 – 3.18	F	5.83 .
CHMS (Cycle 2)	Total	3-5	521	7.29		12 9.8 – 14	2.6 1.9 – 3.3		12 8.8 – 16	22 16 – 28		100^E^ 40 – 170
	Total	6-11	514	10.31		6.9 6.0 – 8.0	1.6 <LD – 1.9		7.2 6.0 – 8.4	15 11 – 18		52^E^ 22 – 83
	Total	12-19	510	10.78		2.9 2.5 – 3.4	<LD		2.8 2.3 – 3.3	6.0 4.3 – 7.7		18^E^ 9.9 – 27

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%;
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 197: Dimethylthiophosphate (DMTP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	27.4	6.58 5.10 – 8.43	1.94 1.59 – 2.44	<LD	<LD	1.67^E 0.98 – 2.17	6.25^E 4.45 – 8.43	20.15^E 12.18 – 26.20	29.05^E 21.80 – 39.33
	Total	F	95	31.6	5.90^E 3.64 – 8.98	1.66 1.24 – 2.30	<LD	<LD	1.00^E 0.86 – 2.06	4.88^E 3.05 – 8.57	15.50^E 8.30 – 24.67	F
	Total	M	102	23.5	7.20 4.96 – 9.59	2.25 1.67 – 3.05	<LD	0.61^E 0.30 – 0.93	2.03^E 0.99 – 2.83	6.95^E 4.35 – 10.91	23.40^E 11.85 – 29.60	29.95^E 20.78 – 46.50
	Anishinabe communities (2)	Total	110	20	6.87^E 4.76 – 9.39	2.43 1.86 – 3.29	<LD	0.80^E 0.30 – 0.97	2.30^E 1.66 – 3.49	6.90^E 4.52 – 11.29	19.00^E 12.37 – 24.10	25.00^E 18.60 – 33.75
	Anishinabe communities (2)	F	55	23.6	6.53^E 3.58 – 11.02	2.22^E 1.51 – 3.28	<LD	0.60^E 0.30 – 0.99	2.35^E 0.99 – 3.83	5.90^E 3.63 – 10.66	13.50^E 8.78 – 22.15	21.50 .
	Anishinabe communities (2)	M	55	16.4	7.21^E 4.61 – 10.26	2.67^E 1.83 – 4.06	<LD	0.91^E 0.30 – 1.35	2.27^E 1.26 – 3.77	F	20.50^E 11.70 – 28.87	28.50 .
	Innu communities (2)	Total	87	36.8	6.20^E 3.77 – 8.77	1.46^E 1.05 – 2.00	<LD	<LD	0.82^E 0.61 – 1.45	5.85^E 1.95 – 7.57	25.30^E 7.59 – 29.63	F
	Innu communities (2)	F	40	42.5	–	–	<LD	<LD	0.63^E 0.30 – 0.91	F	F	26.00 .
	Innu communities (2)	M	47	31.9	7.20^E 3.57 – 11.15	1.85^E 1.12 – 3.02	<LD	<LD	F	F	F	35.85 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 198: Dimethylthiophosphate (DMTP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	27.4	9.54 7.17 – 12.46	2.67 2.14 – 3.41	<LD	<LD	2.33 1.65 – 3.11	8.48^{E} 5.65 – 12.38	27.50 20.50 – 31.50	38.13^{E} 27.86 – 59.39
	Total	F	95	31.6	9.71^{E} 5.83 – 14.76	2.57 1.85 – 3.60	<LD	<LD	2.10^{E} 1.39 – 3.08	8.39^{E} 4.25 – 12.63	24.32^{E} 12.35 – 32.02	F
	Total	M	102	23.5	9.39 6.48 – 12.23	2.76 1.99 – 3.79	<LD	0.73^{E} 0.46 – 1.25	2.61^{E} 1.54 – 3.63	F	28.66^{E} 19.22 – 37.89	43.56^{E} 27.52 – 57.91
	Anishinabe communities (2)	Total	110	20	9.69 6.88 – 12.98	3.73 2.83 – 4.90	<LD	1.32 0.93 – 1.84	3.60^{E} 2.36 – 4.91	11.41^{E} 6.00 – 18.50	27.48 20.12 – 30.33	31.07^{E} 27.29 – 42.25
	Anishinabe communities (2)	F	55	23.6	10.09^{E} 5.89 – 16.31	3.60^{E} 2.44 – 5.41	<LD	1.32^{E} 0.66 – 1.89	3.36^{E} 1.80 – 5.35	11.37^{E} 5.27 – 18.12	27.00^{E} 12.38 – 33.43	32.65 .
	Anishinabe communities (2)	M	55	16.4	9.29^{E} 6.41 – 12.61	3.87^{E} 2.68 – 5.52	<LD	1.39^{E} 0.87 – 2.20	3.77^{E} 2.16 – 5.45	F	27.45^{E} 16.86 – 30.14	30.01 .
	Innu communities (2)	Total	87	36.8	9.36^{E} 5.21 – 14.06	1.74^{E} 1.22 – 2.56	<LD	<LD	1.18^{E} 0.73 – 1.66	F	F	F
	Innu communities (2)	F	40	42.5	–	–	<LD	<LD	1.08^{E} 0.60 – 1.87	F	F	31.07 .
	Innu communities (2)	M	47	31.9	9.50^{E} 4.41 – 14.90	1.85^{E} 1.04 – 3.08	<LD	<LD	F	F	F	55.55 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 199: Dimethylthiophosphate (DMTP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	27.4	6.58 5.10 – 8.43	1.94 1.59 – 2.44	<LD	<LD	1.67E 0.98 – 2.17	6.25E 4.45 – 8.43	20.15E 12.18 – 26.20	29.05E 21.80 – 39.33
	Total	3-5	38	13.2	13.12E 7.58 – 19.90	4.38E 2.52 – 7.36	<LD	0.99E 0.30 – 1.79	F	17.50E 7.60 – 27.13	F	49.60 .
	Total	6-11	79	25.3	6.35E 4.25 – 8.78	2.13E 1.49 – 2.97	<LD	<LD	1.97E 0.95 – 3.40	7.33E 4.15 – 10.94	20.30E 10.04 – 27.10	F
	Total	12-19	80	36.3	3.69E 2.05 – 5.87	1.21 0.90 – 1.66	<LD	<LD	0.93E 0.60 – 1.58	3.00E 2.04 – 4.54	F	F
	Anishinabe communities (2)	Total	110	20	6.87E 4.76 – 9.39	2.43 1.86 – 3.29	<LD	0.80E 0.30 – 0.97	2.30E 1.66 – 3.49	6.90E 4.52 – 11.29	19.00E 12.37 – 24.10	25.00E 18.60 – 33.75
	Anishinabe communities (2)	3-5	24	8.3	F	4.52E 2.52 – 8.76	0.54 .	1.30E 0.65 – 2.56	F	F	22.80 .	33.60 .
	Anishinabe communities (2)	6-11	46	19.6	5.59E 3.67 – 7.89	2.31E 1.54 – 3.41	<LD	0.68E 0.30 – 1.18	F	7.25E 3.65 – 11.31	14.40E 9.59 – 23.35	22.10 .
	Anishinabe communities (2)	12-19	40	27.5	5.00E 2.44 – 8.63	1.78E 1.14 – 2.76	<LD	<LD	2.20E 0.85 – 3.00	4.50E 2.68 – 6.33	F	21.00 .
	Innu communities (2)	Total	87	36.8	6.20E 3.77 – 8.77	1.46E 1.05 – 2.00	<LD	<LD	0.82E 0.61 – 1.45	5.85E 1.95 – 7.57	25.30E 7.59 – 29.63	F
	Innu communities (2)	3-5	14	21.4	F	F	<LD	0.48 .	F	F	41.40 .	50.80 .
	Innu communities (2)	6-11	33	33.3	7.42E 3.57 – 11.92	1.90E 1.09 – 3.32	<LD	<LD	0.97E 0.30 – 3.43	F	F	28.05 .
	Innu communities (2)	12-19	40	45	–	–	<LD	<LD	0.60E 0.30 – 0.84	1.40E 0.72 – 2.63	F	6.70 .
CHMS (Cycle 2)	Total	3-5	524	7.44		6.3 5.1 – 7.8	0.72 <LD – 0.97		6.4 4.5 – 8.3	18 13 – 23		89 60 – 120
	Total	6-11	516	11.82		5.0 4.2 – 6.0	0.64 <LD – 0.80		5.3 3.7 – 6.9	14 9.8 – 18		66E 31 – 100
	Total	12-19	512	16.21		2.6 2.1 – 3.3	<LD		2.7 2.0 – 3.3	7.7 5.0 – 10		36E 22 – 50

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 200: Dimethylthiophosphate (DMTP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	27.4	9.54 7.17 – 12.46	2.67 2.14 – 3.41	<LD	<LD	2.33 1.65 – 3.11	8.48^{E} 5.65 – 12.38	27.50 20.50 – 31.50	38.13^{E} 27.86 – 59.39
	Total	3-5	38	13.2	23.37^{E} 14.50 – 34.21	9.45^{E} 5.66 – 15.48	<LD	F	F	27.45^{E} 18.41 – 34.41	F	104.3 .
	Total	6-11	79	25.3	9.53^{E} 6.39 – 13.01	3.40^{E} 2.39 – 4.67	<LD	<LD	2.65^{E} 1.70 – 4.91	10.80^{E} 5.53 – 16.90	27.84^{E} 15.40 – 36.23	35.63^{E} 25.24 – 61.24
	Total	12-19	80	36.3	2.99^{E} 1.80 – 4.61	1.15 0.87 – 1.55	<LD	<LD	1.03^{E} 0.65 – 1.60	3.36^{E} 2.09 – 4.24	5.94^{E} 4.06 – 8.44	F
	Anishinabe communities (2)	Total	110	20	9.69 6.88 – 12.98	3.73 2.83 – 4.90	<LD	1.32 0.93 – 1.84	3.60^{E} 2.36 – 4.91	11.41^{E} 6.00 – 18.50	27.48 20.12 – 30.33	31.07^{E} 27.29 – 42.25
	Anishinabe communities (2)	3-5	24	8.3	20.43^{E} 12.12 – 32.85	10.54^{E} 6.55 – 17.13	1.32 .	F	F	27.37 16.92 – 28.94	29.51 .	41.35 .
	Anishinabe communities (2)	6-11	46	19.6	9.45^{E} 6.21 – 13.35	4.17^{E} 2.83 – 6.04	<LD	1.44^{E} 0.95 – 2.15	3.94^{E} 2.04 – 5.79	F	26.97^{E} 14.46 – 36.27	34.28 .
	Anishinabe communities (2)	12-19	40	27.5	3.52^{E} 2.13 – 5.40	1.77^{E} 1.19 – 2.61	<LD	<LD	2.09^{E} 1.26 – 3.14	3.77E 2.66 – 5.48	F	8.84 .
	Innu communities (2)	Total	87	36.8	9.36^{E} 5.21 – 14.06	1.74^{E} 1.22 – 2.56	<LD	<LD	1.18^{E} 0.73 – 1.66	F	F	F
	Innu communities (2)	3-5	14	21.4	F	F	<LD	1.26 .	F	F	85.62 .	108.8 .
	Innu communities (2)	6-11	33	33.3	9.65^{E} 4.30 – 16.37	2.55^{E} 1.48 – 4.42	<LD	<LD	F	F	F	45.10 .
	Innu communities (2)	12-19	40	45	–	–	<LD	<LD	0.60^{E} 0.33 – 0.93	F	F	6.74 .
CHMS (Cycle 2)	Total	3-5	523	7.46		11 9.1 – 13	1.5 <LD – 1.9		11 8.2 – 14	33 24 – 41		110 89 - 140
	Total	6-11	514	11.87		5.7 4.7 – 7.0	0.84 <LD – 0.99		5.9^{E} 3.4 – 8.4	16^{E} 10 – 23		90^{E} 29 – 150
	Total	12-19	510	16.27		2.0 1.6 – 2.5	<LD		1.7 1.1 – 2.3	5.7 4.6 – 6.7		25^{E} 12 – 38

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 201: Dimethyldithiophosphate (DMDTP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	67.5	–	–	<LD	<LD	<LD	0.49[E] 0.20 – 0.67	F	3.65[E] 1.74 – 5.26
	Total	F	95	70.5	–	–	<LD	<LD	<LD	0.47[E] 0.15 – 0.61	F	F
	Total	M	102	64.7	–	–	<LD	<LD	<LD	F	F	4.68[E] 1.64 – 5.74
	Anishinabe communities (2)	Total	110	60.9	–	–	<LD	<LD	<LD	0.53[E] 0.30 – 0.86	F	3.30[E] 1.68 – 5.26
	Anishinabe communities (2)	F	55	61.8	–	–	<LD	<LD	<LD	F	F	2.65 .
	Anishinabe communities (2)	M	55	60	–	–	<LD	<LD	<LD	F	F	3.73 .
	Innu communities (2)	Total	87	75.9	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	F	40	82.5	–	–	<LD	<LD	<LD	<LD	F	1.30 .
	Innu communities (2)	M	47	70.2	–	–	<LD	<LD	<LD	F	F	4.38 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 202: Dimethyldithiophosphate (DMDTP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	67.5	–	–	<LD	<LD	<LD	0.78 0.63 – 0.88	F	5.35^E^ 2.63 – 7.35
	Total	F	95	70.5	–	–	<LD	<LD	<LD	0.73 0.60 – 0.96	F	F
	Total	M	102	64.7	–	–	<LD	<LD	<LD	0.77 0.52 – 1.02	F	5.54^E^ 2.41 – 7.13
	Anishinabe communities (2)	Total	110	60.9	–	–	<LD	<LD	<LD	0.83^E^ 0.66 – 1.15	F	F
	Anishinabe communities (2)	F	55	61.8	–	–	<LD	<LD	<LD	F	F	4.43 .
	Anishinabe communities (2)	M	55	60	–	–	<LD	<LD	<LD	0.81^E^ 0.61 – 1.28	F	4.72 .
	Innu communities (2)	Total	87	75.9	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	F	40	82.5	–	–	<LD	<LD	<LD	<LD	F	2.21 .
	Innu communities (2)	M	47	70.2	–	–	<LD	<LD	<LD	F	F	5.48 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 203: Dimethyldithiophosphate (DMDTP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	67.5	–	–	<LD	<LD	<LD	0.49^{E} 0.20 – 0.67	F	3.65^{E} 1.74 – 5.26
	Total	3-5	38	52.6	–	–	<LD	<LD	<LD	F	F	4.36 .
	Total	6-11	79	62	–	–	<LD	<LD	<LD	0.62^{E} 0.30 – 1.02	F	F
	Total	12-19	80	80	–	–	<LD	<LD	<LD	<LD	0.66^{E} 0.27 – 0.96	F
	Anishinabe communities (2)	Total	110	60.9	–	–	<LD	<LD	<LD	0.53^{E} 0.30 – 0.86	F	3.30^{E} 1.68 – 5.26
	Anishinabe communities (2)	3-5	24	58.3	–	–	<LD	<LD	<LD	F	1.86 .	2.94 .
	Anishinabe communities (2)	6-11	46	54.3	–	–	<LD	<LD	<LD	F	F	5.27 .
	Anishinabe communities (2)	12-19	40	70	–	–	<LD	<LD	<LD	F	F	1.30 .
	Innu communities (2)	Total	87	75.9	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	3-5	14	42.9	–	–	<LD	<LD	F	F	5.04 .	7.66 .
	Innu communities (2)	6-11	33	72.7	–	–	<LD	<LD	<LD	F	F	2.53 .
	Innu communities (2)	12-19	40	90	–	–	<LD	<LD	<LD	<LD	<LD	0.66 .
CHMS (Cycle 2)	Total	3-5	523	39.39		0.85 0.68 – 1.1	<LD		0.57^{E} 0.32 – 0.83	2.3^{E} 1.1 – 3.4		18^{E} 9.6 – 26
	Total	6-11	512	45.12		–	<LD		0.49^{E} <LD – 0.75	1.3 0.88 – 1.7		9.3^{E} 5.6 – 13
	Total	12-19	512	50.59		–	<LD		<LD	0.68 0.48 – 0.88		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 204: Dimethyldithiophosphate (DMDTP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	67.5	–	–	<LD	<LD	<LD	0.78 0.63 – 0.88	F	5.35E 2.63 – 7.35
	Total	3-5	38	52.6	–	–	<LD	<LD	<LD	F	F	7.83 .
	Total	6-11	79	62	–	–	<LD	<LD	<LD	0.85E 0.73 – 1.44	F	F
	Total	12-19	80	80	–	–	<LD	<LD	<LD	<LD	0.67E 0.49 – 0.84	0.88E 0.62 – 1.08
	Anishinabe communities (2)	Total	110	60.9	–	–	<LD	<LD	<LD	0.83E 0.66 – 1.15	F	F
	Anishinabe communities (2)	3-5	24	58.3	–	–	<LD	<LD	<LD	F	4.09 .	4.37 .
	Anishinabe communities (2)	6-11	46	54.3	–	–	<LD	<LD	<LD	F	F	7.83 .
	Anishinabe communities (2)	12-19	40	70	–	–	<LD	<LD	<LD	0.38E 0.23 – 0.67	0.78E 0.47 – 1.08	1.06 .
	Innu communities (2)	Total	87	75.9	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	3-5	14	42.9	–	–	<LD	<LD	F	F	10.85 .	17.45 .
	Innu communities (2)	6-11	33	72.7	–	–	<LD	<LD	<LD	F	F	3.46 .
	Innu communities (2)	12-19	40	90	–	–	<LD	<LD	<LD	<LD	<LD	0.63 .
CHMS (Cycle 2)	Total	3-5	522	39.46		1.3 1.0 – 1.7	<LD		0.96 0.70 – 1.2	3.7E 1.9 – 5.5		27E 16 – 38
	Total	6-11	510	45.29		–	<LD		0.52E <LD – 0.72	1.5E 0.93 – 2.1		9.7E 5.2 – 14
	Total	12-19	510	50.78		–	<LD		<LD	0.49 0.33 – 0.65		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%;
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 205: Diethylphosphate (DEP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	9.6	16.33 11.96 – 21.45	5.96 4.93 – 7.17	0.62E 0.50 – 1.14	2.03E 1.57 – 3.05	5.73 4.84 – 7.06	15.38E 10.88 – 20.72	35.30 28.85 – 46.38	66.80E 37.50 – 96.82
	Total	F	95	12.6	14.31E 9.75 – 19.74	5.26 3.94 – 6.91	<LD	1.64E 1.07 – 3.00	5.45 3.74 – 6.59	F	36.50 28.30 – 46.77	F
	Total	M	102	6.9	18.20E 11.25 – 27.30	6.69 5.21 – 8.77	1.07E 0.50 – 1.58	2.35E 1.66 – 4.00	6.10 4.87 – 8.10	16.38E 11.79 – 23.00	F	80.30E 31.10 – 118.5
	Anishinabe communities (2)	Total	110	7.3	18.08E 11.85 – 26.57	6.75 5.28 – 8.81	1.10E 0.50 – 1.66	2.73E 1.78 – 3.71	5.90 4.75 – 7.78	16.50E 10.63 – 27.42	41.00E 28.60 – 53.56	F
	Anishinabe communities (2)	F	55	7.3	17.44E 10.80 – 26.55	6.52E 4.37 – 9.61	0.80E 0.50 – 1.72	2.48E 1.29 – 3.71	5.75E 3.73 – 7.40	27.25E 7.30 – 35.00	F	55.25 .
	Anishinabe communities (2)	M	55	7.3	F	6.98E 5.04 – 9.89	1.40E 0.50 – 2.22	2.75E 1.73 – 4.70	6.70E 4.71 – 10.00	15.25E 10.50 – 20.97	F	55.75 .
	Innu communities (2)	Total	87	12.6	14.11E 9.28 – 19.60	5.09 3.74 – 6.99	<LD	1.48E 1.03 – 2.59	5.35E 3.83 – 7.45	14.25E 8.31 – 21.63	F	F
	Innu communities (2)	F	40	20	10.01E 5.74 – 14.97	3.92E 2.59 – 6.06	<LD	F	F	F	F	36.00 .
	Innu communities (2)	M	47	6.4	17.61E 9.83 – 26.95	6.36E 4.21 – 9.71	1.02E 0.50 – 1.52	F	5.65E 4.19 – 8.20	16.00E 7.92 – 28.48	F	94.25 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 206: Diethylphosphate (DEP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	9.6	20.05 15.07 – 25.97	8.17 6.79 – 9.83	1.37E 0.95 – 2.04	3.72 2.81 – 4.37	8.10 5.65 – 10.29	20.37 14.36 – 23.75	46.31E 33.11 – 72.90	79.19E 54.96 – 118.7
	Total	F	95	12.6	18.43 13.30 – 24.55	8.17 6.29 – 10.71	<LD	3.28 2.50 – 4.38	8.34E 4.86 – 11.10	20.63E 13.80 – 32.35	47.26E 31.65 – 74.73	76.72E 38.56 – 110.0
	Total	M	102	6.9	21.56E 13.32 – 32.24	8.18 6.28 – 10.75	1.19E 0.83 – 2.04	3.86E 2.40 – 5.05	7.60E 5.47 – 10.47	19.10E 12.63 – 24.68	F	F
	Anishinabe communities (2)	Total	110	7.3	24.64E 16.78 – 34.92	10.36 8.22 – 13.34	2.54E 1.75 – 3.50	4.38 3.68 – 5.00	8.40E 5.72 – 12.22	22.20E 15.47 – 33.05	63.55E 33.29 – 94.56	97.81E 60.45 – 133.5
	Anishinabe communities (2)	F	55	7.3	23.42E 15.13 – 33.13	10.59E 7.49 – 14.96	2.43E 1.00 – 3.58	4.05 3.03 – 4.89	8.85E 4.86 – 14.83	F	68.62E 32.96 – 104.4	98.13 .
	Anishinabe communities (2)	M	55	7.3	25.87E 13.56 – 44.82	10.13E 7.37 – 14.02	F	4.78 3.36 – 5.49	7.52E 5.40 – 11.56	21.30E 11.89 – 30.19	F	83.78 .
	Innu communities (2)	Total	87	12.6	14.25E 9.55 – 19.72	6.06 4.52 – 8.16	<LD	2.21E 1.21 – 3.55	7.04E 4.20 – 9.43	13.87E 10.66 – 20.63	34.79E 20.54 – 44.36	F
	Innu communities (2)	F	40	20	11.57E 7.54 – 16.30	5.72E 3.88 – 8.47	<LD	2.23E 1.04 – 3.73	5.89E 3.16 – 9.43	F	31.75E 13.97 – 43.39	37.45 .
	Innu communities (2)	M	47	6.4	16.53E 8.95 – 25.59	6.37E 4.12 – 9.62	0.88E 0.45 – 1.33	F	7.04E 3.94 – 10.48	14.27E 10.31 – 21.02	F	60.39 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 207: Diethylphosphate (DEP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	9.6	16.33 11.96 – 21.45	5.96 4.93 – 7.17	0.62^{E} 0.50 – 1.14	2.03^{E} 1.57 – 3.05	5.73 4.84 – 7.06	15.38^{E} 10.88 – 20.72	35.30 28.85 – 46.38	66.80^{E} 37.50 – 96.82
	Total	3-5	38	5.3	31.48^{E} 14.54 – 54.86	9.15^{E} 5.53 – 14.93	1.04 .	F	F	F	F	124.0 .
	Total	6-11	79	8.9	14.49^{E} 9.84 – 20.05	5.95 4.44 – 8.06	0.73^{E} 0.50 – 1.34	2.88^{E} 1.20 – 3.82	5.58 4.05 – 7.82	F	F	F
	Total	12-19	80	12.5	10.94 8.02 – 14.35	4.87 3.66 – 6.55	<LD	1.60^{E} 1.16 – 2.45	4.90^{E} 3.22 – 6.68	14.00 9.33 – 17.22	28.50^{E} 16.74 – 40.50	41.00^{E} 26.70 – 55.78
	Anishinabe communities (2)	Total	110	7.3	18.08^{E} 11.85 – 26.57	6.75 5.28 – 8.81	1.10^{E} 0.50 – 1.66	2.73^{E} 1.78 – 3.71	5.90 4.75 – 7.78	16.50^{E} 10.63 – 27.42	41.00^{E} 28.60 – 53.56	F
	Anishinabe communities (2)	3-5	24	8.3	F	F	0.82 .	F	F	F	103.2 .	150.0 .
	Anishinabe communities (2)	6-11	46	6.5	14.02^{E} 9.23 – 19.81	7.00^{E} 4.94 – 10.09	F	3.45^{E} 1.94 – 4.53	6.10^{E} 4.09 – 9.18	F	F	47.70 .
	Anishinabe communities (2)	12-19	40	7.5	9.94^{E} 6.45 – 13.82	5.13^{E} 3.49 – 7.43	0.80 .	2.30^{E} 1.18 – 3.54	4.90^{E} 2.70 – 8.29	F	27.00^{E} 11.60 – 41.39	41.00 .
	Innu communities (2)	Total	87	12.6	14.11^{E} 9.28 – 19.60	5.09 3.74 – 6.99	<LD	1.48^{E} 1.03 – 2.59	5.35^{E} 3.83 – 7.45	14.25^{E} 8.31 – 21.63	F	F
	Innu communities (2)	3-5	14	0	F	F	1.10 .	3.35 .	F	F	29.60 .	58.40 .
	Innu communities (2)	6-11	33	12.1	F	4.75^{E} 2.93 – 7.97	<LD	F	4.85^{E} 1.97 – 7.96	F	F	67.10 .
	Innu communities (2)	12-19	40	17.5	11.95^{E} 7.13 – 17.57	4.61^{E} 2.89 – 7.34	<LD	1.40^{E} 0.50 – 2.17	F	16.00^{E} 6.33 – 22.31	F	36.00 .
CHMS (Cycle 2)	Total	3-5	523	8.60		4.9 4.1 – 5.9	1.2 <LD – 1.6		5.1 4.1 – 6.1	9.3 7.2 – 12		29^{E} 9.9 – 48
	Total	6-11	515	11.26		4.1 3.7 – 4.7	1.1 <LD – 1.3		4.0 3.5 – 4.5	8.1 6.6 – 9.7		23^{E} 12 – 33
	Total	12-19	512	12.30		3.4 3.0 – 3.9	<LD		3.1 2.6 – 3.7	7.4 5.8 – 8.9		23^{E} 14 – 31

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 208: Diethylphosphate (DEP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	9.6	20.05 15.07 – 25.97	8.17 6.79 – 9.83	1.37^{E} 0.95 – 2.04	3.72 2.81 – 4.37	8.10 5.65 – 10.29	20.37 14.36 – 23.75	46.31^{E} 33.11 – 72.90	79.19^{E} 54.96 – 118.7
	Total	3-5	38	5.3	44.90^{E} 25.21 – 71.61	19.75^{E} 12.74 – 30.12	4.53 .	8.16^{E} 4.91 – 11.71	18.01^{E} 10.29 – 30.82	F	F	142.3 .
	Total	6-11	79	8.9	20.19 14.26 – 26.83	9.49 7.29 – 12.46	2.44^{E} 0.87 – 3.29	4.10 3.26 – 4.90	8.57^{E} 5.21 – 12.35	20.99^{E} 14.41 – 33.18	55.31^{E} 31.32 – 78.55	78.84^{E} 37.27 – 120.6
	Total	12-19	80	12.5	8.11 6.30 – 10.04	4.63 3.65 – 5.84	<LD	2.01^{E} 1.19 – 3.03	4.75 3.68 – 6.24	10.32^{E} 7.82 – 13.80	20.53^{E} 13.31 – 24.64	24.45^{E} 19.72 – 34.23
	Anishinabe communities (2)	Total	110	7.3	24.64^{E} 16.78 – 34.92	10.36 8.22 – 13.34	2.54^{E} 1.75 – 3.50	4.38 3.68 – 5.00	8.40^{E} 5.72 – 12.22	22.20^{E} 15.47 – 33.05	63.55^{E} 33.29 – 94.56	97.81^{E} 60.45 – 133.5
	Anishinabe communities (2)	3-5	24	8.3	54.23^{E} 25.78 – 93.17	23.11^{E} 12.99 – 40.70	4.87 .	F	F	F	115.2 .	138.1 .
	Anishinabe communities (2)	6-11	46	6.5	24.06^{E} 15.83 – 34.29	12.64^{E} 9.14 – 17.87	3.61^{E} 2.23 – 4.48	4.75 3.89 – 5.93	12.36^{E} 5.67 – 19.11	F	66.06^{E} 28.55 – 97.77	89.60 .
	Anishinabe communities (2)	12-19	40	7.5	7.57 5.23 – 10.04	5.09 3.84 – 6.65	1.75^{E} 0.87 – 2.35	2.60^{E} 1.97 – 3.83	4.75 3.58 – 5.89	F	18.42^{E} 8.47 – 26.43	24.45 .
	Innu communities (2)	Total	87	12.6	14.25^{E} 9.55 – 19.72	6.06 4.52 – 8.16	<LD	2.21^{E} 1.21 – 3.55	7.04^{E} 4.20 – 9.43	13.87^{E} 10.66 – 20.63	34.79^{E} 20.54 – 44.36	F
	Innu communities (2)	3-5	14	0	F	15.08^{E} 7.86 – 29.98	2.17 .	5.98 .	F	F	55.22 .	86.10 .
	Innu communities (2)	6-11	33	12.1	14.81^{E} 7.23 – 24.88	6.37^{E} 4.08 – 10.09	<LD	2.88^{E} 1.70 – 4.47	5.67^{E} 3.63 – 9.59	F	F	49.73 .
	Innu communities (2)	12-19	40	17.5	8.65^{E} 5.82 – 11.68	4.22^{E} 2.77 – 6.33	<LD	F	F	11.66^{E} 8.82 – 19.78	20.63^{E} 12.84 – 28.22	23.75 .
CHMS (Cycle 2)	Total	3-5	522	8.62		8.5 7.3 – 9.9	2.6 <LD – 3.3		8.6 7.2 – 10	15 10 – 19		44 33 – 56
	Total	6-11	513	11.31		4.8 4.3 – 5.3	1.6 <LD – 1.8		4.6 3.9 – 5.2	8.8 7.0 – 11		25^{E} 12 - 38
	Total	12-19	510	12.35		2.6 2.3 – 3.0	<LD		2.5 2.0 – 3.0	4.7 3.9 – 5.5		16^{E} 9.9 – 21

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 209: Diethylthiophosphate (DETP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	193	34.7	1.28 1.02 – 1.59	0.59 0.51 – 0.70	<LD	<LD	0.60 0.45 – 0.74	1.42 1.08 – 1.74	3.07 2.47 – 3.88	4.67[E] 3.26 – 6.38
	Total	F	93	33.3	1.25[E] 0.89 – 1.72	0.59 0.47 – 0.74	<LD	<LD	0.59[E] 0.42 – 0.80	1.29 0.94 – 1.73	2.71[E] 1.72 – 4.72	F
	Total	M	100	36	1.31 0.98 – 1.75	0.60 0.48 – 0.77	<LD	<LD	0.59[E] 0.38 – 0.78	1.50[E] 0.98 – 2.43	3.20 2.49 – 4.15	F
	Anishinabe communities (2)	Total	108	25	1.55 1.15 – 2.05	0.76 0.62 – 0.95	<LD	<LD	0.78 0.60 – 1.00	1.73 1.36 – 2.28	3.32[E] 2.47 – 4.80	F
	Anishinabe communities (2)	F	54	27.8	1.40[E] 0.90 – 2.10	0.69 0.50 – 0.94	<LD	<LD	0.78[E] 0.45 – 1.09	1.55 1.10 – 1.97	F	4.45 .
	Anishinabe communities (2)	M	54	22.2	1.69[E] 1.19 – 2.44	0.85[E] 0.64 – 1.17	<LD	0.34[E] 0.15 – 0.58	0.78[E] 0.63 – 1.32	2.05[E] 1.36 – 3.05	3.46[E] 2.58 – 5.38	5.16 .
	Innu communities (2)	Total	85	47.1	–	–	<LD	<LD	0.35[E] 0.15 – 0.53	0.96[E] 0.64 – 1.25	2.65[E] 1.19 – 3.92	4.10[E] 2.28 – 5.83
	Innu communities (2)	F	39	41	–	–	<LD	<LD	0.42[E] 0.15 – 0.67	F	F	4.64 .
	Innu communities (2)	M	46	52.2	–	–	<LD	<LD	<LD	0.97[E] 0.47 – 1.55	F	2.94 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 210: Diethylthiophosphate (DETP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	193	34.7	1.75 1.40 – 2.16	0.80 0.68 – 0.97	<LD	<LD	0.81 0.65 – 1.00	1.81 1.51 – 2.27	4.20 3.02 – 5.46	7.02E 4.26 – 11.08
	Total	F	93	33.3	1.94 1.41 – 2.62	0.90 0.71 – 1.18	<LD	<LD	0.70 0.59 – 1.01	1.89E 1.50 – 2.92	5.00E 2.78 – 6.79	7.40E 4.32 – 12.97
	Total	M	100	36	1.58 1.17 – 2.05	0.72 0.56 – 0.94	<LD	<LD	0.83 0.65 – 1.03	1.69 1.31 – 2.36	F	F
	Anishinabe communities (2)	Total	108	25	2.11 1.62 – 2.70	1.15 0.93 – 1.44	<LD	<LD	1.06 0.88 – 1.46	2.14 1.75 – 2.99	F	8.95E 4.32 – 11.08
	Anishinabe communities (2)	F	54	27.8	2.18E 1.45 – 3.13	1.10 0.79 – 1.54	<LD	<LD	0.95E 0.61 – 1.76	2.15E 1.70 – 4.14	F	7.15 .
	Anishinabe communities (2)	M	54	22.2	2.03E 1.44 – 2.74	1.20 0.91 – 1.57	<LD	0.76E 0.40 – 0.95	1.16 0.95 – 1.48	2.07E 1.44 – 2.99	F	8.68 .
	Innu communities (2)	Total	85	47.1	–	–	<LD	<LD	0.51E 0.35 – 0.63	1.17E 0.78 – 1.71	3.34E 1.67 – 4.27	F
	Innu communities (2)	F	39	41	–	–	<LD	<LD	0.59 0.44 – 0.74	F	F	6.60 .
	Innu communities (2)	M	46	52.2	–	–	<LD	<LD	<LD	F	F	3.56 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 211: Diethylthiophosphate (DETP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	193	34.7	1.28 1.02 – 1.59	0.59 0.51 – 0.70	<LD	<LD	0.60 0.45 – 0.74	1.42 1.08 – 1.74	3.07 2.47 – 3.88	4.67E 3.26 – 6.38
	Total	3-5	37	29.7	1.59E 0.88 – 2.50	0.68E 0.46 – 1.03	<LD	<LD	0.67E 0.34 – 1.03	F	F	6.31 .
	Total	6-11	77	26	1.41 1.09 – 1.75	0.76 0.59 – 1.00	<LD	<LD	0.74 0.58 – 1.11	1.98E 1.36 – 2.73	3.33E 2.66 – 4.63	4.63E 3.15 – 5.61
	Total	12-19	79	45.6	–	–	<LD	<LD	0.40E 0.15 – 0.51	0.97E 0.72 – 1.28	1.76E 1.18 – 3.30	F
	Anishinabe communities (2)	Total	108	25	1.55 1.15 – 2.05	0.76 0.62 – 0.95	<LD	<LD	0.78 0.60 – 1.00	1.73 1.36 – 2.28	3.32E 2.47 – 4.80	F
	Anishinabe communities (2)	3-5	23	26.1	2.03E 0.94 – 3.41	0.83E 0.49 – 1.44	<LD	<LD	F	F	5.51 .	6.80 .
	Anishinabe communities (2)	6-11	45	17.8	1.55 1.12 – 2.00	0.91E 0.65 – 1.26	<LD	0.40E 0.15 – 0.68	0.90E 0.62 – 1.40	2.08E 1.33 – 2.89	3.35E 2.44 – 4.99	4.53 .
	Anishinabe communities (2)	12-19	40	32.5	1.26E 0.72 – 2.20	0.60E 0.43 – 0.87	<LD	<LD	0.71E 0.28 – 0.95	1.40E 0.86 – 1.78	F	3.30 .
	Innu communities (2)	Total	85	47.1	–	–	<LD	<LD	0.35E 0.15 – 0.53	0.96E 0.64 – 1.25	2.65E 1.19 – 3.92	4.10E 2.28 – 5.83
	Innu communities (2)	3-5	14	35.7	0.87E 0.37 – 1.50	0.48E 0.27 – 0.90	<LD	<LD	F	F	2.02 .	2.89 .
	Innu communities (2)	6-11	32	37.5	1.22E 0.73 – 1.74	0.60E 0.37 – 0.92	<LD	<LD	F	F	2.96E 1.55 – 4.52	4.12 .
	Innu communities (2)	12-19	39	59	–	–	<LD	<LD	<LD	F	F	1.49 .
CHMS (Cycle 2)	Total	3-5	512	14.65		1.0 0.92 – 1.2	<LD		1.0 0.91 – 1.1	1.9 1.5 – 2.4		6.7E 3.4 – 10
	Total	6-11	508	22.05		0.85 0.74 – 0.98	<LD		0.78 0.68 – 0.88	1.5 1.2 – 1.9		F
	Total	12-19	504	22.82		0.67 0.57 – 0.78	<LD		0.59 0.47 – 0.71	1.3 1.0 – 1.6		4.1E 2.5 – 5.7

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 212: Diethylthiophosphate (DETP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	193	34.7	1.75 1.40 – 2.16	0.80 0.68 – 0.97	<LD	<LD	0.81 0.65 – 1.00	1.81 1.51 – 2.27	4.20 3.02 – 5.46	7.02^{E} 4.26 – 11.08
	Total	3-5	37	29.7	2.75^{E} 1.73 – 3.99	1.44^{E} 0.99 – 2.06	<LD	<LD	1.64^{E} 0.97 – 2.08	2.79^{E} 1.90 – 4.23	F	10.08 .
	Total	6-11	77	26	2.20 1.61 – 2.84	1.21 0.94 – 1.55	<LD	<LD	1.04^{E} 0.79 – 1.79	2.66 1.84 – 3.51	F	7.04^{E} 4.27 – 11.46
	Total	12-19	79	45.6	–	–	<LD	<LD	0.44 0.31 – 0.59	0.91^{E} 0.60 – 1.24	1.47^{E} 1.17 – 1.77	F
	Anishinabe communities (2)	Total	108	25	2.11 1.62 – 2.70	1.15 0.93 – 1.44	<LD	<LD	1.06 0.88 – 1.46	2.14 1.75 – 2.99	F	8.95^{E} 4.32 – 11.08
	Anishinabe communities (2)	3-5	23	26.1	3.19^{E} 1.87 – 4.78	1.89^{E} 1.25 – 2.90	<LD	<LD	1.82^{E} 1.01 – 2.67	F	8.21 .	9.55 .
	Anishinabe communities (2)	6-11	45	17.8	2.59^{E} 1.81 – 3.52	1.60 1.19 – 2.17	<LD	0.76 0.55 – 1.00	1.66^{E} 0.95 – 2.23	2.90^{E} 1.99 – 4.31	F	9.84 .
	Anishinabe communities (2)	12-19	40	32.5	0.94^{E} 0.62 – 1.47	0.59 0.45 – 0.79	<LD	<LD	0.62^{E} 0.35 – 0.88	1.18^{E} 0.78 – 1.52	F	1.77 .
	Innu communities (2)	Total	85	47.1	–	–	<LD	<LD	0.51^{E} 0.35 – 0.63	1.17^{E} 0.78 – 1.71	3.34^{E} 1.67 – 4.27	F
	Innu communities (2)	3-5	14	35.7	F	F	<LD	<LD	F	F	2.93 .	6.15 .
	Innu communities (2)	6-11	32	37.5	1.66^{E} 0.92 – 2.53	0.81^{E} 0.55 – 1.20	<LD	<LD	0.74^{E} 0.50 – 1.00	F	F	5.10 .
	Innu communities (2)	12-19	39	59	–	–	<LD	<LD	<LD	0.59^{E} 0.40 – 0.86	F	1.51 .
CHMS (Cycle 2)	Total	3-5	511	14.68		1.7 1.5 – 2.0	<LD		1.7 1.4 – 2.0	3.5 2.9 – 4.1		9.6^{E} 5.1 - 14
	Total	6-11	506	22.13		0.93 0.78 – 1.1	<LD		0.89 0.75 – 1.0	1.9 1.5 – 2.3		F
	Total	12-19	502	22.91		0.47 0.40 – 0.56	<LD		0.48 0.37 – 0.59	0.93 0.77 – 1.1		2.8^{E} 1.6 – 4.1

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 213: Diethyldithiophosphate (DEDTP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	95	96.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	96.1	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	110	95.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	55	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	92.7	–	–	<LD	<LD	<LD	<LD	<LD	0.42 .
	Innu communities (2)	Total	87	97.7	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 214: Diethyldithiophosphate (DEDTP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	95	96.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	102	96.1	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	110	95.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	F	55	98.2	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	M	55	92.7	–	–	<LD	<LD	<LD	<LD	<LD	0.79 .
	Innu communities (2)	Total	87	97.7	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	F	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	M	47	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 215: Diethyldithiophosphate (DEDTP) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	79	94.9	–	–	<LD	<LD	<LD	<LD	<LD	F
	Total	12-19	80	96.3	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	110	95.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	46	91.3	–	–	<LD	<LD	<LD	<LD	<LD	0.38 .
	Anishinabe communities (2)	12-19	40	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	97.7	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	524	98.28		—	<LD		<LD	<LD		<LD
	Total	6-11	516	97.48		—	<LD		<LD	<LD		F
	Total	12-19	511	97.06		—	<LD		<LD	<LD		<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 216: Diethyldithiophosphate (DEDTP) (adjusted for creatinine) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	96.4	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	38	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	79	94.9	–	–	<LD	<LD	<LD	<LD	<LD	0.78 0.68 – 0.85
	Total	12-19	80	96.3	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	110	95.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	3-5	24	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	6-11	46	91.3	–	–	<LD	<LD	<LD	<LD	<LD	0.81 .
	Anishinabe communities (2)	12-19	40	97.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	87	97.7	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	3-5	14	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	6-11	33	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	12-19	40	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	523	98.47		–	<LD		<LD	<LD		<LD
	Total	6-11	514	97.86		–	<LD		<LD	<LD		0.73^{E} <LD – 1.2
	Total	12-19	509	97.45		–	<LD		<LD	<LD		<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

Bouchard, M.F., Chevrier, J., Harley, K.G., Kogut, K., Vedar, M., Calderon, N., Trujillo, C., Johnson, C., Bradman, A., Barr, D.B., Eskenazi, B. (2011). Prenatal exposure to organophosphate pesticides and IQ in 7-year-old children. Environ. Health Perspect., 119 (8), 1189-95.

Bradman, A., Kogut, K., Eisen, E.A., Jewell, N.P., Quirós-Alcalá, L., Castorina, R., Chevrier, J., Holland, N.T., Barr, D.B., Kavanagh-Baird, G., Eskenazi, B. (2013). Variability of organophosphorous pesticide metabolite levels in spot and 24-h urine samples collected from young children during 1 week. Environ. Health Perspect., 121 (1), 118-24.

EPA (United States Environmental Protection Agency) (2013). Recognition and Management of Pesticide Poisonings. Sixth Edition. Source: http://npic.orst.edu/RMPP/rmpp_main2a.pdf

Government of Canada (2008). Pesticides and Health. Consulted online: http://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/contaminants/pesticides-eng.pdf

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

Lu, C., Bravo, R., Caltabiano, L.M., Irish, R.M., Weerasekera, G., Barr, D.B. (2005) The presence of dialkylphosphates in fresh fruit juices: implication for organophosphorous pesticide exposure and risk assessments. J. Toxicol. Environ. Health A. 68 (3), 209-27.

Myridakis, A., Chalkiadaki, G., Fotou, M., Kogevinas, M., Chatzi, L., Stephanou, E.G. (2016). Exposure of preschool-age Greek children (RHEA Cohort) to bisphenol, parabens, phthalates and organophosphates. Environ. Sci. Technol. 50 (2), 932-41.

Santé publique France (2011). Pesticides organophosphorés. Consulted online: invs.santepubliquefrance.fr/Dossiers-thematiques/Environnement-et-sante/Biosurveillance/Index-de-A-a-Z/P/Pesticides-organophosphores

6.3.9. Polybromodiphenylethers (PBDEs)

Polybromodiphenylethers (PBDEs) are used as flame retardants (fireproof substances) and found in multiple consumer products. Although PBDEs are no longer manufactured in Canada, certain products imported into the country may contain them, such as household appliances and electronic devices, furniture, various textiles (clothing, sheets, tents, stuffed toys, etc.), various plastic and rubber toys, some construction/renovation products (paint, lubricants, glue, and sealing foam) as well as car and airplane seats and interiors (Environment and Climate Change Canada, 2016a; Health Canada, 2016).

The general population is exposed to PBDEs through food (especially fish, meat, and milk products), drinking water, soil, and air (including household dust) and through skin contact with products containing PBDEs (Environment and Climate Change Canada, 2016b).

According to scientific data, these contaminants have negative effects on the health of the neurological, endocrine and immune systems and on development and behaviour (Health Canada, 2012). Some PBDE were added to the list of contaminants in the Stockholm Convention (Environment and Climate Change Canada, 2016a).

The PBDE congeners listed below were analysed in serum for participants in the JES!-YEH! project.

- PBDE congener 47
- PBDE congener 99
- PBDE congener 100
- PBDE congener 153
- PBDE congener 209

To date, there is no toxicity threshold reported for these contaminants.

Results

PBDE levels (PBDE 47, PBDE 99, PBDE 100, PBDE 153) were measured in serum for all participants in the JES!-YEH! project. PBDE 209 levels were measured in serum for a subsample (n=50) of participants in the JES!-YEH! project. All results are reported in terms of µg/L of serum and µg/kg of lipids (Tables 217 – 234). The levels of PBDEs that were observed reflect recent exposure. A measureable level does not necessarily mean that they will have negative health effects.

PBDE levels (PBDE 99, PBDE 100, PBDE 153, PBDE 209) of participants in the JES!-YEH! project were not calculated, since more than 40% of samples were below the limit of detection. The data for PDBE 47 could not be compared, as the levels in the CHMS (Cycle 1) were measured only in participants aged 20 years or older.

Table 217: Polybromodiphenylether – congener 47 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	18.9	0.12 0.09 – 0.16	0.06 0.06 – 0.07	<LD	0.03[E] 0.02 – 0.04	0.06 0.06 – 0.07	0.10 0.08 – 0.12	0.20[E] 0.15 – 0.34	0.41 0.25 – 0.55
	Total	F	94	20.2	0.09 0.07 – 0.12	0.06 0.05 – 0.07	<LD	0.03E 0.02 – 0.05	0.06 0.05 – 0.07	0.10 0.08 – 0.12	0.18[E] 0.12 – 0.31	0.31[E] 0.17 – 0.47
	Total	M	102	17.6	0.15[E] 0.09 – 0.21	0.07 0.05 – 0.08	<LD	0.04[E] 0.02 – 0.04	0.06 0.06 – 0.07	0.10[E] 0.08 – 0.14	F	F
	Anishinabe communities (2)	Total	109	13.8	0.09 0.08 – 0.11	0.07 0.06 – 0.08	<LD	0.04 0.03 – 0.05	0.07 0.06 – 0.07	0.10 0.08 – 0.12	0.17 0.12 – 0.20	F
	Anishinabe communities (2)	F	54	16.7	0.09 0.06 – 0.12	0.06 0.05 – 0.08	<LD	0.04[E] 0.02 – 0.05	0.06 0.05 – 0.07	0.09 0.07 – 0.12	F	0.23 .
	Anishinabe communities (2)	M	55	10.9	0.09 0.07 – 0.12	0.07 0.06 – 0.09	<LD	0.04[E] 0.03 – 0.06	0.07 0.06 – 0.08	0.10[E] 0.08 – 0.15	0.18[E] 0.12 – 0.24	0.21 .
	Innu communities (2)	Total	87	25.3	0.16[E] 0.09 – 0.23	0.06 0.05 – 0.08	<LD	<LD	0.06 0.04 – 0.06	0.10[E] 0.07 – 0.16	F	F
	Innu communities (2)	F	40	25	0.10[E] 0.07 – 0.14	0.06 0.04 – 0.08	<LD	<LD	0.06[E] 0.04 – 0.09	F	F	0.31 .
	Innu communities (2)	M	47	25.5	0.21[E] 0.09 – 0.35	0.06[E] 0.04 – 0.09	<LD	<LD	0.05 0.04 – 0.06	F	F	1.28 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 218: Polybromodiphenylether – congener 47 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	18.9	21.80 16.04 – 27.80	11.45 9.88 – 13.12	<LD	6.29 4.08 – 7.81	10.88 9.44 – 12.47	18.47 15.57 – 24.08	39.78E 30.43 – 62.56	72.46E 43.76 – 100.0
	Total	F	94	20.2	16.88 13.08 – 21.23	10.67 8.66 – 12.81	<LD	5.58E 3.24 – 8.11	10.64 8.83 – 12.51	17.72 13.65 – 24.12	35.83E 23.44 – 55.89	58.54E 32.65 – 81.37
	Total	M	101	17.6	26.38E 16.43 – 38.16	12.23 9.96 – 14.95	<LD	6.40E 3.85 – 7.92	10.99 8.92 – 13.02	19.55E 15.19 – 29.61	48.49E 29.73 – 76.11	F
	Anishinabe communities (2)	Total	108	13.8	17.57 14.48 – 21.13	12.42 10.62 – 14.55	<LD	8.00 5.98 – 8.85	12.50 10.39 – 14.54	19.64 15.79 – 25.39	32.28E 26.36 – 42.97	51.17E 32.19 – 73.97
	Anishinabe communities (2)	F	54	16.7	17.08 12.09 – 22.62	11.64 9.12 – 14.40	<LD	8.03E 3.63 – 9.06	11.13 8.86 – 14.00	17.78 13.61 – 23.63	F	47.68 .
	Anishinabe communities (2)	M	54	10.9	18.07 14.20 – 22.49	13.26 10.68 – 16.31	<LD	7.49E 5.92 – 10.26	13.27 10.11 – 15.85	21.82E 16.00 – 30.32	32.82E 25.48 – 52.36	45.80 .
	Innu communities (2)	Total	87	25.3	27.05E 15.08 – 40.19	10.35 8.09 – 13.17	<LD	<LD	8.97 7.42 – 10.97	15.89E 11.83 – 28.26	56.84E 25.20 – 99.89	F
	Innu communities (2)	F	40	25	16.61E 10.83 – 23.61	9.49 6.78 – 13.10	<LD	<LD	8.99E 5.51 – 11.88	F	F	55.36 .
	Innu communities (2)	M	47	25.5	35.93E 15.18 – 60.26	11.15E 7.77 – 16.53	<LD	<LD	8.92 6.57 – 11.03	F	F	240.2 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 219: Polybromodiphenylether – congener 47 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	18.9	0.12 0.09 – 0.16	0.06 0.06 – 0.07	<LD	0.03E 0.02 – 0.04	0.06 0.06 – 0.07	0.10 0.08 – 0.12	0.20E 0.15 – 0.34	0.41 0.25 – 0.55
	Total	3-5	38	7.9	0.14E 0.08 – 0.23	0.08 0.06 – 0.11	0.02 .	0.04E 0.03 – 0.06	0.07 0.05 – 0.09	0.11E 0.08 – 0.18	F	0.36 .
	Total	6-11	78	14.1	0.15E 0.09 – 0.23	0.07 0.06 – 0.09	<LD	0.04E 0.03 – 0.05	0.07 0.06 – 0.08	0.10E 0.08 – 0.15	F	F
	Total	12-19	80	28.8	0.08 0.06 – 0.11	0.05 0.04 – 0.06	<LD	<LD	0.05 0.04 – 0.06	0.08 0.07 – 0.11	F	0.32E 0.14 – 0.46
	Anishinabe communities (2)	Total	109	13.8	0.09 0.08 – 0.11	0.07 0.06 – 0.08	<LD	0.04 0.03 – 0.05	0.07 0.06 – 0.07	0.10 0.08 – 0.12	0.17 0.12 – 0.20	F
	Anishinabe communities (2)	3-5	24	4.2	0.11E 0.07 – 0.16	0.08 0.06 – 0.11	0.03 .	0.04E 0.03 – 0.06	0.07E 0.05 – 0.10	F	F	0.32 .
	Anishinabe communities (2)	6-11	45	13.3	0.10 0.08 – 0.14	0.07 0.06 – 0.09	<LD	0.05E 0.02 – 0.06	0.07 0.06 – 0.09	0.10E 0.08 – 0.14	F	0.33E 0.14 – 0.45
	Anishinabe communities (2)	12-19	40	20	0.06 0.05 – 0.08	0.05 0.04 – 0.06	<LD	0.03E 0.02 – 0.04	0.06 0.04 – 0.07	0.08 0.06 – 0.10	0.12E 0.08 – 0.14	0.14 .
	Innu communities (2)	Total	87	25.3	0.16E 0.09 – 0.23	0.06 0.05 – 0.08	<LD	<LD	0.06 0.04 – 0.06	0.10E 0.07 – 0.16	F	F
	Innu communities (2)	3-5	14	14.3	F	0.07E 0.04 – 0.14	<LD	0.03 .	0.07E 0.03 – 0.09	F	0.23 .	0.70 .
	Innu communities (2)	6-11	33	15.2	F	0.08E 0.05 – 0.11	<LD	0.04E 0.02 – 0.05	0.06 0.04 – 0.08	F	F	1.11 .
	Innu communities (2)	12-19	40	37.5	0.10E 0.06 – 0.16	0.05E 0.03 – 0.07	<LD	<LD	0.04E 0.02 – 0.06	F	F	0.41 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 220: Polybromodiphenylether – congener 47 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	18.9	21.80 16.04 – 27.80	11.45 9.88 – 13.12	<LD	6.29 4.08 – 7.81	10.88 9.44 – 12.47	18.47 15.57 – 24.08	39.78E 30.43 – 62.56	72.46E 43.76 – 100.0
	Total	3-5	38	7.9	26.83E 14.75 – 43.95	14.78 10.99 – 20.13	4.85 .	8.08 5.52 – 9.85	14.89 8.77 – 17.94	21.49E 16.78 – 32.44	F	77.83 .
	Total	6-11	77	14.1	26.68E 16.11 – 39.98	13.20 10.30 – 16.60	<LD	7.28E 4.37 – 9.48	11.95 10.05 – 13.84	19.63E 14.73 – 29.89	F	F
	Total	12-19	80	28.8	14.72 10.81 – 19.40	8.85 7.22 – 11.05	<LD	<LD	8.91 7.57 – 10.71	14.29E 11.05 – 20.50	F	F
	Anishinabe communities (2)	Total	108	13.8	17.57 14.48 – 21.13	12.42 10.62 – 14.55	<LD	8.00 5.98 – 8.85	12.50 10.39 – 14.54	19.64 15.79 – 25.39	32.28E 26.36 – 42.97	51.17E 32.19 – 73.97
	Anishinabe communities (2)	3-5	24	4.2	21.76E 14.58 – 29.77	15.90 11.57 – 21.86	6.14 .	8.51E 6.26 – 12.73	15.79E 8.80 – 20.31	F	37.59 .	70.31 .
	Anishinabe communities (2)	6-11	44	13.3	20.25 14.51 – 26.83	13.83 10.63 – 18.09	<LD	8.36E 3.74 – 11.60	13.27 10.69 – 15.35	19.64E 14.98 – 32.39	F	65.00 .
	Anishinabe communities (2)	12-19	40	20	12.11 9.46 – 14.88	9.52 7.50 – 11.99	<LD	5.97E 3.13 – 8.44	10.39 7.70 – 12.47	15.79E 11.01 – 21.75	25.00 15.76 – 30.24	29.79 .
	Innu communities (2)	Total	87	25.3	27.05E 15.08 – 40.19	10.35 8.09 – 13.17	<LD	<LD	8.97 7.42 – 10.97	15.89E 11.83 – 28.26	56.84E 25.20 – 99.89	F
	Innu communities (2)	3-5	14	14.3	F	13.03E 7.12 – 24.61	<LD	5.43 .	11.45E 5.41 – 16.97	F	41.52 .	132.9 .
	Innu communities (2)	6-11	33	15.2	F	12.41E 8.26 – 18.79	<LD	5.88E 2.96 – 7.97	10.07 7.02 – 12.11	F	F	175.8 .
	Innu communities (2)	12-19	40	37.5	17.32E 10.11 – 27.03	8.23E 5.82 – 11.99	<LD	<LD	8.14E 3.40 – 9.60	F	F	65.96 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 221: Polybromodiphenylether – congener 99 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	59.2	–	–	<LD	<LD	<LD	0.03 0.02 – 0.04	0.06^E^ 0.05 – 0.09	0.13^E^ 0.07 – 0.17
	Total	F	94	58.5	–	–	<LD	<LD	<LD	0.03^E^ 0.02 – 0.04	0.05 0.04 – 0.07	F
	Total	M	102	59.8	–	–	<LD	<LD	<LD	0.03 0.02 – 0.03	F	F
	Anishinabe communities (2)	Total	109	51.4	–	–	<LD	<LD	<LD	0.03 0.03 – 0.04	0.05 0.04 – 0.07	F
	Anishinabe communities (2)	F	54	53.7	–	–	<LD	<LD	<LD	0.03^E^ 0.02 – 0.04	0.05^E^ 0.04 – 0.09	0.08 .
	Anishinabe communities (2)	M	55	49.1	–	–	<LD	<LD	0.01^E^ 0.01 – 0.02	0.03^E^ 0.02 – 0.04	0.06^E^ 0.03 – 0.07	0.07 .
	Innu communities (2)	Total	87	69	–	–	<LD	<LD	<LD	0.02^E^ 0.01 – 0.04	F	F
	Innu communities (2)	F	40	65	–	–	<LD	<LD	<LD	F	F	0.07 .
	Innu communities (2)	M	47	72.3	–	–	<LD	<LD	<LD	F	F	0.28 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 222: Polybromodiphenylether – congener 99 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	59.2	–	–	<LD	<LD	<LD	5.52 4.17 – 6.95	11.99E 8.57 – 16.10	22.47E 13.62 – 28.07
	Total	F	94	58.5	–	–	<LD	<LD	<LD	5.84 3.91 – 7.50	F	F
	Total	M	101	59.8	–	–	<LD	<LD	<LD	5.33E 3.81 – 7.20	14.44E 7.80 – 22.42	F
	Anishinabe communities (2)	Total	108	51.4	–	–	<LD	<LD	<LD	5.94 4.82 – 7.48	10.47E 7.58 – 14.44	14.60E 10.28 – 26.81
	Anishinabe communities (2)	F	54	53.7	–	–	<LD	<LD	<LD	6.22 4.18 – 7.58	F	17.21 .
	Anishinabe communities (2)	M	54	49.1	–	–	<LD	<LD	2.35E 2.04 – 4.15	5.53E 4.17 – 9.65	12.42E 6.42 – 14.57	14.55 .
	Innu communities (2)	Total	87	69	–	–	<LD	<LD	<LD	F	F	F
	Innu communities (2)	F	40	65	–	–	<LD	<LD	<LD	F	F	12.36 .
	Innu communities (2)	M	47	72.3	–	–	<LD	<LD	<LD	F	F	41.53 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 223: Polybromodiphenylether – congener 99 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	59.2	–	–	<LD	<LD	<LD	0.03 0.02 – 0.04	0.06^E^ 0.05 – 0.09	0.13^E^ 0.07 – 0.17
	Total	3-5	38	39.5	F	0.02 0.02 – 0.03	<LD	<LD	0.02^E^ 0.01 – 0.03	0.04^E^ 0.03 – 0.06	F	0.12 .
	Total	6-11	78	52.6	–	–	<LD	<LD	<LD	0.03^E^ 0.02 – 0.05	F	F
	Total	12-19	80	75	–	–	<LD	<LD	<LD	<LD	0.05^E^ 0.03 – 0.06	F
	Anishinabe communities (2)	Total	109	51.4	–	–	<LD	<LD	<LD	0.03 0.03 – 0.04	0.05 0.04 – 0.07	F
	Anishinabe communities (2)	3-5	24	33.3	0.03^E^ 0.02 – 0.05	0.02 0.02 – 0.03	<LD	<LD	0.03^E^ 0.01 – 0.03	0.04^E^ 0.03 – 0.06	0.06 .	0.07 .
	Anishinabe communities (2)	6-11	45	42.2	–	–	<LD	<LD	0.01 0.01 – 0.02	0.03^E^ 0.02 – 0.05	F	0.13 .
	Anishinabe communities (2)	12-19	40	72.5	–	–	<LD	<LD	<LD	0.02^E^ 0.01 – 0.03	0.03^E^ 0.02 – 0.05	0.05 .
	Innu communities (2)	Total	87	69	–	–	<LD	<LD	<LD	0.02^E^ 0.01 – 0.04	F	F
	Innu communities (2)	3-5	14	50	–	–	F	F	<LD	F	0.09 .	0.32 .
	Innu communities (2)	6-11	33	66.7	–	–	<LD	<LD	<LD	F	F	0.27 .
	Innu communities (2)	12-19	40	77.5	–	–	<LD	<LD	<LD	<LD	F	0.10 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 224: Polybromodiphenylether – congener 99 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	59.2	–	–	<LD	<LD	<LD	5.52 4.17 – 6.95	11.99E 8.57 – 16.10	22.47E 13.62 – 28.07
	Total	3-5	38	39.5	F	4.65 3.48 – 6.42	<LD	<LD	4.17E 2.12 – 5.68	7.55E 5.26 – 10.75	F	21.35 .
	Total	6-11	77	52.6	–	–	<LD	<LD	<LD	5.82E 4.07 – 10.45	F	F
	Total	12-19	80	75	–	–	<LD	<LD	<LD	<LD	7.78E 4.83 – 10.43	F
	Anishinabe communities (2)	Total	108	51.4	–	–	<LD	<LD	<LD	5.94 4.82 – 7.48	10.47E 7.58 – 14.44	14.60E 10.28 – 26.81
	Anishinabe communities (2)	3-5	24	33.3	6.64E 4.36 – 8.98	4.89 3.53 – 6.60	<LD	<LD	5.26E 2.16 – 7.37	7.60E 5.36 – 10.00	12.80 .	15.70 .
	Anishinabe communities (2)	6-11	44	42.2	–	–	<LD	<LD	3.57E 2.10 – 4.64	5.86E 4.23 – 10.54	F	24.49 .
	Anishinabe communities (2)	12-19	40	72.5	–	–	<LD	<LD	<LD	3.13E 2.13 – 5.85	6.38E 4.10 – 8.16	7.85 .
	Innu communities (2)	Total	87	69	–	–	<LD	<LD	<LD	F	F	F
	Innu communities (2)	3-5	14	50	–	–	1.71 .	1.79 .	<LD	F	17.10 .	61.59 .
	Innu communities (2)	6-11	33	66.7	–	–	<LD	<LD	<LD	F	F	35.69 .
	Innu communities (2)	12-19	40	77.5	–	–	<LD	<LD	<LD	<LD	F	18.87 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 225: Polybromodiphenylether – congener 100 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	187	61	–	–	<LD	<LD	<LD	0.03 0.02 – 0.03	0.06E 0.03 – 0.08	0.09E 0.07 – 0.13
	Total	F	90	61.1	–	–	<LD	<LD	<LD	0.02 0.01 – 0.03	F	0.08E 0.04 – 0.10
	Total	M	97	60.8	–	–	<LD	<LD	<LD	0.02E 0.02 – 0.03	F	F
	Anishinabe communities (2)	Total	101	54.5	–	–	<LD	<LD	<LD	0.02 0.02 – 0.03	0.04E 0.03 – 0.07	0.07E 0.04 – 0.08
	Anishinabe communities (2)	F	50	60	–	–	<LD	<LD	<LD	0.02 0.01 – 0.03	F	0.08 .
	Anishinabe communities (2)	M	51	49	–	–	<LD	<LD	0.01E 0.01 – 0.02	0.03 0.02 – 0.04	0.04E 0.03 – 0.07	0.07 .
	Innu communities (2)	Total	86	68.6	–	–	<LD	<LD	<LD	0.02E 0.01 – 0.03	F	F
	Innu communities (2)	F	40	62.5	–	–	<LD	<LD	<LD	F	0.06E 0.03 – 0.07	0.07 .
	Innu communities (2)	M	46	73.9	–	–	<LD	<LD	<LD	F	F	0.27 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 226: Polybromodiphenylether – congener 100 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	186	61	–	–	<LD	<LD	<LD	4.50 3.60 – 6.00	10.32E 6.84 – 13.98	16.71E 11.16 – 22.88
	Total	F	90	61.1	–	–	<LD	<LD	<LD	4.08E 2.52 – 5.86	10.16E 5.72 – 13.98	14.58E 7.26 – 18.03
	Total	M	96	60.8	–	–	<LD	<LD	<LD	5.51 3.54 – 6.80	F	F
	Anishinabe communities (2)	Total	100	54.5	–	–	<LD	<LD	<LD	5.77 3.88 – 6.27	8.06E 6.34 – 12.87	13.14E 7.35 – 16.80
	Anishinabe communities (2)	F	50	60	–	–	<LD	<LD	<LD	4.26E 2.59 – 5.94	F	14.24 .
	Anishinabe communities (2)	M	50	49	–	–	<LD	<LD	2.99E 2.07 – 4.01	6.09 3.89 – 6.98	8.06E 6.42 – 12.55	11.93 .
	Innu communities (2)	Total	86	68.6	–	–	<LD	<LD	<LD	F	F	F
	Innu communities (2)	F	40	62.5	–	–	<LD	<LD	<LD	F	10.16E 3.77 – 15.30	13.83 .
	Innu communities (2)	M	46	73.9	–	–	<LD	<LD	<LD	F	F	50.28 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 227: Polybromodiphenylether – congener 100 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	187	61	–	–	<LD	<LD	<LD	0.03 0.02 – 0.03	0.06^{E} 0.03 – 0.08	0.09^{E} 0.07 – 0.13
	Total	3-5	37	56.8	–	–	<LD	<LD	<LD	F	F	0.09 .
	Total	6-11	73	53.4	–	–	<LD	<LD	<LD	0.03 0.02 – 0.03	F	F
	Total	12-19	77	70.1	–	–	<LD	<LD	<LD	0.01 0.01 – 0.02	0.05^{E} 0.02 – 0.07	0.07^{E} 0.03 – 0.09
	Anishinabe communities (2)	Total	101	54.5	–	–	<LD	<LD	<LD	0.02 0.02 – 0.03	0.04^{E} 0.03 – 0.07	0.07^{E} 0.04 – 0.08
	Anishinabe communities (2)	3-5	23	47.8	–	–	<LD	<LD	0.01^{E} 0.01 – 0.02	F	0.06 .	0.08 .
	Anishinabe communities (2)	6-11	41	51.2	–	–	<LD	<LD	<LD	0.03 0.02 – 0.03	F	0.08 .
	Anishinabe communities (2)	12-19	37	62.2	–	–	<LD	<LD	<LD	0.02 0.01 – 0.02	0.03^{E} 0.02 – 0.04	0.04 .
	Innu communities (2)	Total	86	68.6	–	–	<LD	<LD	<LD	0.02^{E} 0.01 – 0.03	F	F
	Innu communities (2)	3-5	14	71.4	–	–	<LD	<LD	<LD	F	0.07 .	0.17 .
	Innu communities (2)	6-11	32	56.3	–	–	<LD	<LD	<LD	0.03^{E} 0.01 – 0.04	F	0.23 .
	Innu communities (2)	12-19	40	77.5	–	–	<LD	<LD	<LD	<LD	F	0.09 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 228: Polybromodiphenylether – congener 100 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	186	61	–	–	<LD	<LD	<LD	4.50 3.60 – 6.00	10.32^E^ 6.84 – 13.98	16.71^E^ 11.16 – 22.88
	Total	3-5	37	56.8	–	–	<LD	<LD	<LD	F	F	17.22 .
	Total	6-11	72	53.4	–	–	<LD	<LD	<LD	5.92 3.87 – 6.79	F	F
	Total	12-19	77	70.1	–	–	<LD	<LD	<LD	2.91^E^ 2.24 – 4.58	F	13.32^E^ 6.22 – 17.09
	Anishinabe communities (2)	Total	100	54.5	–	–	<LD	<LD	<LD	5.77 3.88 – 6.27	8.06^E^ 6.34 – 12.87	13.14^E^ 7.35 – 16.80
	Anishinabe communities (2)	3-5	23	47.8	–	–	<LD	<LD	3.37^E^ 2.05 – 4.79	F	11.75 .	15.00 .
	Anishinabe communities (2)	6-11	40	51.2	–	–	<LD	<LD	<LD	6.00^E^ 3.85 – 6.98	F	12.70 .
	Anishinabe communities (2)	12-19	37	62.2	–	–	<LD	<LD	<LD	3.52^E^ 2.45 – 5.15	F	6.39 .
	Innu communities (2)	Total	86	68.6	–	–	<LD	<LD	<LD	F	F	F
	Innu communities (2)	3-5	14	71.4	–	–	<LD	<LD	<LD	F	12.40 .	31.32 .
	Innu communities (2)	6-11	32	56.3	–	–	<LD	<LD	<LD	F	F	40.21 .
	Innu communities (2)	12-19	40	77.5	–	–	<LD	<LD	<LD	<LD	F	13.83 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 229: Polybromodiphenylether – congener 153 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	70.9	–	–	<LD	<LD	<LD	0.03 0.02 – 0.04	0.07 0.05 – 0.08	0.10^{E} 0.07 – 0.12
	Total	F	94	75.5	–	–	<LD	<LD	<LD	<LD	0.05^{E} 0.03 – 0.07	0.07^{E} 0.05 – 0.10
	Total	M	102	66.7	–	–	<LD	<LD	<LD	0.03^{E} 0.02 – 0.05	0.08^{E} 0.05 – 0.10	0.11^{E} 0.07 – 0.18
	Anishinabe communities (2)	Total	109	64.2	–	–	<LD	<LD	<LD	0.03^{E} 0.02 – 0.05	0.07^{E} 0.05 – 0.09	0.09^{E} 0.07 – 0.13
	Anishinabe communities (2)	F	54	70.4	–	–	<LD	<LD	<LD	0.02^{E} 0.02 – 0.04	0.06^{E} 0.03 – 0.08	0.08 .
	Anishinabe communities (2)	M	55	58.2	–	–	<LD	<LD	<LD	0.04^{E} 0.02 – 0.06	0.08^{E} 0.05 – 0.09	0.09 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	F	40	82.5	–	–	<LD	<LD	<LD	<LD	F	0.05 .
	Innu communities (2)	M	47	76.6	–	–	<LD	<LD	<LD	<LD	F	0.12 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 230: Polybromodiphenylether – congener 153 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	70.9	–	–	<LD	<LD	<LD	5.38 3.56 – 6.94	11.81^{E} 8.94 – 16.43	19.03^{E} 12.53 – 22.02
	Total	F	94	75.5	–	–	<LD	<LD	<LD	<LD	9.94^{E} 6.52 – 13.68	14.61^{E} 9.36 – 19.59
	Total	M	101	66.7	–	–	<LD	<LD	<LD	6.45^{E} 3.77 – 8.96	14.00^{E} 8.89 – 19.21	F
	Anishinabe communities (2)	Total	108	64.2	–	–	<LD	<LD	<LD	6.78E 4.62 – 9.06	12.33^{E} 9.20 – 17.56	F
	Anishinabe communities (2)	F	54	70.4	–	–	<LD	<LD	<LD	5.88^{E} 3.45 – 9.00	11.04^{E} 7.03 – 17.32	16.87 .
	Anishinabe communities (2)	M	54	58.2	–	–	<LD	<LD	<LD	7.46^{E} 4.82 – 10.75	F	18.54 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	F	40	82.5	–	–	<LD	<LD	<LD	<LD	F	10.64 .
	Innu communities (2)	M	47	76.6	–	–	<LD	<LD	<LD	<LD	F	21.46 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 231: Polybromodiphenylether – congener 153 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	196	70.9	–	–	<LD	<LD	<LD	0.03 0.02 – 0.04	0.07 0.05 – 0.08	0.10[E] 0.07 – 0.12
	Total	3-5	38	76.3	–	–	<LD	<LD	<LD	<LD	F	0.10 .
	Total	6-11	78	70.5	–	–	<LD	<LD	<LD	0.02 0.02 – 0.04	F	F
	Total	12-19	80	68.8	–	–	<LD	<LD	<LD	0.04[E] 0.02 – 0.04	0.05 0.04 – 0.07	F
	Anishinabe communities (2)	Total	109	64.2	–	–	<LD	<LD	<LD	0.03[E] 0.02 – 0.05	0.07[E] 0.05 – 0.09	0.09[E] 0.07 – 0.13
	Anishinabe communities (2)	3-5	24	75	–	–	<LD	<LD	<LD	<LD	0.07 .	0.08 .
	Anishinabe communities (2)	6-11	45	62.2	–	–	<LD	<LD	<LD	0.03 0.02 – 0.05	F	0.09 .
	Anishinabe communities (2)	12-19	40	60	–	–	<LD	<LD	<LD	0.04[E] 0.02 – 0.05	F	0.08 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	3-5	14	78.6	–	–	<LD	<LD	<LD	<LD	0.08 .	0.13 .
	Innu communities (2)	6-11	33	81.8	–	–	<LD	<LD	<LD	<LD	F	0.12 .
	Innu communities (2)	12-19	40	77.5	–	–	<LD	<LD	<LD	<LD	0.05[E] 0.02 – 0.06	0.05 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 232: Polybromodiphenylether – congener 153 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	195	70.9	–	–	<LD	<LD	<LD	5.38 3.56 – 6.94	11.81 E 8.94 – 16.43	19.03 E 12.53 – 22.02
	Total	3-5	38	76.3	–	–	<LD	<LD	<LD	<LD	F	19.26 .
	Total	6-11	77	70.5	–	–	<LD	<LD	<LD	5.58 E 3.23 – 7.79	F	F
	Total	12-19	80	68.8	–	–	<LD	<LD	<LD	6.35 E 3.47 – 8.11	10.64 E 7.62 – 14.16	F
	Anishinabe communities (2)	Total	108	64.2	–	–	<LD	<LD	<LD	6.78 E 4.62 – 9.06	12.33 E 9.20 – 17.56	F
	Anishinabe communities (2)	3-5	24	75	–	–	<LD	<LD	<LD	<LD	12.59 .	16.89 .
	Anishinabe communities (2)	6-11	44	62.2	–	–	<LD	<LD	<LD	6.25 E 3.56 – 9.04	F	18.29 .
	Anishinabe communities (2)	12-19	40	60	–	–	<LD	<LD	<LD	8.00 E 3.92 – 10.43	F	16.67 .
	Innu communities (2)	Total	87	79.3	–	–	<LD	<LD	<LD	<LD	F	F
	Innu communities (2)	3-5	14	78.6	–	–	<LD	<LD	<LD	<LD	13.89 .	24.34 .
	Innu communities (2)	6-11	33	81.8	–	–	<LD	<LD	<LD	<LD	F	20.31 .
	Innu communities (2)	12-19	40	77.5	–	–	<LD	<LD	<LD	<LD	7.94 E 3.67 – 10.98	10.64 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 233: Polybromodiphenylether – congener 209 – Levels measured in the serum (µg/L) of JES!-YEH! 2015 participants broken down by region, gender, and age.

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	98	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	26	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	19	94.7	–	–	<LD	<LD	<LD	<LD	<LD	0.01 .
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	22	95.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 234: Polybromodiphenylether – congener 209 (adjusted for lipids) – Levels measured in the serum (µg/Kg) of JES!-YEH! 2015 participants broken down by region, gender, and age.

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	98	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	F	24	95.8	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	M	26	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	3-5	10	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Total	6-11	19	94.7	–	–	<LD	<LD	<LD	<LD	<LD	0.06 .
	Total	12-19	21	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Anishinabe communities (2)	Total	28	100	–	–	<LD	<LD	<LD	<LD	<LD	<LD
	Innu communities (2)	Total	22	95.5	–	–	<LD	<LD	<LD	<LD	<LD	<LD

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

Environment and Climate Change Canada (2016a). Polybromodiphenylethers (PBDE). Government of Canada. Consulted online: http://www.ec.gc.ca/toxiques-toxics/Default.asp?lang=En&n=98E80CC6-1&xml=5046470B-2D3C-48B4-9E46-735B7820A444

Environment and Climate Change Canada (2016b). Canadian Environmental Sustainability Indicators: Human Exposure to Harmful Substances. Consulted online: http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=2D28BA64-1.

Health Canada (2012). Human Health State of the Science Report on Decabromodiphenylether (decaBDE). Government of Canada. Consulted online: http://www.ec.gc.ca/ese-ees/92D49BA9-4B11-4C56-BDB0-9A725C5F688E/DecaBDE - Final SoS - EN.pdf

Health Canada (2016). Flame retardants. Government of Canada. Consulted online: https://www.canada.ca/en/health-canada/services/chemicals-product-safety/flame-retardants.html

6.3.10. Pyrethroids

Pyrethroids (or pyrethrinoids) are part of a class of synthetic pesticides whose molecular structure resembles natural pesticides produced by certain chrysanthemum flowers (in the form of pyrethrins) (Saillenfait et al., 2015). They are more toxic for insects as well as mammals, and they last longer in the environment than pyrethrins (ATSDR, 2003). Pyrethrinoid pesticides are used in houses (bedbugs, cockroaches, spiders, ants, etc.), in agriculture (insect pests), on animals (fleas and ticks), and in humans (lice) (Santé publique France, 2011). Their use has been increasing over the past few years, after the use of organophosphorous pesticides was reduced or banned in Canada and elsewhere in the world (Van Balen et al., 2012).

Exposure to pyrethrinoids occurs mainly through food consumption and the use of these chemical products in houses (inhalation of dust and skin contact) (Saillenfait et al., 2015; Ye et al., 2015). Once absorbed, these contaminants metabolize quickly and are excreted mainly in urine.

As of yet, there is little data on the long-term effects of exposure to low levels of pyrethrinoids (Saillenfait et al., 2015). Some studies tend to show that problems with the immune and reproductive systems could arise following environmental exposure. The neurological development of children could also be affected (Hénault-Éthier, 2016; Saillenfait et al., 2015).

The pyrethrinoid metabolites measured in urine for participants in the JES!-YEH! study are listed below:

- 4-fluoro-3-phenoxybenzoic acid (4-F-3-PBA)
- Cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DBCA)
- Cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DCCA);
- Trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (trans-DCCA);
- 3-phenoxybenzoic acid (3-PBA);

To date, there is no known toxicity threshold established for these contaminants.

Results

Pyrethrinoid levels (cis-DBCA, cis-DCCA, trans-DCCA, 3-PBA and 4-F-3-PBA) were measured in urine in a subsample (n=50) of JES!-YEH! project participants and were reported in terms of µg/L of urine and µg/g of creatinine (Tables 235 – 244). Urine levels of these metabolites reflect recent exposure to these substances. A measureable level does not necessarily mean that they will have negative health effects.

Urine levels of 4-F-3-PBA (Table 236) were not calculated since more than 40% of samples were below the limit of detection, as was the case for the CHMS.

Levels of cis-DBCA measured in the subsample of the JES!-YEH! study were not significantly different from those in the CHMS (Cycle 2) across all three age groups (Table 238).

Level of cis-DCCA measured in the JES!-YEH! study were not significantly different from the concentrations in the CHMS (Cycle 2) for all age groups. However, the results should be interpreted with caution for participants 3-5 and 6-11 years old, considering the enormous fluctuations in their coefficients of variation (Table 240).

Compared to the results of the CHMS (Cycle 2), urine levels of trans-DCCA measured in the subsample of the JES!-YEH! study were not significantly different across all age groups (Table 242). However, the results should be interpreted with caution, considering the enormous fluctuations in the coefficients of variation for all three age groups.

Concentrations of 3-PBA measured in the subsample of the JES!-YEH! study were not significantly different from those in the CHMS (Cycle 2) for the 3-5 and 6-11 age groups. The geometric means for the 12-19 group were two times lower in participants in the JES!-YEH! study compared to the CHMS for the same age group (Cycle 2) (Table 244). However, it should be noted that these results should be interpreted with caution, since their coefficients of variation were between 16.6 and 33.3%.

Table 235: 4-fluoro-3-phenoxybenzoic acid (4-F-3-PBA) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	46	71.7	–	–	<LD	<LD	<LD	F	F	0.03 .
	Total	F	21	71.4	–	–	<LD	<LD	<LD	F	0.02 .	0.05 .
	Total	M	25	72	–	–	<LD	<LD	<LD	F	0.03 .	0.03 .
	Total	3-5	10	70	–	–	<LD	<LD	<LD	0.01 .	0.03 .	0.03 .
	Total	6-11	18	72.2	–	–	<LD	<LD	<LD	F	0.02 .	0.04 .
	Total	12-19	18	72.2	–	–	<LD	<LD	<LD	F	0.02 .	0.03 .
	Anishinabe communities (2)	Total	26	53.8	–	–	<LD	<LD	<LD	F	0.03 .	0.04 .
	Innu communities (2)	Total	20	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	517	49.90		_	<LD		<LD	0.015^E <LD – 0.023		0.050 0.032 – 0.067
	Total	6-11	514	43.77		_	<LD		0.0087 <LD – 0.011	0.015^E 0.009 – 0.020		0.056^E 0.028 – 0.085
	Total	12-19	510	41.76		_	<LD		0.0090 <LD – 0.01	0.015 0.011 – 0.019		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 236: 4-fluoro-3-phenoxybenzoic acid (4-F-3-PBA) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	46	71.7	–	–	<LD	<LD	<LD	F	F	0.08 .
	Total	F	21	71.4	–	–	<LD	<LD	<LD	F	0.07 .	0.08 .
	Total	M	25	72	–	–	<LD	<LD	<LD	F	0.04 .	0.04 .
	Total	3-5	10	70	–	–	<LD	<LD	<LD	0.06 .	0.08 .	0.10 .
	Total	6-11	18	72.2	–	–	<LD	<LD	<LD	F	0.04 .	0.07 .
	Total	12-19	18	72.2	–	–	<LD	<LD	<LD	F	0.02 .	0.03 .
	Anishinabe communities (2)	Total	26	53.8	–	–	<LD	<LD	<LD	F	0.07 .	0.11 .
	Innu communities (2)	Total	20	95	–	–	<LD	<LD	<LD	<LD	<LD	<LD
CHMS (Cycle 2)	Total	3-5	516	50.00		–	<LD		<LD	0.028^{E} <LD – 0.040		0.090^{E} 0.057 – 0.12
	Total	6-11	512	43.95		–	<LD		0.010 <LD – 0.012	0.017 0.011 – 0.022		0.066^{E} 0.024 – 0.11
	Total	12-19	508	41.93		–	<LD		0.0067 <LD – 0.0080	0.012 0.0096 – 0.015		F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 237: Cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DBCA) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	48	0	0.03^{E} 0.02 – 0.04	0.02 0.01 – 0.02	0.00^{E} 0.00 – 0.01	0.01 0.01 – 0.01	0.01 0.01 – 0.02	F	F	0.08 .
	Total	F	23	0	F	0.01^{E} 0.01 – 0.02	0.00 .	0.01 .	0.01^{E} 0.01 – 0.01	F	0.06 .	0.09 .
	Total	M	25	0	0.03^{E} 0.02 – 0.04	0.02^{E} 0.01 – 0.03	0.01 .	0.01E 0.01 – 0.01	0.02^{E} 0.01 – 0.02	F	0.06 .	0.06 .
	Total	3-5	10	0	F	F	0.00 .	0.01 .	F	0.03 .	0.06 .	0.08 .
	Total	6-11	18	0	F	0.02^{E} 0.01 – 0.04	0.01 .	0.01^{E} 0.00 – 0.01	F	F	0.08 .	0.14 .
	Total	12-19	20	0	0.01 0.01 – 0.02	0.01 0.01 – 0.01	0.01 .	0.01^{E} 0.01 – 0.01	0.01^{E} 0.01 – 0.01	0.02^{E} 0.01 – 0.02	0.02 .	0.02 .
	Anishinabe communities (2)	Total	27	0	F	0.02^{E} 0.01 – 0.03	0.00 .	0.01^{E} 0.00 – 0.01	0.01^{E} 0.01 – 0.02	F	0.08 .	0.11 .
	Innu communities (2)	Total	21	0	0.02^{E} 0.01 – 0.03	0.01 0.01 – 0.02	0.00 .	0.01^{E} 0.00 – 0.01	0.01^{E} 0.01 – 0.02	F	0.03 .	0.06 .
CHMS (Cycle 2)	Total	3-5	522	35.25		0.014 0.010 – 0.018	<LD		F	0.031^{E} 0.017 – 0.044		F
	Total	6-11	513	33.33		0.015 0.012 – 0.021	<LD		F	0.035 0.024 – 0.045		F
	Total	12-19	507	34.12		0.014 0.012 – 0.017	<LD		F	0.034 0.027 – 0.042		0.19 0.14 – 0.24

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 238: Cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DBCA) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	48	0	0.04^{E} 0.03 – 0.06	0.02 0.02 – 0.03	0.01 0.00 – 0.01	0.01 0.01 – 0.01	0.02^{E} 0.01 – 0.02	0.05^{E} 0.02 – 0.08	F	0.15 .
	Total	F	23	0	F	0.02^{E} 0.01 – 0.03	0.01 .	0.01^{E} 0.01 – 0.02	0.02^{E} 0.01 – 0.02	F	0.08 .	0.12 .
	Total	M	25	0	0.04^{E} 0.02 – 0.06	0.02^{E} 0.01 – 0.03	0.01 .	0.01^{E} 0.01 – 0.01	F	F	0.10 .	0.15 .
	Total	3-5	10	0	0.06^{E} 0.03 – 0.10	0.04^{E} 0.03 – 0.08	0.01 .	0.02 .	F	0.08 .	0.12 .	0.15 .
	Total	6-11	18	0	0.06^{E} 0.03 – 0.10	0.03^{E} 0.02 – 0.05	0.01 .	0.01^{E} 0.01 – 0.02	F	F	0.13 .	0.18 .
	Total	12-19	20	0	0.01^{E} 0.01 – 0.02	0.01 0.01 – 0.01	0.00 .	0.01 0.00 – 0.01	0.01^{E} 0.01 – 0.01	0.02^{E} 0.01 – 0.02	0.02 .	0.02 .
	Anishinabe communities (2)	Total	27	0	0.05^{E} 0.03 – 0.08	0.03^{E} 0.02 – 0.04	0.01 .	0.01^{E} 0.01 – 0.02	F	F	0.12 .	0.15 .
	Innu communities (2)	Total	21	0	0.03^{E} 0.01 – 0.05	0.02^{E} 0.01 – 0.02	0.00 .	0.01^{E} 0.00 – 0.01	0.01^{E} 0.01 – 0.02	F	0.07 .	0.08 .
CHMS (Cycle 2)	Total	3-5	521	35.32		0.024 0.018 – 0.032	<LD		0.020^{E} <LD – 0.027	0.052^{E} 0.026 – 0.078		F
	Total	6-11	511	33.46		0.018 0.013 – 0.024	<LD		0.016^{E} <LD – 0.022	0.038^{E} 0.023 – 0.052		F
	Total	12-19	505	34.26		0.011 0.0092 – 0.013	<LD		0.010 <LD – 0.012	0.025 0.020 – 0.029		0.13 0.092 – 0.16

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 239: Cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DCCA) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	2	F	0.07 0.05 – 0.10	F	0.04[E] 0.03 – 0.05	0.07 0.05 – 0.08	0.10 0.08 – 0.15	F	0.38 .
	Total	F	24	4.2	F	0.08[E] 0.05 – 0.14	0.01 .	F	0.08[E] 0.05 – 0.09	F	0.21 .	0.40 .
	Total	M	26	0	0.09[E] 0.06 – 0.14	0.06 0.05 – 0.09	0.02 .	0.04[E] 0.02 – 0.05	0.06[E] 0.04 – 0.08	0.09[E] 0.06 – 0.12	F	0.26 .
	Total	3-5	10	10	0.09[E] 0.06 – 0.14	F	<LD	0.04 .	F	F	0.20 .	0.21 .
	Total	6-11	19	0	F	0.09[E] 0.05 – 0.17	0.02 .	0.04[E] 0.01 – 0.06	0.07[E] 0.04 – 0.11	F	0.46 .	0.71 .
	Total	12-19	21	0	0.08[E] 0.06 – 0.11	0.06 0.05 – 0.08	0.02 .	0.04[E] 0.02 – 0.06	0.06 0.04 – 0.08	0.08[E] 0.07 – 0.12	0.13 .	0.19 .
	Anishinabe communities (2)	Total	28	3.6	F	0.07[E] 0.04 – 0.11	0.02 .	0.04[E] 0.02 – 0.05	0.08[E] 0.04 – 0.09	0.11[E] 0.08 – 0.15	0.18 .	0.20 .
	Innu communities (2)	Total	22	0	0.12[E] 0.07 – 0.18	0.08[E] 0.05 – 0.11	0.03 .	0.05[E] 0.03 – 0.06	0.07 0.05 – 0.07	F	0.29 .	0.44 .
CHMS (Cycle 2)	Total	3-5	520	1.35		0.067 0.049 – 0.091	0.016 0.01 – 0.022		0.065 0.047 – 0.08	0.12 0.078 – 0.15		F
	Total	6-11	514	1.17		0.069 0.059 – 0.082	0.018 0.014 – 0.02		0.056 0.046 – 0.06	0.11 0.082 – 0.14		F
	Total	12-19	510	0.39		0.10 0.082 – 0.13	0.026 0.022 – 0.03		0.080 0.065 – 0.09	0.18[E] 0.10 – 0.27		1.7[E] 0.90 – 2.4

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 240: Cis-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (cis-DCCA) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	2	F	0.10 0.07 – 0.13	0.03^{E} 0.02 – 0.04	0.05 0.04 – 0.06	0.07^{E} 0.06 – 0.11	0.16^{E} 0.10 – 0.21	F	0.74 .
	Total	F	24	4.2	F	0.13^{E} 0.08 – 0.21	0.04 .	0.06 0.04 – 0.07	0.08^{E} 0.06 – 0.15	F	0.61 .	0.93 .
	Total	M	26	0	0.12^{E} 0.07 – 0.19	0.08^{E} 0.05 – 0.11	0.03 .	0.04^{E} 0.03 – 0.06	0.07^{E} 0.04 – 0.09	F	0.20 .	0.34 .
	Total	3-5	10	10	0.25^{E} 0.13 – 0.37	0.17^{E} 0.10 – 0.28	<LD	0.07 .	F	0.33 .	0.51 .	0.60 .
	Total	6-11	19	0	F	0.14^{E} 0.08 – 0.24	0.04 .	0.06^{E} 0.04 – 0.08	0.09^{E} 0.06 – 0.16	F	0.82 .	1.15 .
	Total	12-19	21	0	0.07 0.05 – 0.09	0.05 0.04 – 0.07	0.02 .	0.04^{E} 0.02 – 0.04	0.05 0.04 – 0.07	0.08^{E} 0.05 – 0.13	0.14 .	0.15 .
	Anishinabe communities (2)	Total	28	3.6	F	0.10^{E} 0.07 – 0.15	0.04 .	0.05^{E} 0.04 – 0.07	0.07^{E} 0.07 – 0.11	F	0.30 .	0.46 .
	Innu communities (2)	Total	22	0	0.18^{E} 0.08 – 0.30	0.09^{E} 0.06 – 0.15	0.02 .	0.04^{E} 0.02 – 0.06	F	F	0.58 .	0.79 .
CHMS (Cycle 2)	Total	3-5	519	1.35		0.11 0.084 – 0.16	0.031 0.022 – 0.039		0.091 0.064 – 0.12	0.18^{E} 0.10 – 0.26		F
	Total	6-11	512	1.17		0.080 0.068 – 0.094	0.027 0.023 – 0.031		0.059 0.052 – 0.066	0.13 0.098 – 0.16		0.71^{E} <LD – 1.2
	Total	12-19	508	0.39		0.079 0.063 – 0.10	0.024 0.020 – 0.027		0.061 0.047 – 0.074	0.12^{E} 0.055 – 0.19		0.88^{E} 0.53 – 1.2

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 241: Trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (trans-DCCA) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	F	0.19[E] 0.14 – 0.27	0.06[E] 0.02 – 0.09	0.11 0.07 – 0.13	0.16 0.13 – 0.24	0.29[E] 0.23 – 0.39	F	1.05 .
	Total	F	24	0	F	0.21[E] 0.12 – 0.40	0.02 .	0.11[E] 0.02 – 0.14	0.21[E] 0.12 – 0.27	F	0.65 .	1.25 .
	Total	M	26	0	0.27[E] 0.16 – 0.43	0.18 0.13 – 0.25	0.06 .	0.09[E] 0.06 – 0.14	0.15[E] 0.11 – 0.22	0.29[E] 0.16 – 0.38	0.39 .	0.60 .
	Total	3-5	10	0	0.30[E] 0.18 – 0.44	F	0.01 .	0.11 .	F	0.35 .	0.64 .	0.65 .
	Total	6-11	19	0	F	F	0.05 .	0.11 .	0.16[E] 0.11 – 0.29	F	1.45 .	3.01 .
	Total	12-19	21	0	0.20[E] 0.13 – 0.28	0.15[E] 0.10 – 0.21	0.04 .	0.09[E] 0.04 – 0.12	0.14[E] 0.09 – 0.21	0.25[E] 0.14 – 0.33	0.33 .	0.57 .
	Anishinabe communities (2)	Total	28	0	F	0.20[E] 0.13 – 0.33	0.03 .	0.11[E] 0.04 – 0.14	0.24[E] 0.12 – 0.28	0.33[E] 0.26 – 0.39	0.44 .	0.62 .
	Innu communities (2)	Total	22	0	0.33[E] 0.16 – 0.55	0.18[E] 0.12 – 0.28	0.07 .	0.10[E] 0.06 – 0.14	0.15[E] 0.11 – 0.20	F	0.68 .	1.33 .
CHMS (Cycle 2)	Total	3-5	521	0.19		0.22 0.16 – 0.31	0.055 0.038 – 0.07		0.19 0.13 – 0.25	0.40[E] 0.22 – 0.59		F
	Total	6-11	516	0.78		0.21 0.18 – 0.25	0.048 0.037 – 0.06		0.17 0.15 – 0.19	0.37 0.24 – 0.50		F
	Total	12-19	511	0		0.27 0.21 – 0.34	0.057 0.05 – 0.067		0.20 0.16 – 0.25	0.50[E] 0.23 – 0.77		4.8[E] 2.1 – 7.5

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 242: Trans-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid (trans-DCCA) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	F	0.27^E 0.19 – 0.37	0.07^E 0.03 – 0.09	0.11^E 0.08 – 0.18	0.24^E 0.16 – 0.32	0.44^E 0.31 – 0.66	F	2.48 .
	Total	F	24	0	F	0.35^E 0.20 – 0.64	0.07 .	F	0.28^E 0.12 – 0.43	F	1.83 .	2.92 .
	Total	M	26	0	0.38^E 0.20 – 0.63	0.21^E 0.14 – 0.31	0.05 .	0.10^E 0.06 – 0.17	0.21^E 0.11 – 0.30	0.35^E 0.23 – 0.50	0.58 .	1.39 .
	Total	3-5	10	0	0.80^E 0.41 – 1.23	0.58^E 0.35 – 0.97	0.17 .	0.31 .	F	1.06 .	1.68 .	1.95 .
	Total	6-11	19	0	F	0.40^E 0.23 – 0.79	0.10 .	0.19^E 0.10 – 0.24	0.26^E 0.19 – 0.37	F	2.79 .	4.22 .
	Total	12-19	21	0	0.18^E 0.12 – 0.26	0.13^E 0.09 – 0.18	0.04 .	0.07^E 0.04 – 0.09	F	F	0.42 .	0.46 .
	Anishinabe communities (2)	Total	28	0	F	0.31^E 0.20 – 0.49	0.07 .	F	0.27^E 0.17 – 0.35	F	0.95 .	1.51 .
	Innu communities (2)	Total	22	0	F	0.22^E 0.13 – 0.37	0.04 .	0.08^E 0.04 – 0.14	0.19^E 0.08 – 0.32	F	1.90 .	2.70 .
CHMS (Cycle 2)	Total	3-5	520	0.19		0.39 0.27 – 0.55	0.097 0.063 – 0.13		0.32 0.22 – 0.42	0.78^E 0.48 – 1.1		F
	Total	6-11	514	0.78		0.24 0.21 – 0.29	0.077 0.068 – 0.087		0.18 0.16 – 0.21	0.43 0.30 – 0.55		F
	Total	12-19	509	0		0.21 0.16 – 0.26	0.057 0.049 – 0.065		0.16 0.12 – 0.19	0.32^E 0.092 – 0.54		2.4^E 1.3 – 3.5

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 243: 3-phenoxybenzoic acid (3-PBA) – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	F	0.21E 0.15 – 0.30	0.05E 0.02 – 0.09	0.10E 0.07 – 0.15	0.20 0.15 – 0.27	0.34 0.26 – 0.42	F	1.25 .
	Total	F	24	0	F	0.25E 0.14 – 0.47	0.03 .	F	0.20E 0.13 – 0.33	F	0.96 .	2.70 .
	Total	M	26	0	0.26E 0.17 – 0.38	0.18 0.13 – 0.25	0.07 .	0.10E 0.07 – 0.15	0.16E 0.11 – 0.26	0.31E 0.20 – 0.41	0.41 .	0.55 .
	Total	3-5	10	0	F	F	0.02 .	0.12 .	F	0.37 .	0.75 .	1.93 .
	Total	6-11	19	0	F	F	0.03 .	F	0.26E 0.11 – 0.36	F	1.13 .	2.28 .
	Total	12-19	21	0	0.20 0.14 – 0.26	0.16 0.11 – 0.21	0.06 .	0.09E 0.05 – 0.15	0.16E 0.10 – 0.21	0.24E 0.16 – 0.35	0.36 .	0.42 .
	Anishinabe communities (2)	Total	28	0	F	0.21E 0.13 – 0.36	0.03 .	F	0.23E 0.14 – 0.32	0.36 0.26 – 0.42	0.43 .	0.63 .
	Innu communities (2)	Total	22	0	F	0.21E 0.14 – 0.34	0.08 .	0.10E 0.07 – 0.14	0.15E 0.11 – 0.25	F	1.00 .	1.37 .
CHMS (Cycle 2)	Total	3-5	522	0.19		0.32 0.23 – 0.45	0.078 0.06 – 0.099		0.27 0.21 – 0.33	0.60 0.41 – 0.79		F
	Total	6-11	515	0		0.30 0.25 – 0.35	0.079 0.06 – 0.095		0.24 0.19 – 0.30	0.54 0.38 – 0.70		F
	Total	12-19	509	0		0.36 0.28 – 0.45	0.096 0.085 – 0.11		0.27 0.20 – 0.35	0.64E 0.39 – 0.89		5.6E 2.8 – 8.3

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 244: 3-phenoxybenzoic acid (3-PBA) (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu), gender, and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	F	0.29^{E} 0.21 – 0.42	0.06^{E} 0.05 – 0.10	0.13^{E} 0.08 – 0.16	0.25^{E} 0.15 – 0.35	0.54^{E} 0.34 – 0.91	F	2.31 .
	Total	F	24	0	F	0.40^{E} 0.23 – 0.74	0.09 .	0.13^{E} 0.09 – 0.19	F	F	2.33 .	3.62 .
	Total	M	26	0	0.35^{E} 0.21 – 0.55	0.21^{E} 0.15 – 0.32	0.05 .	0.10^{E} 0.05 – 0.15	0.19^{E} 0.13 – 0.32	0.39^{E} 0.23 – 0.55	0.59 .	1.13 .
	Total	3-5	10	0	F	0.72^{E} 0.41 – 1.19	0.19 .	0.38 .	F	1.00 .	1.35 .	2.63 .
	Total	6-11	19	0	F	0.41^{E} 0.23 – 0.80	0.09 .	0.14^{E} 0.08 – 0.28	0.31^{E} 0.14 – 0.44	F	2.21 .	3.32 .
	Total	12-19	21	0	0.19^{E} 0.12 – 0.27	0.14^{E} 0.10 – 0.19	0.05 .	0.07^{E} 0.05 – 0.13	0.13^{E} 0.08 – 0.16	F	0.44 .	0.55 .
	Anishinabe communities (2)	Total	28	0	F	0.33^{E} 0.22 – 0.53	0.09 .	0.13 0.10 – 0.17	0.29^{E} 0.15 – 0.42	F	1.09 .	1.85 .
	Innu communities (2)	Total	22	0	F	0.25^{E} 0.14 – 0.44	0.05 .	F	F	F	1.82 .	2.39 .
CHMS (Cycle 2)	Total	3-5	521	0.19		0.56 0.40 – 0.79	0.15 0.10 – 0.19		0.46 0.35 – 0.57	0.92 0.59 – 1.2		F
	Total	6-11	513	0		0.34 0.29 – 0.41	0.12 0.11 – 0.14		0.26 0.18 – 0.34	0.56 0.36 – 0.76		2.7^{E} 1.1 – 4.2
	Total	12-19	507	0		0.27 0.22 – 0.34	0.081 0.070 – 0.093		0.21 0.15 – 0.27	0.42^{E} 0.14 – 0.69		2.6 2.1 – 3.2

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2003). Public health statement. Pyrethrins and pyrethroids. Available at: www.atsdr.cdc.gov/toxprofiles/tp155.pdf

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Available at: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Available at: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

Saillenfait, A.M., Ndiaye, D., Sabaté, J.P. (2015). Pyrethroids: exposure and health effects – an update. Int. J. Hyg. Environ. Health. 218 (3). 281-92.

Santé publique France (2011). Pesticides pyréthrinoïdes. Consulted online. Available at: invs.santepubliquefrance.fr/Dossiers-thematiques/Environnement-et-sante/Biosurveillance/Index-de-A-a-Z/P/Pesticides-pyrethrinoides

van Balen, E.C., Wolansky, M.J., Kosatsky, T. (2012). Increasing use of pyrethroids in Canadian households: Should we be concerned?. Can. J. Public Health. 103 (6). e404-7.

Ye, M., Beach, J., Martin, J.W., Senthilselvan, A. (2015). Associations between dietary factors and urinary concentrations of organophosphate and pyrethroid metabolites in a Canadian general population. Int. J. Hyg. Environ. Health. 218 (7). 616-26.

6.4. Conclusion for Environmental Contaminants

Important Note for the Reader

Since this pilot project needed to include volunteer participants in two of the four project communities, the data for the population aged 3 – 19 years in these communities is not necessarily representative and should be read with caution. Furthermore, since the four communities that participated in the project were not chosen randomly, but were invited to participate voluntarily, these communities do not necessarily represent the nations to which they belong. Nevertheless, some significant trends emerge and are worthy of mention.

The JES!-YEH! project analysed a total of 88 environmental contaminants, divided into 13 separate groups: metal, organochlorine pesticides, polychlorinated biphenyls (PCBs), chlorophenols, perfluorinated compounds (PFCs), cotinine, phenoxy-type herbicides, polycyclic aromatic hydrocarbons (PAHs), environmental phenols, phthalates, organophosphorous pesticides, polybrominated flame retardants (PBDE), and pyrethroids. The results presented in this report were compared to the data for participants 3-19 years old in the CHMS, depending on study cycles and data availability.

Overall, the results for metals (arsenic, cadmium, mercury, nickel, lead, and uranium) were similar to or lower than the data in the CHMS (CHMS, 2013; 2015). Only blood cadmium in participants 12 to 19 years old was significantly higher than in the CHMS. Furthermore, very few participants had levels of exposure to these metals that exceeded the thresholds established by Quebec or Canada. Three participants had blood mercury levels that slightly exceeded the Health Canada threshold (8 µg/L), but which were lower than the INSPQ threshold (12 µg/L) (INSPQ, 2004; Legrand et al., 2010). Only one participant had blood lead levels slightly above the new INSPQ threshold (50 µg/L) (INSPQ, 2016). Lastly, three young smokers aged 12 to 19 years old had blood cadmium levels that exceeded the INSPQ reporting threshold (5 µg/L) (INSPQ, 2004).

For exposure to cigarette smoke, urine cotinine levels could not be compared to those in the CHMS because 40% of participants were below the limit of detection. According to the INSPQ reference values, 83% of participants were non-smokers, 3% were non-smokers with high exposure to second-hand smoke or occasional smokers, and 14% were considered smokers.

As reported by the CHMS and the FNBI (AFN, 2013), the majority of old POPs, i.e. organochlorine pesticides and polychlorinated biphenyls (PCBs), were practically undetected (40% to 100% under the limit of detection). Only PCB 153 was detected at a level higher than 40% in participants from the Innu communities involved in the project, but the concentrations were 1000 times lower than those reported by Dewailly et al. (1994) in fishermen on the North Shore in 1990. These results corroborate those currently reported in circumpolar regions and elsewhere in the world (AMAP, 2015). They highlight the long term effectiveness of national and international measures to ban the production and use of these contaminants such as the Stockholm Convention, which entered into force in 2004 (Stockholm Convention, 2008).

Urine concentrations of 2,5-dichlorophenol, bisphenol A, and diethylphosphate were significantly higher than in the CHMS in participants 6-11 and 12-19 years old. Levels of perfluorononanoic acid (PFNA) and 2-hydroxynaphthalene were significantly higher than the CHMS in participants 12-19 years old. Urine concentrations of monobenzyle phtalate were significantly higher than those in the CHMS for all three age groups. However, with the exception of bisphenol A, all of these most recent results should be interpreted with caution, since the coefficients of variation associated with these contaminants fluctuated between 16.6 and 33.3%. Furthermore, phthalates were measured only in a subsample of participants. In adults in the FNBI, urine levels of BPA and monobenzyl phtalate were also significantly higher than in the CHMS (BPA higher in women only).

As presented in this report, abnormally high levels were discovered for 2,5-DCP and PFNA in some Innu and Anishinabe communities involved in the project. The source of exposure to 2,5-DCP was most likely the mothballs used into the washrooms at a school. The mothballs were quickly removed from the building when the janitors noticed that the children were eating them. As for PFNAs, research on potential sources in the community is still ongoing. In 2016, just after the JES!-YEH! was completed, the Government of Canada amended the Prohibition of Certain Toxic Substances Regulations to add so-called long chain perfluorinated compounds, including PFNA (Health Canada, 2017).

References

AMAP (Arctic Monitoring Assessment Programme) (2015) Assessment 2015: Human Health in the Arctic. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. vii + 165 pp. Consulted online: www.amap.no/documents/doc/AMAP-Assessment-2015-Human-Health-in-the-Arctic/1346

AFN. (Assembly of First Nations) (2013) First Nation Biomonitoring Initiative: National Results (2011) Ottawa: Assembly of First Nations (APN). Consulted online: http://www.afn.ca/uploads/files/afn_fnbi_en.pdf.

Stockholm Convention (2008). Overview. Consulted online: chm.pops.int/TheConvention/Overview/tabid/3351/Default.aspx

Dewailly E, Ryan JJ, Laliberté C, Bruneau S, Weber JR, Gingras S, Carrier G. (1994) Exposure of Remote Maritime Populations to Coplanar PCBs. Environmental Health Perspectives; 102 Suppl 1:205-209.

CHMS. (2013) Second Report on Human Biomonitoring of Environmental Chemicals in Canada. Ottawa: Government of Canada. Consulted online: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/contaminants/chms-ecms-cycle2/chms-ecms-cycle2-eng.pdf.

CHMS. (2015) Third Report on Human Biomonitoring of Environmental Chemicals in Canada. Ottawa: Government of Canada. Consulted online: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/contaminants/chms-ecms-cycle3/chms-ecms-cycle3-eng.pdf.

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Consulted online: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Consulted online: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

Legrand, M., Freeley, M., Tikhonov, C., Schoen, D., Li-Mueller, A. (2010).Methylmercury blood guidance values for Canada. Can J Public Health. 101 (1), 28-31.

Health Canada (2017) Prohibition of Certain Toxic Substances Regulations (2012) (SOR/2012-285). Available at: www.ec.gc.ca/lcpe-cepa/eng/regulations/DetailReg.cfm?intReg=207

7. Results for Nutritional Status and Health Indicators

The second objective of the JES!-YEH! project was to document the nutritional status and health indicators considered to be priorities by Band Councils and health centre directors, or those identified in the scientific literature. Consequently, this section presents the results for certain essential elements, vitamins, fatty acid profiles, and data on iron deficiency and anemia, body weight, diabetes, and thyroid status.

7.1. Essential Elements

7.1.1. Chromium

Chromium is found mainly in two forms, i.e. chromium III and chromium VI. Chromium VI is used in the manufacture of stainless steel, colorants, and chemicals (IOM, 2001). Chromium VI is also present in cigarette smoke (Sanexen, 2009). In food, it is found in the form of trivalent chromium. The main function of dietary chromium in the body is to improve insulin sensitivity and regulate the use of glucose in cells (Anderson 1997; Cefalu 2004).

Although chromium is present in a wide variety of foods, most dietary sources provide low quantities. Cereal products, especially whole grains and more specifically high-fibre cereals, are among the foods with the highest levels of chromium. A lower quantity of chromium is also found in meat, while fruits and vegetables are quite variable (IOM, 2006). Food preparation, processing, and packaging may also release chromium and thereby increase the chromium content of these foods (Offenbacher and Pi-Sunyer, 1983). Some beers and wines also contain high concentrations of chromium (IOM, 2006).

The trivalent form of chromium has low toxicity or is non-toxic, but for people with pre-existing kidney or liver diseases, excessive intake should be avoided. Ingestion of chromium VI may cause gastrointestinal disorders such as irritation, pain, nausea, and diarrhea, as well as kidney and liver disorders. Chronic exposure to chromium VI may cause skin problems, as well as irritation of the nasal mucosa (ASTDR, 2012). This form of chromium has also been shown to be carcinogenic when inhaled (IOM, 2006).

The Centre de Toxicologie du Québec (CTQ) laboratory reporting threshold for urine chromium was 5 µg/L (100 nmol/L) at the time of the JES!-YEH! study (INSPQ, 2004). However, in January 2017, Quebec authorities removed urine chromium from the list of mandatory notifications (INSPQ, 2016).

Results

Levels of chromium are given in µg/L of urine and µg/g of creatinine in Tables 245 to 248. Urine levels of chromium reflect recent exposure to this substance.

No participants in the JES!-YEH! project had levels of urine chromium that exceeded the Quebec threshold in force at the time of the study. Levels of urine chromium were not measured in the CHMS.

Table 245: Chromium – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	34.5	0.32 0.27 – 0.38	0.21 0.19 – 0.24	<LD	<LD	0.22 0.18 – 0.24	0.35 0.31 – 0.41	0.65[E] 0.51 – 0.92	1.05 0.69 – 1.28
	Total	F	95	43.2	–	–	<LD	<LD	0.15[E] 0.08 – 0.22	0.34 0.28 – 0.42	0.72[E] 0.42 – 1.14	1.21 0.64 – 1.35
	Total	M	102	26.5	0.34 0.27 – 0.43	0.23 0.20 – 0.27	<LD	<LD	0.24 0.20 – 0.27	0.36 0.30 – 0.43	0.60[E] 0.44 – 0.91	0.93[E] 0.56 – 1.15
	Anishinabe communities (2)	Total	110	27.3	0.37 0.30 – 0.47	0.24 0.21 – 0.29	<LD	<LD	0.25 0.23 – 0.30	0.40 0.34 – 0.50	0.68[E] 0.50 – 1.13	1.17[E] 0.66 – 1.37
	Anishinabe communities (2)	F	55	30.9	0.38 0.27 – 0.49	0.24 0.19 – 0.32	<LD	<LD	0.25[E] 0.17 – 0.32	0.40[E] 0.32 – 0.60	0.96[E] 0.48 – 1.33	1.31 .
	Anishinabe communities (2)	M	55	23.6	0.37[E] 0.27 – 0.53	0.25 0.20 – 0.32	<LD	F	0.25 0.22 – 0.31	0.40 0.30 – 0.47	0.60[E] 0.42 – 0.97	0.94 .
	Innu communities (2)	Total	87	43.7	–	–	<LD	<LD	0.15 0.08 – 0.19	0.29 0.23 – 0.35	0.52[E] 0.35 – 0.80	0.85[E] 0.49 – 1.10
	Innu communities (2)	F	40	60	–	–	<LD	<LD	<LD	F	F	0.72 .
	Innu communities (2)	M	47	29.8	0.31 0.22 – 0.40	0.21 0.17 – 0.27	<LD	<LD	0.20 0.15 – 0.28	0.32[E] 0.27 – 0.45	F	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 246: Chromium (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	0.59[E] 0.42 – 0.84	0.29 0.25 – 0.34	0.08 0.07 – 0.10	0.15 0.12 – 0.18	0.29 0.24 – 0.33	0.47 0.42 – 0.60	0.86[E] 0.67 – 1.33	F
	Total	F	95	0	0.69[E] 0.40 – 1.11	0.29 0.23 – 0.37	0.07 0.06 – 0.09	0.12[E] 0.09 – 0.18	0.31 0.21 – 0.36	0.52 0.42 – 0.66	F	F
	Total	M	102	0	0.50[E] 0.34 – 0.71	0.28 0.24 – 0.33	0.10[E] 0.07 – 0.13	0.16 0.13 – 0.21	0.26 0.23 – 0.32	0.46 0.36 – 0.57	0.73 0.58 – 0.89	F
	Anishinabe communities (2)	Total	110	0	0.81[E] 0.52 – 1.22	0.38 0.31 – 0.47	0.10 0.08 – 0.13	0.20 0.13 – 0.24	0.35 0.30 – 0.42	0.61 0.49 – 0.75	F	F
	Anishinabe communities (2)	F	55	0	0.98[E] 0.52 – 1.67	0.39[E] 0.29 – 0.54	0.09[E] 0.05 – 0.11	0.15[E] 0.10 – 0.25	0.39 0.25 – 0.49	F	F	3.29 .
	Anishinabe communities (2)	M	55	0	0.63[E] 0.39 – 0.99	0.36 0.29 – 0.46	0.13[E] 0.08 – 0.20	0.21 0.15 – 0.27	0.33 0.27 – 0.40	0.55 0.40 – 0.73	F	1.49 .
	Innu communities (2)	Total	87	0	0.32[E] 0.23 – 0.46	0.21 0.17 – 0.25	0.07 0.05 – 0.08	0.11 0.08 – 0.15	0.22 0.17 – 0.26	0.35 0.28 – 0.43	0.54 0.42 – 0.66	F
	Innu communities (2)	F	40	0	0.28 0.20 – 0.36	0.20 0.15 – 0.26	0.07 0.05 – 0.08	0.09 0.07 – 0.13	0.18[E] 0.11 – 0.31	0.36 0.28 – 0.44	F	0.63 .
	Innu communities (2)	M	47	0	0.35[E] 0.21 – 0.59	0.21 0.17 – 0.27	0.07[E] 0.04 – 0.11	0.14 0.09 – 0.17	0.22 0.16 – 0.25	0.31[E] 0.24 – 0.45	F	0.67 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 247: Chromium – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	34.5	0.32 0.27 – 0.38	0.21 0.19 – 0.24	<LD	<LD	0.22 0.18 – 0.24	0.35 0.31 – 0.41	0.65^{E} 0.51 – 0.92	1.05 0.69 – 1.28
	Total	3-5	38	28.9	0.29 0.23 – 0.37	0.22 0.17 – 0.28	<LD	<LD	0.25 0.18 – 0.31	0.37 0.27 – 0.49	F	0.58 .
	Total	6-11	79	32.9	0.34 0.24 – 0.45	0.21 0.18 – 0.25	<LD	<LD	0.22 0.16 – 0.24	0.33 0.27 – 0.40	0.63^{E} 0.39 – 0.98	F
	Total	12-19	80	38.8	0.33 0.25 – 0.40	0.21 0.17 – 0.25	<LD	<LD	0.19^{E} 0.08 – 0.25	0.35^{E} 0.28 – 0.48	0.85^{E} 0.43 – 1.08	1.09E 0.68 – 1.33
	Anishinabe communities (2)	Total	110	27.3	0.37 0.30 – 0.47	0.24 0.21 – 0.29	<LD	<LD	0.25 0.23 – 0.30	0.40 0.34 – 0.50	0.68^{E} 0.50 – 1.13	1.17^{E} 0.66 – 1.37
	Anishinabe communities (2)	3-5	24	16.7	0.34 0.25 – 0.44	0.28 0.21 – 0.37	<LD	0.23^{E} 0.08 – 0.26	0.30 0.24 – 0.35	0.38^{E} 0.30 – 0.49	0.53 .	0.66 .
	Anishinabe communities (2)	6-11	46	32.6	0.41^{E} 0.26 – 0.60	0.23 0.18 – 0.31	<LD	<LD	0.23^{E} 0.13 – 0.27	0.37^{E} 0.25 – 0.60	F	1.37 .
	Anishinabe communities (2)	12-19	40	27.5	0.35 0.26 – 0.46	0.24 0.19 – 0.32	<LD	<LD	0.25^{E} 0.15 – 0.33	0.41^{E} 0.31 – 0.59	F	1.09 .
	Innu communities (2)	Total	87	43.7	–	–	<LD	<LD	0.15 0.08 – 0.19	0.29 0.23 – 0.35	0.52^{E} 0.35 – 0.80	0.85^{E} 0.49 – 1.10
	Innu communities (2)	3-5	14	50	–	–	F	F	<LD	F	0.51 .	0.52 .
	Innu communities (2)	6-11	33	33.3	0.24 0.18 – 0.30	0.19 0.14 – 0.23	<LD	<LD	0.19^{E} 0.08 – 0.26	0.30 0.23 – 0.35	F	0.54 .
	Innu communities (2)	12-19	40	50	–	–	F	F	<LD	F	0.76^{E} 0.31 – 1.14	1.04 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 248: Chromium (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	0.59^{E} 0.42 – 0.84	0.29 0.25 – 0.34	0.08 0.07 – 0.10	0.15 0.12 – 0.18	0.29 0.24 – 0.33	0.47 0.42 – 0.60	0.86^{E} 0.67 – 1.33	F
	Total	3-5	38	0	F	0.48 0.35 – 0.67	0.12 .	0.28^{E} 0.14 – 0.35	0.46 0.32 – 0.54	0.69^{E} 0.49 – 0.93	F	2.14 .
	Total	6-11	79	0	0.66^{E} 0.42 – 0.95	0.33 0.27 – 0.42	0.10 0.08 – 0.12	0.20 0.12 – 0.23	0.31 0.24 – 0.38	0.45 0.40 – 0.61	F	F
	Total	12-19	80	0	0.30 0.23 – 0.38	0.20 0.16 – 0.24	0.06 0.04 – 0.07	0.10 0.07 – 0.13	0.20 0.15 – 0.22	0.33^{E} 0.25 – 0.49	0.65^{E} 0.43 – 0.83	F
	Anishinabe communities (2)	Total	110	0	0.81^{E} 0.52 – 1.22	0.38 0.31 – 0.47	0.10 0.08 – 0.13	0.20 0.13 – 0.24	0.35 0.30 – 0.42	0.61 0.49 – 0.75	F	F
	Anishinabe communities (2)	3-5	24	0	F	0.64^{E} 0.42 – 1.06	0.27 .	0.33^{E} 0.27 – 0.47	0.48^{E} 0.33 – 0.69	F	1.71 .	4.80 .
	Anishinabe communities (2)	6-11	46	0	0.85^{E} 0.49 – 1.27	0.42 0.31 – 0.57	0.09^{E} 0.08 – 0.21	0.21^{E} 0.11 – 0.29	0.36 0.26 – 0.45	F	F	3.47 .
	Anishinabe communities (2)	12-19	40	0	0.38^{E} 0.26 – 0.52	0.24 0.17 – 0.33	F	0.13^{E} 0.08 – 0.19	0.21^{E} 0.15 – 0.31	0.52^{E} 0.29 – 0.65	F	0.89 .
	Innu communities (2)	Total	87	0	0.32^{E} 0.23 – 0.46	0.21 0.17 – 0.25	0.07 0.05 – 0.08	0.11 0.08 – 0.15	0.22 0.17 – 0.26	0.35 0.28 – 0.43	0.54 0.42 – 0.66	F
	Innu communities (2)	3-5	14	0	0.37^{E} 0.23 – 0.50	0.29^{E} 0.19 – 0.43	0.10 .	0.13 .	F	0.54^{E} 0.26 – 0.66	0.66 .	0.73 .
	Innu communities (2)	6-11	33	0	F	0.25 0.19 – 0.33	0.09 .	0.16^{E} 0.10 – 0.23	0.24 0.18 – 0.32	0.38 0.26 – 0.44	F	0.62 .
	Innu communities (2)	12-19	40	0	0.23 0.16 – 0.31	0.16 0.12 – 0.21	0.06^{E} 0.03 – 0.07	0.07^{E} 0.06 – 0.12	0.16^{E} 0.09 – 0.22	0.26^{E} 0.19 – 0.36	F	0.52 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

Anderson, R.A. (1997). Nutritional factor influencing the glucose/insulin system: chromium. J Am Coll Nutr, 16, 404-10.

ATSDR (Agency for Toxic Substances and Disease Registry) (2012). Toxicological profile for chromium. Consulted online: https://www.atsdr.cdc.gov/toxprofiles/tp7.pdf

Cefalu, W.T., Hu, F.B. (2004). Role of chromium in human health and in diabetes. Diabetes Care,27, 2741-51.

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

IOM (Institute of Medicine) (2001). Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc. The National Academies Press, Washington, DC, 798p. Consulted online: www.nap.edu/catalog/10026/dietary-reference-intakes-for-vitamin-a-vitamin-k-arsenic-boron-chromium-copper-iodine-iron-manganese-molybdenum-nickel-silicon-vanadium-and-zinc

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Offenbacher, E.G., Pi-Sunyer, F.X. (1983). Temperature and pH effects on the release of chromium from stainless steel into water and fruit juices. J. Agric. Food Chem., 31, 89-92.

Sanexen (2009). Canadian soil quality guidelines for contaminated sites—Human health effects. Scientific supporting document. Report prepared by Sanexen Environmental Services Inc. for Health Canada.

7.1.2. Cobalt

Cobalt is naturally present in rocks, soil, water, plants, and animals. It is part of alloys used to manufacture magnets, tools, airplane engines, and hip and knee prosthetics. Cobalt compounds are also used to manufacture pigments for glass, ceramics, and paint. Radioactive isotopes of cobalt have numerous commercial and medical uses (ATSDR, 2004).

In the body, cobalt is one of the components of vitamin B12, which is essential for neurological functioning and the formation of red blood cells (CDC, 2013; Health Canada, 2017). Since vitamin B12 contains cobalt, so do food sources, i.e. food of animal origin and food enriched with vitamin B12, such as dairy products (IOM, 2006). Several divalent metals such as cobalt, cadmium, lead, manganese, and zinc are known to interact with iron, as they share and compete for common routes of absorption. Consequently, iron deficiency may increase absorption of these metals in the intestines, as well as concentrations of cobalt in circulation, especially when diet is rich in cobalt (Flanagan et al., 1980; Meltzer et al., 2010).

For the general population, the sources of exposure to cobalt are air, drinking water, and to a lesser extent food (ATSDR, 2004). Exposure to high levels of cobalt may cause dermatitis and may have negative consequences on pulmonary and cardiac health (ATSDR, 2004).

The CTQ laboratory's reporting thresholds for blood and urine cobalt are 1 µg/L (17 nmol/L) and 15 µg/L (255 nmol/L) respectively (INSPQ, 2004). However, the reporting threshold for blood cobalt was removed from the list in January 2017 (INSPQ, 2016).

Results

Cobalt levels are given in µg/L of blood, µg/L of urine, and µg/g of creatinine in Tables 249 to 254. Cobalt levels measured in urine reflect recent intake of this substance.

None of the participants had blood or urine cobalt levels that exceeded the Quebec threshold in force at the time of the study.

Blood cobalt levels (Table 250) were not significantly different from levels reported in the CHMS (Cycle 2) for all age groups. Conversely, the average urine cobalt levels measured in the JES!-YEH! study were significantly higher than in the CHMS (Cycle 2) across all age groups (Table 254).

Table 249: Cobalt – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	0.24 0.22 – 0.25	0.22 0.21 – 0.23	0.14 0.13 – 0.15	0.16 0.16 – 0.17	0.21 0.19 – 0.22	0.27 0.24 – 0.30	0.36 0.32 – 0.43	0.48 0.37 – 0.52
	Total	F	92	0	0.24 0.22 – 0.25	0.22 0.21 – 0.24	0.14 0.14 – 0.15	0.16 0.15 – 0.18	0.20 0.19 – 0.23	0.28 0.24 – 0.31	0.35 0.31 – 0.40	0.41 0.34 – 0.49
	Total	M	102	0	0.24 0.22 – 0.27	0.22 0.20 – 0.24	0.14 0.13 – 0.15	0.16 0.15 – 0.17	0.21 0.19 – 0.22	0.26 0.24 – 0.30	0.39 0.30 – 0.49	0.50 0.36 – 0.55
	Anishinabe communities (2)	Total	107	0	0.27 0.25 – 0.29	0.25 0.23 – 0.27	0.16 0.14 – 0.17	0.19 0.17 – 0.21	0.24 0.23 – 0.25	0.31 0.28 – 0.34	0.41 0.35 – 0.50	0.50 0.40 – 0.55
	Anishinabe communities (2)	F	52	0	0.28 0.25 – 0.30	0.26 0.23 – 0.28	0.16 0.14 – 0.19	0.19 0.18 – 0.22	0.24 0.22 – 0.30	0.33 0.29 – 0.35	0.39 0.34 – 0.49	0.48 .
	Anishinabe communities (2)	M	55	0	0.27 0.24 – 0.30	0.25 0.22 – 0.27	0.16 0.13 – 0.17	0.18 0.16 – 0.22	0.24 0.22 – 0.25	0.29 0.25 – 0.35	0.44 0.31 – 0.53	0.51 .
	Innu communities (2)	Total	87	0	0.20 0.18 – 0.22	0.19 0.17 – 0.20	0.13 0.12 – 0.14	0.15 0.14 – 0.16	0.17 0.16 – 0.18	0.21 0.19 – 0.23	0.27 0.23 – 0.31	0.32[E] 0.25 – 0.43
	Innu communities (2)	F	40	0	0.18 0.17 – 0.20	0.18 0.17 – 0.19	0.14 .	0.15 0.14 – 0.16	0.17 0.16 – 0.19	0.21 0.18 – 0.23	0.24 0.21 – 0.28	0.28 .
	Innu communities (2)	M	47	0	0.21 0.18 – 0.25	0.19 0.17 – 0.22	0.13 .	0.15 0.13 – 0.16	0.17 0.16 – 0.19	0.21 0.19 – 0.25	0.30[E] 0.22 – 0.42	0.40 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 250: Cobalt – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	0.24 0.22 – 0.25	0.22 0.21 – 0.23	0.14 0.13 – 0.15	0.16 0.16 – 0.17	0.21 0.19 – 0.22	0.27 0.24 – 0.30	0.36 0.32 – 0.43	0.48 0.37 – 0.52
	Total	3-5	36	0	0.24 0.22 – 0.26	0.23 0.21 – 0.25	0.16 .	0.19 0.17 – 0.21	0.23 0.21 – 0.25	0.27 0.24 – 0.30	0.30 0.26 – 0.33	0.32 .
	Total	6-11	78	0	0.24 0.21 – 0.27	0.22 0.20 – 0.24	0.15 0.13 – 0.16	0.16 0.16 – 0.17	0.20 0.18 – 0.22	0.25 0.23 – 0.30	0.35 0.29 – 0.48	0.48^E 0.33 – 0.53
	Total	12-19	80	0	0.24 0.21 – 0.26	0.22 0.20 – 0.24	0.13 0.12 – 0.14	0.15 0.14 – 0.16	0.19 0.17 – 0.22	0.29 0.23 – 0.34	0.40 0.33 – 0.50	0.50 0.36 – 0.55
	Anishinabe communities (2)	Total	107	0	0.27 0.25 – 0.29	0.25 0.23 – 0.27	0.16 0.14 – 0.17	0.19 0.17 – 0.21	0.24 0.23 – 0.25	0.31 0.28 – 0.34	0.41 0.35 – 0.50	0.50 0.40 – 0.55
	Anishinabe communities (2)	3-5	22	0	0.25 0.24 – 0.27	0.25 0.23 – 0.27	0.19 .	0.22 0.19 – 0.24	0.25 0.22 – 0.28	0.29 0.25 – 0.30	0.30 0.28 – 0.32	0.32 .
	Anishinabe communities (2)	6-11	45	0	0.26 0.23 – 0.29	0.24 0.22 – 0.27	0.15 0.13 – 0.17	0.19 0.16 – 0.22	0.24 0.21 – 0.25	0.29 0.25 – 0.35	0.39 0.31 – 0.49	0.49 .
	Anishinabe communities (2)	12-19	40	0	0.29 0.25 – 0.34	0.26 0.22 – 0.31	0.14 0.12 – 0.17	0.18 0.16 – 0.21	0.24 0.20 – 0.32	0.35 0.30 – 0.44	0.50 0.36 – 0.55	0.54 .
	Innu communities (2)	Total	87	0	0.20 0.18 – 0.22	0.19 0.17 – 0.20	0.13 0.12 – 0.14	0.15 0.14 – 0.16	0.17 0.16 – 0.18	0.21 0.19 – 0.23	0.27 0.23 – 0.31	0.32^E 0.25 – 0.43
	Innu communities (2)	3-5	14	0	0.22 0.18 – 0.26	0.21 0.18 – 0.24	0.15 .	0.16 .	0.20 0.16 – 0.22	0.22^E 0.19 – 0.24	0.24 .	0.32 .
	Innu communities (2)	6-11	33	0	0.21 0.17 – 0.26	0.19 0.17 – 0.22	0.14 .	0.16 0.14 – 0.16	0.17 0.16 – 0.18	0.20 0.18 – 0.23	F	0.31 .
	Innu communities (2)	12-19	40	0	0.19 0.17 – 0.21	0.18 0.16 – 0.20	0.12 0.11 – 0.14	0.14 0.13 – 0.15	0.16 0.15 – 0.18	0.20 0.17 – 0.24	0.27^E 0.22 – 0.31	0.29 .
CHMS (Cycle 2)	Total	3-5	495	0		0.26 0.23 – 0.28	0.17 0.13 – 0.21		0.26 0.24 – 0.28	0.31 0.29 – 0.33		0.42 0.32 – 0.52
	Total	6-11	961	0		0.25 0.23 – 0.27	0.18 0.16 – 0.20		0.24 0.22 – 0.26	0.29 0.27 – 0.31		0.37 0.34 – 0.40
	Total	12-19	997	0.10		0.23 0.21 – 0.25	0.16 0.14 – 0.18		0.23 0.21 – 0.25	0.27 0.25 – 0.30		0.38 0.34 – 0.41

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 251: Cobalt – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	0.63 0.56 – 0.71	0.47 0.41 – 0.52	0.15 0.10 – 0.18	0.31 0.24 – 0.35	0.48 0.44 – 0.54	0.73 0.64 – 0.89	1.25 1.00 – 1.43	1.48 1.32 – 1.83
	Total	F	95	0	0.57 0.48 – 0.65	0.41 0.35 – 0.49	0.11[E] 0.06 – 0.15	0.24[E] 0.15 – 0.33	0.47 0.41 – 0.55	0.71 0.60 – 0.92	1.13 0.92 – 1.31	1.38 1.10 – 1.60
	Total	M	102	0	0.70 0.58 – 0.84	0.52 0.45 – 0.60	0.21[E] 0.14 – 0.26	0.35 0.28 – 0.39	0.48 0.44 – 0.57	0.75 0.63 – 0.91	1.39 0.93 – 1.65	1.74 1.37 – 2.39
	Anishinabe communities (2)	Total	110	0	0.65 0.56 – 0.74	0.50 0.42 – 0.57	0.16[E] 0.12 – 0.22	0.32 0.23 – 0.41	0.54 0.45 – 0.60	0.82 0.64 – 0.93	1.21 0.94 – 1.48	1.53[E] 1.18 – 2.03
	Anishinabe communities (2)	F	55	0	0.61 0.51 – 0.73	0.47 0.38 – 0.58	0.14[E] 0.06 – 0.21	0.29[E] 0.16 – 0.43	0.55 0.42 – 0.63	0.84 0.64 – 0.93	1.09 0.90 – 1.37	1.30 .
	Anishinabe communities (2)	M	55	0	0.69 0.56 – 0.85	0.52 0.43 – 0.64	0.20[E] 0.11 – 0.25	0.35 0.23 – 0.43	0.49 0.43 – 0.61	0.81 0.61 – 1.02	1.38[E] 0.91 – 1.99	1.96 .
	Innu communities (2)	Total	87	0	0.61 0.49 – 0.75	0.43 0.36 – 0.51	0.11[E] 0.09 – 0.17	0.29 0.16 – 0.34	0.44 0.37 – 0.52	0.67 0.54 – 0.82	1.29 0.78 – 1.46	1.46 1.20 – 1.83
	Innu communities (2)	F	40	0	0.50 0.37 – 0.64	0.35 0.26 – 0.45	0.09 .	0.15[E] 0.10 – 0.28	0.35 0.26 – 0.48	0.55[E] 0.45 – 0.91	1.12[E] 0.58 – 1.44	1.36 .
	Innu communities (2)	M	47	0	0.70[E] 0.52 – 0.97	0.52 0.42 – 0.64	0.22[E] 0.09 – 0.32	0.35 0.26 – 0.39	0.48 0.39 – 0.60	0.69 0.57 – 0.97	1.39[E] 0.72 – 1.50	F

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 252: Cobalt (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	0.80 0.72 – 0.88	0.64 0.58 – 0.70	0.27 0.22 – 0.32	0.40 0.36 – 0.47	0.63 0.57 – 0.70	0.97 0.87 – 1.10	1.58 1.23 – 1.85	1.96 1.64 – 2.36
	Total	F	95	0	0.77 0.68 – 0.87	0.64 0.57 – 0.72	0.27 0.23 – 0.33	0.40 0.33 – 0.50	0.66 0.54 – 0.74	0.96 0.83 – 1.03	1.42 1.05 – 1.75	1.79 1.37 – 2.05
	Total	M	102	0	0.83 0.70 – 0.95	0.64 0.55 – 0.73	0.23[E] 0.19 – 0.33	0.39 0.33 – 0.47	0.60 0.54 – 0.70	1.03 0.82 – 1.19	1.75 1.22 – 2.08	2.16 1.56 – 2.44
	Anishinabe communities (2)	Total	110	0	0.91 0.81 – 1.01	0.76 0.68 – 0.85	0.36 0.23 – 0.41	0.52 0.44 – 0.61	0.80 0.70 – 0.88	1.07 0.96 – 1.24	1.69 1.26 – 1.94	1.99 1.65 – 2.42
	Anishinabe communities (2)	F	55	0	0.88 0.76 – 1.01	0.76 0.66 – 0.88	0.35[E] 0.24 – 0.46	0.53 0.41 – 0.69	0.76 0.69 – 0.92	0.99 0.92 – 1.28	1.66 1.11 – 1.87	1.86 .
	Anishinabe communities (2)	M	55	0	0.93 0.77 – 1.10	0.76 0.64 – 0.91	0.32[E] 0.19 – 0.43	0.51 0.39 – 0.61	0.81 0.60 – 0.94	1.13 0.92 – 1.39	1.70[E] 1.19 – 2.23	2.13 .
	Innu communities (2)	Total	87	0	0.67 0.55 – 0.79	0.51 0.44 – 0.59	0.22 0.16 – 0.28	0.33 0.28 – 0.37	0.49 0.40 – 0.56	0.69 0.59 – 0.87	1.37[E] 0.86 – 1.85	1.86[E] 1.16 – 2.41
	Innu communities (2)	F	40	0	0.62 0.49 – 0.78	0.51 0.42 – 0.61	0.24 0.17 – 0.31	0.32 0.25 – 0.39	0.50 0.38 – 0.58	0.72 0.55 – 0.89	F	1.41 .
	Innu communities (2)	M	47	0	0.71 0.53 – 0.90	0.52 0.41 – 0.64	0.20[E] 0.12 – 0.30	0.33 0.22 – 0.38	0.48 0.36 – 0.58	0.67[E] 0.57 – 1.16	1.55[E] 0.71 – 2.16	2.07 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 253: Cobalt – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	0.63 0.56 – 0.71	0.47 0.41 – 0.52	0.15 0.10 – 0.18	0.31 0.24 – 0.35	0.48 0.44 – 0.54	0.73 0.64 – 0.89	1.25 1.00 – 1.43	1.48 1.32 – 1.83
	Total	3-5	38	0	0.54 0.42 – 0.66	0.42 0.32 – 0.53	0.15 .	0.28E 0.15 – 0.38	0.45 0.34 – 0.57	0.66 0.53 – 0.76	0.98E 0.68 – 1.32	1.20 .
	Total	6-11	79	0	0.58 0.48 – 0.70	0.43 0.36 – 0.51	0.13E 0.07 – 0.19	0.30 0.19 – 0.37	0.45 0.41 – 0.53	0.63 0.55 – 0.77	1.07E 0.74 – 1.61	1.61E 0.98 – 2.30
	Total	12-19	80	0	0.73 0.59 – 0.89	0.53 0.44 – 0.63	0.15E 0.09 – 0.26	0.32 0.24 – 0.41	0.55 0.44 – 0.67	0.92 0.73 – 1.13	1.38 1.05 – 1.47	F
	Anishinabe communities (2)	Total	110	0	0.65 0.56 – 0.74	0.50 0.42 – 0.57	0.16E 0.12 – 0.22	0.32 0.23 – 0.41	0.54 0.45 – 0.60	0.82 0.64 – 0.93	1.21 0.94 – 1.48	1.53E 1.18 – 2.03
	Anishinabe communities (2)	3-5	24	0	0.52 0.39 – 0.65	0.40E 0.28 – 0.55	0.10 .	F	0.48E 0.30 – 0.59	0.65E 0.50 – 0.79	0.87 .	1.13 .
	Anishinabe communities (2)	6-11	46	0	0.61 0.47 – 0.77	0.44 0.35 – 0.55	0.14E 0.06 – 0.21	0.23E 0.17 – 0.41	0.44 0.40 – 0.55	0.63 0.54 – 0.83	F	2.00 .
	Anishinabe communities (2)	12-19	40	0	0.78 0.63 – 0.92	0.65 0.52 – 0.79	0.27E 0.14 – 0.39	0.44 0.28 – 0.54	0.71 0.50 – 0.89	0.94 0.85 – 1.22	1.36 0.99 – 1.59	1.47 .
	Innu communities (2)	Total	87	0	0.61 0.49 – 0.75	0.43 0.36 – 0.51	0.11E 0.09 – 0.17	0.29 0.16 – 0.34	0.44 0.37 – 0.52	0.67 0.54 – 0.82	1.29 0.78 – 1.46	1.46 1.20 – 1.83
	Innu communities (2)	3-5	14	0	0.57E 0.37 – 0.83	0.45E 0.32 – 0.66	0.15 .	0.28 .	0.41E 0.27 – 0.64	F	0.95 .	1.31 .
	Innu communities (2)	6-11	33	0	0.55 0.42 – 0.70	0.42 0.32 – 0.55	0.10 .	0.33E 0.11 – 0.39	0.45 0.34 – 0.54	0.58E 0.48 – 0.84	1.09E 0.59 – 1.47	1.40 .
	Innu communities (2)	12-19	40	0	0.68E 0.44 – 0.99	0.43 0.32 – 0.57	0.09E 0.07 – 0.17	0.25E 0.12 – 0.34	0.41E 0.31 – 0.58	0.69E 0.52 – 1.13	F	1.47 .
CHMS (Cycle 2)	Total	3-5	573	2.79		0.34 0.30 – 0.39	0.10 0.068 – 0.13		0.37 0.31 – 0.43	0.55 0.48 – 0.63		1.1E 0.65 – 1.6
	Total	6-11	1061	1.60		0.38 0.35 – 0.41	0.12 0.098 – 0.14		0.40 0.37 – 0.43	0.58 0.53 – 0.64		1.1 0.95 – 1.3
	Total	12-19	1041	3.17		0.36 0.32 – 0.41	0.086 <LD – 0.11		0.36 0.32 – 0.41	0.62 0.54 – 0.71		1.5 1.2 – 1.9

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 254: Cobalt (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	0.80 0.72 – 0.88	0.64 0.58 – 0.70	0.27 0.22 – 0.32	0.40 0.36 – 0.47	0.63 0.57 – 0.70	0.97 0.87 – 1.10	1.58 1.23 – 1.85	1.96 1.64 – 2.36
	Total	3-5	38	0	1.00 0.85 – 1.14	0.90 0.78 – 1.03	0.47 .	0.60 0.50 – 0.72	0.92 0.67 – 1.09	1.35 0.97 – 1.44	1.64 1.36 – 1.80	1.78 .
	Total	6-11	79	0	0.87 0.72 – 1.02	0.69 0.59 – 0.80	0.30 0.24 – 0.37	0.45 0.35 – 0.52	0.63 0.56 – 0.73	0.97 0.77 – 1.21	1.85^{E} 1.11 – 2.30	2.41^{E} 1.60 – 2.94
	Total	12-19	80	0	0.64 0.54 – 0.75	0.50 0.43 – 0.58	0.20 0.15 – 0.24	0.32 0.24 – 0.38	0.49 0.38 – 0.61	0.87 0.65 – 0.96	1.10E 0.95 – 1.80	1.78^{E} 1.05 – 2.13
	Anishinabe communities (2)	Total	110	0	0.91 0.81 – 1.01	0.76 0.68 – 0.85	0.36 0.23 – 0.41	0.52 0.44 – 0.61	0.80 0.70 – 0.88	1.07 0.96 – 1.24	1.69 1.26 – 1.94	1.99 1.65 – 2.42
	Anishinabe communities (2)	3-5	24	0	1.01 0.85 – 1.17	0.93 0.78 – 1.09	0.51 .	0.68 0.52 – 0.86	0.95 0.72 – 1.13	1.34 0.96 – 1.46	1.56 .	1.67 .
	Anishinabe communities (2)	6-11	46	0	0.95 0.78 – 1.14	0.79 0.66 – 0.95	0.39^{E} 0.21 – 0.48	0.55 0.44 – 0.68	0.75 0.64 – 0.87	1.02^{E} 0.84 – 1.53	1.87^{E} 1.12 – 2.40	2.27 .
	Anishinabe communities (2)	12-19	40	0	0.80 0.64 – 0.97	0.65 0.52 – 0.80	0.22^{E} 0.17 – 0.38	0.39^{E} 0.27 – 0.52	0.65^{E} 0.48 – 0.90	1.02 0.78 – 1.16	1.24^{E} 1.03 – 2.05	2.03 .
	Innu communities (2)	Total	87	0	0.67 0.55 – 0.79	0.51 0.44 – 0.59	0.22 0.16 – 0.28	0.33 0.28 – 0.37	0.49 0.40 – 0.56	0.69 0.59 – 0.87	1.37^{E} 0.86 – 1.85	1.86^{E} 1.16 – 2.41
	Innu communities (2)	3-5	14	0	0.99 0.69 – 1.29	0.85 0.63 – 1.14	0.45 .	0.54 .	0.67^{E} 0.51 – 1.22	1.29^{E} 0.63 – 1.66	1.67 .	1.98 .
	Innu communities (2)	6-11	33	0	0.75^{E} 0.52 – 1.05	0.56 0.44 – 0.72	0.26 .	0.33 0.27 – 0.47	0.52 0.38 – 0.58	0.67^{E} 0.55 – 1.17	F	2.20 .
	Innu communities (2)	12-19	40	0	0.48 0.39 – 0.60	0.39 0.33 – 0.48	0.15^{E} 0.11 – 0.23	0.24^{E} 0.19 – 0.33	0.37 0.32 – 0.47	0.62 0.41 – 0.75	F	0.94 .
CHMS (Cycle 2)	Total	3-5	572	6.89		0.22 0.20 – 0.25	<LD		0.22 0.19 – 0.24	0.38 0.34 – 0.41		0.88 0.79 – 0.97
	Total	6-11	1057	1.61		0.43 0.40 – 0.46	0.23 0.21 – 0.26		0.43 0.40 – 0.46	0.59 0.54 – 0.64		1.1 0.91 – 1.3
	Total	12-19	1039	3.18		0.27 0.25 – 0.30	0.11 <LD – 0.13		0.26 0.24 – 0.29	0.43 0.39 – 0.46		0.91 0.77 – 1.1

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2004). Toxicological profile for cobalt. Consulted online: www.atsdr.cdc.gov/toxfaqs/tf.asp?id=372&tid=64

CDC (Centers for Disease Control and Prevention) (2013). Workplace Safety and Health Topics - Cobalt. Consulted online: www.cdc.gov/niosh/topics/cobalt/default.html

Flanagan, P.R., Haist, J., Valberg, L.S. (1980) Comparative effects of iron deficiency induced by bleeding and a low-iron diet on the intestinal absorptive interactions of iron, cobalt, manganese, zinc, lead and cadmium. J Nutr., 110(9), 1754-63.

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Source: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Meltzer, H.M., Brantsaeter, A.L., Borch-Iohnsen, B., Ellingsen, D.G., Alexander, J., Thomassen, Y., Stigum, H., Ydersbond, T.A. (2010) Low iron stores are related to higher blood concentrations of manganese, cobalt and cadmium in non-smoking, Norwegian women in the HUNT 2 study. Environ Res., 110(5), 497-504.

Health Canada (2016). Multi-Vitamin/Mineral Supplements Monograph (Under Consultation). Consulted online:
webprod.hc-sc.gc.ca/nhpid-bdipsn/atReq.do?atid=multi_vitmin_suppl&lang=eng

7.1.3. Iodine

Iodine plays an important role in the body, as it is used to make thyroid hormones, i.e. triiodothyronine (T_3) and thyroxin (T_4) (Health Canada, 2012).

In the environment, oceans provide the majority of iodine found in the air, soil, and water. Iodine can remain in the ground for long periods, since it combines with organic matter in soil (ATSDR, 2004). Furthermore, the concentration present in plants varies widely depending on the soil, and it is therefore difficult to quantify the concentration of iodine in food. In any case, iodine is found in significant quantities in the sea, and saltwater fish, algae, and marine plants are therefore good natural dietary sources of iodine (Latham 1996).

A lack of iodine causes inadequate production of thyroid hormones, which may have numerous health consequences, such as mental delays, hypothyroidism, goiter, and congenital iodine deficiency syndrome. A lack of iodine in pregnant women may affect the growth and mental development of the baby. In children as well, growth and developmental abnormalities may result from iodine deficiency. In the early 20th century, iodine deficiency was a problem in Canada and elsewhere in the world. This problem led to the mandatory iodization of table salt as a public health measure. This iodine intake in the form of table salt is nowadays the main source of dietary iodine (IOM, 2001).

Most people have a high tolerance for elevated iodine levels, but when intake exceeds the recommendations, the observed effects may include thyroiditis, hyperthyroidism, hypothyroidism, and goiter (IOM, 2006).

The World Health Organization (2014) classifies urine iodine levels into 6 categories:

Condition	Urine iodine concentration	
	µmol/L	µg/L
Severe lack	<0.16	<20
Moderate lack	Between 0.16 and 0.38	Between 20 and 49
Slight lack	Between 0.39 and 0.78	Between 50 and 99
Sufficient intake	Between 0.79 and 1.57	Between 100 and 199
More than sufficient intake	Between 1.58 and 2.36	Between 200 and 299
Excessive intake	≥2.37 or more	≥300

Results

Iodine levels are presented in µg/L of urine and µg/g of creatinine in Tables 255 to 258. Urine iodine levels reflect recent exposure to this substance.

Based on the recommendations proposed by the WHO, almost 40% (39.1%) of participants in the JES!-YEH! study lacked urine iodine (3.6% severe lack, 7.6% moderate lack, and 27.9% slight lack). More than half of participants had urine iodine levels that reflected a sufficient (38.1%) or more than sufficient (16.8%) intake. Excessive urine iodine concentrations were detected in 6.1% of participants in the study. As there is no data in the CHMS on urine iodine concentrations, the data measured in the JES!-YEH! study could not be compared.

Table 255: Iodine – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	141.8 129.4 – 154.0	113.5 102.2 – 124.8	45.02 38.67 – 52.91	79.01 70.25 – 85.23	119.3 104.1 – 130.1	179.1 158.2 – 209.7	255.1 226.2 – 286.9	300.2 267.7 – 357.0
	Total	F	95	0	141.3 121.6 – 159.4	109.6 92.67 – 127.2	41.14[E] 18.48 – 55.70	78.64 58.23 – 88.61	112.0 96.62 – 128.4	191.1 146.2 – 222.8	251.6 223.4 – 291.5	294.3 249.8 – 395.6
	Total	M	102	0	142.3 126.0 – 159.8	117.3 103.1 – 133.4	49.62 40.19 – 60.63	78.69 64.14 – 89.98	124.1 99.87 – 140.5	167.7 155.1 – 209.8	263.3 215.6 – 301.3	303.2 251.9 – 343.0
	Anishinabe communities (2)	Total	110	0	153.5 136.1 – 171.0	127.5 111.9 – 143.4	53.16 43.70 – 70.38	89.24 75.63 – 98.42	126.0 111.8 – 151.6	196.2 163.4 – 226.8	265.8 233.9 – 299.1	301.7 260.8 – 403.8
	Anishinabe communities (2)	F	55	0	153.9 130.7 – 177.2	129.2 107.7 – 152.0	62.34[E] 43.25 – 84.49	90.51 77.67 – 100.0	125.6 99.30 – 157.0	201.3 158.8 – 230.9	246.8 213.1 – 298.5	294.3 .
	Anishinabe communities (2)	M	55	0	153.0 129.4 – 179.8	125.9 104.8 – 149.5	48.10[E] 31.62 – 67.85	84.49 55.43 – 103.8	127.1 102.1 – 155.1	185.1 156.0 – 246.8	284.8 220.7 – 311.4	307.0 .
	Innu communities (2)	Total	87	0	127.1 108.9 – 145.7	97.98 82.14 – 116.1	37.72[E] 17.03 – 48.10	70.57 47.73 – 79.11	104.1 82.77 – 124.1	156.7 133.1 – 203.0	235.4 193.7 – 283.5	288.2 226.3 – 360.1
	Innu communities (2)	F	40	0	123.9 96.04 – 155.1	87.41 64.47 – 113.7	F	46.84[E] 25.24 – 76.27	100.0 74.41 – 114.8	139.2[E] 111.3 – 237.3	265.8[E] 150.6 – 314.8	291.1 .
	Innu communities (2)	M	47	0	129.8 108.7 – 152.9	108.0 90.38 – 129.5	48.23[E] 22.15 – 63.54	72.78 52.74 – 84.42	112.0 82.59 – 141.4	158.8 136.1 – 197.8	217.1[E] 163.5 – 290.7	269.0 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 256: Iodine (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	203.9 181.1 – 226.0	155.7 141.1 – 170.8	62.18 49.77 – 70.06	87.80 79.01 – 100.1	150.3 132.8 – 186.5	265.3 239.2 – 292.6	355.8 322.6 – 436.0	525.2 358.0 – 614.3
	Total	F	95	0	225.3 187.9 – 265.0	170.1 147.3 – 197.4	63.11 49.24 – 78.60	89.46 78.87 – 123.9	166.1 134.1 – 209.3	278.7 241.8 – 322.5	357.9^{E} 322.4 – 541.4	602.9^{E} 355.4 – 812.4
	Total	M	102	0	183.9 158.3 – 209.7	143.4 124.0 – 164.9	56.52 36.26 – 70.08	86.32 71.48 – 98.87	143.9 111.9 – 181.7	250.4 209.3 – 283.3	330.0 286.1 – 435.5	475.5 324.3 – 552.6
	Anishinabe communities (2)	Total	110	0	249.8 213.7 – 286.7	195.7 171.3 – 221.1	68.40 62.24 – 85.53	115.2 88.01 – 136.4	206.6 174.0 – 241.2	317.1 271.8 – 335.5	482.1 343.0 – 573.5	604.5^{E} 454.5 – 721.1
	Anishinabe communities (2)	F	55	0	277.6 217.7 – 335.5	209.8 172.1 – 251.4	68.52 53.14 – 96.16	129.7 84.96 – 154.4	227.5 149.2 – 269.8	320.1 268.7 – 358.9	543.2^{E} 329.3 – 709.9	699.2 .
	Anishinabe communities (2)	M	55	0	222.0 187.0 – 260.8	182.6 154.6 – 215.7	68.15 59.46 – 87.05	101.3^{E} 78.03 – 159.1	192.7 158.8 – 229.1	284.7 227.2 – 337.5	397.0 299.2 – 526.4	525.6 .
	Innu communities (2)	Total	87	0	145.8 126.7 – 167.4	116.6 102.0 – 134.9	44.03^{E} 34.02 – 62.20	76.55 62.41 – 86.99	111.9 97.41 – 134.8	196.2 142.7 – 248.0	284.8 241.6 – 339.7	347.3 260.7 – 355.8
	Innu communities (2)	F	40	0	153.4 125.8 – 183.8	127.5 105.8 – 155.7	49.35^{E} 40.42 – 76.88	78.86 63.16 – 104.6	123.1 89.12 – 145.1	201.5^{E} 138.5 – 253.5	335.8 210.4 – 354.4	353.4 .
	Innu communities (2)	M	47	0	139.3 109.6 – 173.4	108.0 86.85 – 133.7	34.93^{E} 25.13 – 58.97	72.85^{E} 39.43 – 89.89	104.7 88.43 – 134.7	158.9^{E} 132.0 – 246.2	266.8^{E} 200.9 – 305.7	302.9 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 257: Iodine – Levels measured in the urine (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	141.8 129.4 – 154.0	113.5 102.2 – 124.8	45.02 38.67 – 52.91	79.01 70.25 – 85.23	119.3 104.1 – 130.1	179.1 158.2 – 209.7	255.1 226.2 – 286.9	300.2 267.7 – 357.0
	Total	3-5	38	0	148.7 117.0 – 181.0	115.0 87.91 – 144.9	50.63 .	78.16 53.11 – 92.09	100.0^{E} 82.25 – 153.2	217.3 121.8 – 237.3	273.4^{E} 221.5 – 355.4	345.6 .
	Total	6-11	79	0	154.1 135.5 – 171.6	128.8 110.9 – 147.9	47.97^{E} 42.53 – 72.78	88.92 61.55 – 99.37	135.8 110.8 – 162.8	205.7 174.1 – 229.4	272.8 226.6 – 295.8	297.8 258.9 – 325.2
	Total	12-19	80	0	126.4 107.0 – 147.0	99.64 82.89 – 116.1	37.55^{E} 15.01 – 56.08	70.89 49.39 – 81.96	112.0 88.45 – 120.9	151.9 129.4 – 159.7	223.6 160.0 – 273.1	272.2^{E} 201.9 – 407.6
	Anishinabe communities (2)	Total	110	0	153.5 136.1 – 171.0	127.5 111.9 – 143.4	53.16 43.70 – 70.38	89.24 75.63 – 98.42	126.0 111.8 – 151.6	196.2 163.4 – 226.8	265.8 233.9 – 299.1	301.7 260.8 – 403.8
	Anishinabe communities (2)	3-5	24	0	163.0 123.7 – 207.5	127.1E 88.52 – 174.0	50.63 .	81.01^{E} 55.06 – 101.9	119.0^{E} 93.33 – 196.2	227.9^{E} 126.4 – 265.8	288.6 .	334.2 .
	Anishinabe communities (2)	6-11	46	0	154.0 131.9 – 176.1	133.1 112.4 – 155.6	50.13 44.00 – 84.16	90.51 60.28 – 100.0	134.6 98.89 – 169.5	194.1 167.5 – 233.3	260.8 210.4 – 296.2	295.6 .
	Anishinabe communities (2)	12-19	40	0	147.2 118.0 – 179.3	121.7 98.39 – 147.5	55.70^{E} 22.18 – 77.09	87.34 60.92 – 108.5	116.5 103.1 – 145.6	160.3 135.8 – 221.5	240.5^{E} 163.1 – 351.5	291.1 .
	Innu communities (2)	Total	87	0	127.1 108.9 – 145.7	97.98 82.14 – 116.1	37.72^{E} 17.03 – 48.10	70.57 47.73 – 79.11	104.1 82.77 – 124.1	156.7 133.1 – 203.0	235.4 193.7 – 283.5	288.2 226.3 – 360.1
	Innu communities (2)	3-5	14	0	124.1^{E} 77.85 – 175.4	96.74^{E} 66.26 – 140.2	32.15 .	63.29 .	82.28^{E} 62.76 – 118.7	F	215.2 .	273.4 .
	Innu communities (2)	6-11	33	0	154.3 122.2 – 185.8	123.0 90.89 – 159.0	43.29 .	80.70^{E} 47.15 – 110.1	134.8 97.05 – 173.0	207.3 151.4 – 256.3	274.7 207.6 – 326.6	308.9 .
	Innu communities (2)	12-19	40	0	105.7 83.20 – 129.9	81.59 62.24 – 102.8	F	51.90^{E} 33.54 – 75.00	84.81 71.84 – 120.3	130.4 108.5 – 151.6	160.3^{E} 133.5 – 253.2	227.9 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 258: Iodine (adjusted for creatinine) – Levels measured in the urine (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	197	0	203.9 181.1 – 226.0	155.7 141.1 – 170.8	62.18 49.77 – 70.06	87.80 79.01 – 100.1	150.3 132.8 – 186.5	265.3 239.2 – 292.6	355.8 322.6 – 436.0	525.2 358.0 – 614.3
	Total	3-5	38	0	298.2 238.5 – 364.4	248.3 203.0 – 305.0	105.6 .	143.8^{E} 115.6 – 240.2	261.2 191.5 – 316.3	355.8 277.8 – 459.3	543.1^{E} 358.8 – 615.7	609.0 .
	Total	6-11	79	0	248.5 213.4 – 288.9	205.4 180.7 – 233.7	89.93 84.78 – 100.9	129.5 99.42 – 162.4	212.8 180.1 – 239.1	288.3 255.5 – 342.0	364.9^{E} 331.5 – 552.6	F
	Total	12-19	80	0	115.0 98.49 – 131.6	94.90 82.36 – 108.0	40.57 31.12 – 51.93	63.42 50.86 – 71.82	86.54 76.67 – 111.9	137.4 120.3 – 170.7	220.7^{E} 161.7 – 286.8	289.1 207.9 – 318.4
	Anishinabe communities (2)	Total	110	0	249.8 213.7 – 286.7	195.7 171.3 – 221.1	68.40 62.24 – 85.53	115.2 88.01 – 136.4	206.6 174.0 – 241.2	317.1 271.8 – 335.5	482.1 343.0 – 573.5	604.5^{E} 454.5 – 721.1
	Anishinabe communities (2)	3-5	24	0	343.6 268.0 – 438.4	296.3 233.8 – 368.7	123.1 .	234.3E 125.4 – 270.9	274.7 242.4 – 359.7	378.3^{E} 287.1 – 539.5	572.2 .	606.4 .
	Anishinabe communities (2)	6-11	46	0	295.2 235.8 – 360.1	240.4 199.4 – 285.5	89.42^{E} 67.53 – 139.2	177.2 103.5 – 202.9	239.8 193.0 – 276.4	323.5 271.9 – 420.9	538.6^{E} 342.7 – 666.8	640.0 .
	Anishinabe communities (2)	12-19	40	0	141.3 117.5 – 167.6	120.6 102.2 – 142.5	58.76 47.57 – 67.00	68.40 62.21 – 89.97	125.3 85.11 – 144.0	172.2^{E} 135.4 – 222.5	289.1 186.1 – 318.4	317.8 .
	Innu communities (2)	Total	87	0	145.8 126.7 – 167.4	116.6 102.0 – 134.9	44.03^{E} 34.02 – 62.20	76.55 62.41 – 86.99	111.9 97.41 – 134.8	196.2 142.7 – 248.0	284.8 241.6 – 339.7	347.3 260.7 – 355.8
	Innu communities (2)	3-5	14	0	220.4^{E} 152.9 – 301.6	183.4^{E} 132.7 – 260.0	69.30 .	121.1 .	148.5^{E} 120.8 – 268.2	F	337.4 .	434.0 .
	Innu communities (2)	6-11	33	0	183.2 155.2 – 213.3	164.9 142.7 – 192.7	91.09 .	102.6 97.37 – 137.4	143.9^{E} 111.9 – 210.9	234.2 178.7 – 282.5	327.0 231.5 – 355.0	354.1 .
	Innu communities (2)	12-19	40	0	88.78 72.22 – 107.8	74.71 61.91 – 90.14	34.82 23.39 – 42.06	48.82^{E} 35.06 – 66.67	76.63 58.72 – 86.02	111.9 82.91 – 129.3	141.4^{E} 113.7 – 219.3	201.5 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry). (2004). Toxicological Profile for Iodine. Consulted online: www.atsdr.cdc.gov/ToxProfiles/tp158.pdf

IOM (Institute of Medicine) (2001). Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc. The National Academies Press, Washington, DC, 798p. Consulted online: www.nap.edu/catalog/10026/dietary-reference-intakes-for-vitamin-a-vitamin-k-arsenic-boron-chromium-copper-iodine-iron-manganese-molybdenum-nickel-silicon-vanadium-and-zinc

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Latham, M.C. (1996). Les vitamins. La nutrition dans les pays en développement. Rome: Collection FAO: Alimentation et nutrition. Pp. 119-122.

WHO (World Health Organization) (2014). Urinary iodine concentrations for determining iodine status in populations. Nutrition for Health and Development Department (NHD), Geneva, Switzerland. Consulted online: http://apps.who.int/iris/bitstream/handle/10665/85972/WHO_NMH_NHD_EPG_13.1_eng.pdf?sequence=1

Health Canada (2012). Iodine. Consulted online: https://www.canada.ca/en/health-canada/services/food-nutrition/food-nutrition-surveillance/health-nutrition-surveys/canadian-health-measures-survey/iodine-nutrition-biomarkers-cycle-1-canadian-health-measures-survey-food-nutrition-surveillance-health-canada.html

7.1.4.Manganese

Manganese is found naturally in the soil. It is also found in ground water, as it is naturally present in various types of rocks. Manganese is mainly used in steel production, in order to improve its hardness and resistance. Manganese compounds are also used in the manufacturing process for pyrotechnic products, matches, fertilizers, paint and cosmetics. Manganese can also be used as an additive in gasoline, to improve the octane index (ATSDR, 2012). In the body, manganese is an essential element involved in bone formation and in certain reactions associated with the metabolization of amino acids, cholesterol and carbohydrates (IOM, 2006).

Foods are the main source of manganese intake for most of the population (ATSDR, 2012). The most significant dietary sources are cereal products, nuts, grains and legumes, as well as tea and vegetables (ATSDR, 2012; IOM, 2006). Certain traditional foods, such as salmon, whitefish, moose and caribou are known to contain naturally high levels of manganese (CINE, 2005). Given that manganese is ubiquitous in the environment, exposure through air, soil and water is also possible (ATSDR, 2012). If the bedrock is rich in manganese, it is highly likely that well water in this region will be high in manganese. If there are high levels of manganese in the drinking water of a water supply system, a chemical treatment is generally applied to remove it before the water is distributed. However, surface water is generally low in manganese (Health Canada, 2016).

Studies conducted on children suggest that exposure to high levels of manganese could have negative effects on brain development, including behavioural changes and reduced learning and memory skills (ATSDR, 2012). In some cases, very high levels of exposure could cause serious symptoms of manganism (including difficulties speaking and walking). However, the scientific community cannot conclude whether these changes are due to manganese exposure alone, or whether these effects are temporary or permanent. Furthermore, it has not yet been demonstrated whether children are more sensitive to the effects of manganese than adults, although animal experiments suggest that this could be the case (ATSDR, 2012).

Normally, blood manganese levels are higher among children and diminish with age. They are also higher in women than in men. Certain medical conditions can increase blood manganese concentrations, such as a metabolic imbalance (e.g.: liver disease) or even long-term parenteral nutrition (Oulhote et al., 2014). Smokers and persons exposed to second-hand smoke also have greater exposure to manganese. Young children living in a household where they are exposed to second-hand smoke can be particularly affected (ATSDR, 2012; Shin et al., 2015).

Manganese ingested in food is subject to homeostatic control mechanisms, i.e. when dietary intake of manganese is high, various adaptive changes occur, especially a decrease in the amount of gastrointestinal absorption of manganese, increased manganese metabolism in the liver, and an increase in manganese excretion in the gall bladder and pancreas (Dorman et al., 2001). Thus, the fraction of manganese ingested and retained by the body is highly regulated, in order to maintain normal concentrations of manganese in various dietary conditions (Dorman et al., 2001). However, as mentioned above, certain divalent metals such as manganese, cobalt, cadmium, lead, and zinc are known to interact with iron because they share and compete for common routes of absorption. Consequently, when the body is iron deficient and food is rich in manganese, there is an increase in intestinal absorption of manganese in the body, and a possible increase in manganese toxicity (Flanagan et al., 1980; Hansen et al., 2010; Maitre et al., 2013; Meltzer et al., 2010).

At the time of the JES!-YEH! study, the CTQ's reporting threshold for blood manganese was 20 µg/L (365 nmol/L) (INSPQ, 2004). However, since January 2017, blood manganese has been excluded from the list of mandatory notifications by the laboratories, since the CTQ considered that there was too much variation in blood manganese levels depending on age and the metabolism of each individual (INSPQ, 2016). As for manganese in the hair, as of yet there is no well-defined reference value. According to the CTQ, it is generally admitted that an individual is likely to be exposed to a high level of manganese in their environment if the levels measured in their hair exceed 3 µg/g (Bouchard et al., 2007). In particular, the measurement of manganese in hair has made it possible to observe associations between manganese present in drinking water and neurological effects in children (Bouchard et al., 2007).

Results

Manganese concentrations were measured in the blood and the first centimetre of hair of participants in the JES!-YEH! project and are reported in µg/L of blood et µg/g of hair (Tables 259 – 262). Blood concentrations tend to reflect recent exposure, contrary to the levels measured in hair. Manganese in the hair is less influenced by the short-term variability of manganese exposure levels due to its slow growth rate, and analysing the first centimetre of hair reflects exposure to manganese over the past months (Reiss et al., 2016).

Out of a total of 194 participants, 23 (11.9%) had blood manganese levels exceeding the CTQ's threshold in force in 2015, and this percentage was similar among the communities of the two participating First Nations (Anishinabe communities: 12.2%, Innu communities: 11.5%). For manganese in the hair, only 1.4% of participants had levels above 3 µg/g.

The blood manganese levels measured in the JES!-YEH! study were significantly higher (approximately 1 to 2 times higher) than those in the CHMS (Cycle 2) across all age groups (Table 260). Blood concentrations of manganese were similar among the communities of the two participating First Nations. Although the levels of manganese in hair were relatively low overall, the participating Anishinabe communities had higher concentrations. That being said, the drinking water in the communities was analysed regularly, and in the four participating communities, all of the results were below the threshold established by Health Canada (the threshold for manganese in drinking water is set at 0.05 mg/L) (Health Canada, 2016). After carrying out an investigation along with the communities, no other local source of manganese was identified, and the hypothesis that iron deficiency accounted for the elevated levels of blood manganese observed was retained. The results for iron deficiency, and the preliminary analyses in support of this conclusion, are given in section 9.4.

Table 259: Manganese – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	15.95 15.40 – 16.50	15.46 14.94 – 15.98	10.84 10.19 – 11.66	12.73 12.11 – 13.39	15.43 14.62 – 16.09	18.11 17.59 – 18.80	20.81 19.36 – 21.67	22.06 21.13 – 23.46
	Total	F	92	0	16.10 15.34 – 16.79	15.68 14.91 – 16.43	11.04 10.06 – 11.77	12.64 11.83 – 14.32	15.75 14.69 – 17.12	18.54 17.70 – 19.13	20.82 19.18 – 21.58	21.68 20.62 – 22.57
	Total	M	102	0	15.82 14.97 – 16.62	15.27 14.46 – 16.04	10.74 9.04 – 12.02	12.76 12.15 – 13.43	15.38 13.91 – 15.87	17.81 16.43 – 18.74	20.66 18.79 – 22.66	23.02 19.77 – 27.66
	Anishinabe communities (2)	Total	107	0	16.00 15.24 – 16.76	15.52 14.83 – 16.27	11.37 10.10 – 12.12	13.05 12.26 – 13.93	15.43 14.44 – 16.20	17.97 16.84 – 18.80	20.93 18.97 – 21.80	21.91 20.61 – 25.38
	Anishinabe communities (2)	F	52	0	16.05 15.14 – 17.05	15.62 14.66 – 16.63	10.51 9.36 – 12.24	12.91 11.42 – 14.42	15.25 14.44 – 17.00	18.68 16.99 – 19.50	21.10 19.02 – 21.90	21.81 19.73 – 23.24
	Anishinabe communities (2)	M	55	0	15.95 14.78 – 17.15	15.44 14.36 – 16.52	11.26 8.85 – 12.47	13.14 12.20 – 14.00	15.11 13.96 – 16.19	17.10 16.23 – 18.43	20.05 17.86 – 23.96	23.08 .
	Innu communities (2)	Total	87	0	15.88 15.06 – 16.72	15.38 14.58 – 16.22	10.67 9.37 – 11.59	12.33 11.56 – 13.37	15.44 14.00 – 17.08	18.36 17.61 – 19.24	20.49 19.21 – 22.07	22.16 19.97 – 23.39
	Innu communities (2)	F	40	0	16.15 15.08 – 17.17	15.76 14.71 – 16.83	10.99 10.44 – 11.84	12.09 11.39 – 14.68	16.48 14.08 – 17.75	18.41 17.57 – 19.37	20.33 18.80 – 21.65	21.43 .
	Innu communities (2)	M	47	0	15.65 14.33 – 16.98	15.07 13.91 – 16.31	10.19 .	12.41 10.92 – 13.42	14.56 13.16 – 15.92	18.27 15.82 – 19.46	20.44 18.90 – 23.07	22.88 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 260: Manganese – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	15.95 15.40 – 16.50	15.46 14.94 – 15.98	10.84 10.19 – 11.66	12.73 12.11 – 13.39	15.43 14.62 – 16.09	18.11 17.59 – 18.80	20.81 19.36 – 21.67	22.06 21.13 – 23.46
	Total	3-5	36	0	15.20 14.20 – 16.18	14.89 13.88 – 15.93	10.77 .	12.91 11.11 – 13.98	15.02 13.67 – 16.41	17.31 15.73 – 17.97	18.35 17.39 – 19.50	19.34 .
	Total	6-11	78	0	15.16 14.22 – 16.06	14.66 13.80 – 15.56	10.36 8.73 – 11.25	11.92 10.95 – 12.91	14.84 13.30 – 15.88	16.92 16.25 – 18.73	20.44 18.19 – 22.03	22.03 19.64 – 23.49
	Total	12-19	80	0	17.05 16.18 – 17.97	16.55 15.71 – 17.41	11.90 10.42 – 12.61	13.96 12.59 – 14.58	17.03 14.80 – 17.90	19.01 18.20 – 19.75	21.43 19.66 – 23.05	23.08 21.20 – 28.75
	Anishinabe communities (2)	Total	107	0	16.00 15.24 – 16.76	15.52 14.83 – 16.27	11.37 10.10 – 12.12	13.05 12.26 – 13.93	15.43 14.44 – 16.20	17.97 16.84 – 18.80	20.93 18.97 – 21.80	21.91 20.61 – 25.38
	Anishinabe communities (2)	3-5	22	0	15.83 14.71 – 16.95	15.61 14.49 – 16.79	12.20 .	13.83 12.19 – 15.04	15.38 13.99 – 17.03	17.67 15.78 – 18.27	18.57 .	19.18 .
	Anishinabe communities (2)	6-11	45	0	15.25 14.17 – 16.43	14.76 13.67 – 15.90	10.58 7.66 – 11.86	12.32 11.03 – 13.60	15.25 13.43 – 16.25	16.74 16.12 – 18.27	20.05 16.96 – 22.27	21.84 .
	Anishinabe communities (2)	12-19	40	0	16.94 15.53 – 18.41	16.38 15.09 – 17.81	11.26 .	13.74 12.19 – 14.48	15.38 14.38 – 18.22	19.05 17.69 – 20.94	21.43 19.23 – 25.52	24.18 .
	Innu communities (2)	Total	87	0	15.88 15.06 – 16.72	15.38 14.58 – 16.22	10.67 9.37 – 11.59	12.33 11.56 – 13.37	15.44 14.00 – 17.08	18.36 17.61 – 19.24	20.49 19.21 – 22.07	22.16 19.97 – 23.39
	Innu communities (2)	3-5	14	0	14.21 12.51 – 15.93	13.83 12.10 – 15.63	9.12 .	11.26 .	13.74 11.23 – 15.93	16.48 13.54 – 17.96	17.91 .	18.63 .
	Innu communities (2)	6-11	33	0	15.03 13.68 – 16.37	14.54 13.21 – 15.89	10.05 .	11.26 10.37 – 12.70	13.53 11.90 – 15.75	17.51 14.70 – 19.56	20.16 17.56 – 22.31	22.17 .
	Innu communities (2)	12-19	40	0	17.17 16.05 – 18.45	16.73 15.62 – 18.00	12.09 9.52 – 13.28	14.29 12.36 – 15.80	17.58 15.29 – 18.17	18.96 17.99 – 20.24	21.43 19.20 – 22.82	22.53 .
CHMS (Cycle 2)	Total	3-5	495	0		11 11 – 12	7.6 7.4 – 7.9		11 10 – 11	13 12 – 14		18 15 – 21
	Total	6-11	961	0		11 10 – 11	7.7 4.5 – 7.9		11 10 – 11	12 12 – 13		16 15 – 17
	Total	12-19	997	0		10 9.8 – 11	7.0 6.6 – 7.4		9.9 9.5 – 10	12 12 – 13		16 15 – 17

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 261: Manganese – Levels measured in the hair (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	142	7.7	0.22 0.16 – 0.31	0.11 0.09 – 0.13	0.02^{E} 0.01 – 0.03	0.05 0.04 – 0.06	0.11 0.08 – 0.14	0.25 0.17 – 0.29	0.39 0.30 – 0.50	F
	Total	F	91	8.8	0.25^{E} 0.16 – 0.38	0.11 0.08 – 0.14	0.02^{E} 0.01 – 0.03	0.05 0.03 – 0.06	0.11 0.08 – 0.15	0.24 0.17 – 0.29	F	F
	Total	M	51	5.9	0.17 0.13 – 0.23	0.11 0.08 – 0.14	0.03^{E} 0.01 – 0.05	0.06 0.04 – 0.07	0.11^{E} 0.07 – 0.15	0.25^{E} 0.14 – 0.32	0.36 0.28 – 0.43	0.42 .
	Anishinabe communities (2)	Total	75	0	0.34^{E} 0.23 – 0.49	0.21 0.17 – 0.26	0.08 0.06 – 0.10	0.11 0.09 – 0.15	0.20 0.15 – 0.26	0.31 0.27 – 0.38	F	F
	Anishinabe communities (2)	F	51	0	0.41^{E} 0.25 – 0.64	0.24 0.18 – 0.31	0.09 0.05 – 0.11	0.13 0.10 – 0.16	0.21 0.16 – 0.27	0.31^{E} 0.26 – 0.48	F	1.29 .
	Anishinabe communities (2)	M	24	0	0.21 0.16 – 0.26	0.17 0.13 – 0.22	0.06 .	0.08^{E} 0.06 – 0.14	0.16^{E} 0.10 – 0.27	0.31 0.20 – 0.36	0.38 .	0.41 .
	Innu communities (2)	Total	67	16.4	0.09^{E} 0.06 – 0.13	0.05 0.04 – 0.06	<LD	0.03^{E} 0.01 – 0.04	0.05 0.04 – 0.06	0.08^{E} 0.06 – 0.12	F	F
	Innu communities (2)	F	40	20	0.05 0.04 – 0.07	0.04 0.03 – 0.05	<LD	0.02^{E} 0.01 – 0.03	0.04 0.03 – 0.05	0.06^{E} 0.05 – 0.09	0.12^{E} 0.07 – 0.16	0.15 .
	Innu communities (2)	M	27	11.1	0.14E 0.07 – 0.23	0.07^{E} 0.05 – 0.11	<LD	0.04^{E} 0.01 – 0.05	0.06^{E} 0.05 – 0.10	F	0.30 .	0.45 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 262: Manganese – Levels measured in the hair (µg/g) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	142	7.7	0.22 0.16 – 0.31	0.11 0.09 – 0.13	0.02^{E} 0.01 – 0.03	0.05 0.04 – 0.06	0.11 0.08 – 0.14	0.25 0.17 – 0.29	0.39 0.30 – 0.50	F
	Total	3-5	26	3.8	F	0.17^{E} 0.11 – 0.27	0.04 .	F	0.18^{E} 0.09 – 0.28	0.32^{E} 0.24 – 0.40	0.44 .	0.99 .
	Total	6-11	50	8	0.21 0.15 – 0.27	0.12 0.09 – 0.17	F	0.06^{E} 0.03 – 0.10	0.16^{E} 0.09 – 0.22	0.28 0.20 – 0.32	F	0.58 .
	Total	12-19	66	9.1	0.18^{E} 0.10 – 0.30	0.08 0.06 – 0.11	0.02^{E} 0.01 – 0.03	0.04 0.03 – 0.05	0.08^{E} 0.05 – 0.10	0.14^{E} 0.11 – 0.18	F	F
	Anishinabe communities (2)	Total	75	0	0.34^{E} 0.23 – 0.49	0.21 0.17 – 0.26	0.08 0.06 – 0.10	0.11 0.09 – 0.15	0.20 0.15 – 0.26	0.31 0.27 – 0.38	F	F
	Anishinabe communities (2)	3-5	16	0	F	0.31^{E} 0.21 – 0.51	0.10 .	0.18^{E} 0.10 – 0.26	0.27^{E} 0.18 – 0.34	F	0.72 .	1.68 .
	Anishinabe communities (2)	6-11	27	0	0.27 0.21 – 0.34	0.23 0.18 – 0.28	0.10 .	0.14^{E} 0.10 – 0.21	0.25 0.17 – 0.29	0.31 0.26 – 0.39	0.43 .	0.61 .
	Anishinabe communities (2)	12-19	32	0	0.32^{E} 0.16 – 0.56	0.17^{E} 0.12 – 0.23	0.06 .	0.08^{E} 0.06 – 0.11	0.14 0.10 – 0.16	F	F	1.08 .
	Innu communities (2)	Total	67	16.4	0.09^{E} 0.06 – 0.13	0.05 0.04 – 0.06	<LD	0.03^{E} 0.01 – 0.04	0.05 0.04 – 0.06	0.08^{E} 0.06 – 0.12	F	F
	Innu communities (2)	3-5	10	10	F	0.07^{E} 0.03 – 0.13	<LD	0.04 .	F	0.10 .	0.16 .	0.34 .
	Innu communities (2)	6-11	23	17.4	F	0.06^{E} 0.04 – 0.10	<LD	F	F	F	0.27 .	0.32 .
	Innu communities (2)	12-19	34	17.6	0.06 0.04 – 0.07	0.04 0.03 – 0.05	<LD	0.03^{E} 0.01 – 0.04	0.05 0.03 – 0.05	0.06^{E} 0.05 – 0.10	F	0.13 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry) (2012). Toxicological profile for manganese. Consulted online: www.atsdr.cdc.gov/toxprofiles/tp151.pdf

Bouchard, M., Laforest, F., Vandelac, L., Bellinger, D., Mergler, D. (2007). Hair Manganese and Hyperactive Behaviors: Pilot Study of School-Age Children Exposed through Tap Water. Environ. Health Perspect., 115, 122–127.

CINE (Centre for Indigenous Peoples' Nutrition and Environment) (2005). Traditional food composition nutribase. Consulted online: www.mcgill.ca/cine/resources/nutrient

Davis, C.D., Zech, L., Greger, J.L. (1993). Manganese metabolism in rats: an improved methodology for assessing gut endogenous losses. Proceedings of the Society for Experimental Biology and Medicine, 202 (1), 103–08.

Dorman, D.C., Struve, M.F., James, R.A., McManus, B.E., Marshall, M.W., Wong, B.A. (2001). Influence of dietary manganese on the pharmacokinetics of inhaled manganese sulphate in male CD rats. Toxicological Sciences, 60 (2), 242–51.

Dorman, D.C., Struve, M.F., Wong, B.A. (2002). Brain manganese concentrations in rats following manganese tetroxide inhalation are unaffected by dietary manganese intake. Neurotoxicology, 23 (2), 185–95.

Flanagan, P.R., Haist, J., Valberg, L.S. (1980) Comparative effects of iron deficiency induced by bleeding and a low-iron diet on the intestinal absorptive interactions of iron, cobalt, manganese, zinc, lead and cadmium. J Nutr., 110 (9), 1754-63.

Hansen, S.L., Ashwell, M.S., Moeser, A.J., Fry, R.S., Knutson, M.D., Spears, J.W. (2010). High dietary iron reduces transporters involved in iron and manganese metabolism and increases intestinal permeability in calves. Journal of Dairy Science, 93 (2), 656-65.

INSPQ. 2004. Substances chimiques avec indicateur biologique: Seuils de déclaration par les laboratoires, Institut national de santé publique, Québec, 14p. Consulted online: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ. 2016. Maladies à déclaration obligatoire d'origine chimique: Révision des seuils de déclaration par les laboratoires. Institut national de santé publique du Québec, 20p. Consulted online: www.inspq.qc.ca/sites/default/files/publications/2151_maladies_declaration_obligatoire_chimique.pdf

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements (2006)The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Maitre, N.L, Aschner, J.L., Aschner, M. (2013). Manganese neurotoxicity may underlie the association between early life iron deficiency and impaired spatial cognition in neonatal piglets. The Journal of Nutrition, 143 (4), 548.

Meltzer, H.M., Brantsaeter, A.L., Borch-Iohnsen, B., Ellingsen, D.G., Alexander, J., Thomassen, Y., Stigum, H., Ydersbond, T.A. (2010) Low iron stores are related to higher blood concentrations of manganese, cobalt and cadmium in non-smoking, Norwegian women in the HUNT 2 study. Environ Res., 110 (5), 497-504.

Oulhote, Y., Mergler, D., Barbeau, B., Bellinger, D.C., Bouffard, T., Brodeur, M.E., Saint-Amour, D., Legrand, M., Sauvé, S., Bouchard, M.F. (2014). Neurobehavioral function in school-age children exposed to manganese in drinking water. Environ. Health Perspect., 122 (12), 1343-1350.

Reiss, B., Simpson, C.D., Baker, M.G., Stover, B., Sheppard, L., Seixas, N.S. (2016). Hair manganese as an exposure biomarker among welders. Ann. Occup. Hyg., 60 (2), 139-149.

Health Canada (2016). Manganese in Drinking Water. Document for Public Consultation. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water. Government of Canada. Consulted online: www.canada.ca/content/dam/canada/health-canada/migration/healthy-canadians/health-system-systeme-sante/consultations/manganese/alt/manganese-eng.pdf

Shin, D.-W., Kim, E.-J., Lim, S.-W., Shin, Y.-C., Oh, K.-S., Kim, E.-J. (2015). Association of hair manganese level with symptoms in attention-deficit/hyperactivity disorder. Psychiatry Investigation, 12 (1), 66–72.

7.1.5. Selenium

Selenium is widespread in the Earth's crust, but is spread out unequally. In the environment, it is often combined with other substances, such as sulphide minerals, as well as in silver, copper, lead, and nickel ore. Selenium has several industrial uses, including the manufacture of organic chemicals, paint, electronic components, nutritional supplements, and fertilizer, as well as in metallurgy and in plumbing as a replacement for lead (ATSDR, 2003; Government of Canada, 2015).

Selenium plays an important role in the body as a component of selenoproteins, several of which help reduce oxidative stress or regulate thyroid hormones (IOM, 2006). In populations with high exposure to mercury (through food), a high dietary intake of selenium would help protect the body against certain negative effects of mercury (Khan et Wang, 2009; Lemire et al., 2010a).

Food is the main source of selenium for the population. The foods that are richest in selenium include meat (especially offal), seafood, fish of marine origin and marine mammals, nuts (especially Brazil nuts), cereal products, and eggs (IOM, 2006; Lemire et al., 2010b, 2015). Furthermore, the selenium content of food varies greatly depending on where the animal was raised, or where the plant was cultivated (IOM, 2006). Soils in western Canada are generally rich in selenium, so most of the grain sold in the country is high in selenium (Government of Canada, 2015). In food, selenium is generally found in organic forms (Rayman, 2008). In water, selenium is found mainly in inorganic form, and in Canada, concentrations of selenium in drinking water are generally low (Government of Canada, 2015).

Selenium deficiency may cause health problems such as an increased risk of inflammation, atherosclerosis, and chronic diseases (IOM, 2006; Government of Canada, 2015). It occurs infrequently in the general population in Canada (Government of Canada, 2015). Among other things, excessive intake of inorganic selenium may cause hair loss and nail loss, and even neurological disorders (IOM, 2006). However, elevated dietary intake of organic selenium would not cause these adverse effects, according to reports from the Brazilian Amazon and the Inuit in the Arctic (Hansen et al., 2004; Lemire et al., 2012).

Plasma selenium is a bioimarker, which is used in particular to study selenium deficiency (Rayman, 2012), while blood selenium is used instead to assess the status of selenium in populations with a selenium intake that varies from normal to high (CHMS, 2010, 2013; Hansen et al., 2004; Lemire et al., 2012). The known thresholds for selenium deficiency are 70 µg/L of total selenium in plasma, or the equivalent of 89 µg/L in the blood (IOM, 2006; Lemire et al., 2012). The proposed thresholds for excessive selenium concentrations in the blood are between 560 and 1000 µg/L of total selenium (Upper Tolerable Level and No Observable Adverse Effect Level) (ATSDR, 2003; IOM, 2006).

Results

Selenium levels were measured in the blood and plasma of participants in the JES!-YEH! study and they are given in terms of µg/L in blood and µg/L in plasma (Tables 263 – 266). Blood concentrations of selenium reflect selenium intake over the past three months, while plasma concentrations reflect recent selenium intake.

None of the study participants had high levels of blood selenium. However, two participants had deficient plasma selenium levels.

The blood selenium levels observed in the JES!-YEH! study were significantly lower than those in the CHMS (Cycle 2) for participants in all 3 age groups (Table 264). Plasma selenium levels were not measured in the CHMS.

Table 263: Selenium – Levels measured in the blood (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	151.9 149.0 – 154.9	150.5 147.6 – 153.4	122.6 118.8 – 126.6	133.2 129.8 – 136.6	146.8 143.4 – 150.4	161.4 157.5 – 165.4	174.4 170.2 – 181.2	185.3 177.5 – 191.9
	Total	F	92	0	153.1 148.7 – 157.4	151.6 147.3 – 155.7	121.3 115.2 – 127.2	135.5 126.7 – 140.5	149.0 143.9 – 153.4	161.9 157.1 – 166.7	175.9 168.2 – 186.4	188.0 173.6 – 194.4
	Total	M	102	0	150.9 146.8 – 155.0	149.5 145.5 – 153.6	124.4 118.0 – 128.1	132.0 129.0 – 136.0	144.8 140.1 – 149.8	160.7 154.4 – 167.2	173.6 167.3 – 181.0	181.5 173.2 – 192.4
	Anishinabe communities (2)	Total	107	0	155.3 151.3 – 159.3	153.9 149.9 – 158.0	126.0 120.1 – 130.7	136.6 131.9 – 142.1	149.9 146.0 – 154.7	164.3 159.2 – 170.2	178.6 171.9 – 186.9	188.7 178.9 – 196.6
	Anishinabe communities (2)	F	52	0	156.2 150.1 – 162.2	154.7 148.7 – 160.6	122.8 .	138.2 128.4 – 145.7	151.8 145.7 – 157.9	164.8 157.3 – 174.0	181.2 168.9 – 188.8	188.0 175.2 – 201.0
	Anishinabe communities (2)	M	55	0	154.5 149.4 – 159.8	153.2 148.1 – 158.4	127.7 113.7 – 132.2	135.1 130.5 – 142.4	148.1 142.2 – 155.7	163.9 156.2 – 171.4	176.7 167.5 – 185.4	183.7 .
	Innu communities (2)	Total	87	0	147.7 143.7 – 151.8	146.4 142.3 – 150.5	120.0 111.2 – 125.1	129.9 125.0 – 134.6	141.9 137.7 – 147.9	156.8 151.7 – 162.9	169.6 162.9 – 177.1	178.9 169.1 – 190.6
	Innu communities (2)	F	40	0	149.1 143.1 – 155.0	147.8 142.0 – 153.7	120.1 .	131.7 122.2 – 138.6	144.8 137.9 – 151.9	158.0 150.5 – 165.0	168.5 161.1 – 177.7	173.8 .
	Innu communities (2)	M	47	0	146.6 141.1 – 152.3	145.3 139.8 – 151.1	119.9 108.6 – 127.3	129.3 123.9 – 134.5	139.7 133.5 – 148.1	155.7 147.6 – 166.4	170.4 158.4 – 180.8	178.9 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 264: Selenium – Levels measured in the blood (µg/L) JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age, and compared to the CHMS (Cycle 2).

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	151.9 149.0 – 154.9	150.5 147.6 – 153.4	122.6 118.8 – 126.6	133.2 129.8 – 136.6	146.8 143.4 – 150.4	161.4 157.5 – 165.4	174.4 170.2 – 181.2	185.3 177.5 – 191.9
	Total	3-5	36	0	142.8 135.5 – 150.9	141.1 133.8 – 148.9	109.0 .	124.8 114.5 – 131.3	137.4 129.8 – 144.7	149.0 142.7 – 159.0	169.0 149.7 – 191.6	190.4 .
	Total	6-11	78	0	149.1 145.2 – 152.9	148.0 144.2 – 151.9	122.2 115.1 – 128.0	131.6 127.8 – 136.2	145.3 139.6 – 151.3	159.0 154.1 – 162.7	167.5 163.0 – 172.4	172.6 165.7 – 179.9
	Total	12-19	80	0	158.8 154.6 – 163.4	157.5 153.3 – 162.0	129.0 123.6 – 135.4	139.6 135.3 – 144.6	152.7 147.9 – 158.4	168.5 162.3 – 174.4	181.7 173.7 – 191.3	192.2 180.6 – 203.0
	Anishinabe communities (2)	Total	107	0	155.3 151.3 – 159.3	153.9 149.9 – 158.0	126.0 120.1 – 130.7	136.6 131.9 – 142.1	149.9 146.0 – 154.7	164.3 159.2 – 170.2	178.6 171.9 – 186.9	188.7 178.9 – 196.6
	Anishinabe communities (2)	3-5	22	0	150.1 139.4 – 160.3	148.3 138.4 – 158.4	119.3 .	132.3 118.2 – 141.6	143.8 134.3 – 151.6	156.0 145.8 – 180.6	186.4 .	193.1 .
	Anishinabe communities (2)	6-11	45	0	151.1 145.9 – 156.1	150.1 144.9 – 155.1	121.6 .	132.3 127.3 – 142.7	147.6 141.3 – 155.3	161.3 154.4 – 165.2	168.8 163.7 – 175.6	173.3 165.7 – 183.7
	Anishinabe communities (2)	12-19	40	0	162.9 156.7 – 169.4	161.6 155.4 – 167.9	134.3 120.1 – 142.1	143.8 137.0 – 151.5	156.0 149.9 – 165.7	173.8 163.5 – 179.2	181.7 176.2 – 201.0	197.5 .
	Innu communities (2)	Total	87	0	147.7 143.7 – 151.8	146.4 142.3 – 150.5	120.0 111.2 – 125.1	129.9 125.0 – 134.6	141.9 137.7 – 147.9	156.8 151.7 – 162.9	169.6 162.9 – 177.1	178.9 169.1 – 190.6
	Innu communities (2)	3-5	14	0	131.5 123.5 – 139.7	130.5 122.6 – 139.1	104.3 .	113.2 .	128.4 114.5 – 135.9	138.2 128.4 – 148.1	148.5 .	152.5 .
	Innu communities (2)	6-11	33	0	146.3 140.1 – 152.1	145.2 139.1 – 151.2	116.6 .	130.7 118.2 – 136.6	140.5 134.8 – 151.7	155.4 145.8 – 161.9	165.1 156.4 – 173.8	171.2 .
	Innu communities (2)	12-19	40	0	154.6 148.9 – 160.7	153.4 147.7 – 159.3	126.4 126.4 – 134.9	136.5 127.6 – 142.7	147.8 141.6 – 157.5	164.3 155.2 – 171.0	173.8 165.8 – 190.8	189.6 .
CHMS (Cycle 2)	Total	3-5	495	0		170 160 – 170	140 140 – 150		160 160 – 170	170 170 – 180		200 200 – 210
	Total	6-11	961	0		170 170 – 180	140 140 – 150		170 170 – 180	180 180 – 190		210 200 – 220
	Total	12-19	997	0		190 180 – 190	160 160 – 170		180 180 – 190	200 190 – 200		230 220 – 240

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 265: Selenium – Levels measured in the plasma (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	104.8 102.9 – 106.5	104.0 102.2 – 105.7	91.67 88.24 – 92.91	96.60 95.02 – 98.62	103.7 101.5 – 105.3	110.8 108.8 – 112.7	119.0 115.0 – 122.0	125.3 120.2 – 131.2
	Total	F	93	0	104.1 101.3 – 107.0	103.2 100.4 – 106.0	90.93 83.10 – 93.52	96.70 93.47 – 98.87	102.9 99.52 – 105.3	109.7 106.2 – 111.4	119.6 111.3 – 124.2	125.1 116.7 – 135.8
	Total	M	101	0	105.4 103.2 – 107.6	104.8 102.6 – 107.0	91.65 88.47 – 94.23	96.47 94.36 – 99.58	104.7 101.1 – 106.4	112.1 108.9 – 114.5	118.4 114.7 – 123.9	125.4 117.6 – 132.0
	Anishinabe communities (2)	Total	108	0	105.5 103.0 – 108.1	104.7 102.2 – 107.1	91.15 87.28 – 94.80	96.89 94.87 – 99.28	105.1 101.4 – 106.2	110.9 108.5 – 113.1	120.4 113.5 – 124.8	128.0 120.2 – 135.5
	Anishinabe communities (2)	F	53	0	105.5 101.6 – 109.8	104.5 100.6 – 108.4	91.07 75.44 – 95.52	97.26 93.11 – 101.0	105.1 100.3 – 106.5	110.5 106.5 – 114.1	119.6 111.3 – 124.5	123.5 .
	Anishinabe communities (2)	M	55	0	105.6 102.3 – 108.9	104.9 101.7 – 108.2	90.44 84.64 – 94.59	96.27 93.21 – 99.97	104.9 99.56 – 107.7	111.5 107.8 – 113.5	120.5 112.7 – 131.1	130.3 .
	Innu communities (2)	Total	86	0	103.8 101.5 – 106.0	103.2 100.9 – 105.3	91.31 85.31 – 93.17	96.23 92.91 – 98.95	102.8 99.79 – 104.8	110.2 106.3 – 114.1	116.8 113.8 – 122.8	123.6 116.5 – 127.3
	Innu communities (2)	F	40	0	102.2 98.64 – 105.8	101.5 97.82 – 105.0	86.89 74.41 – 93.21	95.58 90.76 – 98.78	100.3 98.29 – 103.3	108.2 102.7 – 111.5	114.5 109.5 – 126.4	124.8 .
	Innu communities (2)	M	46	0	105.2 102.3 – 108.0	104.7 101.9 – 107.6	91.86 87.95 – 95.75	96.76 92.81 – 101.4	104.5 100.7 – 107.3	112.8 106.3 – 116.1	116.8 114.4 – 119.8	118.3 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 266: Selenium – Levels measured in the plasma (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	104.8 102.9 – 106.5	104.0 102.2 – 105.7	91.67 88.24 – 92.91	96.60 95.02 – 98.62	103.7 101.5 – 105.3	110.8 108.8 – 112.7	119.0 115.0 – 122.0	125.3 120.2 – 131.2
	Total	3-5	37	0	97.63 94.73 – 100.3	97.17 94.00 – 100.0	84.99 .	93.40 87.99 – 95.76	96.96 95.18 – 100.2	104.6 99.32 – 105.6	106.3 104.9 – 110.6	110.0 .
	Total	6-11	77	0	103.4 100.9 – 105.9	102.8 100.1 – 105.3	89.81 86.53 – 94.39	96.76 93.34 – 99.06	101.5 99.48 – 103.6	109.6 104.9 – 112.5	116.1 111.7 – 122.9	122.9 114.4 – 131.1
	Total	12-19	80	0	109.4 106.2 – 112.5	108.6 105.6 – 111.5	92.42 88.42 – 96.72	101.1 96.32 – 104.7	108.0 106.0 – 110.5	114.9 111.2 – 118.2	122.4 117.7 – 129.1	129.5 120.5 – 138.3
	Anishinabe communities (2)	Total	108	0	105.5 103.0 – 108.1	104.7 102.2 – 107.1	91.15 87.28 – 94.80	96.89 94.87 – 99.28	105.1 101.4 – 106.2	110.9 108.5 – 113.1	120.4 113.5 – 124.8	128.0 120.2 – 135.5
	Anishinabe communities (2)	3-5	23	0	99.29 96.30 – 102.0	99.04 96.03 – 101.8	90.28 .	94.59 90.18 – 97.42	98.93 95.13 – 103.7	105.1 99.46 – 105.6	105.8 104.5 – 108.5	107.2 .
	Anishinabe communities (2)	6-11	45	0	103.9 100.2 – 107.3	103.1 99.27 – 106.7	89.65 78.20 – 94.87	96.56 91.43 – 99.67	101.5 99.24 – 105.8	110.4 105.2 – 114.0	119.3 111.7 – 125.8	124.8 .
	Anishinabe communities (2)	12-19	40	0	111.0 106.0 – 116.2	109.9 105.1 – 114.7	92.42 79.27 – 99.05	105.1 94.98 – 106.8	109.8 105.8 – 111.1	113.0 110.7 – 120.2	122.4 115.9 – 138.3	136.7 .
	Innu communities (2)	Total	86	0	103.8 101.5 – 106.0	103.2 100.9 – 105.3	91.31 85.31 – 93.17	96.23 92.91 – 98.95	102.8 99.79 – 104.8	110.2 106.3 – 114.1	116.8 113.8 – 122.8	123.6 116.5 – 127.3
	Innu communities (2)	3-5	14	0	94.92 88.28 – 100.5	94.18 87.22 – 100.1	72.65 .	87.68 .	95.97 87.41 – 99.50	99.92 95.18 – 107.4	107.9 .	111.0 .
	Innu communities (2)	6-11	32	0	102.8 99.53 – 106.0	102.3 99.26 – 105.4	89.89 .	97.16 91.55 – 99.49	101.1 98.47 – 104.0	105.5 103.0 – 110.9	113.9 105.6 – 116.8	116.2 .
	Innu communities (2)	12-19	40	0	107.7 104.6 – 110.8	107.3 104.2 – 110.3	92.42 91.20 – 97.53	99.53 94.33 – 103.3	106.0 102.9 – 110.0	114.9 108.7 – 117.8	120.9 115.3 – 125.8	125.6 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency for Toxic Substances and Disease Registry). (2003). Toxicological Profile for Selenium. Consulted online: www.atsdr.cdc.gov/ToxProfiles/tp92.pdf

CHMS (Canadian Health Measures Survey). (2010). Report on Human Biomonitoring of Environmental Chemicals in Canada - Results of the Canadian Health Measures Survey Cycle 1 (2007 to 2009). Ottawa. Consulted online: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/hecs-sesc/pdf/pubs/contaminants/chms-ecms/report-rapport-eng.pdf

CHMS (Canadian Health Measures Survey) (2013). Second Report on Human Biomonitoring of Environmental Chemicals in Canada - Results of the Canadian Health Measures Survey (CHMS) Cycle 2 (2009 to 2011). Ottawa. Consulted online: https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/contaminants/chms-ecms-cycle2/chms-ecms-cycle2-eng.pdf

Government of Canada (2015). Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Selenium, Ottawa, 82p. Consulted online: https://www.canada.ca/en/health-canada/services/publications/healthy-living/guidelines-canadian-drinking-water-quality-guideline-technical-document-selenium.html

Hansen, J.C., Deutch, B., Pedersen, H.S. (2004). Selenium status in Greenland Inuit. Science of the Total Environment, 331, 207-214.

IOM (Institute of Medicine). (2006). Dietary reference intakes: the essential guide to nutrient requirements. Washington, DC: The National Academies Press, 1344p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Khan, M.A.K., Wang, F. (2009). Mercury-selenium compounds and their toxicological significance: Toward a molecular understanding of the mercury-selenium antagonism. Environmental Toxicology and Chemistry, 28, 1567-1577.

Lemire, M., Fillion, M., Frenette, B., Mayer, A., Philibert, A., Passos, C.J., Guimarães, J.R., Barbosa, F. Jr., Mergler, D. (2010a). Selenium and mercury in the Brazilian Amazon: Opposing influences on age-related cataracts. Environ. Health Perspect., 118, 1584-1589.

Lemire, M., Fillion, M., Barbosa F. Jr., Guimarães JR, Mergler D. (2010b). Elevated levels of selenium in the typical diet of Amazonian riverside populations. Sci. Total Environ., 408, 4076-4084.

Lemire, M., Philibert, A., Fillion, M., Passos, C.J., Guimarães, J.R., Barbosa, F. Jr., Mergler, D. (2012). No evidence of selenosis from a selenium-rich diet in the Brazilian Amazon. Environment International 40, 128-136.

Lemire, M., Kwan, M., Laouan-Sidi, A.E., Muckle, G., Pirkle, C., Ayotte, P., Dewailly, E. (2015). Local country food sources of methylmercury, selenium and omega-3 fatty acids in Nunavik, Northern Quebec. Sci. Total Environ., 509-510, 248-259.

Rayman, M.P. (2012). Selenium and human health. Lancet, 379, 1256-1268.

Rayman, M.P., Infante, H.G., Sargent, M. (2008). Food-chain selenium and human health: Spotlight on speciation. Br. J. Nutr., 100, 238-253.

7.1.6. Zinc

Zinc is one of the most widespread elements in the Earth's crust and is found in the air, soil and water (ATSDR, 2005). It is used mainly in the galvanization of other metals, such as iron and steel, to prevent corrosion. Zinc is also used in the production of alloys, such as brass and bronze, as well as in the manufacture of paints, preservatives, pesticides, pharmaceutical products (sunscreen and diaper rash creams, etc.) and rubber products (ATSDR, 2005; Environment Canada, 1999; Health Canada, 1987).

Zinc is essential for the development and growth of the body's various biological functions, including the catalysis, structure, and regulation of several compounds (IOM, 2006). It is part of the composition of numerous metalloenzymes and helps in the formation of connective tissue, the functioning of the immune system, and the metabolism of carbohydrates, proteins and fats (CCME, 1999; Health Canada, 1987, 2007).

Zinc is present in most foods, particularly in red meat, some seafood, whole grains, and certain breakfast cereals enriched with zinc (IOM, 2006). Vegetarians have a greater need for zinc because they generally consume more compounds that inhibit zinc absorption, such as phytates and fibre (IOM, 2006).

A lack of zinc can cause dermatitis, anorexia, slower growth, reduced reproductive and mental functions, poor scar formation on wounds, and immune system dysfunction. Insufficient zinc intake could also make other chemicals more carcinogenic (ATSDR, 2005). No studies have identified any toxic effects of high or excessive dietary zinc intake (IOM, 2006; Krebs, 2013). However, excessive regular consumption of dietary zinc supplements has been associated with headaches, gastrointestinal problems, and reduced functioning of the immune system and HDL cholesterol (IOM, 2006).

Plasma is the bioindicator most widely used to assess the risk of zinc deficiency and the recommended thresholds for children are between 650 and 700 µg/L (IOM, 2001; Roohani et al., 2013). Under normal conditions, zinc levels in plasma are around 1000 µg/L, although it is not specified whether these normal values apply to children (ATSDR, 2005; NAS/NRC, 1979). According to several authors, there are no particularly valid bioindicators to assess the status of zinc, because plasma zinc varies on a daily basis, does not correlate well with dietary intake, and does not necessarily reflect intracellular zinc concentrations, among other reasons (ATSDR, 2005; IOM, 2001, 2006). There are no available thresholds for excessive zinc status (Krebs, 2013).

Results

Zinc levels were analysed in the plasma of participants in the JES!-YEH! project, and they are given in terms of µg/L in plasma (Tables 267 and 268). Plasma zinc concentrations reflect recent exposure.

None of the participants in the JES!-YEH! study had a zinc deficiency, and 86.6% had plasma zinc levels higher than 1000 µg/L, even as high as 1640 µg/L. Generally, when a contaminant or an essential element is found in excess in a population, the distribution of observed concentrations follows an asymmetric distribution with extreme values in individuals with the highest exposure. In this case, zinc levels in participants in the JES!-YEH! study followed a normal distribution and there was no significant difference between the two nations.

Data from the JES!-YEH! study were not compared with those in the CHMS because zinc was measured in the same bioindicators (plasma vs. urine and whole blood).

Table 267: Zinc – Levels measured in the plasma (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and gender.

Population	Participating communities	Gender	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	1201 1177 – 1225	1188 1162 – 1212	969.9 917.5 – 1011	1071 1048 – 1106	1194 1164 – 1217	1324 1293 – 1353	1430 1380 – 1462	1492 1442 – 1559
	Total	F	93	0	1185 1151 – 1224	1171 1137 – 1211	952.0 871.5 – 1007	1048 1007 – 1107	1180 1136 – 1215	1300 1248 – 1336	1390 1333 – 1484	1488 1384 – 1602
	Total	M	101	0	1216 1180 – 1250	1203 1167 – 1237	975.8 882.4 – 1059	1092 1065 – 1126	1204 1163 – 1233	1343 1290 – 1378	1437 1381 – 1478	1495 1433 – 1561
	Anishinabe communities (2)	Total	108	0	1216 1180 – 1249	1203 1168 – 1236	1010 918.3 – 1056	1101 1061 – 1133	1196 1163 – 1241	1327 1289 – 1371	1429 1371 – 1481	1523 1422 – 1605
	Anishinabe communities (2)	F	53	0	1205 1155 – 1259	1190 1139 – 1245	949.7 821.6 – 1040	1080 1007 – 1133	1186 1131 – 1261	1324 1251 – 1374	1427 1335 – 1580	1567 .
	Anishinabe communities (2)	M	55	0	1226 1184 – 1267	1215 1173 – 1258	1042 896.1 – 1078	1103 1067 – 1153	1199 1153 – 1271	1332 1277 – 1389	1426 1362 – 1447	1441 .
	Innu communities (2)	Total	86	0	1183 1142 – 1224	1169 1129 – 1210	945.1 851.5 – 996.7	1045 995.4 – 1093	1183 1121 – 1221	1317 1228 – 1354	1425 1348 – 1475	1475 1409 – 1535
	Innu communities (2)	F	40	0	1159 1111 – 1208	1147 1100 – 1198	954.3 834.0 – 1007	1020 982.8 – 1062	1163 1047 – 1212	1288 1204 – 1325	1366 1290 – 1429	1418 .
	Innu communities (2)	M	46	0	1204 1144 – 1262	1188 1129 – 1247	915.0 843.1 – 1042	1078 946.1 – 1127	1203 1111 – 1249	1338 1227 – 1415	1456 1353 – 1531	1520 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 268: Zinc – Levels measured in the plasma (µg/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu) and age.

Population	Participating communities	Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	194	0	1201 1177 – 1225	1188 1162 – 1212	969.9 917.5 – 1011	1071 1048 – 1106	1194 1164 – 1217	1324 1293 – 1353	1430 1380 – 1462	1492 1442 – 1559
	Total	3-5	37	0	1216 1155 – 1282	1201 1141 – 1269	945.8 .	1074 953.2 – 1134	1173 1101 – 1321	1358 1258 – 1421	1461 1362 – 1545	1534 .
	Total	6-11	77	0	1203 1165 – 1238	1191 1153 – 1228	971.9 874.5 – 1047	1096 1045 – 1131	1206 1151 – 1245	1323 1274 – 1347	1395 1333 – 1458	1459 1364 – 1489
	Total	12-19	80	0	1193 1151 – 1234	1178 1139 – 1220	986.9 841.8 – 1027	1057 1018 – 1111	1186 1133 – 1215	1297 1227 – 1377	1418 1361 – 1538	1549 1407 – 1604
	Anishinabe communities (2)	Total	108	0	1216 1180 – 1249	1203 1168 – 1236	1010 918.3 – 1056	1101 1061 – 1133	1196 1163 – 1241	1327 1289 – 1371	1429 1371 – 1481	1523 1422 – 1605
	Anishinabe communities (2)	3-5	23	0	1239 1177 – 1303	1230 1170 – 1294	1046 .	1124 1052 – 1165	1186 1136 – 1326	1350 1196 – 1407	1415 .	1475 .
	Anishinabe communities (2)	6-11	45	0	1204 1154 – 1253	1192 1140 – 1241	951.0 827.2 – 1065	1101 1001 – 1167	1219 1146 – 1273	1300 1265 – 1352	1373 1314 – 1444	1441 .
	Anishinabe communities (2)	12-19	40	0	1215 1155 – 1278	1200 1142 – 1263	1013 849.2 – 1056	1065 1033 – 1132	1176 1110 – 1239	1333 1206 – 1416	1438 1357 – 1603	1601 .
	Innu communities (2)	Total	86	0	1183 1142 – 1224	1169 1129 – 1210	945.1 851.5 – 996.7	1045 995.4 – 1093	1183 1121 – 1221	1317 1228 – 1354	1425 1348 – 1475	1475 1409 – 1535
	Innu communities (2)	3-5	14	0	1178 1051 – 1307	1156 1039 – 1286	908.5 .	947.7 .	1072 945.7 – 1344	1359 1056 – 1494	1498 .	1547 .
	Innu communities (2)	6-11	32	0	1201 1145 – 1257	1190 1136 – 1246	981.7 .	1085 1008 – 1141	1170 1110 – 1237	1329 1203 – 1359	1401 1327 – 1475	1471 .
	Innu communities (2)	12-19	40	0	1171 1112 – 1224	1157 1098 – 1213	862.8 833.0 – 998.0	1046 977.1 – 1141	1196 1085 – 1225	1288 1219 – 1334	1392 1291 – 1433	1418 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

ATSDR (Agency of Toxic Substances and Disease Registry) (2005). Toxicological Profile for Zinc. Consulted online: www.atsdr.cdc.gov/ToxProfiles/tp60.pdf

CCME (Canadian Council of Ministers of the Environment) (1999). Canadian Soil Quality Guidelines for the Protection of Environmental and Human Health – Zinc.

Environment Canada (1999). Canadian Soil Quality Guidelines: Zinc (Environmental Effects). Ottawa: National Guidelines and Standards Office.

Flanagan, P.R., Haist, J., Valberg, L.S. (1980) Comparative effects of iron deficiency induced by bleeding and a low-iron diet on the intestinal absorptive interactions of iron, cobalt, manganese, zinc, lead and cadmium. J Nutr., 110(9), 1754-63.

IOM (Institute of Medicine) (2001). Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc. The National Academies Press, Washington, DC, 798p. Consulted online: www.nap.edu/catalog/10026/dietary-reference-intakes-for-vitamin-a-vitamin-k-arsenic-boron-chromium-copper-iodine-iron-manganese-molybdenum-nickel-silicon-vanadium-and-zinc

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Krebs, N.F. (2013). Update on Zinc Deficiency and Excess in Clinical Pediatric Practice. Annals of Nutrition and Metabolism, 62 (suppl 1), 19-29.

Meltzer, H.M., Brantsaeter, A.L., Borch-Iohnsen, B., Ellingsen, D.G., Alexander, J., Thomassen, Y., Stigum, H., Ydersbond, T.A. (2010) Low iron stores are related to higher blood concentrations of manganese, cobalt and cadmium in non-smoking, Norwegian women in the HUNT 2 study. Environ Res., 110(5), 497-504.

National Academies of Sciences/National Research Council (NAS/NRC) (1979). Zinc. Subcommittee on Zinc, Committee on Medical and Biologic Effects of Environmental Pollutants, Division of Medical Sciences, National Academy of Sciences/National Research Council. Baltimore, MD: University Park Press. Consulted online : books.google.ca/books?id=U5grAAAAYAAJ&lpg=PA308&ots=0wDdmwUPvT&dq=Zinc.%20Subcommittee%20on%20Zinc%2C%20Committee%20on%20Medical%20and%20Biological%20Effects%20of%20Environmental%20Pollutants&pg=PP5#v=onepage&q=Zinc.%20Subcommittee%20on%20Zinc,%20Committee%20on%20Medical%20and%20Biological%20Effects%20of%20Environmental%20Pollutants&f=false

Roohani, N., Hurrell, R., Kelishadi, R., Schulin, R. (2013). Zinc and its importance for human health: An integrative review. Journal of research in medical sciences: the official journal of Isfahan University of Medical Sciences, 18, 144-157.

7.2. Vitamins

7.2.1. Vitamin A

Vitamin A is a liposoluble vitamin that is present is several forms in the body, including retinol, which is the main form of vitamin A in the human diet (Latham, 1996).

Vitamin A has several functions and plays an important role in vision. It is also involved in bone growth, reproduction, regulating the immune system, and the health of the skin and mucous membranes. Vitamin A also plays a role in the transcription of certain genes and the synthesis of certain proteins (IOM, 2006).

The vitamin A absorbed by the body comes from two sources. Firstly, as pre-formed vitamin A (such as retinol), which is found only in foods of animal origin, such as meat (especially the liver), eggs, milk, butter, and certain fish (IOM 2006). Secondly, vitamin A may be obtained from vegetable carotenoids, which are provitamins A. Beta carotene, the carotenoid that is most easily converted into vitamin A by the body, is found in certain coloured fruits and vegetables, such as carrots, apricots, mangoes, sweet potatoes, and dark green vegetables (e.g., spinach) (IOM, 2006). To promote the absorption of beta carotene, a fat source needs to be present (Borel et al., 1997; Jalal et al., 1998). It should be noted that the conversion of beta carotene into vitamin A is less significant in children (Latham, 1996).

A lack of vitamin A is observed more often in populations with low socioeconomic status and manifests as night blindness, xerophthalmia, and recurring infections (Albahrani, 2016). Toxicity associated with excessive vitamin A is rarely caused by dietary intake, but may occur when taking supplements, or with excess consumption of bear or seal liver (Latham, 1996; Rodahl and Moore, 1943).

According to the Institut universitaire de cardiologie et de pneumologie de Québec laboratory (IUCPQ, 2009), the recommended values for vitamin A (retinol) in serum are:

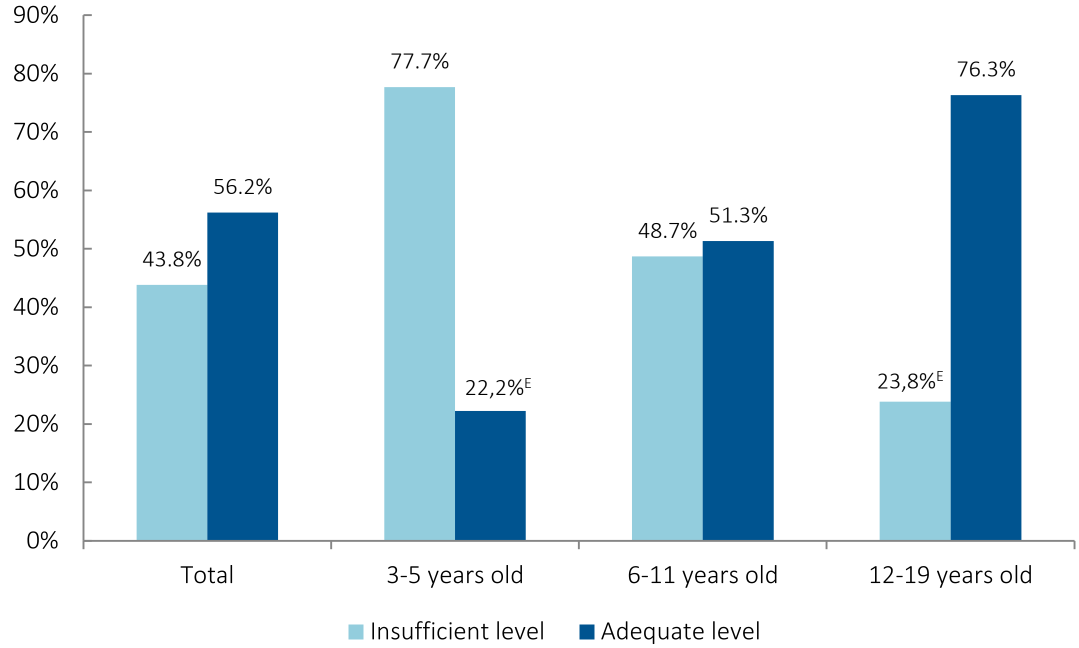
Serum concentration of vitamin A (µmol/L)	Condition
<0.7	Lack
Between 0.7 and <1.4	Insufficient level
Between 1.4 and <3.4	Adequate level

Results

The distribution of serum levels of vitamin A (retinol) measured in JES!-YEH! project participants is presented in the form of graphs broken down by age, gender, and participating nations (Figures 1 to 3).

Overall, serum levels of vitamin A were adequate in 56.2% of participants, while the rest of the participants (43.8%) had insufficient levels. Children 3 to 5 years old had the highest percentage of insufficient levels of vitamin A (77.7%) (Figure 1). There was little difference in terms of gender, but Figure 2 shows that girls had levels of serum vitamin A that were slightly higher than in boys (59.8% vs. 52.9%). Vitamin A was not analysed in the CHMS and therefore the values cannot be compared with the data in this study.

Figure 1: Vitamin A – Distribution of levels measured in the serum (µmol/L) of JES!-YEH! 2015 participants broken down by age.



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%

Figure 2: Vitamin A – Distribution of levels measured in the serum (µmol/L) of JES!-YEH! 2015 participants broken down by gender.

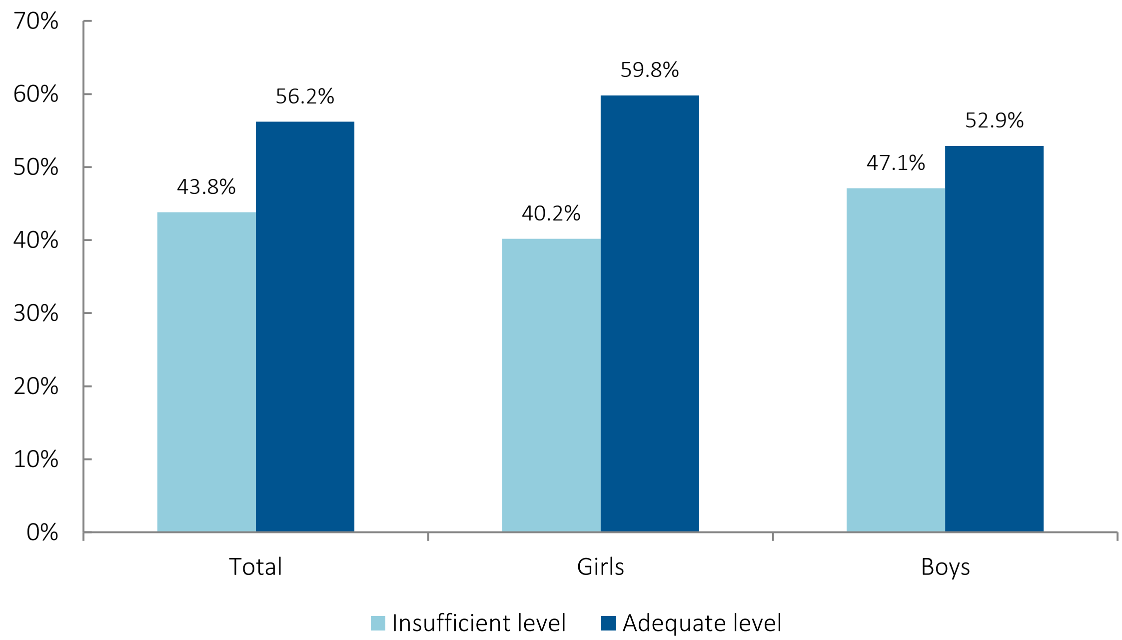
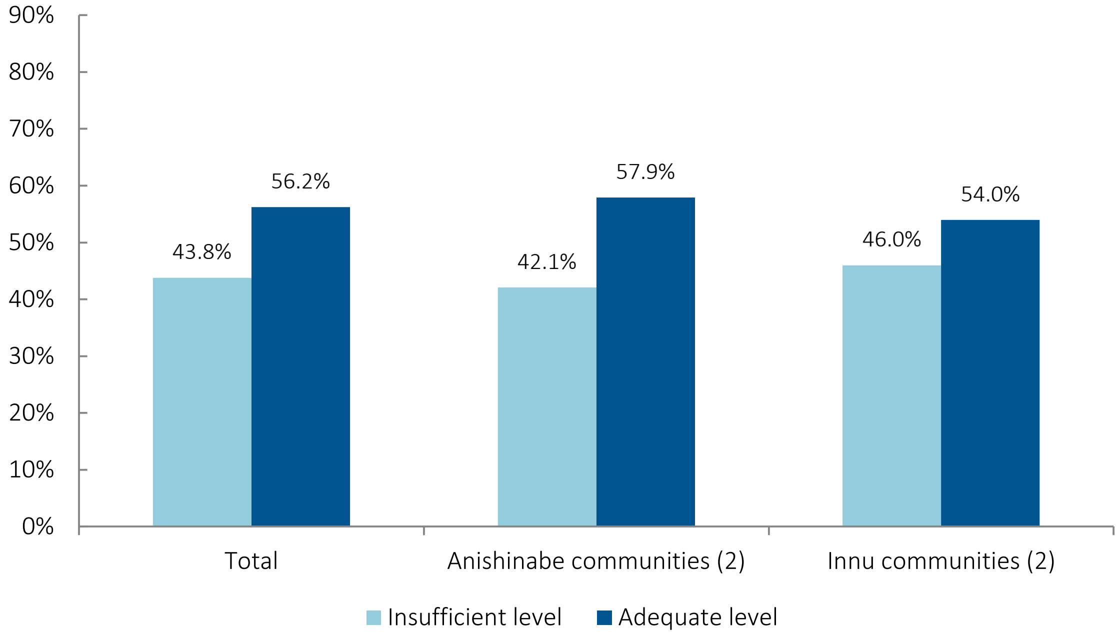


Figure 3: Vitamin A – Distribution of levels measured in the serum (µmol/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu).



References

Albahrani, A.A., Greaves, R.F. (2016). Fat-soluble Vitamins: Clinical Indications and current Challenges for Chromatographic Measurement. Clin. Biochem. Rev., 37 (1), 27-47.

Borel, P., Dubois, C., Mekki, N., Grolier, P., Partier, A., Alexandre-Gouabau, M.C., Lairon, D., Azais-Braesco, V. (1997). Dietary triglycerides, up to 40 g/meal, do not affect preformed vitamin A bioavailability in humans. Eur. J. Clin. Nutr., 51, 717–722.

IUCPQ (Institut universitaire de cardiologie et de pneumologie de Québec) (2009). Répertoire des analyses et des prélèvements. Fiche d'analyse. Vitamine A. Consulted online: infolab.iucpq.qc.ca/analyses-detail.asp?ID=223

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Jalal, F., Nesheim, M.C., Agus, Z., Sanjur, D., Habicht, J.P. (1998). Serum retinol concentrations in children are affected by food sources of beta-carotene, fat intake, and anthelmintic drug treatment. Am. J. Clin. Nutr., 68, 623–629.

Latham, M.C. (1996). Les vitamines. La nutrition dans les pays en développement. Rome: Collection FAO: Alimentation et nutrition. Pp. 119-122.

Mahalanabis, D., Simpson, T.W., Chakraborty, M.L., Ganguli, C., Bhattacharjee, A.K., Mukherjee, K.L. (1979). Malabsorption of water miscible vitamin A in children with giardiasis and ascariasis. Am. J. Clin. Nutr., 32, 313–318.

Rodahl, K., Moore, T. (1943). The vitamin A content and toxicity of bear and seal liver. Biochemical Journal, 37 (2), 166–168.

Sivakumar, B., Reddy, V. (1975). Absorption of vitamin A in children with ascariasis. J. Trop. Med. Hyg., 78, 114–115.

7.2.2. Vitamin B12

Vitamin B12, or cobalamine, is hydrosoluble. Regular dietary intake of vitamin B12 is necessary as it cannot be stored in the body. Vitamin B12 is essential for the formation of red blood cells, as well as certain enzyme reactions and neurological functioning (Health Canada, 2015). In particular, vitamin B12 is found in food of animal origin, such as meat (especially offal, including game offal), seafood, certain fish, and dairy products (IOM, 2006).

Vitamin B12 deficiency occurs most often in vegetarians, especially strict vegetarians (vegans), due to low intake of food that is rich in vitamin B12 (Pawlak, 2001). The elderly also have a higher risk, due to greater incidence of malabsorption (Andrès, 2004). Severe vitamin B12 deficiency is often caused by an intrinsic lack of a protein produced in the stomach that helps absorb vitamin B12. Since the body needs vitamin B12 to produce red blood cells, a lack of vitamin B12 may cause pernicious anemia (Annibale, 2011). A lack of vitamin B12 also increases the risk of neurological damage (MacFarlane, 2011).

According to the IUCPQ (pers. comm.), the recommended values for serum vitamin B12 in children and youths are 145 to 600 pmol/L. Health Canada recommends a value of 148 pmol/L (Statistics Canada, 2013). For this report, the slightly more restrictive IUCPQ threshold was preferred, since it may vary based on the analytical methods used.

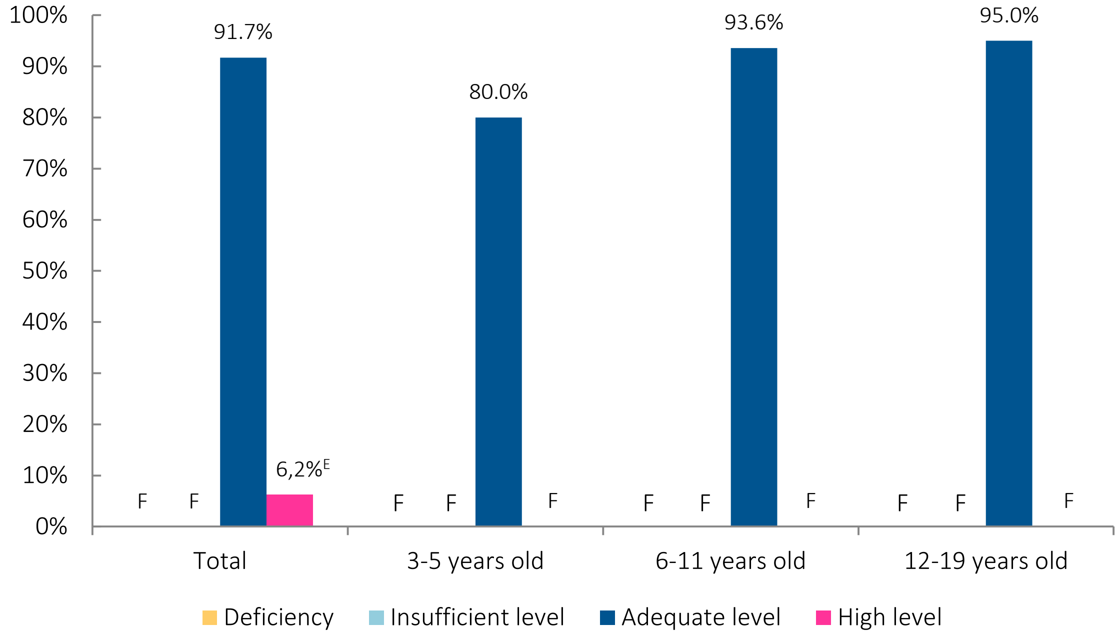
Results

The distribution of serum vitamin B12 levels in participants in the JES!-YEH! project is presented in the form of graphs broken down by age and gender, and by participating nation (Figures 4 to 6).

Overall, more than 90% of participants had adequate levels of vitamin B12 (91.7%) (Figure 4). Approximately 6% had high serum levels (6.2%^{E}) (coefficients of variation between 16.6 and 33.3% for this result). Figure 4 shows that the proportion of participants with adequate levels of vitamin B12 increased with age (80.0% for 3-5 year olds; 93.6 % for 6-11 year olds, and 95.0% for 12-19 year olds). For gender, there was little difference between boys and girls (Figure 5).

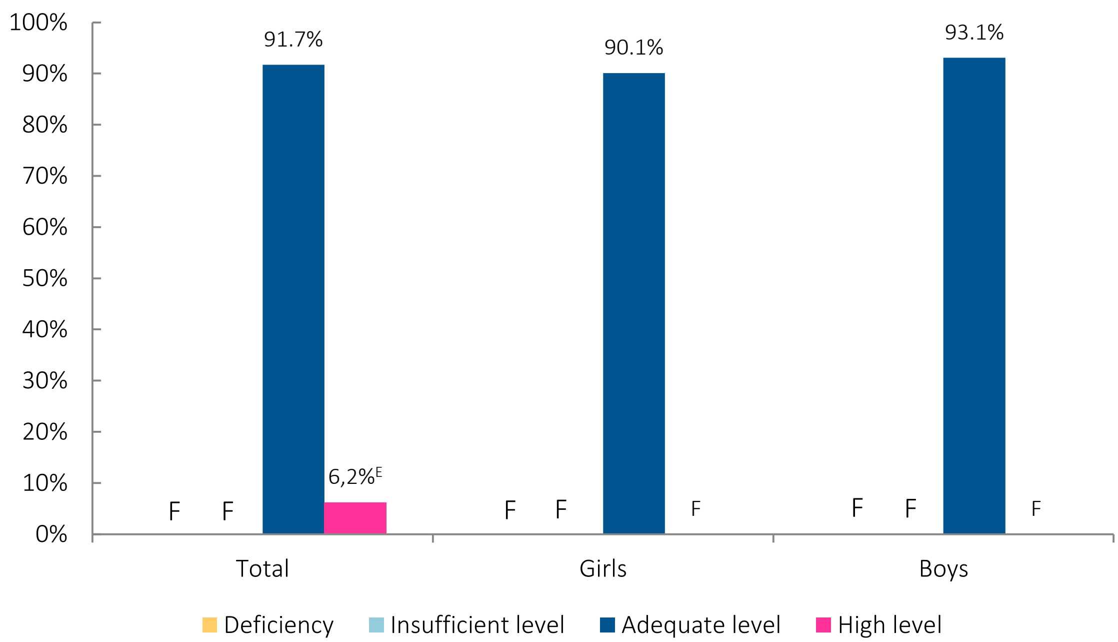
The percentage of participants 3-5 years old in the JES!-YEH! study with adequate levels of vitamin B12 (80%) was low compared to the percentage in the CHMS (Cycle 2) for the same age group (100%) (Statistics Canada, 2013). It should be noted however that the threshold used by Health Canada is slightly higher (148 versus 145 pmol/L). For participants in the 6-11 and 12-19 age groups, the results were similar to those in the CHMS (Cycle 2) (data not given).

Figure 4: Vitamin B12 – Distribution of levels measured in the serum (pmol/L) of JES!-YEH! 2015 participants broken down by age.



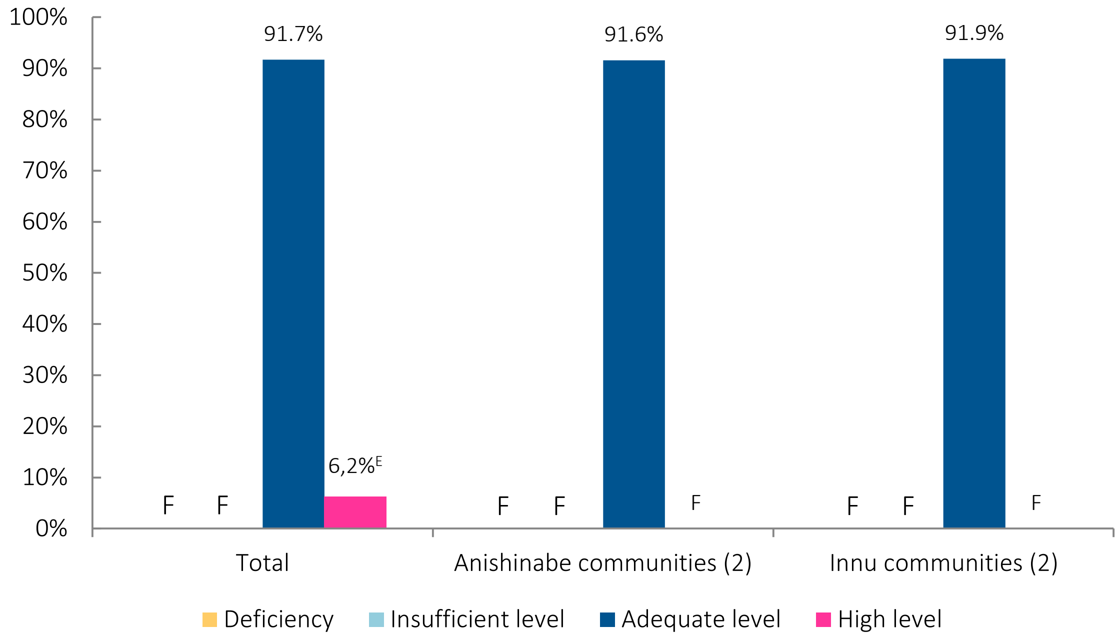
NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 5: Vitamin B12 – Distribution of levels measured in the serum (pmol/L) of JES!-YEH! 2015 participants broken down by gender.



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..

Figure 6: Vitamin B12 – Distribution of levels measured in the serum (pmol/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu).



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..

References

Andrès, E. Henoun Loukili, N., Noel, E., Kaltenback, G., Ben Abdelgheni, M., Perrin, A.E., Noblet-Dick, M., Maloisel, F., Schlienger, J.-L., Blicklé, J.-F. (2004). Vitamin B12 (cobalamin) deficiency in elderly patients. Canadian Medical Association Journal, 171 (3), 251-259.

Annibale, B., Lahner, E., Delle Fave, G. (2011). Diagnosis and Management of Pernicious Anemia. Current Gastroenterology Reports, 13, 518.

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

MacFarlane, A.J., Greene-Finestone, L.S., Shi, Y. (2011). Vitamin B-12 and homocysteine status in a folate-replete population: results from the Canadian Health Measures Survey. American Journal of Clinical Nutrition, 94 (4), 1079-87.

Pawlak, R., Lester, S.E., Babatunde, T. (2014). The prevalence of cobalamin deficiency among vegetarians assessed by serum vitamin B12: a review of literature. European Journal of Clinical Nutrition, 68, 541-548.

Health Canada (2015). Vitamin B12. Consulted online: http://www.hc-sc.gc.ca/fn-an/surveill/nutrition/measures-mesures/vit_b12-eng.php

Statistics Canada (2013). Vitamin B12 status of Canadians, 2009 to 2011. Consulted online: https://www.statcan.gc.ca/pub/82-625-x/2012001/article/11731-eng.htm - n1

7.2.3. Vitamin D

Vitamin D is a liposoluble vitamin, the main function of which is to absorb calcium and phosphorus, which play an important role in bone growth and health (Holick, 2004; Health Canada, 2012).

Foods that naturally contain vitamin D include fatty fish, such as salmon, as well as eggs (Dietitians of Canada, 2017). However, these days the main sources of vitamin D are vitamin D-enriched food sold in grocery stores. In Canada, vitamin D must be added to cow's milk and margarine, as a preventive measure against rickets, osteomalacia, and osteoporosis (CFIA, 2012). It is also added to certain foods such as goat's milk, enriched plant-based drinks (such as soya-enriched drinks), and calcium-enriched orange juice (Health Canada, 2012).

Vitamin D can also be synthesized by the skin. When the skin is exposed to ultraviolet rays from the sun, a compound called sterol is activated, which produces vitamin D (Latham, 1996). The body's ability to produce vitamin D is influenced by factors such as latitude, the season, the time of day, cloud cover, smog, clothing, and sunscreen use (Health Canada, 2012). Skin pigmentation is also linked to vitamin D levels. Melanin evolved to be a natural and effective sunscreen. People with dark skin or more melanin have more difficulty producing vitamin D from exposure to the sun (Holick, 2004). Geography is also a factor: during the winter months in Canada and in other countries in the northern hemisphere, fewer ultraviolet B rays (UVB) reach the Earth. Therefore, the body produces little to no vitamin D during the winter (Lin, 2007).

In children, low levels of vitamin D may cause rickets, a health problem characterized by softening of the bones and skeletal deformities. In adults, vitamin D deficiency may cause osteoporosis (reduced bone mass), which also increases the risk of fractures (CDC, 2012; Holick et al., 2011).

Toxicity linked to excess vitamin D is often associated with hypercalcemia, the symptoms of which include gastrointestinal disorders such as diarrhea, constipation and nausea, as well as bone pain, headaches and muscle pain (Alshahrani, 2013).

According to Health Canada (2012), the recommended values for serum vitamin D are as follows:

Serum concentration of vitamin D (nmol/L)	Condition
<30	Lack
Between 30 and <50	Insufficient level
Between 50 and <125	Adequate level
≥125	High level

Results

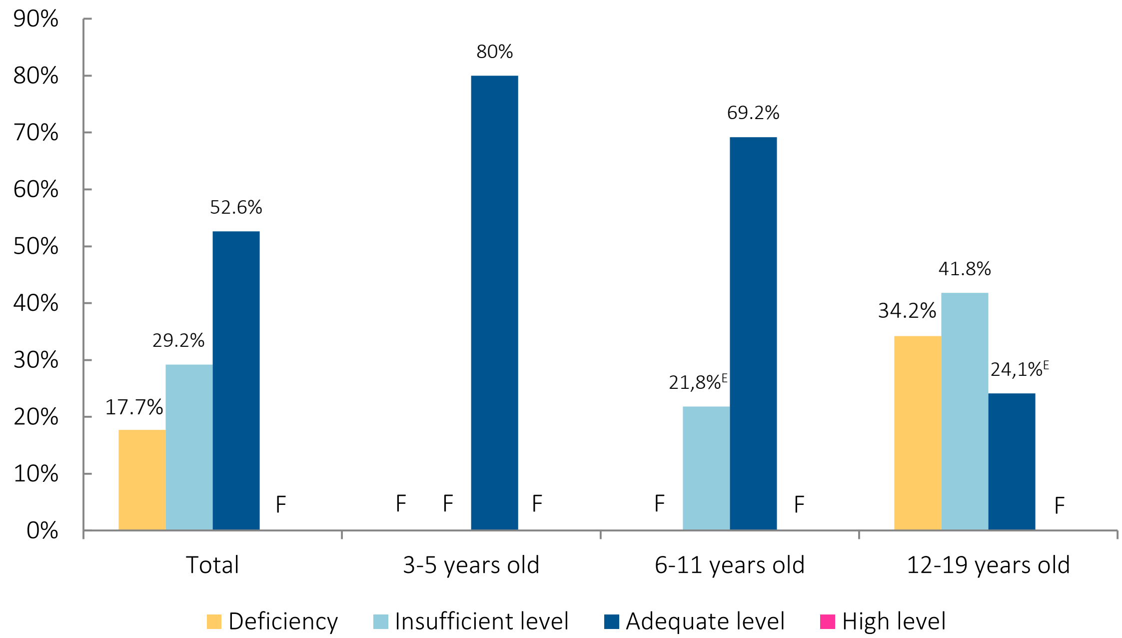
The distribution of serum levels of vitamin D measured in JES!-YEH! project participants is presented in the form of graphs broken down by age, gender, and participating nation (Figures 7 to 9).

Overall, only 52.6% of participants had adequate levels of vitamin D, while 29.2% had insufficient levels and 17.7% had a vitamin D deficiency (Figure 7). Youths 12-19 years old had the highest percentages of vitamin D deficiency and insufficiency (Figure 7). Boys had slightly higher adequate levels of vitamin D than girls (56.9 % vs. 47.8% respectively) (Figure 8). Only a third of the participants in the Innu communities involved in the project had adequate levels of vitamin D

(35.3%), and among the remaining two thirds, 30.6% had vitamin D levels considered to be insufficient, and 34.1% had a vitamin D deficiency (Figure 9).

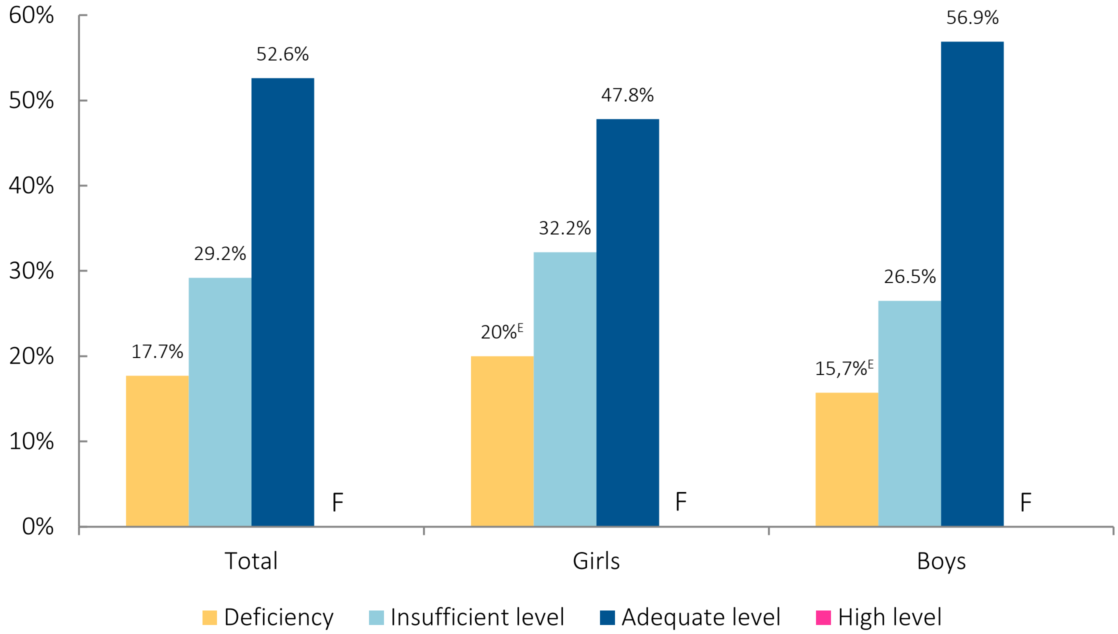
Compared to the same age group in the CHMS (Cycle 3), more participants 12-19 years old in the JES!-YEH! study had vitamin D deficiency (34% vs. 8%[E]) and insufficiency (42% vs. 30%) (Statistics Canada, 2015). As for the other participants younger than 12 years old, the CHMS data were reported only for the 3-11 year old age group (not for 3-5 and 6-11 year olds). Nevertheless, the average adequate levels for the 3-5 and 6-11 year old participants in the JES!-YEH! project (74%) seemed to be comparable to those in the CHMS (78%) (data not shown).

Figure 7: Vitamin D – Distribution of levels measured in the serum (nmol/L) of JES!-YEH! 2015 participants broken down by age.



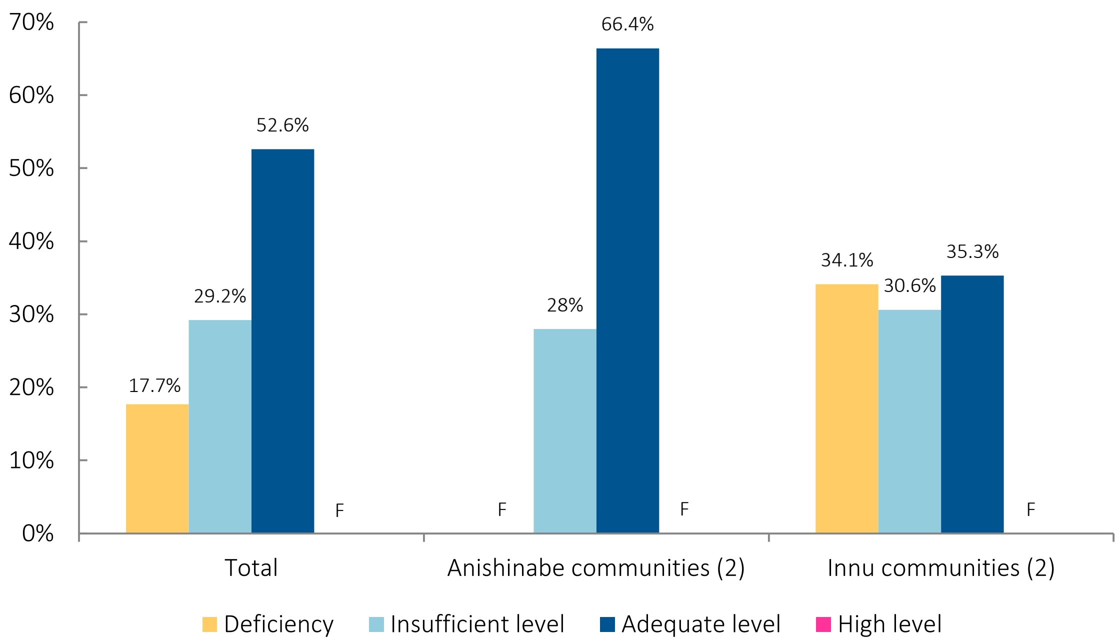
NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..
.

Figure 8: Vitamin D – Distribution of levels measured in the serum (nmol/L) of JES!-YEH! 2015 participants broken down by gender.



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..
.

Figure 9: Vitamin D – Distribution of levels measured in the serum (nmol/L) of JES!-YEH! 2015 participants broken down by participating communities (Anishinabe and Innu).



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..
.

References

CFIA (Canadian Food Inspection Agency) (2012). Chapter 9 – Vitamin Addition, Dairy Product Inspection Manual. Consulted online: http://www.inspection.gc.ca/food/dairy-products/manuals-inspection-procedures/dairy-vitamin-addition/eng/1378179097522/1378180040706

Alshahrani, F., Aljohani, N. (2013). Vitamin D: Deficiency, Sufficiency and Toxicity. Nutrients, 5 (9), 3605-3616.

CDC (Center for Disease Control and Prevention) (2014). Fat-soluble Vitamins & Micronutritients: Vitamin D. Consulted online: www.cdc.gov/nutritionreport/99-02/pdf/nr_ch2b.pdf

Dietitians of Canada (2017). Food Sources of Vitamin D. Consulted online: http://www.dietitians.ca/Downloads/Factsheets/Food-Sources-of-Vitamin-D.aspx

Holick, M. (2004). Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers and cardiovascular disease. Am. J. Clin. Nutr., 80 (suppl), 1678S-1688S.

Latham, M.C. (1996). Les vitamines. La nutrition dans les pays en développement. Collection FAO: Alimentation et nutrition, Rome. Pp. 119-122.

Lin, J., Manson, J., Lee, I.M., Cook, N.R., Buring, J.E., Zhang, S.M. (2007) Intakes of calcium and vitamin D and breast cancer risk in women. Archives of International Medicine, 167 (10), 1050-1059.

Health Canada (2012). Vitamin D and Calcium: Updated Dietary Reference Intakes. Consulted online: http://www.hc-sc.gc.ca/fn-an/nutrition/vitamin/vita-d-eng.php

Statistics Canada (2015). Vitamin D levels of Canadians, 2012 to 2013. Consulted online: http://www.statcan.gc.ca/pub/82-625-x/2014001/article/14125-eng.htm

7.2.4. Folates

The JES!-YEH! project planned to include the measurement of red blood cell folates (or vitamin B9) in its list of blood analyses. However, folates were mistakenly analysed in whole blood and not in red blood cells. To address this error, IUCPQ laboratory staff developed a formula to obtain the equivalent levels that would have been measured in red blood cells. These new concentrations of red blood cell folates obtained using this calculation largely exceeded the thresholds (>1200 nmol/L).

After several discussions with the laboratory's head biochemist, the research team decided not to include the folate results in the report, for two main reasons:

- The method of analysis was similar (i.e. by immunoassay), but the reagents used in the JES!-YEH! study (technique used by Roche Diagnostics) differed from those used in the CHMS (Statistics Canada, 2016).
- There are European results that might match the data from the JES!-YEH! project, but unlike in Canada and the United States, fortifying store-bought food with folates is much different in North America and Europe..

Therefore, these results were removed because of doubt surrounding the validity of the adjusted values and their limited scope for comparison with other studies.

Reference

Statistics Canada (2016). Table 117-0018 – Nutritional status of the household population, by sex and age group. CANSIM (database). Consulted online: www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=1170018&&pattern=&stByVal=1&p1=1&p2=31&tabMode=dataTable&csid=

7.3. Fatty Acid Profile

Fatty acids are essential for health. They provide energy and are necessary for the production of hormones and the absorption of certain vitamins (A, D, E, and K), among other things (Heart and Stroke Foundation, 2017; Passeport Santé, 2005a). However, there are different types of fatty acids (monounsaturated, polyunsaturated, saturated, and trans), and they do not all have the same effect on health. Some are beneficial and others may be more dangerous if they are consumed in excessive quantities. According to the Heart and Stroke Foundation (2017), the type of fat being consumed has a greater impact on health than the quantity of the fat.

Monounsaturated fatty acids are beneficial for cardiovascular health (by decreasing blood cholesterol levels) and they reduce the risk of type II diabetes. They are present in olive, canola and peanut oils, non-hydrogenated margarine, avocados and nuts (pecans, pistachios, cashews, hazelnuts and almonds) (Heart and Stroke Foundation, 2017; Passeport Santé, 2011).

Polyunsaturated fatty acids have several health benefits, because they help with the formation and integrity of cellular membranes and ensure proper functioning of the cardiovascular, cerebral, hormone and inflammatory systems. They are often called essential fatty acids since they cannot be synthesized by the body, and must therefore be derived from food. They are classified into two categories, omega-3 and omega-6. Fatty fish (e.g.: salmon, herring, mackerel, and sardines) are excellent sources of omega-3, as are nuts (pecans, walnuts and pine nuts), flax seed and canola oil. Certain foods are also enriched with omega-3 fatty acids (e.g., eggs). Omega-6 are found in corn and sunflower oil, hydrogenated margarine, certain nuts (almonds, pecans and Brazil nuts) and sunflower seeds. It should be noted that excessive omega-6 consumption can counteract the benefits of polyunsaturated fatty acids (Passeport Santé, 2011, 2015).

Saturated fatty acids are found in animal products (fatty meats, butter, dairy products, lard, duck and goose fat, etc.) or vegetable products (vegetable oil, coconut oil, and palm oil). They can increase the level of cholesterol in the blood and lead to cardiovascular problems (Heart and Stroke Foundation, 2017; Passeport Santé, 2011). Coconut oil, which is used increasingly in cooking, seems to have neutral effects on cardiovascular health, although it is less nutritional than oils containing polyunsaturated fats (Extenso, 2017).

Trans fats have no health benefits. These fats are formed during food processing and the partial hydrogenation of industrially-produced oils. They are found mainly in ultra-processed foods with little nutritional value, such as pastries (doughnuts, croissants, cookies), chips, and fast food or junk food (Passeport Santé, 2005b). They can increase the level of cholesterol in the blood and are recognized as a risk factor for cardiovascular diseases (Health Canada, 2016). Since the 200s, Health Canada has strongly suggested that industries limit the use of trans fats in their products (Government of Canada, 2016). Although there have been some changes, these fats are still present in food. In April 2017, the media reported that Health Canada was studying the possibility of banning all use of trans fats in food in Canada.[5] In September 2017, the Canadian government announced that partially hydrogenated oils will be prohibited starting September 15, 2018 (Health Canada, 2017).

[5] http://ici.radio-canada.ca/nouvelle/1026962/sante-canada-veut-interdire-gras-trans-industriel

Results

As part of the JES!-YEH! project, fatty acid profiles were measured in the red blood cells of a subsample of participants (n=50). Therefore, these results are given for information purposes only. A total of 28 blood samples from the participants in the two Anishinabe communities and 22 samples from the participants in the two Innu communities were analysed. These red blood cell results reflect the average dietary fatty acid intake over the past three months. The results of these analyses include monounsaturated fatty acids (total cis), polyunsaturated fatty acids (total cis, eicosapentaenoic acid (EPA), docosapentaenoic acid (DPA), docosahexaenoic acid (DHA), EPA+DHA, total omega-3 cis acids, total omega-6 cis acids), total saturated fatty acids, and total trans fatty acids. The results are given as a percentage of total fatty acids in red blood cells. For this report, the results are broken down by gender, age, and participating nation (Tables 269 to 278).

The CHMS (Cycle 3) measured fatty acids in the blood of a subsample of participants aged 20 years or older, but at the moment, detailed fatty acid data does not seem to have been published or made available electronically. There are no real reference values for fatty acids.

The average total monounsaturated fatty acids for the 50 participants in the JES!-YEH! study was 21.50% of total fatty acids (Table 269).

As for total polyunsaturated cis fatty acids (Table 270), the average for participants in the JES!-YEH! project was 29.25% of total fatty acids. The averages for EPA, DPA, DHA, and the sum of EPA+DHA were 0.11%[E], 1.38%, 1.79%, and 1.96% of total fatty acids respectively (Tables 271 to 274). The average percentages of total omega-3 and omega-6 (Table 276) were 3.77% and 25.39% respectively for the 50 participants in the JES!-YEH! project. In comparison, the percentages for sum EPA+DHA, total omega-3, and total omega-6 were 4.61%, 6.89%, and 29.05% respectively for Inuit youth in Nunavik (18-24 years old) at the time of the Qanuippitaa Health Survey in 2004 (Proust et al., 2014). Note that this population was older, the study was conducted 10 years ago, and that Inuit dietary habits may be quite different from those of First Nations.

Average saturated fats and trans fats were 47.43% and 0.34% respectively in the JES!-YEH! study (Table 277). This low percentage for trans fats possibly reflects changes in the food industry, as explained above.

Table 269: Total monounsaturated cis fatty acids – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	21.61 20.99 – 22.26	21.50 20.90 – 22.14	19.18 18.45 – 19.74	19.90 19.46 – 20.24	20.97 20.13 – 21.84	23.27 21.52 – 23.91	24.62 23.57 – 25.22	25.20 .
	Total	F	24	0	21.38 20.63 – 22.15	21.30 20.58 – 22.08	19.18 .	19.96 19.18 – 20.45	20.83 20.07 – 21.93	22.88 20.94 – 23.74	23.82 .	24.47 .
	Total	M	26	0	21.82 20.91 – 22.79	21.69 20.81 – 22.63	19.10 .	19.80 19.25 – 20.62	21.16 19.92 – 22.67	23.46 21.47 – 24.55	24.92 .	26.08 .
	Total	3-5	10	0	21.49 20.50 – 22.69	21.42 20.46 – 22.59	19.64 .	19.97 .	20.83 19.82 – 21.94	21.97 .	23.88 .	24.53 .
	Total	6-11	19	0	21.93 20.91 – 23.06	21.82 20.82 – 22.93	19.11 .	19.56 19.01 – 21.23	21.80 19.60 – 23.17	23.41 21.96 – 23.88	23.94 .	24.16 .
	Total	12-19	21	0	21.38 20.38 – 22.48	21.26 20.31 – 22.34	18.84 .	19.88 18.87 – 20.32	20.72 19.92 – 21.23	22.43 20.80 – 24.68	24.74 .	25.20 .
	Anishinabe communities (2)	Total	28	0	21.40 20.58 – 22.24	21.29 20.52 – 22.10	19.18 .	19.74 19.27 – 20.22	20.65 19.93 – 21.46	22.82 20.96 – 23.90	24.10 .	25.01 .
	Innu communities (2)	Total	22	0	21.88 20.93 – 22.81	21.77 20.85 – 22.72	18.90 .	20.03 19.00 – 20.96	21.39 20.10 – 23.16	23.47 21.43 – 24.27	24.49 .	25.17 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 270: Total polyunsaturated cis fatty acids – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	30.29 28.10 – 32.31	29.25 26.92 – 31.57	18.79 16.00 – 21.56	22.80 19.14 – 32.16	34.80 30.47 – 35.27	35.58 35.24 – 35.88	36.13 35.68 – 36.70	36.66 .
	Total	F	24	0	30.61 27.31 – 33.48	29.53 25.93 – 33.00	17.49 .	23.19E 17.56 – 34.61	35.22 23.60 – 35.57	35.70 35.32 – 36.04	36.09 .	36.60 .
	Total	M	26	0	29.99 26.79 – 32.68	29.00 25.83 – 32.06	18.87 .	21.95 18.88 – 32.42	34.54 22.52 – 34.97	35.40 34.77 – 35.78	35.99 .	36.49 .
	Total	3-5	10	0	32.35 28.95 – 35.10	31.92 28.34 – 35.10	22.73 .	27.41 .	34.58 22.87 – 35.23	35.26 .	35.83 .	35.98 .
	Total	6-11	19	0	28.30 24.70 – 31.79	27.09 23.51 – 31.02	18.21 .	19.52 17.61 – 24.10	28.55 20.51 – 35.51	35.55 30.32 – 36.21	36.29 .	36.72 .
	Total	12-19	21	0	31.11 27.76 – 34.06	30.08 26.34 – 33.64	16.93 .	23.60E 16.70 – 34.83	34.97 24.35 – 35.35	35.58 35.01 – 35.87	35.94 .	36.56 .
	Anishinabe communities (2)	Total	28	0	31.33 28.64 – 33.70	30.47 27.58 – 33.24	18.90 .	22.88E 19.07 – 34.61	35.02 29.59 – 35.52	35.64 35.36 – 36.08	36.22 .	36.75 .
	Innu communities (2)	Total	22	0	28.96 25.50 – 32.27	27.77 24.18 – 31.57	16.34 .	21.95 16.30 – 29.43	34.05 22.46 – 35.05	35.25 34.25 – 35.74	35.77 .	36.19 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 271: Eicosapentaenoic acid (EPA) – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.21 0.16 – 0.25	0.11^E 0.07 – 0.16	F	F	0.22 0.13 – 0.26	0.31 0.25 – 0.35	0.37 0.31 – 0.46	0.45 .
	Total	F	24	0	0.19 0.13 – 0.25	0.09^E 0.05 – 0.17	F	F	F	0.30 0.21 – 0.34	0.36 .	0.37 .
	Total	M	26	0	0.22 0.16 – 0.30	0.12^E 0.07 – 0.21	F	F	0.23^E 0.12 – 0.29	0.31 0.24 – 0.37	0.40 .	0.46 .
	Total	3-5	10	0	0.23E 0.14 – 0.32	F	0.01 .	0.07 .	0.25^E 0.01 – 0.32	0.33 .	0.37 .	0.41 .
	Total	6-11	19	0	0.16E 0.10 – 0.22	F	F	F	F	0.25^E 0.13 – 0.30	0.32 .	0.37 .
	Total	12-19	21	0	0.24 0.16 – 0.31	0.13^E 0.06 – 0.24	F	F	0.24^E 0.08 – 0.31	0.32 0.24 – 0.36	0.37 .	0.46 .
	Anishinabe communities (2)	Total	28	0	0.21 0.16 – 0.25	0.13^E 0.08 – 0.21	F	F	0.24^E 0.12 – 0.27	0.30 0.25 – 0.33	0.34 .	0.37 .
	Innu communities (2)	Total	22	0	0.20^E 0.13 – 0.28	F	F	F	F	0.33^E 0.20 – 0.40	0.43 .	0.46 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 272: Docosapentaenoic acid (DPA) – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	1.52 1.35 – 1.68	1.38 1.19 – 1.57	0.68 0.44 – 0.75	0.93 0.72 – 1.37	1.83 1.27 – 1.88	1.93 1.85 – 2.03	2.16 1.95 – 2.31	2.31 .
	Total	F	24	0	1.46 1.23 – 1.68	1.32 1.04 – 1.59	0.54 .	0.96E 0.53 – 1.51	1.67 0.97 – 1.83	1.83 1.78 – 1.94	1.95 .	1.99 .
	Total	M	26	0	1.57 1.32 – 1.81	1.43 1.18 – 1.71	0.71 .	0.90E 0.71 – 1.45	1.88 0.95 – 1.94	2.03 1.89 – 2.21	2.26 .	2.31 .
	Total	3-5	10	0	1.63 1.31 – 1.93	1.54 1.21 – 1.90	0.72 .	1.18 .	1.83 0.89 – 1.88	1.88 .	1.92 .	2.15 .
	Total	6-11	19	0	1.37 1.09 – 1.65	1.21 0.96 – 1.52	0.59 .	0.74E 0.56 – 1.00	1.16E 0.82 – 1.83	1.85 1.24 – 2.07	2.08 .	2.23 .
	Total	12-19	21	0	1.61 1.36 – 1.83	1.47 1.19 – 1.76	0.72 .	F	1.86 1.02 – 1.95	1.95 1.88 – 2.10	2.15 .	2.29 .
	Anishinabe communities (2)	Total	28	0	1.55 1.34 – 1.75	1.43 1.21 – 1.67	0.68 .	0.89E 0.69 – 1.60	1.83 1.23 – 1.87	1.90 1.83 – 1.99	2.06 .	2.20 .
	Innu communities (2)	Total	22	0	1.49 1.22 – 1.75	1.32 1.05 – 1.64	0.51 .	0.93E 0.53 – 1.32	1.50 0.96 – 1.95	1.98 1.67 – 2.17	2.25 .	2.32 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 273: Docosahexaenoic acid (DHA) – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	2.07 1.79 – 2.34	1.79 1.51 – 2.09	0.72 0.52 – 0.96	1.12^E 0.79 – 1.78	2.23 1.69 – 2.50	2.64 2.48 – 2.95	3.18 2.68 – 3.73	3.63 .
	Total	F	24	0	2.17 1.74 – 2.58	1.87 1.44 – 2.37	0.62 .	1.15^E 0.63 – 2.07	2.25 1.31 – 2.57	2.82 2.31 – 3.45	3.47 .	3.71 .
	Total	M	26	0	1.97 1.62 – 2.37	1.72 1.36 – 2.15	0.67 .	1.00^E 0.69 – 1.85	2.00^E 1.14 – 2.54	2.62 2.23 – 2.75	2.77 .	3.02 .
	Total	3-5	10	0	2.42 1.93 – 2.88	2.27 1.75 – 2.84	0.98 .	1.71 .	2.40^E 1.36 – 2.87	2.92 .	3.18 .	3.33 .
	Total	6-11	19	0	1.74 1.33 – 2.15	1.48 1.12 – 1.95	0.53 .	0.82^E 0.54 – 1.25	1.53^E 0.92 – 2.36	2.49 1.72 – 2.65	2.65 .	2.74 .
	Total	12-19	21	0	2.20 1.72 – 2.64	1.90 1.43 – 2.41	0.62 .	1.17^E 0.60 – 2.03	2.18^E 1.36 – 2.62	2.75 2.22 – 3.31	3.42 .	3.75 .
	Anishinabe communities (2)	Total	28	0	2.00 1.70 – 2.29	1.79 1.46 – 2.16	0.70 .	1.32^E 0.71 – 2.00	2.23 1.66 – 2.50	2.54 2.29 – 2.69	2.80 .	2.98 .
	Innu communities (2)	Total	22	0	2.15 1.64 – 2.67	1.79 1.35 – 2.38	0.59 .	1.05^E 0.62 – 1.62	2.05^E 1.10 – 2.70	2.93 2.19 – 3.61	3.71 .	3.83 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 274: EPA+DHA – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	2.26 1.95 – 2.57	1.96 1.64 – 2.29	0.72^E 0.53 – 1.01	1.32^E 0.93 – 1.83	2.25 1.71 – 2.81	2.93 2.78 – 3.31	3.45 3.05 – 3.93	3.89 .
	Total	F	24	0	2.34 1.87 – 2.78	2.02 1.55 – 2.56	0.67 .	1.33^E 0.67 – 2.14	2.42 1.42 – 2.88	3.05 2.55 – 3.54	3.69 .	3.91 .
	Total	M	26	0	2.19 1.79 – 2.64	1.90 1.49 – 2.38	0.68 .	1.05^E 0.70 – 1.90	2.23^E 1.32 – 2.82	2.89 2.38 – 3.12	3.17 .	3.34 .
	Total	3-5	10	0	2.64 2.07 – 3.17	2.47 1.90 – 3.11	1.10 .	1.78 .	2.69^E 1.48 – 3.24	3.27 .	3.45 .	3.69 .
	Total	6-11	19	0	1.89 1.46 – 2.34	1.61 1.21 – 2.11	0.62 .	0.94^E 0.62 – 1.40	1.58^E 0.99 – 2.64	2.78 1.71 – 2.91	2.92 .	3.16 .
	Total	12-19	21	0	2.42 1.90 – 2.90	2.09 1.57 – 2.66	0.64 .	1.38^E 0.60 – 2.27	2.49 1.53 – 2.92	3.02 2.52 – 3.43	3.45 .	4.06 .
	Anishinabe communities (2)	Total	28	0	2.20 1.86 – 2.52	1.96 1.60 – 2.37	0.70 .	1.42^E 0.76 – 2.22	2.42 1.70 – 2.79	2.86 2.57 – 2.98	3.09 .	3.36 .
	Innu communities (2)	Total	22	0	2.34 1.80 – 2.93	1.95 1.48 – 2.58	0.62 .	1.15^E 0.65 – 1.72	2.05^E 1.29 – 3.12	3.25 2.22 – 3.86	3.91 .	4.08 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 275: Total omega-3 cis acids – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	4.12 3.67 – 4.55	3.77 3.31 – 4.25	1.87 1.31 – 2.29	2.60E 2.13 – 3.94	4.39 3.78 – 4.91	5.25 4.81 – 5.62	5.74 5.33 – 6.08	6.01 .
	Total	F	24	0	4.13 3.48 – 4.73	3.77 3.07 – 4.52	1.60 .	2.62E 1.62 – 4.19	4.39 2.73 – 4.96	5.04 4.63 – 5.80	5.86 .	6.07 .
	Total	M	26	0	4.10 3.46 – 4.75	3.78 3.15 – 4.47	1.82 .	2.34E 1.85 – 4.24	4.39 2.59 – 5.05	5.25 4.49 – 5.55	5.60 .	5.72 .
	Total	3-5	10	0	4.60 3.77 – 5.40	4.40 3.53 – 5.35	2.37 .	3.21 .	4.95 2.58 – 5.50	5.50 .	5.78 .	5.94 .
	Total	6-11	19	0	3.62 2.97 – 4.32	3.29 2.68 – 4.05	1.71 .	2.16 1.71 – 2.71	3.53E 2.25 – 4.57	4.72 3.93 – 5.33	5.37 .	5.74 .
	Total	12-19	21	0	4.33 3.56 – 4.99	3.97 3.21 – 4.78	1.78 .	2.77E 1.72 – 4.39	4.56 2.85 – 5.03	5.10 4.64 – 5.72	5.73 .	6.28 .
	Anishinabe communities (2)	Total	28	0	4.08 3.58 – 4.54	3.82 3.29 – 4.40	1.84 .	2.58E 1.91 – 4.33	4.47 3.42 – 4.81	4.98 4.61 – 5.20	5.37 .	5.62 .
	Innu communities (2)	Total	22	0	4.16 3.39 – 4.96	3.72 2.99 – 4.60	1.50 .	2.47E 1.56 – 3.54	4.06E 2.63 – 5.51	5.64 4.33 – 5.98	6.07 .	6.28 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
“-” or “.” means that the study estimates and the coefficients of variation could not be calculated.

Table 276: Total omega-6 cis acids – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	26.17 24.41 – 27.82	25.39 23.52 – 27.25	17.03 13.88 – 19.12	20.29 17.06 – 27.57	29.55 26.96 – 30.24	30.52 30.23 – 30.92	31.16 30.82 – 31.43	31.36 .
	Total	F	24	0	26.48 23.80 – 28.81	25.67 22.79 – 28.45	15.92 .	20.43[E] 15.96 – 29.28	30.00 20.88 – 30.61	30.83 30.09 – 31.17	31.23 .	31.41 .
	Total	M	26	0	25.89 23.39 – 28.06	25.13 22.54 – 27.69	17.04 .	19.48 17.05 – 27.53	28.57 20.18 – 30.23	30.29 29.54 – 30.71	30.89 .	31.12 .
	Total	3-5	10	0	27.75 25.22 – 29.89	27.44 24.70 – 29.87	20.15 .	24.20 .	28.57 20.50 – 30.15	30.18 .	30.88 .	31.02 .
	Total	6-11	19	0	24.68 21.70 – 27.59	23.74 20.85 – 27.00	16.28 .	17.66 15.80 – 21.40	25.00 18.40 – 30.48	30.58 26.49 – 31.17	31.22 .	31.32 .
	Total	12-19	21	0	26.78 24.05 – 29.20	26.00 22.98 – 28.99	15.60 .	20.83[E] 15.38 – 29.56	29.70 21.50 – 30.29	30.48 29.72 – 30.92	30.92 .	31.41 .
	Anishinabe communities (2)	Total	28	0	27.25 25.04 – 29.18	26.60 24.25 – 28.82	17.06 .	20.51 17.23 – 29.75	30.26 25.79 – 30.54	30.92 30.29 – 31.23	31.31 .	31.86 .
	Innu communities (2)	Total	22	0	24.80 22.05 – 27.34	23.93 21.08 – 26.88	14.32 .	19.48 14.27 – 25.59	27.89 20.01 – 29.66	29.89 28.31 – 30.54	30.74 .	30.83 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 277: Total saturated fatty acids – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	47.71 46.24 – 49.33	47.43 46.02 – 48.97	43.07 42.82 – 43.36	43.52 43.23 – 44.05	44.75 43.98 – 45.96	52.35 45.57 – 55.21	56.12 52.93 – 57.27	57.23 .
	Total	F	24	0	47.62 45.39 – 50.17	47.30 45.21 – 49.78	43.08 .	43.36 43.08 – 43.86	44.25 43.46 – 47.57	52.18 44.53 – 55.83	56.59 .	57.97 .
	Total	M	26	0	47.80 45.89 – 50.12	47.54 45.75 – 49.79	42.99 .	43.93 43.02 – 44.44	44.76 44.11 – 48.94	52.19 45.20 – 56.02	56.05 .	56.64 .
	Total	3-5	10	0	45.78 43.80 – 48.14	45.66 43.80 – 47.96	43.04 .	43.22 .	44.11 43.07 – 45.56	45.63 .	51.61 .	52.30 .
	Total	6-11	19	0	49.39 46.65 – 52.10	49.03 46.47 – 51.75	42.87 .	43.74 42.86 – 45.03	45.84 43.88 – 52.76	53.60 46.40 – 57.07	57.18 .	57.52 .
	Total	12-19	21	0	47.12 45.01 – 49.48	46.86 44.91 – 49.12	43.24 .	43.50 43.19 – 44.04	44.19 43.67 – 45.75	49.59 44.37 – 55.87	56.06 .	56.83 .
	Anishinabe communities (2)	Total	28	0	46.94 45.20 – 48.85	46.70 45.08 – 48.54	42.90 .	43.36 42.99 – 44.01	44.25 43.57 – 45.13	51.61 44.65 – 53.92	55.63 .	56.07 .
	Innu communities (2)	Total	22	0	48.70 46.24 – 51.31	48.37 46.11 – 50.94	43.13 .	43.79 43.13 – 44.65	45.00 43.83 – 51.53	52.90 45.52 – 56.94	57.10 .	58.04 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

Table 278: Total trans fatty acids – Levels measured in the red blood cells (expressed in % of total fatty acids) of JES!-YEH! 2015 participants broken down by gender, age, and participating communities (Anishinabe and Innu).

Population	Participating communities	Gender/Age	N	% <LD	A.M. 95%CI	G.M. 95%CI	10th 95%CI	25th 95%CI	50th 95%CI	75th 95%CI	90th 95%CI	95th 95%CI
JES!-YEH!	Total	Total	50	0	0.35 0.33 – 0.37	0.34 0.32 – 0.36	0.26 0.23 – 0.29	0.30 0.27 – 0.32	0.34 0.32 – 0.35	0.36 0.35 – 0.41	0.42 0.37 – 0.48	0.48 .
	Total	F	24	0	0.34 0.31 – 0.37	0.33 0.30 – 0.36	0.24 .	0.30 0.24 – 0.32	0.33 0.30 – 0.35	0.36 0.33 – 0.37	0.39 .	0.46 .
	Total	M	26	0	0.35 0.32 – 0.38	0.35 0.32 – 0.37	0.25 .	0.30 0.26 – 0.33	0.35 0.32 – 0.35	0.39 0.35 – 0.42	0.44 .	0.48 .
	Total	3-5	10	0	0.34 0.32 – 0.37	0.34 0.32 – 0.37	0.29 .	0.32 .	0.34 0.31 – 0.35	0.35 .	0.40 .	0.41 .
	Total	6-11	19	0	0.34 0.30 – 0.39	0.33 0.30 – 0.37	0.24 .	0.28 0.24 – 0.30	0.32 0.28 – 0.35	0.36 0.32 – 0.47	0.49 .	0.54 .
	Total	12-19	21	0	0.35 0.32 – 0.37	0.34 0.31 – 0.37	0.24 .	0.31 0.24 – 0.35	0.35 0.32 – 0.36	0.36 0.35 – 0.42	0.42 .	0.46 .
	Anishinabe communities (2)	Total	28	0	0.32 0.30 – 0.34	0.31 0.29 – 0.33	0.24 .	0.26 0.24 – 0.30	0.32 0.29 – 0.35	0.35 0.33 – 0.37	0.39 .	0.40 .
	Innu communities (2)	Total	22	0	0.38 0.35 – 0.42	0.37 0.35 – 0.41	0.31 .	0.33 0.31 – 0.34	0.35 0.33 – 0.38	0.42 0.35 – 0.48	0.48 .	0.53 .

NB: If more than 40% of the samples were below the limit of detection (LD), the percentile distribution is given but the averages were not calculated.
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.
"-" or "." means that the study estimates and the coefficients of variation could not be calculated.

References

Extenso (Centre de référence sur la nutrition de l'Université de Montréal) (2017). Diabète et maladies du cœur. L'huile de noix de coco est bonne pour le cœur. Consulted online: www.extenso.org/article/l-huile-de-noix-de-coco-est-bonne-pour-le-coeur

Heart and Stroke Foundation (2017). Dietary fats, oils and cholesterol. Consulted online: http://www.heartandstroke.ca/get-healthy/healthy-eating/fats-and-oils

Passeport Santé (2005a). Acides gras (vue d'ensemble). Consulted online: www.passeportsante.net/fr/Solutions/PlantesSupplements/Fiche.aspx?doc=acides_gras_vue_ensemble

Passeport Santé (2005b). Les gras trans: qu'est-ce-que c'est? Consulted online: www.passeportsante.net/fr/Actualites/Dossiers/ArticleComplementaire.aspx?doc=que_sont_les_gras_trans_do

Passeport Santé (2011). Oméga-9. Consulted online: www.passeportsante.net/fr/Solutions/PlantesSupplements/Fiche.aspx?doc=acides_gras_omega-9_ps

Passeport Santé (2015). Oméga-3. Consulted online: www.passeportsante.net/fr/Solutions/PlantesSupplements/Fiche.aspx?doc=acides_gras_essentiels_ps

Proust, F., Lucas, M., Dewailly, E. (2014). Fatty acid profiles among the Inuit of Nunavik: current status and temporal change. Prostaglandins Leukot. Essent. Fatty Acids, 90, 159-67.

Health Canada. (2016). Toward the Prohibition of Partially Hydrogenated Oils in the Canadian Food Supply. Consultation Document. Food Directorate, Health Products and Food Branch, Health Canada. Consulted online: https://www.canada.ca/en/health-canada/programs/banning-partially-hydrogenated-oils-in-foods/consultation-document.html

Health Canada. (2017). Minister Petitpas Taylor announces Government of Canada ban on partially hydrogenated oils (PHOs)—the main source of industrially produced trans fats in Canadian food. News Release. Consulted online: https://www.canada.ca/en/health-canada/news/2017/09/minister_petitpastaylorannouncesgovernmentofcanadabanonindustria.html

7.4. Iron Deficiency and Anemia

The iron in foods exists in two forms: heme iron is found in foods of animal origin and non-heme iron is contained in vegetables and iron-enriched foods (CDC, 1998). Heme iron absorption is two to three times higher than that of non-heme iron (Jackson et al., 2016; Pantopoulos et al., 2012). Furthermore, iron absorption (especially non-heme iron) may be increased with vitamin A and C intake (Jamieson and Kuhnlein, 2008). However, certain nutrients, such as calcium and polyphenols (e.g., vegetables, small fruits, or black tea) are known to reduce iron absorption (Hurrell and Egli, 2010).

Iron deficiency is the most frequent of all nutrient deficiencies (WHO, 2001). Prolonged or severe iron deficiency can lead to a diagnosis of iron-deficient anemia. This type of anemia generally represents more than 50% of childhood anemias (WHO, 2001). In fact, development in children and puberty in adolescents are periods of significant growth where iron needs are significantly higher; therefore iron deficiency in children and youth occurs frequently if their dietary iron intake is not sufficient to meet their increased needs (OMS, 2001). In young girls, the onset of menstruation, particularly when there is abundant blood loss, can also contribute to iron deficiency and iron-deficient anemia (Coad and Conlon, 2011; WHO, 2001).

Hemoglobin, which is present in high concentrations in red blood cells, is a protein that contains a great deal of iron. It is essential for carrying oxygen from the lungs to the body's cells, where it releases the oxygen that is needed for energy production and helps the organs perform their functions. Anemia is caused by a reduced number of red blood cells or hemoglobin in the blood, which results in reduced oxygen intake in the various parts of the body (WHO, 2001). There are multiple causes of anemia. As indicated above, the most common cause is iron deficiency. To various degrees, other nutrient deficiencies (vitamins A, B12, folate, and D, amino acids, etc.), chronic diseases, infections, exposure to lead and genetic diseases can also cause a reduction in the blood concentration of red blood cells or hemoglobin synthesis (Hammond, 1977; Mclean et al., 2008).

Anemia can be considered mild, moderate or severe depending on the extent of the hemoglobin deficiency (WHO, 2001). Moreover, in population studies, and depending on iron status bioindicators and the level of inflammation in the body, anemia can be classified into three broad categories, as presented in Plante et al. (2012): iron-deficient anemia (described above), inflammatory anemia, and anemia of unexplained origin. Inflammatory anemia refers to anemia caused by parasitic infections or by chronic inflammation, as these two conditions reduce hemoglobin production, particularly in school-age children where infections are frequent (WHO, 2001). The so-called "unexplained" anemia is a broad category that includes, among other things, anemias caused by nutrient deficiencies, but excluding iron deficiency. They are also frequent causes of anemia in children (WHO, 2001). This category also includes hereditary anemia, although it is rare. In that case, these forms of anemia appear early in the child's life and the most frequent genetic causes are thalassemia, glucose-6-phosphate dehydrogenase deficiency, hereditary spherocytosis, and sickle-cell anemia (WHO, 2001).

The health effects of iron deficiency and anemia (childhood and juvenile) depend on the duration and severity of the anemia.

<u>Short-term and medium-term health effects:</u>

- Children with anemia have less oxygen delivered to their muscles and tissues, which limits their ability to exercise. Depending on the severity of the anemia, they may suffer from headaches, vertigo, fainting, fatigue, and shortness of breath, which can affect their ability to play, climb stairs, and walk long distances (Lopez et al., 2016);
- Children with iron deficiency are more sensitive to infections and may suffer from hair loss, inflammation of the tongue (glossitis), swallowing problems (Plummer-Vinson Syndrome), brittle nails and cracked skin (IOM, 2001; WHO, 2001; Subramaniam and Girish, 2015).

Long-term health effects:

- Chronic iron deficiency and anemia may cause delayed growth (Lozoff et al., 1991);
- Chronic anemia also leads to irreversible neurological effects in children, such as learning delays, a lower intelligence quotient, and a reduction in reasoning skills, memory, attention, and classroom success (Lopez et al., 2016).

In society, these health problems may appear as follows: children who suffer from anemia may be more isolated because they are not fully capable of doing what the other children can do, and they are also at risk for academic problems, including increased absence from school due to their greater sensitivity to infections (Lozoff et al., 1998; WHO, 2001). Lastly, adolescent girls who are iron-deficient or slightly anemic and who are not treated are more likely to develop severe anemia during and after their first pregnancy (Coad and Conlon, 2011; WHO, 2001).

Chronic anemia in children is therefore a major public health problem. According to the World Health Organization (2001), a prevalence of chronic anemia beyond 5% in a specific group is considered abnormal and immediate action should be taken. When the prevalence of anemia is between 5 and 19%, it is qualified as a minor public health problem, while between 20% and 39%, it is considered a moderate public health problem, and if it is 40% or more, anemia is considered a severe or major public health problem.

As part of the JES!-YEH! project, several elements were used to categorize iron deficiency and anemia (severity and type of anemia): concentration of hemoglobin in the blood, serum ferritin, serum iron, total iron binding capacity (TIBC) in serum, C-reactive protein (hs-CRP) in plasma, urinary cotinine, and percentage of serum transferrin saturation. The algorithms used to categorize iron deficiency and anemia (severity, type) are presented in Appendix I.

Results

For the entire JES!-YEH! project, the prevalence of iron deficiency and anemia was 20.7% and 17.6% respectively (Table 279). The prevalence of iron-deficient anemia was 8.8%,^{E} or half of the cases of anemia (Table 280). As for the severity of anemia, the participants were mainly suffering from mild (11.4%^{E}) or moderate (5.7%^{E}) anemia. However, one case of severe anemia was identified. The situation was particularly concerning in young girls aged 12 to 19 years old; almost half of them had an iron deficiency (42.9%^{E}) and a quarter of them (26.2%^{E}) had anemia, especially iron-deficient anemia (21.4%^{E}). The prevalence of anemia in boys 6-11 years old was also high (20.9%^{E}).

The data on iron and hemoglobin from the CHMS (Cycle 2) presented in the article by Copper et al. (2012) are reported to show sufficient levels of iron and hemoglobin instead of iron and hemoglobin deficiency (anemia). This approach was chosen because the prevalence of iron and hemoglobin deficiency in the Canadian population are low, and so that more specific estimates could be reported (coefficient of variation below 16.6%) (Copper et al., 2012). In the JES!-YEH! project, the methods used to categorize iron status and anemia were slightly different from those in the CHMS (Appendix I). However, as shown in Table 279, the prevalence of iron deficiency and anemia in the JES!-YEH! project (or the opposite for sufficient levels of iron and hemoglobin) were greatly higher than in the CHMS for the same age groups and gender (Cycle 2), and in particular for girls 12-19 years old (42.9%^{E} versus 13%) (Copper et al., 2012). However, these results should be interpreted with caution, since their coefficients of variation were between 16.6 and 33.3%.

Table 279: Prevalence of iron deficiency and anemia for all participants in the JES!-YEH! project

Age groups	JES!-YEH! project					CHMS (Cycle 2)[1]	
		Iron status		Hemoglobin status			
	Number of participants (n)	Iron deficiency (%)	Sufficient iron (%)	Anemia (%)	Sufficient hemoglobin (%)	Sufficient iron (%)	Sufficient hemoglobin (%)
3-5 years old	Girls (15)	F	66.7 E	F	86.7	96.8	99.0
	Boys (20)	F	90.0	F	95.0		
	Total (35)	F	80.0	F	91.4	-	-
6-11 years old	Girls (35)	F	88.6	F	85.7	98.6	95.4
	Boys (43)	F	88.4	20.9E	79.1	97.6	95.4
	Total (78)	11.5E	88.5	18.0E	82.1	-	-
12-19 years old	Girls (42)	42.9E	57.1	26.2E	73.8	86.9 [2]	99.8
	Boys (38)	F	84.2	F	84.2	99.1	96.8
	Total (80)	30.0E	70.0	21.3E	78.6	-	-
Total	Girls (92)	29.4	70.7	19.6E	80.4	-	-
	Boys (101)	12.9E	87.1	15.8E	84.2	-	-
	Total (193)	20.7	79.3	17.6	82.4	-	-

[1] Copper et al. (2012); In the Copper et al. article (2012), an iron deficiency of 13% is also reported for girls 12-19 years old.
NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

According to the categories proposed by the WHO, the prevalence of anemia in girls 12-19 years old (26.2%E) and boys 6-11 years old (20.9%E) in the JES!-YEH! project, which was between 20 and 39%, represents a moderate public health problem.

Table 280: Prevalence of anemia broken down by categories and severity of anemia for all JES!-YEH! project participants

Age groups	Number of participants (n)	Categories of anemia			Severity of anemia		
		Iron-deficient anemia (%)	Inflammatory anemia (%)	Unexplained anemia (%)	Mild (%)	Moderate (%)	Severe (%)
3-5 years old	Girls (15)	F	F	F	F	F	F
	Boys (20)	F	F	F	F	F	F
	Total (35)	F	F	F	F	F	F
6-11 years old	Girls (35)	F	F	F	F	F	F
	Boys (43)	F	F	F	F	F	F
	Total (78)	F	F	F	11.5E	F	F
12-19 years old	Girls (42)	21.4E	F	F	F	F	F
	Boys (38)	F	F	F	F	F	F
	Total (80)	16.2E	F	F	12.5E	F	F
Total	Girls (92)	10.9E	F	F	13.0E	F	F
	Boys (101)	F	F	F	9.9E	F	F
	Total (193)	8.8E	F	F	11.4E	5.7E	F

NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

For the participating Anishinabe communities, the prevalence of iron deficiency was 21.0%E and for anemia it was 17.0%E (Table 281). The results for girls 12-19 years old were concerning: more than half (52.4%E) had iron deficiency and 33.3%E had anemia. All of the results in Tables 281 and 282 should be interpreted with caution, since the coefficients of variation for the prevalence were between 16.6 and 33.3%.

Table 281: Prevalence of iron deficiency and anemia for JES!-YEH! project participants in both Anishinabe communities involved in the project.

Age groups	Number of participants (n)	Iron deficiency (%)	Anemia (%)
3-5 years old	Girls (10)	F	F
	Boys (12)	F	F
	Total (22)	F	F
6-11 years old	Girls (21)	F	F
	Boys (24)	F	F
	Total (45)	F	F
12-19 years old	Girls (21)	52.4^E	33.3^E
	Boys (19)	F	F
	Total (40)	37.5^E	27.5^E
Total	Girls (52)	28.9^E	21.0^E
	Boys (55)	F	F
	Total (107)	21.0^E	17.0^E

NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Table 282: Prevalence of anemia broken down by categories and severity of anemia for JES!-YEH! project participants in both Anishinabe communities involved in the project.

Age groups	Number of participants (n)	Categories of anemia			Severity of anemia		
		Iron-deficient anemia (%)	Inflammatory anemia (%)	Unexplained anemia (%)	Mild (%)	Moderate (%)	Severe (%)
3-5 years old	Girls (10)	F	F	F	F	F	F
	Boys (12)	F	F	F	F	F	F
	Total (22)	F	F	F	F	F	F
6-11 years old	Girls (21)	F	F	F	F	F	F
	Boys (24)	F	F	F	F	F	F
	Total (45)	F	F	F	F	F	F
12-19 years old	Girls (21)	F	F	F	F	F	F
	Boys (19)	F	F	F	F	F	F
	Total (40)	22.5^E	F	F	F	F	F
Total	Girls (52)	F	F	F	F	F	F
	Boys (55)	F	F	F	F	F	F
	Total (107)	9.4^E	F	F	8.4^E	8.4^E	F

NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

For the participants in the two Innu communities, the prevalence of iron deficiency was 21.0%^{E} and for anemia it was 18.6%^{E} (Table 283). The prevalence of iron deficiency in girls 12-19 years old in these communities was also concerning (33.3%^{E}). In addition, a quarter (24.2%^{E}) of 6-11 year old participants had anemia. Table 284 shows that the majority of these cases of anemia were mild anemia (15.1%^{E}). However, all of these results should be interpreted with caution, since the coefficients of variation for the prevalences were between 16.6 and 33.3%.

Table 283: Prevalence of iron deficiency and anemia for JES!-YEH! project participants in both Innu communities involved in the project.

Age groups	Number of participants (n)	Iron deficiency (%)	Anemia (%)
3-5 years old	Girls (5)	F	F
	Boys (8)	F	F
	Total (23)	F	F
6-11 years old	Girls (14)	F	F
	Boys (19)	F	F
	Total (33)	F	24.2[E]
12-19 years old	Girls (21)	33.3[E]	F
	Boys (19)	F	F
	Total (40)	22.5[E]	F
Total	Girls (40)	30.0[E]	F
	Boys (46)	F	19.6[E]
	Total (86)	21.0[E]	18.6[E]

NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Table 284: Prevalence of anemia broken down by categories and severity of anemia for JES!-YEH! project participants in both Innu communities involved in the project.

Age groups	Number of participants (n)	Categories of anemia			Severity of anemia		
		Iron-deficient anemia (%)	Inflammatory anemia (%)	Unexplained anemia (%)	Mild (%)	Moderate (%)	Severe (%)
3-5 years old	Girls (5)	F	F	F	F	F	F
	Boys (8)	F	F	F	F	F	F
	Total (23)	F	F	F	F	F	F
6-11 years old	Girls (14)	F	F	F	F	F	F
	Boys (19)	F	F	F	F	F	F
	Total (33)	F	F	F	F	F	F
12-19 years old	Girls (21)	F	F	F	F	F	F
	Boys (19)	F	F	F	F	F	F
	Total (40)	F	F	F	F	F	F
Total	Girls (40)	F	F	F	F	F	F
	Boys (46)	F	F	F	F	F	F
	Total (86)	F	F	F	15.1[E]	F	F

NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

As stated in the manganese section, although food is generally high in manganese, the body absorbs only 3 to 5% of it (IOM, 2001). However, when the body is iron-deficient, it can absorb more manganese in the bowel. Among participants in the JES!-YEH! project, nearly one-third (27.5%) of iron-deficient participants also had high blood manganese levels. This trend was similar between the two First Nations involved in the project (participating Anishinabe communities: 31.8%; participating Innu communities: 22.2%) (data not shown). Furthermore, as illustrated in Figure 12, serum ferritin and blood manganese were negatively correlated (p<0.0001), supporting the hypothesis that the more the body is iron-deficient, the more the manganese in circulation increases.

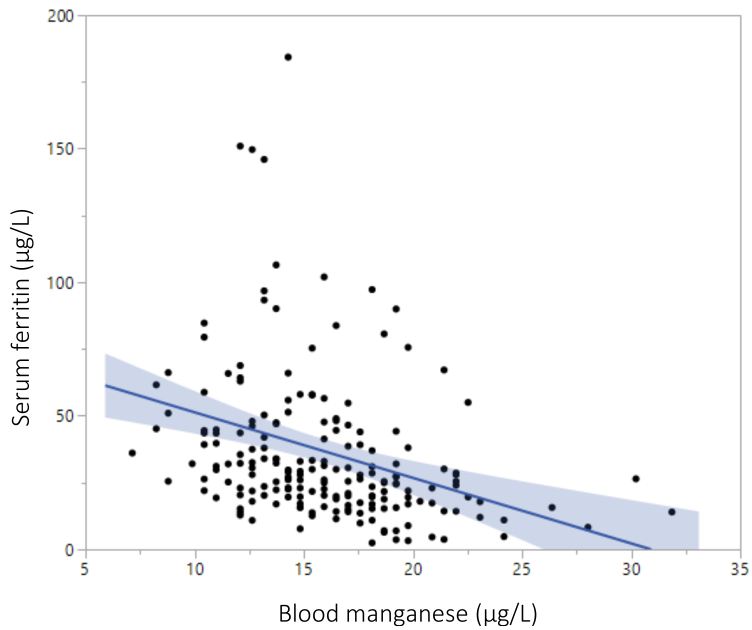


Figure 12: Association between serum ferritin and blood manganese for all participants in the JES!-YEH! project (Spearman correlation ρ = - 0.42, p < 0.0001)

In populations living in poor conditions, the main known risk factors for anemia are iron and vitamin deficiencies, which often result from the increased consumption of ultra-processed store-bought and low quality food, food insecurity, prolonged breastfeeding coupled with inadequate supplemental feeding, and chronic infections (including Helicobacter pylori) (Gessner, 2009; Jamieson et al., 2012). Conversely, the traditional diet is high in heme iron and in several other nutrients, which help improve iron absorption in the bowels, among other things. Several nutritionists in an Indigenous context promote these traditional foods as excellent sources of iron and as a way to prevent iron deficiency and anemia, because they are more effective in restoring iron intake and culturally adapted than store-bought foods and dietary supplements (Morency, pers. comm.; Boucher, pers. comm.; Gauthier, pers. comm.). Data from the JES!-YEH! project highlight the importance of better identifying the protective factors and risk factors for iron deficiency and anemia (and excess blood manganese), particularly among adolescent girls and young girls 12-19 years old and boys 6-11 years old, and developing preventive interventions adapted to their realities. Preventing iron deficiency among young adolescent girls could also eventually contribute to preventing anemia during pregnancy, which is highly prevalent in certain communities involved in the project (Polson, pers. comm.; Morency, pers. comm.).

References

CDC (Centers for Disease Control and Prevention) (1998). Recommendations to prevent and control iron deficiency in the United States. MMWR. Recommendations and Reports : Morbidity and Mortality Weekly Report. Recommendations and Reports / Centers for Disease Control, 47(RR-3), 1–29.

Coad, J., Conlon, C. (2011). Iron deficiency in women: assessment, causes and consequences. Current Opinion in Clinical Nutrition and Metabolic Care, 14 (6), 625–34.

Cooper, M., Greene-Finestone, L., Lowell, H., Levesque, J., Robinson, S. (2012). "Iron Sufficiency of Canadians." Health Reports / Statistics Canada, Canadian Centre for Health Information = Rapports Sur La Santé / Statistique Canada, Centre Canadien D'information Sur La Santé, 23 (4), 41–48.

Gessner, B.D. (2009). Geographic and racial patterns of anemia prevalence among low-income Alaskan children and pregnant or postpartum women limit potential etiologies. Journal of Pediatric Gastroenterology and Nutrition, 48 (4), 475–481.

Hammond, P.B. (1977). Exposure of humans to lead. Annual Review of Pharmacology and Toxicology, 17 (1), 197–214.

Hurrell, R., Egli, I. (2010). Iron bioavailability and dietary reference values. American Journal of Clinical Nutrition, 91 (5), 1461S–1467S.

IOM (Institute of Medicine) (2001). Dietary reference intakes for vitamin A, vitamin K, arsenic, boron, chromium, copper, iodine, iron, manganese, molybdenum, nickel, silicon, vanadium, and zinc. The National Academies Press, Washington, DC, 798p. Consulted online: www.nap.edu/catalog/10026/dietary-reference-intakes-for-vitamin-a-vitamin-k-arsenic-boron-chromium-copper-iodine-iron-manganese-molybdenum-nickel-silicon-vanadium-and-zinc

Jackson, J., Williams, R., McEvoy, M., MacDonald-Wicks, L., Patterson, A. (2016). Is Higher Consumption of Animal Flesh Foods Associated with Better Iron Status among Adults in Developed Countries? A Systematic Review. Nutrients, 8 (2), 89.

Jamieson, J.A., Kuhnlein, H.V. (2008). The paradox of anemia with high meat intake: A review of the multifactorial etiology of anemia in the Inuit of North America. Nutrition Reviews, 66 (5), 256–271.

Jamieson, J.A., Weiler, H.A., Kuhnlein, H.V., Egeland, G.M. (2012). Traditional Food Intake Is Correlated with Iron Stores in Canadian Inuit Men. Journal of Nutrition, 142 (4), 764–770.

Lopez, A., Cacoub, P., Macdougall, IC., Peyrin-Biroulet, L. (2016). Iron deficiency anaemia. The Lancet, 387 (10021), 907–916.

Lozoff, B., Jimenez, E., Wolf, A.W. (1991) Long term developmental outcome of infants with iron deficiency. New England Journal of Medicine, 325, 687-695.

Lozoff, B., Klein, N.K., Nelson, E.C., McClish, D.K., Manuel, M., Chacon, M.E. (1998). Behavior of infants with iron-deficiency anemia. Child Development, 69 (1), 24–36.

Mclean, E., Cogswell, M., Egli, I., Wojdyla, D., De Benoist, B. (2008). Worldwide prevalence of anaemia , WHO Vitamin and Mineral Nutrition Information System , 1993 – 2005. Public Health Nutrition, 12 (4), 444–454.

WHO (World Health Organization (2001). Iron Deficiency Anaemia: Assessment, Prevention and Control, A guide for program managers. A guide for programme mangers. Consulted online: www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/WHO_NHD_01.3/en/

Pantopoulos, K., Porwal, S.K., Tartakoff, A., Devireddy, L. (2012). Mechanisms of mammalian iron homeostasis Importance of iron in mammalian physiology. Biochemistry, 51 (29), 5705–5724.

Plante C, Blanchet C, Rochette L, O'Brien HT. (2011). Prevalence of anemia among inuit women in nunavik, canada. Int J Circumpolar Health 70:154-165.

Subramaniam, G., Girish, M. (2015). Iron Deficiency Anemia in Children. Indian Journal of Pediatrics, 82 (June), 558–564.

7.5. Body Weight

7.5.1. Body Mass Index

Childhood obesity has reached epidemic proportions around the world and it is a significant public health issue. It is recognized that obesity developed in childhood may be a risk factor for the development of cardiovascular disease, type 2 diabetes, and certain cancers (e.g., colorectal, kidney, and esophageal) as an adult (Mokha et al., 2010; OMS, 2012). Obese or overweight children and adolescents also have a greater risk of being bullied, social isolation, and a reduced quality of life (WHO, 2012). Obesity is the result of an imbalance from increased calorie intake and reduced energy expenditure (Yoo, 2016). This imbalance is also strongly influenced by a variety of environmental, genetic, social, cultural, and economic factors (Lobstein et al., 2015).

Body mass index (BMI) (weight (kg)/height $(m)^2$) is often used to assess excessive fat and the impact of obesity on the health of individuals and populations (Zhang et al., 2017).

BMI for persons aged 18 years or older is classified into four categories (Health Canada, 2003) :

Classification	BMI category (kg/m^2)	Risk of developing health problems
Insufficient weight	< 18.5	Increased
Normal weight	18.5 – 24.9	Low
Overweight	25.0 – 29.9	Increased
Obese		
Class I	30.0 – 34.9	High
Class II	35.0 – 39.9	Very high
Class III	≥ 40.0	Extremely high

BMI is a measurement generally used for persons 18 years of age and older. For younger people, it is now possible to use BMI as of 2 years of age, according to the International Obesity Task Force (IOTF) charter, which was developed by investigators who compiled thousands of data points from six countries (United States, Brazil, Great Britain, Singapore, Hong Kong and the Netherlands) (Cole and Lobestein, 2007). This IOTF classification is regularly updated in order to obtain the same information as BMI, taking the growth and gender of young people into consideration.

The IOTF classifications were preferred over those of the World Health Organization (WHO), since they are based on anthropometric measurements from several countries. In addition, a recent study shows that the IOTF classifications seem to be more specific than those of the WHO and the Centers for Disease Control (CDC) when identifying excess weight and obesity in school age Inuit children (Medehouenou et al. 2015).

Results

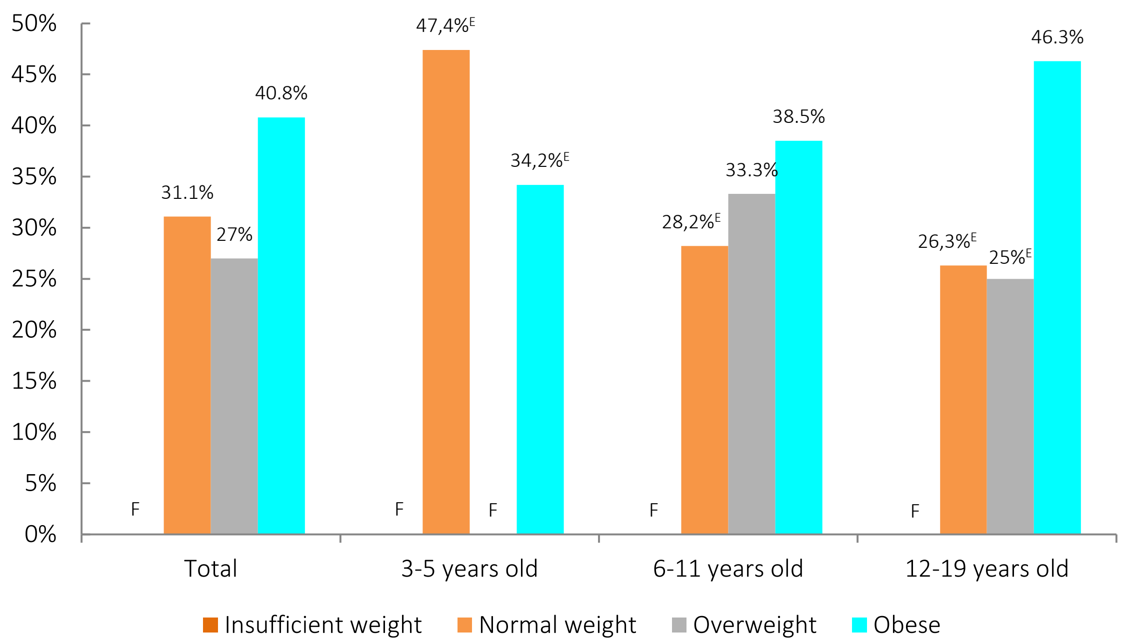
The distribution of BMI classifications for participants in the JES!-YEH! project is presented as graphs broken down by age, gender, and participating nation (Figures 13 to 15). These graphs show that the prevalence of excess weight and obesity is higher (27.0% and 40.8% respectively), especially obesity in participants 12-19 years old (46.3%) (Figure 13). The prevalence of obesity was also higher in boys (45.5%) than in girls (35.8%) (Figure 14) and in the Innu communities involved in the project (participating Innu communities: 65.9%; participating Anishinabe communities: 21.6%[E]) (Figure 15).

Roberts et al. (2012) published BMI results from the CHMS (Cycle 2) according to the IOTF classifications. These data are available for children and youths in age groups similar to those in the JES!-YEH! project (i.e. 5-11 and 12-17 years old) as well as for gender. The respective percentages for excess weight and obesity measured in the JES!-YEH! project for participants 6-11 years old (33.3% and 38.5%) and 12-19 years old (25%[E] and 46.3%) were considerably higher than those in the CHMS (5-11 years old: 14.7% and 7.9%; 12-17 years old: 18% and 8.9%) (Figure 13). However, the coefficient of variation for the results of excess weight of 12-19 year old participants was between 16.6 and 33.3%, and these data should be interpreted with caution. In summary, approximately twice as much overweight and almost 5 times more obesity was detected in youths in the JES!-YEH! study than in the CHMS. The percentage of participants with a normal weight BMI (31.1%) was also twice as low compared to the CHMS (5-11 year old age group: 76.4%; 12-17: 70.9%).

For the gender results both in girls (34.7%) and in boys (27.7%) in the JES!-YEH! project, the percentage of participants with a normal weight BMI was much lower compared to the female (72.7%) and male (74.7%) participants in the CHMS (Figure 14). On the contrary, girls (35.8%) and boys (45.5%) in the JES!-YEH! project had a percentage of obesity that was clearly higher than the CHMS (girls: 7.1%; boys: 9.5%). However, there were no significant differences in the results for overweight.

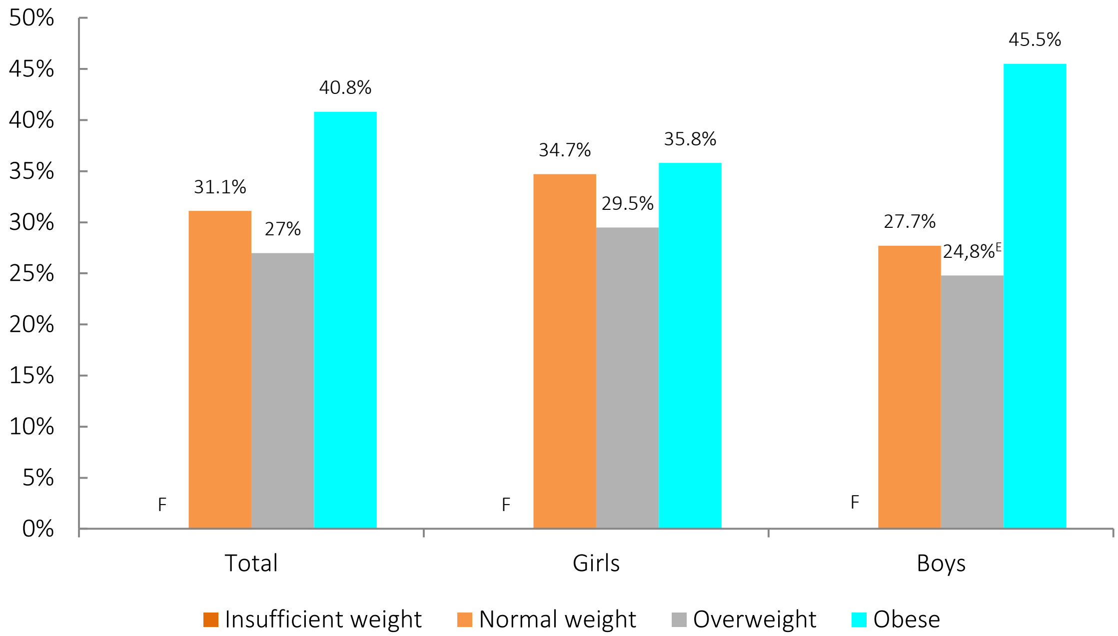
The most recent data published by the CHMS (Cycle 3) (Statistics Canada, 2015) were not used, since the CHMS used the WHO classification and not the IOTF classification.

Figure 13: Body mass index (BMI) – Distribution of BMI results broken down by age for JES!-YEH! project participants



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

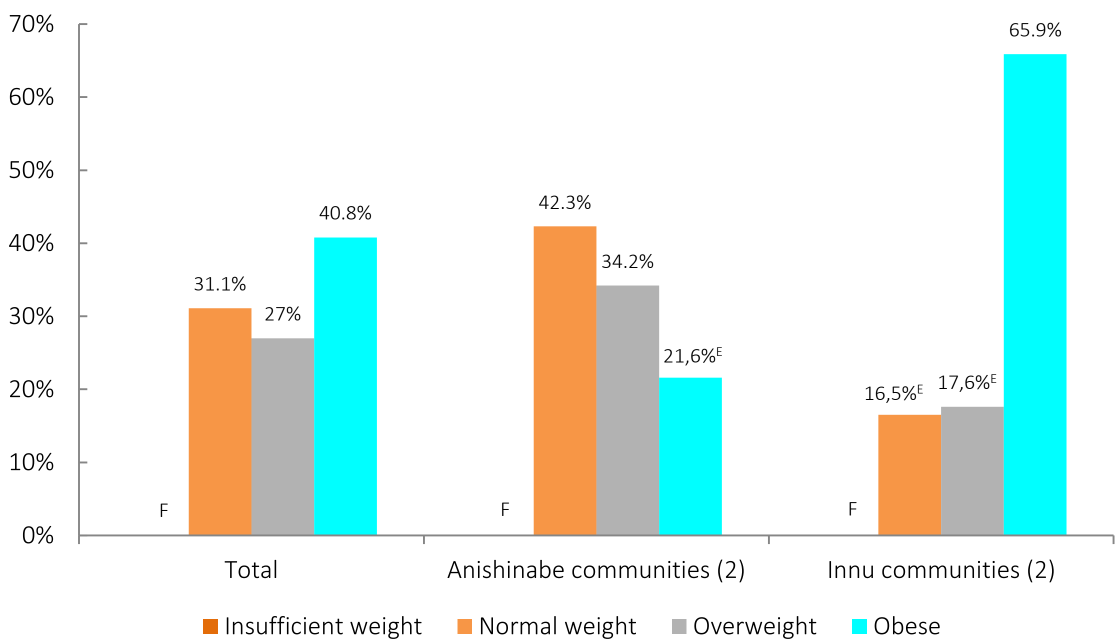
Figure 14: Body mass index (BMI) – Distribution of BMI results broken down by gender for JES!-YEH! project



participants

NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 15: Body mass index (BMI) – Distribution of BMI results broken down by participating communities (Anishinabe and Innu) in the JES!-YEH! project



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

7.5.2. Waist/Height Ratio

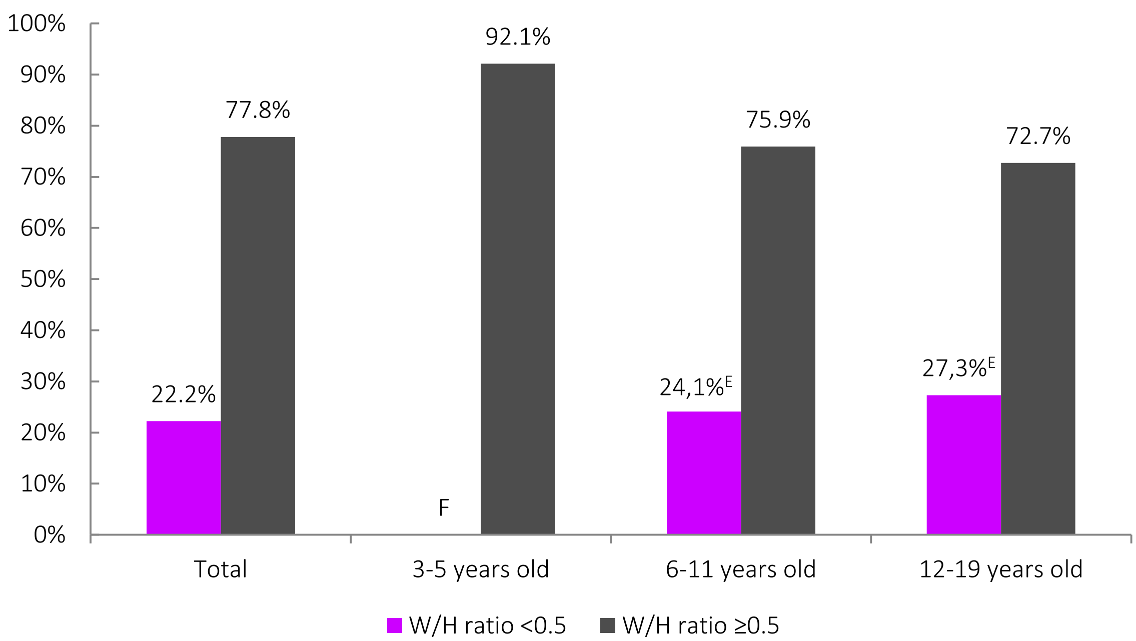
Although BMI is useful for assessing excess weight, this index does not differentiate between fat mass and muscle mass. Moreover, BMI does not give any indication of the distribution of fat mass within the body (Zhang et al., 2017). Conversely, the waist/height ratio (which is calculated by dividing waist circumference by height) has advantages over BMI since it is not highly affected by gender, age or ethnicity (Mehta, 2015). This ratio provides information on the presence of abdominal obesity and also helps assess the relationships between health issues (or their risk factors) caused by this type of obesity (abdominal). The waist /height ratio therefore helps identify people with normal weight, but who might have health issues due to their abdominal obesity, as well as, on the other hand, people who have excess weight (overweight or obese), but who have normal waist circumference based on their height (Mokha et al, 2010)

The waist/height ratio for young people can be categorized into two groups: no abdominal obesity and abdominal obesity. The scientific literature has concluded that a value equal to or greater than 0.5 for waist/height ratio indicates abdominal obesity in both adults and youth (Mokha et al., 2010).

Results

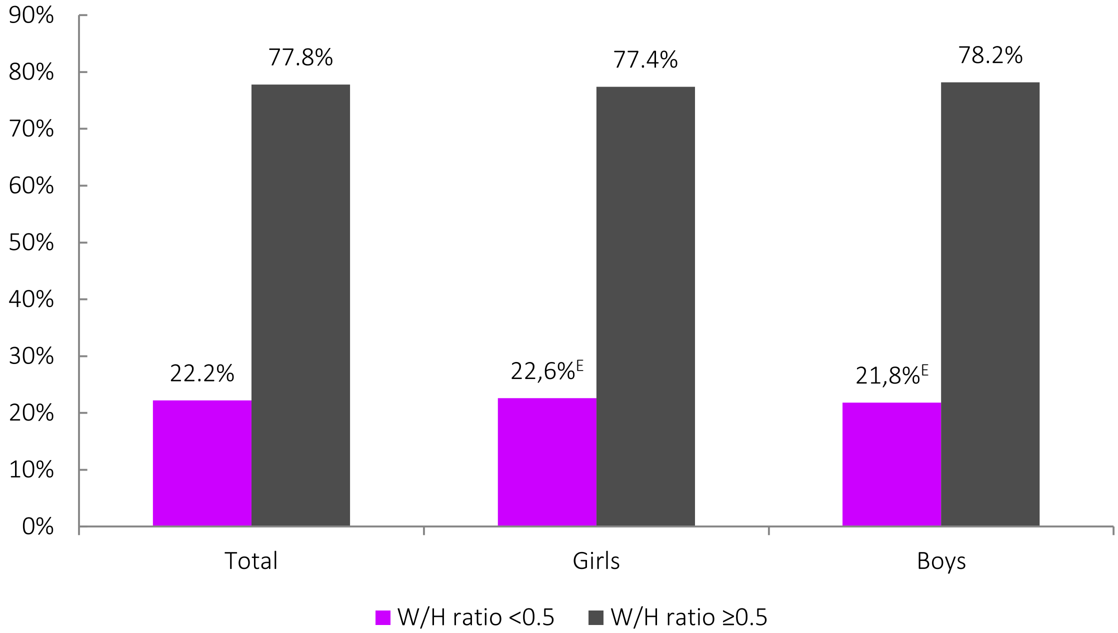
The distribution for the waist/height ratio classification for participants in the JES!-YEH! project is presented as graphs broken down by age, gender, and participating nation (Figures 16 to 18). The results showed that more than 90% of participants 3-5 years old in the JES!-YEH! study had abdominal obesity (92.1%), compared to 75.9% in participants 6-11 years old and 72.7% in participants 12-19 years old (Figure 16). The percentage of abdominal obesity was similar for girls (77.4%) and boys (78.2%) (Figure 17). In the participating Anishinabe and Innu communities, the percentage of participants who had a waist/height ratio with a higher health risk were 67.6% and 91.6%, respectively (Figure 18). Comparative data with the CHMS were not available.

Figure 16: Waist/height (W/H) ratio – Distribution of W/H ratio results broken down by age for JES!-YEH! project participants



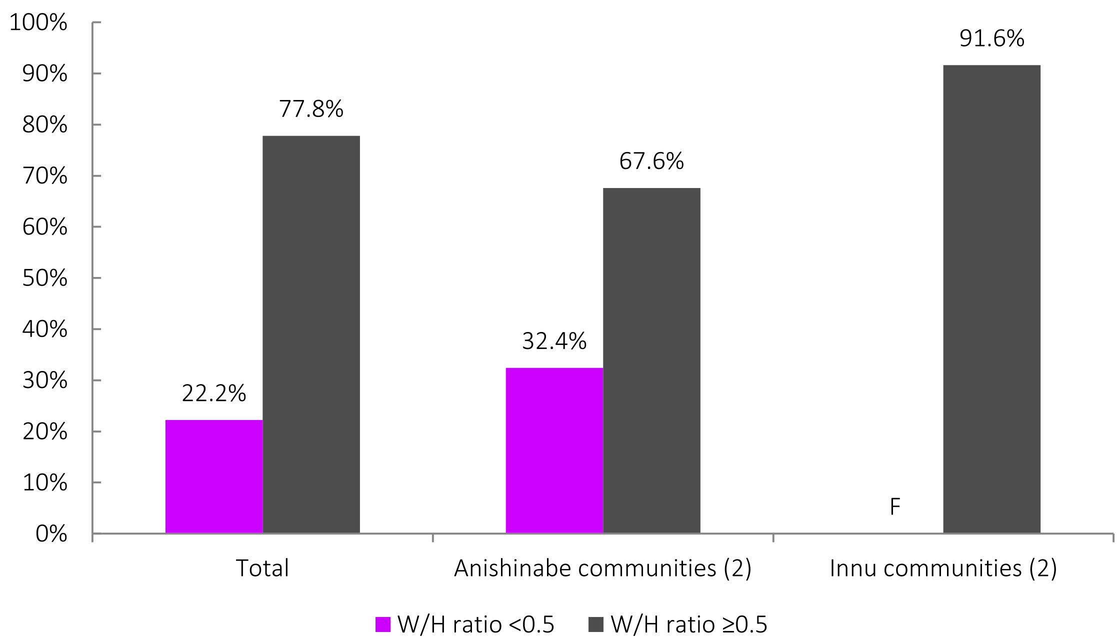
NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..

Figure 17: Waist/height (W/H) ratio – Distribution of W/H ratio results broken down by gender for JES!-YEH! project participants



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..

Figure 18: Waist/height (W/H) ratio – Distribution of W/H ratio results broken down by participating communities (Anishinabe and Innu) in the JES!-YEH! project



NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

References

Cole, T.J., Lobstein, T. (2012). Extended international (IOTF) body mass index cut-offs for thinness, overweight and obesity. Pediatr Obes., 7, 284-94.

Lobstein, T., Jackson-Leach, R., Moodie, M.L., Hall, K.D., Gortmaker, S.L., Swinburn, B.A., James, W.P., Wang, Y., McPherson, K. (2015). Child and adolescent obesity: Part of a bigger picture. Lancet, 385, 2510-2520.

Medehouenou, T.C., Ayotte, P., St-Jean, A., Meziou, S., Roy, C., Muckle, G., Lucas, M. (2015). Overweight and obesity prevalence among school-aged nunavik inuit children according to three body mass index classification systems. J Adolesc Health, 57, 31-36.

Mehta, S.K. (2015). Waist circumference to height ratio in children and adolescents. Clin Pediatr (Phila)., 54, 652-8.

Mokha, J.S., Srinivasan, S.R., Dasmahapatra, P., Fernandez, C., Chen, W., Xu, J., Berenson, G.S. (2010). Utility of waist-to-height ratio in assessing the status of central obesity and related cardiometabolic risk profile among normal weight and overweight/obese children: the Bogalusa Heart Study. BMC Pediatr., 11, 10:73.

WHO (World Health Organization) (2012). Population-based approaches to childhood obesity prevention. WHO, Geneva, Switzerland, 54p. Consulted online:
http://apps.who.int/iris/bitstream/handle/10665/80149/9789241504782_eng.pdf?sequence=1&isAllowed=y

Roberts, K.C., Shields, M., de Groh, M., Aziz, A., Gilbert, J.-A. (2012). Overweight and obesity in children and adolescents: Results from the 2009 to 2011 Canadian Health Measures Survey. Health Rep., 23, 37-41.

Health Canada (2003). Canadian Guidelines for Body Weight Classification in Adults – Quick Reference Tool for Professionals. Health Canada, Ottawa, 2p. Consulted online: https://www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/healthy-weights/canadian-guidelines-body-weight-classification-adults/quick-reference-tool-professionals.html

Statistics Canada (2015). Body mass index of children and youth, 2012 to 2013. Statistics Canada, Ottawa, Consulted online: http://www.statcan.gc.ca/pub/82-625-x/2014001/article/14105-eng.htm

Yoo, E.G. (2016). Waist-to-height ratio as a screening tool for obesity and cardiometabolic risk. Korean J Pediatr., 59, 425-431.

Zhang, Y.X., Wang, S.R., Chen, M., Cheng, Y. (2017). Recent trends in body mass index and waist circumference among children and adolescents in Shandong China. J Trop Pediatr., 0, 1-7.

7.6. Diabetes

Diabetes occurs when insulin (hormone secreted by the pancreas) is not produced in sufficient quantities or often not secreted at all (type 1 diabetes) or when the body is unable to use it properly (type 2 diabetes). Since insulin is essential to the intake of glucose into the muscles and organs, diabetes can develop when blood sugar is abnormally high and the body is no longer able to control it (Diabetes Québec, 2014a).

Type 1 diabetes appears most often in childhood, adolescence or early adulthood. In most cases, the immune system destroys the cells that produce insulin, which is why people with type 1 diabetes must inject themselves with insulin every day (Diabetes Québec, 2014b).

Type 2 diabetes occurs when the body resists the effects of insulin or when insulin production is insufficient to maintain normal blood sugar levels (Diabetes Québec, 2014c). Type 2 diabetes (seen most frequently) usually occurs in adulthood, after 40 years of age. However, these days, type 2 diabetes is increasingly diagnosed among young people under 40 years of age and even in children (Canadian Public Health Association, 2011).

There are several risk factors that can trigger type 2 diabetes (Diabetes Québec, 2014c):

- Excess weight (overweight or obese)
- High waist circumference (abdominal fat)
- Physical inactivity
- Poor eating habits
- Heredity
- Ethnic origin (Indigenous, African, Asian and Latin American)
- For women:
    - Having given birth to a baby over 4.1 kg (9 lbs);
    - Having had gestational diabetes (Bellamy et al., 2009).

Regardless of the type of diabetes, blood sugar that is too high can have negative health effects. There are several complications related to diabetes (cardiovascular disease, neuropathy, retinopathy, nephropathy, etc.). Diabetes is an incurable chronic disease. However, proper blood sugar control helps manage diabetes on a daily basis and thus helps delay or avoid complications (Diabetes Québec, 2014d).

Among the tools available to assess blood sugar, two were used in the JES!-YEH! project, i.e. glycated hemoglobin and random glucose.

Glycated hemoglobin (HbA_1c) is a recognized blood marker that provides information on average blood sugar over the past three months. This test is valid even if the blood sample is taken from a non-fasting participant, and it correlates well with the risks of diabetes-related complications. The result of this test is reported as a percentage (%). A value between 4.3 and 5.9% indicates a normal result. Between 6.0 and 6.4%, the risk of developing type 2 diabetes is increased and the person is therefore prediabetic, and a value greater than or equal to 6.5% means that the person is diabetic. However, it is recommended that a second test be done to confirm the diagnosis (Goldenberg and Punthakee., 2013; International Expert Committee, 2009).

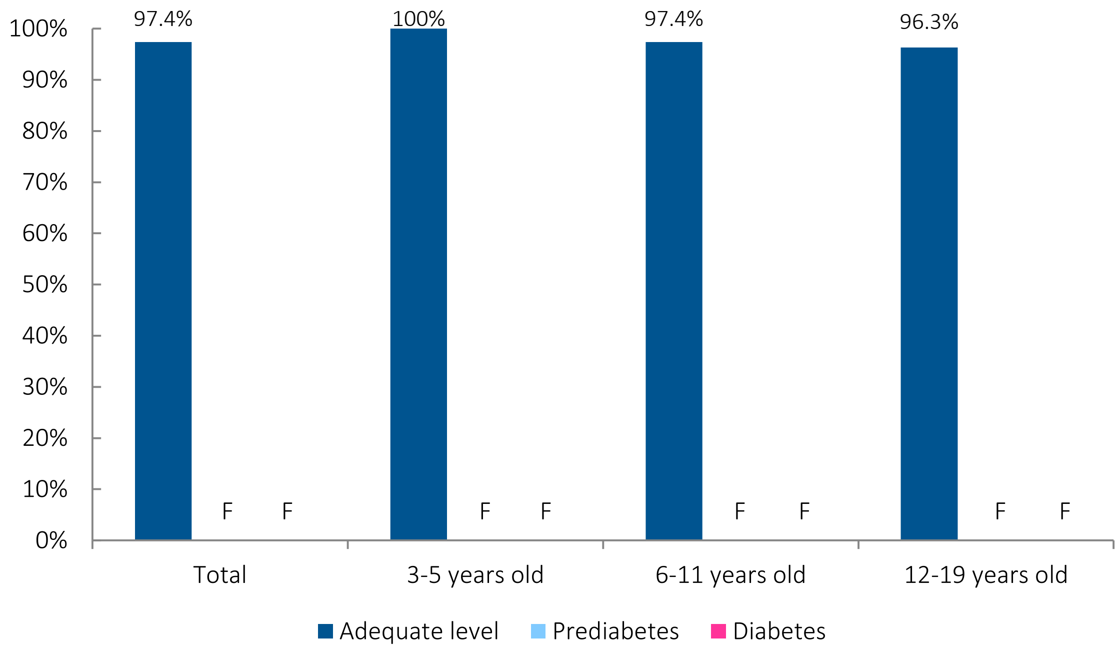
Random glucose measurement can also be used because it can be obtained without the person needing to fast. Blood sugar greater than or equal to 11.1 mmol/L (accompanied by symptoms associated with diabetes, such as polyuria, polydipsia and unexplained weight loss) indicates that the person is diabetic (Public Health Agency of Canada, 2011). Again, performing a second series of tests is recommended to confirm the diagnosis.

Results

The distribution of glycated hemoglobin levels and random glucose in JES!-YEH! project participants is presented in the form of graphs broken down by age, gender, and participating nation (Figures 19 to 24).

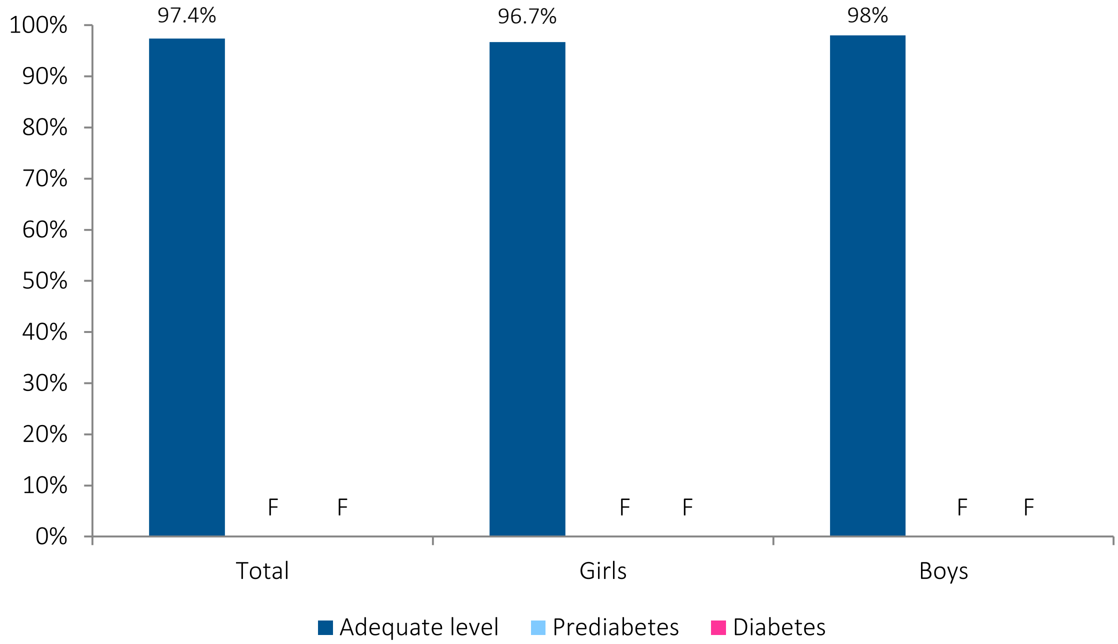
Among all participants, three had already been diagnosed before the project. As part of the JES!-YEH! project, two other participants had results that suggested a diabetic condition (based on their random glucose or glycated hemoglobin results) and one other participant had signs of prediabetes based on their glycated hemogobin results (data not shown). Apart from these data, JES!-YEH! project participants had adequate levels of both glycated hemoglobin (Figures 19 to 21) and random glucose (Figures 22 to 24) in more than 95% of cases, across all ages, genders, and participating nations. Comparative data with the CHMS were not available.

Figure 19: Glycated hemoglobin – Distribution of levels measured in whole blood (%) broken down by age for JES!-YEH! project participants



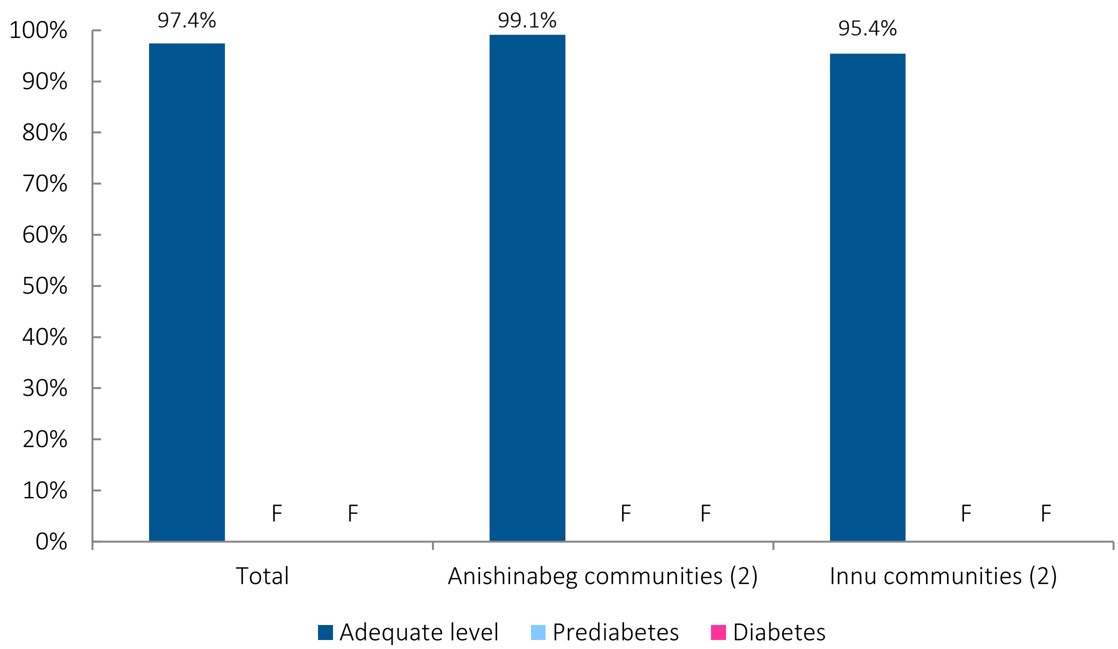
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%..

Figure 20: Glycated hemoglobin – Distribution of levels measured in whole blood (%) broken down by gender for JES!-YEH! project participants



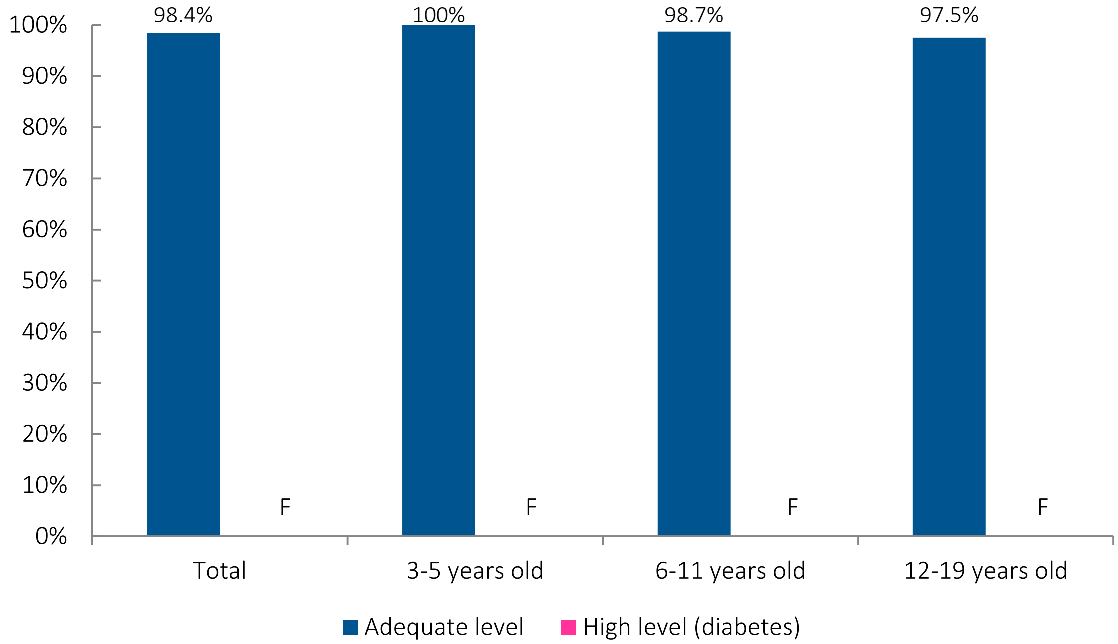
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 21: Glycated hemoglobin – Distribution of levels measured in whole blood (%) broken down by participating communities (Anishinabe and Innu) in the JES!-YEH! project



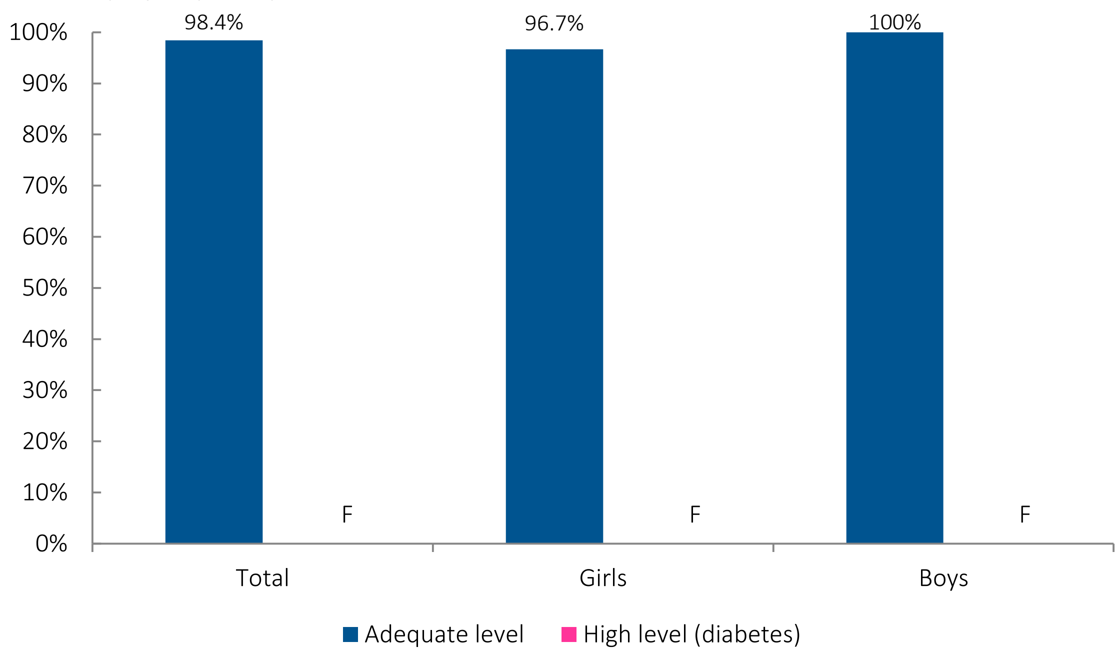
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 22: Random glucose – Distribution of levels measured in whole blood (mmol/L) broken down by age for JES!-YEH! project participants



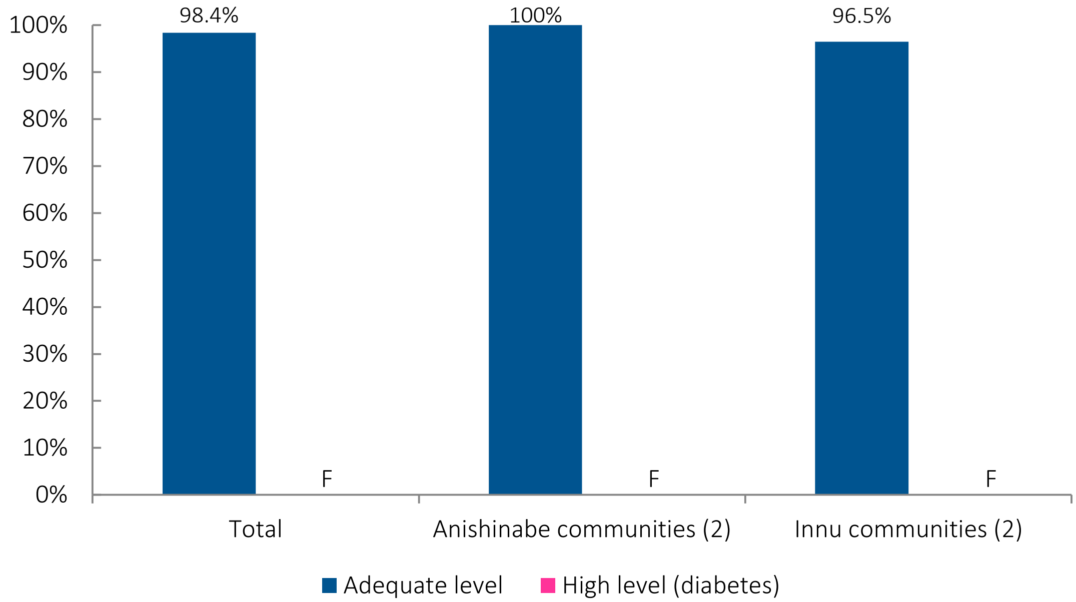
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 23: Random glucose – Distribution of levels measured in whole blood (mmol/L) broken down by gender for JES!-YEH! project participants



NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 24: Random glucose – Distribution of levels measured in whole blood (mmol/L) broken down by participating communities (Anishinabe and Innu) in the JES!-YEH! project



NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

References

PHAC (Public Health Agency of Canada) (2011). Diabetes in Canada: Facts and figures from a public health perspective. ACSO, Ottawa, 134p. Available online: https://www.canada.ca/en/public-health/services/chronic-diseases/reports-publications/diabetes/diabetes-canada-facts-figures-a-public-health-perspective/introduction.html

Bellamy, L., Casas, J.P., Hingorani, A.D., Williams, D. (2009). Type 2 diabetes mellitus after gestational diabetes: a systematic review and meta-analysis. Lancet, 373 (9677), 1773-9.

Diabetes Québec (2014a). What is Diabetes? Consulted online: https://www.diabete.qc.ca/en/understand-diabetes/all-about-diabetes/types-of-diabetes/what-is-diabetes

Diabetes Québec. (2014b). Type 1 Diabetes. Consulted online: https://www.diabete.qc.ca/en/understand-diabetes/all-about-diabetes/types-of-diabetes/type-1-diabetes

Diabetes Québec (2014c), Type 2 Diabetes. Consulted online: https://www.diabete.qc.ca/en/understand-diabetes/all-about-diabetes/types-of-diabetes/type-2-diabetes

Diabetes Québec (2014d). Understanding diabetes. Complications. Consulted online: https://www.diabete.qc.ca/en/understand-diabetes/all-about-diabetes/complications

Goldenberg, R., Punthakee, Z. (2013). Définition, classification et diagnostic du diabète, du prédiabète et du syndrome métabolique. Canadian Journal of Diabetes, 37, S369-S372

International Expert Committee (2009). International Expert Committee report on the role of the A1C assay in the diagnosis of diabetes. Diabetes Care, 32(7), 1327-34.

7.7. Thyroid Status

Thyroid hormones regulate the basic functions of the human body and they ensure the growth and development of organs, the metaboliztion of nutrients, thermoregulation, as well the regulation of the cardiovascular system. Using iodine and an amino acid called tyrosine, the thyroid gland secretes two main thyroid hormones, i.e. triiodothyronine (T_3) and thyroxin (T_4). The thyroid secretes approximately 80% of its hormones in the form of T_4. Thyroid stimulating hormone (TSH) is a hormone produced by the pituitary gland that stimulates the thyroid gland to produce T_3 and T_4. An excessively low concentration of TSH in the blood is a sign of hyperthyroidism, while an excessively high concentration of TSH in the blood is an indicator of hypothyroidism (Thyroid Foundation of Canada, 2009a; Passeport Santé, 2015).

Hypothyroidism is a sign that the thyroid gland is functioning slowly, which may result in a lack of energy, fatigue, difficulty concentrating, fragile hair and nails, and irregular periods. Conversely, hyperthyroidism is an indication that the gland is too active, and this condition may result in loss of weight despite a normal appetite, increased transpiration, tremors, mood swings, and heart palpitations (Thyroid Foundation of Canada, 2009b). To confirm the diagnosis of a thyroid disorder (hyperthyroidism or hypothyroidism), free thyroxin (free T_4) must be measured, i.e. the thyroxin circulating in the serum (Kapelari et al., 2008).

As for thyroglobulin (Tg), it is a protein secreted by the thyroid gland. Its role is to store iodine, and it is also involved in synthesizing thyroid hormones (Cahoon et al., 2013). When there is sufficient iodine, low quantities of Tg are secreted in the bloodstream (Zimmermann, 2009). Thyroglobulin levels are used as a marker to assess iodine status (Pearce, 2014). High levels of thyroglobulin may be associated with both excessive iodine and iodine deficiency (Zimmermann et al., 2013).

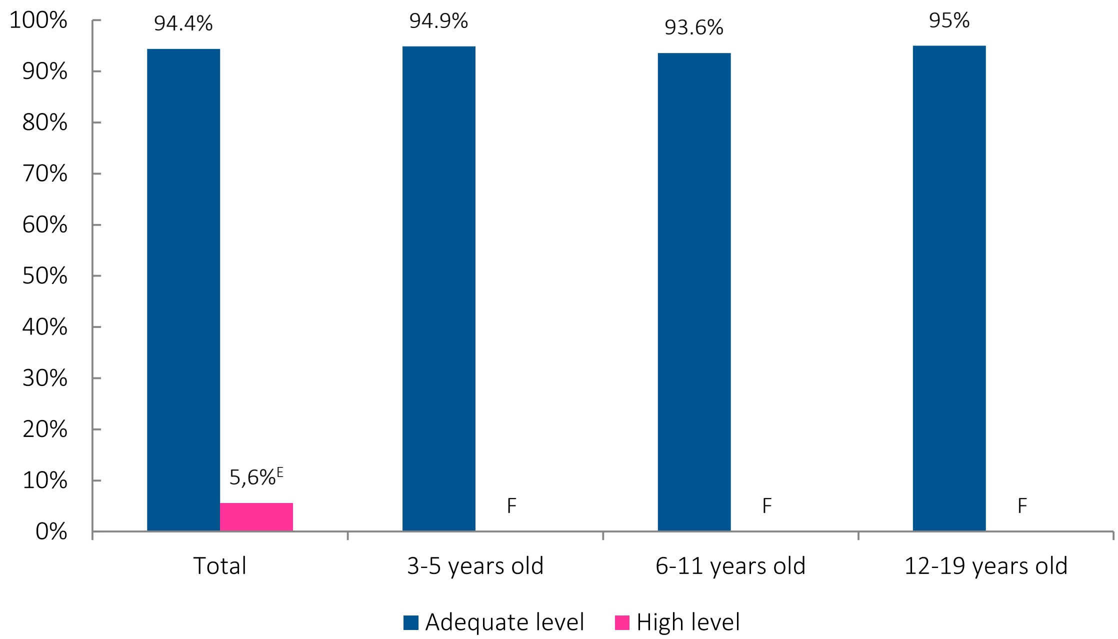
The blood samples in the JES!-YEH! project were used to analyze serum levels of thyroid stimulating hormone (TSH), free thyroxin (free T4), and thyroglobulin (Tg). According to the Laboratoire Multidisciplinaire du Centre hospitalier de l'Université Laval (CHUL), normal values are 0.25 to 5.00 mUI/L for TSH, 11 to 22 pmol/L for free T4, and 1.6 to 50.0 for Tg.

Results

The distribution for the classification of TSH, free T4, and Tg levels is presented in the form of graphs broken down by age, gender, and participating nation for JES!-YEH! project participants (Figures 25 to 33).

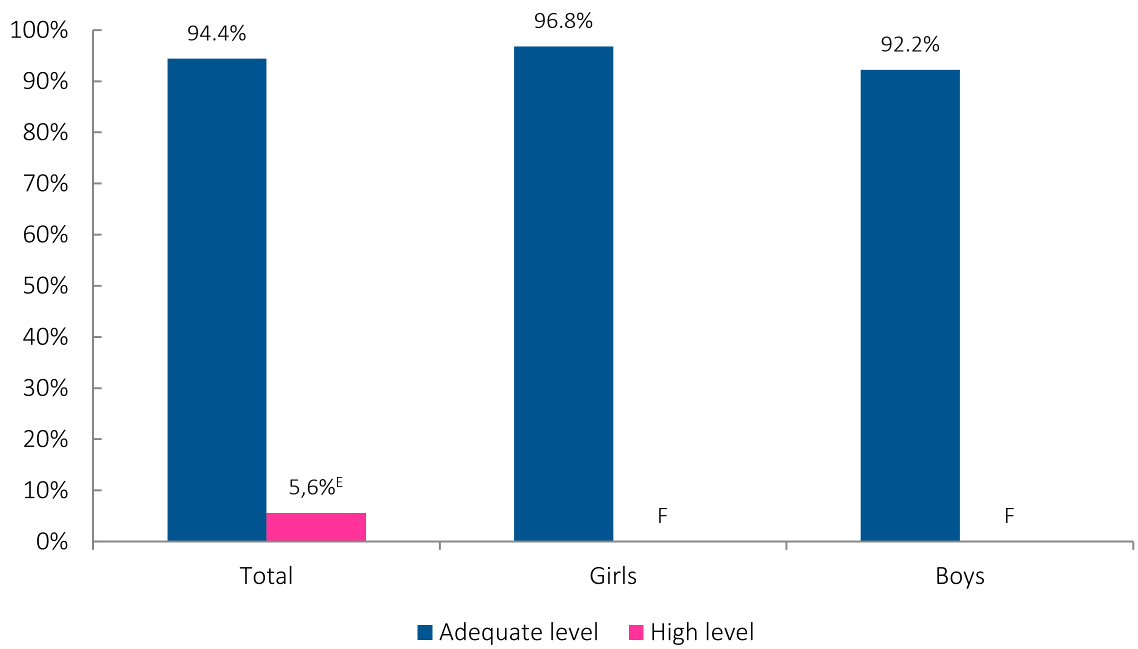
Overall, the majority of participants had blood levels of TSH, free T_4, and Tg within normal limits. However, 5.6% of participants had high levels of TSH, although this result was associated with coefficients of variation between 16.6 and 33.3%, so these results should be interpreted with caution. The results by age, gender, and participating communities were similar (Figures 25 to 33).

Figure 25: Thyroid stimulating hormone (TSH) – Distribution of levels measured in the serum (mUi/L) broken down by age of JES!-YEH! project participants



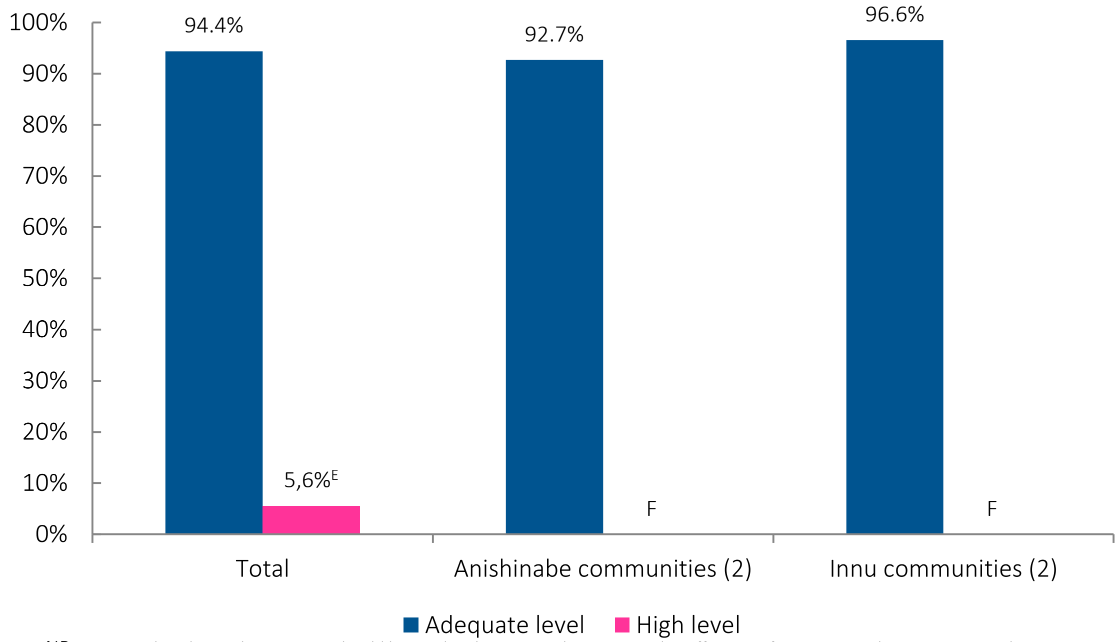
NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 26: Thyroid stimulating hormone (TSH) – Distribution of levels measured in the serum (mUi/L) broken down by gender of JES!-YEH! project participants



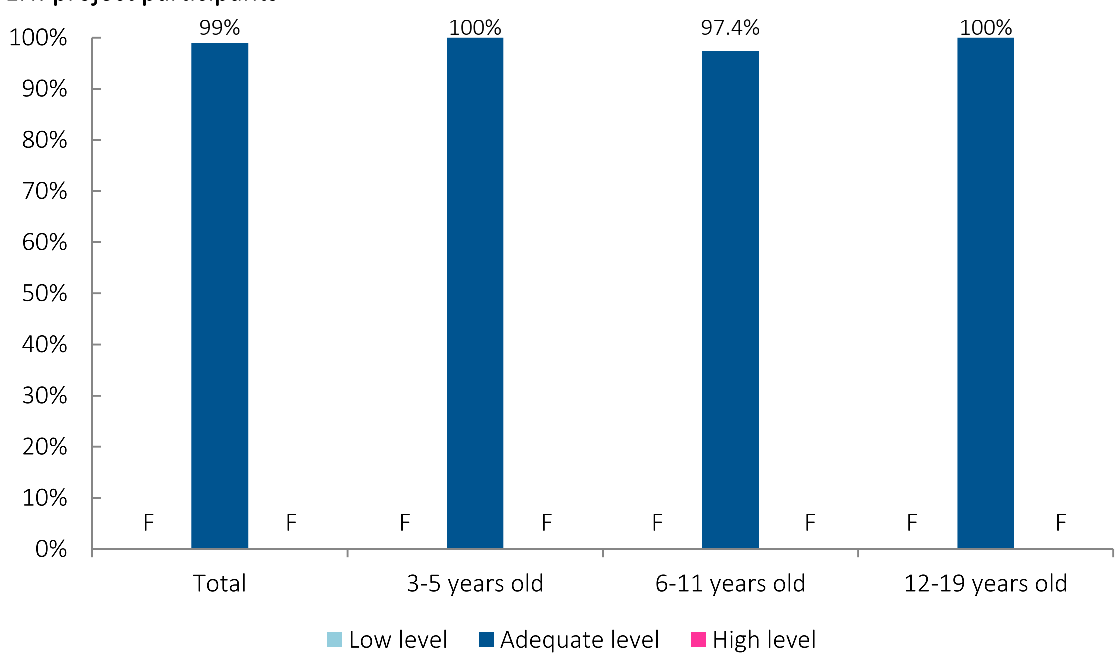
NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%;
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 27: Thyroid stimulating hormone (TSH) – Distribution of levels measured in the serum (mUi/L) broken down by participating communities (Anishinabe and Innu) in the JES!-YEH!
project



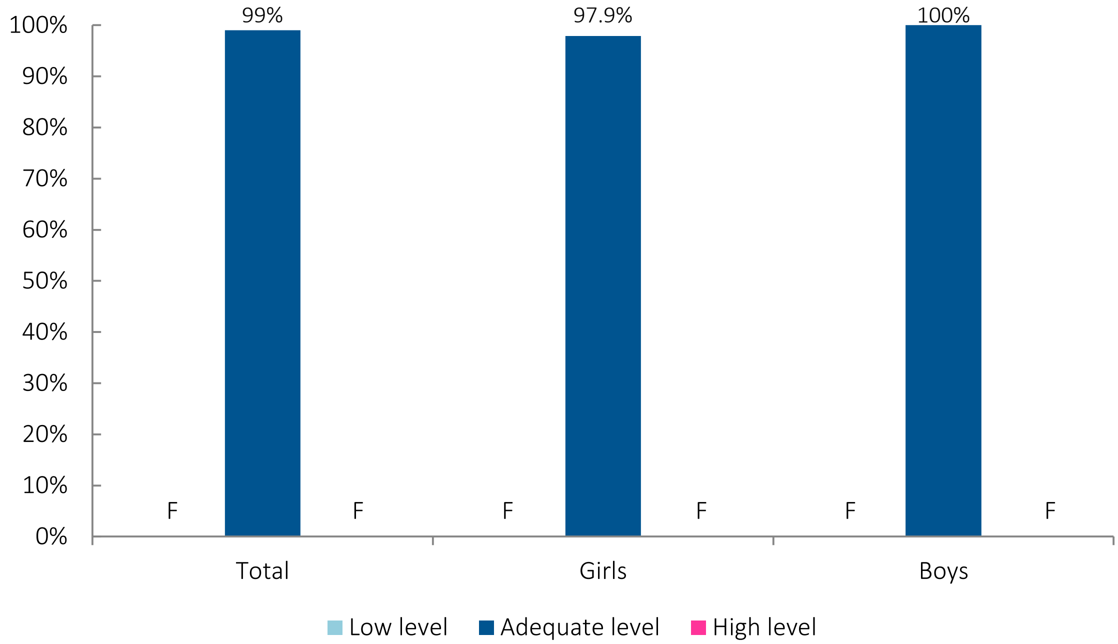
NB: E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%; F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 28: Free thyroxin (free T_4) – Distribution of levels measured in the serum (pmol/L) broken down by age of JES!-YEH! project participants



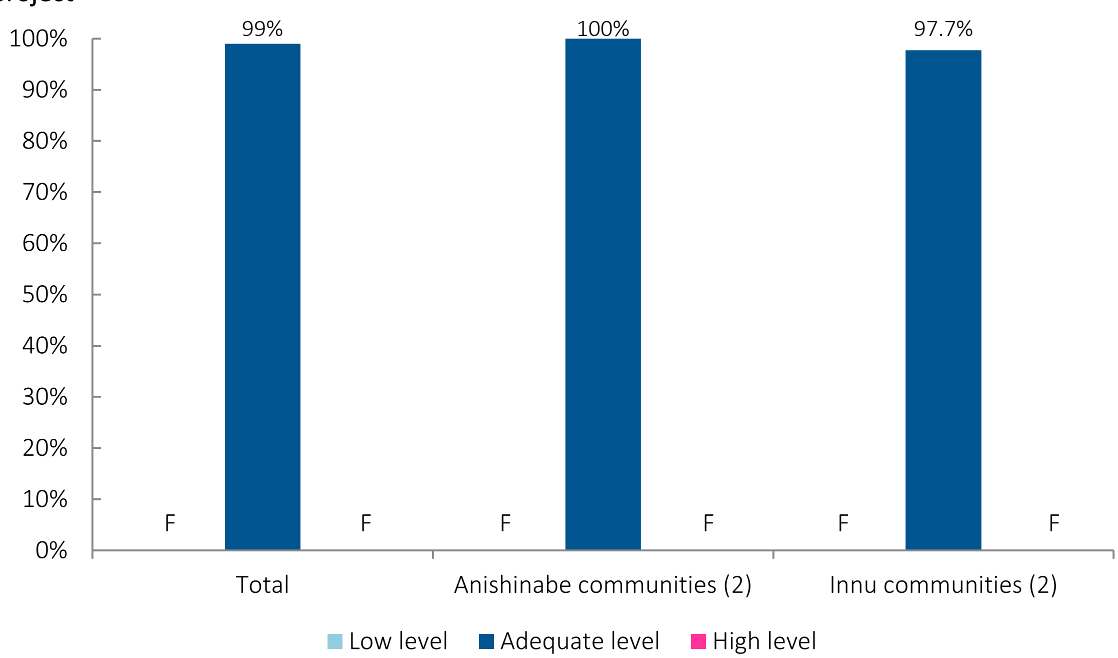
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 29: Free thyroxin (free T_4) – Distribution of levels measured in the serum (pmol/L) broken down by gender of JES!-YEH! project participants



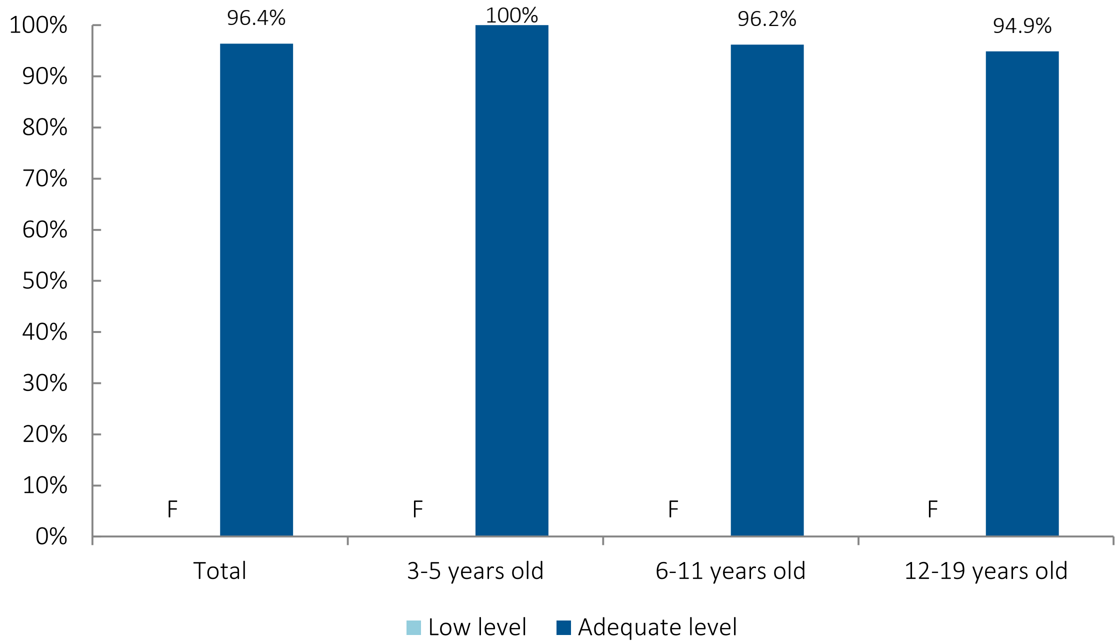
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 30: Free thyroxin (free T_4) – Distribution of levels measured in the serum (pmol/L) broken down by participating communities (Anishinabe and Innu) in the JES!-YEH! project



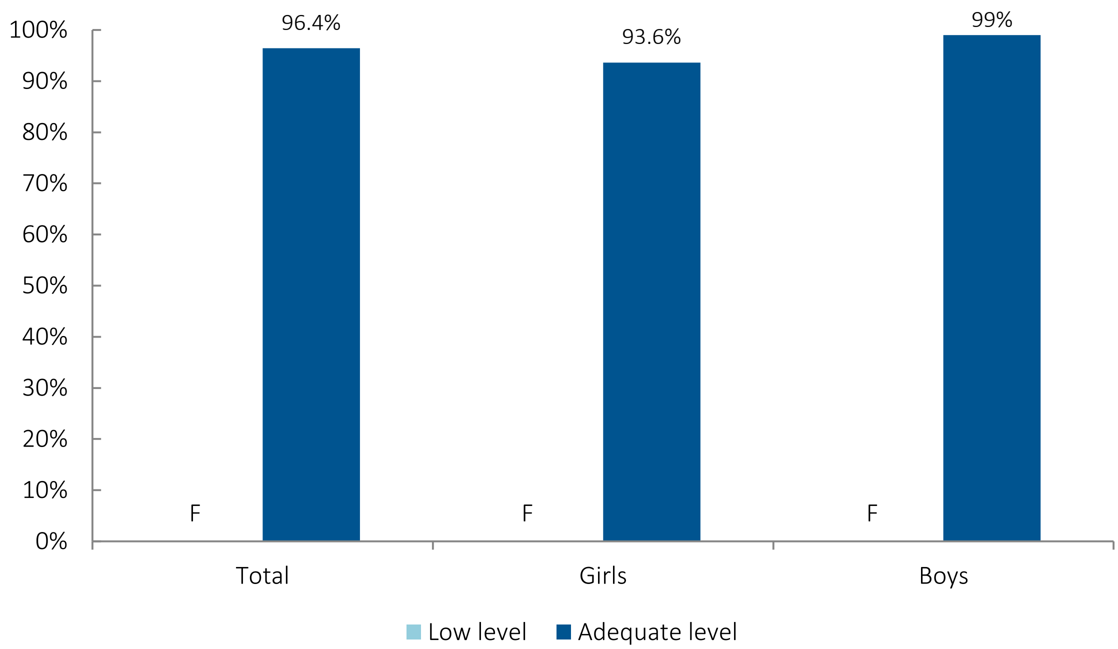
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 31: Thyroglobulin – Distribution of levels measured in the serum (µg/L) broken down by age of JES!-YEH! project participants



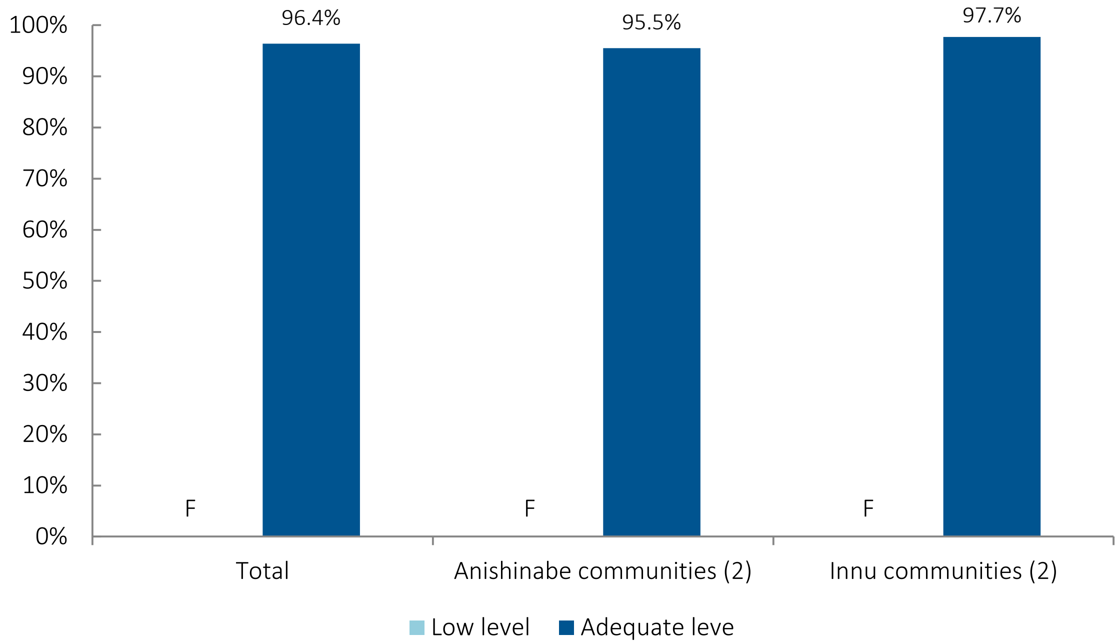
NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 32: Thyroglobulin – Distribution of levels measured in the serum (µg/L) broken down by gender of JES!-YEH! project participants



NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Figure 33: Thyroglobulin – Distribution of levels measured in the serum (µg/L) broken down by participating communities (Anishinabe and Innu) in the JES!-YEH! project



NB: F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

References

Cahoon, E.K., Rozhko, A., Hatch, M., Polyanskaya, O., Ostroumova, E., Tang, M., Nadirov, E., Yauseyenka, V., Savasteeva, I., McConnell, R.J., Pfeiffer, R.M., Brenner, A.V. (2013). Factors associated with serum thyroglobulin levels in a population living in Belarus. Clin. Endocrinol. (Oxf)., 79, 120-7.

Kapelari, K., Kirchlechner, C., Högler, W., Schweitzer, K., Virgolini, I., Moncayo, R. (2008). Pediatric reference intervals for thyroid hormone levels from birth to adulthood: a retrospective study. BMC Endocr. Disord., 27, 8-15.

Thyroid Foundation of Canada (2009a). Thyroid Diseases – Overview of thyroid function. Consulted online: https://thyroid.ca/resource-material/information-on-thyroid-disease/thyroid-disease-overview-of-thyroid-function/

Thyroid Foundation of Canada (2009b). Thyroid Disease. Know the facts! Consulted online: https://thyroid.ca/resource-material/information-on-thyroid-disease/thyroid-disease-know-the-facts/

Passeport Santé (2015). Analyses des hormones thyroïdiennes. Consulted online: www.passeportsante.net/fr/Maux/analyses-medicales/Fiche.aspx?doc=analyse-hormones-thyroidiennes

Pearce, E.N. (2014). Iodine Deficiency in Children. Endocr. Dev., 26, 130-8.

Zimmermann, M.B. (2009). Iodine Deficiency. Endocr. Rev., 30, 376-408.

Zimmermann, M.B., Aeberli, I., Andersson, M., Assey, V., Yorg, J.A., Jooste, P., Jukić, T., Kartono, D., Kusić, Z., Pretell, E., San Luis, T.O. Jr., Untoro, J., Timmer, A. (2013) Thyroglobulin is a sensitive measure of both deficient and excess iodine intakes in children and indicates no adverse effects on thyroid function in the UIC range of 100-299 µg/L: a UNICEF/ICCIDD study group report. J. Clin. Endocrinol. Metab., 98, 1271-80.

7.8. Conclusion for Nutritional Status and Health Indicators

Important Note for the Reader

Since this pilot project needed to include volunteer participants in two of the four project communities, <u>the data for the population aged 3 – 19 years in these communities is not necessarily representative and should be read with caution</u>. Furthermore, since the four communities that participated in the project were not chosen randomly, but were invited to participate voluntarily, these communities do not necessarily represent the nations to which they belong. Nevertheless, some significant trends emerge and are worthy of mention.

Among JES!-YEH! participants, the prevalences of iron deficiency and anemia (20.7% and 17.6% respectively) were greatly higher than in the CHMS (Copper et al., 2012). The situation was concerning in young girls 12 to 19 years old, since almost half of them had an iron deficiency (42.9%^{E}) and a quarter (26.2%^{E}) were anemic, especially in the participating Anishinabe communities (52.4%^{E} and 33.3%^{E} respectively). The prevalence of anemia in boys 6-11 years old was also high (20.9%^{E}). However, these results should be interpreted with caution, as their coefficients of variation were between 16.6 and 33.3%. According to the categories proposed by the WHO, the prevalence of anemia in girls 12-19 years old and boys 6-11 years old in the JES!-YEH! project, which was between 20 and 39%, represent a moderate public health problem.

Participants also had blood manganese levels that were 1 to 2 times higher than in the CHMS (CHMS, 2013), as was observed for adults in the FNBI (APN, 2013). Almost 12% of participants had levels that exceeded the Quebec thresholds in force for blood manganese at the time of the study in 2015 (INSPQ, 2004). However, these thresholds were removed by the Quebec *Ministère de la santé et des services sociaux* in December 2016 (INSPQ, 2016). The percentage of participants with high levels of manganese was similar among the Anishinabe and Innu communities involved in the project. Low concentrations of manganese in the hair and drinking water of these communities, as well as various investigations carried out with community and regional partners and Health Canada, support the hypothesis that there was no environmental source of exposure to manganese in the communities involved in the project. However, certain divalent metals, including manganese, cobalt, cadmium, lead, and zinc are known to interact with iron, as they share and compete for common routes of absorption. Consequently, iron deficiency may increase absorption of these metals in the bloodstream, especially if they are present in sufficient concentrations in food, which is generally the case with manganese, cobalt, and zinc (Flanagan et al., 1980; IOM, 2006; Meltzer et al., 2010). A negative correlation between blood manganese and serum ferritin was observed. It should be noted that participants also had urine cobalt levels that were higher than those in the CHMS and that their plasma zinc levels tended to be high. Further analyses will provide a better characterization of dietary intake of nutrients and vitamins among the participants in the JES!-YEH! project, as well as the protection and risk factors associated with iron deficiency, anemia, and excess blood manganese (taking blood lead, cadmium, cobalt, and zinc levels into account).

Almost 40% (39.1%) of participants in the JES!-YEH! project had urine iodine deficiencies (mild, moderate, and severe). In addition, 43.8% of participants (especially those 3-5 years old) had insufficient levels of vitamin A. For vitamin D, 29.2% had insufficient levels and 17.7% were deficient, especially youths 12-19 years old in the participating Innu communities. Furthermore, participants 12-19 years old had more deficient and insufficient in vitamin D levels than those in the same age group in the CHMS (Statistics Canada, 2015).

Body weight data showed very high prevalences of excess weight and obesity (27.0% and 40.8% respectively), especially in participants 12-19 years old. Furthermore, boys were more obese and the prevalences were particularly high in the participating Innu communities. Overall, these prevalences were 2 to 5 times higher than in the CHMS (Roberts et al., 2012). Furthermore, more than 90% of participants 3-5 years old had a waist/height ratio associated with abdominal obesity. The highest percentages of abdominal obesity were measured in the project's

Innu communities. Glycated hemoglobin and random glucose assays also identified two new probable cases of diabetes and one case of prediabetes among the participants in the JES!-YEH! study. In total, five potential or previously diagnosed cases of diabetes were observed among participants in the project.

These results highlight the importance of better understanding the determinants of healthy food environments in these communities, and the importance of implementing preventive measures at the individual, community, regional, and national level to fight this rapid increase in chronic diseases among First Nations youth.

References

AFN (Assembly of First Nations) (2013). First Nations Biomonitoring Initiative: National Results (2011). Ottawa: Assembly of First Nations (AFN). Consulted online: http://www.afn.ca/uploads/files/afn_fnbi_en.pdf

Cooper, M., Greene-Finestone, L., Lowell, H., Levesque, J., Robinson, S. (2012). "Iron Sufficiency of Canadians." Health Reports / Statistics Canada, Canadian Centre for Health Information = Rapports Sur La Santé / Statistique Canada, Centre Canadien D'information Sur La Santé, 23 (4), 41–48.

CHMS (Canadian Health Measures Survey (2013). Second Report on Human Biomonitoring of Environmental Chemicals in Canada. Ottawa: Government of Canada. Consulted online:https://www.canada.ca/content/dam/hc-sc/migration/hc-sc/ewh-semt/alt_formats/pdf/pubs/contaminants/chms-ecms-cycle2/chms-ecms-cycle2-eng.pdf.

Flanagan, P.R., Haist, J., Valberg, L.S. (1980) Comparative effects of iron deficiency induced by bleeding and a low-iron diet on the intestinal absorptive interactions of iron, cobalt, manganese, zinc, lead and cadmium. J Nutr., 110 (9), 1754-63.

INSPQ (Institut national de santé publique du Québec) (2004). Substances chimiques avec indicateur biologique: seuils de déclaration par les laboratoires. Government of Quebec. Consulted online: www.inspq.qc.ca/pdf/publications/327-SeuilsDeclarationLabo-RapporFinal.pdf

INSPQ (Institut national de santé publique du Québec) (2016). Maladies à déclaration obligatoire d'origine chimique: révision des seuils de déclaration par les laboratoires. Government of Quebec. Consulted online: www.inspq.qc.ca/pdf/publications/2151_maladies_declaration_obligatoire_chimique.pdf

IOM (Institute of Medicine) (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. The National Academies Press, Washington, DC, 1334p. Consulted online: www.nap.edu/catalog/11537/dietary-reference-intakes-the-essential-guide-to-nutrient-requirements

Meltzer, H.M., Brantsaeter, A.L., Borch-Iohnsen, B., Ellingsen, D.G., Alexander, J., Thomassen, Y., Stigum, H., Ydersbond, T.A. (2010) Low iron stores are related to higher blood concentrations of manganese, cobalt and cadmium in non-smoking, Norwegian women in the HUNT 2 study. Environ Res., 110 (5), 497-504.

WHO (World Health Organization (2001). Iron Deficiency Anaemia: Assessment, Prevention and Control, A guide for program managers. A guide for programme mangers. Consulted online: www.who.int/nutrition/publications/micronutrients/anaemia_iron_deficiency/WHO_NHD_01.3/en/

Roberts, K.C., Shields, M., de Groh, M., Aziz, A., Gilbert, J.-A. (2012). Overweight and obesity in children and adolescents: Results from the 2009 to 2011 Canadian Health Measures Survey. Health Rep., 23, 37-41.

Statistics Canada (2015). Vitamin D levels of Canadians, 2012 to 2013. Consulted online: http://www.statcan.gc.ca/pub/82-625-x/2014001/article/14125-eng.htm

8. Results for other Health Determinants

The third objective of the JES!-YEH! project was to document the health determinants considered priorities by Band Councils, health centre directors, or other partners in the communities, or those that have been identified in the scientific literature. As a result, this section is an overview of the data on health perceptions, housing conditions, food security, and eating habits, particularly the consumption of traditional foods, as well as the practice of traditional activities. Finally, data on the consumption of store-bought foods and the consumption of water and sugary drinks are also presented in this section.

8.1. Perceived health

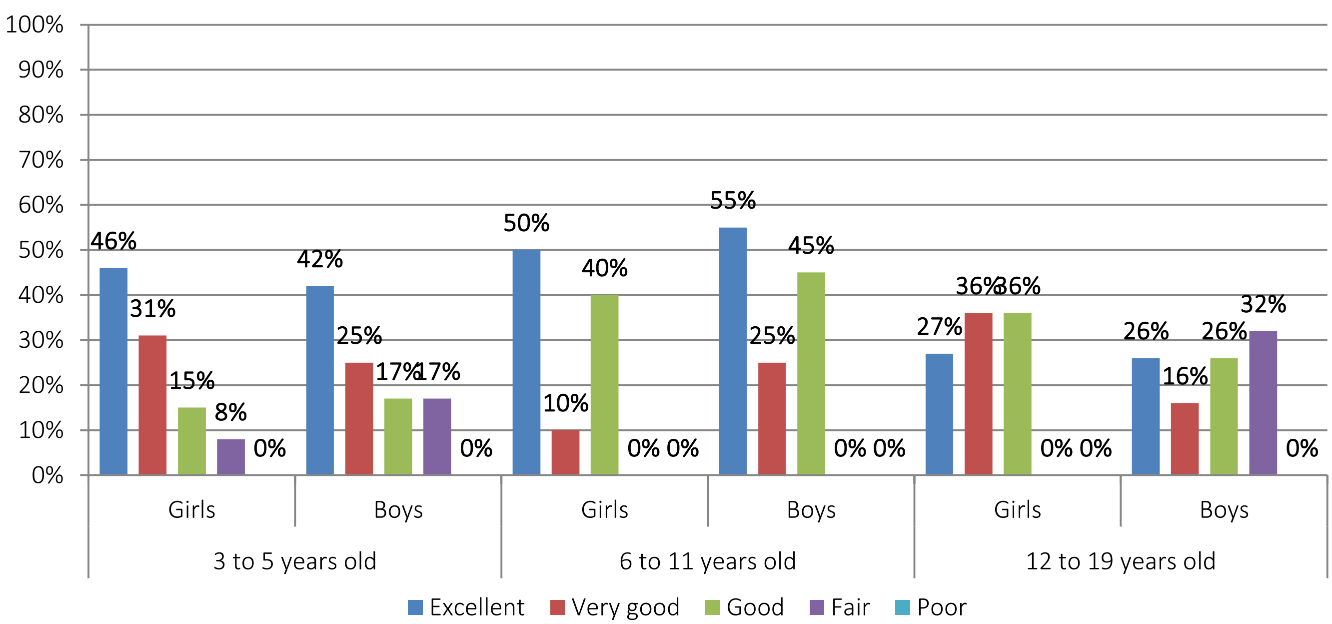
Why documenting perceived health?

Health perception refers to the way in which a person perceives their general state of health. This is an interesting variable to measure in the population, since the self-assessment of health can be a reflection of certain psychological symptoms or aspects related to health. Perceived health has also been tied to morbidity and mortality in a population, and is an indicator that is frequently used in health surveys (Levasseur, 1995; Statistics Canada, 2016).

Results

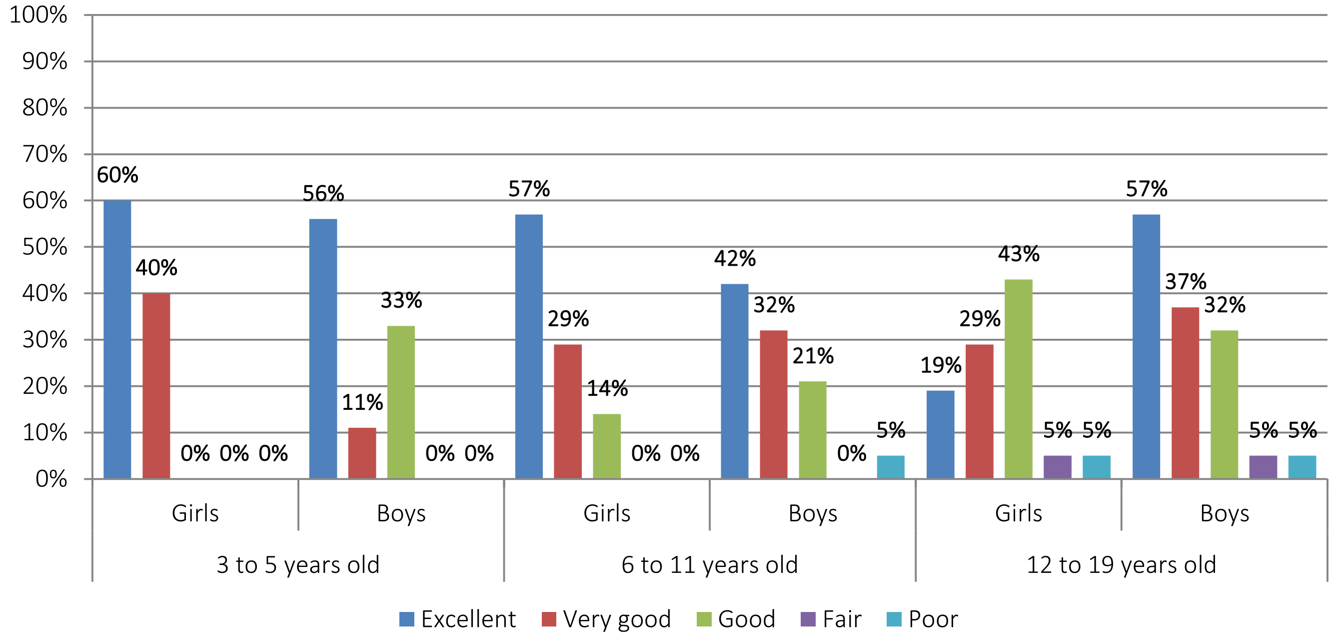
Generally, as indicated in Figure 34, the health of young girls and boys 3-11 years old in the participating Anishinabe communities was considered to be “excellent” by a large proportion of the children’s parents or guardians. In participants 12-19 years old, whose health could be self-assessed (18-19 years old) or reported by their parents or guardians (12-17 years old), health was most often assessed as “very good” or “good” in girls (good: 36%, very good: 36%) and “satisfactory” (32%) for boys in the same age group.

Figure 34: Self-assessed or perceived health of participants from the Anishinabe communities involved in the JES!-YEH! project (n=111)



In the participating Innu communities (Figure 35), the health of youths was most often perceived as “excellent” for young girls and boys 3-11 years old, as well as for boys 12-19 years old. In girls 12-19 years old, self-assessed health or health reported by parents and guardians was most frequently considered to be "good"; only 19% of girls in this age group perceived their health as "excellent." Furthermore, health was self-assessed or perceived to be poor by 5% of participants in boys 6-11 years old and in girls and boys 12-19 years old.

Figure 35: Self-assessed or perceived health of participants from the Innu communities involved in the JES!-YEH! project (n=87)



References

Levasseur, M. (1995). Perception de l'état de santé. Rapport de l'Enquête sociale et de santé 1992-1993. Québec; Santé Québec, Ministère de la Santé et des Services sociaux, Government of Quebec. Volume I. Chapter 11, pp.199-209.

Statistics Canada (2016). Perceived health. Consulted online: https://www150.statcan.gc.ca/n1/pub/82-229-x/2009001/status/phx-eng.htm

8.2. Housing Conditions

Why document housing conditions?

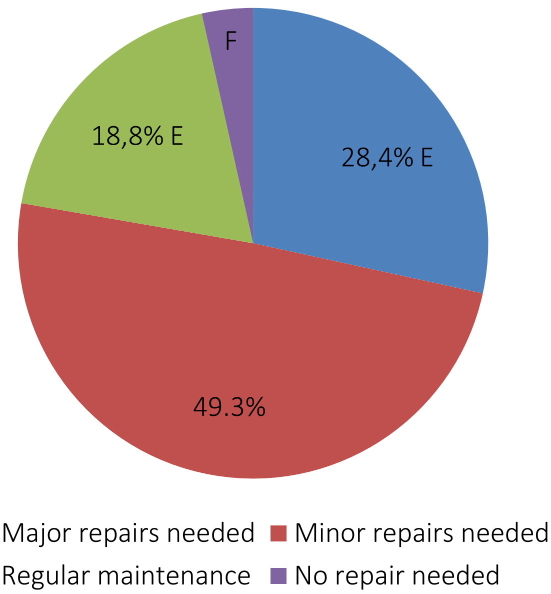
In general, children spend more time in their home than anywhere else. Studies have shown that housing conditions are associated with children's health through two key mechanisms. On the one hand, poor housing conditions may contribute to the transmission of infections, and on the other hand, overcrowding leads to an increased amount of human contact, which may affect mental health (higher noise level, lack of intimacy, physical and psychological withdrawal, aggression, depression, ability to concentrate), among other things (Bailie, Stevens and McDonald, 2011). The presence of mould may also decrease air quality in dwellings and may cause irritation in the eyes, nose, and throat, allergic rhinitis, as well as asthma in youths who are exposed to it (INSPQ, 2002).

Results – participating Anishinabe communities

In both participating Anishinabe communities, 34.9% of housing was considered to be overcrowded (data not shown). This is therefore a higher prevalence compared to the data reported for the Anishinabe nation (6.0%) in the Quebec First Nations Regional Health Survey (RHS) conducted in 2008 (RHS, 2008). For comparison, according to the Quebec First Nations Regional Early Childhood, Education and Employment Survey (REEES) conducted in 2014-2015, the proportion of children younger than five who live in overcrowded housing was 25.4% for Quebec First Nations (REEES, 2017). The prevalence of overcrowding reported in the 2011 National Household Survey for First Nations living on reserves in Canada (27.2%) was also lower than the prevalence measured in this project (Statistics Canada, 2011). For reference, in Canadian cities, the prevalence of overcrowded housing in 2011 was 4% (Statistics Canada, 2011).

As shown in Figure 36, in the participating Anishinabe communities, 28.4%^{E} of housing was assessed as needing major repairs, which is higher than the data on housing repair needs for the Anishinabeg nation in the RHS (22.4% requiring major repairs) (RHS, 2008). However, these data from the JES!-YEH! project should be interpreted with caution, because the coefficient of variation was between 16.6 and 33.3%. As a comparison, the Canada-wide data for 2011 indicate that among First Nations living on reserves, the need for major repairs was 42.7%, while in Canadian cities, this need was 7.0% (Statistics Canada, 2011). In the participating Anishinabe communities, traces of mould were reported in 64.7% of housing over the last twelve months (data not shown), while in the RHS, 40.0% of housing in the Anishinabe communities were reported to have traces of mould (RHS, 2008).

Figure 36. Distribution of participants in the Anishinabe communities involved in the JES!-YEH! project (n=111) broken down by housing repair needs



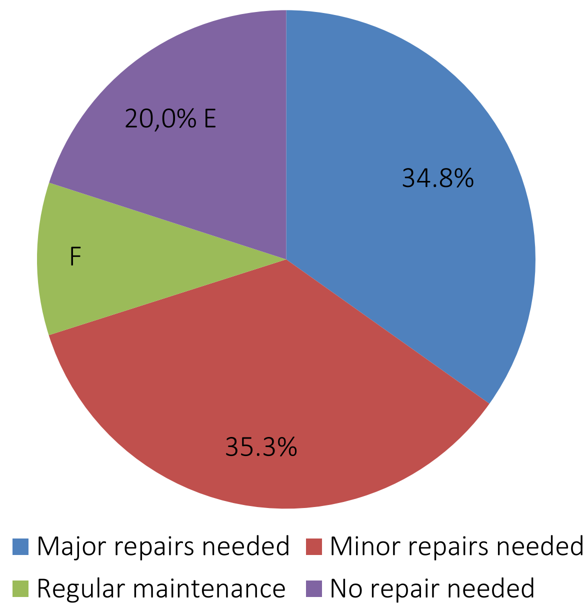
E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Results – participating Innu communities

For the participating Innu communities, the percentage of overcrowded housing measured by the JES!-YEH! project was 18.9%[E], but because the coefficient of variation was between 16.6 and 33.3%, these data should be interpreted with caution (data not shown). This prevalence is higher than that reported in the RHS for Innu communities in 2008 (8.0%), but lower than that reported in children younger than five in the REEES (25.4%) (REEES, 2014; RHS, 2008). It was also lower than the percentage reported by the National Household Survey for First Nations living on reserves in Canada (27.2%), but higher than that for Canadian cities (4.0%) (Statistics Canada, 2011).

As shown in Figure 37, more than one-third of housing (34.8%) in the participating Innu communities was reported as needing major repairs, which is a higher percentage than that reported in the RHS for the Innu nation (27.1%) (RHS, 2008). However, the need for major repairs in housing for First Nations living on reserves in Canada was higher (42.7%) (Statistics Canada, 2011). In the participating Innu communities, traces of mould were reported in 40.4% of housing over the last twelve months (data not shown), while in the RHS, 28.3% of housing in the Innu communities were reported to have traces of mould (RHS, 2008).

Figure 37. Distribution of participants in the Innu communities involved in the JES!-YEH! project (n=87) broken down by housing repair needs



E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

References

Bailie, R.S., Stevens, M., McDonald, E.L. (2011). The impact of housing improvement and socio-environmental factors on common childhood illnesses: a cohort study in Indigenous Australian communities. J. Epidemiol. Community Health, 66 (9), 821-31.

RHS (Quebec First Nations Regional Health Survey) (2008). Chapter 2 - Housing. First Nations of Quebec and Labrador Health and Social Services Commission, Wendake. 54p. Consulted online: http://cssspnql.com/docs/centre-de-documentation/chapitre-2-eng.pdf?sfvrsn=2

REEES (Quebec First Nations Regional Early Childhood, Education and Employment Survey) (2017). Overview of Families. First Nations of Quebec and Labrador Health and Social Services Commission, Wendake. 12p. Consulted online: http://cssspnql.com/docs/default-source/EREEE-2014/cahier_ereee_portrait_familles_eng2.pdf?sfvrsn=2

INSPQ (Institut national de santé publique du Québec) (2002). Les risques à la santé associés à la présence de moisissures en milieu intérieur. Consulted online: www.inspq.qc.ca/pdf/publications/126_RisquesMoisissuresMilieuInterieur.pdf

Statistics Canada (2011). 2011 National Household Survey. Consulted online: http://www.statcan.gc.ca/pub/89-645-x/2015001/housing-logement-eng.htm

8.3. Food Security

What is food security and why should it be documented?

According to Statistics Canada (2016), a household is in a situation of food security "when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life". On the contrary, a household is in a situation of moderate food insecurity when there are signs that the quality or quantity of food consumed is compromised (CCHS, 2015). Food insecurity is said to be severe when there are signs of reduced food intake and a disruption in eating habits (skipped meals, reduced food consumption, and at the extreme end, missing meals for a full day or more) (CCHS, 2015; INSPQ, 2014). Several studies have shown that there is a relationship between households in a situation of food insecurity and negative effects on the physical health, behaviour, and development of children who live there (Ke, 2015).

How was food security measured?

As part of the JES!-YEH! research project, food security was measured using a standardized index, i.e. the United States Department of Agriculture (USDA) index. The short version of this index included 6 questions and is used to assess whether a household has experienced food security or insecurity over the past 12 months. According to the score obtained on this index, insecurity is defined as moderate or severe. The food security index represents the condition of members of the household as a group, not the condition of each member of the household individually. It is generally agreed that food insecurity affects all members of a household, but not necessarily in the same way (CCHS, 2015).

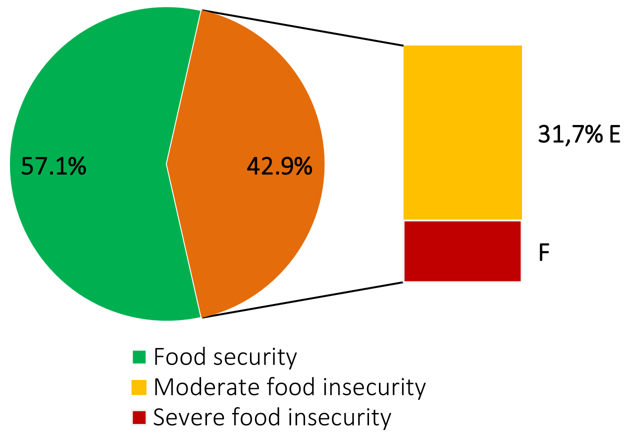
It should be noted that the questions on this index are about the financial ability to purchase food. Therefore, this index does not take into account the Indigenous context, food provided by hunting, fishing, trapping, and harvesting, and sharing of traditional food among households. However, the results of research conducted in an Indigenous context show that a lack of financial resources for purchasing store-bought food also generally indicates a lack of financial resources required to practice hunting or fishing (e.g. purchasing equipment, transportation, gas) (Furgal and Pirkle, pers. comm.). An additional question was therefore added to the food security questionnaire in the JES!-YEH! project in an attempt to cover this potential bias, i.e. "Are you able to obtain the quantity of traditional food that you want or need?".

Results

Food security – participating Anishinabe communities

As shown in Figure 38, the majority (57.1%) of participants in the Anishinabe communities lived in households with food security. However, 42.9% of them were in a situation of food insecurity and 31.7%^{E} were experiencing moderate food insecurity. Since the coefficient of variation for this result was between 16.6 and 33.3%, these results should be interpreted with caution. These results are comparable to those of the RHS in 2008, which indicates that among the Anishinabeg, 42.1% of adults living in a household with children were experiencing moderate or severe food insecurity (RHS, 2008). In comparison, the Canadian Community Health Survey (CCHS) reported that 33% of Indigenous households experienced food insecurity in 2004 (19% moderate food insecurity and 14% severe insecurity), unlike non-Indigenous households in the country, which had prevalence of food insecurity of 8.8% and 8.3% in 2004 and 2011-2012 respectively (CCHS, 2007, 2015).

Figure 38. Distribution of participants from the Anishinabe communities involved in the JES!-YEH! project (n=111) broken down by household food security

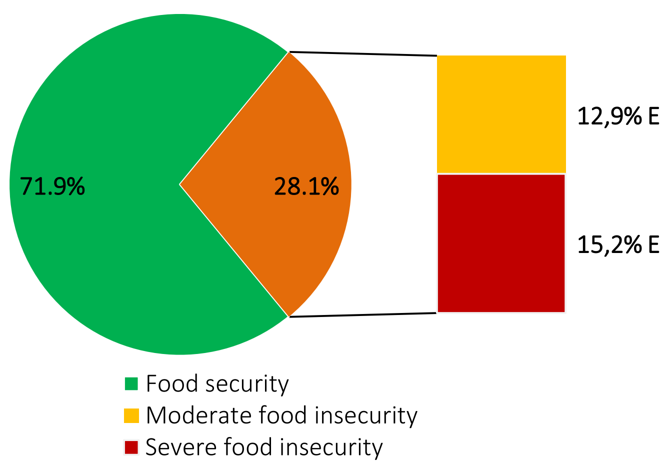


E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.
F means that the study estimates were too uncertain to be published. The associated coefficients of variation are higher than 33.3%.

Food security – participating Innu communities

In the JES!-YEH! study, 71.9% of participants in the Innu communities lived in households with food security. However, 28.1% were experiencing food insecurity, i.e. 12.9%[E] in moderate food insecurity and 15.2%[E] in severe food insecurity (Figure 39). These latter two estimates should be interpreted with caution, since their coefficients of variation were between 16.6 and 33.3%. The percentage of food insecurity in the participating Innu communities was higher than that reported in the RHS for Innu households with adults living with children, i.e. 24.7% (RHS, 2008). For reference, the latest Canadian data show that 33.3% of Indigenous households were experiencing food insecurity, compared to 8.3% of non-Indigenous households (CCHS, 2007; 2015).

Figure 39. Distribution of participants from the Innu communities involved in the JES!-YEH! project (n=87) broken down by household food security



E means that the study estimates should be used with caution. The associated coefficients of variation are between 16.6 and 33.3%.

Access to traditional foods

The data show that for the Anishinabe and Innu communities involved in the project, almost half of participants lived in households were they *often* reported being able to obtain the desired quantity of traditional food or the quantity of food that the household needed (Anishinabeg: 53.2%; Innus: 49.4%). However, in some families, access to traditional food did not always seem to be easy, as 37.8 % of participants in the Anishinabe communities and 46.0% of participants in the Innu communities stated that their households only *sometimes* obtained the necessary amount of traditional food. Furthermore, access to traditional food was considered insufficient (*never*) for 7.2% of Anishinabe participants and 1.1% of Innu participants in the JES!-YEH! project.

References

RHS (Quebec First Nations Regional Health Survey) (2008). Chapter 7 – Food and Physical Activity. First Nations of Quebec and Labrador Health and Social Services Commission, Wendake. 104p. Consulted online: http://www.cssspnql.com/docs/centre-de-documentation/chapitre-7-alimentation-activite-physique-eng-v2.pdf?sfvrsn=2

CCHS (Canadian Community Health Survey Cycle) (2015). Household food insecurity, 2011-2012. Statistics Canada, Ottawa. Consulted online: https://www.statcan.gc.ca/pub/82-625-x/2013001/article/11889-eng.htm

CCHS (Canadian Community Health Survey Cycle 2.2) (2007). Nutrition (2004): Income-Related Household Food Security in Canada. Government of Canada, Health Canada, Ottawa. Consulted online: https://www.canada.ca/en/health-canada/services/food-nutrition/food-nutrition-surveillance/health-nutrition-surveys/canadian-community-health-survey-cchs/canadian-community-health-survey-cycle-2-2-nutrition-2004-income-related-household-food-security-canada-health-canada-2007.html#fig3.3

INSPQ (Institut national de la santé publique du Québec) (2014). L'insécurité alimentaire dans les ménages québécois: mise à jour et évolution de 2005 à 2012. Surveillance des habitudes de vie, Numéro 4. Institut national de santé publique (INSPQ), Government of Quebec, Quebec. 12p. Consulted online: www.inspq.qc.ca/pdf/publications/1858_Insecurite_Alimentaire_Quebecois.pdf

Ke, J., Ford-Jones, E.L. (2015). Food insecurity and hunger: A review of the effects on children's health and behaviour. Paediatrics & Child. Health, 20 (2), 89–91.

Statistics Canada (2016). Indicators based on Statistics Canada surveys. Consulted online: http://www.statcan.gc.ca/pub/82-221-x/2013001/quality-qualite/qua4-eng.htm

8.4. Traditional Foods and Activities

8.4.1. Traditional Activities and Foods

Why document the practice of traditional activities and the consumption of traditional foods?

Traditional Indigenous foods come from fauna or flora and their composition varies based on several factors, including the geographic location of the communities and seasons (Willows, 2005). A diet based on traditional foods is generally high in protein and nutrients (Compher, 2006; Samson and Pretty, 2006; Willows, 2005). Furthermore, it has been demonstrated that including traditional foods in a diet composed of store-bought food improves the quality of the diet (CINE, 2017). A healthy and diverse diet is essential for the proper development of children.

These days, traditional food is no longer the main source of food for most members of the First Nations. However, although the consumption of traditional foods has decreased, Indigenous People still practice hunting, fishing, trapping and harvesting for their families and they also share their harvests within their communities (Redwood et al., 2008; Samson and Pretty, 2006). Therefore, it is important to recognize the consumption of these foods because they are an integral part not only of the dietary profile of Indigenous Peoples, but also of Indigenous culture. Furthermore, the traditional activities involved in obtaining these foods contribute to an active lifestyle, and beyond their health benefits, the practice of these activities is important for cultural identity, knowledge of the region and spirituality (Bellamy and Hardy, 2015; Yukon Health and Social Services, 2012).

The purpose of this section is therefore to document the practice of traditional activities as well as the frequency of consumption of traditional foods over the past twelve months, by season, broken down into 5 categories of foods: game, fish, seafood (only for the participating Innu communities), wild birds, and wild berries.

How were the practice of traditional activities and the consumption of traditional foods measured?

Data collection

The practice of traditional activities was measured to observe what percentage of participants and their parents or guardians had hunted, trapped, fished, harvested, or gardened over the past year.

The consumption of traditional foods was measured to assess the proportion (yes/no) of participants who had access to these foods and the frequency of this access (number of times/day). Data on traditional foods was collected using a dietary frequency questionnaire (Appendix C), for each season over the past year (spring: March 21 to June 20, summer: June 21 to September 20, fall: September 21 to December 20, winter: December 21 to March 20). Traditional foods were grouped into categories: fish, game, wild birds, wild berries, and seafood (for the participating Innu communities only). It is important to note that certain harvest seasons took place between two seasons, and thus the frequency provided by the participants could reflect the specific time of harvest rather than an average for the entire season, particularly for berries such as blueberries and lingonberries (also known as redberries).

Furthermore, there may be a risk of recollection bias in such a questionnaire, because the participants are required to remember their dietary consumption over the past year and by season, which may be difficult. Moreover, since the information for the participants was reported by their parents or guardians in most cases (for all participants 3 to 13 years old and some participants 14-17 years old, although the latter were encouraged to answer on their own), they may not have had a detailed picture of how frequently they consumed traditional foods, as their children may have had access to certain foods outside of the home (e.g.: traditional meal at school, dinner at a relative or friend's home, etc.). Therefore, they might have underestimated their children's intake of traditional foods. However, the parents or legal guardians were identified as being in the best position to provide the research team with information about their children's diet, given that they are responsible for meals and providing food. Participants 18-19 years of age answered the questions themselves. In summary, although the data collected was limited in some ways, the fact remains that they provide an overall picture of the consumption of traditional foods among these young participants.

Data analysis

The proportion of participants who consumed various traditional foods (yes/no) was measured to assess the foods most commonly consumed in the participating Anishinabe and Innu communities. The frequency of food consumption (number of times/day) was also measured for each season, and a GM as well as a 95% CI were also calculated.

The consumption frequency scale below (Table 285) was used to analyze consumption frequency, i.e. a numeric value in terms of frequency per day was associated with each frequency interval. Each value corresponds to the median value of each interval.

Table 285: Scale used for the traditional food consumption questionnaire

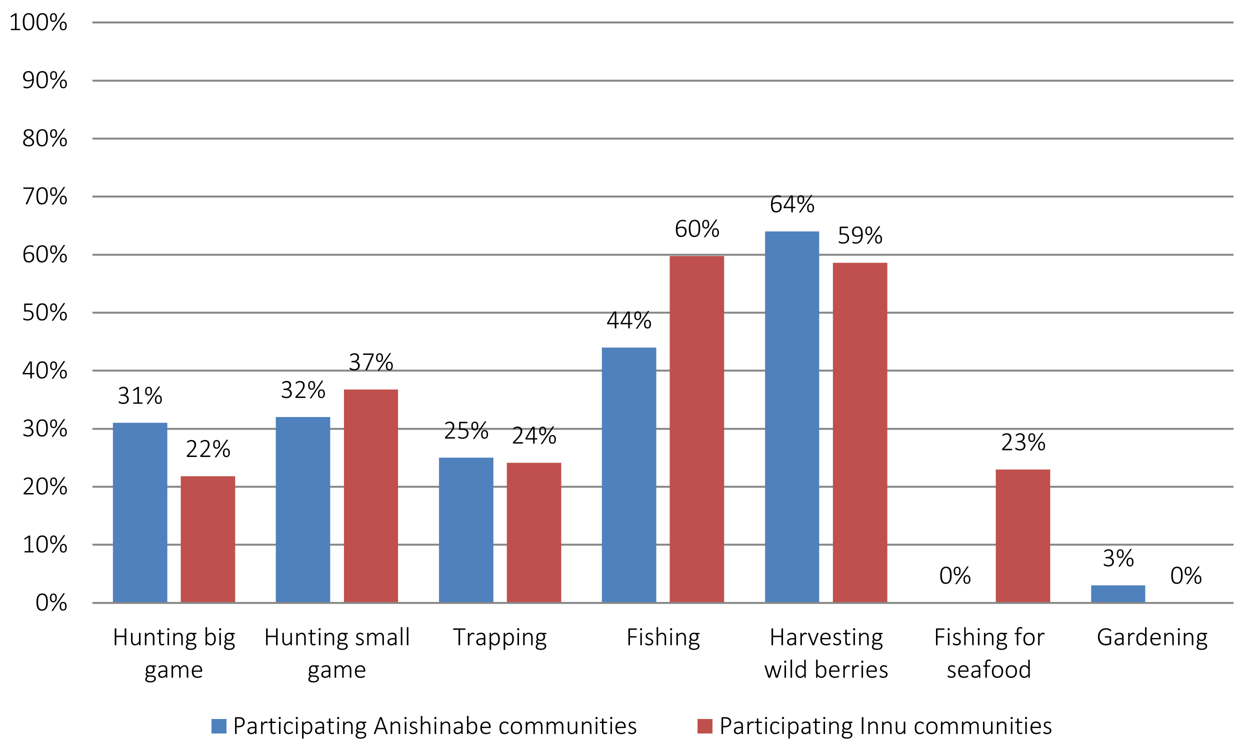
Consumption frequency	2 to 3 times per day	1 time per day	5 to 6 times per week	2 to 4 times per week	1 time per week	1 to 3 times per month	Never/ less than 1 time per month
Numeric value corresponding to the number of times per day	2.50 times/day	1.00 time/day	0.79 times/day	0.43 times/day	0.14 times/day	0.07 times/day	0.00 times/day

Results

Practice of traditional activities

The traditional activity practiced most often by the Innu and Anishinabe communities that participated in the study was harvesting wild berries, followed by fishing (Figure 40). Few participants mentioned gardening. Almost a quarter of participants in the Innu communities fished for seafood. The percentage for other activities, i.e. hunting large and small game, as well as trapping, varied between 22 and 37% for both the Anishinabe and Innu communities involved in the project.

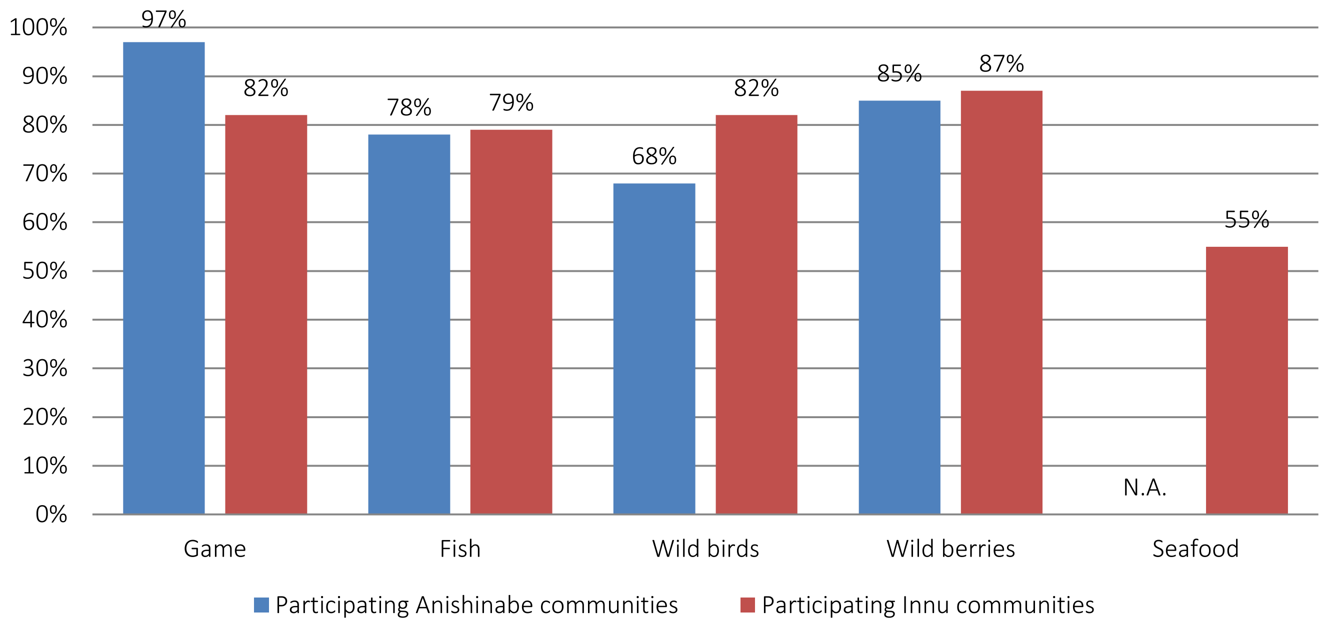
Figure 40: Percentage of participants in the JES!-YEH! project who practiced traditional activities over the year preceding the data collection, broken down by participating communities (Innu (n=87) and Anishinabe (n=111))



Consumption of the various categories of traditional food

Figure 41 illustrates the proportion of participants who consumed traditional foods at least once in the year preceding data collection. Almost all of the participants from the Anishinabe communities had consumed game (97%) and wild berries (85%) at least once, while a smaller percentage had consumed wild birds (68%). In the participating Innu communities, the percentage of traditional food consumption for game, fish, birds, and wild berries was rather similar, around 80%, while just over half of participants had consumed locally harvested seafood (55%) (Figure 41).

Figure 41: Percentage of participants in the JES!-YEH! project who consumed traditional foods broken down by participating community (Innu (n=87) and Anishinabe (n=111))



Although the percentage of traditional food consumption seems high, the frequency of consumption of these foods should also be taken into consideration, in order to assess their contribution to the overall diet of participants. The following section assesses the frequency of consumption of various traditional foods in greater detail, broken down by the nations involved in the project.

Detailed traditional food consumption – participating Anishinabe communities

Table 286 illustrates the proportion of participants from both Anishinabe communities who consumed various traditional foods (at least once) and the frequency of consumption per season in the year preceding data collection. Only the traditional foods consumed by more than 10% of participants are presented here. The average total consumption of traditional foods on an annual basis was 0.37 times/day (CI 95%: 0.28 - 0.48 times/day), or approximately two and a half times per week.

For each category (i.e. fish, game, birds, and wild berries), the food consumed most frequently is given in more detail in the following figures, i.e. walleye, moose meat, partridge, and blueberries (Figures 42 to 45).

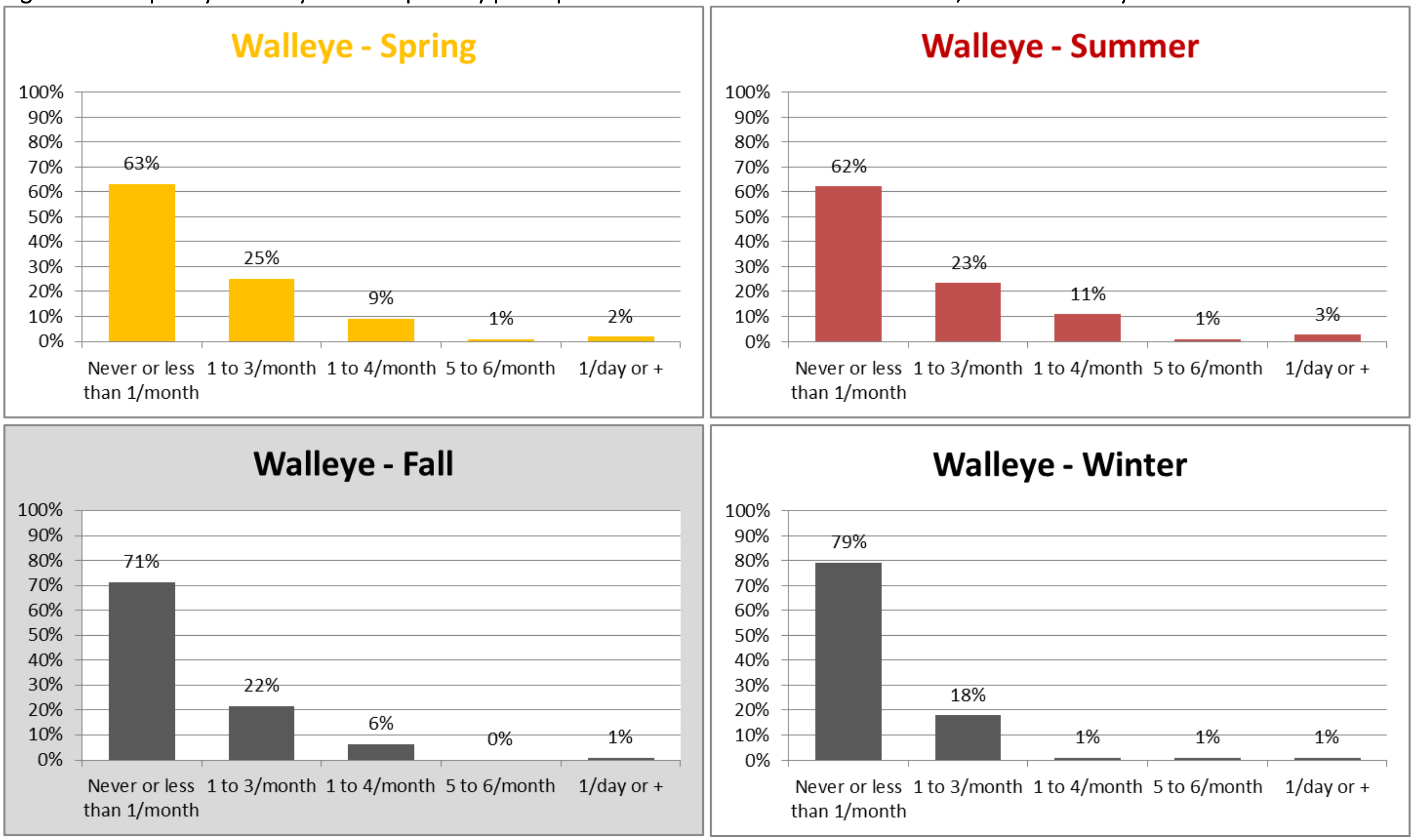
Table 286: Proportions and geometric means for the frequency of traditional food consumption by participants in the Anishinabe communities involved in the JES!-YEH! project (n=111)

Traditional foods	Proportion (%)	Geometric mean (CI 95%)			
		Spring	Summer	Fall	Winter
Moose (meat)	97	0.14 [0.09 – 0.18]	0.12 [0.07 – 0.16]	0.16 [0.12 – 0.21]	0.12 [0.08 – 0.16]
Blueberry	85	0.01 [0.00 – 0.02]	0.21 [0.16 – 0.27]	0.01 [0.01 – 0.02]	0.01 [0.01 – 0.02]
Walleye	73	0.07 [0.04 – 0.11]	0.08 [0.04 – 0.12]	0.04 [0.02 – 0.06]	0.03 [0.01 – 0.04]
Hare (meat)	63	0.01 [0.00 – 0.02]	0.00 [0.00 – 0.00]	0.02 [0.01 – 0.03]	0.05 [0.03 – 0.08]
Beaver (meat)	62	0.01 [0.00 – 0.03]	0.01 [0.01 – 0.02]	0.01 [0.01 – 0.02]	0.03 [0.01 – 0.05]
Partridge	57	0.02 [0.01 – 0.03]	0.01 [0.00 – 0.02]	0.04 [0.02 – 0.06]	0.02 [0.01 – 0.04]
Goose (Canada goose)	43	0.01 [0.01 – 0.02]	0.00 [0.00 – 0.00]	0.01 [0.00 – 0.01]	0.00 [-0.00 – 0.00]
Lake sturgeon	31	0.01 [0.00 – 0.02]	0.01 [-0.00 – 0.02]	0.00 [0.00 – 0.01]	0.00 [-0.00 – 0.00]
Moose (liver)	31	0.01 [0.00 – 0.02]	0.01 [-0.00 – 0.01]	0.02 [0.00 – 0.03]	0.01 [0.00 – 0.01]
Spruce grouse	31	0.01 [0.00 – 0.02]	0.01 [0.00 – 0.02]	0.03 [0.01 – 0.05]	0.02 [0.00 – 0.04]
Raspberry	28	0.00 [-0.00 – 0.01]	0.06 [0.03 – 0.09]	0.00 [-0.00 – 0.01]	0.00 [-0.00 – 0.01]
Moose (kidneys)	20	0.00 [0.00 – 0.01]	0.00 [-0.00 – 0.00]	0.01 [0.00 – 0.02]	0.00 [0.00 – 0.01]
Strawberry	14	0.01 [-0.00 – 0.02]	0.04 [0.01 – 0.08]	0.00 [-0.00 – 0.01]	0.00 [-0.00 – 0.01]
Northern pike	12	0.00 [-0.00 – 0.01]	0.01 [-0.00 – 0.03]	0.01 [-0.00 – 0.01]	0.00 [-0.00 – 0.00]

Fish

In the participating Anishinabe communities, the results show that 78% of participants had consumed local fish in the year preceding the study, at an average frequency of 0.08 times per day (approximately twice per month). The fish consumed most often was walleye (73% of participants), lake sturgeon (31%), and northern pike (12%). Figure 42 illustrates the frequency of consumption of walleye per season. In general, walleye consumption was higher in the summer and spring; 38% and 37% of participants had consumed walleye respectively (1 to 3 times per month or more), while the proportion of participants decreased to 29% in the fall and 11% in the winter (Figure 42).

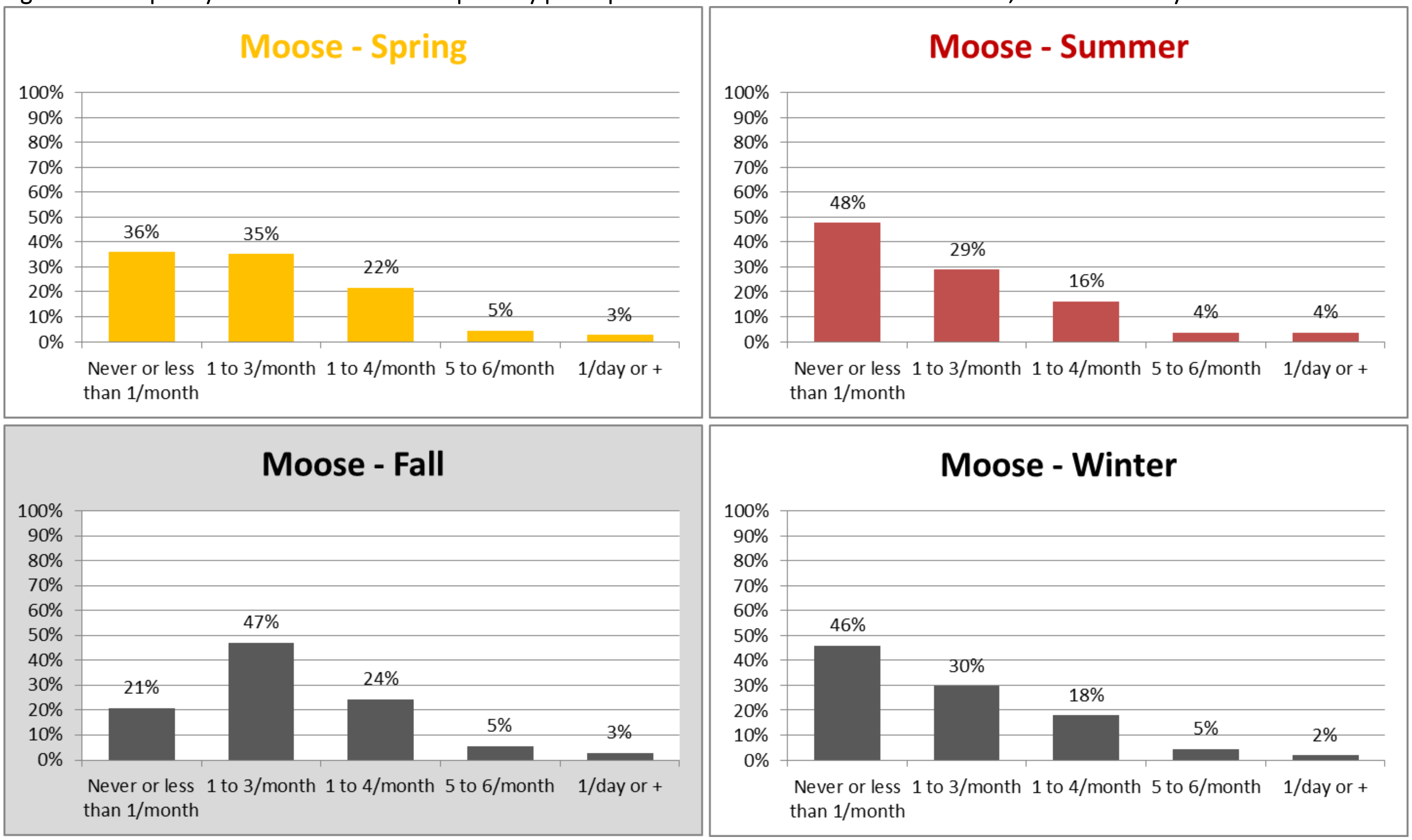
Figure 42: Frequency of walleye consumption by participants from the Anishinabe communities, broken down by season



Game

In the Anishinabe communities involved in the JES!-YEH! project, 97% of participants had consumed game in the year preceding the study, on average around 0.18 times/day, or just over once per week. The types of game consumed most often by participants were moose (97%), hare (63%), and beaver (62%) meat. Figure 43 illustrates the frequency of moose consumption per season. Moose was the traditional food consumed most often by participants in the Anishinabe communities (all foods combined), and consumption was especially high in the spring and fall. Over this period, the majority of participants had consumed moose 1 to 3 times per month or more (65% in the spring and 79% in the fall) (Figure 43).

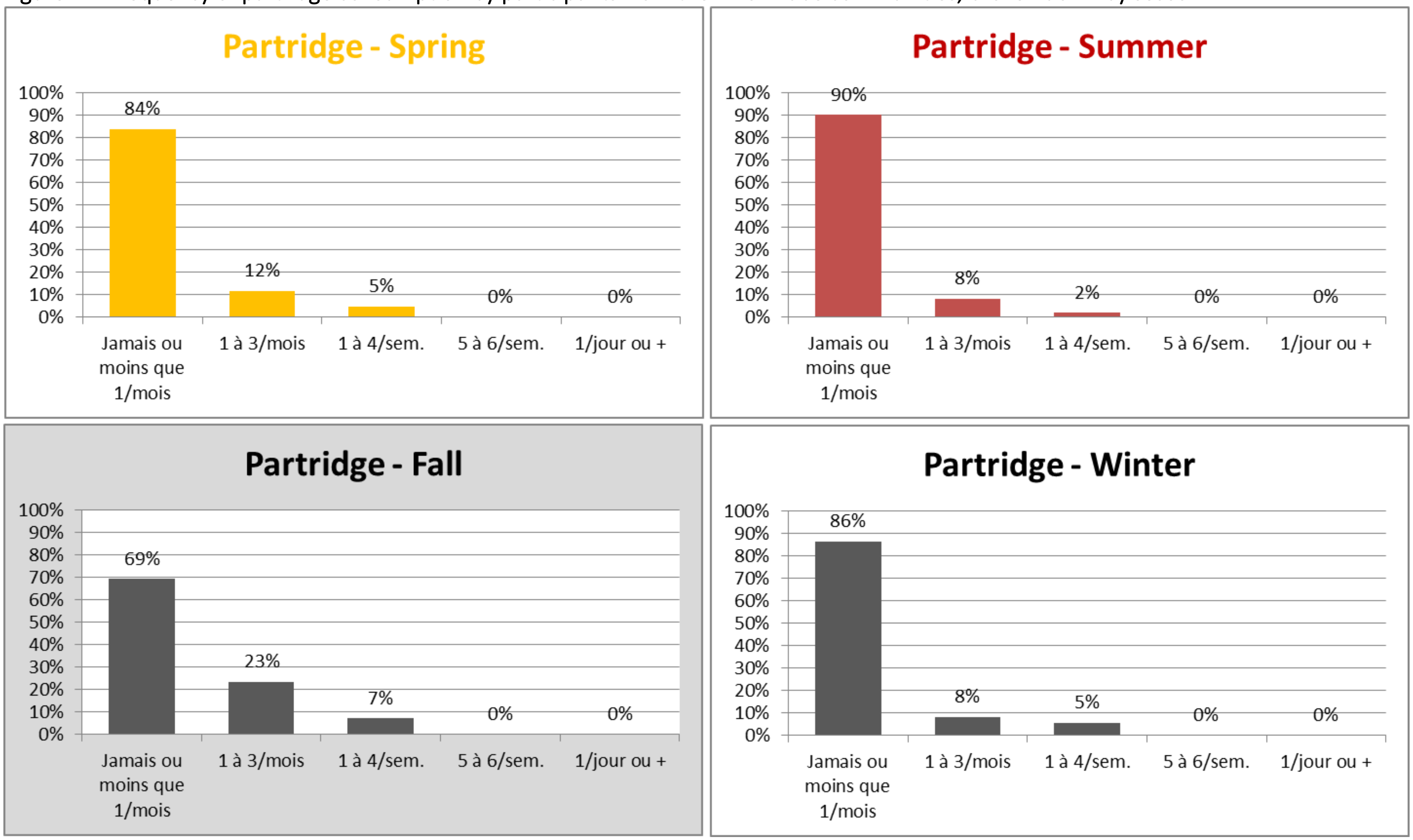
Figure 43: Frequency of moose meat consumption by participants from the Anishinabe communities, broken down by season



Wild birds

The wild birds consumed most often by participants from the Anishinabe communities were partridge (57%), goose (43%), and spruce grouse (31%). The average frequency of consumption was 0.05 times per day, or between one and two times per month, and 68% of participants had consumed wild birds in the year preceding the study. Figure 44 illustrates the frequency of partridge consumption per season. The percentage of partridge consumption was higher in the fall (30% of participants), but in the majority of cases (23%), consumption was 1 to 3 times per month. Consumption decreased to 17% in the spring, 12% in the winter, and 10% in the summer (Figure 44).

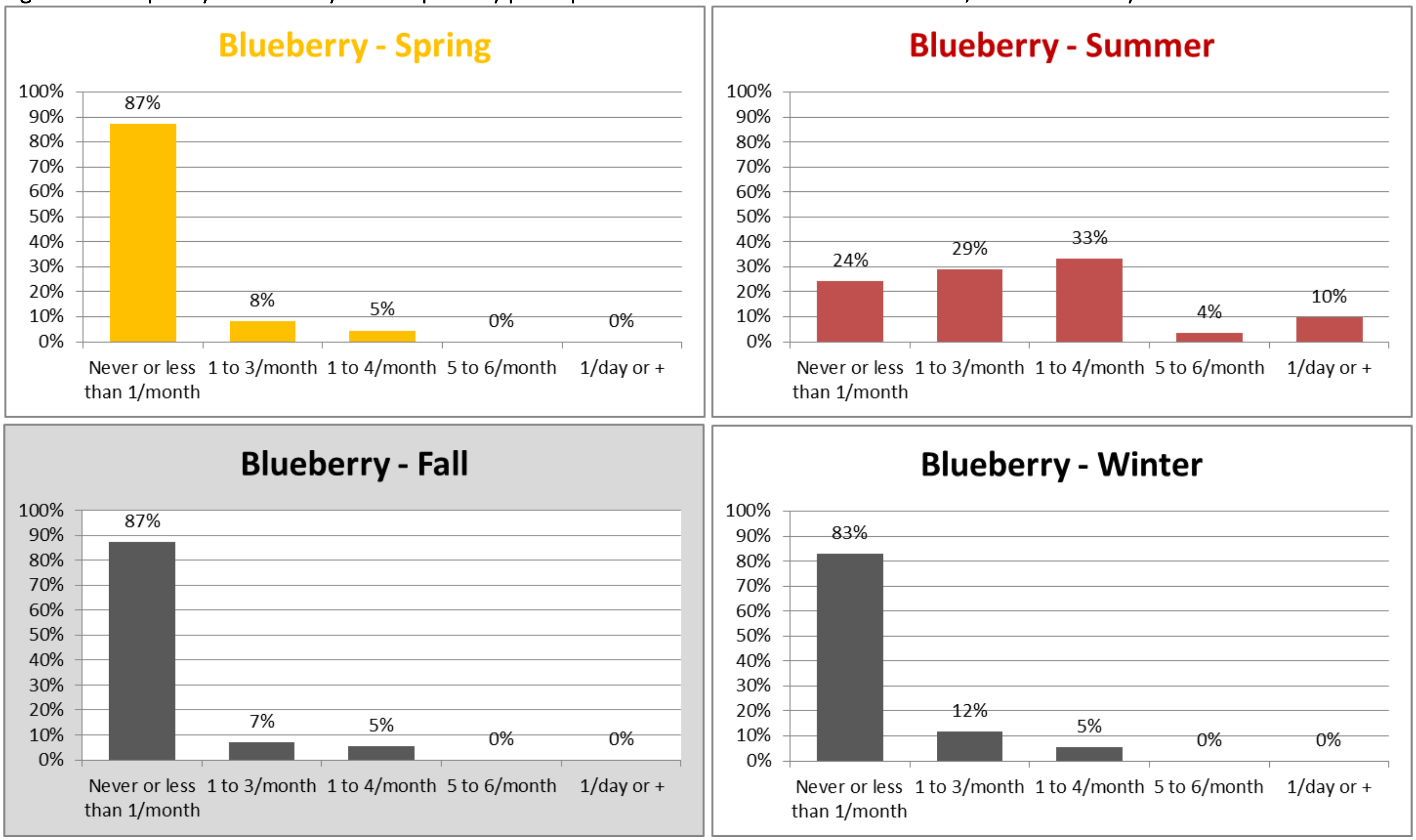
Figure 44: Frequency of partridge consumption by participants from the Anishinabe communities, broken down by season



Wild berries

The wild berries consumed most often in the participating Anishinabe communities were blueberries (85%), raspberries (28%), and strawberries (14%). The average consumption frequency of wild berries was 0.11 times per day, or just over three times per month, and 85% of participants had eaten wild berries in the year preceding the study. Figure 45 illustrates the frequency of blueberry consumption per season. For the Anishinabe participants in the JES!-YEH! project, blueberries were consumed more frequently in the summer, while 66% of the population reported consuming them, and 10% said that they had consumed blueberries every day. During the other seasons, the frequency of consumption decreased greatly, i.e. 17% in the winter, 13% in the spring, and 12% in the fall (Figure 45).

Figure 45: Frequency of blueberry consumption by participants from the Anishinabe communities, broken down by season



Detailed consumption of traditional foods – participating Innu communities

Table 287 illustrates the proportion of participants in both Innu communities who consumed various traditional foods (at least once) and the frequency of consumption per season in the year preceding data collection. Only the foods consumed by more than 10% of the study population are presented here. The average total consumption of traditional foods on an annual basis was 0.58 times/day (CI 95%: 0.44 - 0.74 times/day), or approximately four times per week.

For each category (i.e. fish, seafood, game, birds, and wild berries), the food consumed most frequently is given in more detail in the following figures, i.e. Atlantic salmon, lobster, hare, caribou, goose, and blueberries (Figures 46 to 51).

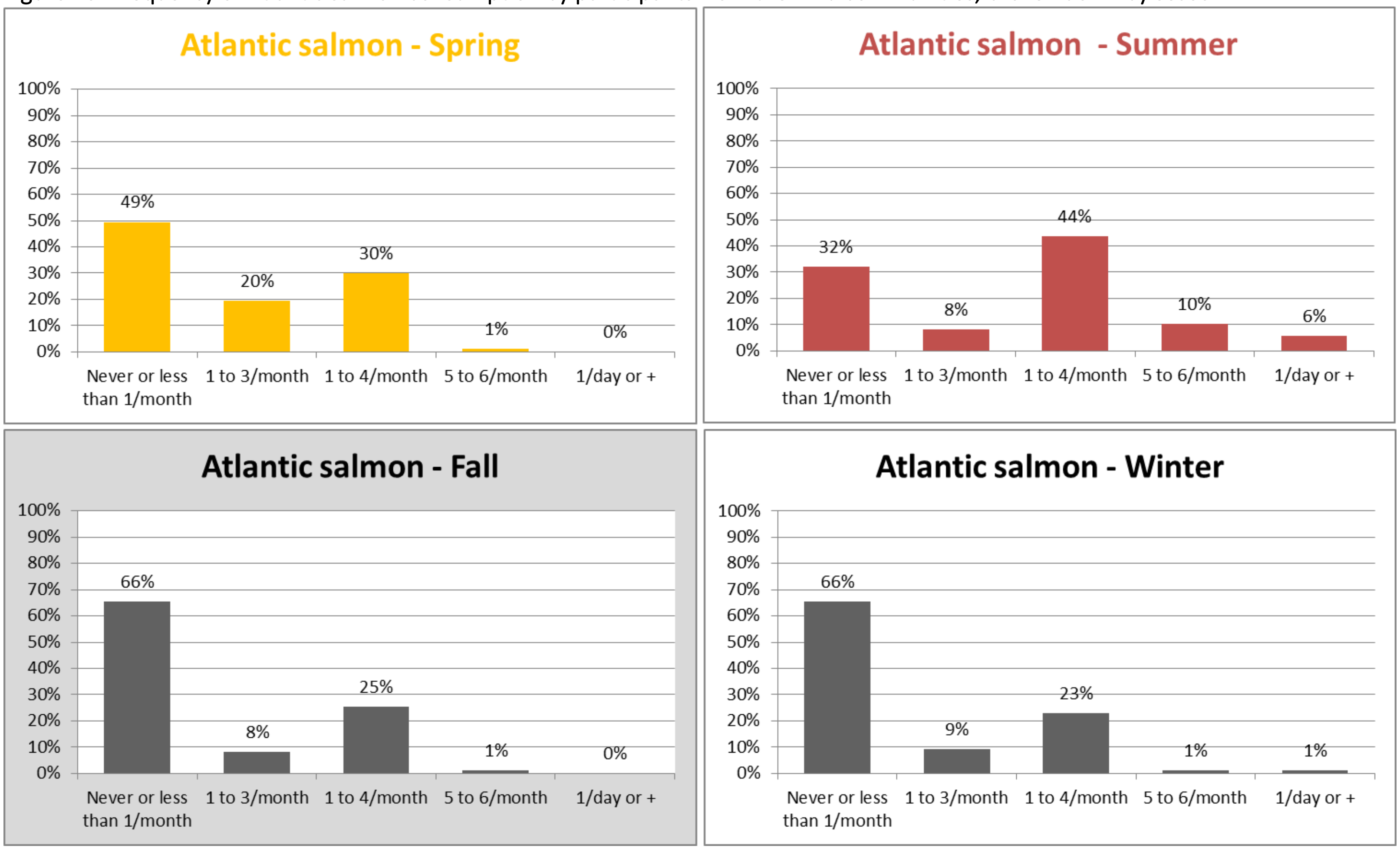
Table 287: Proportions and geometric means for the frequency of traditional food consumption by participants in the Innu communities involved in the JES!-YEH! project (n=87)

Traditional foods	Proportion (%)	Geometric mean CI 95%			
		Spring	Summer	Fall	Winter
Blueberry	87	0.06 [0.01 – 0.11]	0.17 [0.11 – 0.24]	0.03 [0.01 – 0.05]	0.01 [0.00 – 0.01]
Goose (Canada goose)	79	0.08 [0.05 – 0.11]	0.00 [0.00 – 0.01]	0.02 [0.00 – 0.04]	0.01 [0.01 – 0.02]
Atlantic salmon (boiled)	74	0.05 [0.03 – 0.07]	0.15 [0.09 – 0.21]	0.04 [0.02 – 0.06]	0.06 [0.02 – 0.10]
Hare (meat)	69	0.03 [0.01 – 0.04]	0.01 [0.00 – 0.01]	0.03 [0.02 – 0.05]	0.08 [0.05 – 0.11]
Atlantic salmon (smoked)	66	0.03 [0.02 – 0.05]	0.14 [0.08 – 0.20]	0.02 [0.01 – 0.04]	0.03 [0.01 – 0.05]
Caribou (meat)	63	0.06 [0.04 – 0.09]	0.01 [0.00 – 0.01]	0.03 [0.01 – 0.05]	0.13 [0.08 – 0.19]
Moyak (i.e. Common eider)	55	0.07 [0.03 – 0.11]	0.02 [0.01 – 0.04]	0.02 [0.01 – 0.02]	0.00 [0.00 – 0.01]
Lobster (meat)	53	0.07 [0.04 – 0.10]	0.13 [0.08 – 0.19]	0.01 [0.01 – 0.02]	0.01 [0.01 – 0.02]
Trout (brook)	42	0.04 [0.01 – 0.08]	0.03 [0.00 – 0.06]	0.03 [0.01 – 0.05]	0.03 [0.01 – 0.04]
Lingonberry (redberry)	41	0.02 [0.00 – 0.03]	0.02 [0.00 – 0.03]	0.05 [0.03 – 0.07]	0.02 [0.01 – 0.04]
Moose (meat)	38	0.03 [0.00 – 0.05]	0.01 [0.00 – 0.02]	0.05 [0.02 – 0.09]	0.03 [0.00 – 0.07]
Partridge	36	0.02 [0.01 – 0.03]	0.01 [0.00 – 0.02]	0.03 [0.01 – 0.06]	0.01 [0.01 – 0.02]
Cloudberry	31	0.00 [-0.00 – 0.001]	0.08 [0.03 – 0.13]	0.00 [0.00 – 0.01]	0.00 [-0.00 – 0.00]
American black duck	25	0.02 [0.01 – 0.03]	0.01 [0.00 – 0.01]	0.00 [-0.00 – 0.01]	0.00 [-0.00 – 0.00]
Raspberry	24	0.00 [-0.00 – 0.01]	0.05 [0.01 – 0.08]	0.00 [-0.00 – 0.00]	0.00 [-0.00 – 0.00]
Castor (meat)	24	0.01 [-0.00 – 0.02]	0.00 [0.00 – 0.01]	0.02 [0.00 – 0.03]	0.01 [-0.00 – 0.01]
Atlantic cod	22	0.01 [0.01 – 0.02]	0.01 [0.01 – 0.02]	0.01 [0.01 – 0.02]	0.01 [0.01 – 0.02]
Moyak egg	19	0.03 [0.01 – 0.06]	0.00 [-0.00 – 0.00]	-	-
Ouananiche (freshwater salmon)	18	0.02 [0.00 – 0.02]	0.03 [-0.01 – 0.06]	0.02 [-0.01 – 0.05]	0.00 [-0.00 – 0.01]
American smelt	16	0.00 [0.00 – 0.01]	0.00 [-0.00 – 0.00]	0.00 [-0.00 – 0.00]	0.01 [0.00 – 0.01]
Strawberry	16	0.00 [-0.00 – 0.01]	0.02 [0.00 – 0.03]	0.00 [-0.00 – 0.01]	0.00 [-0.00 – 0.01]
Seagull egg	15	0.02 [0.00 – 0.04]	0.00 [-0.00 – 0.01]	-	-
Grouse	14	0.00 [-0.00 – 0.01]	0.00 [-0.00 – 0.00]	0.00 [-0.00 – 0.01]	0.00 [0.00 – 0.01]
Scallop	14	0.01 [-0.00 – 0.02]	0.01 [-0.00 – 0.03]	0.00 [-0.00 – 0.00]	0.00 [-0.00 – 0.00]
Lake trout	13	0.01 [0.00 – 0.01]	0.01 [0.00 – 0.0102]	0.02 [-0.01– 0.05]	0.00 [0.00 – 0.01]
Crab	11	0.01 [0.00 – 0.01]	0.01 [-0.00 – 0.02]	-	-

Fish

Among the participants from the Innu communities, 79% had consumed fish (caught locally) in the year preceding the study, at an average frequency of 0.19 times per day, therefore just over once/week. The local fish consumed most often were Atlantic salmon (boiled and smoked) (74% and 66%), brook trout (42%), and Atlantic cod (22%). Figure 46 illustrates the consumption frequency of Atlantic salmon per season. For participants from the Innu communities, Atlantic salmon was consumed in the spring (51% of participants) and especially in the summer (68% of participants), while ~~60~~16% of participants had consumed Atlantic salmon weekly (1-7 times/week or more). In the fall and winter, the proportion of participants who consumed Atlantic salmon decreased to 34% (Figure 46).

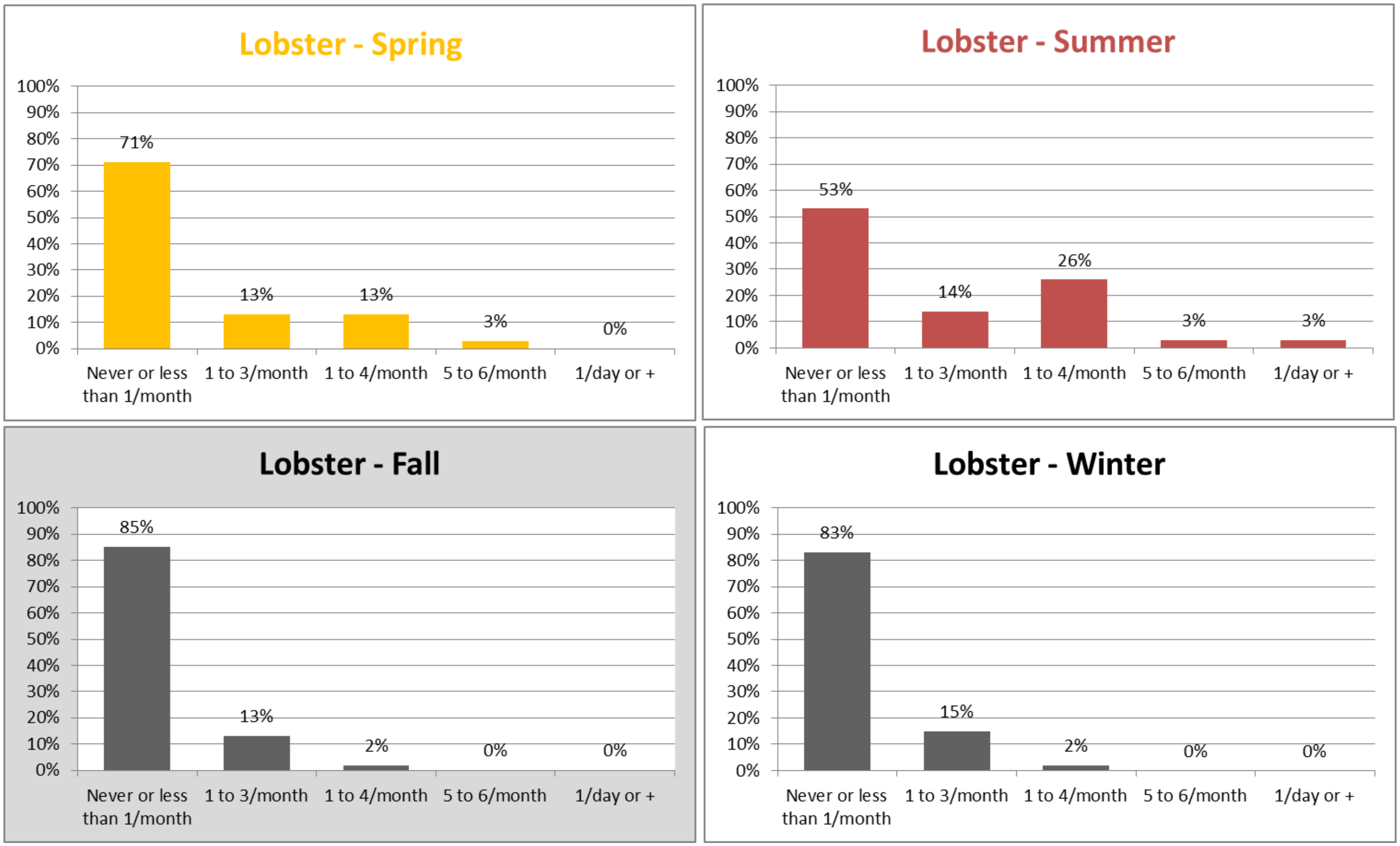
Figure 46: Frequency of Atlantic salmon consumption by participants from the Innu communities, broken down by season



Seafood

More than half of participants from the Innu communities (55%) had consumed local seafood over the past year, at an average frequency 0.08 times per day, or approximately once every two weeks. The seafood consumed most often were lobster (53%), scallops (14%), as well as crab (11%). Figure 47 illustrates the frequency of lobster consumption broken down by season. Lobster consumption was highest in the summer for participants from the Innu communities, where almost half of participants (47%) said that they had consumed lobster at least once per month, and a quarter of participants had consumed lobster weekly. In the spring, 29% of participants had consumed lobster at least once per month, while this proportion was 17% in the winter and 15% in the fall (Figure 47).

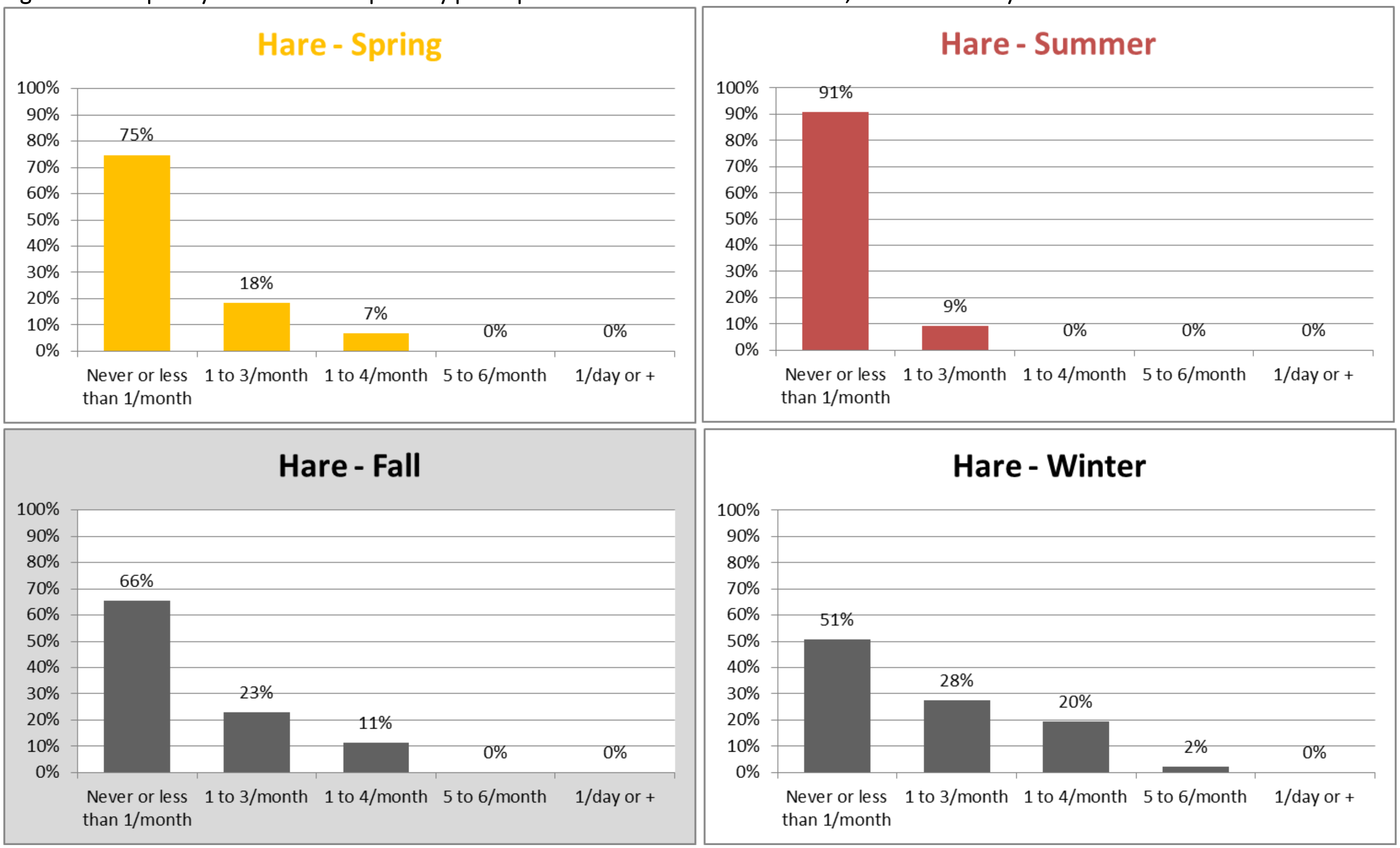
Figure 47: Frequency of lobster consumption by participants from the Innu communities, broken down by season



Game

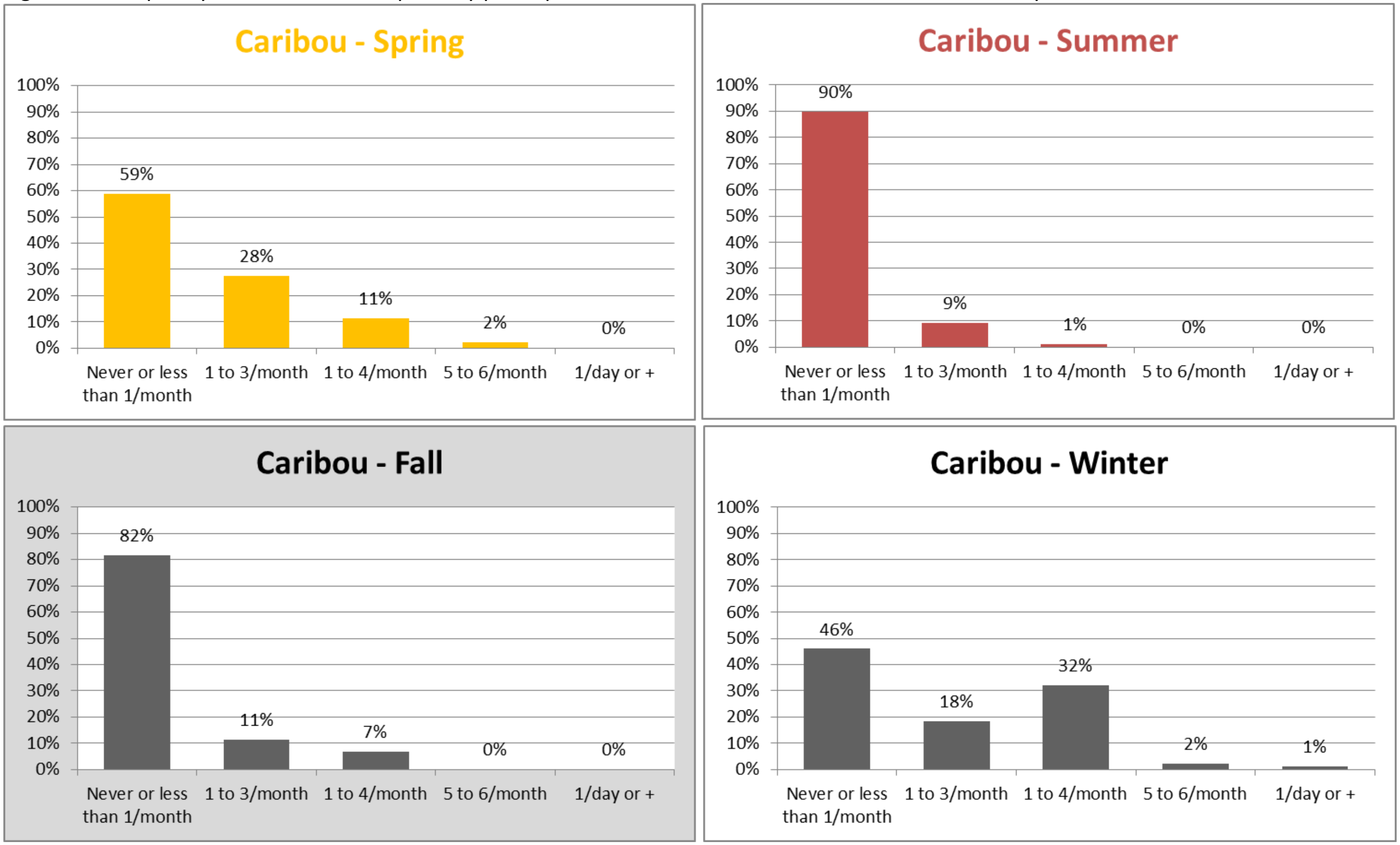
In the participating Innu communities, 82% of participants had consumed game in the year preceding the study, on average on a weekly basis (0.14 times/day). The types of game consumed most often were hare (69%), caribou (63%), and beaver (38%) meat. Figures 48 and 49 illustrate the frequency of hare and caribou consumption per season. For participants in the Innu communities, hare was consumed at a higher frequency in the fall and winter (fall: 23% of participants consumed hare monthly, 11% weekly; winter: 28% monthly, 22% weekly) while in the spring, 25% of participants had consumed hare, and 9% had consumed hare in the summer (Figure 48).

Figure 48: Frequency of hare consumption by participants from the Innu communities, broken down by season



In the winter, the proportion of caribou consumption was 35% for participants from the Innu communities, and 18% consumed caribou monthly. In the spring, 41% of participants had consumed caribou at least once per month. Caribou consumption was lower in the fall and summer, while 82% and 90% of participants had not consumed caribou at all (Figure 49).

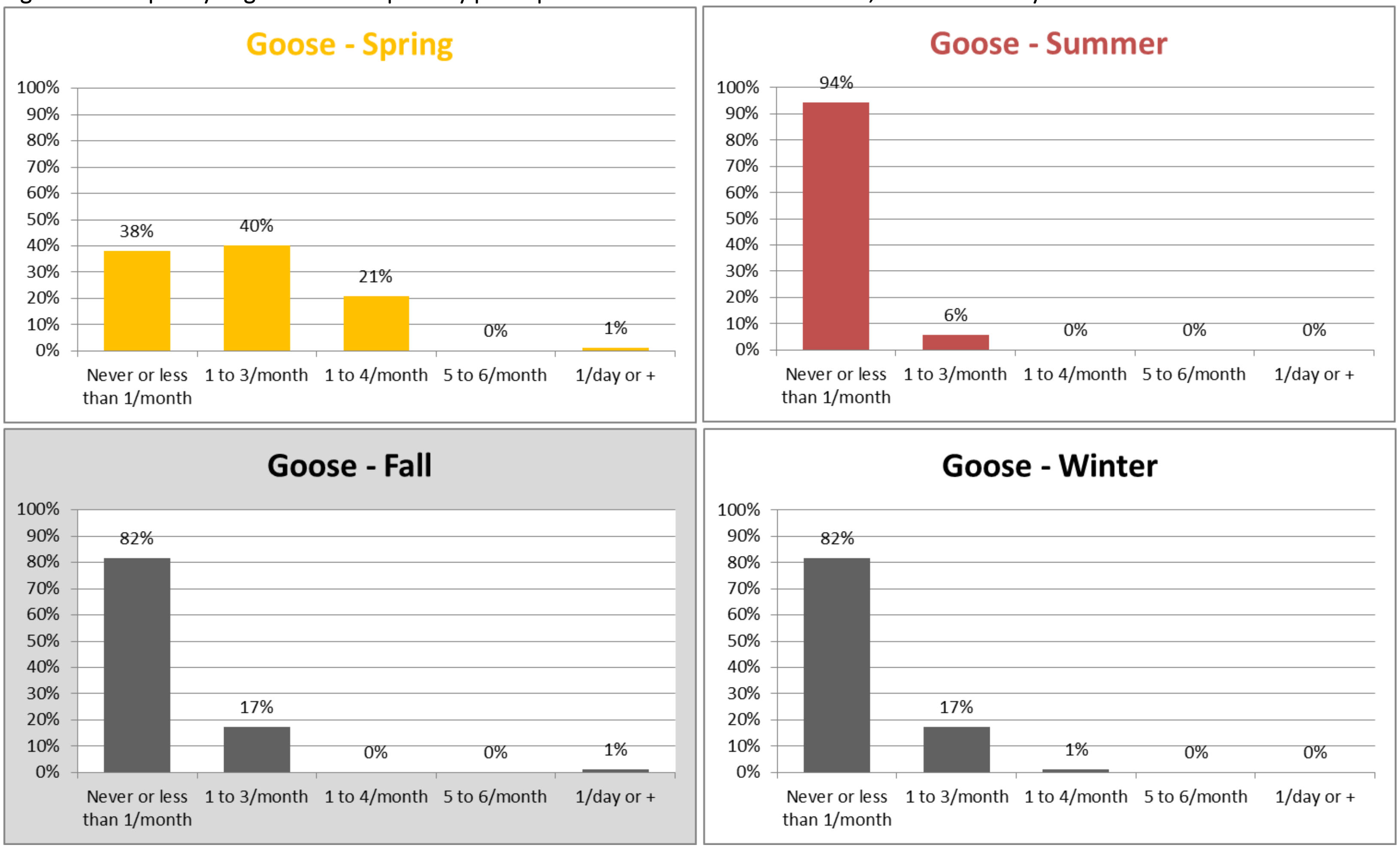
Figure 49: Frequency of caribou consumption by participants from the Innu communities, broken down by season



Wild birds

The wild birds consumed by a greater proportion of participants from the Innu communities were goose (79%), moyak (i.e. Common eider) (55%), and American black duck (25%). The average frequency was 0.08 times per day (approximately 2 times/month) and 82% of participants had consumed wild birds in the year preceding the study. Figure 50 illustrates the frequency of goose consumption per season. For participants from the Innu communities, the frequency of goose consumption was rather low in the fall, winter, and summer, i.e. less than 20% of participants, while in the spring, 62% of participants indicated that they had consumed wild birds at least once per month, and 22% consumed wild bird each week (1-4 times per week or more) (Figure 50).

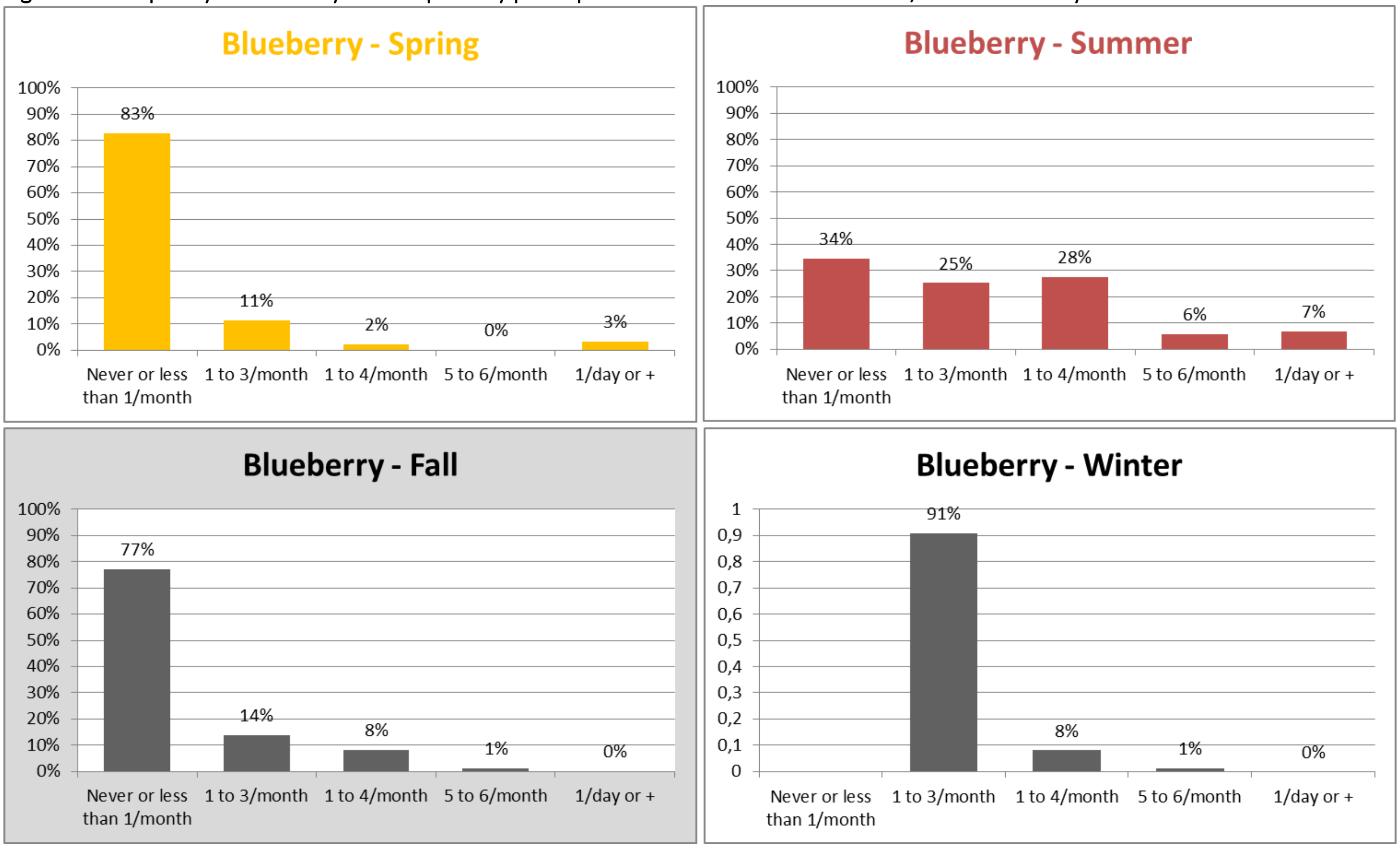
Figure 50: Frequency of goose consumption by participants from the Innu communities, broken down by season



Wild berries

Among the berries consumed by participants from the Innu communities are blueberries, which were consumed the most often (86%), followed by lingonberries (redberries) (41%) and cloudberries (31%). In general, 87% of participants had consumed wild berries in the year preceding the survey, at an average frequency of 0.15 times per day, i.e. approximately once per week. Blueberries were consumed mainly in the summer by 66% of participants in the Innu communities, and 31% of these participants consumed blueberries weekly, while in the fall, spring, and winter, consumption was much lower (23%, 16%, and 9% of participants respectively) (Figure 51).

Figure 51: Frequency of blueberry consumption by participants from the Innu communities, broken down by season



8.4.2. Store-Bought Foods

Why document the consumption of store-bought foods?

The eating habits of Indigenous Peoples have undergone significant changes in a short period of time, and the consumption of traditional foods has often decreased in favour of store-bought foods. Therefore, the traditional diet, characterized by the consumption of nutritious natural foods, has given way to a dietary model that is higher in sugar, salt, and fat, introduced in western store-bought foods (Earle, 2013). Children and youths are not immune to this transition and their dietary intake often translates into a diet with high energy density, but low nutrient density (Downs 2007).

Data on the prevalence of obesity in Indigenous children in the JES!-YEH! project indicate 46.3% obesity in participants 12-19 years old, 38.5% in those 6-11 years old, and 34.2% in participants 3-5 years old. in comparison, in the general population in Canada, the obesity rate for 6-17 year olds is close to 9% (PHAC, 2011a). This is therefore a disturbing percentage, not counting the higher percentage of diabetes and pre-diabetes in Indigenous youths compared to non-Indigenous youths (PHAC, 2011b). Given that diet plays a key role in the development of obesity and associated illnesses, it is all the more important to focus on better characterizing the dietary habits of Indigenous youths.

The purpose of this section is therefore to document the consumption frequency of traditional recipes (cooked partly from store-bought foods) and store-bought foods, divided into five categories: vegetables and fruit, starches (grain products, potatoes and bannock), milk and alternatives, meat and alternatives, as well as "other foods." Sub-groups of foods have also been created to better describe the diet.

How was the consumption of store-bought foods measured?

Data collection

Data on store-bought foods were collected using a dietary frequency questionnaire (Appendix C) and refer to consumption in the three months preceding the study. This approach was preferred because the seasons have little effect on the availability and consumption of store-bought foods, unlike traditional foods.

For participants 3-17 years old, information was collected from their parents and legal guardians (except for some 14-17 year olds, as they were encouraged to answer themselves). As with traditional foods, biases may have been introduced into the results because the parent was not always present when the child was eating (e.g.: lunch meal at school or daycare, purchase of additional foods in stores). Furthermore, parents may have had a tendency to answer based on social desirability standards, in particular with regard to unfavourable behaviours. In terms of diet, this could be reflected by underestimating the consumption frequency of foods with little nutritional value and overestimating nutritional foods (Merydith, Prout and Blaha, 2003). Nevertheless, the parents were identified as being in the best position to provide information on their children's diets, given that they are responsible for meals and procuring food. Participants 18-19 years old answered the questions themselves. Although the data collected was limited in some ways, the fact remains that the information that was collected helps create an overall picture of the consumption of store-bought foods among young participants.

Analyses
The geometric means, their CI 95%, and the 5th, median (50th), and 95th percentiles of food group consumption frequency were used to quantify how frequently participants consumed store-bought food. The quantity of food and number of portions were not calculated, so the results cannot be compared to Canada's Food Guide First Nations, Inuit, and Métis.

Table 288 presents the consumption frequency scale that was used for this questionnaire in order to facilitate the consumption frequency analysis, i.e. a numerical value expressed in terms of frequency per day was associated with each frequency interval. Each value corresponds to the median value for each interval.

Table 288: Scale used for the store-bought food dietary habits questionnaire

Consumption frequency	4 to 5 times per day	2 to 3 times per day	Once per day	5 to 6 times per week	2 to 4 times per week	Once per week	1 to 3 times per month	Never/ less than once per month
Numeric value corresponding to the number of times per day	4.50 times/day	2.50 times/day	1.00 times/day	0.79 times/day	0.43 times/day	0.14 times/day	0.07 times/day	0.00 times/day

Specifications
Traditional recipes are presented in this section not because they are foods that come entirely from the local environment, but rather because they are recipes made in part from store-bought foods (and sometimes traditional foods), which have been adapted by First Nations Peoples and are now considered part of their traditions.

The starchy foods group includes grain products, but also potatoes because their starch content is higher than most vegetables. Furthermore, since the prevalence of diabetes is generally higher among Indigenous children compared to non-native children, it seems more relevant to consider potatoes as a significant source of carbohydrates rather than as vegetables, although they are also significant sources of vitamins, minerals and antioxidants (PHAC, 2011c; Passeport Santé, 2011). The various kinds of bannock (baked bannock, fried bannock, tekaep – described in Table 292, p. 463) were also included as starches, due to their frequent use as a starch in meals by Indigenous peoples and their composition, which is similar to other foods in this group.

To better compare the frequency of consumption of meat and alternatives of low or high nutritional value, a sub-group was created, i.e. processed meats. This group includes foods made from meat, but that have a lower nutritional value considering the cut of meat or the way the food was processed. This group is not part of Canada's Food Guide for First Nations, Inuit, and Métis.

Aside from the usual food groups in Canada's Food Guide for First Nations, Inuit, and Métis, foods considered to be sweets (e.g. candy bars, ice cream, milk chocolate) and junk food (e.g.: poutine, chips) were grouped under the title "other foods" in this report. Although the nutritional value of these foods is lower, this particular group is worth documenting because these foods are also part of the participants' daily diet.

Results – Traditional recipes

Traditional recipes – Participating Anishinabe communities

Participants from the Anishinabe communities consumed few traditional recipes, between 0.06 and 0.09 times per day for each recipe, or approximately once every two weeks. Napanewabo was the most frequently consumed recipe. In total, traditional recipes were consumed 0.24 times/day, or less than 2 days per week (Table 289).

Table 289: Frequency of consumption of traditional recipes by participants from the Anishinabe communities involved in the JES!-YEH! project (n=111)

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Traditional recipes – total	0.24 [0.18 – 0.31]	0.00	0.14	1.29
Napanewabo (flour soup prepared with moose or beef and sometimes carrots)	0.09 [0.06 – 0.11]	0.00	0.07	0.43
Patikabo (dish made from potatoes and wheat, with moose or beef and sometimes carrots)	0.08 [0.06 – 0.10]	0.00	0.07	0.43
Kipatci (prepared delicacy with a base of boiled moose, potatoes, wheat, and bannock dough)	0.06 [0.04 – 0.08]	0.00	0.00	0.43

Traditional recipes – Participating Innu communities

Traditional recipes were consumed by participants from the Innu communities an average of 0.06 times/day, or approximately 2 times per month. Game soup was consumed a bit more frequently, i.e. 0.03 times per day, while fish soup was consumed 0.02 times per day, which corresponds to slightly less than once per month.

Table 290: Frequency of consumption of traditional recipes by participants from the Innu communities involved in the JES!-YEH! project (n=87)

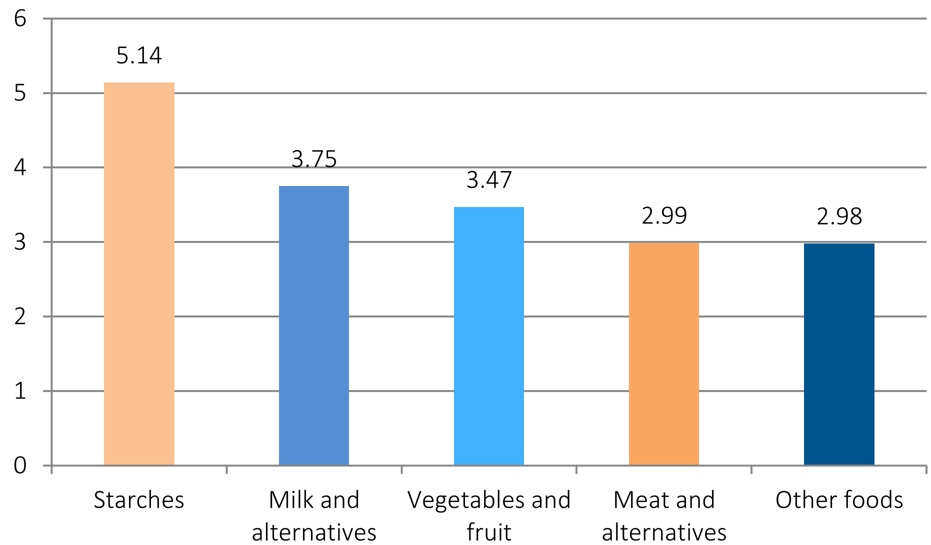
Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Traditional recipes – total	0.06 [0.01 – 0.11]	0.00	0.00	0.14
Game soup	0.03 [0.01 – 0.05]	0.00	0.00	0.14
Fish soup	0.02 [-0.00 – 0.04]	0.00	0.00	0.07

Results – Store-bought food – Participating Anishinabe communities

Frequency of consumption of store-bought foods per food group

The results presented in this section provide a more accurate portrait of the food categories consumed in the Anishinabe communities involved in the project. According to Figure 52, the foods consumed most frequently were starches, followed by milk and alternatives, and vegetables and fruit, while meat and alternatives and other foods were consumed the least often. Vegetables and fruit should be the food group consumed most often in a healthy diet, and the “other food” group should be the group consumed least often (Health Canada, 2015).

Figure 52: Average frequency of consumption by participants from the Anishinabe communities involved in the JES!-YEH! project (n=111) broken down by store-bought food group



Vegetables and fruit

For both participating Anishinabe communities, the average frequency of vegetable consumption was 1.28 times per day [1.07 – 1.50]. The vegetables consumed most often were onions (0.29 times per day), while broccoli was consumed on a more occasional basis (0.13 times per day) (Table 291).

The average frequency of fruit consumption was 2.07 fruits per day [1.82 – 2.34]. The fruits consumed most often were apples and bananas, while store-bought berries as well as canned fruits were consumed less often (Table 291). Furthermore, it should also be noted that the participants consumed locally harvested wild berries at a frequency of 0.11 times per day (see the Traditional foods – Anishinabe communities section, page 447). This therefore increases the consumption of berries to 0.31 times per day, or more than 2 times per week.

Fruit juices are excluded from this category and details about fruit juice consumption are found in the Beverages - Anishinabe communities section, page 473. It should be noted that fruit juices were consumed an average of 2.58 times per day (including powdered and bottled juices), which is higher than the consumption frequency for all fresh fruits listed on the questionnaire. However, although the vitamin and mineral content of 100% pure fruit juice is significant, fruit juices do not provide as much fibre as fresh fruits, and are therefore lower in nutritional value (Bazzano et al. 2008; Flood-Obbagy and Rolls, 2009; UWCPHN, 2012). Furthermore, the consumption of fruit juices by children has been identified as contributing to excessive calorie intake in children, as fruit juices do not provide a feeling of fullness (Flood-Obbagy and Rolls, 2009).

Generally, vegetables were consumed less often than fruits. For total fruit and vegetable consumption, the average frequency of consumption was 3.44 times per day [3.04 – 3.87] for participants in the Anishinabe communities (Table 291).

Table 291: Frequency of fruit and vegetable consumption by participants from the Anishinabe communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Vegetables – total	**1.28 [1.07 – 1.50]**	**0.07**	**1.28**	**3.86**
Onion	0.29 [0.22 – 0.36]	0.00	0.43	1.00
Yellow vegetables	0.26 [0.21 – 0.31]	0.00	0.14	1.00
Other vegetables	0.25 [0.20 – 0.31]	0.00	0.14	1.00
Tomato	0.21 [0.16 – 0.27]	0.00	0.14	1.00
Green vegetables	0.19 [0.15 – 0.24]	0.00	0.14	1.00
Broccoli	0.13 [0.09 – 0.17]	0.00	0.07	0.43
Fruits – total	**2.07 [1.82 – 2.34]**	**0.42**	**2.15**	**5.57**
Apple	0.53 [0.45 – 0.62]	0.07	0.43	1.00
Banana	0.50 [0.43 – 0.58]	0.07	0.43	1.00
Orange	0.37 [0.29 – 0.45]	0.00	0.43	1.00
Other fruits	0.28 [0.21 – 0.34]	0.00	0.14	1.00
Canned fruits	0.25 [0.19 – 0.31]	0.00	0.14	1.00
Store-bought berries	0.20 [0.14 – 0.25]	0.00	0.14	0.79
Vegetables and fruit – total	**3.44 [3.04 – 3.87]**	**0.99**	**3.50**	**8.01**

Starches

For participants from the Anishinabe communities, the average frequency of starch consumption was 5.14 starches per day [4.76 – 5.54] (Table 292). White bread had the highest daily frequency of consumption, i.e. an average of 1.05 times per day. Cold cereals (or breakfast cereals) were also frequently consumed, i.e. 0.79 times per day. In contrast, the foods consumed less often were oatmeal (0.21 times/day) and whole wheat bread (0.16 times/day). Bannock was also consumed less frequently, between 1 and 2 times per week. Whole wheat bread and oatmeal (in its most natural form) are nutritional dietary choices and meet Health Canada's recommendations for consuming more whole grain products (Health Canada, 2010). In contrast, white bread, as well as several kinds of breakfast cereals, are made from simple sugars and not whole grains.

Table 292: Frequency of starch consumption by participants from the Anishinabe communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Starches – total	**5.14 [4.76– 5.54]**	**3.07**	**5.02**	**8.36**
White bread	1.05 [0.89 – 1.24]	0.00	1.00	2.5
Cold cereals	0.79 [0.70 – 0.89]	0.00	0.79	2.5
Pasta	0.57 [0.49 – 0.66]	0.00	0.43	1.00
Rice	0.46 [0.40 – 0.52]	0.00	0.43	1.00
Potatoes	0.41 [0.35 – 0.47]	0.00	0.43	1.00
Lipton soup	0.39 [0.33 – 0.46]	0.00	0.43	1.00
Crackers	0.27 [0.21 – 0.34]	0.00	0.14	1.00
Oven-baked bannock	0.22 [0.17 – 0.28]	0.00	0.07	0.79
Saco (fried bannock)	0.21 [0.15 – 0.28]	0.00	0.07	1.00
Oatmeal	0.21 [0.16 – 0.25]	0.00	0.14	0.79
Brown bread	0.16 [0.10 – 0.23]	0.00	0.00	2.50

Meat and alternatives

In the participating Anishinabe communities, meat and alternatives were consumed at an average frequency of 1.73 times per day [1.54 – 1.94] (Table 293). The most consumed foods were eggs, at an average 0.48 times per day, while store-bought fish (fresh or canned) were consumed least often (0.06 per day, or approximately 2 times per month; more specifically: 0.005 times/day for sardines; 0.009 times/day for white tuna, 0.03 times/day for light tuna, and 0.02 times/day for fresh or frozen fish). According to Health Canada (2011), it is recommended that fish should be eaten 2 times per week (frequency of 0.29 times per day). Even taking into consideration locally caught fish (see Traditional foods – Anishinabe communities section, page 444), which were consumed 0.08 times per day (equivalent to once per week) the frequency of fish consumption was insufficient based on the recommendations currently in force. Certain meat substitutes, such as nuts and legumes, were also consumed rarely, i.e. 0.04 and 0.07 times per day respectively. Peanut butter was consumed at a frequency of 0.19 times per day.

Participants from the Anishinabe communities in the study consumed processed meats at an average frequency of 1.22 times per day [1.06 – 1.39] (Table 293). Sausages were the food consumed most often in this category, 0.29 times per day (2 times per week). Including processed to the meat and alternatives category, the average daily consumption was almost 3 times per day (2.98 times per day [2.67 – 3.31]) (Table 293). Overall, apart from egg and beef consumption, the consumption frequency of sausages (0.29 times/day), sliced meats (e.g., salami, pepperoni, precooked preserved meat) (0.29 times/day), and bacon (0.26 times/day) was higher than all other meat and alternatives, including chicken (0.21 times per day). In general, all processed meats were consumed more than store-bought fish as well as alternatives (except peanut butter).

Table 293: Frequency of meat and alternatives consumption by participants from the Anishinabe communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Meat and alternatives – total	**1.73 [1.54 – 1.94]**	**0.64**	**1.85**	**4.36**
Eggs	0.48 [0.40 – 0.57]	0.00	0.43	1.00
Beef	0.40 [0.33 – 0.47]	0.00	0.43	1.00
Chicken	0.21 [0.17 – 0.25]	00.0	0.14	0.43
Peanut butter	0.19 [0.14 – 0.24]	0.00	0.14	1.00
Pork	0.14 [0.11 – 0.17]	0.00	0.07	0.43
Hamburger	0.13 [0.10 – 0.17]	0.00	0.07	0.43
Legumes	0.07 [0.05 – 0.10]	0.00	0.00	0.43
Nuts	0.04 [0.02 – 0.06]	0.00	0.00	0.14
Light tuna	0.03 [-0.01 – 0.06]	0.00	0.00	0.07
Fresh or frozen fish	0.02 [0.01 – 0.03]	0.00	0.00	0.14
White tuna	0.009 [-0.007 – 0.025]	0.00	0.00	0.00
Sardine	0.005 [-0.002 – 0.012]	0.00	0.00	0.00
Processed meats – total	**1.22 [1.06 – 1.39]**	**0.35**	**1.21**	**2.79**
Sausages	0.29 [0.22 – 0.36]	0.00	0.14	1.00
Processed or sliced meat	0.29 [0.23 – 0.34]	0.00	0.14	1.00
Bacon	0.26 [0.21 – 0.32]	0.00	0.14	1.00
Chicken nuggets	0.18 [0.14 – 0.21]	0.00	0.14	0.43
Hot dogs	0.18 [0.13 – 0.22]	0.00	0.07	0.79
Beef jerky	0.01 [0.00 – 0.02]	0.00	0.00	0.07
Meats, alternatives, and processed meats – total	**2.98 [2.67 – 3.31]**	**1.19**	**3.21**	**6.85**

Milk and alternatives

Participants from the Anishinabe communities consumed dairy products at an average frequency of 3.75 times per day [3.35 – 4.18] (Table 294). Participants consumed milk (1.44 times/day) and yoghurt (0.76 times/day) most often. Table 294 shows that milk, yoghurt and cheese were consumed more than chocolate milk and processed cheese, which were less nutritional choices.

Table 294: Frequency of milk and alternatives consumption by participants from the Anishinabe communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Dairy products – total	**3.75 [3.35 – 4.18]**	**1.35**	**3.79**	**10.07**
Milk	1.44 [1.24 – 1.65]	0.43	1.00	4.50
Yoghurt	0.76 [0.62 – 0.90]	0.07	0.43	2.50
Cheese	0.48 [0.40 – 0.57]	0.00	0.43	2.50
Chocolate milk	0.39 [0.29 – 0.51]	0.00	0.14	2.50
Processed cheese	0.30 [0.23 – 0.37]	0.00	0.14	1.00
Milk in coffee	0.13 [0.08 – 0.20]	0.00	0.00	1.00
Milk formula	0.001 [-0.001 – 0.004]	0.00	0.00	0.00

Other foods

Participants from the Anishinabe communities consumed foods in the “other foods” category at an average frequency of 2.98 times per day [2.68 – 3.30] (Table 295). In the “sweets” category, jam was consumed most often, at an average frequency of 0.29 times per day, or twice per week. Among added sugars or condiments, participants frequently consumed white sugar (0.29 times per day) and ketchup (0.24 times per day). As for junk food, chips were consumed the most often, i.e. an average of 0.35 times per day, followed by poutine, at a frequency of 0.18 times per day, or just over once per week. The food or products consumed least often in this group were donuts and sweeteners (0.06 and 0.02 times per day).

Table 295: Frequency of other foods and sweets consumption by participants from the Anishinabe communities involved in the JES!-YEH! project

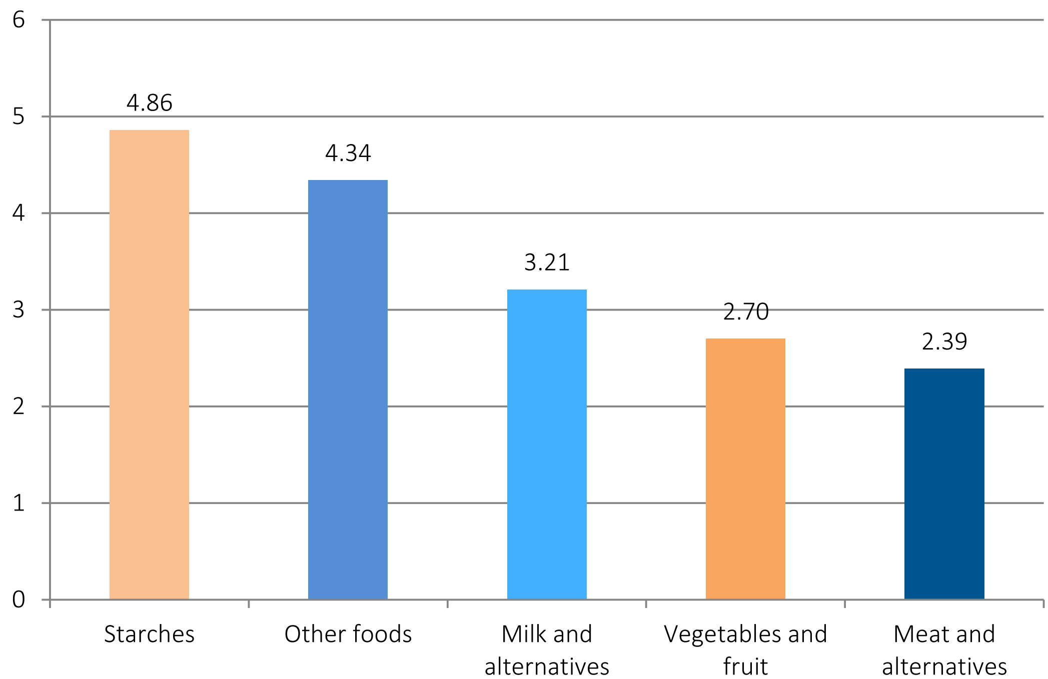
Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Sweets – total	**1.90 [1.67 – 2.15]**	**0.7**	**1.77**	**5.00**
Jam	0.29 [0.22 – 0.36]	0.00	0.14	1.00
White sugar	0.29 [0.22– 0.36]	0.00	0.14	1.00
Ketchup	0.24 [0.18 – 0.30]	0.00	0.14	0.79
Non-chocolate candies	0.21 [0.16 – 0.26]	0.00	0.14	0.79
Ice cream	0.20 [0.15 – 0.25]	0.00	0.14	0.43
Pie	0.19 [0.13 – 0.24]	0.00	0.07	0.79
Candy bars	0.14 [0.10 – 0.19]	0.00	0.07	0.79
Milk chocolate	0.13 [0.09 – 0.17]	0.00	0.07	0.43
Cake	0.08 [0.06 – 0.10]	0.00	0.07	0.43
Donuts	0.06 [0.04 – 0.08]	0.00	0.07	0.14
Sweeteners	0.02 [0.00 – 0.04]	0.00	0.00	0.14
Junk food – total	**1.05 [0.93 – 1.17]**	**0.35**	**1.07.**	**2.43**
Chips	0.35 [0.29 – 0.41]	0.07	0.43	1.00
Poutine	0.18 [0.15 – 0.22]	0.00	0.14	0.43
French fries	0.18 [0.14 – 0.23]	0.00	0.14	0.43
Popcorn	0.16 [0.12 – 0.20]	0.00	0.07	0.43
Pizza	0.15 [0.13 – 0.18]	0.07	0.14	0.43
Other foods – total	**2.98 [2.68 – 3.30]**	**1.14**	**2.84**	**7.05**

Results – Store-Bought Foods – Participating Innu Communities

Frequency of store-bought food consumption per food group

The results of this section give a dietary profile for the two Innu communities, detailing the total consumption frequency for the foods found in the various food groups. Figure 53 shows that participants consumed the items found in the starches and other foods categories most often. Meat and alternatives was the food group consumed least often, followed by vegetables and fruit. Ideally, vegetables and fruit should be the food group consumed most often, while "other foods" should be consumed in lower proportions (Health Canada, 2015).

Figure 53: Average consumption frequency by participants from the Innu communities involved in the JES!-YEH! project (n=86) broken down by store-bought food groups



Vegetables and fruit

Participants from the Innu communities consumed vegetables an average 1.04 times/day [0.82 – 1.28] (Table 296). Onions (0.27 times/day) and yellow vegetables (0.23 times/day) were consumed more frequently, unlike green vegetables (0.16 times/day) and broccoli (0.08 times/day).

On average, fruits were consumed more often than vegetables, i.e. 1.61 times per day [1.37 – 1.87] (Table 296). The fruits consumed most often were apples (0.39 times/day) and bananas (0.36 times/day), while other fruits and store-bought berries were consumed more rarely (0.20 times/day). Considering also that participants consumed harvested wild berries (see the Traditional Foods – Innu communities section, page 454) at a frequency of 0.15 times per day, this increases berry consumption to 0.35 times per day, or between 2 and 3 times per week.

When fruit consumption is compared to juice consumption in both Innu communities, juice intake (including bottled and powdered juices) was 1.82 times per day (see the Beverages – Innu communities section on page 474), or more than all the different types of fresh fruits, although fruit juice has less nutritional value than fresh fruits.

The total frequency of vegetables and fruit consumption was on average 2.70 times per day [2.31 – 3.14] for participants from the Innu communities involved in the project (Table 296).

Table 296: Frequency of vegetables and fruit consumption by participants from the Innu communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Vegetables – total	**1.04 [0.82 – 1.28]**	**0.07**	**0.85**	**4.22**
Onion	0.27 [0.17 – 0.39]	0.00	0.07	1.00
Yellow vegetables	0.23 [0.17 – 0.29]	0.00	0.14	0.79
Other vegetables	0.23 [0.15 – 0.31]	0.00	0.14	0.43
Tomato	0.21 [0.16 – 0.26]	0.00	0.14	0.43
Green vegetables	0.16 [0.09 – 0.24]	0.00	0.07	1.00
Broccoli	0.08 [0.03 – 0.13]	0.00	0.00	0.43
Fruits – total	**1.61 [1.37 – 1.87]**	**0.14**	**1.83**	**4.38**
Apple	0.39 [0.32 – 0.46]	0.00	0.43	1.00
Banana	0.36 [0.31 – 0.42]	0.00	0.43	1.00
Orange	0.33 [0.28 – 0.40]	0.00	0.43	1.00
Canned fruits	0.21 [0.14 – 0.27]	0.00	0.14	0.79
Other fruits	0.20 [0.14 – 0.27]	0.00	0.14	0.79
Store-bought berries	0.20 [0.13 – 0.28]	0.00	0.14	1.00
Vegetables and fruit – total	**2.70 [2.31 – 3.14]**	**0.49**	**2.79**	**7.20**

Starches

Participants from the Innu communities consumed starches at an average frequency of 4.86 times per day [4.39 – 5.38] (Table 297). White bread was the starch consumed most often, i.e. 1.36 times per day, unlike brown bread, which was consumed 0.07 times per day. Oven-baked bannock was also consumed rather frequently, approximately 3 times per week (0.48 times/day), while sand-baked bannock and tekaep were consumed less often (0.11 and 0.08 times/day, respectively). In order to adopt a healthy diet, whole grain products are recommended over refined grain products (Health Canada, 2010). Among other frequently consumed starches were cold cereals and potatoes, which were consumed approximately once every two days (0.57 times/day and 0.48 times/day respectively).

Table 297: Frequency of starch consumption by participants from the Innu communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Starches – total	**4.86 [4.39 – 5.38]**	**2.05**	**4.86**	**8.29**
White bread	1.36 [1.10 – 1.65]	0.14	1.00	4.50
Cold cereals	0.57 [0.46 – 0.69]	0.00	0.43	2.50
Potatoes	0.48 [0.40 – 0.56]	0.14	0.43	1.00
Oven-baked bannock	0.48 [0.36 – 0.61]	0.00	0.43	2.50
Rice	0.38 [0.31 – 0.46]	0.07	0.43	0.79
Pasta	0.37 [0.32 – 0.41]	0.14	0.43	0.79
Oatmeal	0.30 [0.22 – 0.38]	0.00	0.14	0.79
Lipton soup	0.24 [0.16 – 0.32]	0.00	0.14	0.79
Crackers	0.18 [0.13 – 0.24]	0.00	0.14	0.43
Sand-baked bannock	0.11 [0.06 – 0.15]	0.00	0.07	0.43
Tekaep (type of pancake/bannock with lingonberries)	0.08 [0.04 – 0.11]	0.00	0.00	0.43
Brown bread	0.07 [0.01 – 0.13]	0.00	0.00	0.43

Meat and alternatives

In the participating Innu communities, for the store-bought, meat and alternatives (not including traditional meats caught by hunting) that are part of Canada's Food Guide for First Nations, Inuit, and Métis (Health Canada, 2007), the average consumption frequency among youth participants was 1.50 times/day [1.31 – 1.70] (Table 298). Eggs and beef were consumed most often, at a frequency of 0.43 and 0.36 times per day respectively. Fish (fresh, frozen, or preserved) was not consumed often, i.e. 0.01 times per day, which corresponds to less than once per month. Health Canada (2011) recommends consuming fish 2 times per week (frequency of 0.29 times per day). As indicated in the "Traditional Foods – Innu communities" section (page 449), participants from the Innu communities regularly consumed locally-caught fish, on average 0.19 times per day. Therefore, although store-bought fish consumption is low, total fish consumption was nevertheless 0.20 times per day, representing consumption approximately 1.5 times per week, which is close to the current recommendations in Canada's Food Guide for First Nations, Inuit, and Métis (i.e. 2 times per week). As for other meat alternatives, i.e. peanut butter, nuts, and legumes, they were consumed more occasionally, at a frequency of 0.08, 0.06 and 0.03 times per day respectively, or around 1-3 times per month (Table 298).

As mentioned above, a sub-group of processed meats was included in order to document its consumption. Participants from both Innu communities consumed processed meats at an average frequency of 0.87 times per day [0.73 – 1.03] (Table 298). Sliced meats (e.g., salami, pepperoni, precooked preserved meat) were consumed most often, at an average of 0.25 times per day, followed by bacon 0.22 times per day. Dry beef (jerky) was consumed less often, at a frequency of 0.002 times/day.

Overall, the frequency of meat and alternatives consumption, aside from eggs and beef, was similar to processed meats. The average frequency of meat consumption, including processed meat, was 2.39 times per day [2.11 – 2.69] (Table 298).

Table 298: Frequency of processed meat consumption by participants from the Innu communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5^{th} percentile	Median	95^{th} percentile
Meat and alternatives – total	**1.50 [1.31 – 1.70]**	**0.56**	**1.42**	**3.14**
Eggs	0.43 [0.35 – 0.53]	0.07	0.43	2.5
Beef	0.36 [0.30 – 0.42]	0.07	0.43	1.00
Chicken	0.19 [0.15 – 0.23]	0.00	0.14	0.43
Pork	0.19 [0.15 – 0.23]	0.00	0.14	0.43
Hamburger	0.12 [0.08 – 0.17]	0.00	0.07	0.43
Peanut butter	0.08 [0.03 – 0.13]	0.00	0.00	0.43
Nuts	0.06 [0.03 – 0.09]	0.00	0.00	0.43
Legumes	0.03 [0.02 – 0.05]	0.00	0.00	0.14
Fish	0.009 [0.003 – 0.015]	0.00	0.00	0.07
Sardines	0.004 [0.001 – 0.008]	0.00	0.00	0.07
Light tuna	0.0006 [-0.0006 – 0.0017]	0.00	0.00	0.00
White tuna	0.0005 [-0.0005 – 0.0015]	0.00	0.00	0.00
Processed meats – total	**0.87 [0.73 – 1.03]**	**0.21**	**0.82**	**2.29**
Sliced and processed meat	0.25 [0.19 – 0.31]	0.07	0.14	0.43
Bacon	0.22 [0.16 – 0.28]	0.00	0.14	0.79
Chicken nuggets	0.17 [0.13 – 0.22]	0.00	0.14	0.43
Hot dogs	0.13 [0.10 – 0.16]	0.00	0.07	0.43
Sausages	0.11 [0.09 – 0.14]	0.00	0.07	0.43
Beef jerky	0.002 [-0.000 – 0.005]	0.00	0.00	0.00
Meat, alternatives, and processed meats- total	**2.39 [2.11 – 2.69]**	**1.05**	**2.35**	**6.10**

Milk and alternatives

The consumption frequency of dairy products was on average 3.21 times per day [2.77 – 3.70] (Table 299). Milk, yoghurt, and cheese were the foods consumed most often, at an average of 1.25, 0.65 and 0.49 times per day respectively, while foods of lesser nutritional value, such as chocolate milk and processed cheese, were consumed less often (0.37 and 0.16 times/day).

Table 299: Frequency of milk and alternatives consumption by participants from the Innu communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Dairy products – total	**3.21 [2.77 – 3.70]**	**1.14**	**3.39**	**8.72**
Milk	1.25 [1.04 – 1.48]	0.43	1.00	4.50
Yoghurt	0.65 [0.50 – 0.82]	0.00	0.43	2.50
Cheese	0.49 [0.39 – 0.61]	0.07	0.43	2.50
Processed cheese	0.37 [0.26 – 0.48]	0.00	0.43	2.50
Chocolate milk	0.16 [0.11 – 0.22]	0.00	0.07	0.79
Milk in coffee	0.09 [0.04 – 0.15]	0.00	0.00	0.79

Other foods (sweets and junk food)

Participants from the Innu communities consumed products in the “other foods” category at an average frequency of 4.34 times per day [3.79 – 4.97] (Table 300). Among condiments and additives, ketchup (0.60 times/day), white sugar (0.53 times/day) and jam (0.33 times/day) were consumed most often. As for junk food, chips (0.36 times/day), granola bars (0.29 times/day) and frozen desserts (0.29 times/day) had the highest frequency of consumption. Sweeteners were rarely consumed (frequency of 0.005 times/day).

Table 300: Frequency of consumption of other foods (sweets and junk food) by participants from the Innu communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Sweets – total	**3.34 [2.87 – 3.86]**	**0.00**	**0.43**	**2.50**
Ketchup	0.60 [0.47 – 0.74]	0.00	0.43	2.50
White sugar	0.53 [0.38 – 0.70]	0.00	0.29	2.50
Jam	0.33 [0.23 – 0.44]	0.00	0.14	1.00
Granola bars	0.29 [0.19 – 0.39]	0.00	0.14	1.00
Frozen desserts	0.29 [0.21 – 0.37]	0.00	0.14	1.00
Pies	0.20 [0.12 – 0.28]	0.00	0.07	1.00
Candy without chocolate	0.19 [0.12 – 0.25]	0.00	0.07	0.43
Ice cream	0.16 [0.11 – 0.21]	0.00	0.07	0.43
Cake	0.15 [0.10 – 0.21]	0.00	0.07	0.43
Candy bars	0.14 [0.09 – 0.19]	0.00	0.07	0.43
Milk chocolate	0.10 [0.07 – 0.13]	0.00	0.00	0.43
Donuts	0.08 [0.03 – 0.12]	0.00	0.00	0.00
Sweeteners	0.005 [-0.005 – 0.015]	0.91	3.50	8.94
Junk food – total	**0.96 [0.81 – 1.12]**	**0.21**	**0.92**	**2.43**
Chips	0.36 [0.27 – 0.45]	0.00	0.43	1.00
Poutine	0.19 [0.15 – 0.23]	0.00	0.14	0.43
Pizza	0.17 [0.13 – 0.20]	0.00	0.14	0.43
French fries	0.14 [0.11 – 0.18]	0.00	0.07	0.43
Popcorn	0.12 [0.09 – 0.15]	0.00	0.07	0.43
Other foods – total	4.34 [3.79 – 4.97]	1.34	4.44	10.28

8.4.3. Beverages

Why document the consumption of water and beverages?

Sugary drinks, in the form of carbonated beverages, fruit beverages or energy drinks, provide practically no nutrients relative to their calorie intake and are comprised mainly of water and added sugar (ASPQ, 2010). In Quebec, the consumption of sugary drinks is particularly high among youths 15 to 17 years old (INSPQ, 2017a). According to Canadian data from 2004, sugary drinks (carbonated beverages and fruit beverages) were the main sources of added sugar in the diet of youths 1 to 18 years old (INSPQ, 2017b). Furthermore, it is recognized that sugar consumption, particularly in the form of sugary drinks, contributes to excess weight and the risk of coronary artery diseases. Conversely, reducing the consumption of beverages with added sugar among youths could contribute to preventing weight gain (Ebbeling, 2014). Consuming water is essential to health because water contributes to the proper functioning of the body, while providing no calories. Therefore, water should be the main source of hydration in the diet and should be chosen over higher calorie beverages (Health Canada, 2016).

The purpose of this section is to document the consumption frequency and intake of beverages by participants from the Innu and Anishinabe communities involved in the project.

How was water and beverage consumption measured?

Data Collection

The frequency of beverage consumption (number of times/day) was measured using two different questionnaires. One of these was the questionnaire on dietary frequency in the three months preceding the study (Appendix C). The beverages for which frequency of consumption was measured included juices (in bottles or boxes), carbonated beverages (regular and diet), sports drinks (such as *Gatorade*), and energy drinks (such as *Red Bull*). Data on consumption of water and water-based beverages (e.g., powdered juice or made from concentrate, tea, coffee, etc.) were measured using another questionnaire. This questionnaire measured the frequency (number of glasses/day) and portion (number of glasses consumed) of water and water-based beverages consumed in the seven months preceding the study, and these data were used to calculate the quantity of each item consumed (in mL). These data were grouped together to represent overall beverage consumption, despite the different questionnaires used.

Analyses

The geometric means, their CI 95%, and the 5th percentile, median, and 95th percentile for the consumption frequency of various beverages were calculated. A consumption frequency scale (Table 301) was used to facilitate the consumption frequency analysis. A numerical value in terms of frequency per day was associated with each frequency interval. Each value corresponds to the median value of each interval.

Table 301: Scale used for the beverage questionnaire.

Consumption frequency	4 to 5 times per day	2 to 3 times per day	Once per day	5 to 6 times per week	2 to 4 times per week	Once per week	1 to 3 times per month	Never/less than once per month
Numerical value corresponding to the times per day	4.50 times/day	2.50 times/day	1.00 times/day	0.79 times/day	0.4 3 times/day	0.14 times/day	0.07 times/day	0.00 times/day

Results – Beverage consumption – Participating Anishinabe communities

Beverage consumption

Table 302 presents beverage consumption by participants from the Anishinabe communities. On average, total consumption frequency was 6.68 times per day. Water was the most frequently consumed beverage (2.39 times per day), but powdered and bottled juices were also frequently consumed (1.76 times/day and 0.82 times/day). As mentioned in the fruit consumption section, although the vitamin and mineral content of 100% pure fruit juices is significant, fruit juices do not provide as much fibre as fresh fruits, and also have a lower nutritional value (Bazzano et al. 2008; Flood-Obbagy and Rolls, 2009; UWCPHN, 2012). As for powdered juices, they are made mostly of sugar and water, which makes them unfavourable for children's health. Furthermore, the consumption of fruit juices by children has been identified as contributing to excessive calorie intake in children due their inability to provide a feeling of fullness (Flood-Obbagy and Rolls, 2009).

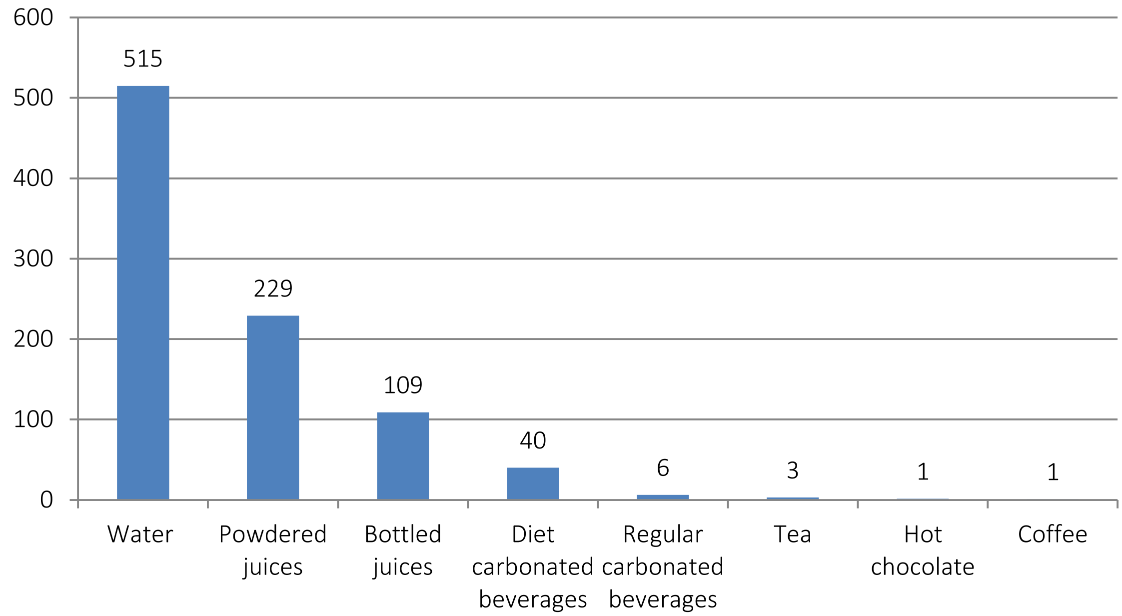
Regular carbonated beverages were consumed more often (0.31 times/day) than diet carbonated beverages (0.15 times/day). The consumption frequency of all types of carbonated beverages taken together was almost once every two days (0.46 times/day).

Table 302: Frequency of beverage consumption by participants from the Anishinabe communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Beverages – total	6.68 [6.082– 7.33]	2.72	7.14	12.00
Water	2.39 [2.06-2.77]	0.43	2.14	7.00
Powdered juices	1.76 [1.45 – 2.11]	0.00	2.00	6.00
Bottled juices or juice boxes	0.82 [0.64 – 1.01]	0.00	0.43	2.50
Regular carbonated beverages	0.31 [0.24 – 0.39]	0.00	0.14	1.00
Diet carbonated beverages	0.15 [0.10 – 0.20]	0.00	0.00	1.00
Tea	0.15 [0.08 – 0.22]	0.00	0.00	1.00
Sports drinks	0.13 [0.09 – 0.18]	0.00	0.00	0.43
Hot chocolate	0.09 [0.04 – 0.15]	0.00	0.00	1.00
Coffee	0.07 [0.03 – 0.12]	0.00	0.00	1.00
Energy drinks	0.02 [-0.00 – 0.03]	0.00	0.00	0.07

Figure 54 presents the average volume consumed for each beverage indicated. The values for sports drinks and energy drinks are not listed since they were not measured when the data were collected. It was noted that water was the beverage with the highest average daily consumption, i.e. 515 ml per day. However, the recommended daily water consumption in children and youths is between 1.5L and 2L (Mullen and Shield, 2017), although hydration needs vary widely depending on several factors, such as age and weight. Juices (bottled and powdered) represent 338 ml per day. Other beverages were consumed in lower quantities, i.e. 46 ml for carbonated beverages, and less than 5 ml for other beverages.

Figure 54: Volume (in ml) of beverages consumed by participants from the Anishinabe communities involved in the JES!-YEH! project



Consumption of tap water and bottled water

Although all participants had access to drinking water through the municipal water system, 13% of them consumed tap water exclusively at home. Twenty-seven percent of participants indicated that the taste, appearance, or odour of the water sometimes (10%) or always (17%) prevented them from drinking tap water. Furthermore, bottled water was consumed by 85% of participants.

Results – Beverage consumption – Participating Innu communities

Beverage consumption

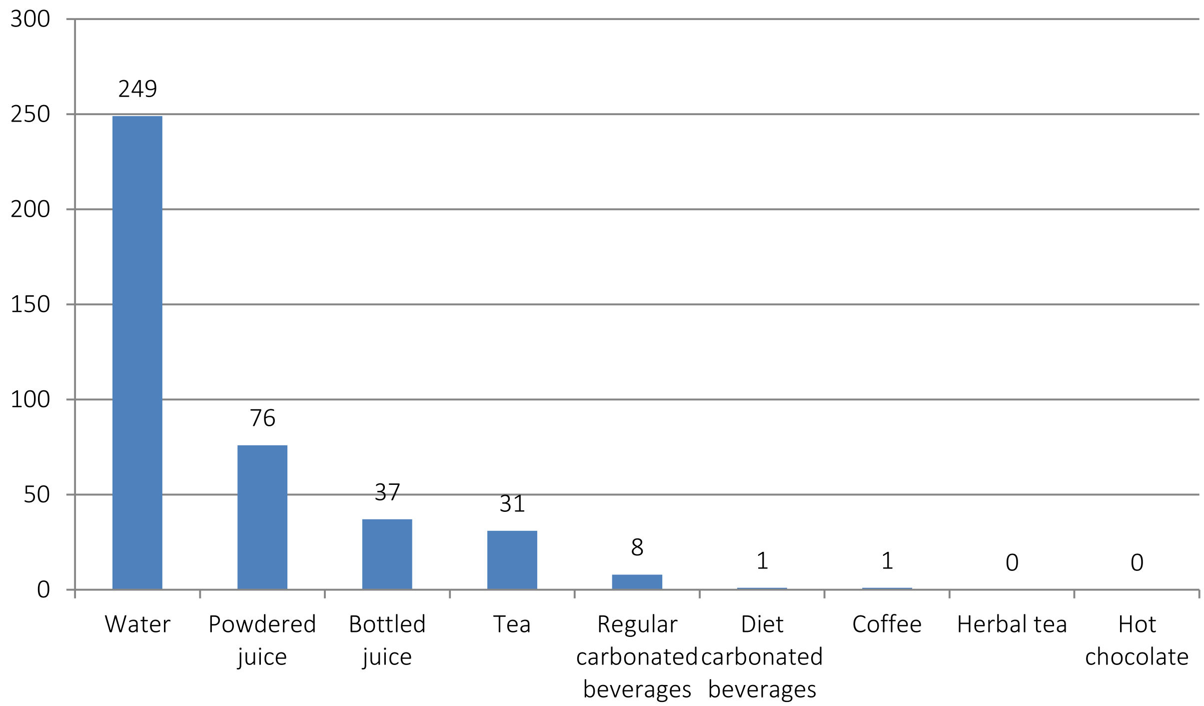
Table 303 presents the consumption of beverages by participants from the Innu communities. On average, total consumption frequency was 5.79 times per day. Although water was the most frequently consumed beverage (1.73 times/day), bottled juices (0.64 times/day) and especially powdered juices (1.18 times/day) also had high daily consumption. The average frequency of carbonated beverage consumption was 0.23 times/day (regular: 0.18 times/day and diet: 0.05 times/day) (Table 303). Caffeinated beverages (coffee, energy drinks) were rarely consumed (0.05 and 0.01 times per day respectively).

Table 303: Frequency of beverage consumption by participants from the Innu communities involved in the JES!-YEH! project

Variable	Geometric mean (CI 95%)	5th percentile	Median	95th percentile
Beverages – total	**5.79 [5.03 – 6.66]**	**1.57**	**5.64**	**14.07**
Water	1.73 [1.35 – 2.17]	0.00	1.43	8.00
Powdered juices	1.18 [0.85 – 1.57]	0.00	1.00	6.00
Bottled juices or juice boxes	0.64 [0.44 – 0.86]	0.00	0.43	4.50
Tea	0.61 [0.41 – 0.82]	0.00	0.43	4.00
Regular carbonated beverages	0.18 [0.11 – 0.25]	0.00	0.00	1.00
Sports drinks	0.16 [0.11 – 0.21]	0.00	0.07	0.79
Diet carbonated beverages	0.05 [0.00 – 0.09]	0.00	0.00	0.14
Coffee	0.05 [0.01 – 0.10]	0.00	0.00	0.29
Hot chocolate	0.02 [-0.00 – 0.04]	0.00	0.00	0.14
Energy drinks	0.01 [-0.00 – 0.02]	0.00	0.00	0.00
Herbal tea	0.01 [-0.00 – 0.01]	0.00	0.00	0.00

Figure 55 presents the average volume consumed for each beverage. The values for sports drinks and energy drinks are not listed since they were not measured when the data were collected. Water was consumed in greater quantities than the other beverages, i.e. 249 ml per day on average, followed by juices (powdered and bottled), with an average consumption volume of 103 ml per day. Average tea consumption was 31 ml per day, and other beverages were rarely consumed. In summary, water consumption was clearly below the recommendations for daily water consumption by children and youths, i.e. between 1.5L and 2L (Mullen and Shield, 2017).

Figure 55: Volume (in ml) of beverages consumed by participants from the Innu communities involved in the JES!-YEH! project



Consumption of tap water and bottled water

Fifteen percent of participants drank only tap water. Bottled water was consumed by 85% of participants, and 27% of them indicated that the taste, appearance, or odour of the water sometimes (18%) or always (9%) prevented them from drinking tap water.

References

PHAC (Public Health Agency of Canada) (2011a). Obesity in Canada – A Joint Report from the Public Health Agency Of Canada and the Canadian Institute for Health Information. Consulted online: http://www.canada.ca/content/dam/phac-aspc/migration/phac-aspc/hp-ps/hl-mvs/oic-oac/assets/pdf/oic-oac-eng.pdf

PHAC (Public Health Agency of Canada) (2011b). Diabetes in Canada: Facts and figures from a public health perspective. Chapter 6 – Diabetes among Indigenous populations (First Nations, Inuit and Métis). Consulted online: https://www.canada.ca/en/public-health/services/chronic-diseases/reports-publications/diabetes/diabetes-canada-facts-figures-a-public-health-perspective/chapter-6.html

PHAC (Public Health Agency of Canada) (2011c). Diabetes in Canada: Facts and figures from a public health perspective. Chapter 5 – Diabetes in youth and children. Consulted online: https://www.canada.ca/en/public-health/services/chronic-diseases/reports-publications/diabetes/diabetes-canada-facts-figures-a-public-health-perspective/chapter-5.html

ASPQ (Agence pour la santé publique du Québec) (2010). Dossier spécial sur les boissons sucrées. Bulletin de Santé publique 32:3.

Bazzano, L.A., Li, T.Y., Joshipura, K.J., Hu, F.B. (2008). Intake of Fruit, Vegetables, and Fruit Juices and Risk of Diabetes in Women. Diabetes Care, 31 (7), 1311-1317.

Bellamy, S., Hardy, C. (2015). Post-Traumatic Stress Disorder in Aboriginal People in Canada. National Collaborating Centre for Aboriginal Health. Consulted online: http://www.nccah-ccnsa.ca/Publications/Lists/Publications/Attachments/152/2015-10-07-RPT-MentalHealth01-PTSD-BellamyHardy-EN-Web.pdf

CINE (Centre for Indigenous Peoples' Nutrition and Environment)(2017). Benefits of Traditional Foods. Consulted online: www.mcgill.ca/cine/research/canada/food/benefits

Compher, C. (2006). The nutrition transition in American Indians. J. Transcult. Nurs., 17 (3), 217-23.

Downs, S.M., Arnold, A., Marshall, D., McCargar, L.J., Raine, K.D., Willows, N.D. (2007). Associations among the food environment, diet quality and weight status in Cree children in Québec. Public Health Nutr, 12(9), 1504-1511.

Earle, L. (2013). Traditional Aboriginal Diets and Health. National Collaborating Centre for Aboriginal Health. Consulted online: https://www.nccah-ccnsa.ca/docs/emerging/FS-TraditionalDietsHealth-Earle-EN.pdf

Ebbeling, C.B. (2014). Sugar-sweetened beverages and body weight. Current Opinion in Lipidology, 25 (1), 1-7.

RHS (First Nations Regional Longitudinal Health Survey) (2003). Obesity in Canada – Prevalence among aboriginal populations. Consulted online: https://www.canada.ca/en/public-health/services/health-promotion/healthy-living/obesity-canada/prevalence-among-aboriginal-populations.html - notei

Flood-Obbagy, J.E., Rolls, B.J. (2009). The effect of fruit in different forms on energy intake and satiety at a meal. Appetite. 52 (2), 416-422.

INSPQ (Institut national de santé publique du Québec) (2017a). Les jeunes de 15 à 17 ans sont de grands consommateurs de boissons sucrées. Communiqué de presse. Consulted online: www.stat.gouv.qc.ca/salle-presse/communique/communique-presse-2017/avril/avril1720.html

INSPQ (Institut national de santé publique du Québec) (2017b) La consommation de sucre et la santé – Fiche thématique. Consulted online: www.inspq.qc.ca/sites/default/files/publications/2236_consommation_sucre_sante_0.pdf

Merydith, S.P., Prout, H.T., Blaha, J. (2003). Social desirability and behavioral rating scales: An exploratory study with the Child Behavior Checklist/4-18. Psychology in the Schools, 40, 225-235.

Mullen, M., Shield, E. (2017). Water: How Much Do Kids Need? Eatright, Academy of Nutrition and Dietetics. Consulted online: www.eatright.org/resource/fitness/sports-and-performance/hydrate-right/water-go-with-the-flow

Passeport Santé (2011). Profil santé de la pomme de terre. Consulted online: www.passeportsante.net/fr/Nutrition/EncyclopedieAliments/Fiche.aspx?doc=pomme_de_terre_nu

Redwood, D.G., Ferucci, E.D., Schumacher, M.C., Johnson, J.S., Lanier, A.P. Helzer, L.J., Tom-Orme, L., Murtough, M.A., Slattery, M.L. (2008). Traditional Foods and Physical Activity Patterns and Associations with Cultural Factors in a Diverse Alaska Native Population. International Journal of Circumpolar Health, 67 (4), 334-348.

Samson, C., Pretty, J. (2006). Environmental and Health Benefits of Hunting Lifestyles and Diets for the Innu of Labrador. Food Policy, 31 (6), 528-553.

Health Canada (2010). Eating Well with Canada's Food Guide. First Nations, Inuit and Métis. Consulted online: https://www.canada.ca/en/health-canada/services/food-nutrition/reports-publications/eating-well-canada-food-guide-first-nations-inuit-metis.html - a_3

Health Canada (2011). Eating Well with Canada's Food Guide – A Resource for Educators and Communicators. Consulted online: www.canada.ca/content/dam/hc-sc/migration/hc-sc/fn-an/alt_formats/hpfb-dgpsa/pdf/pubs/res-educat-fra.pdf

Health Canada (2015). What is healthy eating? Consulted online: https://www.canada.ca/en/health-canada/services/tips-healthy-eating/what-is-healthy-eating.html

Health Canada (2016). Stay hydrated with water. Consulted online: https://www.canada.ca/en/health-canada/services/tips-healthy-eating/stay-hydrated-with-water.html

UWCPHN (University of Washington Center for Public Health Nutrition (2012). Replacing Juice with Fruit: Nutrition and Economic Effects. Issue Brief 6. Consulted online: depts.washington.edu/uwcphn/reports/JuiceBrief_Final.pdf

Willows, N.D. (2005). Determinants of healthy eating in Aboriginal peoples in Canada: the current state of knowledge and research gaps. Can. J. Public Health, 96 (Suppl 3), S32- S36.

Yukon Health and Social Services (2012). Traditional First Nations foods. Consulted online:
http://www.yukonwellness.ca/traditionalfood.php - .WYtkelXyi01

8.1. Conclusion on Other Health Determinants and Future Perspectives

Since this pilot project needed to include volunteer participants in two of the four project communities, <u>the data for the population aged 3 – 19 years in these communities is not necessarily representative and should be read with caution</u>. Furthermore, since the four communities that participated in the project were not chosen randomly, but were invited to participate voluntarily, these communities do not necessarily represent the nations to which they belong. Nevertheless, some significant trends emerge and are worthy of mention.

The proportion of overcrowded housing and household food insecurity among the participants from the Anishinabe communities involved in the JES!-YEH! project was concerning (34.9% and 42.9% respectively). Overcrowding was considerably higher than reported for the Anishinabe nation in 2008 in the Quebec First Nations Regional Health Survey (RHS) and for First Nations living on reserves in Canada in the 2011 National Household Survey. However, the percentage of food insecurity was similar to that reported in the RHS for Anishinabe adults living in households with children in 2008, but higher than that reported for Indigenous households in Canada in the Canadian Community Health Survey in 2004.

Although the proportion of participants who consumed traditional foods seemed to be high, their frequency of consumption was rather low. It should be noted that the participants in the Anishinabe communities consumed game and those in the Innu communities consumed fish an average of once per week (0.18 and 0.19 times/day respectively). Furthermore, the results of the JES!-YEH! project show that levels of exposure to mercury and lead were low. Post-study analyses will verify whether the low level of consumption of certain traditional foods that may contain these contaminants (fish, game, and birds) might explain these results. That being said, since traditional foods have significant cultural value and high nutritional quality, it is important to promote the consumption of these foods, while also minimizing exposure to these contaminants.

Traditional foods and prevention of exposure to lead and mercury

To prevent exposure to lead in children and youths and avoid contaminating the local wildlife, hunting with lead-free ammunition and improving nearby communities' access to these ammunition is strongly recommended. This includes steel pellets (balls) for hunting migratory birds or small terrestrial game, 100% copper bullets for large game, and steel pellets for *baby guns*, which are often used by youths.

To prevent exposure to mercury in food, it should be noted that non-predatory freshwater fish species, such as yellow perch, sturgeon, and rainbow and brook trout often contain little mercury. In saltwater, fish such as salmon, sea trout, light tuna (preserved) as well as seafood also contain little mercury (Pirkle et al., 2016).

For the participating Anishinabe communities, the food group consumed most often was starches (5.14 times/day). In contrast, vegetables and fruit were consumed less often (3.44 times/day), or only slightly more than meat and alternatives (2.98 times/day) and "other foods" (2.98 times/day). Traditional recipes were consumed an average of 0.24 times per day, and the frequency of consumption of all traditional foods on an annual basis was 0.37 times per day. For the participating Innu communities, the average frequency of consumption of food in the "other foods" group (4.34 times/day), or sweets and junk food, was very high, while starches were consumed somewhat more often, i.e. 4.86 times/day. In contrast, meat and alternatives as well as vegetables and fruit were the store-bought foods consumed least often (2.70 et 2.39 times/day respectively), and the total for traditional foods was an average of 0.58 times per day annually. Traditional recipes were rarely consumed, i.e. 0.06 times per day.

Compared to the recommendations currently in force, the participants' water consumption was insufficient both in the Innu and the Anishinabe communities involved in the project. In contrast, powdered juices were consumed frequently, while these types of juices represent a significant source of added sugars and are well known for contributing to the development of certain chronic diseases (INSPQ, 2017). Bottled water was also consumed by a large proportion of the study population. At the same time, waste management of plastic bottles is an increasingly large problem for all communities. It should be noted that the various activities available as part of the *Tchin-Tchin*

Challenge[6], which promotes both tap water consumption and the use of water bottles, helps make children and youths aware of this reality.

In summary, the data in the JES!-YEH! study show that traditional foods seemed to be consumed rather rarely in general, while ultra-processed foods such as processed meats (e.g., sausages and other prepared meats), sweets, junk food (e.g., chips, pastries, poutine) and powdered juices were consumed frequently. These foods are often of poor nutritional quality and their packaging may contain several chemical contaminants that can migrate into food or act as endocrine disruptors in humans, among other things (NIEHS, 2017; Zota et al., 2016). Increased consumption of these foods is associated with malnutrition, obesity, and several chronic diseases (Moubarac and Batal, 2016). Moreover, some of these risk factors and health problems have been identified in the participants and communities involved in the project, such as a higher percentage of iron deficiency, anemia, obesity, and diabetes. As part of the JES!-YEH! project, supplementary analyses will be conducted to document the relationship between food quality and packaging, health indicators, and exposure to environmental contaminants likely found in ultra-processed food (e.g., bisphenol A, PFNAs, phthalates, etc.).

Considering the multiple issues currently associated with food systems, food security, food quality, obesity, and chronic diseases around the globe, the United Nations has proclaimed the years 2016-2025 as the *United Nations Decade of Action on Nutrition* in order to eradicate hunger and prevent all types of malnutrition around the world (FAO-WHO, 2016). Moubarac et al. (2017) note that the increasing production and consumption of ultra-processed foods is a global crisis that must be at the centre of these measures to prevent malnutrition. Furthermore, in a recent article, Frumkin et al. (2017) call upon the scientific community to better document the role of contact with nature in improving health and preventing chronic diseases, and such an approach would be highly appropriate in children and youth in an Indigenous context. As observed during the project, store-bought food makes up the most significant part of the diet of children and youth, and not all members of the community necessarily have access to traditional foods. In the participating communities, several activities are held, such as cultural weeks and workshops teaching traditional knowledge, which are promising solutions for encouraging youths to follow their traditions.

These results show the importance of better understanding the determinants for healthy food environments in the communities and implementing preventive measures at the individual, community, regional, and national level to promote traditional activities and the consumption of traditional foods, minimize exposure to environmental contaminants, and counter the rapid increase of chronic diseases in First Nations youth.

[6] http://www.cqpp.qc.ca/app/uploads/2017/03/Defi_Tchin-tchin.pdf

References

ACCLPP (Advisory Committee on Childhood Lead Poisoning Prevention) (2012). CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in " Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention ". Atlanta. Consulted online: www.cdc.gov/nceh/lead/acclpp/cdc_response_lead_exposure_recs.pdf.

Dietitians of Canada (2014). Food Sources of Iron. Consulted online: http://www.dietitians.ca/Downloads/Factsheets/Food-Sources-of-Iron.aspx

FAO-WHO (Food and Agriculture Organization of the United Nations and World Health Organization) (2016). United Nations Decade of Action on Nutrition, 2016-2025. Food and Agriculture Organization of the United Nations and World Health Organization, Geneva, 4p. Consulted online: http://www.fao.org/3/a-i6129e.pdf

Frumkin, Bratman GN, JoBreslow S, Cochran B, KahnJr PH, Lawler JJ, Levin PS, Tandon PS, Varanasi U, Wolf KL, Wood SA. (2017). Nature Contact and Human Health: A Research Agenda. Environ. Health Perspect., in press.

INSPQ (Institut national de santé publique du Québec) (2017) La consommation de sucre et la santé – Fiche thématique. Consulted online: www.inspq.qc.ca/sites/default/files/publications/2236_consommation_sucre_sante_0.pdf

Moubarac, J.C., Parra, D.C., Cannon, G., Monteiro, C.A. (2014). Food Classification Systems Based on Food Processing: Significance and Implications for Policies and Actions: A Systematic Literature Review and Assessment. Curr. Obes. Rep., 3 (2), 256-72.

Moubarac, J.C., Batal, M. (2016). La consommation d'aliments transformés et la qualité de l'alimentation au Québec - Rapport soumis au Ministère de la Santé et des Services sociaux du Québec (MSSS). Consulted online: www.rccq.org/wp-content/uploads/Qu%C3%A9bec-MSSS-consommation-daliments-ultra-transform%C3%A9s-et-qualit%C3%A9-de-lalimentation_Moubarac-et-Batal-2016.pdf

NIEHS (National Institute of Environmental Health Sciences) (2017). Endocrine disruptors. Consulted online: www.niehs.nih.gov/health/topics/agents/endocrine/index.cfm.

Passeport Santé (2011). Les aliments riches en fer contre l'anémie. Consulted online: www.passeportsante.net/fr/Nutrition/Dietes/Fiche.aspx?doc=anemie_diete

Pirkle, C.M., Muckle, G., Lemire, M. (2016). Managing mercury exposure in northern Canadian communities. CMAJ, 188(14), 1015-1023.

Zota, A.R., Phillips, C.A., Mitro, S.D. (2016). Recent Fast Food Consumption and Bisphenol A and Phthalates Exposures among the U.S. Population in NHANES, 2003-2010. Environ. Health Perspect., 124 (10), 1521-1528.

9. Coming Soon

After presenting the results to the participants, parents, and communities, several discussions took place with our community partners from the FNQLHSSC and the FNIHB at the provincial and federal level. It should be noted that the regional FNIHB and FNQLHSSC nutritionists, Thanh Van Nguyen and Alexandra Picard-Sioui, are available if communities from the JES!-YEH! project would like to discuss the possibility of developing an action plan to fight anemia, obesity, and food insecurity in their communities. They will also be able to assist and support communities in implementing these plans once they are developed.

Confidential reports for each of the four communities were provided in early 2018.

As indicated in the preceding sections, food intake based on the results of the dietary questionnaires is currently being calculated. Emad Tahir's master's thesis on the factors of protection and risk factors for iron deficiency, anemia, and excessive manganese should be completed in the next few months. A new master's project on the relationship between the quality of the food being consumed and the consumption of ultra-processed foods, nutritional status, health indicators, and exposure to environmental contaminants will begin in the next few months. Deeper analyses studying the relationship between environmental contaminants, nutritional status, health indicators, and other health determinants, including the consumption of traditional foods (Objective 4) will also be conducted later.

Feel free to contact the project team if you have any questions, if you would like more information about specific results, or if you have any specific needs for new research projects.

Table of content

Appendix A – Fact sheet about the project

Axe Santé des Populations et Pratiques Optimales en Santé — CHU de Québec Centre de recherche — Affilié à Université Laval — Institut national de santé publique Québec

First Nations Youth, Environment & Health Pilot Study – YEH!

FACT SHEET

This pilot project is a great opportunity to:
→ Obtain a portrait of children and young adults' possible exposure to environmental contaminants
→ Document nutritional and health status of children and young adults in your community

What is this pilot study about?

Every day, we are exposed to a wide range of environmental contaminants through air, drinking water, foods, and products that come into contact with our skin. This study looks at how much of these contaminants end-up in our bodies and focuses on children since children are more sensitive and may be more exposed than adults to contaminants. This study was developed to help your community, Chief and Council, and health authorities learn more about health and the environment.

This study involves children and young adults from 3 to 19 years old. It will:

- Check if your child (3 to 17 years old) or you (18 and 19 years old) have been exposed to certain environmental contaminants (heavy metals such as lead and mercury, persistent organic pollutants and new contaminants).
- Look at other aspects of health and lifestyle: nutritional status (vitamins, fatty acids and several essential minerals), and anaemia, diabetes, cholesterol, thyroid hormones status.

Who will be part of it?

Approximately 200 First Nations children and young adults from 2 Innu and 2 Algonquin communities. For smaller communities, we will invite about 30 children and young adults to participate (together with their parents for minors), while for larger ones, we will invite about 80 children and young adults to participate.

Why are we focusing on First Nations' children in Quebec?

- Children are more sensitive than adults to contaminants.
- There is little information available on baseline levels of environmental contaminants and nutritional status in First Nations children in Quebec and Canada.
- First Nations communities in Quebec and First Nations children in Canada were not included in two fairly recent Canadian health studies monitoring human exposure to a wide range of environmental contaminants.

How contaminants can affect children's health?

Many studies have demonstrated the harmful effects of early exposure to contaminants on child development, for example:

- Lead mineral exposure during pregnancy or childhood can affect brain development and result in reduced intellectual performance, attention deficits, increased antisocial behavior, and reduced success in school[1]. Nowadays, the most common sources of lead are in the use of lead ammunition, old household paint, old water pipes, and some consumer goods (batteries, etc.)[2].
- Mercury exposure during pregnancy can affect attention, memory, intellectual performance, and language later in infancy and childhood[3]. Mercury exposure during childhood can also affect children's motor coordination

[1] Bellinger DC. Very low lead exposures and children's neurodevelopment. Curr Opin Pediatr. 2008 Apr;20(2):172-7.
[2] Fillion M, et al. Identification of environmental sources of lead exposure in Nunavut (Canada) using stable isotope analyses. Environ Int. 2014;71:63-73.
[3] Boucher, O, et al. (2012). Prenatal methylmercury, postnatal lead exposure, and evidence of attention deficit/hyperactivity disorder among Inuit children in Arctic Quebec. Environ Health Perspect 120(10): 1456-1461.

abilities[4]. Nowadays, the main source of mercury exposure is through the consumption of top-predators fish such as lake trout, pike and walleye[5].

Are there any benefits to participating in this pilot study?

By participating, you and your child will be:

- helping your community to know if children and young adults of your community are exposed to contaminants;
- helping your community to know more about how healthy children are, and how health care could be improved;
- helping your community to undertake actions that will improve the health of the environment if needed and as a result, also bringing long-term positive health impacts to your community and to future generations;
- helping track trends of several contaminants, so that environmental sources and health effects of these contaminants may be better identified;
- helping researchers better document best research practices with First Nations children and young adults, and plan the future *First Nations Biomonitoring Initiative among children and young adults across Canada*;
- receiving his/her personal level of exposure to environmental contaminants, and more information about his/her nutritional and health status, which may help you and your local physician/nurse to make improvements, if needed.

In order to thank you for your participation, a 50$ food coupon will be given to you at the end of the visit.

What will your child (3 to 17 years old) or you (18 and 19 years old) be asked to do as a participant?

Children and young adults will be selected by random chance - like a lottery ticket - to participate in the study.

If selected, the steps are:

- *For children and youth between 3 and 17 years old:*

If you, the parent or legal guardian*, agree to have your child participate in the study, you will be asked to answer a questionnaire of about 45 minutes in a face-to-face interview. Feel free to ask for a translator to help you understand the questions. The questionnaire will be about your child's health and food security status, eating habits, lifestyle, housing conditions, potential sources of exposure to environmental contaminants and socio-demographic characteristics. Young people between 14 and 17 years old will be asked to directly answer questions about their eating habits and lifestyle. Your child will also be asked for blood, urine and hair samples and for his/her height and weight. Samples will be collected with nurses especially trained to work with children. The whole visit will take about 1.5 hours.
* Young mothers below 18 years old can consent for their child and themselves.

- *For young adults of 18 and 19 years old:*

If you agree to participate in the study, you will be asked to answer a questionnaire of about 45 minutes in a face-to-face interview. Feel free to ask for a translator to help you understand the questions. The questionnaire will be about your health and food security status, eating habits, lifestyle, housing conditions, potential sources of exposure to environmental contaminants and socio-demographic characteristics. You will also be asked for blood, urine and hair samples and your height and weight will be measured. The whole visit will take about 1.5 hours.

Do you have to participate in this pilot study?

You can decide whether you want your child or yourself to be in this study or not. What you decide will not cause any prejudice to you, your child or your family, and will not have any effect on the health care that you or your child receives.

---

[4] Despres C, et al. Neuromotor functions in Inuit preschool children exposed to Pb, PCBs, and Hg. Neurotoxicol Teratol 2005; 27: 245-57.
[5] Lemire M et al. Local country food sources of methylmercury, selenium and omega-3 fatty acids in Nunavik, Northern Quebec. Sci Total Environ. 2015; 509–510: 248–259.

Qui sommes-nous?

Notre équipe est du Centre de recherche du CHU de Québec, affilié à l'Université Laval à Québec

- Mélanie Lemire (Chercheure principale): melanie.lemire@crchuq.ulaval.ca
- Elisabeth Gagné (Coordinatrice du projet): elisabeth.gagne.1@ulaval.ca

Et nos partenaires?

- Commission de santé et de services sociaux des Premières Nations du Québec et du Labrador (CSSSPNQL)
- Institut national de santé publique du Québec (INSPQ)
- Directions régionales de santé publique

Qui finance l'étude?

La Direction générale de la santé des Premières Nations et des Inuits et la Direction générale de la santé environnementale et de la sécurité de Santé Canada

Vous désirez plus d'information?

Contactez Elisabeth Gagné: elisabeth.gagne.1@ulaval.ca, + 418-525-4444 ext.46580

Nous serons heureux d'avoir de vos nouvelles!

Suivez-nous sur Facebook: YES! JES!

Appendix B – Consent forms

Monitoring of environmental pollutants and health determinants in children and young adults (3-19 years old) from Quebec's First Nations communities in Quebec: A pilot study

INFORMATION SHEET AND CONSENT FORM (3-17 years old)

Principal Investigator:	Mélanie Lemire, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada.
Co-investigators:	Gina Muckle, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec, Département de psychologie, Université Laval. Pierre Ayotte, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), and Québec National Institute of Public Health, Québec. Mylène Riva, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada. Michel Lucas, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada.
Organisation in charge:	Centre de recherche du CHU de Québec, Université Laval.
Study partners:	First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC) and Institut national de santé publique (INSPQ)

Funding Organization:	First Nations and Inuit Health Branch (FNIHB) and Healthy Environments and Consumer Safety Branch (HECSB) of Health Canada.

Take your time to read this information sheet and consent form. If something is not clear to you or if you do not understand something, please do not hesitate to ask questions. It will be our pleasure to answer them.

What is this pilot study about?

Every day, we are exposed to a wide range of environmental contaminants through air, drinking water, foods, and products that come into contact with our skin. This study looks at how much of these contaminants end-up in our bodies and focuses on children and youth since children and youth are more sensitive and may be more exposed than adults to contaminants. This study was developed to help your community, Chief and Council, and health authorities learn more about health and the environment.

The study will examine:

- If your child is exposed to certain environmental contaminants (heavy metals, persistent organic pollutants and new contaminants), and what are the factors associated to these expositions.
- Other indicators and determinants of your child's health such as nutritional status (vitamins, fatty acids and several essential minerals), anaemia, diabetes, cholesterol, thyroid hormones status, socio-economic and housing conditions, food security, eating habits, and lifestyle, and the associations between these health indicators and determinants;
- The associations between exposure to environmental contaminants and these health indicators and determinants.

Who will be part of it? Approximately 200 First Nations children and young adults, between 3 and 19 years old, from 2 Innu and 2 Algonquin communities.

What will your child be asked to do as a participant?

If you agree to have your child participate in the study, you will be asked to answer a questionnaire of about 45 minutes in a face-to-face interview. Feel free to ask for a translator to help you understand the questions. The questionnaire will be about your child's health and food security status, eating habits, lifestyle, housing conditions, potential sources of exposure to environmental contaminants and socio-demographic information. Young study participants between 14 and 17 years old will be asked to directly answer questions about their eating habits and lifestyle. Your child will also be asked for blood, urine and hair samples and for his/her height and weight. Samples will be collected with nurses especially trained to work with children. The whole visit will take about 1.5 hours.

Why are we taking blood, urine and hair samples and what will we do with them?

Blood, urine and hair analyses will mainly allow researchers to determine the exact quantity of each studied element your child has in his/her body. It will also allow researchers to examine your child's nutrition and health status.

Remaining blood, urine and hair samples will be stored for 10 years in the laboratory of the CHU-CHUL in Quebec City. This will allow control analyses if needed, and the biological analyses permitted are strictly limited to those approved in the present consent form. To conduct any other biological analysis after study results are returned to the community, the research team will first have to seek your approval. Blood, urine and hair samples will never be used to test for drugs or genetic testing, nor provided to any commercial or pharmaceutical companies.

Are there any benefits to participating in this pilot study?

By participating, you and your child will be:

- helping your community to know if children and young adults of your community are exposed to contaminants;
- helping your community to know more about how healthy children are, and how health care could be improved;
- helping your community to undertake actions that will improve the environment if needed and as a result, also bringing long-term positive health impacts to your community and to future generations;
- helping track trends of several contaminants, so that environmental sources and health effects of these contaminants may be better identified;
- helping researchers better document best research practices with First Nations children and young adults, and plan the future *First Nations Biomonitoring Initiative among children and young adults across Canada*;
- receiving his/her personal level of exposure to environmental contaminants, and more information about his/her nutritional and health status, which may help you and your local physician/nurse to make improvements, if needed.

In order to thank you and your child for your participation, a 50$ food coupon will be given to you at the end of the visit.

Are there risks to participating in this pilot study?

We do not think that being in the study will cause your child any harm. But when your child gives a blood sample, he or she might develop a light bruise where the needle goes in. This process is no different as when a family doctor or nurse takes a blood sample.

How will we keep your information confidential?

All information gathered for this study will be kept confidential and professional secrecy will be applied by all people working with personal and research data. The information you provide us will be labelled with a number, not by your child's name. The data for your community, without the names of the participants, will be provided to your health authorities. Data will also be stored securely in offices at the CHU de Québec Research Centre, where access to it will be strictly controlled.

Do you have to participate in this pilot study?

- You can decide whether you want your child to be in this study or not. Even if you agree for your child to be in the study, you can change your mind later if you do not want your child to continue. What you decide will not cause any prejudice to you, your child or members of your family, and will not have any effect on the health care that you or your child receives.
- Your child must also assent to participate in the study (meaning that she/he understands what the study is about and agrees to the decision that was taken for him/herself). Your child has the right to refuse to participate even if you consent for your child to be in this study.

When and how can you find out about the results of the pilot study?

The research team will go back to your community with preliminary results in the year following the end of the data collection. This delay is a result of the time necessary to complete the laboratory analyses and to compile, discuss and interpret the results with the advisory committee of the study, and community leaders involved in it. Again, your child will never be identified in any communications regarding community results.

For your child's personal results, we will come back to your community to return and explain the results to you. If you wish, these results can also be sent to your local clinic (or the doctor of your choice) to be added to your child's medical file. If needed, local doctor/nurses of your community will ensure adequate follow-up and medical care to your child. Support from the research team, the FNQLHSSC and the Regional Public Health authorities will also be available.

We will also present to your community a general report to explain what the study found out (in community meetings, by radio, during workshops, etc.). Your child's name will not appear in any report and we will be careful that your child cannot be identified.

A summary of the results for all communities involved in the pilot study will also be produced, discussed with the advisory committee of the study and later disseminated. They may also be published in scientific journals or presented at conferences (with the communities' consent).

If you have questions later about this pilot study, whom can you call?

The study is being done by the Research Center of the CHU in Québec. All aspects of this project have been discussed with your community health authorities and leaders, and they have agreed to include your community in the pilot study.

If you have any questions or comments about this research project, please feel free to contact:

> Dr Mélanie Lemire, Assistant Professor and Principal Investigator, Department of Social and Preventive Medicine, Laval University : +1 (418) 525-4444, ext. 46535 (Quebec City office); +1 (418) 866-1138 (cell phone).

If you have any complaints about your child's participation to this study, you can also call the Local Complaints and Quality Services of the Chu de Québec at +1 418-654-2211 (Quebec City).

If you have questions concerning your child's rights as a subject of research, you can contact the Ethics Board of CHU de Québec: +1 418- 525-4444, ext. 52715 (Quebec City).

Monitoring of environmental pollutants and health determinants in children and young adults (3-19 years old) from First Nations communities in Quebec: A pilot study

CONSENT FORM (3-17 years old)

- I have read and understand what is involved in this study in English, a language that I understand and speak fluently;
- I understand that I can choose whether or not to have my child be in the study and that I can withdraw his/her participation at any time without suffering any consequences;
- My child understands what the study is about and agrees to the decision that was taken for him/her;
- I have been able to ask all questions I wanted regarding the study and the answers that I received were satisfactory;
- I have read the information sheet and consent form and understand what is involved in this study.

I agree to participate with my child participate in this pilot project.

Yes ☐ No ☐

I would like my child's results to be sent to the local clinic (or to the doctor of my choice) to be placed in his/her medical file.

Yes ☐ No ☐

The doctor of my choice (if other than a doctor at my local clinic) is: Name ______________________
Address______________________

Other choice (You do not need to agree to participate the study)

I authorize the principal investigator to communicate with me for a follow-up on my child's results or for any other analyses not mentioned above.

Yes ☐ No ☐

Name of the participant	Signature (participants 14 to 17 years old)	____/____/____ Date (d/m/y)
Name of participant's parent/ legal guardian	Signature	____/____/____ Date (d/m/y)
Name of witness	Signature	____/____/____ Date (d/m/y)
Name of principal investigator or his designated representative	Signature	____/____/____ Date (d/m/y)

Monitoring of environmental pollutants and health determinants in children and young adults (3-19 years old) from First Nations communities in Quebec: A pilot study

INFORMATION SHEET AND CONSENT FORM (18 and 19 years old)

Principal Investigator:	**Mélanie Lemire**, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada.
Co-investigators:	**Gina Muckle**, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec, Département de psychologie, Université Laval. **Pierre Ayotte**, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), and Québec National Institute of Public Health, Québec. **Mylène Riva**, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada. **Michel Lucas**, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada.
Organization in charge:	Centre de recherche du CHU de Québec, Université Laval.
Study partners:	First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC) and Institut national de santé publique (INSPQ)
Funding Organization:	First Nations and Inuit Health Branch (FNIHB) and Healthy Environments and Consumer Safety Branch (HECSB) of Health Canada.

Take your time to read this information sheet and consent form. If something is not clear to you or if you do not understand something, please do not hesitate to ask questions. It will be our pleasure to answer them.

What is this pilot study about?

Every day, we are exposed to a wide range of environmental contaminants through air, drinking water, foods, and products that come into contact with our skin. This study looks at how much of these contaminants end-up in our bodies and focuses on youth since youth are more sensitive and may be more exposed than adults to contaminants. This study was developed to help your community, Chief and Council, and health authorities learn more about health and the environment.

The study will examine:

- If you are exposed to certain environmental contaminants (heavy metals, persistent organic pollutants and new contaminants), and what are the factors associated to these expositions.
- Other indicators and determinants of your health such as nutritional status (vitamins, fatty acids and several essential minerals), anaemia, diabetes, cholesterol, thyroid hormones status, socio-economic and housing conditions, food security, eating habits, and lifestyle, and the associations between these health indicators and determinants;
- The associations between exposure to environmental contaminants and these health indicators and determinants.

Who will be part of it? Approximately 200 First Nations children and young adults, between 3 and 19 years old, from 2 Innu and 2 Algonquin communities.

What will you be asked to do as a participant?

If you agree to participate in the study, you will be asked to answer a questionnaire of about 45 minutes in a face-to-face interview. Feel free to ask for a translator to help you understand the questions. The questionnaire will be about your health and food security status, eating habits, lifestyle, housing conditions, potential sources of exposure to environmental contaminants and socio-demographic information. You will also be asked for a blood, urine and hair sample and we will measure your height and weight. Samples will be collected with nurses especially trained to work with youth. The whole visit will take about 1.5 hours.

Why are we taking blood, urine and hair samples and what will we do with them?

Blood, urine and hair analyses will mainly allow researchers to determine the exact quantity of each studied element you have in your body. It will also allow researchers to examine your nutrition and health status.

Remaining blood, urine and hair samples will be stored for 10 years in the laboratory of the CHU-CHUL in Quebec City. This will allow control analyses if needed, and the biological analyses permitted are strictly limited to those approved in the present consent form. To conduct any other biological analysis after study results are returned to the community, the research team will first have to seek your approval. Blood, urine and hair samples will never be used to test for drugs or genetic testing, nor provided to any commercial or pharmaceutical companies.

Are there any benefits to participating in this pilot study?

By participating, you will be:

- helping your community to know if children and young adults of your community are exposed to contaminants;
- helping your community to know more about how healthy children and young adults are, and how health care could be improved;
- helping your community to undertake actions that will improve the environment if needed and as a result, also bringing long-term positive health impacts to your community and to future generations;
- helping track trends of several contaminants, so that environmental sources and health effects of these contaminants may be better identified;
- helping researchers better document best research practices with First Nations children and young adults, and plan the future *First Nations Biomonitoring Initiative among children and young adults across Canada*;
- receiving your personal level of exposure to environmental contaminants, and more information about your nutritional and health status, which may help you and your local physician/nurse to make improvements, if needed.

In order to thank you for your participation, a 50$ food coupon will be given to you at the end of the visit.

Are there risks to participating in this pilot study?

We do not think that being in the study will cause any harm. But when you will give a blood sample, you might develop a light bruise where the needle goes in. This process is no different as when a family doctor or nurse takes a blood sample.

How will we keep your information confidential?

All information gathered for this study will be kept confidential and professional secrecy will be applied by all people working with personal and research data. The information you provide us will be labelled with a number, not by your name. The data for your community, without the names of the participants, will be provided to your health authorities. Data will also be stored securely in offices at the CHU de Québec Research Centre, where access to it will be strictly controlled.

Do you have to participate in this pilot study?

You can decide whether you want to be in this study or not. Even if you agree to be in the study, you can change your mind later if you do not want to continue. What you decide will not cause any prejudice to you or members of your family, and will not have any effect on the health care that you receive.

When and how can you find out about the results of the pilot study?

The research team will go back to your community with preliminary results in the year following the end of the data collection. This delay is a result of the time necessary to complete the laboratory analyses and to compile, discuss and interpret the results with the advisory committee of the study, and community leaders involved in it. Again, you will never be identified in any communications regarding community results.

For your personal results, we will come back to your community to return and explain the results to you. If you wish, these results can also be sent to your local clinic (or the doctor of your choice) to be added to your medical file. If needed, local doctor/nurses of your community will ensure adequate follow-up and medical care. Support from the research team, the FNQLHSSC and the Regional Public Health authorities will also be available.

We will also present to your community a general report to explain what the study found out (in community meetings, by radio, during workshops, etc.). Your name will not appear in any report and we will be careful that you cannot be identified.

A summary of the results for all communities involved in the pilot study will also be produced, discussed with the advisory committee of the study and later disseminated. They may also be published in scientific journals or presented at conferences (with the communities' consent).

If you have questions later about this pilot study, whom can you call?

The study is being done by the Research Center of the CHU in Québec. All aspects of this project have been discussed with your community health authorities and leaders, and they have agreed to include your community in the pilot study.

If you have any questions or comments about this research project, please feel free to contact:

> Dr Mélanie Lemire, Assistant Professor and Principal Investigator, Department of Social and Preventive Medicine, Laval University : +1 (418) 525-4444, ext. 46535 (Quebec City office); +1 (418) 866-1138 (cell phone).

If you have any complaints about your participation to this study, you can also call the Local Complaints and Quality Services of the Chu de Québec at +1 418-654-2211 (Quebec City).

If you have questions concerning your rights as a subject of research, you can contact the Ethics Board of CHU de Québec: +1 418- 525-4444, ext. 52715 (Quebec City).

Monitoring of environmental pollutants and health determinants in children and young adults (3-19 years old) from First Nations communities in Quebec: A pilot study

CONSENT FORM (18 and 19 years ols)

- I have read and understand what is involved in this study in English, a language that I understand and speak fluently;
- I understand that I can choose whether or not to be in the study and that I can withdraw at any time without suffering any consequences;
- I have been able to ask all questions I wanted regarding the study and the answers that I received were satisfactory;
- I have read the information sheet and consent form and understand what is involved in this study.

I agree to participate in this pilot project.

Yes ☐ No ☐

I would like my results to be sent to the local clinic (or to the doctor of my choice) to be placed in my medical file.

Yes ☐ No ☐

The doctor of my choice (if other than a doctor at my local clinic) is: Name ________________________

Address________________________

Other choice (You do not need to agree to participate the study) I authorize the principal investigator to communicate with me for a follow-up on my results or for any other analyses not mentioned above. Yes ☐ No ☐

___________________________	_________________________________	____/____/____
Name of participant	Signature	Date (d/m/y)
___________________________	_________________________________	____/____/____
Name of witness	Signature	Date (d/m/y)
___________________________	_________________________________	____/____/____
Name of principal investigator or his designated representative	Signature	Date (d/m/y)

Monitoring of environmental pollutants and health determinants in children and young adults (3-19 years old) from Quebec's First Nations communities in Quebec: A pilot study

INFORMATION SHEET AND CONSENT FORM

for young mothers between 14 and 17 years old (☐ for themselves or ☐ their child)

Principal Investigator: **Mélanie Lemire**, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada.

Co-investigators: **Gina Muckle**, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec, Département de psychologie, Université Laval.
Pierre Ayotte, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), and Québec National Institute of Public Health, Québec.
Mylène Riva, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada.
Michel Lucas, Axe - Santé des populations et pratiques optimales en santé, Centre de recherche du CHU (Centre hospitalier universitaire) de Québec; Département de médecine sociale and préventive, Université Laval, Québec (Qc), Canada.

Organisation in charge: Centre de recherche du CHU de Québec, Université Laval.

Study partners: First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC) and Institut national de santé publique (INSPQ)

Funding Organization: First Nations and Inuit Health Branch (FNIHB) and Healthy Environments and Consumer Safety Branch (HECSB) of Health Canada.

Take your time to read this information sheet and consent form. If something is not clear to you or if you do not understand something, please do not hesitate to ask questions. It will be our pleasure to answer them.

What is this pilot study about?

Every day, we are exposed to a wide range of environmental contaminants through air, drinking water, foods, and products that come into contact with our skin. This study looks at how much of these contaminants end-up in our bodies and focuses on children and youth since children and youth are more sensitive and may be more exposed than adults to contaminants. This study was developed to help your community, Chief and Council, and health authorities learn more about health and the environment.

The study will examine:

- If you or your child are exposed to certain environmental contaminants (heavy metals, persistent organic pollutants and new contaminants), and what are the factors associated to these expositions.
- Other indicators and determinants of your health or your child's health such as nutritional status (vitamins, fatty acids and several essential minerals), anaemia, diabetes, cholesterol, thyroid hormones status, socio-economic and housing conditions, food security, eating habits, and lifestyle, and the associations between these health indicators and determinants;
- The associations between exposure to environmental contaminants and these health indicators and determinants.

Who will be part of it? Approximately 200 First Nations children and young adults, between 3 and 19 years old, from 2 Innu and 2 Algonquin communities.

What will you or your child be asked to do as a participant?

If you agree to participate or to have your child participate in the study, you will be asked to answer a questionnaire of about 45 minutes in a face-to-face interview. Feel free to ask for a translator to help you understand the questions. The questionnaire will be about you or your child's health and food security status, eating habits, lifestyle, housing conditions, potential sources of exposure to environmental contaminants and socio-demographic information. You or your child will also be asked for blood, urine and hair samples and for his/her height and weight. Samples will be collected with nurses especially trained to work with children. The whole visit will take about 1.5 hours each.

Why are we taking blood, urine and hair samples and what will we do with them?

Blood, urine and hair analyses will mainly allow researchers to determine the exact quantity of each studied element you or your child has in your or his/her body. It will also allow researchers to examine your or your child's nutrition and health status.

Remaining blood, urine and hair samples will be stored for 10 years in the laboratory of the CHU-CHUL in Quebec City. This will allow control analyses if needed, and the biological analyses permitted are strictly limited to those approved in the present consent form. To conduct any other biological analysis after study results are returned to the community, the research team will first have to seek your approval. Blood, urine and hair samples will never be used to test for drugs or genetic testing, nor provided to any commercial or pharmaceutical companies.

Are there any benefits to participating in this pilot study?

By participating, you and your child will be:

- helping your community to know if children and young adults of your community are exposed to contaminants;
- helping your community to know more about how healthy children are, and how health care could be improved;
- helping your community to undertake actions that will improve the environment if needed and as a result, also bringing long-term positive health impacts to your community and to future generations;
- helping track trends of several contaminants, so that environmental sources and health effects of these contaminants may be better identified;
- helping researchers better document best research practices with First Nations children and young adults, and plan the future *First Nations Biomonitoring Initiative among children and young adults across Canada*;
- receiving your or your child personal level of exposure to environmental contaminants, and more information about his/her nutritional and health status, which may help you and your local physician/nurse to make improvements, if needed.

In order to thank you and your child of your participation, **a 50$ food coupon** (one for your participation and/or one for your child participation) will be given to you at the end of the visit.

Are there risks to participating in this pilot study?

We do not think that being in the study will cause any harm to you or your child. But when you or your child gives a blood sample, he or she might develop a light bruise where the needle goes in. This process is no different as when a family doctor or nurse takes a blood sample.

How will we keep your information confidential?

All information gathered for this study will be kept confidential and professional secrecy will be applied by all people working with personal and research data. The information you provide us will be labelled with a number, not by your or your child's name. The data for your community, without the names of the participants, will be provided to your health authorities. Data will also be stored securely in offices at the CHU de Québec Research Centre, where access to it will be strictly controlled.

Do you have to participate in this pilot study?

- You can decide whether you want to participate or your child to be in this study or not. Even if you agree, you can change your mind later if you do not want to continue. What you decide will not cause any prejudice to you, your child or members of your family, and will not have any effect on the health care that you or your child receives.
- Your child must also assent to participate in the study if you agrees to it (meaning that she/he understands what the study is about and agrees to the decision that was taken for him/herself). Your child has the right to refuse to participate even if you consent for your child to be in this study.

When and how can you find out about the results of the pilot study?

The research team will go back to your community with preliminary results in the year following the end of the data collection. This delay is a result of the time necessary to complete the laboratory analyses and to compile, discuss and interpret the results with the advisory committee of the study, and community leaders involved in it. Again, you or your child will never be identified in any communications regarding community results.

For you or your child's personal results, we will come back to your community to return and explain the results to you. If you wish, these results can also be sent to your local clinic (or the doctor of your choice) to be added to you or your child's medical file. If needed, local doctor/nurses of your community will ensure adequate follow-up and medical care to you or your child. Support from the research team, the FNQLHSSC and the Regional Public Health authorities will also be available.

We will also present to your community a general report to explain what the study found out (in community meetings, by radio, during workshops, etc.). You and your child's name will not appear in any report and we will be careful that you cannot be identified.

A summary of the results for all communities involved in the pilot study will also be produced, discussed with the advisory committee of the study and later disseminated. They may also be published in scientific journals or presented at conferences (with the communities' consent).

If you have questions later about this pilot study, whom can you call?

The study is being done by the Research Center of the CHU in Québec. All aspects of this project have been discussed with your community health authorities and leaders, and they have agreed to include your community in the pilot study.

If you have any questions or comments about this research project, please feel free to contact:

> **Dr Mélanie Lemire**, Assistant Professor and Principal Investigator, Department of Social and Preventive Medicine, Laval University : +1 (418) 525-4444, ext. 46535 (Quebec City office); +1 (418) 866-1138 (cell phone).

If you have any complaints about you or your child's participation to this study, you can also call the Local Complaints and Quality Services of the Chu de Québec at +1 418-654-2211 (Quebec City).

If you have questions concerning you or your child's rights as a subject of research, you can contact the Ethics Board of CHU de Québec: +1 418- 525-4444, ext. 52715 (Quebec City).

Monitoring of environmental pollutants and health determinants in children and young adults (3-19 years old) from First Nations communities in Quebec: A pilot study

CONSENT FORM

for young mothers between 14 and 17 years old (☐ for themselves or ☐ their child)

- I have read and understand what is involved in this study in English, a language that I understand and speak fluently;
- I understand that I can choose whether or not to participate or to have my child participate in the study, and that I can withdraw our participation at any time without suffering any consequences;
- My child understands what the study is about and agrees to the decision that was taken for him/her;
- I have been able to ask all questions I wanted regarding the study and the answers that I received were satisfactory;
- I have read the information sheet and consent form and understand what is involved in this study.

I agree to participate in this pilot project.

Yes ☐ No ☐

AND/OR

I agree to participate with my child participate in this pilot project.

Yes ☐ No ☐

AND

I would like my results and/or child's results to be sent to the local clinic (or to the doctor of my choice) to be placed in his/her medical file.

Yes ☐ No ☐

The doctor of my choice (if other than a doctor at my local clinic) is: Name ________________________
Address________________________

Other choice (You do not need to agree to participate the study)

I authorize the principal investigator to communicate with me for a follow-up on my results or my child's results or for any other analyses not mentioned above.

Yes ☐ No ☐

___________________	___________________	____/____/____
Name of the young mother	Signature	Date (d/m/y)
___________________	___________________	____/____/____
Name of witness	Signature	Date (d/m/y)
___________________	___________________	____/____/____
Name of principal investigator or his designated representative	Signature	Date (d/m/y)

Appendix C – Questionnaires

Questionnaires for the Anishnabeg communities

FIRST NATION YOUTH, ENVIRONMENT AND HEALTH PILOT STUDY – YEH*!*
INTERVIEW-ADMINISTERED QUESTIONNAIRE

GENERAL INFORMATION

GI1. Date: ____/___/____
Day/Mo/Year

GI3. Community: ____

GI4. Participant's age: ________ years GI5. Date of birth: _______/____/______ Day/Mo/Year GI6. Sex: ☐ 1. Female ☐ 2. Male

GI7. The parent/legal guardian or participant came to the health centre with their medication:
☐ 1. Yes
☐ 2. No

GI8. The parent/legal guardian or participant came to the health centre with their supplements:
☐ 1. Yes
☐ 2. No

GI9. Which questionnaire needs to be answered and by whom?
☐ 3 to 13 year old: → ☐ 1. Q1 – Part A & Part B by parents/legal guardian
☐ 14 to 17 year old: → ☐ 2. Q1 – Part A by parents/legal guardian (cig.and child's health by teenager?)
→ ☐ 3. Q1 – Part B by teenager
OR if the teenager does not want to answer:
→ ☐ 4. Q1 – Part B by parents/legal guardian
☐ Young mother – her child → ☐ 5. Q1 – Part A & Part B by young mother

QUESTIONNAIRE 1 – PART A

GI10. Interviewer: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda)

GI2. Time start interview: ____: ____ (24h)

During this interview, I will be asking you general questions about your health status, and smoking habits. Feel free to ask for a translator to help you understand the questions. Young people between 14 and 17 years old will be also directly asked to answer questions about their cigarette consumption. Some questions are personal. You may wonder why they are asked in a study aimed to document exposure to environmental contaminants, nutrition and health status. These questions are important to help understand how we get exposed to contaminants and how they relate to our body measurements, or our nutritional or health status. All the information you give me is kept confidential; I will not tell anyone anything you tell me. You can choose not to answer some questions or stop answering this questionnaire at any time.

CHILD'S HEALTH STATUS

This first section deals with various aspects of your child's or your health.

GI11. This section is filled out by:
☐ 1. Parent/Legal guardian
☐ 2. Teenager (14-17 years old)

* In this section INTERVIEWER refers to "your child", "this child", directly to the child's name, of "your health" if answered by the teenager

CH1. In general, how would you rate your child's or your health?
☐ 1. Excellent
☐ 2. Very Good
☐ 3. Good
☐ 4. Fair
☐ 5. Poor

CH2. Compared to one year ago, how would you rate your child's health or your health now?
☐ 1. Much better now than 1 year ago
☐ 2. Somewhat better now (than 1 year ago)
☐ 3. About the same as 1 year ago
☐ 4. Somewhat worse now (than 1 year ago)
☐ 5. Much worse now (than 1 year ago)

CH3. Does your child or do you have a regular/family doctor?
☐ 1. Yes
☐ 2. No
☐ 3. Don't know

CH4. Was your child or were you born before 37 weeks of pregnancy? (pre-term birth)
☐ 1. Yes
☐ 2. No
☐ 3. Don't know

(Skip CH5)

This section is about certain health conditions that your child or you may have. We are interested by those which are expected to last or have already lasted 6 months or more (long-term), AND that have been diagnosed by a doctor or a nurse.

Did your child ever suffered/Is he suffering from? Did you ever suffered/Are you suffering from?	NO	YES	Don't know	Age first diagnosed?
CH6. Recurrent Bronchitis/Bronchiolitis				
CH7. Asthma				
CH8. Anaemia (lack of iron)				
CH9. High blood pressure (high blood pressure)				
CH10. High blood cholesterol (high cholesterol)				
CH11. Heart disease				
CH12. Thyroid condition				
CH13. Liver problem, if yes, which: ______________________				
CH14. Cancer, if yes, which: ___________________________				
Diabetes				
CH15. Type 1 diabetes (insulin dependant)				
CH16. Type 2 diabetes (non-insulin dependant)				
CH17. Type 2 pre-diabetes (glucose intolerance)				
CH19. Any other diagnosis: ___________________________				

CH20. IN THE LAST 24 HOURS (since yesterday), did your child or you take medication, for example prescription or over-the-counter medication.
☐ 1. Yes
☐ 2. No (Go to CH22)

CH21. If YES,
- Please tell me the name of all of these products and the reason for medication
- In THE LAST MONTH, how often was each of these medications taken?

MEDICATION NAME (name and molecule)	Reason and frequency (Daily or sporadic? Duration?)
1.	
2.	
3.	

CH22. IN THE LAST 24 HOURS (since yesterday), did your child or you take any of the following: nutritional supplements, vitamins, minerals, herbal or homeopathic preparations?
☐ 1. Yes
☐ 2. No (Go to GI12)

CH23. If YES
- Please tell me the name of all of these products and the reason for taking supplements?
- In THE LAST MONTH, how often was each of these supplements taken?

SUPPLEMENT NAME (name and molecule)	Reason and frequency (Daily or sporadic? Duration?)
1.	
2.	
3.	

SMOKING HABITS

*INTERVIEWER: If child 14 to 17 years old:
Since these questions on cigarette consumption may be hard to answer for the parent, I will directly ask your child.

GI12. This section is filled out by:
☐ 1. Parent/Legal guardian
☐ 2. Teenager (14-17 years old)

Now, I am going to ask about cigarette smoking. By cigarettes, we mean both ready-made cigarettes and the ones they roll, excluding cigars, cigarillos or pipes. This also includes the “cigarettes butches”, the cigarettes already partly smoked by others.

SH1. At the present time, how often does your child or do you smoke cigarettes?
☐ 1. Every day (Go to SH2, then SH3)
☐ 2. Occasionally (Go to SH4, then SH6)
☐ 3. Never - Not at all (Go to SH6)
☐ 4. Don’t know (If SH1 and SH2 =DK, go to SH6)
☐ 5. Don’t want to answer (If SH1 and SH2 = RF, go to SH6)

SH2. At what age did your child or you smoke his/your first whole cigarette? _________ years old (Max 17)
☐ Don’t know

→ Daily smoker (current)
SH3. How many cigarettes does your child smoke or do you smoke each day now? (MIN: 1) (MAX: 95)
__________ Cigarettes (Go to SH9) ☐ Don’t know (Go to SH9) ☐ Don’t want to answer (Go to SH9)

→ Occasional smoker (current)

SH4. On the days that he/she or you smoke, how many cigarettes does he/she or do you usually smoke? (MIN: 1) (MAX: 95)

__________ Cigarettes ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

SH5. IN THE PAST MONTH, how many days has he/she smoked or have you smoked 1 or more cigarettes? (MIN: 0) (MAX: 31)

__________ Days (Go to SH9) ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

→ Non-current smoker

SH6. I understand your child doesn't smoke now or you don't smoke now (or DK or RF), but did he/she or you smoke IN THE PAST MONTH? (*INTERVIEWER: At least once? Tried to smoke? Cigarettes butches?)

☐ 1. Yes
☐ 2. No (Go to SH9)
☐ 3. Don't know (Go to SH9)
☐ 4. Don't want to answer (Go to SH9)

SH7. On the days your child or you smoked, how many cigarettes did he/she or you usually smoke? (MIN: 1) (MAX: 95)

__________ Cigarettes (Go to SH9) ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

SH8. IN THE PAST MONTH, how many days has your child or you smoked 1 or more cigarettes? (MIN: 0) (MAX: 31)

__________ Days ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

Other sources of tobacco

Now I will ask about other possible sources of tobacco. By this, we mean cigars, cigarillos, cannabis mixed with tobbaco, pipes, etc.

IN THE PAST MONTH, did your child or you…	Every day or almost every day	On weed-end or 1-2/ week	At least once in the past month	Never - Not at all	Don't know	Don't want to answer
SH9. Smoke cigars/cigarillos?						
SH10. Smoke cannabis mixed with tobacco?						
SH11. Smoke pipe with tobacco?						
SH12. Smoke a water pipe/narguillé/chicha with tobacco?						
SH13. Had chewing tobacco/snuff?						

EXPOSURE TO SECOND-HAND SMOKE

Now, I am going to ask about second-hand smoke. Second-hand smoke includes the smoke that smokers exhale and the smoke from burning tobacco.

SH14. Including both household members and regular visitors, does anyone smoke cigarettes, cigars or pipes (or any other) *inside* your child home or your home, every day or almost every day?

☐ 1. Yes
☐ 2. No (Go to SH17)
☐ 3. Don't know (Go to SH17)
☐ 4. Don't want to answer (Go to SH17)

→If YES:

SH15. How many people smoke inside this home every day or almost every day? (Including household members and regular visitors). (MIN: 1) (MAX: 15)

__________ Number of people

SH16. Overall, IN THE PAST MONTH, how often were people in inside this home smoking in the presence of your child or in your presence (excluding your child or your smoking)?
☐ 1. Every day
☐ 2. Almost every day
☐ 3. On weed-end or twice a week
☐ 4. At least once in the past month
☐ 5. Never - Not at all
☐ 6. Don't know
☐ 7. Don't want to answer

SH17. IN THE PAST MONTH, was your child or you exposed to second-hand smoke, every day or almost every day, <u>in a car or other private vehicle or workplace or any other place like another house</u>?
☐ 1. Yes
☐ 2. No
☐ 3. Don't know
☐ 4. Don't want to answer

GI2b. Time end interview: ___: ___ (24h)

→ SWITCH INTERVIEWER

GI13. Interviewer: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda)

GI14. This section is filled out by:
☐ 1. Parent/Legal guardian
☐ 2. Teenager (14-17 years old)

GI5. Time start interview: ___: ___ (24h)

From now on, I will be asking you general questions about your education and socio-demographic information, housing conditions, food security, eating and water consumption habits, and lifestyle. Young people between 14 and 17 years old will be also directly asked to answer questions about their eating and water consumption habits and lifestyle. These questions are important to help understand how we get exposed to contaminants and how they relate to our body measurements, or our nutritional or health status. All the information you give me is kept confidential; I will not tell anyone anything you tell me. You can choose not to answer some questions or stop answering this questionnaire at any time.

CHILD'S EDUCATION AND SOCIO-DEMOGRAPHIC INFORMATIONS

CES1. To this child, you are the…
☐ 1. Biological mother (birth mother)
☐ 2. Adoptive mother
☐ 3. Stepmother
☐ 4. Biological father (birth father)
☐ 5. Adoptive father
☐ 6. Stepfather
☐ 7. Grandparent(s)
☐ 8. Aunt/uncle/cousins
☐ 9. Other: ____________________

CES2. Parent/legal guardian's age:___________ years

CES3. Where does your child spend most of his days?
☐ 1. At daycare (Go to CES8)
☐ 2. At school
☐ 3. At home (Go to CES8)
☐ 4. At work (wages, salary, self-employed) (Go to CES6)
☐ 5. Elsewhere, specify: ________________________ (Go to CES8)

→ IF GO TO SCHOOL:

CES4. Where does your child go to school?
☐ In the community
☐ In another First Nation community, which? _______________
☐ In a non-First Nation community, which? _______________
☐ Other: ______________________

CES5. What is the highest level of education he/she has completed? (school grade)

☐ 1. Kindergarden	☐ 9. Grade 8 (secondary 2)
☐ 2. Grade 1	☐ 10. Grade 9 (secondary 3)
☐ 3. Grade 2	☐ 11. Grade 10 (secondary 4)
☐ 4. Grade 3	☐ 12. Grade 11 (secondary 5)
☐ 5. Grade 4	☐ 13. Cegep (Y1)
☐ 6. Grade 5	☐ 14. Cegep (Y2)
☐ 7. Grade 6	☐ 15. Cegep (Y3)
☐ 8. Grade 7 (secondary 1)	☐ 16. Other: __________________________________

(Go to CES8)

→ IF WORKING:

CES6. If your child is working (wages, salary, self-employed)? Is she/he working...
☐ 1. Full time
☐ 2. Part time
☐ 3. Occasionally

CES7. If YES, where is she/he working? (Check all that apply)
☐ In the community
☐ In another First Nation community, which? _______________
☐ In a non-First Nation community, which? _______________
☐ Other: ______________________

I would now like to ask a few questions about your marital status, your education and your household income.

CES8. Are you...

☐ 1. Married or engaged	☐ 4. Divorced
☐ 2. Common law relationship or boyfriend/girlfriend	☐ 5. Widowed
☐ 3. Separated	☐ 6. Single

CES9. What is the highest level of education you have completed? (school grade)

☐ 1. Kindergarden	☐ 9. Grade 8 (secondary 2)
☐ 2. Grade 1	☐ 10. Grade 9 (secondary 3)
☐ 3. Grade 2	☐ 11. Grade 10 (secondary 4)
☐ 4. Grade 3	☐ 12. Grade 11 (secondary 5)
☐ 5. Grade 4	☐ 13. Cegep (Y1)
☐ 6. Grade 5	☐ 14. Cegep (Y2)
☐ 7. Grade 6	☐ 15. Cegep (Y3)
☐ 8. Grade 7 (secondary 1)	☐ 16. Other: __________________________________

CES10. Do you currently work for pay (wages, salary, self-employed)?
☐ 1. Yes
☐ 2. No (Go to CES13)

→ IF YES:

CES11. If YES, At...
☐ 1. Full time
☐ 2. Part time
☐ 3. Occasionally

CES12. If YES, Where are you working? (Check all that apply)
☐ In the community
☐ In another First Nation community, which? ______________
☐ In a non-First Nation community, which? _______________
☐ Other: ______________________ (Go to CES14)

→ IF NO:
CES13. IF NO, which of the following best describes your situation?
☐ 1. Currently looking for work
☐ 2. Student
☐ 3. Seasonal worker
☐ 4. Retired or on pension
☐ 5. Stay-at-home parent / house worker
☐ 6. Cannot work for health reasons
☐ 7. No longer looking for work, gave up looking for work
☐ 8. Don't want to work
☐ 9. Other, specify: _______________________

In the next sections, we refer to your household, which means everybody that lives in your house.

CES14. IN THE PAST 12 MONTHS, what was the total income of YOUR HOUSEHOLD, before taxes and including money from all sources: wages, salary, contracts, welfare, child tax benefits, scholarship, tips, commissions, etc., but not including loans?
Here I refer to how much money you and other persons living in your house made or received in the last year. I will name you income scales. Please say "stop" when I say one that suits you, that is to say, YOUR BEST ESTIMATE of your household total income for the last 12 months.
☐ 1. Less than $ 15 000
☐ 2. $ 15 000 to $ 20 000
☐ 3. $ 20 000 to $ 25 000
☐ 4. $ 25 000 to $ 40 000
☐ 5. $ 40 000 to $ 60 000
☐ 6. $ 60 000 or more
☐ 7. Don't know
☐ 8. Refusal

FOR YOUR HOUSEHOLD, IN THE PAST 12 MONTHS	CES15. From which of the following sources did you receive any income?	CES16. What was your main source of income (money)?
1- Employment income (wages, salaries or self-employment income)		
2- Child Tax Benefits		
3- Income Support (welfare/social support)		
4- Other income, for example: ☐ 1. Employment insurance ☐ 2. Old age security ☐ 3. Scholarship ☐ 4. Child support (separated parents) ☐ 5. Royalties from mining companies ☐ 6. Bonus ☐ 7. Loans ☐ 8. Other: ______________________ *CHECK ALL THOSE THAT APPLY		
5 – Income from selling: ☐ 1. Traditional foods ☐ 2. Home-made recipes		
6 – Income from traditional activities: ☐ 1. Carving, sewing, crafts/art ☐ 2. Traditional knowledge sharing programs ☐ 3. Other: ____________________________		
7- No income		

ID: _______________

HOUSING CONDITIONS

The next questions are about the house where your child lives at the moment.

HC1. How long has your child lived in the house where you live now?
☐ 1. All his/her life (since his/her birth)
☐ 2. Less than 1 year
☐ 3. 1 to 4 years
☐ 4. 5 to 10 years
☐ 5. More than 10 years

HC2. IN THE LAST TWELVE MONTHS, where did your child live most of the time? (Check the main house (>50% of time), if equal or 50/50, check where the parent/legal guardian know more about housing conditions, possibly his own house)
☐ 1. House where you and your child live now
☐ 2. Father's house
☐ 3. Mother's house
☐ 4. Relative's house (grandparents, aunt and uncle, cousins)
☐ 5. Lodging/school
☐ 6. Camping site/tent
☐ 7. Other: __________________

The next questions refer to the main house, where your child lives most of the time now.

HC3. Does your house have a basement? (* INTERVIEWER now and so on refers to the main house)
☐ 1. Yes
☐ 2. No

HC4. How many rooms are there in the house where your child lives at the moment?
(including: bedrooms, kitchen, living room, finished basement, etc.)
(excluding: bathroom, halls, laundry room or attached sheds)
_____ rooms

HC5. Among those, how many are bedrooms? _________ bedrooms

HC6. Where does your child sleep in the house? (*INTERVIEWER decomposes the question 1. Bedroom vs living room; 2. Ground floor vs basement)
☐ 1. Bedroom on the ground floor
☐ 2. Bedroom in the basement
☐ 3. Living room
☐ 4. Other, specify: _________

HC7. Does your child have his own bedroom (where he/she sleeps)? (is he alone in it?)
☐ 1. Yes
☐ 2. No

HC8. Including yourself, how many children, youth and adults live in your house right now?
(those that have meals and sleep there at least 4 nights/week)
HC8a. Age 0-5 years: _____ children
HC8b. Age 6-11 years: _____ children
HC8c. Age 12-17 years: _____ teenagers
HC8d. Age 18 years and over: _____ adults
Total: _______ persons (*INTERVIEWER make sure the count is good)

HC9. In what year was your home built?
________ year ☐ Don't know

ID: ______________

HC10. Is your home in need of repairs? (Is anything broken that needs to be fixed?)

☐ 1. Major repairs such as defective plumbing, electrical wiring, structural repairs to walls, floors, ceiling, foundation, etc.
☐ 2. Minor repairs such as missing or loose floor tiles, missing or broken kitchen wardrobe doors or shingles, defective steps, railings, siding, etc.
☐ 3. Only regular maintenance such as painting, cleaning the chimney (fireplace, furnace), etc.
☐ 4. None

HC11. IN THE PAST 12 MONTHS, have you seen mold/mildew in your home?
Mold can be black, white, pink, or almost any color, and take the form of a more or less extensive smudge.

☐ 1. Yes
☐ 2. No (Go to HC15)
☐ 3. Don't know (Go to HC15)

HC12. If YES, in which room? *INTERVIEWER check room if yes

	HC13. If yes, where in each room?						HC14. What is the size of the mold? *INTERVIEWER shows pictures
	On window frame/sill	Under windows	Around sink, bathroom, toilet	On walls	On ceiling	Other	
☐ 1. Kitchen?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 2. Bathroom?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 3. Living room?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 4. Your child bedroom?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 5. Basement?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 6. Other?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre

HC15. IN THE PAST 12 MONTHS, have you had water infiltration in your house (through the roof, cracks in the foundation, sewer reflux, broken pipes, etc.)?

☐ 1. Yes
☐ 2. No (Go to HC18)
☐ 3. Don't know (Go to HC18)

→ IF YES:

HC16. If YES, in which room and where from?____

____

HC17. If YES, how often?

☐ 1. Several times a month
☐ 2. 1-3 times a month
☐ 3. Every 2-3 months
☐ 4. Once or few times a year

ID: ______________

HC18. What is the main source of heat in your house? (Check all that apply and note the order of priority)

☐ 1. Electric heat
☐ 2. Wood-burning stove
☐ 3. Wood-burning fireplace
☐ 4. Oil furnace
☐ 5. Gas furnace
☐ 6. Gas fireplace
☐ 7. Other – specify:____________________

IN THE PAST MONTH and IN YOUR MAIN HOUSE, how many times were any chemicals used to treat….
*INTERVIEWER show example of products

	2-4/week	1/week	1-3/ month	Never	Don't know	HC20. Where?
HC19. Bed bugs, roaches, moths (food or textile) ants or termites, or were any insecticides used on indoor house plants?						☐ 1. Living room ☐ 2. Dining room ☐ 3. Kitchen ☐ 4. Bathroom(s) ☐ 5. Child's bedroom ☐ 6. Other bedroom(s) ☐ 7. Other rooms (den, play room, etc.) ☐ 8. Outside (foundation of building) ☐ 9. Entire home ☐ 10. Other? ________________
HC21. Head lice on your child?						
HC22. Fleas on pets?						
HC23. The yard or lawn of this house, or the surrounding fields, woods or orchards with chemical products to kill insects or weeds, or to control plant diseases?						

FOOD SECURITY STATUS

This section is about whether your household was able to afford the food you needed in THE LAST 12 MONTHS. It applies to you but also to your family as a whole. Some of the questions are personal and may be difficult for you to answer. Like the rest of the questionnaire, this information is strictly confidential.

- I will read you a series of statements that describe the experience of some families.
- For each of these statements, please tell me whether this happened often, sometimes or never for your household IN THE LAST 12 MONTHS. *INTERVIEWER SHOW CARDS FOR EACH STATEMENT

FS1. Some families might say, *"The food that we bought just didn't last, and we didn't have money to get more."*
In the last 12 months, how often did that happen for your household?

☐ 1. Often
☐ 2. Sometimes
☐ 3. Never
☐ 4. Don't know
☐ 5. Refusal

FS2. Some families might say, *"We couldn't afford to eat balanced meals."*
(Balanced meals contain a variety of food groups, for example a selection of vegetables, fruits, meat/fish, grains, and dairy products)
In the last 12 months, how often did that happen for your household?

☐ 1. Often
☐ 2. Sometimes
☐ 3. Never
☐ 4. Don't know
☐ 5. Refusal

FS3. In the last 12 months: *Did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?*

☐ 1. Yes
☐ 2. No (Go to FS5)
☐ 3. Don't know (Go to FS5)
☐ 4. Refusal (Go to FS5)

→ IF YES:

FS4. If YES, How often did this happen in the last 12 months?

☐ 1. Almost every month
☐ 2. Some months but not every month
☐ 3. Only 1 or 2 months
☐ 4. Don't know
☐ 5. Refusal

FS5.In the last 12 months: *"Did you, yourself, ever eat less that you felt you should because there wasn't enough money for food?"*

☐ 1. Yes
☐ 2. No
☐ 3. Don't know
☐ 4. Refusal

FS6. In the last 12 months: *"Were you, yourself, ever hungry but didn't eat because there wasn't enough money for food?"*

☐ 1. Yes
☐ 2. No
☐ 3. Don't know
☐ 4. Refusal

FS7. Some families might say: *"We are able to get traditional food as much as we want to or we need."*
In the last 12 months, how often did that happen in your household?

☐ 1. Often
☐ 2. Sometimes
☐ 3. Never
☐ 4. Don't know
☐ 5. Refusal

GI4. Time end of the interview Part A: ____: ___ (24h)

QUESTIONNAIRE 1 – PART B

(For parents/legal guardian/young mothers – her child, OR For teenagers 14 to 17 years old)

GI6. Date: ____/___/____
Day/Mo/Year

GI7. Time start interview Part B: ____: ___ (24h)

GI18. Interviewer: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda)

GI19. This section is filled out by:
☐ 1. Parent/Legal guardian
☐ 2. Teenager (14-17 years old)

EATING HABITS – Traditional foods

This section is about traditional food – that is, food harvested within the local environment by fishing, hunting, trapping , picking, etc. It can be eaten and cooked in any form – for example: cooked, baked, smoked, dried, etc. or even included in recipes, for example moose stew. This also includes traditional food that you froze and eat in later in the year.

We want to know how often your child or you ate different types of traditional food IN THE PAST YEAR at home.
I will begin by asking questions about fish consumption.

EH1. In the past year, did your child or you eat any FISH? (Fish from river/lake and not from the store)
☐ 1. Yes
☐ 2. No (Go to next section –LAND MAMMALS)

*INTERVIEWER explains the time frame for seasons and shows the frequency chart for traditional foods

I will now read you a list of fish species. Can you tell me if, IN THE PAST YEAR, your child or you ate it, and if YES, how often in the past spring. After, how often in each other season.

FISH Portion: 3-5 oz or 1- 1 2/3 deck of cards	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
1.1 Brook trout (speckled trout)	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
1.2 Lake trout	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
1.3 Rainbow trout	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
1.4 Walleye (yellow or blue)	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								

	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
1.5 Sauger ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.6 Northern pike ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.7 Lake sturgeon ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.8 Yellow perch ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.9 Lake whitefish ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.10 Bass ☐ Yes ☐ No ☐ 1.5.1 Smallmouth ☐ 1.5.2 Largemouth	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.11 Ling (Burbot, Maria) ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
Other fish? ☐ Yes ☐ No ☐ 1.12 Rock bass ☐ 1.13 Pumpkinseed Sunfish ☐ 1.14 Mooneye, flatfish ☐ 1.15 Brown bullhead catfish ☐ 1.16 Red (longnose) Sucker ☐ 1.17 White sucker ☐ 1.18 Carp (endemic) ☐ 1.19 Other : ____________ * INTERVIEWER refers to poster and note the fish number in the case referring to its consumption	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.20 Fish eggs? ☐ Yes ☐ No Which fish? ___________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

EH2. In the past year, did your child or you eat any wild game or big game (LAND MAMMALS)?
☐ 1. Yes
☐ 2. No (Go to next section – WILD BIRDS)

I will now read you a list of species. Can you tell me if, IN THE PAST YEAR, your child or you ate it and if so, how often.

LAND MAMMALS Portion: Meat: 4-6 oz or 1 1/2-2 deck of cards Organs: 2-3 oz or 2/3-1 deck of cards	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
2.1.1 Moose - meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.1.2 Moose - liver ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.1.3 Moose - kidneys ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.1.4 Moose – other parts? ☐ Yes ☐ No Which? __________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.2.1 Caribou - meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.2.2 Caribou - liver ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.2.3 Caribou - kidneys ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.2.4 Caribou – other parts? ☐ Yes ☐ No Which? __________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
2.3.1 **Deer** - meat ☐ Yes ☐ No ☐	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.3.2 **Deer** - liver ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.3.3 **Deer** - kidneys ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.3.4 **Deer** –other part ☐ Yes ☐ No Which? __________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.4.1 **Black bear** - meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.4.2 **Black bear** - liver ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.4.3 **Black bear** – kidneys ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.4.4 **Black bear** – fat or other parts ☐ Yes ☐ No Which? __________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.5.1 **Beaver**- meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.5.2 **Beaver** – other parts ☐ Yes ☐ No Which? __________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
2.6 Lynx – meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.7 Hare - meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.8 Muskrat – meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.9 Porcupine – meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.10 Other LAND MAMMAL ☐ Yes ☐ No Which? _________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

EH3. In the past year, did your child or you eat any WILD BIRDS such as ducks, geese, and grouse?
☐ 1. Yes
☐ 2. No (Go to next section – WILD BERRIES and PLANTS)

I will now read you a list of bird species. Can you tell me if, IN THE PAST YEAR, your child or you ate it and if so, how often.

WILD BIRDS Portion: 4-6 oz or 1 1/2-2 deck of cards	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
3.1 Ducks ☐ Yes ☐ No	**Spring** (March 21–June 20)								
☐ 3.1.1 Wood Duck ☐ 3.1.2 Ring necked duck ☐ 3.1.3 American wigeon ☐ 3.1.4 Northern pintail ☐ 3.1.5 Northern shoveler ☐ 3.1.6 Gadwall ☐ 3.1.7 Mallard	**Winter** (Dec 21-March 20)								
☐ 3.1.8 American black ☐ 3.1.9 Teal ☐ 3.1.10 Golden eye ☐ 3.1.11 Bufflehead ☐ 3.1.12 Loon ☐ 3.1.13 Merganser ☐ 3.1.14 Other? __________	**Fall** (Sept 21 – Dec 20)								
* INTERVIEWER refers to poster and writes bird number in the case referring to its consumption. JUST a check mark if don't know the duck sp.	**Summer** (June 21 – Sept 20)								

WILD BIRDS	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
3.2 Geese ☐ Yes ☐ No ☐ 3.2.1 Canada geese ☐ 3.2.2 Snow geese (White or dark sub sp.) ☐ 3.2.3 Brant * INTERVIEWER refers to poster and note the geese number in the case referring to its consumption	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
3.3 Land birds ☐ Yes ☐ No ☐ 3.3.1 Ruffed grouse (also known as Gray partridge – white meat) ☐ 3.3.2 Spruce grouse (red meat) ☐ 3.3.3 Willow ptarmigan ☐ 3.3.4 Wild turkey ☐ 3.3.5 American woodcock * INTERVIEWER refers to poster and note the bird number in the case referring to its consumption	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
3.4 Other birds ☐ Yes ☐ No Which? __________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
3.5 Bird eggs ☐ Yes ☐ No ☐ 3.5.1 Seagull ☐ 3.5.2 Geese ☐ 3.5.3 Other? _____________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

EH4. In the past year, did your child or you eat any WILD BERRIES or PLANTS?

☐ 1. Yes

☐ 2. No (Go to next section – MARKET FOODS)

I will now read you a list of berry species. Can you tell me if, IN THE PAST YEAR, your child or you ate it and if so, how often.

WILD BERRIES and PLANTS Portion : 1/2 cup * FRESH – NOT JAM	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
4.1 Wild raspberry ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

* FRESH – NOT JAM	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
4.2 Wild blueberries ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.3 Chokecherry ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.4 Pine cherry ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.5 Small cranberry (bog or swamp cranberry) ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.6 Other fruits or plants? ☐ Yes ☐ No ☐ 4.6.1 Wild strawberry ☐ 4.6.2 Highbush cranberry (Squashberry, Mooseberry) ☐ 4.6.3 Serviceberry (Saskatoonberry) ☐ 4.6.4 Gooseberry, currant (red, black) ☐ 4.6.5 Creeping snowberry (white berry and tea) ☐ 4.6.7 Teaberry (wintergreen, small red fruit and tea) ☐ 4.6.8 Juniper ☐ 4.6.9 Baked hazelnut (chestnut) ☐ 4.6.10 Dandelion leaves ☐ 4.6.11 Wild rice ☐ 4.6.12 Other? _______________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

QUESTIONNAIRE 1 - for children 3 to 17 years old - PART B ID: _______________

EATING HABITS – Market foods

This section is about foods that you get from the store, that is to say, those that can be eaten as is or cooked in recipes. Now think about the PAST 3 MONTHS.

*INTERVIEWER explains the past 3 month time frame and shows the frequency chart for market foods

EH5. How often, on average did your child or you eat this food in the PAST 3 MONTHS?
*INTERVIEWER check if yes

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
Traditional recipes made with market foods									
☐ 1. **Bannock** (bake) (1 slice/piece)									
☐ 2. **Saco** (fried) (1 slice/piece)									
☐ 3. **Traditional recipes** (1 bol) ☐ 3.1 **Napanewabo** - flour bowl (water, flour, beef/moose, +/- carrots) ☐ 3.2 **Patîkabo** - potato bowl (water, flour, potato, beef/moose, +/- carrots) ☐ 3.3 **Kipâtci** (water, moose broth, potato, flour, bannock dough) ☐ 3.4 Other? ___________________									
Store-bought meat									
☐ 4. **Hamburger**, lean or regular (1 patty)									
☐ 5. **Beef** (steak, ground beef) (4-6 oz or 1 1/2-2 decks of cards)									
☐ 6. **Beef or pork hot dogs** (1)									
☐ 7. **Sausage** (2 small links, in can) **or wieners** (1)									
☐ 8. **Pork, pork chops, roast pork** (4-6 oz or 1 1/2-2 decks of cards)									
☐ 9. **Chicken/turkey** (breast, legs) (4-6 oz or 1 1/2-2 decks of cards)									
☐ 10. **Chicken nuggets** (4-6 nuggets) or **chicken wings** (6-8)									
☐ 11. **Beef Jerky** (1 bag)									
☐ 12. **Sliced or processed meat** (ham, Kam, Spam, salami, bologna, pepperoni, etc. (1 slice/1 piece), (4-6 oz or 1 1/2-2 decks of cards)									
☐ 13. **Bacon** (2 slices)									
☐ 14. **Eggs** (chicken) (1 egg)									
☐ 15. **Fresh or frozen fish from the market** (4-6 oz or 1 1/2-2 decks of cards)									* Note sp.
☐ 16. **Canned salmon or sardines** (3-4 oz or 1- 1 1/2 decks of cards)									
☐ 17. **Canned tuna** (3-4 oz or 1- 1 1/2 decks of cards)									☐ Pale ☐ White
Fruits									
☐ 18. **Fresh apples or pears** (1)									
☐ 19. **Bananas** (1)									
☐ 20. **Oranges** (1) or **grapefruit** (1/2)									
☐ 21. **Store-bought berries, fresh or frozen** (1/2 cup)									
☐ 22. **Other fresh fruits** (1 fruit or 1/2 cup)									
☐ 23. **Canned fruit** (1/2 cup)									

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, Less than 1/month	Comments
Vegetables									
☐ 24. Green, leafy vegetables (1 cup of iceberg, romaine or leaf lettuce, 1/2 cup cooked spinach)									
☐ 25. Dark-yellow vegetables (carrots, turnips, yams, etc.) (1 medium carrot or 1/2 cup)									
☐ 26. Broccoli, cauliflower, cabbage (1/2 cup)									
☐ 27. Tomatoes (1 whole or 1/2 cup canned) or 1/2 cup juice (Tomato or V8)									
☐ 28. Beans or peas (1/2 cup baked or canned)									
☐ 29. Other vegetables (green pepper, cucumber, corn, celery, mushrooms, mixed vegetables, etc.) (1/2 cup)									
☐ 30. Onions as a cooked vegetable (1/2 cup)									
Bread, cereals, starches									
☐ 31. White bread (1 slice)									
☐ 32. Whole wheat bread or other whole grains (1 slice)									
☐ 33. Cold cereals (cornflakes, etc.) (1 cup)									
☐ 34. Hot cereals (oatmeal, etc.) (1 cup)									
☐ 35. Noodles/macaroni soup (Lipton soup, pasta, tomato can, +3- ground beef) (1 bowl)									
☐ 36. Pasta, e.g. macaroni, spaghetti (1 cup)									
☐ 37. Rice (1 cup)									
☐ 38. Potatoes, mashed (1 cup), baked or boiled (1)									
☐ 39. Poutine or fries with gravy (1 medium)									
☐ 40. French fries (side dish) (6 oz. or 1 serving)									
☐ 42. Potato chips or corn chips (small bag or 1 oz.)									
☐ 43. Popcorn (3 cups)									
☐ 44. Crackers, e.g. Ritz (6)									
☐ 45. Pizza (2 slices)									
Sweets, baked goods									
☐ 46. Pies and cookies, homemade or ready-made (1 slice/1 piece)									
☐ 47. Doughnuts (1)									
☐ 48. Cake (homemade or ready-made, ex. Vachon) (1 piece ou 1 pq)									
☐ 49. Milk Chocolate (bar or pack), e.g. Hershey's, Aero, etc.									
☐ 50. Candy bars (bar or pack), e.g. Snickers, Reeses, Mars, M&M, etc.									
☐ 51. Candy without chocolate (1 oz.)									
☐ 52. Peanut butter (1 tablespoon)									
☐ 53. Nuts (Peanuts, almonds, etc.) or sunflower seeds (small bag or 1 oz)									
☐ 54. Jam (homemade or ready-made), sirup, honey (1 tablespoon)									
☐ 55. White sugar in tea or coffee (1 tablespoon)									* Note no. tablespoons
☐ 56. Artificial sweetener (1 packet), e.g. Egal, Twin									* Note no. bags
☐ 57. Ketchup (1 tablespoon)									* Note no. tablespoons

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, Less than 1/month	Comments
Dairy products									
☐ 58. **Milk as a drink or in cereals** (1 cup) (fresh, Carnation, in powder)									☐ 1% ☐ 2% ☐ 3.25% ☐ Carnation ☐ In powder
☐ 59. **Chocolate milk** (fresh or in powder) (1 cup)									
☐ 60. **Infant formula** (Enfamil, Bon départ, etc.) (1 cup)									
☐ 61. **Milk in tea or coffee** (fresh, Carnation, in powder) (1 teaspoon)									☐ 1% ☐ 2% ☐ 3.25% ☐ Coffee mate ☐ Carnation ☐ In powder
☐ 62. **Yogurt or Yop** (1/2 cup)									
☐ 63. **Ice cream** (1/2 cup)									
☐ 64. **Cheese, cheese curds, in a dish or grated** (cheddar or mozzarella) (1 slice, 1 small bag or 1 oz)									
☐ 65. **Processed cheese** (Kraft, Cheez Whiz, Vache qui rit) (1 slice or 1 tablespoon)									
Divers									
☐ 66. **Butter** (1 teaspoon), added to food or bread; exclude use in cooking									
☐ 67. **Margarine** (1 teaspoon), added to food or bread; exclude use in cooking									
☐ 68. **Miracle whip** (salad dressing) (1 tablespoon)									
☐ 69. **Mayonnaise** (1 tablespoon)									☐ Low fat ☐ Regular
☐ 70. **Salad dressing** (1-2 tablespoons)									☐ Low fat ☐ Olive oil ☐ Other vegetal oil/regular
71. **How often does your child ate fried/deep fried food** at home? (Exclude "Pam"-type spray)									

72. **What kind of fat is usually used for frying/deep frying** at home? (Exclude "Pam"-type spray)
☐ Real butter ☐ Margarine ☐ Olive/Canola oil ☐ Corn/soya oil ☐ Vegetal shortening (Crisco) ☐ Lard (Tenderflake) ☐ Other: ____________

73. **What type of fat is usually used to cook (in the recipes, in the pan)** at home? (note the most frequent)
☐ Real butter ☐ Margarine ☐ Olive/Canola oil ☐ Corn/soya oil ☐ Vegetal shortening (Crisco) ☐ Lard (Tenderflake) ☐ Other: ____________

Breverage: How often does your child or you drink…

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, Less than 1/month	Comments
☐ 75. **Juice in bottle** (Oasis, Fruité, Sunny-D) (1 cup)									
☐ 76. **Diet soft drink** (1 can)									* Note no. can
☐ 77. **Regular soft drink** (1 can)									Note no. can
☐ 78. **Sport drink** (Powerade, Gatorade) (1 bottle)									* Note no. bottles
☐ 79. **Energy drinks** (Redbull, Monster, Guru) (1 can)									Note no. can

DRINKING WATER SOURCES

This part of the interview pertains to the drinking water that is consumed in your house.

DW1. Does your house have tap water?
☐ 1. Yes
☐ 2. No (Go to DW5)

→ If YES:

DW2. Does your child drink the tap water in your house?
☐ 1. Yes
☐ 2. No

DW3. Does the taste/odour/appearance prevent your child from drinking tap water?
☐ 1. Yes
☐ 2. No
☐ 3. Sometimes

DW4. Is tap water used to prepare food in your house?
☐ 1. Yes
☐ 2. No

DW5. Does your child drink another type of water in your house?
☐ 1. No
☐ 2. Bottled water
☐ 3. Well
☐ 4. Spring
☐ 5. Stream/river
☐ 6. Lake/pond
☐ 7. Rainwater cistern
☐ 8. Other, please specify: ______________________

DW6. Is another type of water used for cooking in your house?
☐ 1. No
☐ 2. Bottled water
☐ 3. Well
☐ 4. Spring
☐ 5. Stream/river
☐ 6. Lake/pond
☐ 7. Rainwater cistern
☐ 8. Other, please specify: ______________________

DW7. Do you treat the water in your house?
☐ 1. Boil because of baby
☐ 2. Boil for everybody
☐ 3. Boil when there is a notice
☐ 4. Filter (charcoal or similar)
☐ 5. Water softener
☐ 6. Ultraviolet system
☐ 7. Reverse osmosis
☐ 8. Tablets
☐ 9. None
☐ 10. Other, specify: ____________________

ID: ______________

BEVERAGE CONSUMPTION

Now, I will ask about your child's or your consumption of beverages and soups and the different sources of water in your home used to make the beverages and soups. We are interested in these beverages or foods consumed AT HOME IN THE LAST WEEK. We will use a MUG to quantify your daily amount. * INTERVIEWER, bring out the MUG

For each item listed below, please tell me:
a) If your child or you had it IN THE LAST WEEK *INTERVIEWER, check item if yes
b) How many DAYS your child or you had it in the last week
c) How many cups your child or you drank each day * INTERVIEWER, bring out the MUG
d) The main source of water (example, tap water, bottled water) used to make this beverage/food

Did your child or you have ANY of these in the PAST WEEK?	1 day	2 days	3 days	4 days	5 days	6 days	7 days	Amount (cups/ day)	Source of water
☐ DW9. Water									
☐ DW10. Coffee									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW11.Tea (any)									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW12.Hot chocolate									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW13. Juice made from concentrate or crystals (can, Tang, Kool-Aid or Gatorade)									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW14. Infant formula (Enfamil, Good Start, etc.)									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW15. Regular powdered milk									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW16. Broth/ soup									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW17. Stew									☐ Tap ☐ Bottle ☐ Other ____________
☐ DW18. Other food/drink made with water Which?__________________________									☐ Tap ☐ Bottle ☐ Other ____________

LIFESTYLE

IN THE LAST YEAR, on average, how often did your child ...						2. Besides him/her, anyone else in your house? (number)	
	Several times a month	1-3 times a month	Every 2-3 months	Once or few times a year	Never – Not at all	No	Yes
L1. Hunt for big game?							
L2. Trap small game?							
L3. Hunt for small game?							
L4. Fish?							
L5. Harvest seafood?							
L6. Harvest wild berries or plants?							
L7. Plant a garden?							

ID: _______________

If you or someone in the household is fishing, hunting big or small game, we will now ask you some questions about fish sinkers, ammunitions and pellets. ☐ This section does not apply

L8. Do you or someone in your household make your own fishing sinkers with lead?
☐ 1. Yes
☐ 2. No
☐ 3. Don't know

L9. Do you or someone in your household make or modify your own ammunitions with lead?
☐ 1. Yes
☐ 2. No (Go to L11)
☐ 3. Don't know

L10. If YES, how? With lead pellets? Where and what type? To hunt for what?
____
____
____

L11. Where do you or your household members clean guns?
☐ 1. In the kitchen
☐ 2. In the living room
☐ 3. In the shed
☐ 4. Outside the house
☐ 5. Other: ____________________

L12. After hunting, who cleans the animal (does the butchering)?
☐ 1. Yourself or a relative
☐ 2. A butcher (end of the interview)
☐ 3. Other: _________________________________
☐ 4. Don't know

L13. When cutting the meat, is the meat around the impact of the bullet removed?
*INTERVIEWER show the picture of the meat with bullet impact
☐ 1. Yes
☐ 2. No (end of the interview)
☐ 3. Don't know (end of the interview)

L14. If YES, to what extent? * INTERVIEWER BRINGS RULER OR MEASURING TAPE
_______ cm _______ in ☐ Don't know

GI20. Time end of the interview Part B: ___: ___ (24h)

GENERAL COMMENTS

Write any comments about the interview. Identify any question(s) during any part of the interview with the respondent that was not well understood or instances where he/she seemed unusually guarded or withheld information. Did he/she reveal any problems that may interfere with participation in the study?

____

____

____

____

____

____

FIRST NATION YOUTH, ENVIRONMENT AND HEALTH PILOT STUDY – YEH*!*
INTERVIEW-ADMINISTERED QUESTIONNAIRE

GENERAL INFORMATION

GI1. Date: ____/___/____
Day/Mo/Year

GI3. Community: ____

GI4. Participant's age: ________ years GI5. Date of birth: _______/____/______ GI6. Sex: ☐ 1. Female
Day/Mo/Year ☐ 2. Male

GI7. The parent/legal guardian or participant came to the health centre with their medication:
☐ 1. Yes
☐ 2. No

GI8. The parent/legal guardian or participant came to the health centre with their supplements:
☐ 1. Yes
☐ 2. No

GI6. Which questionnaire needs to be answered and by whom?
☐ 18 and 19 year old → ☐ 6. Q2 – Part A & Part B by young adults
☐ Young mother – herself → ☐ 7. Q2 – Part A & Part B by young mother

QUESTIONNAIRE 2 – PART A

GI10. Interviewer: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda)
GI2. Time start interview: ____: ____ (24h)

During this interview, I will be asking you general questions about your health status, and smoking habits. Feel free to ask for a translator to help you understand the questions. Some questions are personal. You may wonder why they are asked in a study aimed to document exposure to environmental contaminants, nutrition and health status. These questions are important to help understand how we get exposed to contaminants and how they relate to our body measurements, or our nutritional or health status. All the information you give me is kept confidential; I will not tell anyone anything you tell me. You can choose not to answer some questions or stop answering this questionnaire at any time.

CHILD'S HEALTH STATUS

This first section deals with various aspects of your health.

GI11. This section is filled out by:
☐ 3. Young adult (18-19 years old)
☐ 4. Young mother (14 to 17 years old)

CH1. In general, how would you rate your health?
☐ 1. Excellent
☐ 2. Very Good
☐ 3. Good
☐ 4. Fair
☐ 5. Poor

CH2. Compared to one year ago, how would you rate your health now?
☐ 1. Much better now than 1 year ago
☐ 2. Somewhat better now (than 1 year ago)
☐ 3. About the same as 1 year ago
☐ 4. Somewhat worse now (than 1 year ago)
☐ 5. Much worse now (than 1 year ago)

CH3. Do you have a regular/family doctor?
☐ 1. Yes
☐ 2. No
☐ 3. Don't know

CH4. Was your child or were you born before 37 weeks of pregnancy? (pre-term birth)
☐ 1. Yes
☐ 2. No
☐ 3. Don't know

For child/women above 14 years old, it is important to know when analyzing health whether or not the person is breastfeeding.
CH5. Are you currently breastfeeding?
☐ 1. Yes
☐ 2. No

This section is about certain health conditions that you may have. We are interested by those which are expected to last or have already lasted 6 months or more (long-term), AND that have been diagnosed by a doctor or a nurse.

Did you ever suffered /are you suffering from?	NO	YES	Don't know	Age first diagnosed?
CH6. Recurrent Bronchitis/Bronchiolitis				
CH7. Asthma				
CH8. Anaemia (lack of iron)				
CH9. High blood pressure (high blood pressure)				
CH10. High blood cholesterol (high cholesterol)				
CH11. Heart disease				
CH12. Thyroid condition				
CH13. Liver problem, if yes, which: ________________________				
CH14. Cancer, if yes, which: _____________________________				
Diabetes				
CH15. Type 1 diabetes (insulin dependant)				
CH16. Type 2 diabetes (non-insulin dependant)				
CH17. Type 2 pre-diabetes (glucose intolerance)				
CH18. Gestational diabetes (if young mother only)				
CH19. Any other diagnosis: ______________________________				

CH20. IN THE LAST 24 HOURS (since yesterday), did you take medication, for example prescription or over-the-counter medication.
☐ 1. Yes
☐ 2. No (Go to CH22)

→If YES:
CH21. If YES,
- Please tell me the name of all of these products and the reason for medication
- In THE LAST MONTH, how often was each of these medications taken?

MEDICATION NAME (name and molecule)	Reason and frequency (Daily or sporadic? Duration?)
1.	
2.	
3.	

CH22. IN THE LAST 24 HOURS (since yesterday), did you take any of the following: nutritional supplements, vitamins, minerals, herbal or homeopathic preparations?
☐ 1. Yes
☐ 2. No (Go to GI12)

→If YES:
CH23. If YES
- Please tell me the name of all of these products and the reason for taking supplements?
- In THE LAST MONTH, how often was each of these supplements taken?

SUPPLEMENT NAME (name and molecule)	Reason and frequency (Daily or sporadic? Duration?)
1.	
2.	
3.	

SMOKING HABITS

GI12. This section is filled out by:
☐ 3. Young adult (18-19 years old)
☐ 4. Young mother (14 to 17 years old)

Now, I am going to ask about cigarette smoking. By cigarettes, we mean both ready-made cigarettes and the ones they roll, excluding cigars, cigarillos or pipes. This also includes the "cigarettes butches", the cigarettes already partly smoked by others.

SH1. At the present time, how often do you smoke cigarettes?
☐ 1. Every day (Go to SH2, then SH3)
☐ 2. Occasionally (Go to SH4, then SH6)
☐ 3. Never - Not at all (Go to SH6)
☐ 4. Don't know (If SH1 and SH2 =DK, go to SH6)
☐ 5. Don't want to answer (If SH1 and SH2 = RF, go to SH6)

SH2. At what age did you smoke your first whole cigarette? _________ years old (Max 19)
☐ Don't know

→ Daily smoker (current)
SH3. How many cigarettes do you smoke each day now? (MIN: 1) (MAX: 95)
__________ Cigarettes (Go to SH9) ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

→ Occasional smoker (current)

SH4. On the days that you smoke, how many cigarettes do you usually smoke? (MIN: 1) (MAX: 95)
__________ Cigarettes ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

SH5. IN THE PAST MONTH, how many days have you smoked 1 or more cigarettes? (MIN: 0) (MAX: 31)
__________ Days (Go to SH9) ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

→ Non-current smoker

SH6. I understand you don't smoke now (or DK or RF), but did you smoke IN THE PAST MONTH?
(*INTERVIEWER: At least once? Tried to smoke? Cigarettes butches?)
☐ 1. Yes
☐ 2. No (Go to SH9)
☐ 3. Don't know (Go to SH9)
☐ 4. Don't want to answer (Go to SH9)

SH7. On the days you smoked, how many cigarettes did you usually smoke? (MIN: 1) (MAX: 95)
__________ Cigarettes (Go to SH9) ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

SH8. IN THE PAST MONTH, how many days have you smoked 1 or more cigarettes? (MIN: 0) (MAX: 31)
__________ Days ☐ Don't know (Go to SH9) ☐ Don't want to answer (Go to SH9)

Other sources of tobacco

Now I will ask about other possible sources of tobacco. By this, we mean cigars, cigarillos, cannabis mixed with tobbaco, pipes, etc.

IN THE PAST MONTH, did you…	Every day or almost every day	On weed-end or 1-2/ week	At least once in the past month	Never - Not at all	Don't know	Don't want to answer
SH9. Smoke cigars/cigarillos?						
SH10. Smoke cannabis mixed with tobacco?						
SH11. Smoke pipe with tobacco?						
SH12. Smoke a water pipe/narguillé/chicha with tobacco?						
SH13. Had chewing tobacco/snuff?						

EXPOSURE TO SECOND-HAND SMOKE

Now, I am going to ask about second-hand smoke. Second-hand smoke includes the smoke that smokers exhale and the smoke from burning tobacco.

SH14. Including both household members and regular visitors, does anyone smoke cigarettes, cigars or pipes (or any other) *inside* your home, every day or almost every day?
☐ 1. Yes
☐ 2. No (Go to SH17)
☐ 3. Don't know (Go to SH17)
☐ 4. Don't want to answer (Go to SH17)

→If YES:

SH15. How many people smoke inside this home every day or almost every day?
(Including household members and regular visitors). (MIN: 1) (MAX: 15)
__________ Number of people

SH16. Overall, IN THE PAST MONTH, how often were people in inside this home smoking in your presence (excluding your smoking)?
☐ 1. Every day
☐ 2. Almost every day
☐ 3. On weed-end or twice a week
☐ 4. At least once in the past month
☐ 5. Never - Not at all
☐ 6. Don't know
☐ 7. Don't want to answer

SH17. IN THE PAST MONTH, was you exposed to second-hand smoke, every day or almost every day, in a car or other private vehicle or workplace or any other place like another house?
☐ 1. Yes
☐ 2. No
☐ 3. Don't know
☐ 4. Don't want to answer

GI2b. Time end interview: ____: ____ (24h)

→ SWITCH INTERVIEWER

GI13. Interviewer: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda)

GI14. This section is filled out by:
☐ 3. Young adult (18-19 years old)
☐ 4. Young mother (14 to 17 years old)

☐ GI5. Time start interview: ____: ____ (24h)

From now on, I will be asking you general questions about your education and socio-demographic information, housing conditions, food security, eating and water consumption habits, and lifestyle. These questions are important to help understand how we get exposed to contaminants and how they relate to our body measurements, or our nutritional or health status. All the information you give me is kept confidential; I will not tell anyone anything you tell me. You can choose not to answer some questions or stop answering this questionnaire at any time.

EDUCATION AND SOCIO-DEMOGRAPHIC INFORMATIONS

(skip CES1 and CES2)

CES3. Where do you spend most of your days?
☐ 1. ------------
☐ 2. At school
☐ 3. At home (Go to CES8)
☐ 4. At work (wages, salary, self-employed) (Go to CES6)
☐ 5. Elsewhere, specify: ________________________________ (Go to Q CES8)

→ IF GO TO SCHOOL:

CES4. Where do you go to school?
☐ In the community
☐ In another First Nation community, which? _______________
☐ In a non-First Nation community, which? ________________
☐ Other: ______________________

CES5. What is the highest level of education you have completed? (school grade)
☐ 1. Kindergarden
☐ 2. Grade 1
☐ 3. Grade 2
☐ 4. Grade 3
☐ 5. Grade 4
☐ 6. Grade 5
☐ 7. Grade 6
☐ 8. Grade 7 (secondary 1)
☐ 9. Grade 8 (secondary 2)
☐ 10. Grade 9 (secondary 3)
☐ 11. Grade 10 (secondary 4)
☐ 12. Grade 11 (secondary 5)
☐ 13. Cegep (Y1)
☐ 14. Cegep (Y2)
☐ 15. Cegep (Y3)
☐ 16. Other: ________________________________

→ IF WORKING:

CES6. If you are working (wages, salary, self-employed)? You are working at ...
☐ 1. Full time
☐ 2. Part time
☐ 3. Occasionally

CES7. If YES, where are you working? (Check all that apply)
☐ In the community
☐ In another First Nation community, which? ______________
☐ In a non-First Nation community , which? _______________
☐ Other: _____________________

I would now like to ask a few questions about your marital status, your education and your household income.

CES8. Are you...
☐ 1. Married or engaged
☐ 2. Common law relationship or boyfriend/girlfriend
☐ 3. Separated
☐ 4. Divorced
☐ 5. Widowed
☐ 6. Single

→ If WORKING, AT HOME OR ELSEWHERE (NOT IN SCHOOL)

CES9. What is the highest level of education you have completed?
☐ 1. Kindergarden
☐ 2. Grade 1
☐ 3. Grade 2
☐ 4. Grade 3
☐ 5. Grade 4
☐ 6. Grade 5
☐ 7. Grade 6
☐ 8. Grade 7 (secondary 1)
☐ 9. Grade 8 (secondary 2)
☐ 10. Grade 9 (secondary 3)
☐ 11. Grade 10 (secondary 4)
☐ 12. Grade 11 (secondary 5)
☐ 13. Cegep (Y1)
☐ 14. Cegep (Y2)
☐ 15. Cegep (Y3)
☐ 16. Other: ________________________________

(skip CES10, CES11, CES12)

→ If AT HOME OR ELSEWHERE (NOT IN SCHOOL AND NOT WORKING)

CES13. Which of the following best describes your situation?
☐ 1. Currently looking for work
☐ 2. Student
☐ 3. Seasonal worker
☐ 4. Retired or on pension
☐ 5. Stay-at-home parent / house worker
☐ 6. Cannot work for health reasons
☐ 7. No longer looking for work, gave up looking for work
☐ 8. Don't want to work
☐ 9. Other, specify: ______________________

In the next sections, we refer to your household, which means everybody that lives in your house.

CES14. IN THE PAST 12 MONTHS, what was the total income of YOUR HOUSEHOLD, before taxes and including money from all sources: wages, salary, contracts, welfare, child tax benefits, scholarship, tips, commissions, etc., but not including loans?
Here I refer to how much money you and other persons living in your house made or received in the last year. I will name you income scales. Please say "stop" when I say one that suits you, that is to say, YOUR BEST ESTIMATE of your household total income for the last 12 months.

☐ 1. Less than $ 15 000
☐ 2. $ 15 000 to $ 20 000
☐ 3. $ 20 000 to $ 25 000
☐ 4. $ 25 000 to $ 40 000
☐ 5. $ 40 000 to $ 60 000
☐ 6. $ 60 000 or more
☐ 7. Don't know
☐ 8. Refusal

FOR YOUR HOUSEHOLD, IN THE PAST 12 MONTHS	CES15. From which of the following sources did you receive any income?	CES16. What was your main source of income (money)?
1- Employment income (wages, salaries or self-employment income)		
2- Child Tax Benefits		
3- Income Support (welfare/social support)		
4- Other income, for example: ☐ 1. Employment insurance ☐ 2. Old age security ☐ 3. Scholarship ☐ 4. Child support (separated parents) ☐ 5. Royalties from mining companies ☐ 6. Bonus ☐ 7. Loans ☐ 8. Other: ______________________ *CHECK ALL THOSE THAT APPLY		
5 – Income from selling: ☐ 1. Traditional foods ☐ 2. Home-made recipes		
6 – Income from traditional activities: ☐ 1. Carving, sewing, crafts/art ☐ 2. Traditional knowledge sharing programs ☐ 3. Other: ____________________________		
7- No income		

HOUSING CONDITIONS

The next questions are about the house where you live at the moment.

HC1. How long have you lived in the house where you live now?
☐ 1. All your life (since you are born)
☐ 2. Less than 1 year
☐ 3. 1 to 4 years
☐ 4. 5 to 10 years
☐ 5. More than 10 years

HC2. IN THE LAST TWELVE MONTHS, where did you live most of the time? (Check the main house (>50% of time), if equal or 50/50, check where the parent/legal guardian know more about housing conditions, possibly his own house)
☐ 8. Your own house
☐ 2. Father's house
☐ 3. Mother's house
☐ 4. Relative's house (grandparents, aunt and uncle, cousins)
☐ 5. Lodging/school
☐ 6. Camping site/tent
☐ 7. Other: _________________

The next questions refer to the main house, where you live most of the time now.

HC3. Does your house have a basement? (* INTERVIEWER now and so on refers to the main house)
☐ 1. Yes
☐ 2. No

HC4. How many rooms are there in the house where you live at the moment?
(including: bedrooms, kitchen, living room, finished basement, etc.)
(excluding: bathroom, halls, laundry room or attached sheds)
_____ rooms

HC5. Among those, how many are bedrooms? _________ bedrooms

HC6. Where do you sleep in the house? (*INTERVIEWER decomposes the question 1. Bedroom vs living room; 2. Ground floor vs basement)
☐ 1. Bedroom on the ground floor
☐ 2. Bedroom in the basement
☐ 3. Living room
☐ 4. Other, specify: _________

HC7. Do you have your own bedroom (where you sleep)? (are you alone in it?)
☐ 1. Yes
☐ 2. No

HC8. Including yourself, how many children, youth and adults live in your house right now?
(those that have meals and sleep there at least 4 nights/week)
HC8a. Age 0-5 years: _____ children
HC8b. Age 6-11 years: _____ children
HC8c. Age 12-17 years: _____ teenagers
HC8d. Age 18 years and over: _____ adults

Total: _______ persons (*INTERVIEWER make sure the count is good)

HC9. In what year was your home built?
________ year ☐ Don't know

HC10. Is your home in need of repairs? (Is anything broken that needs to be fixed?)
☐ 1. Major repairs such as defective plumbing, electrical wiring, structural repairs to walls, floors, ceiling, foundation, etc.
☐ 2. Minor repairs such as missing or loose floor tiles, missing or broken kitchen wardrobe doors or shingles, defective steps, railings, siding, etc.
☐ 3. Only regular maintenance such as painting, cleaning the chimney (fireplace, furnace), etc.
☐ 4. None

ID: ______________

HC11. IN THE PAST 12 MONTHS, have you seen mold/mildew in your home?
Mould can be black, white, pink, or almost any color, and take the form of a more or less extensive smudge.
☐ 1. Yes
☐ 2. No (Go to HC15)
☐ 3. Don't know (Go to HC15)

HC12. If YES, in which room? *INTERVIEWER check room if yes

	HC13. If yes, where in each room?						HC14. What is the size of the mold? *INTERVIEWER shows pictures
	On window frame/sill	Under windows	Around sink, bathroom, toilet	On walls	On ceiling	Other	
☐ 1. Kitchen?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 2. Bathroom?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 3. Living room?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 4. Your bedroom?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 5. Basement?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre
☐ 6. Other?							☐ A few small dots only ☐ Bigger than a post card ☐ Bigger than a 8 1/2 x 11 sheet ☐ Bigger than a square metre

HC15. IN THE PAST 12 MONTHS, have you had water infiltration in your house (through the roof, cracks in the foundation, sewer reflux, broken pipes, etc.)?
☐ 1. Yes
☐ 2. No (Go to HC18)
☐ 3. Don't know (Go to HC18)

→ IF YES:

HC16. If YES, in which room and where from?____

____

HC17. If YES, how often?
☐ 1. Several times a month
☐ 2. 1-3 times a month
☐ 3. Every 2-3 months
☐ 4. Once or few times a year

HC18. What is the main source of heat in your house? (Check all that apply and note the order of priority)
☐ 1. Electric heat
☐ 2. Wood-burning stove
☐ 3. Wood-burning fireplace
☐ 4. Oil furnace
☐ 5. Gas furnace
☐ 6. Gas fireplace
☐ 7. Other – specify:____________________

IN THE PAST MONTH and IN YOUR MAIN HOUSE, how many times were any chemicals used to treat….
*INTERVIEWER show example of products

	2-4/week	1/week	1-3/ month	Never	Don't know	HC20. Where?
HC19. Bed bugs, roaches, moths (food or textile) ants or termites, or were any insecticides used on indoor house plants?						☐ 1. Living room ☐ 2. Dining room ☐ 3. Kitchen ☐ 4. Bathroom(s) ☐ 5. Child's bedroom ☐ 6. Other bedroom(s) ☐ 7. Other rooms (den, play room, etc.) ☐ 8. Outside (foundation of building) ☐ 9. Entire home ☐ 10. Other? ________________
HC21. Head lice on your child?						
HC22. Fleas on pets?						
HC23. The yard or lawn of this house, or the surrounding fields, woods or orchards with chemical products to kill insects or weeds, or to control plant diseases?						

FOOD SECURITY STATUS

This section is about whether your household was able to afford the food you needed in THE LAST 12 MONTHS. It applies to you but also to your family as a whole. Some of the questions are personal and may be difficult for you to answer. Like the rest of the questionnaire, this information is strictly confidential.

- I will read you a series of statements that describe the experience of some families.
- For each of these statements, please tell me whether this happened often, sometimes or never for your household IN THE LAST 12 MONTHS. *INTERVIEWER SHOW CARDS FOR EACH STATEMENT

FS1. Some families might say, *"The food that we bought just didn't last, and we didn't have money to get more."*
In the last 12 months, how often did that happen for your household?
☐ 1. Often
☐ 2. Sometimes
☐ 3. Never
☐ 4. Don't know
☐ 5. Refusal

FS2. Some families might say, *"We couldn't afford to eat balanced meals."*
(Balanced meals contain a variety of food groups, for example a selection of vegetables, fruits, meat/fish, grains, and dairy products)
In the last 12 months, how often did that happen for your household?
☐ 1. Often
☐ 2. Sometimes
☐ 3. Never
☐ 4. Don't know
☐ 5. Refusal

FS3. In the last 12 months: *Did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?*
☐ 1. Yes
☐ 2. No (Go to FS5)
☐ 3. Don't know (Go to FS5)
☐ 4. Refusal (Go to FS5)

→ IF YES:
FS4. If YES, How often did this happen in the last 12 months?
☐ 1. Almost every month
☐ 2. Some months but not every month
☐ 3. Only 1 or 2 months
☐ 4. Don't know
☐ 5. Refusal

ID: ______________

FS5.In the last 12 months: *"Did you, yourself, ever eat less that you felt you should because there wasn't enough money for food?"*

☐ 1. Yes
☐ 2. No
☐ 3. Don't know
☐ 4. Refusal

FS6. In the last 12 months: *"Were you, yourself, ever hungry but didn't eat because there wasn't enough money for food?"*

☐ 1. Yes
☐ 2. No
☐ 3. Don't know
☐ 4. Refusal

FS7. Some families might say: *"We are able to get traditional food as much as we want to or we need."*
In the last 12 months, how often did that happen in your household?

☐ 1. Often
☐ 2. Sometimes
☐ 3. Never
☐ 4. Don't know
☐ 5. Refusal

GI4. Time end of the interview Part A: ____: ___ (24h)

QUESTIONNAIRE 2 – PART B

(For young adults 18-19y, young mothers)

GI6. Date: ____/___/____
Day/Mo/Year

GI7. Time start interview Part B: ____: ___ (24h)

GI18. Interviewer: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda)

GI19. This section is filled out by:
☐ 3. Young adult (18-19 years old)
☐ 4. Young mother (14 to 17 years old)

EATING HABITS – Traditional foods

This section is about traditional food – that is, food harvested within the local environment by fishing, hunting, trapping , picking, etc. It can be eaten and cooked in any form – for example: cooked, baked, smoked, dried, etc. or even included in recipes, for example moose stew. This also includes traditional food that you froze and eat in later in the year.

We want to know how often you ate different types of traditional food IN THE PAST YEAR AT HOME.
I will begin by asking questions about fish consumption.

EH1. In the past year, did you eat any FISH? (Fish from river/lake and not from the store)
☐ 1. Yes
☐ 2. No (Go to next section –LAND MAMMALS)

*INTERVIEWER explains the time frame for seasons and shows the frequency chart for traditional foods

I will now read you a list of fish species. Can you tell me if, IN THE PAST YEAR, you ate it, and if YES, how often in the past spring. After, how often in each other seasons

FISH Portion: 3-5 oz or 1- 1 2/3 deck of cards	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
1.1 Brook trout (speckled trout) ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.2 Lake trout ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.3 Rainbow trout ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.4 Walleye (yellow or blue) ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
1.5 Sauger ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.6 Northern pike ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.7 Lake sturgeon ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.8 Yellow perch ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.9 Lake whitefish ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.10 Bass ☐ Yes ☐ No ☐ 1.5.1 Smallmouth ☐ 1.5.2 Largemouth	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.11 Ling (Burbot, Maria) ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
Other fish? ☐ Yes ☐ No ☐ 1.12 Rock bass ☐ 1.13 Pumpkinseed Sunfish ☐ 1.14 Mooneye, flatfish ☐ 1.15 Brown bullhead catfish ☐ 1.16 Red (longnose) Sucker ☐ 1.17 White sucker ☐ 1.18 Carp (endemic) ☐ 1.19 Other : ____________ * INTERVIEWER refers to poster and note the fish number in the case referring to its consumption	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
1.20 Fish eggs? ☐ Yes ☐ No Which fish? ___________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

EH2. In the past year, did you eat any wild game or big game (LAND MAMMALS)?
☐ 1. Yes
☐ 2. No (Go to next section – WILD BIRDS)

I will now read you a list of species. Can you tell me if, IN THE PAST YEAR, you ate it and if so, how often.

LAND MAMMALS Portion: Meat: 4-6 oz or 1 1/2-2 deck of cards Organs: 2-3 oz or 2/3-1 deck of cards	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
2.1.1 Moose - meat	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
2.1.2 Moose - liver	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
2.1.3 Moose - kidneys	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
2.1.4 Moose – other parts?	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
Which? __________________	**Summer** (June 21 – Sept 20)								
2.2.1 Caribou - meat	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
2.2.2 Caribou - liver	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
2.2.3 Caribou - kidneys	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
2.2.4 Caribou – other parts?	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
Which? __________________	**Summer** (June 21 – Sept 20)								

	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
2.3.1 **Deer** - meat	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
☐	**Summer** (June 21 – Sept 20)								
2.3.2 **Deer** - liver	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.3.3 **Deer** - kidneys	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.3.4 **Deer** –other part	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
Which? ___________________	**Summer** (June 21 – Sept 20)								
2.4.1 **Black bear** - meat	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.4.2 **Black bear** - liver	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.4.3 **Black bear** – kidneys	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
☐ Yes	**Fall** (Sept 21 – Dec 20)								
☐ No	**Summer** (June 21 – Sept 20)								
2.4.4 **Black bear** – fat or other parts	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
Which? ___________________	**Summer** (June 21 – Sept 20)								
2.5.1 **Beaver**- meat	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.5.2 **Beaver** – other parts	**Spring** (March 21–June 20)								
☐ Yes	**Winter** (Dec 21-March 20)								
☐ No	**Fall** (Sept 21 – Dec 20)								
Which? ___________________	**Summer** (June 21 – Sept 20)								

	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
2.6 Lynx – meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.7 Hare - meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.8 Muskrat – meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.9 Porcupine – meat ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
2.10 Other LAND MAMMAL ☐ Yes ☐ No Which? _______________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

EH3. In the past year, did you eat any WILD BIRDS such as ducks, geese, and grouse?
☐ 1. Yes
☐ 2. No (Go to next section – WILD BERRIES and PLANTS)

I will now read you a list of bird species. Can you tell me if, IN THE PAST YEAR, you ate it and if so, how often.

WILD BIRDS Portion: 4-6 oz or 1 1/2-2 deck of cards	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
3.1 Ducks ☐ Yes ☐ No	**Spring** (March 21–June 20)								
☐ 3.1.1 Wood Duck ☐ 3.1.2 Ring necked duck ☐ 3.1.3 American wigeon ☐ 3.1.4 Northern pintail ☐ 3.1.5 Northern shoveler ☐ 3.1.6 Gadwall	**Winter** (Dec 21-March 20)								
☐ 3.1.7 Mallard ☐ 3.1.8 American black ☐ 3.1.9 Teal ☐ 3.1.10 Golden eye ☐ 3.1.11 Bufflehead ☐ 3.1.12 Loon	**Fall** (Sept 21 – Dec 20)								
☐ 3.1.13 Merganser ☐ 3.1.14 Other? _________ * INTERVIEWER refers to poster and writes bird number in the case referring to its consumption. JUST a check mark if don't know the duck sp.	**Summer** (June 21 – Sept 20)								

WILD BIRDS	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
3.2 Geese ☐ Yes ☐ No ☐ 3.2.1 Canada geese ☐ 3.2.2 Snow geese (White or dark sub sp.) ☐ 3.2.3 Brant * INTERVIEWER refers to poster and note the geese number in the case referring to its consumption	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
3.3 Land birds ☐ Yes ☐ No ☐ 3.3.1 Ruffed grouse (also known as Gray partridge – white meat) ☐ 3.3.2 Spruce grouse (red meat) ☐ 3.3.3 Willow ptarmigan ☐ 3.3.4 Wild turkey ☐ 3.3.5 American woodcock * INTERVIEWER refers to poster and note the bird number in the case referring to its consumption	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
3.4 Other birds ☐ Yes ☐ No Which? ____________________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
3.5 Bird eggs ☐ Yes ☐ No ☐ 3.5.1 Seagull ☐ 3.5.2 Geese ☐ 3.5.3 Other? _______________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

EH4. In the past year, did you eat any WILD BERRIES or PLANTS?

☐ 1. Yes

☐ 2. No (Go to next section – MARKET FOODS)

I will now read you a list of berry species. Can you tell me if, IN THE PAST YEAR, you ate it and if so, how often.

WILD BERRIES and PLANTS Portion : 1/2 cup * FRESH – NOT JAM	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
4.1 Wild raspberry ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

* FRESH – NOT JAM	Season	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
4.2 Wild blueberries ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.3 Chokecherry ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.4 Pine cherry ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.5 Small cranberry (bog or swamp cranberry) ☐ Yes ☐ No	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								
4.6 Other fruits or plants? ☐ Yes ☐ No ☐ 4.6.1 Wild strawberry ☐ 4.6.2 Highbush cranberry (Squashberry, Mooseberry) ☐ 4.6.3 Serviceberry (Saskatoonberry) ☐ 4.6.4 Gooseberry, currant (red, black) ☐ 4.6.5 Creeping snowberry (white berry and tea) ☐ 4.6.7 Teaberry (wintergreen, small red fruit and tea) ☐ 4.6.8 Juniper ☐ 4.6.9 Baked hazelnut (chestnut) ☐ 4.6.10 Dandelion leaves ☐ 4.6.11 Wild rice ☐ 4.6.12 Other? ______________	**Spring** (March 21–June 20)								
	Winter (Dec 21-March 20)								
	Fall (Sept 21 – Dec 20)								
	Summer (June 21 – Sept 20)								

EATING HABITS – Market foods

This section is about foods that you get from the store, that is to say, those that can be eaten as is or cooked in recipes. Now think about the PAST 3 MONTHS.

*INTERVIEWER explains the past 3 month time frame and shows the frequency chart for market foods

EH5. How often, on average did your child or you eat this food in the PAST 3 MONTHS?
*INTERVIEWER check if yes

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, less than 1/month	Comments
Traditional recipes made with market foods									
☐ 1. **Bannock** (bake) (1 slice/piece)									
☐ 2. **Saco** (fried) (1 slice/piece)									
☐ 3. **Traditional recipes** (1 bol) ☐ 3.1 **Napanewabo** - flour bowl (water, flour, beef/moose, +/- carrots) ☐ 3.2 **Patîkabo** - potato bowl (water, flour, potato, beef/moose, +/- carrots) ☐ 3.3 **Kipâtci** (water, moose broth, potato, flour, bannock dough) ☐ 3.4 Other? ________________									
Store-bought meat									
☐ 4. **Hamburger**, lean or regular (1 patty)									
☐ 5. **Beef** (steak, ground beef) (4-6 oz or 1 1/2-2 decks of cards)									
☐ 6. **Beef or pork hot dogs** (1)									
☐ 7. **Sausage** (2 small links, in can) **or wieners** (1)									
☐ 8. **Pork, pork chops, roast pork** (4-6 oz or 1 1/2-2 decks of cards)									
☐ 9. **Chicken/turkey** (breast, legs) (4-6 oz or 1 1/2-2 decks of cards)									
☐ 10. **Chicken nuggets** (4-6 nuggets) or **chicken wings** (6-8)									
☐ 11. **Beef Jerky** (1 bag)									
☐ 12. **Sliced or processed meat** (ham, Kam, Spam, salami, bologna, pepperoni, etc. (1 slice/1 piece), (4-6 oz or 1 1/2-2 decks of cards)									
☐ 13. **Bacon** (2 slices)									
☐ 14. **Eggs** (chicken) (1 egg)									
☐ 15. **Fresh or frozen fish from the market** (4-6 oz or 1 1/2-2 decks of cards)									* Note sp.
☐ 16. **Canned salmon or sardines** (3-4 oz or 1- 1 1/2 decks of cards)									
☐ 17. **Canned tuna** (3-4 oz or 1- 1 1/2 decks of cards)									☐ Pale ☐ White
Fruits									
☐ 18. **Fresh apples or pears** (1)									
☐ 19. **Bananas** (1)									
☐ 20. **Oranges** (1) or **grapefruit** (1/2)									
☐ 21. **Store-bought berries, fresh or frozen** (1/2 cup)									
☐ 22. **Other fresh fruits** (1 fruit or 1/2 cup)									
☐ 23. **Canned fruit** (1/2 cup)									

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, Less than 1/month	Comments
Vegetables									
☐ 24. Green, leafy vegetables (1 cup of iceberg, romaine or leaf lettuce, 1/2 cup cooked spinach)									
☐ 25. Dark-yellow vegetables (carrots, turnips, yams, etc.) (1 medium carrot or 1/2 cup)									
☐ 26. Broccoli, cauliflower, cabbage (1/2 cup)									
☐ 27. Tomatoes (1 whole or 1/2 cup canned) or 1/2 cup juice (Tomato or V8)									
☐ 28. Beans or peas (1/2 cup baked or canned)									
☐ 29. Other vegetables (green pepper, cucumber, corn, celery, mushrooms, mixed vegetables, etc.) (1/2 cup)									
☐ 30. Onions as a cooked vegetable (1/2 cup)									
Bread, cereals, starches									
☐ 31. White bread (1 slice)									
☐ 32. Whole wheat bread or other whole grains (1 slice)									
☐ 33. Cold cereals (cornflakes, etc.) (1 cup)									
☐ 34. Hot cereals (oatmeal, etc.) (1 cup)									
☐ 35. Noodles/macaroni soup (Lipton soup, pasta, tomato can, +3- ground beef) (1 bowl)									
☐ 36. Pasta, e.g. macaroni, spaghetti (1 cup)									
☐ 37. Rice (1 cup)									
☐ 38. Potatoes, mashed (1 cup), baked or boiled (1)									
☐ 39. Poutine or fries with gravy (1 medium)									
☐ 40. French fries (side dish) (6 oz. or 1 serving)									
☐ 42. Potato chips or corn chips (small bag or 1 oz.)									
☐ 43. Popcorn (3 cups)									
☐ 44. Crackers, e.g. Ritz (6)									
☐ 45. Pizza (2 slices)									
Sweets, baked goods									
☐ 46. Pies and cookies, homemade or ready-made (1 slice/1 piece)									
☐ 47. Doughnuts (1)									
☐ 48. Cake (homemade or ready-made, ex. Vachon) (1 piece ou 1 pq)									
☐ 49. Milk Chocolate (bar or pack), e.g. Hershey's, Aero, etc.									
☐ 50. Candy bars (bar or pack), e.g. Snickers, Reeses, Mars, M&M, etc.									
☐ 51. Candy without chocolate (1 oz.)									
☐ 52. Peanut butter (1 tablespoon)									
☐ 53. Nuts (Peanuts, almonds, etc.) or sunflower seeds (small bag or 1 oz)									
☐ 54. Jam (homemade or ready-made), sirup, honey (1 tablespoon)									
☐ 55. White sugar in tea or coffee (1 tablespoon)									* Note no. tablespoons
☐ 56. Artificial sweetener (1 packet), e.g. Egal, Twin									* Note no. bags
☐ 57. Ketchup (1 tablespoon)									* Note no. tablespoons

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, Less than 1/month	Comments
Dairy products									
☐ 58. **Milk as a drink or in cereals** (1 cup) (fresh, Carnation, in powder)									☐ 1% ☐ 2% ☐ 3.25% ☐ Carnation ☐ In powder
☐ 59. **Chocolate milk** (fresh or in powder) (1 cup)									
☐ 60. **Infant formula** (Enfamil, Bon départ, etc.) (1 cup)									
☐ 61. **Milk in tea or coffee** (fresh, Carnation, in powder) (1 teaspoon)									☐ 1% ☐ 2% ☐ 3.25% ☐ Coffee mate ☐ Carnation ☐ In powder
☐ 62. **Yogurt or Yop** (1/2 cup)									
☐ 63. **Ice cream** (1/2 cup)									
☐ 64. **Cheese, cheese curds, in a dish or grated** (cheddar or mozzarella) (1 slice, 1 small bag or 1 oz)									
☐ 65. **Processed cheese** (Kraft, Cheez Whiz, Vache qui rit) (1 slice or 1 tablespoon)									
Divers									
☐ 66. **Butter** (1 teaspoon), added to food or bread; exclude use in cooking									
☐ 67. **Margarine** (1 teaspoon), added to food or bread; exclude use in cooking									
☐ 68. **Miracle whip** (salad dressing) (1 tablespoon)									
☐ 69. **Mayonnaise** (1 tablespoon)									☐ Low fat ☐ Regular
☐ 70. **Salad dressing** (1-2 tablespoons)									☐ Low fat ☐ Olive oil ☐ Other vegetal oil/regular
71. **How often do you ate fried/deep fried food** at home? (Exclude "Pam"-type spray)									

72. **What kind of fat is usually used for frying/deep frying** at home? (Exclude "Pam"-type spray)
☐ Real butter ☐ Margarine ☐ Olive/Canola oil ☐ Corn/soya oil ☐ Vegetal shortening (Crisco) ☐ Lard (Tenderflake) ☐ Other: ____________

73. **What type of fat is usually used to cook (in the recipes, in the pan)** at home? (note the most frequent)
☐ Real butter ☐ Margarine ☐ Olive/Canola oil ☐ Corn/soya oil ☐ Vegetal shortening (Crisco) ☐ Lard (Tenderflake) ☐ Other: ____________

Breverage: How often do you drink…

	4-5/day	2-3/day	1/day	5-6/ week	2-4/ week	1/ week	1-3/ month	Never, Less than 1/month	Comments
☐ 75. **Juice in bottle** (Oasis, Fruité, Sunny-D) (1 cup)									
☐ 76. **Diet soft drink** (1 can)									* Note no. can
☐ 77. **Regular soft drink** (1 can)									Note no. can
☐ 78. **Sport drink** (Powerade, Gatorade) (1 bottle)									* Note no. bottles
☐ 79. **Energy drinks** (Redbull, Monster, Guru) (1 can)									Note no. can

DRINKING WATER SOURCES

This part of the interview pertains to the drinking water that is consumed in your house.

DW1. Does your house have tap water?
☐ 1. Yes
☐ 2. No (Go to DW5)

→ If YES:

DW2. Do you drink the tap water in your house?
☐ 1. Yes
☐ 2. No

DW3. Does the taste/odour/appearance prevent you from drinking tap water?
☐ 1. Yes
☐ 2. No
☐ 3. Sometimes

DW4. Is tap water used to prepare food in your house?
☐ 1. Yes
☐ 2. No

DW5. Do you drink another type of water in your house?
☐ 1. No
☐ 2. Bottled water
☐ 3. Well
☐ 4. Spring
☐ 5. Stream/river
☐ 6. Lake/pond
☐ 7. Rainwater cistern
☐ 8. Other, please specify: ______________________

DW6. Is another type of water used for cooking in your house?
☐ 1. No
☐ 2. Bottled water
☐ 3. Well
☐ 4. Spring
☐ 5. Stream/river
☐ 6. Lake/pond
☐ 7. Rainwater cistern
☐ 8. Other, please specify: ______________________

DW7. Do you treat the water in your house?
☐ 1. Boil because of baby
☐ 2. Boil for everybody
☐ 3. Boil when there is a notice
☐ 4. Filter (charcoal or similar)
☐ 5. Water softener
☐ 6. Ultraviolet system
☐ 7. Reverse osmosis
☐ 8. Tablets
☐ 9. None
☐ 10. Other, specify: _____________________

ID: ______________

BEVERAGE CONSUMPTION

Now, I will ask about your consumption of beverages and soups and the different sources of water in your home used to make the beverages and soups. We are interested in these beverages or foods consumed AT HOME IN THE LAST WEEK. We will use a MUG to quantify your daily amount. * INTERVIEWER, bring out the MUG

For each item listed below, please tell me:
a) If you had it IN THE LAST WEEK *INTERVIEWER, check item if yes
b) How many DAYS you had it in the last week
c) How many cups you drank each day * INTERVIEWER, bring out the MUG
d) The main source of water (example, tap water, bottled water) used to make this beverage/food

Did you have ANY of these in the PAST WEEK?	1 day	2 days	3 days	4 days	5 days	6 days	7 days	Amount (cups/ day)	Source of water
☐ DW9. Water									
☐ DW10. Coffee									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW11.Tea (any)									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW12.Hot chocolate (made with water)									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW13. Juice made from concentrate or crystals (can, Tang, Kool-Aid or Gatorade)									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW14. Infant formula (Enfamil, Good Start, etc.)									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW15. Regular powdered milk									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW16. Broth/ soup									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW17. Stew (home-made)									☐ Tap ☐ Bottle ☐ Other ___________
☐ DW23. Other food/drink made with water Which?_________________________									☐ Tap ☐ Bottle ☐ Other ___________

LIFESTYLE

IN THE LAST YEAR, on average, how often did you …						2. Besides you, anyone else in your house?(number)	
	Several times a month	1 – 3 times a month	Every 2-3 months	Once or few times a year	Never – Not at all	No	Yes
L1. Hunt for big game?							
L2. Trap small game?							
L3. Hunt for small game?							
L4. Fish?							
L5. Harvest seafood?							
L6. Harvest wild berries or plants?							
L7. Plant a garden?							

If you or someone in the household is fishing, hunting big or small game, we will now ask you some questions about fish sinkers, ammunitions and pellets. ☐ This section does not apply

L8. Do you or someone in your household make your own fishing sinkers with lead?
☐ 1. Yes
☐ 2. No
☐ 3. Don't know

L9. Do you or someone in your household make or modify your own ammunitions with lead?
☐ 1. Yes
☐ 2. No (Go to L11)
☐ 3. Don't know

L10. If YES, how? With lead pellets? Where and what type? To hunt for what?
____
____
____

L11. Where do you or your household members clean guns?
☐ 1. In the kitchen
☐ 2. In the living room
☐ 3. In the shed
☐ 4. Outside the house
☐ 5. Other: ___________________

L12. After hunting, who cleans the animal (does the butchering)?
☐ 1. Yourself or a relative
☐ 2. A butcher (end of the interview)
☐ 3. Other: ______________________________
☐ 4. Don't know

L12. When cutting the meat, is the meat around the impact of the bullet removed?
*INTERVIEWER show the picture of the meat with bullet impact
☐ 1. Yes
☐ 2. No (end of the interview)
☐ 3. Don't know (end of the interview)

L13. If YES, to what extent? * INTERVIEWER brings ruler or measuring tape
_______ cm _______ in ☐ Don't know

GI20. Time end of the interview Part B: ___: ___ (24h)

GENERAL COMMENTS

Write any comments about the interview. Identify any question(s) during any part of the interview with the respondent that was not well understood or instances where he/she seemed unusually guarded or withheld information. Did he/she reveal any problems that may interfere with participation in the study?
____
____
____
____
____
____

Questionnaires for the Innu communities

ÉTUDE PILOTE JEUNES, ENVIRONNEMENT ET SANTÉ DES PREMIÈRES NATIONS – JES*!*
QUESTIONNAIRE ADMINISTRÉ PAR UN INTERVIEWEUR

INFORMATION GÉNÉRALE

GI1. Date: ____/___/____
Jour/Mois/Année

Participant volontaire
☐ 1. Oui
☐ 2. Non

GI3. Communauté: ____

GI4. Age du participant: ______ ans GI5.Date de naissance: _______/____/______ Jour/Mois/Année

GI6. Sexe: ☐ 1. Féminin
☐ 2. Masculin

GI7. Le parent/tuteur ou le participant est venu au centre de santé avec leur médication(s):
☐ 1. Oui
☐ 2. Non

GI8. Le parent/tuteur ou le participant est venu au centre de santé avec leur supplément(s):
☐ 1. Oui
☐ 2. Non

QUESTIONNAIRE 1

GI10. Intervieweur: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda; 6. Sylvie; 7. Annie; 8. João; 9. Micheline)

GI2. Heure début interview: ___: ___ (24h)

Durant cette entrevue, je vous demanderai des informations générales sur les conditions de santé et la consommation de cigarette de votre enfant. N'hésitez pas à demander un traducteur pour vous aider à comprendre les questions. Les jeunes participants à l'étude âgés de 14 à 17 ans seront invités à répondre directement au questionnaire portant sur leur consommation de cigarette. Certaines questions sont personnelles. Il est possible que vous vous demandiez pourquoi elles sont posées dans une étude qui vise à documenter l'exposition aux contaminants environnementaux, et le statut nutritionnel et de santé. Ces questions sont importantes pour nous aider à comprendre la façon dont nous pouvons être exposés aux contaminants et comment ces derniers sont reliés aux mesures corporelles ou notre statut nutritionnel ou de santé. Toutes les informations que vous donnerez sont confidentielles; je ne dirai pas à personne ce que vous me direz. Vous pouvez décider de ne pas répondre à certaines questions ou d'arrêter le questionnaire en tout temps.

CONDITIONS DE SANTÉ DE L'ENFANT

Les questions suivantes portent sur différents aspects de la santé de votre enfant ou votre santé.

GI11. Cette section est complétée par:
☐ 1. Parent/Tuteur légal (NOTE: option préférable)
☐ 2. Jeune (14-17 ans)

* Dans cette section l'INTERVIEWEUR réfère à "votre enfant", "cet enfant", directement au nom de l'enfant ou à "votre santé" si cette portion est répondue directement par le jeune.

CH1. En général, comment évaluez-vous la santé de votre enfant ou votre santé?
☐ 1. Excellente
☐ 2. Très bonne
☐ 3. Bonne
☐ 4. Passable
☐ 5. Mauvaise

CH2. Comparé à l'an dernier, comment évaluez-vous maintenant la santé de votre enfant ou votre santé?
☐ 1. Bien meilleure maintenant que l'an dernier
☐ 2. Un peu mieux maintenant (que l'an dernier)
☐ 3. À peu près la même que l'an dernier
☐ 4. Un peu moins bonne maintenant (que l'an dernier)
☐ 5. Bien moins bonne maintenant (que l'an dernier)

CH4. Est-ce que votre enfant est ou est-ce que vous êtes né à moins de 37 semaines de grossesse? (naissance prématurée)
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas

Pour une jeune femme de plus de 14 ans, il est important de savoir, au moment de l'analyse de son état de santé, si vous allaitez.
CH5. Allaitez-vous actuellement?
☐ 1.Oui
☐ 2. Non

Cette section porte sur certains problèmes de santé que votre enfant peut avoir ou que vous pouvez avoir. Nous sommes intéressés par ceux qui devraient durer ou qui ont déjà duré 6 mois ou plus (long terme/chronique) ET qui ont été diagnostiqués par un médecin ou une infirmière.

Votre enfant a-t-il déjà souffert/souffre-t-il de ? Souffrez vous/Avez-vous souffert de?	NON	OUI	Ne sais pas	Âge du premier diagnostic? Spécifiez.
CH6. Bronchite/Bronchiolite à répétition				
CH7. Asthme				
CH8. Anémie (manque de fer)				
CH9. Hypertension artérielle (haute pression)				
CH10. Hypercholestérolémie (cholestérol élevé)				
CH11. Maladie cardiaque				
CH12. Problème de la thyroïde				
CH13. Problème de foie, si oui, lequel : ______________________				
CH14. Cancer, si oui, lequel: ______________________________				
Diabète:				
CH15. Diabète de type 1 (insulino-dépendant)				
CH16. Diabète de type 2 (non insulino-dépendant)				
CH17. Pré-diabète type 2 (intolérance au glucose)				
CH19. Tout autre diagnostic: ____________________________				

CH20. DANS LES 24 DERNIÈRES HEURES (depuis hier), votre enfant a-t-il pris des médicaments ou avez-vous pris des médicaments, par exemple une médication prescrite ou en vente libre?
☐ 1. Oui
☐ 2. Non (Aller à CH22)

CH21. Si OUI,
- S'il-vous-plaît, dites-moi le nom des et la raison de la prise de ce médicament
- Dans le <u>DERNIER MOIS</u>, à quelle fréquence ont été pris chacun de ces médicaments?

NOM DU MÉDICAMENT (nom et molécule)	Raison et fréquence (prise habituelle ou ponctuelle?)
1.	
2.	
3.	

CH22. DANS LES 24 DERNIÈRES HEURES (depuis hier), votre enfant a-t-il pris ou avez-vous pris un des produits suivants: suppléments nutritionnels, vitamines, minéraux ou toute préparation homéopathique ou à base d'herbes?
☐ 1. Oui
☐ 2. Non (Aller à GI12)

CH23. Si OUI,
- S'il-vous-plaît, dites-moi le nom des suppléments et la raison de la prise de ce supplément
- Dans le <u>DERNIER MOIS</u>, à quelle fréquence ont été pris chacun de ces suppléments?

NOM DU SUPPLÉMENT	Raison et fréquence (prise habituelle ou ponctuelle?)
1.	
2.	
3.	

CONSOMMATION DE CIGARETTE

* INTERVIEWEUR: Si l'enfant a de 14 à 17 ans:
Puisque cette sur la consommation de cigarette peut être difficile à répondre par le parent, je demanderai directement à votre enfant.

GI12. Cette section est complétée par:
☐ 1. Parent/Tuteur legal
☐ 2. Jeune (14-17 ans) (*NOTE: si 14-17 ans, option préférable)

Maintenant, je vais poser des questions sur la cigarette. Par cigarettes, nous entendons les cigarettes commerciales et roulées, à l'exclusion des cigares, des cigarillos ou des pipes. Ceci inclut aussi les « butch » de cigarettes, c'est-à-dire les cigarettes qui ont déjà été à moitié fumées par d'autres.

SH1. En ce moment, à quelle fréquence est-ce que votre enfant fume ou est-ce que vous fumez?
☐ 1. Chaque jour (Aller à SH2, puis SH3)
☐ 2. Occasionnellement (Aller à SH2, SH4 puis SH5)
☐ 3. Jamais – Pas du tout (Aller à SH6)
☐ 6. Plus maintenant, mais j'ai déjà fumé (Aller à SH2, puis SH6, SH7 puis SH8)
☐ 4. Je ne sais pas (Si SH1 et SH2 = SP, Aller à SH6, SH7 puis SH8)
☐ 5. Je ne veux pas répondre (Si SH1 et SH2 = NR, Aller à SH6, SH7 puis SH8)

SH2. À quel âge est-ce que votre enfant a fumé sa première cigarette ou est-ce que vous avez fumé votre première cigarette? _________ ans (Max 17) ☐ Je ne sais pas

→ Fumeur quotidien (actuel)

SH3. En ce moment, combien de cigarettes votre enfant fume-t-il/elle ou fumez-vous chaque jour? (MIN: 1, MAX: 95)
__________ Cigarettes (Aller à SH9) ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

→ Fumeur occasionnel (actuel)

SH4. Les jours où il / elle fume ou que vous fumez, combien de cigarettes fume-t-il/elle ou fumez-vous habituellement? (MIN: 1, MAX: 95)
__________ Cigarettes ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

SH5. DANS LE DERNIER MOIS, combien de jours a-t-il/elle ou avez-vous fumé plus d'une cigarette par jour? (MIN: 0, MAX: 31)
__________ Jours (Aller à SH9) ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

→ Non-fumeur (actuel)

SH6. Je comprends que votre enfant ne fume pas ou que vous ne fumez pas actuellement (ou SP ou NR), mais est-ce qu'il a fumé ou vous avez fumé DANS LE DERNIER MOIS? (*INTERVIEWER: Au moins une fois? A essayé de fumer? Fumé des butch de cigarettes?)
☐ 1. Oui
☐ 2. Non (Aller à SH9)
☐ 3. Je ne sais pas (Aller à SH9)
☐ 4. Je ne veux pas répondre (Aller à SH9)

SH7. Les jours où votre enfant a ou que vous avez fumé, combien de cigarettes fumait-t-il/ elle ou fumiez-vous habituellement? (MIN: 1, MAX: 95)
__________ Cigarettes ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

SH8. DANS LE DERNIER MOIS, combien de jours a-t-il/elle ou avez-vous fumé plus d'une cigarette par jour? (MIN: 0, MAX: 31)
__________ Jour ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

Autres sources de tabac

Maintenant, je vais vous poser des questions sur d'autres sources possibles de tabac. Ceci inclut les cigares, les cigarillos, le tabac mélangé à la marijuana, les pipes, etc.

DANS LE DERNIER MOIS, est-ce que votre enfant a ou est-ce que vous avez…	Chaque jour ou presque chaque jour	La fin de semaine ou 1-2 fois par semaine	Au moins une fois le dernier mois	Jamais – Pas du tout	Je ne sais pas	Je ne veux pas répondre
SH9. Fumé des cigares ou des cigarillos?						
SH10. Fumé de la marijuana mélangé à du tabac?						
SH11. Fumé la pipe avec du tabac?						
SH12. Fumé la pipe à eau/narguillé/chicha avec du tabac?						
SH13. Consommé du tabac à chiquer ou à sniffer?						

EXPOSITION À LA FUMÉE SECONDAIRE

Maintenant, je vais poser des questions sur la fumée secondaire. La fumée secondaire inclut la fumée que les fumeurs exhalent et la fumée qui provient de la combustion du tabac fumé par d'autres personnes.

SH14. En comptant les habitants de votre maison et les visiteurs réguliers, y a-t-il quelqu'un qui fume la cigarette, des cigares, des pipes (ou autres) *à l'intérieur* de la maison de votre enfant ou de votre maison, chaque jour ou presque chaque jour?
☐ 1. Oui
☐ 2. Non (Aller à SH17)
☐ 3. Je ne sais pas (Aller à SH17)
☐ 4. Je ne veux pas répondre (Aller à SH17)

→Si OUI:

SH15. Combien de personnes fument *à l'intérieur* de cette maison, chaque jour ou presque chaque jour? (Incluant les habitants de votre maison et les visiteurs réguliers). (MIN: 1, MAX: 15)
__________ personnes

SH16. Globalement [à l'exclusion de la consommation de tabac de votre enfant ou votre consommation de tabac], à quelle fréquence votre enfant a été exposé ou avez-vous été exposé à de la fumée secondaire à l'intérieur de cette maison DANS LE DERNIER MOIS?
☐ 1. Chaque jour ou presque chaque jour
☐ 2. La fin de semaine ou une-deux fois par sem.
☐ 3. Au moins une fois le dernier mois
☐ 4. Jamais – Pas du tout
☐ 5. Je ne sais pas
☐ 6. Je ne veux pas répondre

SH17. DANS LE DERNIER MOIS, votre enfant a été exposé ou est-ce que vous avez été exposé à de la fumée secondaire, chaque jour ou presque chaque jour, dans une voiture ou un autre véhicule privé ou un lieu de travail ou tout autre lieu?
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas
☐ 4. Je ne veux pas répondre

GI2b. Heure fin interview: ___: ___ (24h)

→ CHANGER INTERVIEWEUR

GI13. Intervieweur: _________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda, 7. Annie, 8. Joao, 9. Micheline)

GI14. Cette section est complétée par:
☐ 1. Parent/Tuteur légal (NOTE: option préférable)
☐ 2. Jeune (14-17 ans)

GI15. Heure début interview: ___: ___ (24h)

À partir de maintenant, je vous demanderai des informations générales sur l'éducation, le statut sociodémographiques, les conditions de logement, la sécurité alimentaire, la consommation d'aliments et d'eau et le mode de vie de votre enfant. N'hésitez pas à demander un traducteur pour vous aider à comprendre les questions. Les jeunes âgés de 14 à 17 ans seront invités à répondre directement au questionnaire portant sur leur consommation d'aliments et d'eau et leurs habitudes de vie. Ces questions sont importantes pour nous aider à comprendre la façon dont nous pouvons être exposés aux contaminants et comment ces derniers sont reliés aux mesures corporelles ou notre statut nutritionnel ou de santé. Toutes les informations que vous donnerez sont confidentielles; je ne dirai pas à personne ce que vous me direz. Vous pouvez décider de ne pas répondre à certaines questions ou d'arrêter le questionnaire en tout temps.

ÉDUCATION DE L'ENFANT ET INFORMATIONS SOCIO-DÉMOGRAPHIQUES

CES1. Pour cet enfant, vous êtes…
☐ 1. Mère biologique (mère de naissance)
☐ 2. Mère adoptive
☐ 3. Belle-mère
☐ 4. Père biologique (père de naissance)
☐ 5. Père adoptif
☐ 6. Beau-père
☐ 7. Grand-parent(s)
☐ 8. Tante/Oncle/Cousins
☐ 9. Autre: ____________________

CES2. Âge du parent/tuteur:___________ ans

CES3. Où votre enfant passe-t-il la majeure partie de sa journée?
☐ 1. À la garderie (Aller à CES8)
☐ 2. À l'école (pré-maternelle ou maternelle)
☐ 3. À la maison (Aller à CES8)
☐ 4. Au travail (salarié, contrat ou travailleur autonome) (Aller à CES6)
☐ 5. Autre, spécifiez: ______________________________ (Aller à CES8)

→ SI L'ENFANT VA À L'ÉCOLE:

CES4. Où votre enfant va-t-il à l'école?
☐ 1. Dans la communauté
☐ 2. Dans une autre communauté des Premières Nations, laquelle? ______________
☐ 3. Dans une communauté non-autochtone, laquelle? ______________
☐ 4. Autre: ____________________

CES5. Quel niveau de scolarité a-t-il/elle complété?
☐ 1. Pré-maternelle/Maternelle
☐ 2. 1re année
☐ 3. 2e année
☐ 4. 3e année
☐ 5. 4e année
☐ 6. 5e année
☐ 7. 6e année
☐ 8. Secondaire 1
☐ 9. Secondaire 2
☐ 10. Secondaire 3
☐ 11. Secondaire 4
☐ 12. Secondaire 5
☐ 13. Cegep (1re année)
☐ 14. Cegep (2e année)
☐ 15. Cegep (3e année)
☐ 16. Autre: ________________________________
(Aller à CES8)

→ SI L'ENFANT TRAVAILLE:

CES6. Si votre enfant travaille (salarié, contractuel ou travailleur autonome)? Travaille-t-il à…
☐ 1. Temps plein
☐ 2. Temps partiel
☐ 3. Occasionnellement

CES7. SI OUI, où est situé son emploi? (Cochez toutes les cases qui s'appliquent)
☐ 1. Dans la communauté
☐ 2. Dans une autre communauté des Premières Nations, laquelle? ______________
☐ 3. Dans une communauté non-autochtone, laquelle? ______________
☐ 4. Autre: ____________________

J'aimerais maintenant vous posez quelques questions au sujet du statut socioéconomique de votre ménage.

CES8. Êtes-vous…
☐ 1. Marié(e) ou fiancé(e)
☐ 2. Conjoint(e) de fait ou chum/blonde
☐ 3. Séparé(é)
☐ 4. Divorcé(e)
☐ 5. Veuf/Veuve
☐ 6. Célibataire

CES9. Quel niveau de scolarité avez-vous complété?

☐ 1. Pré-maternelle/Maternelle
☐ 2. 1re année
☐ 3. 2e année
☐ 4. 3e année
☐ 5. 4e année
☐ 6. 5e année
☐ 7. 6e année
☐ 8. Secondaire 1
☐ 9. Secondaire 2
☐ 10. Secondaire 3
☐ 11. Secondaire 4
☐ 12. Secondaire 5
☐ 13. Cegep (1re année)
☐ 14. Cegep (2e année)
☐ 15. Cegep (3e année)
☐ 17. Université (Certificat)
☐ 18. Université (Baccalauréat)
☐ 19. Université (Maîtrise)
☐ 16. Autre: ________________________________

CES10. Occupez-vous actuellement un travail (salarié, contractuel ou travailleur autonome)?

☐ 1. Oui
☐ 2. Non (Passez à CES13)

→ SI OUI:

CES11. SI OUI, à…

☐ 1. Temps plein
☐ 2. Temps partiel
☐ 3. Occasionnellement

CES12. SI OUI, où est situé votre emploi? (Cochez toutes les cases qui s'appliquent)

☐ 1. Dans la communauté
☐ 2. Dans une autre communauté des Premières Nations, laquelle? ______________
☐ 3. Dans une communauté non-autochtone, laquelle? ______________
☐ 4. Autre: ____________________ (Aller à CES14)

→ SI NON:

CES13. Si NON, qu'est-ce qui décrit le mieux votre situation?

☐ 1. Je cherche du travail
☐ 2. Je suis étudiant
☐ 3. J'occupe un emploi saisonnier
☐ 4. Je suis à la retraite ou je reçois une pension
☐ 5. Je suis parent au foyer
☐ 6. Je ne peux pas travailler pour des raisons de santé
☐ 7. Je ne cherche plus de travail, j'ai renoncé à chercher du travail
☐ 8. Je n'ai pas envie de travailler
☐ 10. Congé de maternité
☐ 11. Congé de maladie
☐ 9. Autre, spécifier: __________________________

HC8. Incluant vous-même, combien d'enfants, jeunes et adultes habitent dans votre logement actuellement?

(Ceux qui y prennent leurs repas et y dorment au moins 4 nuits/semaine)

HC9a. Âge 0-5 ans: _____ enfants
HC9b. Âge 6-11 ans: _____ enfants
HC9c. Âge 12-17 ans: _____ adolescents
HC9d. Âge 18 ans et plus: _____ adultes

Total: _______ personnes (*INTERVIEWEUR s'assure que le compte est bon)

Dans les prochaines sections, on fait référence à votre ménage, c'est à dire à toutes les personnes qui habitent dans votre maison.

POUR VOTRE MÉNAGE, DANS LES 12 DERNIERS MOIS…	CES15. Parmi les sources de revenu suivantes, lesquelles avez-vous reçu ?	CES16. Parmi celles-ci, quelle est votre principale source de revenu cette année?
1- Revenu d'emploi (salarié, contrat ou travailleur autonome)		
2- Allocations familiales		
3- Prestations d'aide sociale		
4- Autre revenu, par exemple (Cocher tout ce qui s'applique) : ☐ 1. Assurance emploi (chômage) ☐ 2. Pension de vieillesse ☐ 3. Bourse d'étude ☐ 4. Pension alimentaire ☐ 5. Redevances provenant de sociétés minières ☐ 6. Bonus ☐ 7. Prêts ☐ 8. Autre: ______________________		
5- Revenu provenant de la vente ou l'échange : ☐ 1. Aliments traditionnels ☐ 2. Recettes maison		
6- Revenu provenant d'activités traditionnelles : ☐ 1. Sculpture, couture, artisanat/art ☐ 2. Programmes de partage de connaissances traditionnelles ☐ 3. Autre : ________________________		
7- Aucun revenu		
8 - Refus		

CES14. DANS LES 12 DERNIERS MOIS, quel était le revenu total de VOTRE MÉNAGE, avant impôts, incluant toutes sources d'argent comme : salaire, contrats, aide sociale, allocation familiale, bourse d'étude, pourboires, commissions, etc., mais n'incluant pas les prêts?
Je fais référence ici au montant d'argent approximatif que vous et les habitants de votre ménage avez gagné au total pendant l'année qui vient de passer.
Je vais vous nommer des échelles de revenus. S'il vous plaît dites "stop" lorsque je dirai celle qui vous convient, c'est-à-dire la meilleure estimation de votre revenu total pour les 12 derniers mois.
(*INTERVIEWEUR MONTRE CHARTE AVEC CATÉGORIES)

☐ 1. Moins de 15 000$
☐ 2. 15 000$ à 20 000$
☐ 3. 20 000$ à 25 000$
☐ 4. 25 000$ à 40 000$
☐ 5. 40 000$ à 60 000$
☐ 6. 60 000$ et plus
☐ 7. Je ne sais pas
☐ 8. Refus

CONDITIONS DE LOGEMENT

Les prochaines questions portent sur le logement où votre enfant demeure en ce moment.

HC1. Depuis combien de temps votre enfant vit-il dans le logement où vous vivez actuellement?
☐ 1. Toute sa vie (depuis sa naissance)
☐ 2. Moins d'1 an
☐ 3. 1 à 5 ans
☐ 4. 4 à 10 ans
☐ 5. Plus de 10 ans

HC2. AU COURS DES 12 DERNIERS MOIS, où votre enfant a-t-il vécu la plupart du temps? (Cocher la maison principale (>50% du temps), si égal ou 50/50, cocher où le parent/tuteur connait le mieux les conditions de logement, possiblement sa propre maison)

☐ 1. La maison où vous et votre enfant vivez maintenant
☐ 2. Chez son père
☐ 3. Chez sa mère
☐ 4. Chez un autre membre de la famille (Grands-parents, tante, oncle, cousins)
☐ 5. Pensionnat/école
☐ 6. Campement/tente
☐ 7. Autre: __________________

Les prochaines questions font référence à la maison principale où votre enfant habite la majeure partie du temps en ce moment.

HC3. Est-ce que votre logement possède un sous-sol? (*INTERVIWEUR fait toujours référence au logement principal)

☐ 1. Oui
☐ 2. Non

HC4. Combien y a-t-il de pièces dans le logement où votre enfant vit actuellement?
(inclut : chambre(s), cuisine, salon, pièce(s) dans le sous-sol, etc.)
(exclut : salles de bain, couloir, salle de lavage ou cabanon/remise)
______ pièces

HC5. Parmi celles-ci, combien sont des chambres à coucher? _________ chambres à coucher

HC6. Où votre enfant dort-il dans le logement? (*INTERVIEWEUR décompose la question 1. Chambre vs salon; 2. Rez-de-chaussée vs sous-sol)

☐ 1. Chambre à coucher au rez-de-chaussée (1er étage)
☐ 2. Chambre à coucher dans le sous-sol
☐ 3. Salon
☐ 4. Autre, spécifiez: _________

HC7. Est-ce que votre enfant a sa propre chambre (où il/elle dort) ?(dort-il/elle seul dans sa chambre?)

☐ 1. Oui
☐ 2. Non

HC9. En quelle année votre logement a-t-il été construit (si vous ne savez pas, donnez un estimatif à +/- 5 ans)?
________ année ☐ Je ne sais pas

HC10. Votre logement a-t-il besoin d'être rénové? (y a-t-il des réparations à faire?)

☐ 1. Oui, des réparations majeures telles que sur la plomberie défectueuse, le câblage électrique, la structure des murs, des planchers, des plafonds, de la fondation etc.
☐ 2. Oui, mais des réparations mineures telles que la fixation de carreaux de plancher ou des portes d'armoires détachés ou manquants, des bardeaux du toit arrachés, de marches défectueuses, de rampes, etc.
☐ 3. Seulement un entretien régulier comme la peinture, le nettoyage de la cheminée (foyer, fournaise), etc.
☐ 4. Non

HC11. AU COURS DES DOUZE DERNIERS MOIS, avez-vous observé des moisissures dans votre logement?
Les moisissures peuvent être noires, blanches, roses, ou presque toutes les couleurs, et prendre la forme d'une tache plus ou moins étendue.

☐ 1. Oui
☐ 4. Non, mais j'ai senti une odeur de moisissure (Aller à HC15)
☐ 2. Non (Aller à HC15)
☐ 3. Je ne sais pas

HC12. Si OUI, dans quelles pièces avez-vous observé des moisissures? *INTERVIEWEUR coche la pièce si oui

	HC13. Si oui, où dans chaque pièce?						HC14. Quelle est la taille des moisissures? *INTERVIWEUR montre les photos
	Sur le(s) cadre(s) de fenêtre	Sous les fenêtres	Autour de l'évier, du bain ou de la toilette	Sur le(s) mur(s)	Sur le plafond	Autre	
☐ 1. Cuisine?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 2. Salle de bain?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 3. Salon?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 4. Chambre de votre enfant?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 5. Sous-sol?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 6. Autre?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré

HC15. AU COURS DES DOUZE DERNIERS MOIS, est-ce qu'il y a eu des infiltrations d'eau dans votre logement (par le toit, fissure de la fondation, reflux d'égouts, bris de tuyaux, etc.)?
☐ 1. Oui
☐ 2. Non (Aller à HC18)
☐ 3. Je ne sais pas (Aller à HC18)

→ SI OUI:
HC16. Si OUI, dans quelle pièce et où venait l'infiltration?____
____

HC17. Si OUI, à quelle fréquence?
☐ 1. Plusieurs fois par mois
☐ 2. 1-3 fois par mois
☐ 3. Chaque 2-3 mois
☐ 4. Une fois ou quelques fois par année

HC18. Quelle sont les sources de chauffage dans votre logement? (Cochez toutes les cases qui s'appliquent et noter l'ordre de priorité)
☐ 1. Chauffage électrique
☐ 2. Poêle à bois
☐ 3. Foyer au bois
☐ 4. Fournaise à l'huile
☐ 5. Fournaise au gaz
☐ 6. Foyer au gaz
☐ 7. Autre – spécifiez:_____________________

DANS LE DERNIER MOIS et DANS VOTRE LOGEMENT PRINCIPAL, à quelle fréquence avez-vous utilisé des produits chimiques pour traiter ou éliminer des…
*INTERVIEWEUR montre des exemples de produits

	2-4/sem	1/sem	1-3/ mois	Jamais	Je ne sais pas	HC20. Où?
HC19. Punaises de lit, coquerelles, mites (laine ou alimentaires), fourmis, ou termites, ou des insecticides pour éliminer des insectes sur des plantes intérieures?						☐ 1. Salon ☐ 2. Salle à manger ☐ 3. Cuisine ☐ 4. Salle de bain ☐ 5. Chambre de l'enfant ☐ 6. Autre(s) chambres ☐ 7. Autres pièces (salle de jeux, etc.) ☐ 8.À l'extérieur (foundation de la maison) ☐ 9. Maison complète ☐ 10. Autre? ___________________
HC21. Poux dans les cheveux de votre enfant?						
HC22. Puces sur vos animaux domestiques?						
HC23. Dans la cour ou la pelouse de ce logement, ou les champs, les bois ou les vergers environnants pour tuer des insectes ou des mauvaises herbes ou pour contrôler des maladies des plantes?						

SÉCURITÉ ALIMENTAIRE

L'objectif de cette section est d'évaluer si, AU COURS DES 12 DERNIERS MOIS, votre ménage était en mesure de payer la nourriture dont vous aviez besoin. Ceci s'applique à vous mais aussi aux membres de votre famille dans son ensemble. Notez que ces informations sont strictement confidentielles.

- Je vais vous lire une série d'énoncés qui décrivent l'expérience de certaines familles.
- Pour chacun de ces énoncés, dites-moi si dans votre ménage AU COURS DES 12 DERNIERS MOIS de telles expériences se présentent souvent, parfois ou jamais * INTERVIWEUR MONTRE DES CARTES AVEC LES ÉNONCÉS

FS1. Certaines familles peuvent dire : *"Toute la nourriture que nous avions acheté a été mangée, et nous n'avions pas d'argent pour en racheter".*
Au cours des 12 derniers mois, combien de fois est-ce arrivé dans votre ménage?
☐ 1. Souvent
☐ 2. Quelques fois
☐ 3. Jamais
☐ 4. Je ne sais pas
☐ 5. Refus

FS2. Certaines familles peuvent dire : *"Nous n'avions pas les moyens de manger des repas équilibrés".*
(Repas équilibrés = alimentation variée avec des fruits, des légumes, des produits laitiers, des céréales et des viandes ou poissons).
Au cours des 12 derniers mois, combien de fois est-ce arrivé dans votre ménage?
☐ 1. Souvent
☐ 2. Quelques fois
☐ 3. Jamais
☐ 4. Je ne sais pas
☐ 5. Refus

FS3. Au cours des 12 derniers mois : *"Avez-vous ou d'autres adultes de votre ménage déjà réduit votre portion ou sauté des repas parce qu'il n'y avait pas assez d'argent pour acheter de la nourriture?".*
☐ 1. Oui
☐ 2. Non (Aller à FS5)
☐ 3. Je ne sais pas (Aller à FS5)
☐ 4. Refus (Aller à FS5)
→ Si OUI:
FS4. Si OUI, Combien de fois est-ce arrivé dans les 12 derniers mois…
☐ 1. Presque chaque mois
☐ 2. Certains mois mais pas tous les mois
☐ 3. Seulement 1 ou 2 mois
☐ 4. Je ne sais pas
☐ 5. Refus

FS5. Au cours des 12 derniers mois : *"Avez-vous, vous-même, déjà mangé moins de nourriture que vous auriez dû, selon vous, parce qu'il n'y avait pas assez d'argent pour acheter de la nourriture?".*
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas
☐ 4. Refus

FS6. Au cours des 12 derniers mois, *"Avez-vous, vous-même, été dans une situation où vous aviez faim et ne pouviez pas manger parce que vous n'aviez pas assez d'argent pour acheter de la nourriture?".*
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas
☐ 4. Refus

FS7. Certaines familles peuvent dire : *"Nous sommes en mesure d'obtenir la quantité de nourriture traditionnelle que nous voulons ou que nous avons de besoin"*
Au cours des 12 derniers mois, combien de fois est-ce arrivé dans votre ménage?
☐ 1. Souvent
☐ 2. Quelques fois
☐ 3. Jamais
☐ 4. Je ne sais pas
☐ 5. Refus

GI15b. Heure fin de cette section: ___: ___

HABITUDES ALIMENTAIRES – Aliments traditionnels

GI16. Date: ____/___/____ GI17. Heure début section: ___: ___ (24h)
Jour/Mo/Année

GI18. Intervieweur: _________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda; 7. Annie; 8. João;)

GI19. Cette section est complétée par:
☐ 1. Parent/tuteur (NOTE: option préférable)
☐ 2. Jeune

EH0.1 DANS LA DERNIÈRE ÀNNÉE, comme exemple lors d'une semaine typique, à quelle fréquence votre enfant mange-t-il à votre domicile?
(Cochez les cases qui s'appliquent)

	0 jour/sem	1 jour/sem	2 jour/sem	3 jour/sem	4 jour/sem	5 jour/sem	6 jour/sem	7 jour/sem
Déjeuner								
Dîner								
Souper								

EH0.2 Lorsque les repas ne sont pas consommés à la maison, où sont-ils le plus souvent consommés?
☐ 1. Chez un autre membre de la famille (famille élargie ou amis de la famille)
☐ 2. À l'école
☐ 3. Au restaurant/casse-croûte
☐ 4. Toujours à la maison
☐ 4. Autre, spécifiez : _______________

Cette section porte sur la consommation d'aliments traditionnels, c'est-à-dire les aliments chassés, pêchés, trappés ou récoltés dans l'environnement qui entoure la communauté. Ces aliments peuvent être mangés et cuisinés de multiples façons, que ce soit cuit à la poêle ou au four, fumé, séché, etc. ou bien même inclus dans des recettes, par exemple du ragoût d'orignal. Ceci inclus aussi les aliments traditionnels qui ont été congelés et mangés plus tard dans l'année.

Nous voulons savoir à quelle fréquence votre enfant a mangé différents aliments traditionnels AU COURS DE LA DERNIÈRE ANNÉE à votre domicile. Commençons par la consommation de poissons.

EH1. DANS LA DERNIÈRE ANNÉE, est-ce que votre enfant a mangé ou avez-vous mangé du POISSON? (Poisson de la région (pêchés dans les rivières, l'estuaire ou les lacs) et non pas les espèces de poissons d'ailleurs à l'épicerie)
☐ 1. Oui
☐ 2. Non (Aller à la section – MAMMIFÈRES TERRESTRES)

Maintenant, je vais vous lire une liste d'espèces de poissons. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, votre enfant en a mangé ou vous en avez mangé, et SI OUI, combien de fois au printemps dernier. Ensuite, combien de fois à chaque autre saison.

POISSONS Portion: 3-5 oz ou 1- 1 2/3 de jeux de cartes	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
1.1 Truite mouchetée (truite de mer, omble de fontaine)	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
☐ Oui	**Automne** (21 sept. – 20 déc.)								
☐ Non	**Été** (21 juin – 20 sept.)								
1.2 Truite grise/ de lac (touladi)	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.21 Saumon d'eau douce (ouananiche)	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.22.1 Saumon atlantique (bouilli, cuit, au four, en canne)	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
☐ Oui	**Automne** (21 sept. – 20 déc.)								
☐ Non	**Été** (21 juin – 20 sept.)								
1.22.2 Saumon atlantique (boucané)	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.24 Morue franche	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.25 Éperlan arc-en-ciel	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.26 Capelan	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
Autre poisson? ☐ Oui ☐ Non ☐ 1.6 Grand brochet ☐ 1.4 Doré jaune ☐ 1.9 Corégone (poisson blanc) ☐ 1.3 Truite arc-en-ciel ☐ 1.23 Omble chevalier (omble de l'Arctique) ☐ 1.27 Hareng ☐ 1.28 Maquereau ☐ 1.29 Flétan du Groenland ☐ 1.31 Plie canadienne (sole) ☐ 1.30 Esturgeon noir ☐ 1.18 Carpe (endémique) ☐ 1.8 Perchaude ☐ 1.11 Loche (lotte) ☐ 1.10.1 Achigan (petite bouche) ☐ 1.10.2 Achigan (grande bouche) ☐ 1.12 Crapet de roche ☐ 1.13 Crapet soleil ☐ 1.14 Laquaïche argenté ☐ 1.15 Barbotte ☐ 1.16 Meunier rouge ☐ 1.17 Meunier noir ☐ 1.19 Autre : _____________ * INTERVIEWEUR réfère au poster et note le no. du poisson dans la case qui correspond à sa consommation	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.20 Œufs de poissons, de quel poisson? ☐ Oui ☐ Non De quel poisson?________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

EH1. DANS LA DERNIÈRE ANNÉE, est-ce que votre enfant a mangé ou avez-vous mangé des FRUITS DE MER?
(Fruits de mer de la région (pêchés dans les rivières, l'estuaire ou les lacs) et non pas les espèces de fruits de mer d'ailleurs)
☐ 1. Oui
☐ 2. Non (Aller à la section – MAMMIFÈRES TERRESTRES)

CRUSTACÉS	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
1.32.1 Homard d'Amérique – chair, viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.32.2 Homard – tomalli, organes, vert ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.33 Mye (coques) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
1.34 Moule bleue	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.35 Pétoncle géant	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.36 Crabe des neiges	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.37 Crevette nordique	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.38 Autre crustacé?	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
Lesquels? ___________________	**Été** (21 juin – 20 sept.)								

EH2. DANS LA DERNIÈRE ANNÉE, est-ce que votre enfant a mangé ou vous avez mangé du gibier sauvage (MAMMIFÈRES TERRESTRES)?

☐ 1. Oui

☐ 2. Non (Aller à la section – OISEAUX SAUVAGES)

Je vais vous lire une liste d'espèces. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, votre enfant en a mangé ou vous en avez mangé, et SI OUI, combien de fois au printemps dernier. Ensuite, combien de fois à chaque autre saison.

MAMMIFÈRES TERRESTRES Portion: Viande: 4-6 oz ou 1 1/2-2 jeux cartes Organes: 2-3 oz ou 2/3-1 jeux cartes	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
2.1.1 Orignal - viande	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.1.2 Orignal - foie	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.1.3 Orignal - reins	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
2.1.4 **Orignal** – autre partie ☐ Oui ☐ Non Lesquelles? ___________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.1 **Caribou**- viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.2 **Caribou** – foie ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.3 **Caribou** - reins ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.4 **Caribou** – autre partie ☐ Oui ☐ Non Lesquelles? ___________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.7 **Lièvre** - viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.5.1 **Castor** - viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.5.2 **Castor** – autre partie ☐ Oui ☐ Non Lesquelles? ___________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.9 **Porc-épic** – viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
2.10 Autre MAMMIFÈRE TERRESTRE ☐ Oui ☐ Non ☐ 2.8 Rat musqué - viande ☐ 2.4.1 Ours noir – viande ☐ 2.4.2 Ours noir – foie, reins ☐ 2.4.3 Ours noir – gras ☐ 2.4.3 Ours noir – autre partie? ☐ 2.6.1 Lynx – viande ☐ 2.6.2 Lynx – autre partie? ☐ 2.10.1 Loutre de mer – viande ☐ 2.10.2 Loutre de mer – foie, reins ☐ 2.10.3 Loutre de mer – gras ☐ 2.10.4 Loutre de mer – autre partie? ☐ 2.11.1 Loup de mer (phoque) – viande ☐ 2.11.2 Loup de mer (phoque) – foie, reins ☐ 2.11.3 Loup de mer (phoque) – gras ☐ 2.11.4 Loup de mer (phoque) – autre partie? ☐ Autre? Lesquels? ________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

EH3. DANS LA DERNIÈRE ANNÉE, est-ce que votre enfant a mangé ou vous avez mangé des OISEAUX SAUVAGES comme du canard, de l'outarde ou de la perdrix?
☐ 1. Oui
☐ 2. Non (Aller à la section – PETITS FRUITS et PLANTES SAUVAGES)

Je vais vous lire une liste d'espèces d'oiseaux. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, votre enfant en a mangé ou vous en avez mangé, et SI OUI, combien de fois au printemps dernier. Ensuite, combien de fois à chaque autre saison.

OISEAUX SAUVAGES Portion: 4-6 oz ou 1 1/2-2 jeux cartes	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
3.1 Canards ☐ Oui ☐ Non ☐ 3.1.15 Eider à duvet (Moyak) ☐ 3.1.12 Huard ☐ 3.1.8 Canard noir ☐ 3.1.4 Canard pilet ☐ 3.1.7 Canard colvert ☐ 3.1.2 Fuligule à collier ☐ 3.1.13 Grand harle ☐ 3.1.9 Sarcelle ☐ 3.1.10 Garrot à œil d'or ☐ 3.1.6 Canard chipeau ☐ 3.1.3 Canard siffleur d'Amérique ☐ 3.1.11 Petit garrot ☐ 3.1.1 Canard branchu ☐ 3.1.5 Canard souchet ☐ 3.1.14 Autre? Lequel? * INTERVIEWEUR réfère au poster et note le no. du canard dans la case qui correspond à sa consommation. JUSTE faire un crochet si ne sait pas l'espèce de canard	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
3.2 Oies ☐ Oui ☐ Non ☐ 3.2.1 Outarde, Bernache du Canada ☐ 3.2.2 Oie blanche (sous sp. blanche ou foncée) ☐ 3.2.3 Bernache cravant * INTERVIEWEUR réfère au poster et note le no. de l'oiseau dans la case qui correspond à sa consommation.	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
3.3 Oiseaux terrestres ☐ Oui ☐ Non ☐ 3.3.1 Perdrix, Gélinotte huppée (viande blanche) ☐ 3.3.2 Tétra du Canada (viande rouge) ☐ 3.3.3 Lagopède des saules ☐ 3.3.5 Bécasse d'Amérique * INTERVIEWEUR réfère au poster et note le no. de l'oiseau dans la case qui correspond à sa consommation.	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
3.4 Autres oiseaux ☐ Oui ☐ Non Lesquels? __________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
3.5 Œufs d'oiseaux ☐ Oui ☐ Non ☐ 3.5.1 Goélands ☐ 3.5.2 Oies ☐ 3.5.4 Eider à duvet (Moyak) ☐ 3.5.3 Autre? _____________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

EH4. DANS LA DERNIÈRE ANNÉE, est-ce que votre enfant a mangé ou avez-vous mangé des PETITS FRUITS ou des PLANTES SAUVAGES?

☐ 1. Oui
☐ 2. Non (Aller à la section – ALIMENTS DU MARCHÉ)

Je vais vous lire une liste d'espèces de petits fruits. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, votre enfant en a mangé ou vous en avez mangé, et SI OUI, combien de fois à l'été dernier. Ensuite, à chaque saison.

PETITS FRUITS et PLANTES SAUVAGES Portion : ½ tasse * FRAIS, PAS EN CONFITURE	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
4.1 Framboise sauvage ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
4.6.1 Fraise sauvage ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.7 Chicoutai ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.2 Bleuet sauvage ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.8 Camarine noire ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.5 Graines rouges (airelle rouge) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.6 Autre fruits ou plantes? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
☐ 4.5 Airelle canneberge (atoca) ☐ 4.6.3 Amélanchier (petite poire) ☐ 4.6.4 Gadelles (rouge ou cassis) ☐ 4.6.2 Pimbina, viorne comestible	**Hiver** (21 déc. – 20 mars)								
☐ 4.6.5 Petit thé (fruit blanc) ☐ 4.6.7 Thé des bois ☐ 4.6.9 Noisettes (Noisetier à long bec) ☐ 4.6.10 Feuilles de pissenlit ☐ 4.6.12 Autre? Lesquels?	**Automne** (21 sept. – 20 déc.)								
____________________ * INTERVIEWEUR réfère au poster et note le no. de la plante dans la case qui correspond à sa consommation.	**Été** (21 juin – 20 sept.)								

HABITUDES ALIMENTAIRES – Aliments du marché

Cette section est à propos des aliments du supermarché, c'est-à-dire ceux qui se mangent tel quel ou bien cuisinés dans des recettes. Pour cette section, pensez à ce que vous avez mangé dans les TROIS DERNIERS MOIS.

EH5. DANS LES TROIS DERNIERS MOIS, combien de fois en moyenne votre enfant a-t-il mangé ou avez-vous mangé…
*INTERVIEWEUR coche si OUI

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais, Moins que 1/mois	Commentaires
Recettes traditionnelles avec des aliments de marché									
☐ 1.1 **Banique** (cuit au four) (1 tr/morceau)									
☐ 1.2 **Banique** (cuit dans le sable) + sel									
☐ 2. **Recettes traditionnelles** (1 bol) ☐ 2.1 **Soupe poisson** (eau, bouillon, poisson, boule farine) ☐ 2.2 **Soupe gibier** (eau, gibier, boule farine) ☐ 2.3 **Tekaep** (Crêpes ou banique avec graines rouges) ☐ 2.4 Autre? ____________________									
Viande de l'épicerie									
☐ 4. **Hamburger**, maigre ou régulier (1 boulette)									
☐ 5. **Bœuf** (steak, viande hachée) (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 6. **Hot dogs de porc ou de bœuf** (1)									
☐ 7. **Saucisses** (2 petites,1 grosse ou en conserve)									
☐ 8. **Porc, côtelettes** (pork chops) **ou rôti de porc** (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 9. **Poulet/dinde** (poitrine, cuisse) (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 10. **Pépites ou croquettes de poulet** (4-6), **ailes de poulet** (6-8)									
☐ 11. **Jerky de boeuf** (1 sac)									
☐ 12. **Viande transformée ou tranchée** (jambon, baloney, Kam, Spam, salami, pepperoni,, etc. (1 tr/morceau), (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 13. **Bacon** (2 tranches)									
☐ 14. **Œufs** (poule) (1 œuf)									
☐ 15. **Poisson frais ou congelé de l'épicerie** (4-6 oz ou 1 1/2-2 jeux de cartes)									* Noter sp.
☐ 16. **Saumon ou sardines en conserve** (3-4 oz ou 1- 1 1/2 jeux de cartes)									
☐ 17. **Thon en conserve** (3-4 oz ou 1- 1 1/2 jeux de cartes)									☐ Pâle ☐ Blanc
Fruits									
☐ 18. **Pommes ou poires** fraiches (1)									
☐ 19. **Bananes** (1)									
☐ 20. **Oranges** (1) ou **pamplemousse** (1/2)									
☐ 21. **Petits fruits** du marché frais ou congelés (1/2 tasse)									
☐ 22. **Autres fruits frais** (1 fruit or 1/2 tasse)									
☐ 23. **Fruit en conserve** (1/2 tasse)									
Légumes									
☐ 24. **Légumes verts en feuilles** (1 tasse de salade iceberg ou romaine, 1/2 tasse épinards cuits)									
☐ 25. **Légumes jaune-orange** (carottes, navets, etc.) (1 carotte moyenne ou 1/2 tasse)									
☐ 26. **Brocoli, choux, chou-fleur** (1/2 tasse)									

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais, Moins que 1/mois	Commentaires
☐ 27. **Tomates** (1 entière ou 1/2 tasse en conserve ou ½ tasse de jus (Tomate ou V8), sauce spaghetti, soupe, Indian taco)									
☐ 28. **Légumineuses : Fèves au lard, fèves ou pois** (1/2 tasse cuit ou en conserve)									
☐ 29. **Autres légumes** (poivron-piment vert, concombre, mais, céleri, champignons, etc.) (1/2 tasse)									
☐ 30. **Oignon, cuit comme un légume** (1/2 tasse)									
Pain, céréales, amidon de blé									
☐ 31. **Pain blanc** (1 tranche)									
☐ 32. **Pain blé entier** ou autre grains entiers (1 tranche)									
☐ 33. **Céréales froides** (cornflakes, etc.) (1 tasse)									
☐ 34. **Céréales chaudes** (gruau, etc.) (1 tasse)									
☐ 35. **Soupe aux nouilles/macaroni** (soupe Lipton, pâtes, canne tomates, +/- viande hachée) (1 bol)									
☐ 36. **Pâtes**, ex. macaroni, spaghetti (1 tasse)									
☐ 37. **Riz** (1 tasse)									
☐ 38. **Patates en purée** (1 tasse), **au four ou bouillie** (1)									
☐ 39. **Poutine ou frite sauce** (1 moyenne)									
☐ 40. **Frites** (accompagnement) (6 oz. ou 1 portion)									
☐ 42. **Chips ou chips de maïs** (petit sac ou 1 oz.)									
☐ 43. **Popcorn ou maïs soufflé** (3 tasses)									
☐ 44. **Craquelins ou biscuits salé**, ex. Ritz (6)									
☐ 45. **Pizza** (2 tranches)									
Sucreries, pâtisseries									
☐ 46. **Tartes et biscuits** maison ou du commerce (1 tranche ou 1 morceau)									
☐ 47. **Beignes** (1)									
☐ 48. **Gâteau** (maison ou du commerce, ex. Vachon) (1 morceau ou 1 pq)									
☐ 49. **Barres de chocolat au lait** (barre ou paquet), ex. Hershey's, Aero, etc.									
☐ 50. **Barres de chocolat/friandises** (barre ou paquet), ex. Snickers, Reeses, Mars, M&M, etc.									
☐ 51. **Bonbon sans chocolat (jujubes, sucon, bonbon durs)** (1 oz.)									
☐ 52. **Beurre de peanuts** (1 c. à soupe)									
☐ 53. **Noix** (Peanuts/arachides, amandes, etc.) ou **graines de tournesol** (petit sac or 1 oz)									
☐ 54. **Confiture** (maison ou commerciale), **sirop, miel, Nutella** (1 c.à soupe)									
☐ 55. **Sucre blanc ou cassonade dans céréales, café ou thé** (1 c. à thé)									* Noter no. cuillères
☐ 56. **Édulcorant artificiel dans céréales, café ou thé** (1 paquet), ex. Egal, Twin									* Noter no. sachets
☐ 57. **Ketchup** (1 c. à soupe)									* Noter no. cuillères
☐ 79. **Barres tendres** (Nutri-grain, Val nature…)									
☐ 80. **Desserts glacées** (MrFreeze, Popsicles …)									

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3 /mois	Jamais, Moins que 1/mois	Commentaires
Produits laitiers									
☐ 58. Lait comme boisson ou dans les céréales (1 tasse) (frais, Carnation, en poudre)									☐ 1% ☐ 2% ☐ 3.25% ☐ Carnation ☐ En poudre
☐ 59. Lait au chocolat / chocolat chaud avec du lait (frais ou en poudre) (1 tasse)									
☐ 60. Préparation lactée (Enfamil, Bon départ, etc.) (1 tasse)									
☐ 61. Lait dans le thé ou le café (frais, Carnation, en poudre) (1 c. à thé)									☐ 1% ☐ 2% ☐ 3.25% ☐ Carnation ☐ Eagle brand ☐ En poudre ☐ Coffee mate
☐ 62. Yogourt ou Yop (1/2 tasse)									
☐ 63. Crème glacée (1/2 tasse)									
☐ 64. Morceau fromage, fromage en grain ou dans un plat ou gratiné (cheddar ou mozzarella) (1 tranche, 1 petit sac ou 1 oz)	,								
☐ 65. Fromage transformé (Singles Kraft, cheez whiz, Vache qui rit) (1 tranche ou 1 c. à soupe)									
Divers									
☐ 66. Beurre (carré), sur du pain ou dans les aliments, exclure celui utilisé pour cuisiner									
☐ 67. Margarine (carré), sur du pain ou dans les aliments, exclure celui utilisé pour cuisiner									
☐ 68. Miracle whip (sauce à salade) (1 c. à soupe)									
☐ 69. Mayonnaise (1 c. à soupe)									☐ Faible en gras ☐ Régulière
☐ 70. Vinaigrette à salade (1-2 c. à soupe)									☐ Faible en gras ☐ Huile d'olive ☐ Autre huile végétale/régulière
71. À quelle fréquence votre enfant a-t-il mangé des aliments frits ? (Exclure huile en vaporisateur de type "Pam")									

72. Quel type de gras est habituellement utilisé pour frire les aliments à la maison? (Exclure huile en vaporisateur de type "Pam")
☐ Huile Olive/Canola ☐ Huile Mais/soya ☐ Graisse végétale (Crisco) ☐ Lard/saindoux (Tenderflake)

73. Quel type de gras est habituellement utilisé pour cuisiner (dans les recettes, à la poêle) à la maison? (noter le plus fréquent)
☐ Vrai beurre ☐ Margarine ☐ Huile Olive/Canola ☐ Huile Mais/Soya ☐ Graisse végétale (Crisco) ☐ Lard/saindoux (Tenderflake)
☐ Autre: ____________ ☐ Aucun gras utilisé pour cuisiner

Breuvage

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3 /mois	Jamais, Moins que 1/mois	Commentaires
☐ 74. Jus en bouteille/carton (Oasis, Fruité, Sunny-D, Tropicana,) (1 tasse)									
☐ 75. Liqueur diète (1 canette)									* Noter no. canettes
☐ 76. Liqueur régulière (1 canette)									* Noter no. canettes
☐ 77. Boisson sport (Powerade, Gatorade) (1 bouteille)									* Noter no. bouteilles
☐ 78. Boisson énergétique (Redbull, Monster, Guru) (1 canette)									* Noter no. canettes

SOURCES D'EAU POTABLE

Cette partie du questionnaire fait référence à l'eau qui est consommée dans votre maison.

DW1. Est-ce qu'il y a l'eau courante dans votre maison (eau du robinet)?
☐ 1. Oui
☐ 2. Non (Aller à DW5)

DW2. Est-ce que votre enfant boit ou buvez-vous l'eau du robinet à la maison?
☐ 1. Oui
☐ 2. Non

DW3. Est-ce que le goût, l'apparence ou l'odeur de l'eau empêche votre enfant ou vous empêche de boire l'eau du robinet?
☐ 1. Oui
☐ 2. Non
☐ 3. Parfois

DW4. Est-ce que l'eau du robinet est utilisée pour cuisiner à la maison?
☐ 1. Oui
☐ 2. Non

DW5. Votre enfant boit-il ou buvez-vous un autre type d'eau à la maison?
☐ 1. Non
☐ 2. Eau en bouteille
☐ 3. Eau de puits
☐ 4. Eau de source
☐ 5. Eau de ruisseau ou rivière
☐ 6. Eau de lac ou d'un étang
☐ 7. Eau de pluie (citerne)
☐ 8. Autre, svp spécifier: ___________________________

DW6. Un autre type d'eau est-elle utilisée pour cuisiner à la maison?
☐ 1. Non
☐ 2. Eau en bouteille
☐ 3. Eau de puits
☐ 4. Eau de source
☐ 5. Eau de ruisseau ou rivière
☐ 6. Eau de lac ou d'un étang
☐ 7. Eau de pluie (citerne)
☐ 8. Autre, svp spécifier: ___________________________

DW7. Est-ce que vous traitez l'eau à la maison?
☐ 1. Faire bouillir l'eau pour le bébé
☐ 2. Faire bouillir pour toute la maison
☐ 3. Faire bouillir quand il y a un avis de faire bouillir
☐ 4. Filtrer (charbon ou similaire)
☐ 5. Adoucisseur d'eau
☐ 6. Système ultraviolet
☐ 7. Osmose inverse
☐ 8. Comprimés
☐ 9. Aucun
☐ 10. Autre, svp spécifier: ____

CONSOMMATION D'EAU

Maintenant, je vais vous poser des questions sur la consommation d'eau et d'autres boissons ou de soupes de votre enfant et sur les différentes sources de l'eau dans votre maison utilisées pour faire ces boissons. Nous sommes intéressés aux boissons ou aux aliments consommés à la maison DANS LA DERNIÈRE SEMAINE. Nous allons utiliser une tasse pour illustrer la quantité consommée. * INTERVIEWEUR sort la TASSE

Pour chaque breuvage ci-dessous, veuillez indiquer:
a) Si votre enfant a bu ce breuvage LA SEMAINE DERNIÈRE *INTERVIEWEUR coche le breuvage si oui
b) Combien de JOURS la semaine dernière
c) Combien de tasses votre enfant a bu à chaque jour * INTERVIEWEUR sort la TASSE
d) Quelle était la source d'eau (ex. robinet, eau en bouteille, etc.) utilisée pour faire ce breuvage/recette

LA SEMAINE DERNIÈRE, est-ce que votre enfant a bu ou avez-vous bu…	1 jour	2 jours	3 jours	4 jours	5 jours	6 jours	7 jours	Quantité (Tasse/jour)	Source d'eau
☐ DW9. Eau									
☐ DW10. Café									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW11.Thé (n'importe lequel)									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW12.Chocolat chaud fait avec de l'eau									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW13. Jus fait de concentré ou cristaux (canne, Tang, Kool-Aid ou Gatorade)									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW14. Préparation lactée (Enfamil, Bon départ, etc.)									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW15.Lait en poudre régulier									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW16. Bouillon/soupe									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW17. Ragoût									☐ Robinet ☐ Eau bouteille ☐ Autre______________
☐ DW18. Autre liquides/repas à base d'eau Nommer: ________________________									☐ Robinet ☐ Eau bouteille ☐ Autre______________

MODE DE VIE

DANS LA DERNIÈRE ANNÉE, en moyenne, combien de fois votre enfant a ou avez-vous…

		Plus d'1 fois par semaine	1 fois par semaine	1-3 fois par mois	Chaque 2-3 mois	Une fois ou quelques fois par an	Jamais ou pas du tout
L.1 Chassé le gros gibier? ☐ Oui ☐ Non	Printemps (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L.2 Trappé du petit gibier? ☐ Oui ☐ Non	Printemps (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						

		Plus d'1 fois par semaine	1 fois par semaine	1-3 fois par mois	Chaque 2-3 mois	Une fois ou quelques fois par an	Jamais ou pas du tout
L3. Chassé du petit gibier? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L4. Est allé pêcher? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L5. Ramasser des fruits de mer? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L6. Ramasser des fruits ou des plantes sauvages? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L7. Planté un jardin? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						

2. Quelqu'un d'autre dans votre ménage? (nombre de personnes)		
	Non	Oui
L1. Chassé du gros gibier?		
L2. Trappé du petit gibier?		
L3. Chassé du petit gibier?		
L4. Est allé pêcher?		
L5. Ramasser des fruits de mer?		
L6. Ramasser des fruits ou des plantes sauvages?		
L7. Planté un jardin?		

Si quelqu'un dans votre ménage pêche, chasse le gros ou le petit gibier, nous allons maintenant vous poser quelques questions sur les plombs et les munitions de chasse. ☐ Cette section ne s'applique pas

L8. Est-ce que vous ou quelqu'un dans votre ménage fabrique des plombs pour la pêche?
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas

L9. Est-ce que vous ou quelqu'un dans votre ménage fabrique ses propres cartouches ou modifie ses munitions?
☐ 1. Oui
☐ 2. Non (Aller à L11)
☐ 3. Je ne sais pas

L10. Si OUI, quoi et comment? Avec de la grenaille de plomb? où et quel type? Pour chasser quoi?
____
____
____

L11. Où est-ce que vous ou les membres de votre famille nettoyez vos armes à feu?
☐ 1. Dans la cuisine
☐ 2. Dans le salon
☐ 3. Dans la remise
☐ 4. À l'extérieur de la maison
☐ 5. Autre: ___________________

L12. Après la chasse, qui nettoie l'animal (fait la boucherie)?
☐ 1. Vous-même ou un membre de votre famille
☐ 2. Un boucher (fin de l'entrevue)
☐ 3. Autre: _______________________________
☐ 4. Je ne sais pas

L13. Lorsque vous nettoyez l'animal, est-ce que la viande autour de l'impact de la balle est enlevée?
☐ 1. Oui
☐ 2. Non (fin de l'entrevue)
☐ 3. Je ne sais pas (fin de l'entrevue)

L14. Si OUI, combien? * INTERVIEWEUR APPORTE UNE RÈGLE OU UN GALON À MESURER
_______ cm _______ in ☐Je ne sais pas

GI20. Heure fin interview: ___: ___ (24h)

COMMENTAIRES GÉNÉRAUX

Écrire tous les commentaires qui vous viennent en tête au sujet de l'entrevue. Identifier toute question qui n'a pas été bien comprise, les situations où il/elle semblait avoir inhabituellement des réserves ou il/elle aurait omis de donner des informations exactes ou véridiques. A-t- il/elle révélé des problèmes qui pourraient interférer avec sa participation à étude?

____
____
____
____
____
____

ÉTUDE PILOTE JEUNES, ENVIRONNEMENT ET SANTÉ DES PREMIÈRES NATIONS – JES!
QUESTIONNAIRE ADMINISTRÉ PAR UN INTERVIEWEUR

INFORMATION GÉNÉRALE

GI1. Date: ____/___/____
Jour/Mois/Année

Participant volontaire
☐ 1. Oui
☐ 2. Non

GI3. Communauté: ____

GI4. Age du participant: ______ ans GI5.Date de naissance: _______/____/______ GI6. Sexe: ☐ 1. Féminin
Jour/Mois/Année ☐ 2. Masculin

GI7. Le parent/tuteur ou le participant est venu au centre de santé avec leur médication(s):
☐ 1. Oui
☐ 2. Non

GI8. Le parent/tuteur ou le participant est venu au centre de santé avec leur supplément(s):
☐ 1. Oui
☐ 2. Non

GI9. Questionnaire complété par qui?
☐ 18 et 19 ans → ☐ 6. Q2 – Tout le questionnaire par le jeune adulte
☐ Jeune mère – elle-même → ☐ 7. Q2 – Tout le questionnaire par la mère pour elle-même

QUESTIONNAIRE 2

GI10. Intervieweur: _________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda, 6. Sylvie; 7. Annie; 8. João; 9. Micheline)

GI2. Heure début interview: ___: ___ (24h)

Durant cette entrevue, je vous demanderai des informations générales sur votre santé et votre consommation de cigarette. N'hésitez pas à demander un traducteur pour vous aider à comprendre les questions. Certaines questions sont personnelles. Il est possible que vous vous demandiez pourquoi elles sont posées dans une étude qui vise à documenter l'exposition aux contaminants environnementaux, et le statut nutritionnel et de santé. Ces questions sont importantes pour nous aider à comprendre la façon dont nous pouvons être exposés aux contaminants et comment ces derniers sont reliés aux mesures corporelles ou notre statut nutritionnel ou de santé. Toutes les informations que vous donnerez sont confidentielles; je ne dirai pas à personne ce que vous me direz. Vous pouvez décider de ne pas répondre à certaines questions ou d'arrêter le questionnaire en tout temps.

CONDITIONS DE SANTÉ

Les questions suivantes portent sur différents aspects de votre santé

CH1. En général, comment évaluez-vous votre santé?
☐ 1. Excellente
☐ 2. Très bonne
☐ 3. Bonne
☐ 4. Passable
☐ 5. Mauvaise

CH2. Comparé à l'an dernier, comment évaluez-vous maintenant votre santé?
☐ 1. Bien meilleure maintenant que l'an dernier
☐ 2. Un peu mieux maintenant (que l'an dernier)
☐ 3. À peu près la même que l'an dernier
☐ 4. Un peu moins bonne maintenant (que l'an dernier)
☐ 5. Bien moins bonne maintenant (que l'an dernier)

CH4. Est-ce que vous êtes né à moins de 37 semaines de grossesse? (naissance prématurée)
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas

Pour une jeune femme de plus de 14 ans, il est important de savoir, au moment de l'analyse de son état de santé, si vous allaitez.

CH5. Allaitez-vous actuellement?
☐ 1. Oui
☐ 2. Non

Cette section porte sur certains problèmes de santé que vous pouvez avoir.
Nous sommes intéressés par ceux qui devraient durer ou qui ont déjà duré 6 mois ou plus (long terme/chronique) ET qui ont été diagnostiqués par un médecin ou une infirmière.

Avez-vous déjà souffert/souffrez-vous de?	NON	OUI	Ne sais pas	Âge du premier diagnostic? Spécifiez.
CH6. Bronchite/Bronchiolite à répétition				
CH7. Asthme				
CH8. Anémie (manque de fer)				
CH9. Hypertension artérielle (haute pression)				
CH10. Hypercholestérolémie (cholestérol élevé)				
CH11. Maladie cardiaque				
CH12. Problème de la thyroïde				
CH13. Problème de foie, si oui, lequel : ______________________				
CH14. Cancer, si oui, lequel: ______________________________				
Diabète:				
CH15. Diabète de type 1 (insulino-dépendant)				
CH16. Diabète de type 2 (non insulino-dépendant)				
CH17. Pré-diabète type 2 (intolérance au glucose)				
CH18. Diabète de grossesse (si jeune mère seulement)				
CH19. Tout autre diagnostic: ____________________________				

CH20. DANS LES 24 DERNIÈRES HEURES (depuis hier), avez-vous pris des médicaments, par exemple une médication prescrite ou en vente libre?
☐ 1. Oui
☐ 2. Non (Aller à CH22)

CH21. Si OUI,
- S'il-vous-plaît, dites-moi le nom des et la raison de la prise de ce médicament
- Dans le DERNIER MOIS, à quelle fréquence ont été pris chacun de ces médicaments?

NOM DU MÉDICAMENT (nom et molécule)	Raison et fréquence (prise habituelle ou ponctuelle?)
1.	
2.	
3.	

CH22. DANS LES 24 DERNIÈRES HEURES (depuis hier), avez-vous pris un des produits suivants: suppléments nutritionnels, vitamines, minéraux ou toute préparation homéopathique ou à base d'herbes?
☐ 1. Oui
☐ 2. Non (Aller à SH1)

CH23. Si OUI,
- S'il-vous-plaît, dites-moi le nom des suppléments et la raison de la prise de ce supplément
- Dans le DERNIER MOIS, à quelle fréquence ont été pris chacun de ces suppléments?

NOM DU SUPPLÉMENT	Raison et fréquence (prise habituelle ou ponctuelle?)
1.	
2.	
3.	

CONSOMMATION DE CIGARETTE

(skip GI12)

Maintenant, je vais poser des questions sur la cigarette. Par cigarettes, nous entendons les cigarettes commerciales et roulées, à l'exclusion des cigares, des cigarillos ou des pipes. Ceci inclut aussi les « butch » de cigarettes, c'est-à-dire les cigarettes qui ont déjà été à moitié fumées par d'autres.

SH1. En ce moment, à quelle fréquence est-ce que vous fumez?
☐ 1. Chaque jour (Aller à SH2, puis SH3)
☐ 2. Occasionnellement (Aller à SH2, SH4 puis SH5)
☐ 3. Jamais – Pas du tout (Aller à SH6)
☐ 6. Plus maintenant, mais j'ai déjà fumé (Aller à SH2, puis SH6, SH7 puis SH8)
☐ 4. Je ne sais pas (Si SH1 et SH2 = SP, Aller à SH6, SH7, SH8)
☐ 5. Je ne veux pas répondre (Si SH1 et SH2 = NR, Aller à SH6)

SH2. À quel âge avez-vous fumé votre première cigarette? _________ ans (Max 19) ☐ Je ne sais pas

→ Fumeur quotidien (actuel)
SH3. En ce moment, combien de cigarettes fumez-vous chaque jour? (MIN: 1, MAX: 95)
__________ Cigarettes (Aller à SH9) ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

→ Fumeur occasionnel (actuel)
SH4. Les jours où vous fumez, combien de cigarettes fumez-vous habituellement? (MIN: 1, MAX: 95)
__________ Cigarettes ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

SH5. DANS LE DERNIER MOIS, combien de jours avez-vous fumé plus d'une cigarette par jour? (MIN: 0, MAX: 31)
__________ Jours (Aller à SH9) ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

→ Non-fumeur (actuel)
SH6. Je comprends que vous ne fumez pas actuellement (ou SP ou NR), mais avez-vous fumé DANS LE DERNIER MOIS? (*INTERVIEWER: Au moins une fois? A essayé de fumer? Fumé des butch de cigarettes?)
☐ 1. Oui
☐ 2. Non (Aller à SH9)
☐ 3. Je ne sais pas (Aller à SH9)
☐ 4. Je ne veux pas répondre (Aller à SH9)

SH7. Les jours où vous avez fumé, combien de cigarettes fumiez-vous habituellement? (MIN: 1, MAX: 95)
__________ Cigarettes ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

SH8. DANS LE DERNIER MOIS, combien de jours avez-vous fumé plus d'une cigarette par jour? (MIN: 0, MAX: 31)
__________ Jour ☐ Je ne sais pas (Aller à SH9) ☐ Je ne veux pas répondre (Aller à SH9)

Autres sources de tabac
Maintenant, je vais vous poser des questions sur d'autres sources possibles de tabac. Ceci inclut les cigares, les cigarillos, le tabac mélangé à la marijuana, les pipes, etc.

DANS LE DERNIER MOIS, est-ce que vous avez…	Chaque jour ou presque chaque jour	La fin de semaine ou 1-2 fois par semaine	Au moins une fois le dernier mois	Jamais – Pas du tout	Je ne sais pas	Je ne veux pas répondre
SH9. Fumé des cigares ou des cigarillos?						
SH10. Fumé de la marijuana mélangé à du tabac?						
SH11. Fumé la pipe avec du tabac?						
SH12. Fumé la pipe à eau/narguillé/chicha avec du tabac?						
SH13. Consommé du tabac à chiquer ou à sniffer?						

EXPOSITION À LA FUMÉE SECONDAIRE

Maintenant, je vais poser des questions sur la fumée secondaire. La fumée secondaire inclut la fumée que les fumeurs exhalent et la fumée qui provient de la combustion du tabac fumé par d'autres personnes.

SH14. En comptant les habitants de votre maison et les visiteurs réguliers, y a-t-il quelqu'un qui fume la cigarette, des cigares, des pipes (ou autres) *à l'intérieur* de votre maison, chaque jour ou presque chaque jour?
☐ 1. Oui
☐ 2. Non (Aller à SH17)
☐ 3. Je ne sais pas (Aller à SH17)
☐ 4. Je ne veux pas répondre (Aller à SH17)

→Si OUI:
SH15. Combien de personnes fument *à l'intérieur* de votre maison, chaque jour ou presque chaque jour? (Incluant les habitants de votre maison et les visiteurs réguliers). (MIN: 1, MAX: 15)
__________ personnes

SH16. Globalement [à l'exclusion votre consommation de tabac], à quelle fréquence avez-vous été exposé à de la fumée secondaire à l'intérieur de cette maison DANS LE DERNIER MOIS?
☐ 1. Chaque jour ou presque chaque jour
☐ 2. La fin de semaine ou une-deux fois par sem.
☐ 3. Au moins une fois le dernier mois
☐ 4. Jamais – Pas du tout
☐ 5. Je ne sais pas
☐ 6. Je ne veux pas répondre

SH17. DANS LE DERNIER MOIS, avez-vous été exposé à de la fumée secondaire, chaque jour ou presque chaque jour, dans une voiture ou un autre véhicule privé ou un lieu de travail ou tout autre lieu?
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas
☐ 4. Je ne veux pas répondre

GI2b. Heure fin interview: ____: ____ (24h)

→ CHANGER INTERVIEWEUR

GI13. Intervieweur: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda, 7. Annie, 8. Joao, 9. Micheline)
(Skip GI4)

GI15. Heure début interview: ____: ____ (24h)

À partir de maintenant, je vous demanderai des informations générales sur votre éducation, votre statut sociodémographiques, vos conditions de logement, la sécurité alimentaire de votre ménage, et votre consommation d'aliments et d'eau et sur votre mode de vie. N'hésitez pas à demander un traducteur pour vous aider à comprendre les questions. Ces questions sont importantes pour nous aider à comprendre la façon dont nous pouvons être exposés aux contaminants et comment ces derniers sont reliés aux mesures corporelles ou notre statut nutritionnel ou de santé. Toutes les informations que vous donnerez sont confidentielles; je ne dirai pas à personne ce que vous me direz. Vous pouvez décider de ne pas répondre à certaines questions ou d'arrêter le questionnaire en tout temps.

ÉDUCATION ET INFORMATIONS SOCIO-DÉMOGRAPHIQUES

(Skip CES1 et CES2)

CES3. Où passez-vous la majeure partie de votre journée?
☐ 1. ---------
☐ 2. À l'école
☐ 3. À la maison (Aller à CES8)
☐ 4. Au travail (salarié, contrat ou travailleur autonome) (Aller à CES6)
☐ 5. Autre, spécifiez: __________________________________ (Aller à CES8)

→ SI LE JEUNE VA À L'ÉCOLE:

CES4. Où allez-vous à l'école?
☐ 1. Dans la communauté
☐ 2. Dans une autre communauté autochtone, laquelle? ________________
☐ 3. Dans une communauté non-autochtone, laquelle? ________________
☐ 4. Autre: _______________________

CES5. Quel niveau de scolarité avez-vous complété?

☐ 1. Pré-maternelle/Maternelle
☐ 2. 1re année
☐ 3. 2e année
☐ 4. 3e année
☐ 5. 4e année
☐ 6. 5e année
☐ 7. 6e année
☐ 8. Secondaire 1
☐ 9. Secondaire 2
☐ 10. Secondaire 3
☐ 11. Secondaire 4
☐ 12. Secondaire 5
☐ 13. Cegep (1re année)
☐ 14. Cegep (2e année)
☐ 15. Cegep (3e année)
☐ 16. Autre: ___________________________________

→ SI LE JEUNE TRAVAILLE:

CES6. Si vous travaillez (salarié, contractuel ou travailleur autonome)? Travaillez-vous à…

☐ 1. Temps plein
☐ 2. Temps partiel
☐ 3. Occasionnellement

CES7. SI OUI, où est situé votre emploi? (Cochez toutes les cases qui s'appliquent)

☐ 1. Dans la communauté
☐ 2. Dans une autre communauté des Premières Nations, laquelle? _______________
☐ 3. Dans une communauté non-autochtone, laquelle? _______________
☐ 4. Autre: ______________________

J'aimerais maintenant vous posez quelques questions au sujet du statut socioéconomique de votre ménage.

CES8. Êtes-vous…

☐ 1. Marié(e) ou fiancé(e)
☐ 2. Conjoint(e) de fait ou chum/blonde
☐ 3. Séparé(é)
☐ 4. Divorcé(e)
☐ 5. Veuf/Veuve
☐ 6. Célibataire

→ SI LE JEUNE TRAVAILLE, EST À LA MAISON OU AILLEURS (PAS À L'ÉCOLE) :

CES9. Quel niveau de scolarité avez-vous complété?

☐ 1. Pré-maternelle/Maternelle
☐ 2. 1re année
☐ 3. 2e année
☐ 4. 3e année
☐ 5. 4e année
☐ 6. 5e année
☐ 7. 6e année
☐ 8. Secondaire 1
☐ 9. Secondaire 2
☐ 10. Secondaire 3
☐ 11. Secondaire 4
☐ 12. Secondaire 5
☐ 13. Cegep (1re année)
☐ 14. Cegep (2e année)
☐ 15. Cegep (3e année)
☐ 17. Université (Certificat)
☐ 18. Université (Baccalauréat)
☐ 19. Université (Maîtrise)

☐ 16. Autre: ___________________________________

(Skip CES10, CES11, CES12)

→ SI LE JEUNE EST À LA MAISON OU AILLEURS (PAS À L'ÉCOLE NI AU TRAVAIL) :

CES13. Qu'est-ce qui décrit le mieux votre situation?

☐ 1. Je cherche du travail
☐ 2. Je suis étudiant
☐ 3. J'occupe un emploi saisonnier
☐ 4. Je suis à la retraite ou je reçois une pension
☐ 5. Je suis parent au foyer
☐ 6. Je ne peux pas travailler pour des raisons de santé
☐ 7. Je ne cherche plus de travail, j'ai renoncé à chercher du travail
☐ 8. Je n'ai pas envie de travailler
☐ 10. Congé de maternité
☐ 11. Congé de maladie
☐ 9. Autre, spécifier:___________________________

HC8. Incluant vous-même, combien d'enfants, jeunes et adultes habitent dans votre logement actuellement?
(Ceux qui y prennent leurs repas et y dorment au moins 4 nuits/semaine)
HC9a. Âge 0-5 ans: _____ enfants
HC9b. Âge 6-11 ans: _____ enfants
HC9c. Âge 12-17 ans: _____ adolescents
HC9d. Âge 18 ans et plus: _____ adultes

Total: _______ personnes (*INTERVIEWEUR s'assure que le compte est bon)

Dans les prochaines sections, on fait référence à votre ménage, c'est à dire à toutes les personnes qui habitent dans votre maison.

POUR VOTRE MÉNAGE, DANS LES 12 DERNIERS MOIS…	CES15. Parmi les sources de revenu suivantes, lesquelles avez-vous reçu ?	CES16. Parmi celles-ci, quelle est votre principale source de revenu cette année?
1- Revenu d'emploi (salarié, contrat ou travailleur autonome)		
2- Allocations familiales		
3- Prestations d'aide sociale		
4- Autre revenu, par exemple (Cocher tout ce qui s'applique) : ☐ 1. Assurance emploi (chômage) ☐ 2. Pension de vieillesse ☐ 3. Bourse d'étude ☐ 4. Pension alimentaire ☐ 5. Redevances provenant de sociétés minières ☐ 6. Bonus ☐ 7. Prêts ☐ 8. Autre: ______________________		
5- Revenu provenant de la vente ou l'échange: ☐ 1. Aliments traditionnels ☐ 2. Recettes maison		
6- Revenu provenant d'activités traditionnelles : ☐ 1. Sculpture, couture, artisanat/art ☐ 2. Programmes de partage de connaissances traditionnelles ☐ 3. Autre : ________________________		
7- Aucun revenu		
8 - Refus		

CES14. DANS LES 12 DERNIERS MOIS, quel était le revenu total de VOTRE MÉNAGE, avant impôts, incluant toutes sources d'argent comme : salaire, contrats, aide sociale, allocation familiale, bourse d'étude, pourboires, commissions, etc., mais n'incluant pas les prêts?
Je fais référence ici au montant d'argent approximatif que vous et les habitants de votre ménage avez gagné au total pendant l'année qui vient de passer. Je vais vous nommer des échelles de revenus. S'il vous plaît dites "stop" lorsque je dirai celle qui vous convient, c'est-à-dire la meilleure estimation de votre revenu total pour les 12 derniers mois. (*INTERVIEWEUR MONTRE CHARTE AVEC CATÉGORIES)
☐ 1. Moins de 15 000$
☐ 2. 15 000$ à 20 000$
☐ 3. 20 000$ à 25 000$
☐ 4. 25 000$ à 40 000$
☐ 5. 40 000$ à 60 000$
☐ 6. 60 000$ et plus
☐ 7. Je ne sais pas
☐ 8. Refus

CONDITIONS DE LOGEMENT

Les prochaines questions portent sur votre logement où vous demeurez en ce moment.

HC1. Depuis combien de temps vivez-vous dans le logement où vous vivez actuellement?
☐ 1. Toute votre vie (depuis votre naissance)
☐ 2. Moins d'1 an
☐ 3. 1 à 5 ans
☐ 4. 4 à 10 ans
☐ 5. Plus de 10 ans

HC2. Au cours des 12 derniers mois, où avez-vous vécu la plupart du temps? (Cocher la maison principale (>50% du temps), si égal ou 50/50, cocher où le jeune connait le mieux les conditions de logement)
☐ 1. Votre propre maison
☐ 2. Chez votre père
☐ 3. Chez votre mère
☐ 4. Chez un autre membre de la famille (Grands-parents, tante, oncle, cousins)
☐ 5. Pensionnat/école
☐ 6. Campement/tente
☐ 7. Autre: __________________

Les prochaines questions font référence à la maison principale où vous habitez la majeure partie du temps en ce moment.
HC3. Est-ce que votre logement possède un sous-sol? (*INTERVIWEUR fait toujours référence au logement principal)
☐ 1. Oui
☐ 2. Non

HC4. Combien y a-t-il de pièces dans le logement où vous vivez actuellement?
(inclut : chambre(s), cuisine, salon, pièce(s) dans le sous-sol, etc.)
(exclut : salles de bain, couloir, salle de lavage ou cabanon/remise)
______ pièces

HC5. Parmi celles-ci, combien sont des chambres à coucher? _________ chambres à coucher

HC6. Où dormez-vous dans le logement? (*INTERVIEWEUR décompose la question 1. Chambre vs salon; 2. Rez-de-chaussée vs sous-sol)
☐ 1. Chambre à coucher au rez-de-chaussée (1er étage)
☐ 2. Chambre à coucher dans le sous-sol
☐ 3. Salon
☐ 4. Autre, spécifiez: _________

HC7. Est-ce que vous avez votre propre chambre (où vous dormez) ?(dormez-vous seul dans votre chambre?)
☐ 1. Oui
☐ 2. Non

HC9. En quelle année votre logement a-t-il été construit (si vous ne savez pas, donnez un estimatif à +/- 5 ans)?
________ année ☐ Je ne sais pas

HC10. Votre logement a-t-il besoin d'être rénové? (y a-t-il des réparations à faire?)
☐ 1. Oui, des réparations majeures telles que sur la plomberie défectueuse, le câblage électrique, la structure des murs, des planchers, des plafonds, de la fondation etc.
☐ 2. Oui, mais des réparations mineures telles que la fixation de carreaux de plancher ou des portes d'armoires détachés ou manquants, des bardeaux du toit arrachés, de marches défectueuses, de rampes, etc.
☐ 3. Seulement un entretien régulier comme la peinture, le nettoyage de la cheminée (foyer, fournaise), etc.
☐ 4. Non

HC11. AU COURS DES DOUZE DERNIERS MOIS, avez-vous observé des moisissures dans votre logement?
Les moisissures peuvent être noires, blanches, roses, ou presque toutes les couleurs, et prendre la forme d'une tache plus ou moins étendue.
☐ 1. Oui
☐ 4. Non, mais j'ai senti une odeur de moisissure (Aller à HC15)
☐ 2. Non (Aller à HC15)
☐ 3. Je ne sais pas

HC12. Si OUI, dans quelles pièces avez-vous observé des moisissures? *INTERVIEWEUR coche la pièce si oui

	HC13. Si oui, où dans chaque pièce?						HC14. Quelle est la taille des moisissures? *INTERVIWEUR montre les photos
	Sur le(s) cadre(s) de fenêtre	Sous les fenêtres	Autour de l'évier, du bain ou de la toilette	Sur le(s) mur(s)	Sur le plafond	Autre	
☐ 1. Cuisine?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 2. Salle de bain?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 3. Salon?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 4. Votre chambre?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 5. Sous-sol?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré
☐ 6. Autre?							☐ Seulement quelques picots ☐ Plus grand qu'une carte postale ☐ Plus grand qu'une feuille 8 ½ X 11 ☐ Plus grand qu'un mètre carré

HC15. AU COURS DES DOUZE DERNIERS MOIS, est-ce qu'il y a eu des infiltrations d'eau dans votre logement (par le toit, fissure de la fondation, reflux d'égouts, bris de tuyaux, etc.)?
☐ 1. Oui
☐ 2. Non (Aller à HC18)
☐ 3. Je ne sais pas (Aller à HC18)

→ SI OUI:
HC16. Si OUI, dans quelle pièce et où venait l'infiltration?____
____

HC17. Si OUI, à quelle fréquence?
☐ 1. Plusieurs fois par mois
☐ 2. 1-3 fois par mois
☐ 3. Chaque 2-3 mois
☐ 4. Une fois ou quelques fois par année

HC18. Quelle sont les sources de chauffage dans votre logement? (Cochez toutes les cases qui s'appliquent et noter l'ordre de priorité)
☐ 1. Chauffage électrique
☐ 2. Poêle à bois
☐ 3. Foyer au bois
☐ 4. Fournaise à l'huile
☐ 5. Fournaise au gaz
☐ 6. Foyer au gaz
☐ 7. Autre – spécifiez:_____________________

DANS LE DERNIER MOIS et DANS VOTRE LOGEMENT PRINCIPAL, à quelle fréquence avez-vous utilisé des produits chimiques pour traiter ou éliminer des…
*INTERVIEWEUR montre des exemples de produits

	2-4/sem	1/sem	1-3/ mois	Jamais	Je ne sais pas	HC20. Où?
HC19. Punaises de lit, coquerelles, mites (laine ou alimentaires), fourmis, ou termites, ou des insecticides pour éliminer des insectes sur des plantes intérieures?						☐ 1. Salon ☐ 2. Salle à manger ☐ 3. Cuisine ☐ 4. Salle de bain ☐ 5. Chambre de l'enfant ☐ 6. Autre(s) chambres ☐ 7. Autres pièces (salle de jeux, etc.) ☐ 8.À l'extérieur (foundation de la maison) ☐ 9. Maison complète ☐ 10. Autre? ___________________
HC21. Poux dans vos cheveux?						
HC22. Puces sur vos animaux domestiques?						
HC23. Dans la cour ou la pelouse de ce logement, ou les champs, les bois ou les vergers environnants pour tuer des insectes ou des mauvaises herbes ou pour contrôler des maladies des plantes?						

SÉCURITÉ ALIMENTAIRE

L'objectif de cette section est d'évaluer si, AU COURS DES 12 DERNIERS MOIS, votre ménage était en mesure de payer la nourriture dont vous aviez besoin. Ceci s'applique à vous mais aussi aux membres de votre famille dans son ensemble. Notez que ces informations sont strictement confidentielles.

- Je vais vous lire une série d'énoncés qui décrivent l'expérience de certaines familles.
- Pour chacun de ces énoncés, dites-moi si dans votre ménage AU COURS DES 12 DERNIERS MOIS de telles expériences se présentent souvent, parfois ou jamais * INTERVIWEUR MONTRE DES CARTES AVEC LES ÉNONCÉS

FS1. Certaines familles peuvent dire : *"Toute la nourriture que nous avions acheté a été mangée, et nous n'avions pas d'argent pour en racheter".*
Au cours des 12 derniers mois, combien de fois est-ce arrivé dans votre ménage?
☐ 1. Souvent
☐ 2. Quelques fois
☐ 3. Jamais
☐ 4. Je ne sais pas
☐ 5. Refus

FS2. Certaines familles peuvent dire : *"Nous n'avions pas les moyens de manger des repas équilibrés".*
(Repas équilibrés = alimentation variée avec des fruits, des légumes, des produits laitiers, des céréales et des viandes ou poissons).
Au cours des 12 derniers mois, combien de fois est-ce arrivé dans votre ménage?
☐ 1. Souvent
☐ 2. Quelques fois
☐ 3. Jamais
☐ 4. Je ne sais pas
☐ 5. Refus

FS3. Au cours des 12 derniers mois : *"Avez-vous ou d'autres adultes de votre ménage déjà réduit votre portion ou sauté des repas parce qu'il n'y avait pas assez d'argent pour acheter de la nourriture?".*
☐ 1. Oui
☐ 2. Non (Aller à FS5)
☐ 3. Je ne sais pas (Aller à FS5)
☐ 4. Refus (Aller à FS5)
→ Si OUI:
FS4. Si OUI, Combien de fois est-ce arrivé dans les 12 derniers mois…
☐ 1. Presque chaque mois
☐ 2. Certains mois mais pas tous les mois
☐ 3. Seulement 1 ou 2 mois
☐ 4. Je ne sais pas
☐ 5. Refus

FS5. Au cours des 12 derniers mois : *"Avez-vous, vous-même, déjà mangé moins de nourriture que vous auriez dû, selon vous, parce qu'il n'y avait pas assez d'argent pour acheter de la nourriture?".*
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas
☐ 4. Refus

FS6. Au cours des 12 derniers mois, *"Avez-vous, vous-même, été dans une situation où vous aviez faim et ne pouviez pas manger parce que vous n'aviez pas assez d'argent pour acheter de la nourriture?".*
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas
☐ 4. Refus

FS7. Certaines familles peuvent dire : *"Nous sommes en mesure d'obtenir la quantité de nourriture traditionnelle que nous voulons ou que nous avons de besoin"*
Au cours des 12 derniers mois, combien de fois est-ce arrivé dans votre ménage?
☐ 1. Souvent
☐ 2. Quelques fois
☐ 3. Jamais
☐ 4. Je ne sais pas
☐ 5. Refus

GI15b. Heure fin de cette section: ____: ____

HABITUDES ALIMENTAIRES – Aliments traditionnels

GI16. Date: ____/___/____
Jour/Mo/Année

GI17. Heure début section: ___: ___ (24h)

GI18. Intervieweur: __________(1. Joannie; 2. Elisabeth; 3. Yolande; 4. Mélanie; 5. Linda; 7. Annie; 8. João)
(Skip GI19)

EH0.1 DANS LA DERNIÈRE ÀNNÉE, comme exemple lors d'une semaine typique, à quelle fréquence votre enfant mange-t-il à votre domicile?
(Cochez les cases qui s'appliquent)

	0 jour/sem	1 jour/sem	2 jour/sem	3 jour/sem	4 jour/sem	5 jour/sem	6 jour/sem	7 jour/sem
Déjeuner								
Dîner								
Souper								

EH0.2 Lorsque les repas ne sont pas consommés à la maison, où sont-ils le plus souvent consommés?
☐ 1. Chez un autre membre de la famille (famille élargie ou amis de la famille)
☐ 2. À l'école
☐ 3. Au restaurant/casse-croûte
☐ 4. Toujours à la maison
☐ 4. Autre, spécifiez : ________________

Cette section porte sur la consommation d'aliments traditionnels, c'est-à-dire les aliments chassés, pêchés, trappés ou récoltés dans l'environnement qui entoure la communauté. Ces aliments peuvent être mangés et cuisinés de multiples façons, que ce soit cuit à la poêle ou au four, fumé, séché, etc. ou bien même inclus dans des recettes, par exemple du ragoût d'orignal. Ceci inclus aussi les aliments traditionnels qui ont été congelés et mangés plus tard dans l'année.

Nous voulons savoir à quelle fréquence vous avez mangé différents aliments traditionnels AU COURS DE LA DERNIÈRE ANNÉE à votre domicile. Commençons par la consommation de poissons.

EH1. DANS LA DERNIÈRE ANNÉE, avez-vous mangé du POISSON? (Poisson de la région (pêchés dans les rivières, l'estuaire ou les lacs) et non pas les espèces de poissons d'ailleurs à l'épicerie)
☐ 1. Oui
☐ 2. Non (Aller à la section – MAMMIFÈRES TERRESTRES)

Maintenant, je vais vous lire une liste d'espèces de poissons. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, vous en avez mangé, et SI OUI, combien de fois au printemps dernier. Ensuite, combien de fois à chaque autre saison.

POISSONS Portion: 3-5 oz ou 1- 1 2/3 de jeux de cartes	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
1.1 Truite mouchetée (truite de mer, omble de fontaine) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.2 Truite grise/ de lac (touladi) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.21 Saumon d'eau douce (ouananiche) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.22.1 Saumon atlantique (bouilli, cuit, au four, en canne) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.22.2 Saumon atlantique (boucané) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.24 Morue franche ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.25 Éperlan arc-en-ciel ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.26 Capelan ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
Autre poisson? ☐ Oui ☐ Non ☐ 1.6 Grand brochet ☐ 1.4 Doré jaune ☐ 1.9 Corégone (poisson blanc) ☐ 1.3 Truite arc-en-ciel ☐ 1.23 Omble chevalier (omble de l'Arctique) ☐ 1.27 Hareng ☐ 1.28 Maquereau ☐ 1.29 Flétan du Groenland ☐ 1.31 Plie canadienne (sole) ☐ 1.30 Esturgeon noir ☐ 1.18 Carpe (endémique) ☐ 1.8 Perchaude ☐ 1.11 Loche (lotte) ☐ 1.10.1 Achigan (petite bouche) ☐ 1.10.2 Achigan (grande bouche) ☐ 1.12 Crapet de roche ☐ 1.13 Crapet soleil ☐ 1.14 Laquaïche argenté ☐ 1.15 Barbotte ☐ 1.16 Meunier rouge ☐ 1.17 Meunier noir ☐ 1.19 Autre : _____________ * INTERVIEWEUR réfère au poster et note le no. du poisson dans la case qui correspond à sa consommation	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.20 Œufs de poissons, de quel poisson? ☐ Oui ☐ Non De quel poisson?_________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

EH1. DANS LA DERNIÈRE ANNÉE, est-ce que votre enfant a mangé ou avez-vous mangé des FRUITS DE MER?
(Fruits de mer de la région (pêchés dans les rivières, l'estuaire ou les lacs) et non pas les espèces de fruits de mer d'ailleurs)
☐ 1. Oui
☐ 2. Non (Aller à la section – MAMMIFÈRES TERRESTRES)

CRUSTACÉS	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
1.32.1 Homard d'Amérique – chair, viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.32.2 Homard – tomalli, organes, vert ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.33 Mye (coques) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
1.34 Moule bleue	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.35 Pétoncle géant	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.36 Crabe des neiges	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.37 Crevette nordique	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
1.38 Autre crustacé?	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
Lesquels? ___________________	**Été** (21 juin – 20 sept.)								

EH2. DANS LA DERNIÈRE ANNÉE, avez-vous mangé du gibier sauvage (MAMMIFÈRES TERRESTRES)?

☐ 1. Oui
☐ 2. Non (Aller à la section – OISEAUX SAUVAGES)

Je vais vous lire une liste d'espèces. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, vous en avez mangé, et SI OUI, combien de fois au printemps dernier. Ensuite, combien de fois à chaque autre saison.

MAMMIFÈRES TERRESTRES Portion: Viande: 4-6 oz ou 1 1/2-2 jeux cartes Organes: 2-3 oz ou 2/3-1 jeux cartes	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
2.1.1 Orignal - viande	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.1.2 Orignal - foie	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.1.3 Orignal - reins	**Printemps** (21 mars – 20 juin)								
☐ Oui	**Hiver** (21 déc. – 20 mars)								
☐ Non	**Automne** (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
2.1.4 **Orignal** – autre partie ☐ Oui ☐ Non Lesquelles? ___________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.1 **Caribou**- viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.2 **Caribou** – foie ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.3 **Caribou** - reins ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.2.4 **Caribou** – autre partie ☐ Oui ☐ Non Lesquelles? ___________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.7 **Lièvre** - viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.5.1 **Castor** - viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.5.2 **Castor** – autre partie ☐ Oui ☐ Non Lesquelles? ___________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
2.9 **Porc-épic** – viande ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
2.10 Autre MAMMIFÈRE TERRESTRE ☐ Oui ☐ Non ☐ 2.8 Rat musqué - viande ☐ 2.4.1 Ours noir – viande ☐ 2.4.2 Ours noir – foie, reins ☐ 2.4.3 Ours noir – gras ☐ 2.4.3 Ours noir – autre partie? ☐ 2.6.1 Lynx – viande ☐ 2.6.2 Lynx – autre partie? ☐ 2.10.1 Loutre de mer – viande ☐ 2.10.2 Loutre de mer – foie, reins ☐ 2.10.3 Loutre de mer – gras ☐ 2.10.4 Loutre de mer – autre partie? ☐ 2.11.1 Loup de mer (phoque) – viande ☐ 2.11.2 Loup de mer (phoque) – foie, reins ☐ 2.11.3 Loup de mer (phoque) – gras ☐ 2.11.4 Loup de mer (phoque) – autre partie? ☐ Autre? Lesquels? _______________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

EH3. DANS LA DERNIÈRE ANNÉE, avez-vous mangé des OISEAUX SAUVAGES comme du canard, de l'outarde ou de la perdrix?

☐ 1. Oui

☐ 2. Non (Aller à la section – PETITS FRUITS et PLANTES SAUVAGES)

Je vais vous lire une liste d'espèces d'oiseaux. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, vous en avez mangé, et SI OUI, combien de fois au printemps dernier. Ensuite, combien de fois à chaque autre saison.

OISEAUX SAUVAGES Portion: 4-6 oz ou 1 1/2-2 jeux cartes	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
3.1 Canards ☐ Oui ☐ Non ☐ 3.1.15 Eider à duvet (Moyak) ☐ 3.1.12 Huard ☐ 3.1.8 Canard noir ☐ 3.1.4 Canard pilet ☐ 3.1.7 Canard colvert ☐ 3.1.2 Fuligule à collier ☐ 3.1.13 Grand harle ☐ 3.1.9 Sarcelle ☐ 3.1.10 Garrot à œil d'or ☐ 3.1.6 Canard chipeau ☐ 3.1.3 Canard siffleur d'Amérique ☐ 3.1.11 Petit garrot ☐ 3.1.1 Canard branchu ☐ 3.1.5 Canard souchet ☐ 3.1.14 Autre? Lequel? * INTERVIEWEUR réfère au poster et note le no. du canard dans la case qui correspond à sa consommation. JUSTE faire un crochet si ne sait pas l'espèce de canard	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
3.2 Oies ☐ Oui ☐ Non ☐ 3.2.1 Outarde, Bernache du Canada ☐ 3.2.2 Oie blanche (sous sp. blanche ou foncée) ☐ 3.2.3 Bernache cravant * INTERVIEWEUR réfère au poster et note le no. de l'oiseau dans la case qui correspond à sa consommation.	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
3.3 Oiseaux terrestres ☐ Oui ☐ Non ☐ 3.3.1 Perdrix, Gélinotte huppée (viande blanche) ☐ 3.3.2 Tétra du Canada (viande rouge) ☐ 3.3.3 Lagopède des saules ☐ 3.3.5 Bécasse d'Amérique * INTERVIEWEUR réfère au poster et note le no. de l'oiseau dans la case qui correspond à sa consommation.	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
3.4 Autres oiseaux ☐ Oui ☐ Non Lesquels? __________________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
3.5 Œufs d'oiseaux ☐ Oui ☐ Non ☐ 3.5.1 Goélands ☐ 3.5.2 Oies ☐ 3.5.4 Eider à duvet (Moyak) ☐ 3.5.3 Autre? ______________	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

EH4. DANS LA DERNIÈRE ANNÉE, avez-vous mangé des PETITS FRUITS ou des PLANTES SAUVAGES?
☐ 1. Oui
☐ 2. Non (Aller à la section – ALIMENTS DU MARCHÉ)

Je vais vous lire une liste d'espèces de petits fruits. Pouvez-vous me dire si, DANS LA DERNIÈRE ANNÉE, vous en avez mangé, et SI OUI, combien de fois à l'été dernier. Ensuite, à chaque saison.

PETITS FRUITS et PLANTES SAUVAGES Portion : ½ tasse * FRAIS, PAS EN CONFITURE	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
4.1 Framboise sauvage ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								

	Saison	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais ou moins que 1/mois	Commentaires
4.6.1 Fraise sauvage ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.7 Chicoutai ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.2 Bleuet sauvage ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.8 Camarine noire ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.5 Graines rouges (airelle rouge) ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
	Hiver (21 déc. – 20 mars)								
	Automne (21 sept. – 20 déc.)								
	Été (21 juin – 20 sept.)								
4.6 Autre fruits ou plantes? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)								
☐ 4.5 Airelle canneberge (atoca) ☐ 4.6.3 Amélanchier (petite poire) ☐ 4.6.4 Gadelles (rouge ou cassis) ☐ 4.6.2 Pimbina, viorne comestible	**Hiver** (21 déc. – 20 mars)								
☐ 4.6.5 Petit thé (fruit blanc) ☐ 4.6.7 Thé des bois ☐ 4.6.9 Noisettes (Noisetier à long bec) ☐ 4.6.10 Feuilles de pissenlit ☐ 4.6.12 Autre? Lesquels?	**Automne** (21 sept. – 20 déc.)								
* INTERVIEWEUR réfère au poster et note le no. de la plante dans la case qui correspond à sa consommation.	**Été** (21 juin – 20 sept.)								

HABITUDES ALIMENTAIRES – Aliments du marché

Cette section est à propos des aliments du supermarché, c'est-à-dire ceux qui se mangent tel quel ou bien cuisinés dans des recettes. Pour cette section, pensez à ce que vous avez mangé dans les TROIS DERNIERS MOIS.

EH5. DANS LES TROIS DERNIERS MOIS, combien de fois en moyenne avez-vous mangé…
*INTERVIEWEUR coche si OUI

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais, Moins que 1/mois	Commentaires
Recettes traditionnelles avec des aliments de marché									
☐ 1.1 **Banique** (cuit au four) (1 tr/morceau)									
☐ 1.2 **Banique** (cuit dans le sable) + sel									
2. **Recettes traditionnelles** (1 bol) ☐ 2.1 **Soupe poisson** (eau, bouillon, poisson, boule farine) ☐ 2.2 **Soupe gibier** (eau, gibier, boule farine) ☐ 2.3 **Tekaep** (Crêpes ou banique avec graines rouges) ☐ 2.4 Autre? ____________________									
Viande de l'épicerie									
☐ 4. **Hamburger**, maigre ou régulier (1 boulette)									
☐ 5. **Bœuf** (steak, viande hachée) (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 6. **Hot dogs de porc ou de bœuf** (1)									
☐ 7. **Saucisses** (2 petites,1 grosse ou en conserve)									
☐ 8. **Porc, côtelettes** (pork chops) **ou rôti de porc** (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 9. **Poulet/dinde** (poitrine, cuisse) (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 10. **Pépites ou croquettes de poulet** (4-6), **ailes de poulet** (6-8)									
☐ 11. **Jerky de boeuf** (1 sac)									
☐ 12. **Viande transformée ou tranchée** (jambon, baloney, Kam, Spam, salami, pepperoni,, etc. (1 tr/morceau), (4-6 oz ou 1 1/2-2 jeux de cartes)									
☐ 13. **Bacon** (2 tranches)									
☐ 14. **Œufs** (poule) (1 œuf)									
☐ 15. **Poisson frais ou congelé de l'épicerie** (4-6 oz ou 1 1/2-2 jeux de cartes)									* Noter sp.
☐ 16. **Saumon ou sardines en conserve** (3-4 oz ou 1- 1 1/2 jeux de cartes)									
☐ 17. **Thon en conserve** (3-4 oz ou 1- 1 1/2 jeux de cartes)									☐ Pâle ☐ Blanc
Fruits									
☐ 18. **Pommes ou poires** fraiches (1)									
☐ 19. **Bananes** (1)									
☐ 20. **Oranges** (1) ou **pamplemousse** (1/2)									
☐ 21. **Petits fruits** du marché frais ou congelés (1/2 tasse)									
☐ 22. **Autres fruits frais** (1 fruit or 1/2 tasse)									
☐ 23. **Fruit en conserve** (1/2 tasse)									

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3/mois	Jamais, Moins que 1/mois	Commentaires
Légumes									
☐ 24. **Légumes verts en feuilles** (1 tasse de salade iceberg ou romaine, 1/2 tasse épinards cuits)									
☐ 25. **Légumes jaune-orange** (carottes, navets, etc.) (1 carotte moyenne ou 1/2 tasse)									
☐ 26. **Brocoli, choux, chou-fleur** (1/2 tasse)									
☐ 27. **Tomates** (1 entière ou 1/2 tasse en conserve ou ½ tasse de jus (Tomate ou V8), sauce a spaghetti, soupe, indian taco)									
☐ 28. **Légumineuses : Fèves au lard, fèves ou pois** (1/2 tasse cuit ou en conserve)									
☐ 29. **Autres légumes** (poivron-piment vert, concombre, mais, céleri, champignons, etc.) (1/2 tasse)									
☐ 30. **Oignon, cuit comme un légume** (1/2 tasse)									
Pain, céréales, amidon de blé									
☐ 31. **Pain blanc** (1 tranche)									
☐ 32. **Pain blé entier** ou autre grains entiers (1 tranche)									
☐ 33. **Céréales froides** (cornflakes, etc.) (1 tasse)									
☐ 34. **Céréales chaudes** (gruau, etc.) (1 tasse)									
☐ 35. **Soupe aux nouilles/macaroni** (soupe Lipton, pâtes, canne tomates, +/- viande hachée) (1 bol)									
☐ 36. **Pâtes**, ex. macaroni, spaghetti (1 tasse)									
☐ 37. **Riz** (1 tasse)									
☐ 38. **Patates en purée** (1 tasse), **au four ou bouillie** (1)									
☐ 39. **Poutine ou frite sauce** (1 moyenne)									
☐ 40. **Frites** (accompagnement) (6 oz. ou 1 portion)									
☐ 42. **Chips ou chips de maïs** (petit sac ou 1 oz.)									
☐ 43. **Popcorn ou maïs soufflé** (3 tasses)									
☐ 44. **Craquelins ou biscuits salé**, ex. Ritz (6)									
☐ 45. **Pizza** (2 tranches)									
Sucreries, pâtisseries									
☐ 46. **Tartes et biscuits** maison ou du commerce (1 tranche ou 1 morceau)									
☐ 47. **Beignes** (1)									
☐ 48. **Gâteau** (maison ou du commerce, ex. Vachon) (1 morceau ou 1 pq)									
☐ 49. Barre de **chocolat au lait** (barre ou paquet), ex. Hershey's, Aero, etc.									
☐ 50. **Barres de chocolat/friandises** (barre ou paquet), ex. Snickers, Reeses, Mars, M&M, etc.									
☐ 51. **Bonbon sans chocolat (jujubes, sucon, bonbon durs)** (1 oz.)									
☐ 52. **Beurre de peanuts** (1 c. à soupe)									
☐ 53. **Noix** (Peanuts/arachides, amandes, etc.) ou **graines de tournesol** (petit sac or 1 oz)									
☐ 54. **Confiture** (maison ou commerciale), **sirop, miel, Nutella** (1 c.à soupe)									
☐ 55. **Sucre blanc ou cassonade dans céréales, café ou thé** (1 c. à thé)									* Noter no. cuillères
☐ 56. **Édulcorant artificiel dans céréales, café ou thé** (1 paquet), ex. Egal, Twin									* Noter no. sachets
☐ 57. **Ketchup** (1 c. à soupe)									* Noter no. cuil
☐ 79. **Barres tendres** (Nutri-grain, Val nature…)									
☐ 80. **Desserts glacées** (MrFreeze, Popsicles …)									

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3 /mois	Jamais, Moins que 1/mois	Commentaires
Produits laitiers									
☐ 58. Lait comme boisson ou dans les céréales (1 tasse) (frais, Carnation, en poudre)									☐ 1% ☐ 2% ☐ 3.25% ☐ Carnation ☐ En poudre
☐ 59. Lait au chocolat / chocolat chaud avec du lait (frais ou en poudre) (1 tasse)									
☐ 60. Préparation lactée (Enfamil, Bon départ, etc.) (1 tasse)									
☐ 61. Lait dans le thé ou le café (frais, Carnation, en poudre) (1 c. à thé)									☐ 1% ☐ 2% ☐ 3.25% ☐ Carnation ☐ Eagle brand ☐ En poudre ☐ Coffee mate
☐ 62. Yogourt ou Yop (1/2 tasse)									
☐ 63. Crème glacée (1/2 tasse)									
☐ 64. Morceau fromage, fromage en grain ou dans un plat ou gratiné (cheddar ou mozzarella) (1 tranche, 1 petit sac ou 1 oz)	,								
☐ 65. Fromage transformé (Singles Kraft, cheez whiz, Vache qui rit) (1 tranche ou 1 c. à soupe)									
Divers									
☐ 66. Beurre (carré), sur du pain ou dans les aliments, exclure celui utilisé pour cuisiner									
☐ 67. Margarine (carré), sur du pain ou dans les aliments, exclure celui utilisé pour cuisiner									
☐ 68. Miracle whip (sauce à salade) (1 c. à soupe)									
☐ 69. Mayonnaise (1 c. à soupe)									☐ Faible en gras ☐ Régulière
☐ 70. Vinaigrette à salade (1-2 c. à soupe)									☐ Faible en gras ☐ Huile d'olive ☐ Autre huile végétale/régulière
71. À quelle fréquence votre enfant a-t-il mangé des aliments frits ? (Exclure huile en vaporisateur de type "Pam")									

72. Quel **type de gras est habituellement utilisé pour frire les aliments** à la maison? (Exclure huile en vaporisateur de type "Pam")
☐ Huile Olive/Canola ☐ Huile Mais/soya ☐ Graisse végétale (Crisco) ☐ Lard/saindoux (Tenderflake) ☐ Autre: ____________ ☐ Aucune friture

73. Quel **type de gras est habituellement utilisé pour cuisiner (dans les recettes, à la poêle)** à la maison? (noter le plus fréquent)
☐ Vrai beurre ☐ Margarine ☐ Huile Olive/Canola ☐ Huile Mais/Soya ☐ Graisse végétale (Crisco) ☐ Lard/saindoux (Tenderflake)
☐ Autre: ____________ ☐ Aucun gras utilisé pour cuisiner

Breuvage

	4-5/jour	2-3/jour	1/jour	5-6/sem.	2-4/sem.	1/ sem.	1-3 /mois	Jamais, Moins que 1/mois	Commentaires
☐ 74. Jus en bouteille/carton (Oasis, Fruité, Sunny-D, Tropicana,) (1 tasse)									
☐ 75. Liqueur diète (1 canette)									* Noter no. canettes
☐ 76. Liqueur régulière (1 canette)									* Noter no. canettes
☐ 77. Boisson sport (Powerade, Gatorade) (1 bouteille)									* Noter no. bouteilles
☐ 78. Boisson énergétique (Redbull, Monster, Guru) (1 canette)									* Noter no. canettes

SOURCES D'EAU POTABLE

Cette partie du questionnaire fait référence à l'eau qui est consommée dans votre maison.

DW1. Est-ce qu'il y a l'eau courante dans votre maison (eau du robinet)?
☐ 1. Oui
☐ 2. Non (Aller à DW5)

DW2. Est-ce que buvez-vous l'eau du robinet à la maison?
☐ 1. Oui
☐ 2. Non

DW3. Est-ce que le goût, l'apparence ou l'odeur de l'eau empêche vous empêche de boire l'eau du robinet?
☐ 1. Oui
☐ 2. Non
☐ 3. Parfois

DW4. Est-ce que l'eau du robinet est utilisée pour cuisiner à la maison?
☐ 1. Oui
☐ 2. Non

DW5. Buvez-vous un autre type d'eau à la maison?
☐ 1. Non
☐ 2. Eau en bouteille
☐ 3. Eau de puits
☐ 4. Eau de source
☐ 5. Eau de ruisseau ou rivière
☐ 6. Eau de lac ou d'un étang
☐ 7. Eau de pluie (citerne)
☐ 8. Autre, svp spécifier: __________________________

DW6. Un autre type d'eau est-elle utilisée pour cuisiner à la maison?
☐ 1. Non
☐ 2. Eau en bouteille
☐ 3. Eau de puits
☐ 4. Eau de source
☐ 5. Eau de ruisseau ou rivière
☐ 6. Eau de lac ou d'un étang
☐ 7. Eau de pluie (citerne)
☐ 8. Autre, svp spécifier: __________________________

DW7. Est-ce que vous traitez l'eau à la maison?
☐ 1. Faire bouillir l'eau pour le bébé
☐ 2. Faire bouillir pour toute la maison
☐ 3. Faire bouillir quand il y a un avis de faire bouillir
☐ 4. Filtrer (charbon ou similaire)
☐ 5. Adoucisseur d'eau
☐ 6. Système ultraviolet
☐ 7. Osmose inverse
☐ 8. Comprimés
☐ 9. Aucun
☐ 10. Autre, svp spécifier: ____

CONSOMMATION D'EAU

Maintenant, je vais vous poser des questions sur la consommation d'eau et d'autres boissons ou de soupes de votre enfant et sur les différentes sources de l'eau dans votre maison utilisées pour faire ces boissons. Nous sommes intéressés aux boissons ou aux aliments consommés à la maison DANS LA DERNIÈRE SEMAINE. Nous allons utiliser une tasse pour illustrer la quantité consommée. * INTERVIEWEUR sort la TASSE

Pour chaque breuvage ci-dessous, veuillez indiquer:
a) Si vous avez bu ce breuvage LA SEMAINE DERNIÈRE *INTERVIEWEUR coche le breuvage si oui
b) Combien de JOURS la semaine dernière
c) Combien de tasses avez-vous bu à chaque jour * INTERVIEWEUR sort la TASSE
d) Quelle était la source d'eau (ex. robinet, eau en bouteille, etc.) utilisée pour faire ce breuvage/recette

LA SEMAINE DERNIÈRE, avez-vous bu…	1 jour	2 jours	3 jours	4 jours	5 jours	6 jours	7 jours	Quantité (Tasse/jour)	Source d'eau
☐ DW9. Eau									
☐ DW10. Café									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW11.Thé (n'importe lequel)									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW12.Chocolat chaud fait avec de l'eau									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW13. Jus fait de concentré ou cristaux (canne, Tang, Kool-Aid ou Gatorade)									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW14. Préparation lactée (Enfamil, Bon départ, etc.)									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW15.Lait en poudre régulier									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW16. Bouillon/soupe									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW17. Ragoût									☐ Robinet ☐ Eau bouteille ☐ Autre_______________
☐ DW18. Autre liquides/repas à base d'eau Nommer: ____________________									☐ Robinet ☐ Eau bouteille ☐ Autre_______________

MODE DE VIE

DANS LA DERNIÈRE ANNÉE, en moyenne, combien de fois votre enfant a ou avez-vous…

		Plus d'1 fois par semaine	1 fois par semaine	1-3 fois par mois	Chaque 2-3 mois	Une fois ou quelques fois par an	Jamais ou pas du tout
L.1 Chassé le gros gibier? ☐ Oui ☐ Non	Printemps (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						

		Plus d'1 fois par semaine	1 fois par semaine	1-3 fois par mois	Chaque 2-3 mois	Une fois ou quelques fois par an	Jamais ou pas du tout
L.2 Trappé du petit gibier? ☐ Oui ☐ Non	Printemps (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L3. Chassé du petit gibier? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L4. Est allé pêcher? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L5. Ramasser des fruits de mer? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L6. Ramasser des fruits ou des plantes sauvages? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						
L7. Planté un jardin? ☐ Oui ☐ Non	**Printemps** (21 mars – 20 juin)						
	Hiver (21 déc. – 20 mars)						
	Automne (21 sept. – 20 déc.)						
	Été (21 juin – 20 sept.)						

2. Quelqu'un d'autre dans votre ménage? (nombre)		
	Non	Oui
L1. Chassé du gros gibier?		
L2. Trappé du petit gibier?		
L3. Chassé du petit gibier?		
L4. Est allé pêcher?		
L5. Ramasser des fruits de mer?		
L6. Ramasser des fruits ou des plantes sauvages?		
L7. Planté un jardin?		

Si quelqu'un dans votre ménage pêche, chasse le gros ou le petit gibier, nous allons maintenant vous poser quelques questions sur les plombs et les munitions de chasse. ☐ Cette section ne s'applique pas

L8. Est-ce que vous ou quelqu'un dans votre ménage fabrique des plombs pour la pêche?
☐ 1. Oui
☐ 2. Non
☐ 3. Je ne sais pas

L9. Est-ce que vous ou quelqu'un dans votre ménage fabrique ses propres cartouches ou modifie ses munitions?
☐ 1. Oui
☐ 2. Non (Aller à L11)
☐ 3. Je ne sais pas

L10. Si OUI, quoi et comment? Avec de la grenaille de plomb? où et quel type? Pour chasser quoi?
____
____
____

L11. Où est-ce que vous ou les membres de votre famille nettoyez vos armes à feu?
☐ 1. Dans la cuisine
☐ 2. Dans le salon
☐ 3. Dans la remise
☐ 4. À l'extérieur de la maison
☐ 5. Autre: ___________________

L12. Après la chasse, qui nettoie l'animal (fait la boucherie)?
☐ 1. Vous-même ou un membre de votre famille
☐ 2. Un boucher (fin de l'entrevue)
☐ 3. Autre: _______________________________
☐ 4. Je ne sais pas

L13. Lorsque vous nettoyez l'animal, est-ce que la viande autour de l'impact de la balle est enlevée?
☐ 1. Oui
☐ 2. Non (fin de l'entrevue)
☐ 3. Je ne sais pas (fin de l'entrevue)

L14. Si OUI, combien? * INTERVIEWEUR APPORTE UNE RÈGLE OU UN GALON À MESURER
_______ cm _______ in ☐Je ne sais pas

GI20. Heure fin interview: ___: ___ (24h)

COMMENTAIRES GÉNÉRAUX

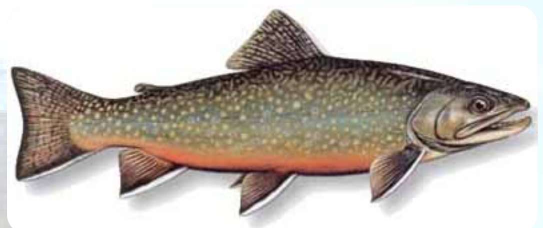
Écrire tous les commentaires qui vous viennent en tête au sujet de l'entrevue. Identifier toute question qui n'a pas été bien comprise, les situations où il/elle semblait avoir inhabituellement des réserves ou il/elle aurait omis de donner des informations exactes ou véridiques. A-t- il/elle révélé des problèmes qui pourraient interférer avec sa participation à étude?

____
____
____
____
____
____

Appendix D – Traditional food posters by region

Poissons et oiseaux de l'Abitibi-Témiscamingue – Fishes and birds of the Abitibi-Témiscamingue region

Poissons / Fishes
Kigòsek / Kìgònz


Truite mouchetée / Brook Trout (speckled trout)
Salvelinus fontinalis
Namegocec / Mànìamegos


Truite grise (Touladi) / Lake Trout
Salvelinus namaycush
Namegos / Namegos


Truite arc-en-ciel / RainbowTrout
Oncorhynchus mykiss
Otainamek/


Doré / Walleye (yellow/blue pickerel)
Sander vitreus
Ogas / Ogà


Doré noir / Sauger
Sander canadensis
/


Grand brochet / Northen pike
Esox lucius
Kinoie / Kinòje (màskinòie)


Esturgeon de lac / Sturgeon (lake)
Acipenser fulvescens
Name/ Name


Perchaude / Yellow Perch
Perca flavescens
Acawec / Ozàwens


Corégone (Poisson blanc) / Lake whitefish
Coregonus albula
Attikamek/

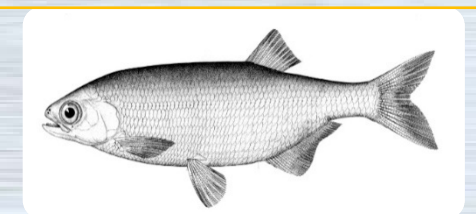

Achigan à petite bouche / Smallmouth Bass
Micropterus dolomieu
Acigan/ Ashigan (mànashigan)


Achigan à grande bouche / Largemouth Bass
Micropterus salmoides
Manicigan /

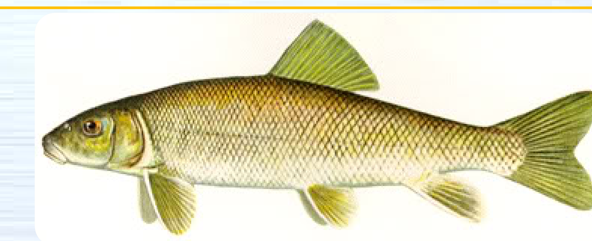

Loche / Ling (Burbot or Maria)
Misgurnus anguillicaudatus
Minackijjoc / Mizay (agakanàngwe)


Crapet de roche / Rock Bass
Ambloplites rupestris
Akakanakwe/


Crapet soleil / Sunfish (Bluegrill)
Lepomis gibbosus
/ Pimidabàkesi


Laquaîche argenté / Mooneye (Flat fish)
Hiodon tergisus
/


Barbotte / Brown bullhead catfish
Ameiurus nebulosus
Awasisi/


Meunier rouge / Red Sucker (longnose)
Catostomus catostomus
Miskoname ban/ Miskwamebin

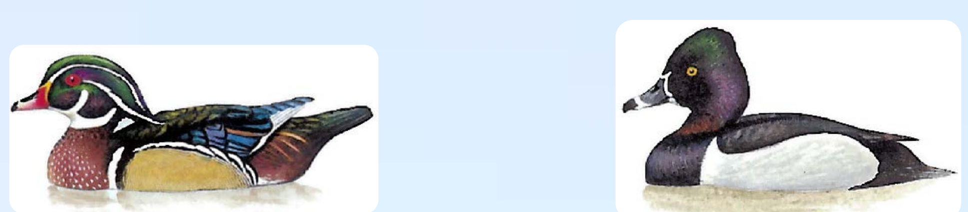

Meunier noir / White Sucker
Catostomus commersoni
Nameban/ Namebin


Carpe / Carp (native)
Cyprinus carpio Linné
/ Namebin


Œufs de poissons / Fish eggs
Wàk /

Oiseaux / Birds
Pineshìnjish / Binêziek

3.1 Canard / Duck / Shìshìb


Canard branchu / Wood duck
Aix sponsa
/ Pikwàkoshìb

Fuligule à collier/ Ring necked duck
Aythya collaris
/

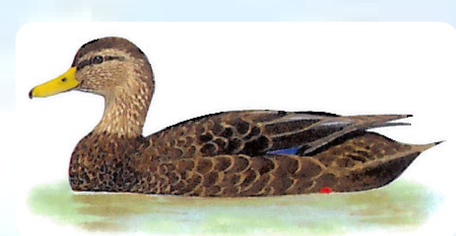

Canard siffleur d'Amérique / American wigeon
Anas americana
/

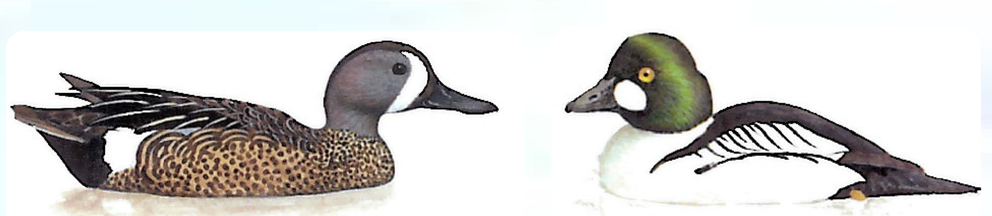

Canard Pilet / Northern pintail
Anas acuta
Aawe /


Canard souchet/ Northern Shoveler
Anas clypeata
Nadagamcip /


Canard chipeau/ Gadwall
Anas strepera
/


Canard colvert / Mallard
Anas platyrhynchos
Wâbincip / Wewìbigwàngesshib


Canard noir / American black
Anas rubripes
Tokodji /


Sarcelle/ Teal
Anas crecca
/ Chìchìnàgoshìb

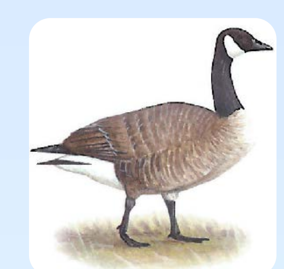
Garrot à œil d'or/ Golden eye
Bucephala clangula
Kokocip /


Petit garrot / Bufflehead
Bucephala albeola
Pkokocip /

Huard/ Loon
Gavia immer
Makcicip /


Grand harle/ Merganser
Mergus merganser
Iisik /

Oies / Geese


Bernache du Canada/ Canada Goose
Branta canadensis
Nika /


Oie blanche / Snow Goose
Chen caerulescens
Wabanika /


Bernache cravant / Brant Goose
Branta bernicla
Nakacip /

Oiseaux terrestres / Landbird


Perdrix/ Partridge
Perdix perdix
Pine / Pine


Tétra du Canada/ Spruce grouse
Falcipennis canadensis
Miskôdese /


Lagopède des saules / Willow Ptarmigan
Lagopus lagopus
Asko /


Dindon sauvage/ Wild turkey
Meleagris gallopavo
/ Misise


Bécasse d'Amérique / American Woodcock
Scolopax minor
/ Pedjashkanjì

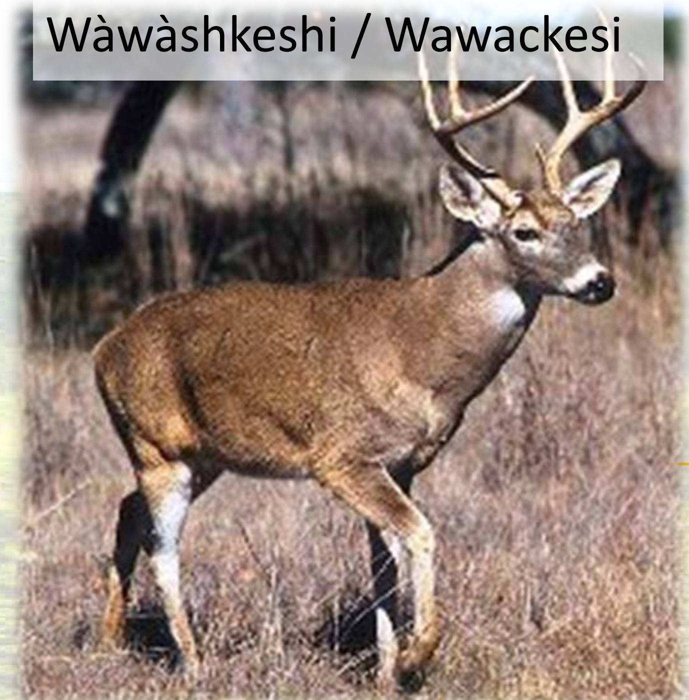
Grue du Canada/ Sandhill crane
Grus canadensis
/

Œufs d'oiseaux / Bird's eggs
Wàw x2

Mammifères et petits fruits de l'Abitibi-Témiscamingue – Mammals and berries of the Abitibi-Témiscamingue region

Mammifères / Mammals
Awesìnz /

Chevreuil / Deer
Capreolus capreolus
Wàwàshkeshi / Wawackesi



Caribou / Caribou
Rangifer tarandus
Ininadik/ Adik

Castor / Beaver
Castor canadensis
Amik wiyas / Amik

Lièvre/ Hare
Leporidae
Wabos /

Rat musqué/ Muskrat
Ondatra zibethicus
/ Wajashk

Orignal / Moose
Alces americanus
Mònz/ Mos

Ours noir / Black Bear
Ursus americanus
Mokô / Makwa

Lynx / Lynx
Grus canadensis
Pijîw / Pijiw

Porc-épic/ Porcupine
Erethizon dorsata
Kâk / Kàg

Petits fruits et plantes sauvages / Berries and wild plants
Pagwadjiminan/ Netàwigingin

Fraises des champs / Wild strawberry
Fragaria virginiana
Oteimin / Odeyimin

Bluets sauvages / Wild blueberries
Vaccinum angustifolium
/ Minadjic

Cerise à grappe / Cherry
Prunus virginiana L.
Asesemin / Azasaweminan

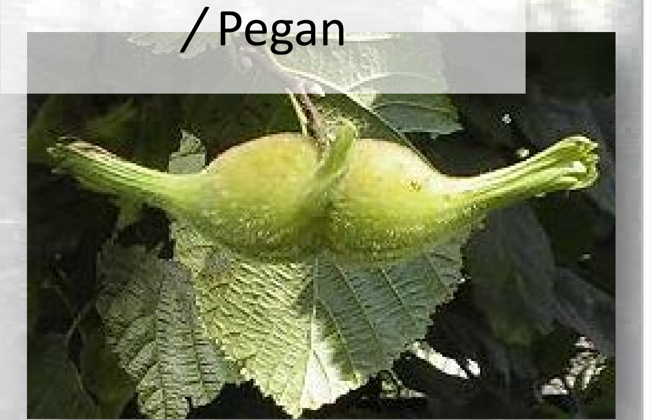
Framboises sauvages / Wild raspberry
Rubus idaeus
Miskomin / Miskominag

Merise / Pinecherry
Prunus avium
Pwiminan / Pawahiminàn

Airelle canneberges / Cranberry
Vaccinium oxycoccos
Mickigominan / Mashkìgomin

Petit thé / Creeping snowberry
Gaultheria hispidula
/

Noisettes / Hazel
Corylus avellana
/ Pegan



Feuilles de pissenlit / Dandelion leaves
Taraxacum
/ shìwanìbish anìbìsh

Pimbina, virone comestible / Squashberry
Viburnum edule
Anìbimin / Anìbimin

Thé des bois / Teaberry
Gaultheria procumbens
/

Amélanchier / Serviceberry
Amelanchier sp
/

Gadelles / Gooseberry
Ribes glandulosum
/ Shàbòminan

Genévrier / Juniper
Juniperus communis
/

Riz sauvage / Wild rice
Zizania palustris
/ pagwadjanòmin


Poissons, crustacés et oiseaux de la Côte-Nord
Poissons et crustacés
Truite mouchetée ou de mer (omble de fontaine) / Brook Trout *Salvelinus fontinalis*
Truite grise ou de lac (touladi) / Lake Trout *Salvelinus namaycush*
Truite arc-en-ciel (truite saumonée) / RainbowTrout *Oncorhynchus mykiss*
Saumon d'eau douce (ouananiche) / Landlocked Atlantic salmon *Salmo salar*
Saumon atlantique/Atlantic salmon *Salmo salar*
Omble de l'arctique ou chevalier/ Arctic char *Salvelinus alpinus*
Œufs de poissons / Fish eggs
Morue franche/Atlantic cod *Gadus morhua*
Éperlan arc-en-ciel/Rainbow smelt *Osmerus mordax*
Caplan/Capelin *Mallotus villosus*
Hareng/**Atlantic herring** *Clupea harengus*
Maquereau/Mackerel Scombrini
Flétan du Groenland/Greenland halibut *Reinhardtius hippoglossoides*
Grand brochet / Northen pike *Esox lucius*
Doré jaune Acipenser oxyrinchus
Corégone (Poisson blanc) / Lake whitefish *Coregonus albula*
Plie canadienne (sole)/American plaice *Hippoglossoides platessoides*
Esturgeon noir/Atlantic sturgeon Acipenser oxyrinchus
Carpe / Carp (native) *Cyprinus carpio Linné*
Homard d'Amérique/American lobster *Homarus americanus*
Mye (coques)/Soft-shell clam *Mya arenaria*
Moules bleue/Blue mussel *Mytilus edulis*
Pétoncle géant/Giant scallop Placopecten magellanicus
Crabe des neiges/Snow crab Chionoecetes opilio
Crevette nordique/Northen shrimp Pandalus borealis
Oiseaux
Canard
Huard/ Loon *Gavia immer*
Eider à duvet/ Spruce grouse *Somateria mollissima*
Canard noir / American black *Anas rubripes*
Canard Pilet / Northen pintail *Anas acuta*
Canard colvert / Mallard *Anas platyrhynchos*
Fuligule à collier/ Ring necked duck *Aythya collaris*
Grand harle/ Merganser *Mergus merganser*
Sarcelle/ Teal *Anas crecca*
Garrot à œil d'or/ Golden eye *Bucephala clangula*
Canard chipeau/ Gadwall *Anas strepera*
Canard siffleur d'Amérique / American wigeon *Anas americana*
Petit garrot / Bufflehead *Bucephala albeola*
Canard branchu / Wood duck *Aix sponsa*
Canard souchet/ Northern Shoveler *Anas clypeata*
Oiseaux terrestres
Perdrix/ Partridge *Perdix perdix*
Bécasse d'Amérique / American Woodcock *Scolopax minor*
Tétra du Canada/ Spruce grouse *Falcipennis canadensis*
Lagopède des saules / Willow Ptarmigan *Lagopus lagopus*
Oies
Bernache cravant / Brant Goose *Branta bernicla*
Oie blanche / Snow Goose *Chen caerulescens*
Bernache du Canada/ Canada Goose *Branta canadensis*
Œufs d'oiseaux

Mammifères, petits fruits et plantes sauvages de la Côte-Nord

Mammifères


Caribou / Caribou
Rangifer tarandus


Lièvre/ Hare
Leporidae


Castor / Beaver
Castor canadensis


Porc-épic/ Porcupine
Erethizon dorsata


Rat musqué/ Muskrat
Ondatra zibethicus


Orignal / Moose
Alces americanus


Lynx / Lynx
Grus canadensis


Ours noir / Black Bear
Ursus americanus


Loutre de mer/Sea otter
Enhydra lutris


Loup marin (phoque)/Seal
Phocidae sp

Petits fruits et plantes sauvages


Fraises des champs / Wild strawberry
Fragaria virginiana


Chichoutai (plaquebière) / Cloudberry (Bakeapple)
Rubus Chamaemorus


Bleuets sauvages / Wild blueberries
Vaccinum angustifolium
Vaccinum myrtilloides


Framboises sauvages / Wild raspberry
Rubus idaeus


Camarine noire / Blackberry (Crowberry)
Empetrum nigrum


Graines rouges (airelles vigne d'ida)/ Redberry (lingonberry)
Vaccinum vitis-idaea


Pimbina, virone comestible / Squashberry
Viburnum edule


Thé des bois / Teaberry
Gaultheria procumbens


Noisettes / Hazel
Corylus avellana


Feuilles de pissenlit / Dandelion leaves
Taraxacum


Petit thé / Creeping snowberry
Gaultheria hispidula


Airelle canneberges (atoca) / Cranberry
Vaccinium oxycoccos


Gadelles / Gooseberry
Ribes glandulosum


Catherinettes (ronce pubescent)/ Dewberry
Rubus pubescens


Amélanchier / Serviceberry
Amelanchier sp

Appendix E – Number of participants recruited

Table A1: Eligible population, recruitment objectives and number of participants recruited for the whole JES! -YEH! study by age groups and gender.

	Population in the communities in 2014	Recruitment objective			Total of participants recruited		
		Boys	Girls	**Total**	Boys	Girls	**Total**
3-5 years old	300	20	20	**40**	21	18	**39**
6-11 years old	589	42	35	**77**	44	35	**79**
12-19 years old	636	40	43	**83**	38	42	**80**
Total	1525	102	98	200	103	95	198

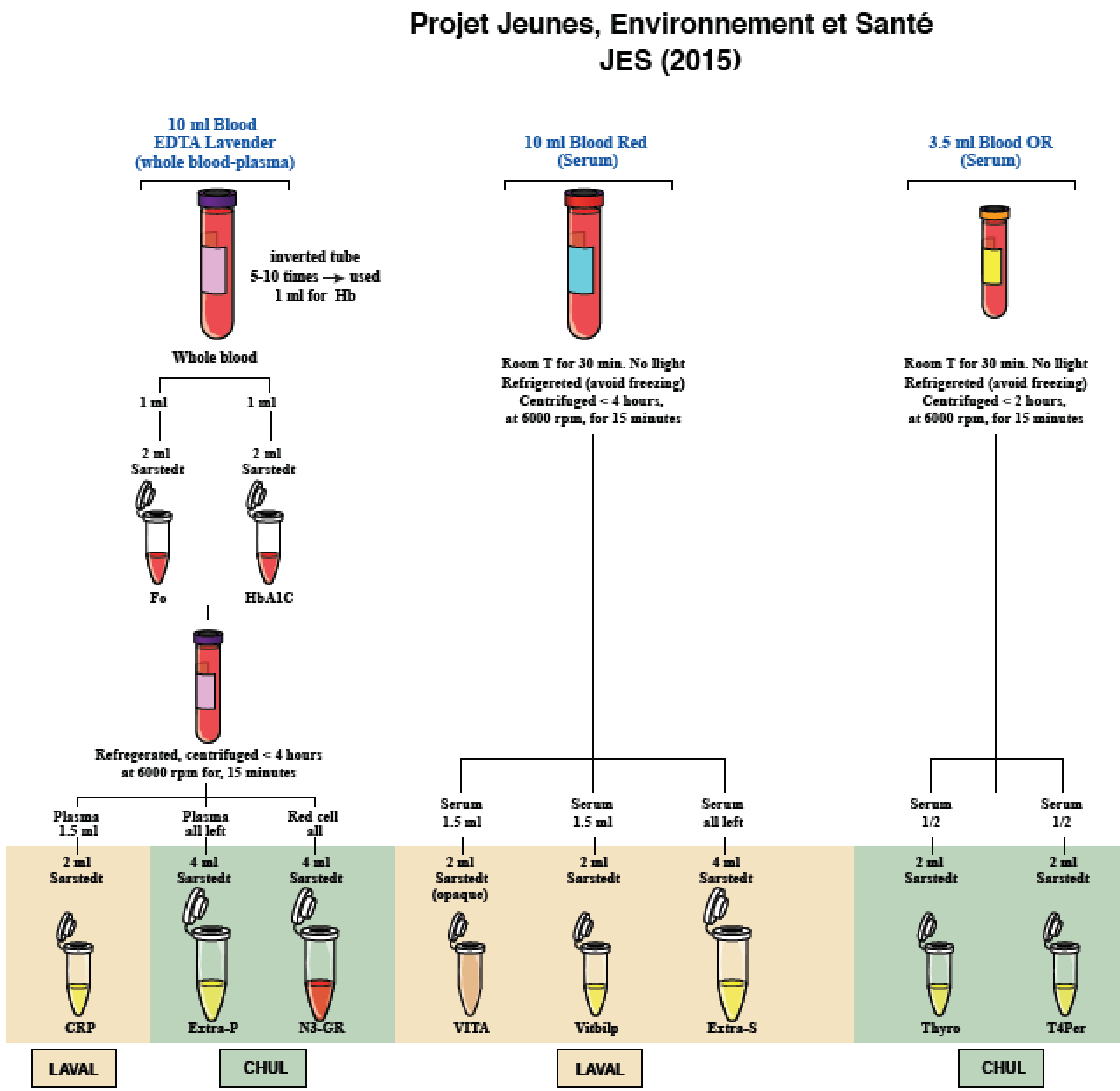
Table A2: Eligible population, recruitment objectives, number of participants recruited and number of participants recruited according to the method (random vs voluntary) for the JES! -YEH! study by age groups and gender, for the Anishnabeg communities.

	Population in the communities in 2014	Recruitment objective			Total of participants recruited in the Anishnabeg communities			Participants recruited in the Anishnabeg communities Random participants (voluntary participants)		
		Boys	Girls	**Total**	Boys	Girls	**Total**	Boys	Girls	**Total**
3-5 years old	188	11	14	**25**	12	13	**25**	11 (1)	13	**24 (1)**
6-11 years old	331	23	21	**44**	25	21	**46**	23 (2)	21	**44 (2)**
12-19 years old	332	20	23	**43**	19	21	**40**	17 (2)	21	**38 (2)**
Total	851	54	58	112	56	55	111	51 (5)	55	106 (5)

Table A3: Eligible population, recruitment objectives, number of participants recruited and number of participants recruited according to the method (random vs voluntary) for the JES! -YEH! study by age groups and gender, for the Innu communities.

	Population in the communities in 2014	Recruitment objective			Total of participants recruited in the Innu communities			Participants recruited in the Innu communities Random participants (voluntary participants)		
		Boys	Girls	**Total**	Boys	Girls	**Total**	Boys	Girls	**Total**
3-5 years old	112	9	6	**15**	9	5	**14**	8 (1)	3 (2)	**11 (3)**
6-11 years old	258	19	14	**33**	19	14	**33**	15 (4)	12 (2)	**27 (6)**
12-19 years old	304	20	20	**40**	19	21	**40**	14 (5)	19 (2)	**33 (7)**
Total	674	48	40	88	47	40	87	37 (10)	24 (6)	71 (16)

Appendix F - Scheme of blood and urine collection



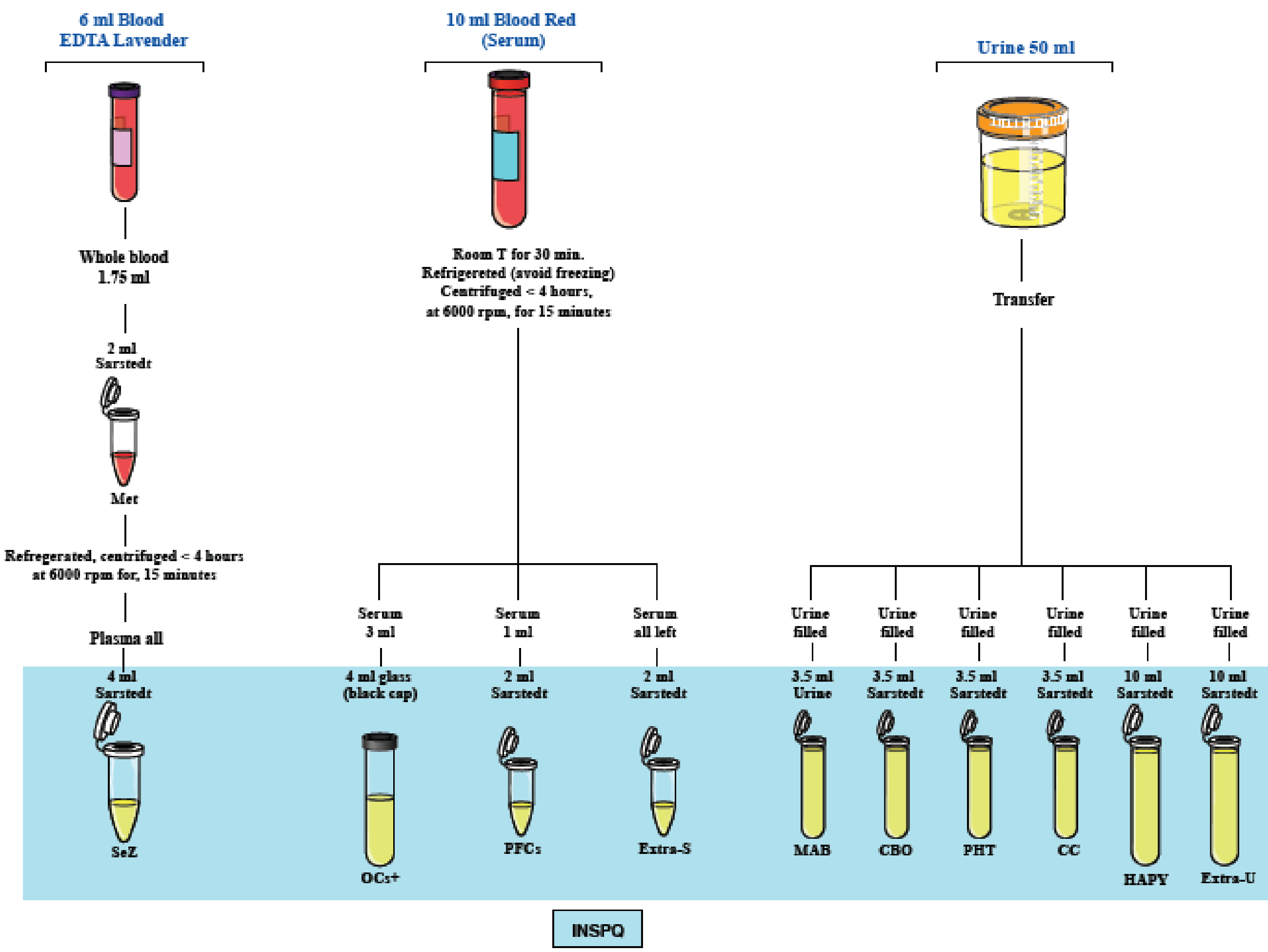
Analyses:

Hb: Hémoglobine
Fo: Folate (B9)
HbA1C: Hémoglobine glyquée (test hbA1c)
CRP: Protéine C-réactive ultrasensible (hs-CRP)
Extra P: Extra plasma
N3-GR: Acides gras des membranes des érythrocytes
VITA: Vitamine A (rétinol)
Vitbilp: Vitamine B12, vitamine D (25-hydroxyvitamine D), ferritine, fer (body iron), transferrine, UIBC, LDL, HDL, cholestérol total, triglycérides, glucose, insuline
Extra S: Extra sérum
Thyro : Thyroglobuline, anti-thyroglobuline (anti-T), anti-thyroperoxidase (anti-TPO), thyréostimuline (TSH)
T4Per: Thyroxine libre (T4 libre)

Laboratoires:

LAVAL: Hôpital Laval - Institut universitaire de cardiologie et de pneumologie de Québec (IUCPQ)
CHUL: CHU de Québec –Université Laval

Projet Jeunes, Environnement et Santé
JES (2015)



Analyses:

Met: Plomb, mercure total, mercure inorganique, sélénium, selenoneine, cadmium, cobalt, manganèse

SeZ: Sélénium, zinc

OCs+: Organochlorés (OC), biphényles polychlorés (BPC), polybromodiphényléthers (PBDE), lipides

PFCs: Composés perfluorés (PFC)

MAB: Métaux (arsenic, spéciation de l'arsenic, cadmium, cobalt, chrome, iode, nickel, uranium, bore)

CBO: Chlorophénols, bisphénol A (BPA)/Triclosan, pesticides organophosphorés (OP)

PHT: Phthalates

CC: Créatinine, cotinine

HAPY: hydrocarbures aromatiques polycycliques (HAP), pyréthroïdes

Extra-U: Extra urine

Laboratoire:

INSPQ: Institut national de santé publique du Québec

Appendix G – Fact sheet on the laboratory analyses

First Nations Youth, Environment & Health Pilot Study – YEH!

FACT SHEET ON LABORATORY TESTS INCLUDED IN THE STUDY

This is a summary of the laboratory tests conducted on blood, urine and hair samples. A complete list of the environmental contaminants and nutrients is included in the next section. Not all of the tests apply to every participant. Therefore, your final report might not include results for every test.

Blood tests

Environmental contaminants exposure

We will test your or your child blood sample to learn about your exposure to chemical substances found in the environment. These substances include heavy metals and some organic chemicals (see next section for more details).

Nutritional status

These tests will tell us about your or your child levels of the following nutrients: Vitamin A, Vitamin B9 (folate), Vitamin B12, Vitamin D, fatty acids profile (including omega-3 fatty acids) and several essential minerals (cobalt, copper, chromium, manganese, selenium and zinc) (see next section for more details).

Anaemia indicators and iron status

Iron deficiency anaemia is a condition where a lack of iron in the body leads to a reduction in the number of red blood cells or haemoglobin. Iron is used to produce haemoglobin, which help store and carry oxygen in the blood. If you have fewer haemoglobin than is normal, your organs and tissues will not get as much oxygen as they usually would. Iron-deficiency anemia for infants in their earlier stages of development may have greater consequences than it does for adults. There are several different types of anaemia and each one has a different cause, although iron deficiency anaemia is the most common type. Other forms of anaemia can be caused by a lack of vitamin B12 or folate in the body. We will test your or your child blood sample for haemoglobin, ferritin (one of the main forms in which iron is stored in the body), total iron stores, and all other relevant indicators of anaemia.

Cardiovascular health

We will test your blood sample for levels of high density lipoprotein (HDL), known as “good cholesterol” because it helps remove cholesterol from the blood. We will also test for low density lipoprotein (LDL), known as “bad cholesterol” because it can lead to cholesterol build-up in the blood vessels. Other tests include total cholesterol and triglycerides, a type of fat that your body uses for energy, and many fatty acids.

Diabetes

Diabetes is a chronic condition which affects your body’s ability to use glucose, a kind of sugar. The amount of sugar in the blood is controlled by a hormone called insulin, which is produced by the pancreas (a gland behind the stomach). When food is digested and enters your bloodstream, insulin moves glucose out of the blood and into cells, where it's broken down to produce energy. However, if you have diabetes, your body is unable to break down glucose into energy. This is because there's either not enough insulin to move the glucose, or the insulin produced doesn't work properly.

- In type 1 diabetes, the body's immune system attacks and destroys the cells that produce insulin. As no insulin is produced, your glucose levels increase, which can seriously damage the body's organs. Type 1 diabetes is often known as insulin-dependent diabetes. It's also sometimes known as juvenile diabetes or early-onset diabetes because it usually develops before the age of 40, often during the teenage years. Type 1 diabetes is less common than type 2 diabetes.
- Type 2 diabetes is where the body doesn't produce enough insulin, or the body's cells don't react to insulin. This is known as insulin resistance. Type 2 diabetes is far more common than type 1 diabetes. If you're diagnosed with type 2 diabetes, you may be able to control your symptoms simply by eating a healthy diet, exercising regularly, and monitoring your blood glucose levels. However, as type 2 diabetes is a progressive condition, you may eventually need medication, usually in the form of tablets. Type 2 diabetes is often associated with obesity.

Many more people have blood sugar levels above the normal range, but not high enough to be diagnosed as having diabetes. This is sometimes known as prediabetes. If your blood sugar level is above the normal range, your risk of developing full-blown diabetes is increased. It's very important for diabetes to be diagnosed as early as possible because it will get progressively worse if left untreated. We will test your or your child levels of glucose, insulin and glycated hemoglobin A1c; this gives information about your or your child average blood sugar level from the past two to three months.

Thyroid status

Your thyroid is a gland that helps control your body's temperature and the metabolism of proteins, fats and sugars. They affect processes such as heart rate and body temperature, and help convert food into energy to keep the body going. A thyroid disorder can affect many chronic diseases, such as heart disease and diabetes. We will test your or your child thyroid hormones status.

Urine tests

Environmental contaminants exposure

We will test your or your child urine sample to learn about your exposure to over 40 environmental substances. These include arsenic which is used in pesticides and also found naturally in drinking water, bisphenol A (BPA), which is used in manufacturing to make food containers, and triclosan, a substance used in anti-bacterial products, including hand soaps, toothpastes, cleaning products and dish detergents. Finally, we will test for several types of organophosphate insecticides, several types of parabens, which are used as preservatives in many cosmetic and personal care products, and many different kinds of polyaromatic hydrocarbons (PAHs), which are chemical substances produced by the burning of coal and internal combustion engines (see next section for more details).

Nutritional status

We will test your or your child urine sample for indicators of your nutritional status, including iodine, an element that is essential to maintain normal functioning of the thyroid gland.

Kidney function

We will learn about your kidney function by testing for creatinine, a waste product filtered out of your blood and into your urine.

Hair tests

Hair samples are taken in case high levels of manganese are found in blood or local drinking water, which will be tested in your or your child hair sample in case such situation is found. Hair manganese values have been shown to better evaluate manganese exposure to from water than blood tests.

FACT SHEET ON ENVIRONMENTAL CONTAMINANTS AND NUTRIENTS

Environmental contaminants evaluated in the present study can be divided into two "classes" based on their chemistry:

- Heavy metals: They are naturally occurring substances that make up part of the Earth's crust. Children and youth can be exposed to metals from both natural sources and human activities, which can transform or make metals more accessible in your environment. Lead, mercury and cadmium are heavy metals of particular interest due to their potential effects on human health, particularly among children and youth. Other elements, such as arsenic, boron, nickel, and uranium were included in the study in order to establish current concentrations in the First Nations youth population and help your community to undertake actions that will improve the environment if needed and as a result, also bringing long-term positive health impacts to your community and to future generations (see p.4).

- Organic chemicals: They are normally synthetic, though they often mimic chemicals that exist in nature, created by plants or animals. Many of the organic chemicals being measured in this study are long-lasting chemicals. While many of them are no longer used in Canada, others are still nowadays found in many consumer goods. We don't know precisely the long-term health effects of many of these long-lasting chemicals, but it is important to measure our level of exposure so that environmental sources and health effects of these contaminants may be better identified. These results will allow First Nations communities to compare their results from those from other studies such as the Canadian Health Measures Survey which has measured these same sets of chemicals in the bodies of Canadians in urban centres. This will also give you vital information about what is the exposure of the youth in your community, and help your community to undertake actions that will improve the environment if needed and as a result, also bringing long-term positive health impacts to your community and to future generations (see p.7).

Nutrients evaluated in the present study can be divided into three "classes" based on their properties:

- Vitamins: They are essential for optimal health. The ones included of interest in the present study are Vitamin A, Vitamin B9 (folate), Vitamin B12 and Vitamin D (see p.11).

- Essential elements: They are minerals found in different foods and are essential in small amount for the maintenance of good health. They may also be found in other sources such as drinking water. An excessive intake of theses minerals may adversely affect your health. These include cobalt, copper, chromium, iodine, manganese, selenium and zinc (see p.11).

- Fatty acids: Oily fish contains a special kind of fat, called long-chain omega-3 fatty acids. Long-chain omega-3 may help prevent heart disease. It is also important for women who are pregnant or breastfeeding because it can help a baby's nervous system to develop. Oily fish are the richest source of long-chain omega-3. Some white fish and shellfish also contain long-chain omega-3, but not as much as oily fish. The main shellfish sources of long-chain omega-3 are mussels, oysters, squid and crab.

Heavy Metals

Lead

What is it?

Lead is a soft, heavy, inexpensive metal, which makes it useful in the manufacture of many products such old pipes, sheeting, or as filler in the automobile body industry. It is also used in lead shot (shotgun shells) for hunting.

Where does it come from?

In Canada, lead is mainly used to manufacture (lead-acid) batteries for cars. It is also used in ammunition, fishing weights, and solder. For many years, it was used in products found in and around homes, including paint and gasoline. Improper disposal of any of these products can increase the amount of lead in the environment. Older houses may still have lead pipes (or pipes with lead-solder joints) or lead paint, which can increase exposure. If your house has lead in water pipes, when you turn on your tap the first time in the morning you should run the water for a few minutes as the new water will not have time to absorb lead from the pipe. If you have lead paint you should consider proper removal, or painting over it if it is in good shape (not broken or peeling). Lead is also used in lead shot for hunting various big game, small game and bird species. Lead shots are now banned for use in hunting water fowl and have been replaced with steel shot. If you are hunting other bird species (such as partridge) or small game (such as beaver), you should consider switching to steel shot anyway. If you choose to continue using lead shot, remove the lead shot from the meat as quickly and as thoroughly as possible. For big game, copper shot are now available. If you choose to continue using lead shot, ideally remove a significant amount of meat around the impact of the lead shot (10 to 30 cm) if possible.

What is the risk?

Children are more sensitive than adults to the effects of lead. Young children under the age of five are particularly vulnerable for a variety of reasons, mostly because their body and brain are still developing. Two year-olds tend to have the highest levels of lead in their blood because they put many things into their mouth, including toys or other products that may contain, or be contaminated with lead. Lead exposure during pregnancy or childhood can affect brain development and result in reduced intellectual performance (IQ quotient), attention deficits, increased antisocial behavior, and reduced success in school, and this even at low levels of lead. In adults, lead can increase blood pressure and cause fertility problems, nerve disorders, muscle and joint pain, irritability, and memory or concentration problems. It takes much more exposure to lead for adults than it does for children and youth to have adverse health effects.

Mercury

What is it?

Mercury is a naturally occurring element found in the Earth's crust. Mercury (which was commonly called quicksilver) is unique because it is the only metal that is a liquid at room temperature. In the environment, microorganisms (bacteria and fungi) and other natural processes can change mercury from one less-harmful form to another more-harmful form (methymercury). Mercury is persistent, and builds up (or bioaccumulates) in living organisms and the food chain, depending on diet. Mercury is released into the air, water and soils from a range of natural and human sources.

Where does it come from?

Mercury is released into the environment by natural weathering processes (such as soil and rock erosion), forest fires, volcanoes and flooding. Human (or "anthropogenic") sources are also adding to natural sources of mercury in the environment. About half of the mercury currently released into the atmosphere comes from human activity, such as the burning of fossil fuels (especially coal, but also gasoline, diesel and oil), mining, metal smelting, the production of chlorine and sodium hydroxide by the chemical industry, cement production, and municipal and medical waste incineration. Mercury can be released into the environment by other processes, for example, when land is flooded (for things like creating a new reservoir for a hydro or other dam) mercury that was in the soil and vegetation before it was covered in water breaks down and is released into the water. This means that the most common exposure will come from eating predatory fish or fish-eating animals (which accumulate mercury from their prey). Mercury is a persistent pollutant and can travel great distances through atmospheric and water currents before being deposited in a particular area. Most of the mercury entering Canada's environment comes from outside Canada, nowadays mostly Asia and Southeast Asia, and congregates in Arctic and northern areas.

What are the risks?

High levels of mercury are very toxic and can be transported in the blood to the brain, where it can affect brain function. During pregnancy, mercury can be transported in the blood through the placenta, where it can affect the foetus brain development. Mercury exposure during pregnancy can affect attention, memory, intellectual performance, and language later in infancy and childhood. Mercury exposure during childhood can also affect children's motor coordination abilities. Mercury exposure can have a wide array of health effects on humans, ranging from weakening our immune systems to neurological (both the brain and nerves) disorders, depending upon the level of exposure. People facing a greater risk for mercury contamination are high fish-eating communities, pregnant women, women of child-bearing age (because of risk to the unborn child if they become pregnant) and young children. Recent studies also show that mercury may have a significant impact on wildlife, for example the ability of certain fish populations to reproduce, and can also affect the reproduction and behavior of fish-eating wildlife like loons and otters.

Cadmium

What is it?

Cadmium (Cd) is a natural element in the Canadian environment that comes from both natural processes (including forest fires, volcanic emissions and weathering of soil, till, and bedrock) and human activities.

Where does it come from?

Weathering and erosion of rocks that naturally contain cadmium is likely the most significant source for natural sources of cadmium in the environment. People release cadmium through metal production (particularly base metal smelting and refining), stationary fuel combustion (power generation and heating), transportation, solid waste disposal, and sewage sludge application to fields as a fertilizer. Cadmium is used in the production of batteries (NiCad batteries are made of Nickel and Cadmium), as a pigment, as a stabilizer in PVC. Tobacco plant also naturally accumulates cadmium in the environment, therefore a high amount of cadmium is found in cigarettes. This is likewise the case for lichens, depending of the amount of cadmium found in the environment (due to an industrial source of cadmium). Therefore, land mammals feeding on lichens and plants may present high amount of cadmium in their liver and kidneys, such as moose kidneys and liver (but not moose meat). Based on an estimation of the average daily intake of cadmium (total) from air, drinking water, food, and soil for various age groups in the general population, food is likely where we get the most cadmium from, although smoking may also have a significant contribution.

What are the risks?

High levels of cadmium can damage the kidneys, the pulmonary system (the lungs and the blood vessels that exchange carbon dioxide for oxygen in the lungs), affect reproduction and damage bone. Very high exposure can also lead to respiratory distress, but this is normally only found in unsafe working conditions. Under most circumstances, people are not exposed to enough cadmium to cause concern.

Arsenic

What is it?

Arsenic is a natural element found widely in the earth's crust. It may be found in some drinking water supplies, including wells, and used to be used in pressure treated lumber.

Where does it come from?

There are trace amounts of arsenic in all living matter. For most Canadians, the primary source of exposure to arsenic is food, followed by drinking water, soil and air. Drinking water would only be the major source of exposure for people living near a source of arsenic; for others, the major source would be through food. Arsenic may naturally enter lakes, rivers or underground water when mineral deposits or rocks containing arsenic dissolve. Arsenic may also get into water through the discharge of industrial wastes and by the deposit of arsenic particles in dust, or dissolved in rain or snow. These arsenic particles can enter the environment through the burning of fossil fuels (especially coal); metal production (such as gold and base metal mining); agricultural use (in pesticides and feed additives); and, waste (garbage) burning. Arsenic is also a preservative commonly used in pressure treated wood. Although arsenic treated wood is no longer allowed for residential use, boardwalks, fences or playground equipment (there is a newer, arsenic-free treatment for wood), industrial use is still allowed. Structures that are often used by children, such as playground structures, should not be made of pressure treated lumber; old structures should be dismantled or coated with a sealant (such as an oil-based paint). When dismantling old structures made with pressure treated wood, the wood should never be burned, either indoors or outdoors, as this can lead to inhalation of arsenic, and dust masks should be worn when cutting. Pressure treated lumber should be properly disposed of in a lined landfill site.

What are the risks?

Long-term exposure (over many years or decades) to high levels of arsenic in drinking water may also cause cancer; thickening and discoloration of the skin; nausea and diarrhea; decreased production of blood cells; abnormal heart rhythm and blood vessel damage; and numbness in the hands and feet. Short-term exposure to very high levels of arsenic in drinking water can result in abdominal pain, vomiting and diarrhea; muscular cramping or pain; weakness and flushing of skin, skin rash; numbness, burning or tingling sensation or pain in hands and feet; thickening of the skin on the palms of the hands and soles of the feet; and, loss of movement and sensory responses. If you live in an area that has natural sources of arsenic or is known to have high levels of arsenic in its groundwater, you should have your well water tested. To do so, contact your regional public health office. If your water contains too much arsenic and there is no alternate water source available, there are in-home water treatment devices that are effective in removing arsenic from water.

Nickel

What is it?

Nickel is a naturally occurring element that exists mainly in the form of underground sulphide ores, and in surface silicate minerals, and is a natural part of the soil. Pure nickel is a hard, silvery-white metal that is widely used to make strong, durable metal alloys.

Where does it come from?

Nickel is found primarily in combination with oxygen (oxides) or sulphur (sulphides). Canada is rich in sulphide ores containing nickel and is the second largest producer of nickel in the world. It is found in many consumer products such as stainless steel pots and pans, coins, and rechargeable batteries.

What are the risks?

We usually take in nickel by breathing dust, ingesting food or water, and by contact with objects containing nickel such as money and jewellery. Most people are exposed to nickel simply by eating and drinking water. All foods grown in Canada and almost all water supplies in Canada will naturally contain small quantities of nickel. Foods such as chocolate, soy beans, nuts, and oatmeal contain naturally higher levels of nickel. No matter how one is exposed to nickel, almost all of the absorbed nickel will be excreted in urine. However, it does take the body a longer period of time to remove nickel deposited in the lungs in comparison to ingested nickel, so inhalation should be avoided wherever possible. This is normally only a concern in occupational settings where exposures are higher. Inhaling too much nickel can cause allergic asthma, and even lung cancer. Very high levels of skin exposure to nickel can cause irritation.

Uranium

What is it?

Uranium is a common element that exists naturally throughout the world. It is radioactive. There is a small amount of uranium in most Canadian soil with small, localized areas with higher concentrations of uranium scattered across the country, depending on the bedrock in the area. For example, in some areas with granite bedrock, the average concentrations can be higher.

Where does it come from?

Uranium is very common in soils and bedrock without risk to animals, people or plants. Mining activities may release uranium in the vicinity of the operation, if there is a lot of uranium-containing bedrock in the area.

What are the risks?

Under normal circumstances, the chemical properties of uranium are of greater concern than its radioactivity. The primary health concern is in drinking water, particularly in areas where uranium is abundant in bedrock. Drilled water wells tend to have higher concentrations than dug wells or surface water. Studies show that elevated levels of uranium in drinking water can affect the kidneys. There are many laboratories across Canada that test drinking water, and there are many relatively inexpensive options available to remove uranium from drinking water, should they be required.

Organic Chemicals

Organochlorines (Pesticides) and Polychlorinated Biphenyls (PCBs)

What are they?
Organochlorines are man-made chemicals, including pesticides that are no longer registered for use in Canada. Various industrial and commercial compounds, such as PCBs, have been subject to restricted use in Canada since the 1970s. These controls were put in place because these chemicals do not break down easily and therefore can stay in the environment for many years. In addition, since they tend to accumulate in the food chain, particularly in the fatty tissues of living organisms, it leads to human exposure through diet.

Where do they come from?
Historically, organochlorine pesticides were used in agriculture to reduce insects. PCBs were mainly used in electronics as a cooling fluid, but were sometimes mixed with pesticides. Due to the fact that they take a very long time to break down, can travel great distances, and continue to be used in some countries, organochlorines are widely dispersed around the world. Global efforts such as the United Nations Environment Programme (UNEP) Stockholm Convention on Persistent Organic Pollutants (POPs) have been put in place to manage these chemicals.

What are the risks?
The most commonly observed health effects are in people that were exposed to very high levels of organochlorines from industrial accidents or intentional dumping of PCBs. The health effects of high-level exposure are skin conditions such as chloracne (acne caused by chlorine-containing chemicals) and skin rashes. It is not clear what health affects organochlorines have at typical environmental levels; still, several studies have shown associations between PCBs exposure during pregnancy and neurologic effects later in childhood, as well as and PCBs exposure and increased diabetes risk.

Brominated Flame Retardants

What are they?
Brominated flame retardants (BFRs) consist of polybrominated diphenyl ethers (PBDEs) and polybrominated biphenyls (PBBs). They are persistent (long-lasting) organic compounds that are produced synthetically and have been around since the late 1970s.

Where do they come from?
BFRs were used widely as fire retardants in plastics, clothing, and other consumer products. The majority of BFR compounds are no longer in use, though there are still some that are. It was thought that because they were bound inside materials, there would be no significant exposure. However, it was found that when materials began to break down, the BFRs were released. This has resulted in widespread exposure of the environment and people to these compounds.

What are the risks?
Recent studies have shown that while concentrations of BFRs in humans are generally low, they have been increasing over the last two decades. It is not clear what affect BFRs have on human health at low levels.

Perfluorinated Compounds

What are they?
Perfluorinated compounds, such as perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are man-made chemicals that have been produced for a variety of industrial and commercial uses since the 1950s.
Where do they come from?
The most famous use was (and still is) for non-stick coatings (e.g. Teflon frying pans), but it is also used for fabric protectors, lubricants, wire and cable insulation, and food packaging. Perfluorohexane sulfonate (PFHxS) is a by-product resulting from the production of PFOS. The coatings used on cookware can enter food when they begin to break down or are scratched. There is also some evidence that the coatings can give off harmful vapours when heated to extremely high temperatures, but home cooking does not create these conditions.

What are the risks?

Perfluorinated compounds persist in the environment and some can bioaccumulate in the food chain. They have been detected worldwide in various parts of the environment and in humans. There is some evidence of negative effects in laboratory animals (to the immune system, liver and thyroid), but it is not clear what human health effects they have at the low levels commonly found in the environment.

Bisphenol A

What are they?

Bisphenol A (BPA) is a synthetic chemical used in the production of polycarbonate plastics and epoxy resins. Polycarbonate plastic is used to manufacture food and beverage containers, and epoxy resins are used as a protective lining in cans. BPA is also used in products such as medical devices, sporting and safety equipment, electronics and automotive parts.

Where do they come from?

BPA most often enters our bodies through food, although some exposure can also occur from drinking water, soil and dust, or from the air, either indoors or out. You can also be exposed to it from furniture, carpeting, or other products, such as those listed above. Levels of BPA in urine can be used as a marker of exposure.

What are the risks?

There is some concern that exposure to BPA, particularly at sensitive early life stages (babies and young children, as well as the unborn child), may affect health later in life. BPA mimics natural hormones in the body, and can lead to reproductive problems.

Phthalates

What are they?

Phthalates are colourless liquids most often used to manufacture polyvinyl chloride plastics. While some phthalates occur naturally in crude oil and coal, the vast majority are man-made.

Where do they come from?

Phthalates are found in a number of consumer products, including important medical devices such as blood bags and intravenous tubing. They are also found in vinyl flooring and some plastics, and they are used in non-petroleum-based lubricating oils and as carriers for perfumes in cosmetics.

What are the risks?

Mice studies have found a range of effects associated with different phthalates. In general, phthalates have effects on laboratory animals that include changes to the liver, kidneys, reproductive systems, and birth defects. They are suspected of affecting hormone systems (also known as endocrine disruptors). More research is needed into the possible effects that phthalates may have on people. The science on these chemical substances is constantly evolving, and although they are found in the environment, we need to know more about whether the levels at which they are found are affecting the health of human populations.

Organophosphate Insecticides

What are they?

Organophosphate insecticides are man-made chemicals used in agriculture, forestry and around the home or workplace. Health Canada began to re-evaluate organophosphate insecticides in 1999. As a result, 16 organophosphate insecticides have been or are in the process of being removed from the marketplace and the remaining 11 have had their uses restricted to reduce human and environmental exposure.

Where do they come from?

Organophosphate insecticides have been widely used in agriculture, lawn care, and sprayed across wide expanses of forests to treat pests. As such they can be found in water, soil, and on fruits and vegetables.

What are the risks?

After organophosphate pesticides enter your body, they rapidly break down into metabolites, which are excreted in urine. Levels of these metabolites in urine can be used as a marker of exposure to the pesticides or their breakdown products. There is some evidence that some organophosphate insecticides can affect the immune system, or cause psychiatric disturbances (paranoid behaviour, disorientation, anxiety/depression, etc), though the effects of long-term, low-level exposure are not clear.

Pyrethroid Insecticides

What are they?

Pyrethrins are naturally occurring compounds found in certain chrysanthemum flowers and have been used for their insect-control properties since the late 1800s. Pyrethroids are man-made versions of pyrethrins, which have been structurally altered to improve their efficacy as pesticides by increasing their stability in the environment and their toxicity. There are several commercial pyrethroid pesticides, including allethrin, cyfluthrin, *lambda*-cyhalothrin, cypermethrin, deltamethrin, fluvalinate-*tau,* permethrin, d-phenothrin, resmethrin, and tetramethrin.

Where do they come from?

Pyrethroids are widely used in Canada to control insects in agriculture, forestry and lawn care. When DDT was banned in the 1950s, pyrethoid use began to increase. In the residential setting, they are used for mosquito control, as well as flea and tick treatments for pets. Pyrethroid exposure to the general population occurs primarily through the use of products that contain pyrethroids, such as household insecticides and pet sprays, and through the ingestion of food and drinking water contaminated with pyrethroid residues.

What are the risks?

Pyrethroid insecticides are known to be very harmful to aquatic organisms (fish, fish larvae and shellfish). In humans, they are quickly converted to metabolites in the body and excreted in urine. Levels of these metabolites in urine can be used as a marker of exposure to the pesticides or their breakdown products. Pyrethroids, much like the naturally occurring pyrethrins, primarily affect the nervous system of mammals and insects. Studies indicate that long-term exposures to low levels of pyrethroids do not cause neurological effects in mammals, primarily due to the rapid metabolism and elimination of these compounds from the body. Allergic reactions in humans are common following exposure to pyrethroids and may result in symptoms similar to allergic reactions to pollen (i.e., sneezing, nasal discharge, and sinus congestion).

Phenoxy Herbicide

What is it?

The pesticide 2,4-dichlorophenoxyacetic acid (2,4-D) is used for the control of broadleaf weeds in residential, agricultural and forest environments. The sale and use of 2,4-D is regulated in Canada by Health Canada, which recently completed a re-evaluation of this herbicide.

Where do they come from?

2,4-D is a synthetic plant hormone, which can enter the environment through accidental spills or by direct application, especially if it is applied too close to streams or other waters. It easily degrades through multiple biological processess both in soil and in water.

What are the risks?

Health Canada has determined that 2,4-D meets strict health and safety standards, and is acceptable for continued use in Canada. It has very little effect on humans or animals, whether it is ingested, inhaled, or comes into contact with the skin. It is easily broken down by bacteria, both in soil and in aquatic environments, and does not last for long in the environment, though it will have an effect on the environment in the area where it is applied by killing many of the leafy plants.

Chlorophenol

What is it?

2,4-dichlorophenol (2,4-DCP) is part of the chlorophenol group of chemicals and is not naturally present in the environment.

Where does it come from?
Sources of 2,4-DCP include pesticides and in making pharmaceuticals. It also comes from the chlorination of organic material in wastewater treatment, the burning of organochlorine-containing waste, and the degradation of chlorinated compounds in the environment.

What are the risks?
There is very little information available on the effects of 2,4-DCP on human health, especially at concentrations that would be found in the environment. A laboratory study that exposed mice to high levels of 2,4-DCP indicated that it can cause muscle twitching, tremors, and weakness, but these effects have not been observed in humans from 2,4-DCP. Long-term exposure to 2,4-DCP in humans may be associated with effects on the liver and immune system, as well as skin acne.

Polycyclic aromatic hydrocarbons

What is it? Where does it come from?
Polycyclic aromatic hydrocarbons (PAHs) are a group of over 100 chemicals formed during the incomplete burning of coal, oil, gas, wood, garbage, and other organic substances such as tobacco and charbroiled meat. PAHs occur naturally and generally occur as complex mixtures (i.e. in combustion products). Pure PAH chemicals can range from colorless to golden yellow with a faint pleasant odor. Most PAHs are not soluble in water.

Where does it come from?
Environmental exposure to PAHs primarily occur through the inhalation of tobacco smoke, wood fire smoke, and contaminated air as well as ingestion of contaminated water and various foods. For example, PAHs are found in smoked, barbequed, deep fried and charcoal-broiled foods, cereals and grains, meats, and vegetables. Dermal exposure upon contact with creosote treated wood, soot or tar could also occur. In Canada, forest fires are the greatest natural source of PAHs in the environment. However, because forest fires occur at different times and in different locations, high exposures are not occurring in any specific area or population. Other natural sources of PAHs include volcanoes, crude oil, and shale oil. Other significant human sources of PAHs release into the air include residential wood heating; agricultural burning and open fires; the incineration of wood waste by saw mills; and transportation.

What are the risks?
Human cancers have been associated with PAHs, which occur predominantly in the lungs and skin following inhalation and dermal exposure, respectively. A number of different non-cancer adverse health effects associated with PAHs exposure have been observed in humans and animals. Depending how people get exposed to PAHs (air, food, etc.), PAHs exposure has been associated with decrements in lung function, skin inflammation and lesions, and decreases in immunity.

.

Cotinine

What is it?
Cotinine is created when nicotine breaks down in the body. Nicotine is a chemical commonly found in all tobacco products.

Where does it come from?
Cotinine is made by the body when it is exposed to nicotine. You can absorb nicotine either by smoking or breathing second hand smoke, as well as from chewing tobacco, nicotine gum, or other products that contain nicotine.

What are the risks?
Cotinine itself is not measured because of it's own potential health effects, but it is the best indicator of exposure to tobacco products and tobacco smoke. As a result of the adverse effects of tobacco smoke, the Government of Canada, along with various provincial and municipal governments, has taken steps to reduce exposure to tobacco smoke, particularly for those who are taking in second-hand smoke involuntarily. Cotinine was included in the YEH! pilot study to measure the exposure to tobacco in children and youth of First Nations communities and to provide a baseline which could be used to measure the effectiveness of efforts to reduce tobacco smoke exposure.

Vitamins

Vitamin A: This vitamin is fat-soluble and naturally present in many foods. Vitamin A is important for normal vision, the immune system, and reproduction. Vitamin A also helps the heart, lungs, kidneys, and other organs work properly. There are two different types of vitamin A. The first type, preformed vitamin A, is found in meat, poultry, fish, and dairy products. It may be found in very high (and maybe toxic) concentrations in bear liver such as polar bear liver. The second type, provitamin A, is found in fruits, vegetables, and other plant-based products. The most common type of provitamin A in foods and dietary supplements is beta-carotene, the red-orange pigment naturally found in carrots, sweet potatoes and pumkins.

Vitamin B9 (folate): Folate is a B-vitamin that is naturally present in many foods. A form of folate, called folic acid, is used in dietary supplements and fortified foods. Folate is an essential vitamin for red blood cell formation, protein metabolism and cell division and growth. Folate is very important for healthy pregnancies. Vegetables (especially asparagus, Brussels sprouts, and dark green leafy vegetables such as spinach and mustard greens) and beef liver contain a great amount of folate.

Vitamin B12: This vitamin involved in making blood cells and DNA, as well as in maintaining a healthy nervous system. Vitamin B12 also helps prevent a type of anemia called megaloblastic anemia that makes people tired and weak. It is found in large amount in beef liver and clams. Fish, meat, poultry, eggs, milk, and other dairy products also contain vitamin B12.

Vitamin D: Vitamin D is a nutrient found in some foods that is needed for health and to maintain strong bones. It does so by helping the body absorb calcium (one of bone's main building blocks) from food and supplements. People who get too little vitamin D may develop soft, thin, and brittle bones, a condition known as rickets in children and osteomalacia in adults. Vitamin D is important to the body in many other ways as well. Muscles need it to move, for example, nerves need it to carry messages between the brain and every body part, and the immune system needs vitamin D to fight off invading bacteria and viruses. Together with calcium, vitamin D also helps protect older adults from osteoporosis. Vitamin D is found in cells throughout the body. The body makes vitamin D when skin is directly exposed to the sun, and most people meet at least some of their vitamin D needs this way. Very few foods naturally have vitamin D. Fatty fish such as salmon, tuna, and mackerel are among the best sources. Beef liver, cheese, and egg yolks provide small amounts. Mushrooms provide some vitamin D.

Essential elements

Manganese

What is it?
Manganese occurs naturally in ground water and can be found in many types of rocks. Pure manganese does not occur naturally; it combines with other elements such as oxygen, sulphur, or chlorine, and can be found in these combinations in groundwater. It can be found in food, such as grains, cereal, seafood, or tea.

Where does it come from?
Manganese exists naturally in rivers, lakes, and underground water. It may also be released into water from natural deposits, industrial wastes (iron, steel, acid mine drainage), and the use of pesticides. Iron and steel plants also release manganese into the atmosphere. Manganese combines with carbon to form organic compounds, which are used in pesticides, and fuel additives in some gasoline. Manganese compounds are also used to manufacture metal alloys, dry cell batteries, paints, varnishes, inks, dyes, glass, ceramics, matches, fireworks and fertilizers. Except for industrial settings, or areas very near to industry, most people will not encounter enough manganese to cause concern for health.

What are the risks?
Manganese is an essential trace element for good health; it appears to lower blood pressure and to lower the risk of death from a heart attack. However, high levels of manganese for long periods of time can be harmful. Too much manganese will injure a portion of the brain that helps control body movements, and may also cause respiratory problems and sexual dysfunction. For children, small amounts of manganese are needed for growth and good health, but excess manganese can result in nervous system problems.

Selenium

What is it?

Selenium is widely but unevenly distributed in the earth's crust. It is most often associated with copper ores but may also be found in silver, lead and zinc ores. Organic compounds of selenium may form in plants, fish and animals.

Where does it come from?

Selenium can be released into the soil through leaching and weathering of bedrock. Ground and surface water can transport selenium through the environment. Plants can absorb water-soluble selenium compounds from the soil and groundwater and transform them into organic compounds. For example, Milk-vetch is a flowering plant in the Yukon that thrives in high selenium soils. Selenium then accumulates in animals that forage on the plant. Some selenium may also be released to the environment by human activity such as coal burning, metal ore refinement (particularly copper), or leaching from waste containers. Eating plants and animals in areas with high-selenium soil may increase exposure, but it is unlikely you will take in enough to be of concern.

What are the risks?

At low levels, selenium is an essential element in the diet. It acts as an antioxidant in the body, helping to prevent damage to tissues. Because selenium is a micronutrient, a deficiency in the diet may have harmful effects. If you ingest, inhale or absorb too much selenium, it can have negative health effects. Exposure may result in hair loss, muscle discomfort, skin rashes, swelling, nausea and fatigue, fingernail loss, changes in the nervous and circulatory systems and/or possible damage to the liver and kidneys. Long-term high doses of selenium can trigger the build-up of fluid in the lungs and lead to severe bronchitis.

Zinc

What is it?

Zinc is one of the most common elements in the world as it naturally occurs in the Earth's crust and is found in air, soil, water, and is present in most foods.

Where does it come from?

Zinc can enter the environment from a variety of human activities such as mining, steel production, coal burning, and burning of waste. Because zinc does not dissolve in water, it can build up in humans, fish and other organisms but does not build up in plants. Similar to lead and other metals, zinc usually enters the body through the mouth (orally) by taking in food, water or small soil or dust particles. Zinc can also be inhaled if you live near certain industries (such as zinc smelters or welding operations) and it is less commonly absorbed through the skin. It is unlikely that normal, everyday life would expose a person to enough zinc to worry about, though if you work in a setting where you can be exposed to high levels of zinc, you should follow the health and safety precautions laid out by your employer.

What are the risks?

Large doses of zinc (at levels 10-15 times higher than recommended dietary intake) consumed even for a short time can cause stomach cramps, nausea, and vomiting. Chronic exposure to high doses can cause anaemia, damage your pancreas and decrease the levels of your good cholesterol. Aside from occupational exposures, infants and young children are the most susceptible to high levels of zinc because zinc is very common in soil and they will often put dirty, non-food items and their hands in their mouths.

For More Information

Contact

If you have additional questions about contaminants or nutrients, or about the project generally, please contact, our team at the CHU de Québec Research Centre, affiliated to Laval University in Quebec City:

- Mélanie Lemire (Principal Investigator): melanie.lemire@crchuq.ulaval.ca
  +1 (418) 525-4444, ext.46535
- Elisabeth Gagné (Project Coordinator): elisabeth.gagne.1@ulaval.ca
  +1 (418) 525-4444, ext.46580

Web Resources – Health Canada and First Nations Environmental Health Innovation Network Information Sheets

For additional information on the chemicals included in the study and advice on how to reduce exposure, please visit the following links:

Chemical	For More Information
Metals	It's Your Health - Effects of Lead on Human Health http://www.hc-sc.gc.ca/ewh-semt/contaminants/lead-plomb/asked_questions-questions_posees-eng.php FNEHIN Factsheet - Lead: http://www.fnehin.ca/wp-content/uploads/2015/01/2008_first_nations_environmental_health_innovation_network_fact_sheets/LEAD.pdf It's Your Health - Mercury and Human Health www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/merc-eng.php Food and Nutrition - Mercury www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/mercur/index-eng.php http://www.ec.gc.ca/mercure-mercury/default.asp?lang=En&n=DCBE5083-1 FNEHIN Factsheet – Mercury in Fish www.fnehin.ca/uploads/docs/fs2-mercury-in-fish.pdf
	For Quebec province only (mercury levels in fish by lake): *Guide de consommation du poisson de pêche sportive en eau douce* http://www.mddelcc.gouv.qc.ca/Eau/guide/recherche.asp
	It's Your Health - Arsenic in Drinking Water www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/arsenic-eng.php Food and Nutrition - Arsenic www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/arsenic-eng.php FNEHIN Factsheet – Cadmium http://www.fnehin.ca/wp-content/uploads/2015/01/2008_first_nations_environmental_health_innovation_network_fact_sheets/fs2-cadmium.pdf
Polychlorinated biphenyls (PCBs)	Chemicals At A Glance - Polychlorinated Biphenyls (PCBs) www.chemicalsubstanceschimiques.gc.ca/fact-fait/pcb-bpc-eng.php Food and Nutrition - Polychlorinated Biphenyls (PCBs) www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/pcb-bpc/index-eng.php FNEHIN Factsheet – Polychlorinated Biphenyls (PCBs) www.fnehin.ca/uploads/docs/fs2-PCBs.pdf
Organochlorines	Persistent Organic Pollutants (POPs) Fact Sheet Series: Dichlorodiphenyltrichloroethane (DDT) www.ainc-inac.gc.ca/ai/scr/yt/pubs/2010fs/ddt-eng.asp Persistent Organic Pollutants (POPs) Fact Sheet Series: Toxaphene www.ainc-inac.gc.ca/ai/scr/yt/pubs/2010fs/txp-eng.asp

Chemical	For More Information
	Chemicals At A Glance - Lindane (gamma-hexachlorocyclohexane) www.chemicalsubstanceschimiques.gc.ca/fact-fait/lindane-eng.php
Polybrominated flame retardants (PBDEs)	It's Your Health - PBDE Flame Retardants and Human Health www.hc-sc.gc.ca/hl-vs/iyh-vsv/environ/pbde-eng.php Food and Nutrition - Polybrominated Diphenyl Ethers (PBDEs) www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/pbde-edpb/index-eng.php
Perfluorinated compounds (PFCs)	Perfluorooctane Sulfonate (PFOS) and Health www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/perfl urooctane_sulfonate-eng.php Food and Nutrition - Perfluorinated Chemicals in Food www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/pcf-cpa/index-eng.php
Phthalates	Chemicals At A Glance - Phthalates www.chemicalsubstanceschimiques.gc.ca/fact-fait/phthalates-eng.php
Bisphenol A	Chemicals At A Glance - Bisphenol A www.chemicalsubstanceschimiques.gc.ca/fact-fait/bisphenol-a-eng.php Questions and Answers on Bisphenol A www.chemicalsubstanceschimiques.gc.ca/fact-fait/bisphenol-a_qa-qr-eng.php Food and Nutrition - Bisphenol A www.hc-sc.gc.ca/fn-an/securit/packag-emball/bpa/index-eng.php
Organophosphate insecticides	Pesticides and Health http://hc-sc.gc.ca/ewh-semt/pubs/contaminants/pesticides-eng.php Pesticides and Food http://www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/food-nourriture/index-eng.php FNEHIN Factsheet – Pesticides, Herbicides and Traditional Foods http://www.fnehin.ca/uploads/docs/fs2-pesticides.pdf
Pyrethroid pesticides	Pesticides and Health http://hc-sc.gc.ca/ewh-semt/pubs/contaminants/pesticides-eng.php Homeowner Guidelines for Pesticide Use www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/use-utiliser/_home-maison/index-eng.php
Phenoxy herbicides	Homeowner Guidelines for Pesticide Use www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/use-utiliser/_home-maison/index-eng.php Questions and Answers - Final Decision on the Re-evaluation of 2,4-D www.hc-sc.gc.ca/cps-spc/pest/part/protect-proteger/use-utiliser/_24d/24d-faq-eng.php
Polycyclic aromatic hydrocarbons (PAHs)	www.carexcanada.ca/en/polycyclic_aromatic_hydrocarbons/
Tobacco Exposure - Cotinine	It's Your Health - Second-hand Smoke www.hc-sc.gc.ca/hl-vs/iyh-vsv/life-vie/shs-fs-eng.php

For **Vitamins and Essential elements**, we suggest you to visit the following websites, which provides detailed information on all vitamins and essential elements, health properties, recommended intakes and food sources:

- US National Institute of Health Dietary Fact sheets (http://ods.od.nih.gov/factsheets/list-all/)
- USDA Library on Vitamins and minerals (http://fnic.nal.usda.gov/food-composition/vitamins-and-minerals)
- UK NHS Choices websites (www.nhs.uk)

Appendix H – Analytical methods and detection limits

Laboratory analyses of environmental contaminants and essential elements as listed in Table 1 were carried out at the CTQ, which is accredited by the Canadian Association for Environmental Analytical Laboratories and accredited ISO 17025.

- **Metals and essential elements** were measured by inductively coupled plasma mass spectrometry (ICP-MS; INSPQ method M-572 (blood), M-580 (plasma), M-593 (urine)).
- **Boron** was measured by inductively coupled plasma – tandem mass spectrometry (ICP-MS/MS; INSPQ method M-611). **Cotinine** was measured by ultra-performance liquid chromatography – tandem mass spectrometric (UPLC-MS/MS; INSPQ method C-550).
- Chlorophenols compounds, including urine concentrations of **chlorophenols**, **bisphenol A**, **triclosan** and **organophosphate** (OPs) metabolites, were measured by gas chromatography – tandem mass spectrometry (GC-MS/MS; INSPQ method E-454).
- **Perfluoroalkyl compounds** (PFCs) were measured by ultra-performance liquid chromatography – tandem mass spectrometry (UPLC-MS/MS; INSPQ method E-501).
- **Phthalates** metabolites were measured by ultra-performance liquid chromatography – tandem mass spectrometry ((UPLC-MS/MS; INSPQ method E-490).
- **Polycyclic Aromatic Hydrocarbons** metabolites (PAHs) were measured by gas chromatography – tandem mass spectrometry (GC-MS/MS; INSPQ method E-465).
- Polyhalogenated compounds, including plasma concentrations of **polychlorinated bisphenyls** (PCBs), **organochlorine pesticides** (OCs) and **polybrominated flame retardants** (PBDEs), were measured by gas chromatography – mass spectrometry (GC-MS; INSPQ method E-446).
- **Pyrethroids** were measured by gas chromatography – mass spectrometry (GC-MS; INSPQ method E-491).

Laboratory analyses of nutrients and health indicators as listed in Table 2 were carried out in the laboratories of the IUCPQ and the CHUL.

- **Vitamins, iron status biomarkers and cardiometabolic biomarkers** were measured at IUCPQ. Vitamin A (retinol) was measured by fluorometry and vitamin B12, vitamin D (25 OH vitamin D – total vitamin D), folate and ferritin were measured using electrochemiluminescence (Modular E-170, Roche). Transferrin was measured by immunoturbidimetry (Modular P analyser, Roche). Body iron, UIBC, HDL cholesterol and triglycerides were measured using colorimetry (Modular P analyser, Roche). LDL were calculated using the Friedewald formula. Hs-CRP was measured using electrochemiluminescence (Cobas Integra 800, Roche). Insulin was measured using immunoturbidimetry (Modular E-170, Roche). Glycated haemoglobin was measured using immunoturbidimetry (Cobas Integra 800, Roche). Glucose hexokinase method was used to determine glucose levels (Roche).
- **Fatty acids** were measured at the Centre de recherche sur les maladies lipidiques of the CHUL by gas chromatography.
- **Thyroid hormones status** were measured at the Laboratoire multidisciplinaire of the CHUL by chemoluminescence (DXi800, Beckman) and electrochemoluminesce (Modular E-170, Roche).

Table H1: Limits of detection for metals, essential elements, cotinine, old POPs and other contaminants analysed at CTQ.

Chemical name	Abbreviation	Matrix	Limit of detection (LOD)
Metals and essential elements			
Arsenic	As	Urine	0.3744 µg/L
Cadmium	Cd	Whole blood	0.04494 µg/L
Cadmium	Cd	Urine	0.02246 µg/L
Cobalt	Co	Whole blood	0.02357 µg/L
Cobalt	Co	Urine	0.02946 µg/L
Chromium	Cr	Urine	0.156 µg/L
Bore	B	Urine	7 µg/L
Iodine	I	Urine	1.2658 µg/L
Lead	Pb	Whole blood	0.005 µg/L
Manganese	Mn	Whole blood	0.54944 µg/L
Manganese	Mn	Hair	0.02 µg/L
Mercury	Hg	Whole blood	0.5 µg/L
Nickel	Ni	Urine	0.11742 µg/L
Selenium	Se	Whole blood	7.8988 µg/L
Selenium	Se	Plasma	3.9494 µg/L
Uranium	U	Urine	0.00952 µg/L
Zinc	Zn	Plasma	32.6796 µg/L
Old POPs			
Organochlorine Pesticides	**OC**		
Aldrin		Serum	0.01 µg/L
α-chlordane a-chlordane	α-chlordane	Serum	0.01 µg/L
ɣ-chlordane g-chlordane	γ-chlordane	Serum	0.005 µg/L
cis-Nonachlor		Serum	0.005 µg/L
trans-Nonachlor		Serum	0.01 µg/L
Oxychlordane		Serum	0.005 µg/L
β-Hexachlorocyclohexane	β-HCH	Serum	0.01 µg/L
ɣ -Hexachlorocyclohexane	ɣ-HCH	Serum	0.01 µg/L
p,p'-Dichlorodiphenyltrichloroethane	p,p'-DDT	Serum	0.05 µg/L
p,p'-Dichlorodiphenyldichloroethylene	p,p'-DDE	Serum	0.09 µg/L
Hexachlorobenzene	HCB	Serum	0.04 µg/L
Mirex		Serum	0.01 µg/L
Toxaphene parlar 26		Serum	0.005 µg/L
Toxaphene parlar 50		Serum	0.005 µg/L
Polychlorinated Biphenyls	**PCBs**		
Aroclor 1260	Aroclor 1260	Serum	0.1 µg/L
2,3',4,4',5-Pentachlorobiphenyl	PCB 118	Serum	0.01 µg/L
2,2',3,4,4',5'-Hexachlorobiphenyl	PCB 138	Serum	0.01 µg/L
2,2',4,4',5,5'-Hexachlorobiphenyl	PCB 153	Serum	0.01 µg/L
2,2',3,4,4',5,5'-Heptachlorobiphenyl	PCB 180	Serum	0.01 µg/L
Other contaminants			
Chlorophenols			
2,4-dichlorophenol	2,4-DCP	Urine	0.3 µg/L
2,5-dichlorophenol	2,5-DCP	Urine	0.3 µg/L
Perflurinated chemicals	**PFCs**		
Perfluorooctanoic acid	PFOA	Serum	0.03 µg/L
Perfluorononanoic acid	PFNA	Serum	0.07 µg/L
Perfluorodecanoic acid	PFDA	Serum	0.03 µg/L
Perfluoroundecanoic acid	PFUDA	Serum	0.050 µg/L
Perfluorohexane sulfonate	PFHxS	Serum	0.04 µg/L
Perfluorooctane sulfonate	PFOS	Serum	0.2 µg/L
Cotinine (metabolite)			
Cotinine		Urine	1.1 µg/L
Phenoxy herbicide (metabolite)			
2,4-Dichlorophenoxyacetic acid	2,4-D	Urine	0.2 µg/L

Table H1: Limits of detection for metals, essential elements, cotinine, old POPs and other contaminants analysed at CTQ (continued).

Chemical name	Abbreviation	Matrix	Limit of detection (LOD)
Polycyclic Aromatic Hydrocarbons (metabolites)	**PAH**		
3-Hydroxybenzo[a]pyrene		Urine	0.002 µg/L
2-Hydroxychrysene		Urine	0.004 µg/L
3-Hydroxychrysene		Urine	0.003 µg/L
4-Hydroxychrysene		Urine	0.003 µg/L
6-Hydroxychrysene		Urine	0.006 µg/L
3-Hydroxyfluoranthene		Urine	0.008 µg/L
2-Hydroxyfluorene		Urine	0.003 µg/L
3-Hydroxyfluorene		Urine	0.001 µg/L
9-Hydroxyfluorene		Urine	0.003 µg/L
1-Hydroxynapthtalene		Urine	0.1 µg/L
2-Hydroxynapthtalene		Urine	0.05 µg/L
1-Hydroxyphenanthrene		Urine	0.005 µg/L
2-Hydroxyphenanthrene		Urine	0.003 µg/L
3-Hydroxyphenanthrene		Urine	0.003 µg/L
4-Hydroxyphenanthrene		Urine	0.001 µg/L
9-Hydroxyphenanthrene		Urine	0.004 µg/L
1-Hydroxypyrene		Urine	0.002 µg/L
Phénols environnementaux			
Bisphenol A	BPA	Urine	0.2 µg/L
Triclosan		Urine	3 µg/L
Phthalates (metabolites)			
Mono-Benzyl Phthalate	MBzP	Urine	0.4 µg/L
Mono-n-Butyl Phthalate	MnBP	Urine	0.4 µg/L
Mono-Cyclohexyl Phthalate	MCHP	Urine	0.3 µg/L
Mono-Ethyl Phthalate	MEP	Urine	1 µg/L
Mono-Isobutyl Phthalate	MiBP	Urine	0.1 µg/L
Mono-Isononyl Phthalate	MiNP	Urine	0.4 µg/L
Mono-Methyl Phthalate	MMP	Urine	0.2 µg/L
Mono-n-Octyl Phthalate	MOP	Urine	0.2 µg/L
Mono-3-Carboxypropyl Phthalate	MCPP	Urine	0.1 µg/L
Mono-2-Ethylhexyl Phthalate	MEHP	Urine	0.1 µg/L
Mono-(2-Ethyl-5-Oxohexyl) Phthalate	MEOHP	Urine	0.09 µg/L
Mono-(2-Ethyl-5-Hydroxyhexyl) Phthalate	MEHHP	Urine	0.2 µg/L
Organophosphate metabolites	**OP**		
Dimethylphosphate	DMP	Urine	1 µg/L
Dimethylthiophosphate	DMTP	Urine	0.6 µg/L
Dimethyldithiophosphate	DMDTP	Urine	0.3 µg/L
Diethylphosphate	DEP	Urine	1 µg/L
Diethylthiophosphate	DETP	Urine	0.3 µg/L
Diethyldithiophosphate	DEDTP	Urine	0.3 µg/L
Polybromodiphenylethers	**PBDE**		
2,2',4,4'-Tetrabromodiphenyl ether	PBDE 47	Serum	0.03 µg/L
2,2',4,4',5-Pentabromodiphenyl ether	PBDE 99	Serum	0.02 µg/L
2,2',4,4',6-Pentabromodiphenyl ether	PBDE 100	Serum	0.02 µg/L
2,2',4,4',5,5'-Hexabromodiphenyl ether	PBDE 153	Serum	0.03 µg/L
2,2',3,3',4,4',5,5',6,6'-Decabromodiphenyl ether	PBDE 209	Serum	0.02 µg/L
Pyrethroids metabolites			
4-Fluoro-3-Phenoxybenzoic Acid	4-F-3-PBA	Urine	0.005 µg/L
cis-3-(2,2-Dibromovinyl)-2,2-Dimethylcyclopropane Carboxylic Acid	cis-DBCA	Urine	0.003 µg/L
cis-3-(2,2-Dichlorovinyl)-2,2-Dimethylcyclopropane Carboxylic Acid	cis-DCCA	Urine	0.005 µg/L
trans-3-(2,2-Dichlorovinyl)-2,2-Dimethylcyclopropane Carboxylic Acid	trans-DCCA	Urine	0.008 µg/L
3-Phenoxybenzoic Acid	3-PBA	Urine	0.005 µg/L
Lipids			

Total of lipids		Serum	n.a.
Creatinine			
Creatinine		Urine	0.0316 g/L

Table H2: Limits of detection for vitamins, fatty acids, bioindicators of iron status, cardiometabolic bioindicators and bioindicators of thyroid hormones statut.

Vitamins	Acronym	Matrix	Limit of detection (LOD)
Vitamins			
Vitamin A (retinol)	Vit A	Serum	NA
Folate (B9)	Folate	Red blood cells *	106 nmol/L
Vitamin B12	Vit B12	Serum	22 pmol/L
Vitamin D (25-hydroxyvitamin D)	Vit D	Serum	7.50 nmol/L
Fatty acids profile			
Fatty acids		Red blood cells	NA
Bioindicators of iron status			
Ferritin	FS	Serum	0.500 µg/L
Transferrin	TS	Serum	0.1 g/L
Body Iron	F	Serum	0.90 µmol/ L
Unsaturated Iron Binding Capacity	UIBC	Serum	2.1 µmol/L
Cardiometabolic bioindicators			
hs-CRP		Plasma	0.1 mg/L
HDL		Serum	0.08 mmol/L
Total Cholesterol		Serum	0.08 mmol/L
Triglycerides		Serum	0.05 mmol/L
Glycated hemoglobin	hbA1c	Whole blood	NA
Glucose		Serum	0.11 mmol/L
Insulin		Serum	1.39 pmol/L
Bioindicators of thyroid hormones status			
Thyroglobulin		Serum	0.1 µg/L
Anti-thyroglobulin		Serum	1 KUI/L
Anti-thyroperoxydase	Anti-TPO	Serum	ND
TSH	TSH	Serum	ND
Free Thyroxine	T4	Serum	ND

* The folates were analysed in the whole blood by mistake and then adjusted by taking into account the results of hemoglobin according to this formula: red blood cells folates = whole blood folates / (0.0127 + 0.002917 x Hb)

Annexe I – Decisional algorithms for classifying iron deficiency and anemia

As illustrated in Figure I1, SF < 15 µg/L is the single best estimate of depleted iron stores in the absence of inflammation; when hs-CRP biomarker ≤ 5 mg/L. This hs-CRP cut-off at 5 mg/L as an indicator of inflammation was chosen since the CRP increases in the first 48 hours following acute infection or inflammation then gradually decreases to less than 10 mg/L and reaches 5 mg/L in approximately 10 days (D. I. Thurnham & McCabe, 2010). Indigenous children have higher prevalence of acute infections (MacMillan, MacMillan, Offord, & Dingle, 1996). Thus, choosing a cut-off value at 5 mg/L for the hs-CRP instead of higher levels will better determine the inflammatory window for children as well as the adjustment for it (MacMillan, MacMillan, Offord, & Dingle, 1996).

Moreover, SF is a positive acute phase protein that increases independently of iron status in the presence of inflammation or infection (classified as hs-CRP > 5 mg/L) (WHO, 2001). In such case, using the SF < 15 µg/L as cut-off value underestimate iron depletion especially when infectious and inflammatory rates are elevated (Guyatt et al., 1992). The exclusion of participants with inflammation could bias results, accordingly higher cut-off value for SF in these cases is to be used (Thurnham et al., 2010). Although, using SF < 30 µg/L instead of SF < 15 µg/L criteria improves accuracy in estimating depleted iron stores in all ages with a sensitivity of more than 92% without changing of the specificity (98%) (Mast, Blinder, Gronowski, Chumley, & Scott, 1998), but, in acute and chronic inflammation condition using SF ≥ 30 µg/L may underdiagnose may still have ID (Guyatt et al., 1992). Therefore, when working with children populations with frequent inflammatory and infectious conditions, choosing SF <50 µg/L will be more appropriate (Turgeon O'Brien, Blanchet, Gagné, Lauzière, & Vézina, 2016).

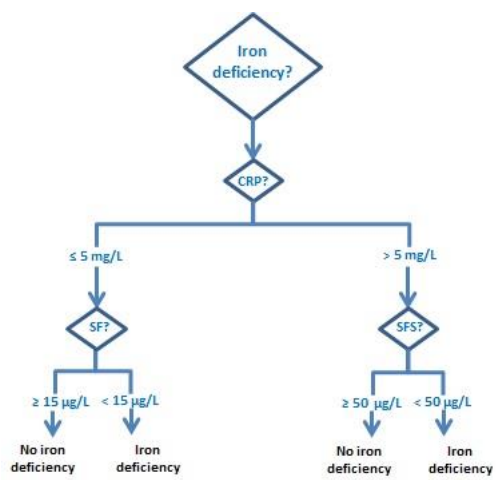


Figure I1: Classification of iron deficiency for the participants of JES!-YEH! study

In population-based research, blood tests requiring fresh blood samples such as MCV are rarely available. In such context, anemia could be classified based on WHO Hb cut-off values as no anemia, mild, moderate or severe anemia. The WHO cut-off values are specific for age groups and sex, after adjusting for smoking exposure's biomarkers (based on cotinine levels in the present study) as depicted in figure I2 (WHO, 2001). Adjusting for smoking is important since erythropoietin production increase in response to relative hypoxia created by smoking, which in turn enhances RBCs and Hb production (Aitchison & Russell, 1988). To categorize anemia IDA, ACI and UA, a multiple-indices model is suggested due to increase confusion between IDA and ACI in children (Patterson, Brown, & Roberts, 2001). In this model, WHO Hb cut-off values need to be combined with ID results (detailed above), and abnormal TIBC and /or TS. A TIBC > 68 µmol/L and TS <16% is found to improve diagnosis of IDA in children (Patterson et al., 2001). Though, low SI < 10 µmol/L is a consistent feature of chronic inflammation, thus anemia will be considered of ACI if low Hb is combined with low SI without evidence of ID (normal or higher values of TS and TIBC) otherwise UA will be considered (Cash & Sears, 1989). However, since SI is subject to diurnal variation, it is to note that using SI with participants in non-fasting conditions may lead to underestimates ACI in favour of UA (WHO, 2001).

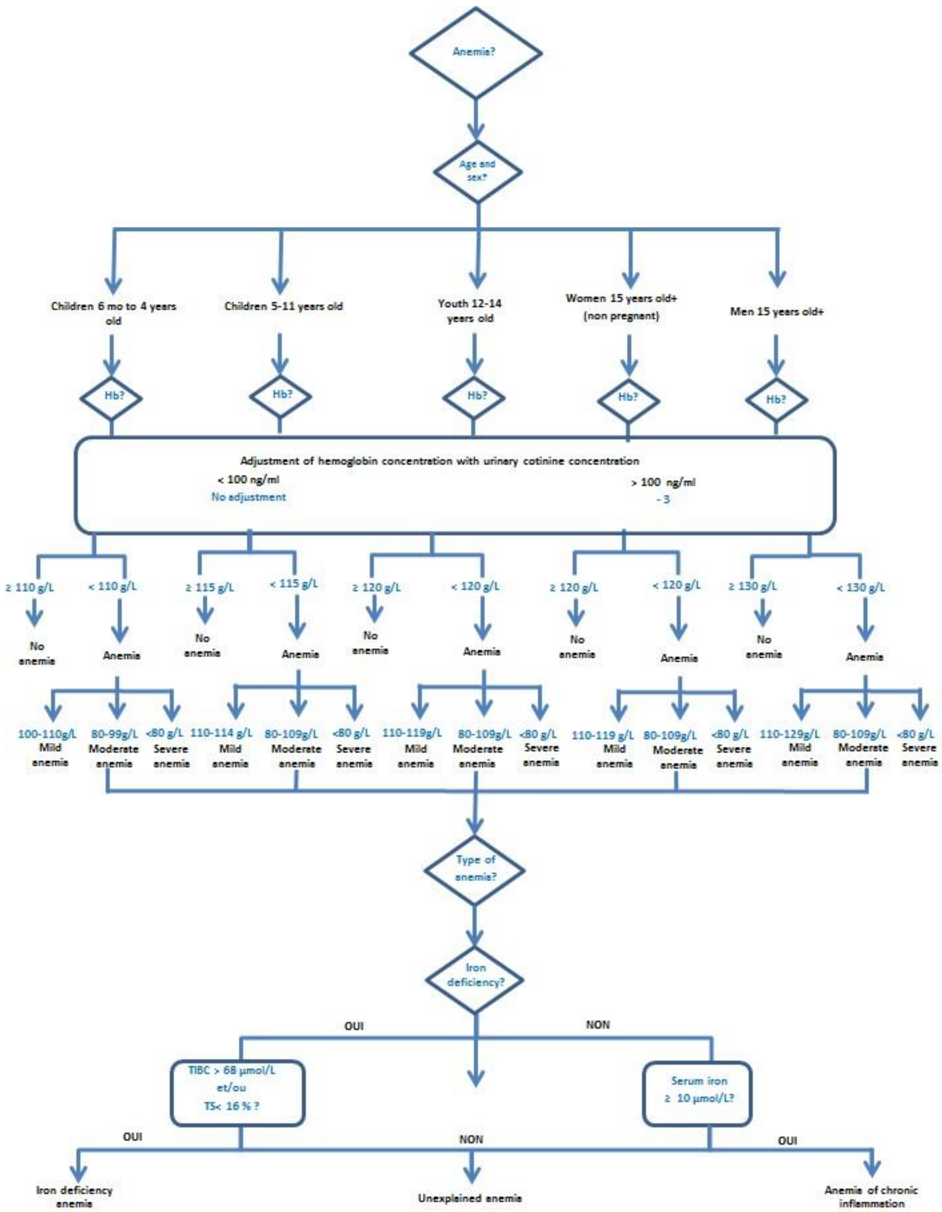


Figure I2: Classification of anemia and types of anemia for the participants of JES!-YEH! study

Aitchison, R., & Russell, N. (1988). Smoking--a major cause of polycythaemia. *Journal of the Royal Society of Medicine*, *81*(2), 89–91. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/3346863

Calvin, J., Neale, G., Fotherby, K. J., & Price, C. P. (1988). The relative merits of acute phase proteins in the recognition of inflammatory conditions. *Ann Clin Biochem*, *25*, 60–66. Retrieved from http://journals.sagepub.com/doi/pdf/10.1177/000456328802500108

Cash, J. M., & Sears, D. A. (1989). The anemia of chronic disease: spectrum of associated diseases in a series of unselected hospitalized patients. *The American Journal of Medicine*, *87*(6), 638–44. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/2589399

D. I. Thurnham, L. D. M. S. H. F. T. W. C. A. N.-C., & McCabe, G. P. (2010). Adjusting plasma ferritin concentrations to remove the effects of subclinical inflammation in the assessment of iron deficiency: a meta-analysis. Retrieved from http://agris.fao.org/agris-search/search.do?recordID=GB2012104649

Guyatt, G. H., Oxman, A. D., Ali, M., Willan, A., McIlroy, W., & Patterson, C. (1992). Laboratory diagnosis of iron-deficiency anemia: an overview. *Journal of General Internal Medicine*, *7*(2), 145–53. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/1487761

MacMillan, H. L., MacMillan, A. B., Offord, D. R., & Dingle, J. L. (1996). Aboiginal health. *CMAJ*. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1334995/pdf/cmaj00107-0037.pdf

Mast, A. E., Blinder, M. A., Gronowski, A. M., Chumley, C., & Scott, M. G. (1998). Clinical utility of the soluble transferrin receptor and comparison with serum ferritin in several populations. *Clinical Chemistry*, *44*(1), 45–51. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/9550557

Patterson, A. J., Brown, W. J., & Roberts, D. C. (2001). Dietary and supplement treatment of iron deficiency results in improvements in general health and fatigue in Australian women of childbearing age. *Journal of the American College of Nutrition*, *20*(4), 337–42. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/11506061

Thurnham, D. I., Mccabe, L. D., Haldar, S., Wieringa, F. T., Northrop-Clewes, C. A., & Mccabe, G. P. (2010). Adjusting plasma ferritin concentrations to remove the effects of subclinical inflammation in the assessment of iron deficiency: a meta-analysis 1–3. *Am J Clin Nutr*. https://doi.org/10.3945/ajcn.2010.29284

Turgeon O'Brien, H., Blanchet, R., Gagné, D., Lauzière, J., & Vézina, C. (2016). Using Soluble Transferrin Receptor and Taking Inflammation into Account When Defining Serum Ferritin Cutoffs Improved the Diagnosis of Iron Deficiency in a Group of Canadian Preschool Inuit Children from Nunavik. *Anemia*, *2016*, 6430214. https://doi.org/10.1155/2016/6430214

WHO. (2001). *Iron Deficiency Anaemia: Assessment, Prevention and Control, A guide for program managers*. *A guide for programme mangers*. https://doi.org/10.1136/pgmj.2009.089987

Appendix J – Example of results letter provided to the participants and their parents

First Nations Youth, Environment and Health Pilot Study – YEH*!*

Participant information

NAME
PARENT'S NAME/ LEGAL GUARDIAN
BIRTH DATE
TESTING DATE
ADDRESS
TELEPHONE

Information about the study

The study aimed to assess the level of exposure to multiple environmental contaminants, the nutritional status and some health issues among children and young people (aged 3-19 years) of four Quebec First Nations. Your child has participated in this study in June 2015 when our research team visited your community. Results for your child are presented in scoreboards in the next section and, when needed, health advices are available for each measurement. One of the following faces with its explanation was given to each section to facilitate the interpretation of results.

☺ : Good news! *Everything is normal!*
😐 : Oops! *Look at the scoreboard and follow the health advices if possible.*
☹ : Warning! *Please, look at the section for advices and make an appointment at your health center with the doctor, nurse or nutritionist as recommended (and if not done already).*

Who are we?

Our team is from the University hospital research center (CHU de Québec) which is affiliated to the Laval University situated in Québec city.

- Mélanie Lemire (Principal investigator) : melanie.lemire@crchudequebec.ulaval.ca
- João Guedes (Project coordinator) : joao-carlos.guedes-de-oliveira@crchudequebec.ulaval.ca

Who are partners?

- First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC)
- Quebec's National Institute of Public Health (INSPQ)
- Regional Public Health Boards
- Health Canada

Would you like more information about this project?

Please contact João Guedes at joao-carlos.guedes-de-oliveira@crchudequebec.ulaval.ca or 418-525-4444 ext.81998

Does my child have contaminants?

Your child: 😐 Oops!

Results of your child's mercury and lead levels

Tests	Normal	Slightly above the normal	Elevated	Any actions to take?
Mercury (Blood)		X		Yes, follow the health advices below (end of the document)
Lead (Blood)	X			No

Results of your child's arsenic, cadmium, nickel and uranium levels

Tests	Normal	Elevated	Any actions to take?
Arsenic (urine)	X		Yes, follow the health advices below or no
Cadmium (blood)	X		Yes, follow the health advices below or no
Nickel (urine)	X		Yes, follow the health advices below or no
Uranium (urine)	X		Yes, follow the health advices below or no

Results of your child's cotinine levels

(Indicator of exposure to cigarette smoke)

Test	Normal (non-smoking)	Exposed to a second-hand smoke or occasionally smokes	Smoking	Any actions to take?
Cotinine (urine)	X			Yes, follow the health advices below or no

Does my child have all vitamins needed?
Your child: 😐 Oops!

Results of your child's vitamins levels

Test	Low	Normal	Elevated	Any actions to take?
Vitamin A		X		Yes, follow the health advices below or no
Folate (Vitamin B_9) (in red blood cells)		X		Yes, follow the health advices below or no
Vitamin B_{12}		X		Yes, follow the health advices below or no
Vitamin D	X			Yes, follow the health advices below or no ***Please take an appointment with the nurse or nutritionist at your local health center***

Does my child have enough iron? Is my child anemic?
Your child: ☹ Warning!

Results of your child's iron level and anemia status

Test					Any actions to take?
Iron level	Normal		Iron deficiency		Yes, follow the health advices below or no ***Please take an appointment with the nurse or nutritionist at your local health center***
	X				
Categories of anemia according to hemoglobin results (% of red cells)	No anemia	Marginal anemia	Moderate anemia	Severe anemia	
			X		
Type of anemia*	No anemia				
	Iron deficiency anemia				
	Anemia of unknown origin (not linked to iron deficiency)		X		

* The types of anemia were evaluated according to the concentrations of hemoglobin, serum ferritin, serum iron and C-reactive protein (highly sensitive) recommended by the World Health Organization.

What are my child's mineral levels?

Your child: 😐 Oops!

Results of your child's mineral levels

Test	Below normal	Normal	Elevated	Any actions to take?
Chromium (urine)				Yes, follow the health advices below or no
Cobalt (blood)				Yes, follow the health advices below or no
Iodine (urine)		X		Yes, follow the health advices below or no
Manganese (blood)			X	There is no known source of elevated manganese exposure in your community. Decrease in manganese blood levels is often associated with a lack of iron in the diet. Please, take an appointment at the center of health with the doctor soon (if not already done).
Manganese (hair)		X		Yes, follow the health advices below or no
Selenium (blood)		X		Yes, follow the health advices below or no
Zinc (serum)		X		Yes, follow the health advices below or no

How is my child's weight? Is my child suffering from diabetes?

Your child: ☹ Warning!

Results of your child's body mass index (BMI) and blood sugar level

<table>
<tr><th>Test</th><th colspan="4"></th><th>Any actions to take?</th></tr>
<tr><td rowspan="2">Body mass index *
(according to body weight and high-interpretation based on child age)</td><td>Underweight</td><td>Recommended weight</td><td>Overweight</td><td>Obese</td><td rowspan="6">Yes, follow the health advices below or no
Please take an appointment with the nurse or nutritionist at your local health center</td></tr>
<tr><td></td><td></td><td>X</td><td></td></tr>
<tr><td rowspan="2">Blood sugar
(random glucose)</td><td colspan="2">Normal</td><td colspan="2">Elevated</td></tr>
<tr><td colspan="2"></td><td colspan="2">X</td></tr>
<tr><td rowspan="2">Diabetic status
(according to glycated hemoglobin)</td><td>Hypoglycemic</td><td>No diabetes</td><td>Pre-diabetes</td><td>Diabetes</td></tr>
<tr><td></td><td></td><td>X</td><td></td></tr>
</table>

* Results were already provided to the child and parent in June 2015.

How is my child's thyroid?

Your child: ☺ Good news!

Results of your child's thyroid hormones levels

Tests	Below normal value	Normal	Any actions to take?
Thyroid : T_3		X	
Thyroid : T_4		X	
Thyroid : TSH		X	

First Nations Youth, Environment and Health Pilot Study – YEH*!*

Participant information

NAME
PARENT'S NAME/ LEGAL GUARDIAN
BIRTH DATE
TESTING DATE
ADDRESS
TELEPHONE

Information about the study

The study aimed to assess the level of exposure to multiple environmental contaminants, the nutritional status and some health issues among children and young people (aged 3-19 years) of four Quebec First Nations. You have participated in this study in June 2015 when our research team visited your community. Results for you are presented in scoreboards in the next section and, when needed, health advices are available for each measurement. One of the following faces with its explanation was given to each section to facilitate the interpretation of results.

☺ : Good news! *Everything is normal!*
😐 : Oops! *Look at the scoreboard and follow the health advices if possible.*
☹ : Warning! *Please, look at the section for advices and make an appointment at your health center with the doctor, nurse or nutritionist as recommended (and if not done already).*

Who are we?

Our team is from the University hospital research center (CHU de Québec) which is affiliated to the Laval University situated in Québec city.

- Mélanie Lemire (Principal investigator) : melanie.lemire@crchudequebec.ulaval.ca
- João Guedes (Project coordinator) : joao-carlos.guedes-de-oliveira@crchudequebec.ulaval.ca

Who are partners?

- First Nations of Quebec and Labrador Health and Social Services Commission (FNQLHSSC)
- Quebec's National Institute of Public Health (INSPQ)
- Regional Public Health Boards
- Health Canada

Would you like more information about this project?

Please contact João Guedes at joao-carlos.guedes-de-oliveira@crchudequebec.ulaval.ca or 418-525-4444 ext.81998

Do you have contaminants?

You: 😐 Oops!

Results of your mercury and lead levels

Tests	Normal	Slightly above the normal	Elevated	Any actions to take?
Mercury (Blood)		X		Yes, follow the health advices below (end of the document)
Lead (Blood)	X			No

Results of your arsenic, cadmium, nickel and uranium levels

Tests	Normal	Elevated	Any actions to take?
Arsenic (urine)	X		Yes, follow the health advices below or no
Cadmium (blood)	X		Yes, follow the health advices below or no
Nickel (urine)	X		Yes, follow the health advices below or no
Uranium (urine)	X		Yes, follow the health advices below or no

Results of your cotinine levels

(Indicator of exposure to cigarette smoke)

Test	Normal (non-smoking)	Exposed to a second-hand smoke or occasionally smokes	Smoking	Any actions to take?
Cotinine (urine)	X			Yes, follow the health advices below or no

Do you have all vitamins needed?

You: 😐 Oops!

Results of your vitamins levels

Test	Low	Normal	Elevated	Any actions to take?
Vitamin A		X		Yes, follow the health advices below or no
Folate (Vitamin B_9) (in red blood cells)		X		Yes, follow the health advices below or no
Vitamin B_{12}		X		Yes, follow the health advices below or no
Vitamin D	X			Yes, follow the health advices below or no ***Please take an appointment with the nurse or nutritionist at your local health center***

Do you have enough iron? Are you anemic?

You: ☹ Warning!

Results of your iron level and anemia status

<table>
<tr><th>Test</th><th colspan="4"></th><th>Any actions to take?</th></tr>
<tr><td rowspan="2">Iron level</td><td colspan="2">Normal</td><td colspan="2">Iron deficiency</td><td rowspan="7">Yes, follow the health advices below or no ***Please take an appointment with the nurse or nutritionist at your local health center***</td></tr>
<tr><td colspan="2">X</td><td colspan="2"></td></tr>
<tr><td rowspan="2">Categories of anemia according to hemoglobin results (% of red cells)</td><td>No anemia</td><td>Marginal anemia</td><td>Moderate anemia</td><td>Severe anemia</td></tr>
<tr><td></td><td></td><td>X</td><td></td></tr>
<tr><td rowspan="3">Type of anemia*</td><td colspan="2">No anemia</td><td colspan="2"></td></tr>
<tr><td colspan="2">Iron deficiency anemia</td><td colspan="2"></td></tr>
<tr><td colspan="2">Anemia of unknown origin (not linked to iron deficiency)</td><td colspan="2">X</td></tr>
</table>

* The types of anemia were evaluated according to the concentrations of hemoglobin, serum ferritin, serum iron and C-reactive protein (highly sensitive) recommended by the World Health Organization.

What are my mineral levels?

You: 😐 Oops!

Results of your mineral levels

Test	Below normal	Normal	Elevated	Any actions to take?
Chromium (urine)				Yes, follow the health advices below or no
Cobalt (blood)				Yes, follow the health advices below or no
Iodine (urine)		X		Yes, follow the health advices below or no
Manganese (blood)			X	There is no known source of elevated manganese exposure in your community. Decrease in manganese blood levels is often associated with a lack of iron in the diet. Please, take an appointment at the center of health with the doctor soon (if not already done).
Manganese (hair)		X		Yes, follow the health advices below or no
Selenium (blood)		X		Yes, follow the health advices below or no
Zinc (serum)		X		Yes, follow the health advices below or no

How is my weight? Are you suffering from diabetes?

You: ☹ Warning!

Results of your body mass index (BMI) and blood sugar level

Test					Any actions to take?
Body mass index * (according to body weight and high-interpretation based on child age)	Underweight	Recommended weight	Overweight	Obese	Yes, follow the health advices below or no ***Please take an appointment with the nurse or nutritionist at your local health center***
			X		
Blood sugar (random glucose)	Normal		Elevated		
			X		
Diabetic status (according to glycated hemoglobin)	Hypoglycemic	No diabetes	Pre-diabetes	Diabetes	
			X		

* Results were already provided to the child and parent in June 2015.

How is my thyroid?

You: ☺ Good news!

Results of your thyroid hormones levels

Tests	Below normal value	Normal	Any actions to take?
Thyroid : T_3		X	
Thyroid : T_4		X	
Thyroid : TSH		X	

Appendix K – Document on the analyses that accompanied the results letter

Mercury

Sources :

- Occurs naturally in water, air (atmospheric), soil, sediments and organic matter. It can therefore be released into the environment following natural processes such as soil erosion, forest fires, volcanoes irruptions and floods.
- From human activities :
  - Such as burning coal, some mining activity, chlorine and cement production and waste incineration. Nowadays, atmospheric mercury comes primarily from human activities in Asia. The mercury that ends up in the air is transported over long distances and is mainly deposited in the water of Nordic regions.
  - The flooding of land for the construction of a hydroelectric dam may also temporarily free soil mercury in the water. Mercury does not accumulate in plants, rather in water. That why fish contain mercury in their flesh. However, fish that eat other fish (they are called piscivorous) such as walleye, pike or trout, will accumulate higher levels of mercury throughout their life when compared to non-piscivorous fish like examples.

Health effects:

- Exposure to mercury during pregnancy can cause mental retardation, attention and memory deficits and, visual problems in children.
- Exposure to mercury in childhood can also decrease motor skills and heart function in children.

Health advice to reduce mercury blood levels:

1. Eating fish is good for your health.

2. However, to prevent high levels of mercury in the blood which is detrimental to your child:
   → You can eat non-piscivorous fish because they accumulate less mercury than piscivorous fish.
   → You can eat younger/smaller fish because they had less time to accumulated mercury in their flesh.
   → **Please consult the factsheets about mercury levels in fish of your regional lakes and rivers.**

Lead

Sources :

- Used in the manufacture of many products such as old pipes and in materials used in the automotive industry, car batteries, some paints, hunting ammunition, fishing weights (sinker) and welding.
- By eating food handled by hands that have been in contact with ammunition and lead dust or lead fishing sinkers.
- By eating lead fragments found in a hunted animal with lead ammunition.
- Breathing dust or smoke containing lead, for example smoke from a gun when fired with lead ammunition.

Health effects:

- Children are more susceptible than adults to the effects of lead, and the impacts are observed even in the presence of relatively low lead levels.
- Lead exposure during pregnancy and childhood can have significant impacts on the developing brain and, cause mental retardation, attention deficit, antisocial behaviour and decrease school success.

Health advice to reduce lead blood levels:

1. Avoid hunting with ammunition containing lead **– See the factsheet on ammunitions and lead-free alternatives.**

2. Clean firearms outside of the house since lead dust is a source of exposure.

3. Eliminate other possible sources of lead around the house.

Arsenic

Sources :

- High contents of arsenic may be found naturally in soil.
- Humans can absorb this element through drinking water from wells situated in arsenic rich soils.
- Human activities such as mining, usage of pesticides containing arsenic and disposal of industrial also released arsenic in the soil, air and water.

Health effects:

- Exposure to arsenic from drinking water during several years is associated with an increased risk of cancer, thickening and discolouration of the skin, nausea and diarrhea, red blood cells decrease, heart problems and numbness of the hands and feet.
- Health Canada is collaborating with provinces and territories to define recommendations to incorporate in the *Guidelines for Canadian Drinking Water Quality* to ensure that Canadians have access to safe drinking water.

Cadmium

Sources :

- Naturally present in the environment and can be released due to forest fires, volcanoes and soil erosion.
- Mining, energy and electric battery production and, disposal of solid waste also reject cadmium.
- Since tobacco is a plant that naturally accumulates cadmium from soils, a high amount of cadmium is found in cigarettes. This is also the case with lichens, which will accumulate high levels if nearby industries emit cadmium nearby. Moose and caribou that eat lichen and plants can therefore have significant amounts of cadmium in their liver and their kidneys (but not meat).

Health effects: High levels of cadmium can damage the kidneys, bones and lungs and, also affect reproduction.

Health advice to reduce cadmium blood levels:

1. Avoid cigarette smoking since smoke is a major source of cadmium and it is very harmful for your child.

2. Reduce your consumption of moose and caribou liver. But their meat is very good for health.

Nickel

Sources :

- Nickel is a natural part of soils.
- Regularly used in the manufacture of stainless steel pans, coins, jewelry and rechargeable batteries.
- Almost all sources of drinking water and certain foods such as chocolate, soybeans, nuts and oats naturally contain small amounts of nickel.
- We generally absorb nickel by breathing, eating, drinking or by touching objects containing nickel such as money or jewelry.
- No matter how a person is exposed to nickel, almost all the absorbed nickel will be excreted in the urine.

Health effects:

The body needs more time to get rid of nickel absorbed through the lungs. This is especially common in people who work in nickel industries. Inhalation of a large amount of nickel can cause asthma and even lung cancer. A very large amount of nickel on the skin can also cause irritation.

Uranium

Sources :

- Common natural radioactive element found worldwide; most Canadian soils contain small amount of uranium, but its presence does not cause risk to animals, humans or plants.
- Mining activities can release uranium in a region if soils contain high concentrations. It can also be found in drinking water, especially from wells dug in uranium-rich soil.

Health effects:

- The chemical properties of uranium are of greater concern than its radioactivity.
- High exposure to uranium in drinking water can affect kidney health. Many laboratories in Canada test drinking water and, if needed, there are several relatively affordable options to remove uranium from drinking water.

Cotinine

Sources :

- Cotinine is produced by the body when exposed to nicotine from tobacco.
- Cotinine is not measured for its potential effects on health but its urine concentration is a good indicator of tobacco smoke exposure:
  - Average urine levels = children are exposed to second-hand smoke environment or they occasionally smoke.
  - High urine levels = the child smokes on a regular basis.

Health effects :

- In homes where people smoke :
  - cigarette smoke can cause ear infections, respiratory infections, childhood asthma, dental health problems and cardiovascular diseases among young people.
  - when exposed to a smoking environment, young people are more likely to also become addicted to tobacco
- Cigarette consumption during pregnancy is associated with a lower weight birth, preterm births and a higher risk of sudden death in infants.
- Cigarette smoke is also associated with cancer.

→ Besides being a source of cadmium exposure, cigarette smoke is very harmful to the health of children.

→ For tips on how to quit smoking, visit your local health centre.

Vitamin A

Role: Vitamin A contributes to normal body development and growth while maintaining the health of your eyes, skin and immune system.

Foods rich in vitamin A:
→ Dark-green or orange fruits and vegetables (cabbage, carrot, tomato, cloudberry, crowberry, carrot, turnip, squash, orange, broccoli, spinach, etc.);
→ Liver, fish and other meat, eggs, milk.

Folate (Vitamin B_9)

Role: Vitamin B9 promotes healthy blood vessels and heart. Without enough folate to produce healthy red blood cells, you may feel weak, tired or have trouble concentrating.

Foods rich in folates:
→ Lentils, beans and cooked dried peas;
→ Spinach, asparagus, romaine lettuce, beets, broccoli, corn, peas, tomato and vegetable juice and, Brussels sprouts;
→ Orange juice, canned pineapple juice, cantaloupe, honeydew melon, bananas, raspberries, grapefruit and strawberries;
→ Enriched grain products such as pasta, cereal and bread.

Vitamin B_{12}

Role: Vitamin B12 allows our body to produce healthy blood cells and helps the nervous system to function normally.

Foods rich in vitamin B_{12}:
→ Milk and its substitutes;
→ Meat and its substitutes;
→ Vitamin B_{12} fortified foods such as fortified almond, oatmeal, soy or rice beverages.

Vitamin D

Role: Vitamin D helps your body absorb calcium. Calcium and vitamin D work together to help keep your bones healthy.

Foods rich in vitamin D:

→ Some foods naturally containing vitamin D (e.g. Salmon, herring, halibut, sardines, eggs) and others have been enriched (e.g. Cow milk, soy milk, fortified orange juice, margarine) ;
→ The sources are unfortunately limited, so it may be advisable to take a supplement, especially if the foods mentioned are not consumed.

How our body can produce more vitamin D:

→ Your body makes vitamin D when your skin is exposed to the sun without sunscreen.
→ During the spring, summer and autumn, about 15 minutes of sun exposure between 10 am and 3 pm is enough to produce vitamin D. However, the amount of vitamin D that your body can make from the sunlight also depends on your age, where you live and your skin tone.

Body weight and diabetes

Being **overweight** and suffering from **obesity** are **risk factors** for type **2 diabetes**. Children who are overweight and who are less active have a higher risk of developing type 2 diabetes.

What is blood glucose? Glucose is the main form of sugar in the blood and is the major source of energy for the body.

What is diabetes? Diabetes is a chronic disease that occurs when the body is unable to produce enough insulin or use it properly. Insulin is a regulating hormone that allows each cell of the body to store and use glucose (sugar). Therefore, insulin is essential for our cells to use glucose as an energy source. There are different types of diabetes: type 1 diabetes, type 2 diabetes and gestational diabetes.

What is pre diabetes? Pre-diabetes is characterized by higher than normal blood glucose (sugar level) but not high enough to diagnose diabetes. This is the perfect time to take action and prevent diabetes!

The more you earn the following factors, the more you increase the risk of developing type 2 diabetes:

- Pre-diabetes;
- Overweight or obesity;
- High blood pressure;
- Physical inactivity;
- Have a family history of diabetes;
- Belong to certain ethnic groups (South Asian, East Asian, Native and Black).

Health Tips to help control weight reduce the risk of developing type 2 diabetes and, thus, prevent:

→ Eat a **variety of healthy foods** from Canada's Food Guide for First Nations. Choose **high-fibre foods** (bread and whole grains, legumes, fruits and vegetables). **Avoid sugary foods and fried foods.**

→ **Watch your portions**; listen to your body's signals of hunger and satiety.

→ Enjoy **home-cooked meals with your family.**

→ Increase your **physical activity** level. A minimum of 60 minutes of moderate to strong physical activity a day is recommended by the World Health Organization (WHO).

Iron and iron deficiency anemia

Role of iron for health:

- Essential mineral that is important for maintaining good health. It delivers oxygen to all parts of the body and allows it to function properly.
- Iron is essential for proper development of the brain and nervous system of babies and children.
- Iron needs are highest during childhood (6 to 24 months, during growth spurts) and in adolescence.

Symptoms of inadequate intake of iron-rich foods:

- Fatigue and irritability;
- Pale skin.

* If this is the case for several days, it is a sign that there is possibly an iron deficiency (iron deficiency).

Iron deficiency can cause iron deficiency anemia, a condition characterized by a lack of red blood cells (hemoglobin). The symptoms are fatigue and lack of energy, change of behaviour, pale skin, gums, nail beds and the eyelids. Untreated iron deficiency anemia may become severe enough to interfere with child development. Infants with anemia that does not heal may have stunted growth and intellectual deficit resulting in learning difficulties. In children, an anemic condition can affect their learning and level of physical activity.

Health tips to ensure adequate iron intake:

→ Eat **iron-rich foods: liver, meat, poultry and fish** (wild game: caribou, original, hare... wild birds, other meats: beef, pork, chicken, other: sardines, clams...).

→ Eggs and some plant, such as legumes, vegetables, fruits, grains, nuts and fortified cereal products are good sources of iron. However, you will need to add food containing **vitamin C** (oranges, kiwis, cloudberries, tomatoes, peppers, turnips, broccoli…) **in the same meal to help iron absorption.**

→ Some substances may interfere with the absorption of iron like those in tea, so it is best to consume between meals. **Children should avoid drinking tea.**

Chromium

Sources :

- Occurs naturally in rocks, animals, plants and soil.
- Used for the manufacture of steel and for chromium plating, dyes, tanning leather and wood preservation.
- Is also present in cigarette smoke.

Health effects:

- Chromium is an essential element in the metabolism of carbohydrates, proteins and fats.
- Exposure to excessive levels of chromium may have adverse effects on the nose, stomach, intestines and skin. It can also cause respiratory problems, anemia and cancer.

Cobalt

Sources:

- Is found naturally in rocks, soil, water, plants and animals.
- Enters the composition of different metal alloys used for various productions (aircraft engines, magnets, artificial hip, glass, ceramics and paint, etc.). Radioactive isotopes of cobalt also have many commercial and medical uses.

Health effects:

- It is part of vitamin B12, which is essential for good health.
- Exposure to excessive levels of cobalt is associated with skin, lung and heart problems.

Iodine

Sources:

- Occurs naturally in foods such as seafood, fish of the sea (cod and cod liver, salmon, haddock, sardines, mackerel, herring, etc.), dairy products, eggs, certain algae, plants like soybeans or green beans, and meat.
- Iodine is added to table salt in Canada.
- It is also present in many foods such as potato chips, meats, prepared meals, etc.

Health effects:

- Iodine is essential for body functions: it is a major component of thyroid hormones that play a role in regulating body temperature, basal metabolism, reproduction, growth, production of blood cells and in the level of development of the nervous system and muscle function.
- Too high iodine intake from food, water or supplements can cause thyroid problems or hypersensitivity reactions.

Manganese

Sources:

- Naturally in well water if the surrounding soil is rich in manganese.
- In foods such as grains, cereals, seafood and tea.
- Iron or steel factories, industries (manufacturing paint, varnish, ink, dye, glass, ceramics, matches, fireworks, fertilizer) and certain pesticides (mancozeb for potato production) may reject manganese in the environment.

Health effects :

- Manganese is essential for the proper functioning of the body as it is involved in many vital functions, including the metabolism of cholesterol, carbohydrates and proteins as well as bone formation. The body usually absorbs a very small percentage of manganese present in food and can easily eliminate surplus when necessary.
- However, when the body is exposed to excessive levels of manganese from the air (dust or fumes) or water, elimination is hampered and manganese may further accumulate in the body. In children, high levels of exposure to manganese from water or air can cause adverse effects on brain development, including behavioural changes, decreased ability to learn and remember, and decreased motor skills.

* Association with iron deficiency: Elevated blood manganese levels are also often associated with a lack of iron in the diet. In fact, when the body is deficient in iron, it tends to absorb more iron from food in the intestines. Since the absorption of iron and manganese are similar, the body simultaneously absorbs more manganese.

Health tips when there is no known source of exposure to high levels of manganese in the environment:

The best way to lower blood manganese levels to normal is to improve iron status, consuming more iron-rich foods, see the sidebar "Health tips to ensure adequate intake of iron".

For more information on manganese, see the factsheet on the manganese sources found in your area.

Selenium

Sources:

- Present in the earth's crust, but unevenly.
- Drinking water may contain selenium if surrounding soils are rich in this element.
- Plants and algae naturally uptake selenium available from the soil and water. Then, it accumulates in the flesh of animals and fish that eat them.
- Human activities such as burning coal, refining of copper ore and certain industrial activities may reject selenium in the environment and in the water.

Health effects:

- Selenium is an antioxidant essential for basic body functions such as the immune system and of the thyroid.
- Excessive exposure to selenium in drinking water or in the air can cause hair and nails loss, skin problems and eventually affect the nervous system.

Zinc

Sources:

- Naturally found in the earth's crust and, in the air, soil, water and most foods.
- Human activities (such as mining, steel production, coal combustion and waste combustion) reject zinc into the environment.
- Since zinc does not dissolve in water, it can accumulate in humans, fish and other organisms, but not in plants. It is found mainly in red meat which includes game meat.

Health effects:

- Zinc plays a central role in regulating the immune system, tissue growth, acting as an antioxidant and is important for reproduction.
- Excessive exposure to zinc can cause anemia, pancreas damage and reduce the level of good cholesterol.
- Babies and young children are most vulnerable because this element is widespread in soil and, babies and young children often put soiled contaminated items in their hands and mouths.

Thyroid and thyroid hormones

The thyroid is a small gland located in the neck just below Adam's apple. It releases thyroxine (T_4) and tri-iodothyroxine (T_3), hormones that increase the amount of oxygen consumed by the body. Hormones produced by the thyroid gland (T_3 and T_4) are **produced from iodine** present in the diet and captured by the gland.

The thyroid assumes many body functions. It manages heart rate and body temperature, and assures the metabolism of proteins, fats and sugars (helps convert food into energy). Thyroid problems may be the source of many chronic diseases such as heart disease and diabetes. The thyroid is regulated by the thyroid-stimulating hormone (TSH), secreted by the pituitary gland which is part of the brain.

Health problems occur when the thyroid underactive (hypothyroidism) or overactive (hyperthyroidism). Thyroid disorders most commonly affect women rather than men. Thyroid disorders sometimes result from inadequate levels of TSH, or problems with the gland itself. Finally, an excessive iodine intake from food, water or supplements can cause thyroid or hypersensitivity reaction problems.

Health advice on iodine-rich foods:

Eat foods that naturally contain iodine, such as seafood, fish of the sea (cod and cod liver, salmon, haddock, sardines, mackerel, herring, etc.), dairy products, eggs, some algae, plants such as soybeans or green beans, and meat.

Appendix L – Fact sheet on how to prevent lead exposure from ammunitions

Hunting and eating game meat are great for health, especially when we manage to avoid lead!

HOW TO AVOID LEAD FROM AMMUNITIONS

Why is it important to try to avoid lead shot and bullets?

- Lead is toxic: it interferes with normal brain development of the fetus and children.
- Cartridges with lead shot (also called lead pellets) or bullets with a lead head (also called lead bullet) release a significant amount of lead in the earth, in rivers and in lakes.
- Once in the environment, lead contaminates birds and fish, and can have toxic effects on the health of birds and fish.
- Cartridges with lead shot were banned in Canada to protect the health of birds living near rivers and lakes.

How can ammunition expose pregnant women, children, youth and adults to lead?

- The meat of birds or small game hunted with lead shot ammunition may be contaminated with lead: we may see lead shot in the meat or sometimes there are small fragments of lead invisible to the naked eye.
- The meat of big game meat hunted with lead bullets can also be contaminated with lead: when the bullet penetrates and explodes in the flesh of the animal, it releases small lead fragments, around the wound and through the wound channel.
- When cleaning guns that use lead ammunition, dust coming off the gun contains lead.
- When making lead ammunition (cartridges with lead pellets) with hands or when touching ammunitions or lead-containing dust (for example, for children walking on all fours or when children play with spent lead cartridges).
- Hunters who hunt with lead ammunition breathe lead fumes when shooting.

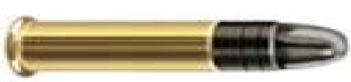
Good news! Lead-free shotgun cartridges are available!

AVOID!
Cartridge with lead shot
Banned for migratory birds

LEAD-FREE!
Cartridge with steel shot
Available in most gauges
Cheaper than lead

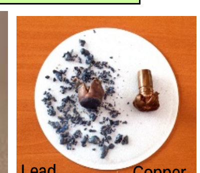
LEAD-FREE!
Cartridge with bismuth or tungsten shot
Available in most gauges but a bit more expensive than steel

There are also lead-free bullets !!



WITH LEAD!
Bullets with a lead head
Still on the market.

WITH LEAD!
Bullet with a copper covered head but with the inside in lead

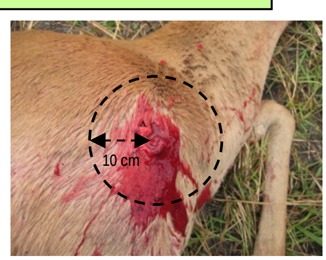


Best Option

LEAD-FREE!
100% copper bullet
(covering and inside in copper)
But a bit more expensive than the others

How to avoid lead if you are hunting with bullets containing lead?

Removing <u>10 cm of meat around the bullet impact</u> can eliminate a large part of lead fragments in meat



Slingshots, bows and arrows and crossbows are also a great option to avoid the lead!

For more information, contact the JES !-YEH ! project:
melanie.lemire@crchudequebec.ulaval.ca

Appendix M – Fieldwork budget

Cost for data collection for the JES-YEH project (excluding coordinator salary and laboratory analyses)

# of trips/community, etc.				
If communities are pre-selected, possibly only one consultation is needed.				
But still, a second consultation is needed to hire the recruiter and staff, get the children list of the community (for random selection process), find a place to stay and conduct the research and adapt the traditional food questionnaire				
In some cases the second consultation costs can be avoided by making 2-3 staff arriving few days earlier in the community before data collection				
Then you have the research field itself, and the first trip to return the results				
Estimation of the costs for FIELD RESEARCH ONLY based on 2015 cost of living				
	1 small (500 inhabitants) remote community but access by road (12h)	1 large community (2000) inhabitants) with road access (10h)	1 medium community (1200 inhabitants) with road (15h)+boat travel	1 medium community (1200 inhabitants) with plane access only - similar to Cree communities or Lower North shore in winter
Number of participants	22	90	45	45
Days for field research	9	23	19	19
(travel + week-ends)				
Material				
clinical supplies	660	1980	990	990
Travel costs for 5 staff				
car rental	1500	3000	3000	0
boat	0	0	1000	0
plane + cargo (minimum)	0	0	0	14500
samples shipping	0	0	500	500
Feeding costs				
dinner also for participants	1800	4600	5700	5700
Staff costs (coordinator covered by the central budget)				
Senior nurse (48$/h)	3500	10500	7000	7000
Assistant nurse (40$/h)	2000	6000	4000	4000
Interviewer (20$/h)	1000	3000	2000	2000
Interviewer (20$/h)	1000	3000	2000	2000
Local staff				
Recruiter	1500	3000	2000	2000
Babysitter	400	1200	750	750
Cook	350	750	600	600
Accommodation costs				
housing 1000$/week	1500	3000	3000	3000
Compensation costs				
50$ per participant	1100	4500	2250	2250
Study promotion material				
	1000	1000	1000	1000
TOTAL	**17310**	**45530**	**35790**	**46290**
Estimation of the costs for CONSULTATION or RESULTS RETURN (2 staff and 5 days with travel)				
Travel costs for 2 staff by plane	2000	2000	5000	5000
Hotel	800	800	1200	1200
Per diem	500	500	500	500
Study promotion material	200	200	200	200
Total per consultation	**3500**	**3500**	**6900**	**6900**
Estimation of total costs per community including 2 consultations, 1 research field and 1 study results return				
1st consultation	**3500**	**3500**	**6900**	**6900**
2nd consultation *	**1500**	**1500**	**1900**	**1900**
* option arrive few days prior to research				
Research field	**17310**	**45530**	**35790**	**46290**
Results return	**3500**	**3500**	**6900**	**6900**
TOTAL	25810	54030	51490	61990

Appendix N – New methods and costs of CTQ laboratory analyses in 2007

Measures	Sample type	INSPQ Method number	Cost In 2017	Minimum sample amount	Instrument	Method
Hg, Pb, Cd, Mn, Se	Blood	M-572	80$	0.5 mL	ICP-MS instrument (Inductively coupled plasma mass spectrometry), Perkin Elmer Sciex, Elan DRC II with auto-sampler ESI SC-4 and ELAN workstation	Blood samples are diluted in a basic solution containing octylphenol ethoxylate and ammonium hydroxide. They are analysed by ICP-MS, DRC (Dynamic Reaction Chamber). Matrix matched calibration is performed using blood from a non-exposed individual.
Se, Zn	Plasma	M-580	45$	0.5 mL	ICP-MS instrument (Inductively coupled plasma mass spectrometry), Perkin Elmer Sciex, Elan DRC II with auto-sampler ESI SC-4 and ELAN workstation	Plasma samples are diluted in a basic solution containing octylphenol ethoxylate and ammonium hydroxide. They are analysed by ICP-MS, DRC (Dynamic Reaction Chamber). Matrix matched calibration is performed using serum from a non-exposed individual.
As, Cd, I, Ni, U	Urine	M-593	80$	0.5 mL	ICP-MS instrument (Inductively coupled plasma mass spectrometry), Perkin Elmer, NexION 300S with autosampler, ESI SC-2DX Fast System	Urine samples are diluted in a special acid diluent and analysed by ICP-MS. Matrix matched calibration is performed using urine from non-exposed individuals. The relative specific gravity of the donor's urine must be 1,015 ± 0,002 g/mL.
Hg Speciated Analytes MeHg, HgI	Blood	M-613	150$	0.1 mL	GC-ICP-MS instrument (Gas chromatograph Perkin-Elmer Clarus 580; with Empower 3 software coupled to NexION 350s ICP-MS and Syngistix software version 1.1)	Whole blood is digested with tetramethylammonium hydroxide (TMAH) and the different forms of mercury are derivatized into volatile compounds by sodium tetra-n-propylborate. Mercury is extracted by solid-phase micro extraction (SPME) with a PDMS/DVB fiber. The chromatography is performed on a Zebron ZB-5 column and the detection on an ICP-MS. Quantification is obtained by isotope dilution calculation.
As Speciated Analytes Arsenobetaine; As+3; As+5 Dimethylarsinic acid (DMAA) Monomethylarsonic acid (MAA)	Urine	M-612	160$	0.1 mL	HPLC-ICP-MS instrument (Waters Acquity UPLC with Empower 3 software coupled to NexION 350s ICP-MS and Syngistix software version 1.1)	The urine samples are diluted in an ammonium carbonate solution and analyzed by HPLC-ICP-MS. The calibration curve is made by standard additions directly in the dilution solvent. Methylseleno-L-cysteine is used as internal standard.
Cotinine	Urine	C-550	70$	1.0 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Quattro Premier XE with MassLynx software)	Cotinine is extracted from the urine by solid phase extraction in a 96 wells plate format with a mixed-mode cation exchange and reversed phase medium using an automated workstation. The extracts are brought to dryness, taken in the mobile phase and analysed by UPLC-MS-MS with an electrospray source in MRM positive mode.

Measures	Sample type	INSPQ Method number	Cost In 2017	Minimum sample amount	Instrument	Method
Organochlorine Pesticides– OCs **Analytes** Aldrin alpha-chlordane gamma-chlordane cis-nonachlor trans-nonachlor Oxychlordane p,p'-DDE p, P'-DDT Hexahlorobenzene Beta-HCH Gamma-HCH Mirex Toxaphene parlar 26 Toxaphene parlar 50	Plasma	E-446	210$ plus 15$ for lipids	3.0 mL	GC-MS instrument (Gas chromatograph Agilent 6890 coupled to ECD detector Agilent G2397A and mass detector Agilent 5973 Network with Agilent MSD Chem software)	Plasma samples are enriched with internal standards and organohalogenated compounds are extracted by liquid-liquid extraction with a mixture of ammonium sulphate:ethanol:hexane (1:1:3). These extracts are cleaned up on florisil before being analyzed by GC-MS using selected ion monitoring (SIM) in negative chemical ionization (NCI) mode. Analyte concentrations are evaluated by considering the % recovery of labelled internal standards. The ECD detector serves to quantify the PCB congeners 28 and 52 when the detection limit is not obtained with the mass detector.
Polychlorinated Biphenyls– PCBs **Analytes** PCB 28, 52, 66, 74, 99, 101, 105, 118, 128,138, 146, 153, 156, 163, 167, 170, 178, 180, 183, 187, 194, 201, 203, 206, Aroclor 1260	Plasma					
Polybrominated Diphenyl Ethers – PBDEs **Analytes** PBB 153 PBDE 15, 17, 25, 28, 33, 47, 99, 100, 153	Plasma					
Perfluoroalkyl substances – PFCs **Analytes** PFBA, PFBS, PFDA, PFHxA, PFHxS, PFNA, PFOA, PFOS, PFuDA	Plasma	E-501	190$	0.4 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-S with MassLynx software)	The perfluorinated compounds are extracted from serum or plasma by solid phase extraction in a 96 wells plate format with a weak anion exchange medium using an automated workstation. The extracts are brought to dryness, taken in the mobile phase and analysed using C18-PFP column by UPLC-MS-MS with an electrospray source in MRM negative mode.
Dioxins and Furans **Analytes** **(2,3,7,8 chlorinated congeners)** 7 congeners of polychlorinated dibenzo-para-dioxins (PCDD) 10 congeners of polychlorinated dibenzofurans (PCDF) **PCB coplanar** **Analytes** (PCB 77,81,126,169)	Plasma	E-510	TBD	2.0 mL	APGC-MS/MS instrument (Gas chromatograph Agilent 7890B; tandem mass detector Waters Xevo TQ-XS with MassLynx software	Plasma samples are enriched with internal standards and chlorinated organic compounds are extracted by liquid-liquid extraction with a mixture of ammonium sulphate: ethanol: Hexane (1:1:3). The extracts are cleaned up on alumina column before being analyzed by GC-MS by atmospheric positive ionization (API+) in MRM mode. Analytes concentrations are evaluated by considering the % recovery of labelled internal standards.

Measures	Sample type	INSPQ Method number	Cost In 2017	Minimum sample amount	Instrument	Method
Polychlorinated Naphthalenes (PCNs) **Analytes** PCN13,27,28,35,36,42,46,50,52,53,60,66,67,69,72,73,75	Plasma	E-510 or E-5XX	TBD	0 mL or 0.2 mL	APGC-MS/MS instrument (Gas chromatograph Agilent 7890B; tandem mass detector Waters Xevo TQ-XS with MassLynx software	In development. These compounds may be added to the E-510 method. If this is not possible, a new method will be developed.
Halogenated Flame Retardants (HFRs) **Analytes** Hexabromocyclo-dodecane (HBCD) Pentabromo ethyle benzene (PBEB) Hexabromo benzene (HBB) Dechlorane 602 (Dec-602) Ethyle hexyl tetrabromobenzoate (EHTBB) Dechlorane 603 (Dec-603) Dechlorane 604 component A (Dec-604A) 1,2 bis tribrophenoxy ethane (BTBPE) Bis ethylehexyl tetrabromo phthalate (BEHTBP) syn-dechlorane (syn-DP)	Plasma	E-5XX	TBD	0.2 mL	APGC-MS/MS instrument (Gas chromatograph Agilent 7890B; tandem mass detector Waters Xevo TQ-XS with MassLynx software	In development.
Short-chained Chlorinated Paraffins –SCCPs **Analytes (Total and by homologues)** **C (10 to 13)** **Cl (5 to 10)**	Plasma	E-510 or E-5XX	TBD	0 mL or 2.0 mL	APGC-QTOF instrument (Gas Agilent GC; time of flight Waters Xevo G2 with MassLynx software	In development. These compounds may be added to the E-510 method. If this is not possible, a new method will be developed.
Chlorophenols metabolites and triclosan **Analytes** 2,4-dichlorophenol 2,5-dichlorophenol 2,4,5-trichlorophenol 2,4,6-trichlorophenol Pentachlorophenol (PCP) Triclosan	Plasma	E-478	TBD	0.5 mL to 1.0 mL	To be determined	A new method will be developed.
Organophosphate triester – OPS **(14 analytes)**	Urine	E-492 E-508	240$	1.0 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-XS with MassLynx software)	In development. Two methods. One method using liquid-liquid extraction and the other using solid phase extraction.
Benzene/Toluene metabolites **Analytes** t,t-MA, S-PMA, S-BMA	Urine	E-477	170$	0.4 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-S with MassLynx software)	The analytes are extracted on an automated workstation with HLB solid phase extraction plate. The extracts are brought to dryness, taken up in with the mobile phase and analysed using HSS T3 column by UPLC-MS-MS with an electrospray source in MRM negative mode.

Measures	Sample type	INSPQ Method number	Cost In 2017	Minimum sample amount	Instrument	Method
BPA and BPA analogues (15 analytes)	Urine	E-505	260$	1.0 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-S with MassLynx software)	In development.
Chlorophenols metabolites **Analytes** 2,4-dichlorophenol 2,5-dichlorophenol 2,4,5-trichlorophenol 2,4,6-trichlorophenol Triclosan	Urine	E-454	160$	0.5 mL	GC-MS-MS instrument (Agilent 6890 coupled to tandem triple-quadrupole mass detector Waters Quattro Micro GC with MassLynx software)	Following an enzymatic deconjugation step, the analytes and isotope labelled analogues are derivatized with pentafluorobenzyl bromide. The derivatives are extracted using an hexane:dichloromethane mixture and the resulting extract is concentrated prior to analysis by GC-MS-MS with negative chemical ionization (NCI) in MRM mode.
Organophosphate metabolites **Analytes** Dimethylphosphate (DMP) Dimethylthiophosphate (DMTP) Dimethyldithiophosphate (DMDTP) Diethylphosphate (DEP) Diethylthiophosphate (DETP) Diethyldithiophosphate (DEDTP)	Urine	E-495	150$	0.5 mL	GC-MS-MS instrument (Agilent 6890 coupled to tandem triple-quadrupole mass detector Waters Quattro Micro GC with MassLynx software)	Following an enzymatic deconjugation step, the analytes and isotope labelled analogues are derivatized with pentafluorobenzyl bromide. The derivatives are extracted using an hexane:dichloromethane mixture and the resulting extract is concentrated prior to analysis by GC-MS-MS with negative chemical ionization (NCI) in MRM mode.
PAHs metabolites **Analytes** 1-OH-naphtalene 1-OH-phenanthrene 1-OH-pyrene 2-OH-chrysene 2-OH-fluorene 2-OH-naphtalene 2-OH-phenanthrene 3-OH-benzo(a) pyrene 3-OH-chrysene 3-OH-fluoranthene 3-OH-fluorene 3-OH-phenanthrene 4-OH-chrysene 4-OH-phenanthrene 6-OH-chrysene 9-OH-fluorene 9-OH-phenanthrene	Urine	E-465	270$	5.0 mL	GC-MS-MS instrument (Agilent 7890 coupled to tandem triple-quadrupole mass detector Agilent 7000B with MassHunter software)	Following an enzymatic deconjugation step, the analytes are extracted at neutral pH by liquid-liquid extraction. The extracts are evaporated, derivatized with MSTFA and analysed by GC-MS-MS with by electron ionization (EI) in MRM mode.
Parabens **Analytes** Benzyl paraben Butyl paraben Ethyl paraben Isobutyl paraben Methyl paraben n-Propyl paraben	Urine	E-474	130$	0.2 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-S with MassLynx software)	Urine samples are fortified with isotopically enriched paraben analogues and diluted with water. The addition of acetate buffer with the enzyme β-glucuronidase is used to measure total forms (conjugated and non-conjugated). The analytes are extracted by liquid-liquid extraction with chlorobutane. The extracts are brought to dryness, taken up in with the mobile phase and analyzed by UPLC-MS-MS with an electrospray source in MRM negative mode.

Measures	Sample type	INSPQ Method number	Cost In 2017	Minimum sample amount	Instrument	Method
Phthalate metabolites **Analytes** MBzP, MCHP, MCHpP, MCiNP, MCiOP, MCMHP, MCPP, MECPP, MEHHP, MEHP, MEOHP, MEP, MHBP, MHiDP, MHiNP, MiBP, MiDP, MiNP, MMP, MnBP, MnOP,MOiDP, MOiNP, 2OH-MiBP	Urine	E-490	300$	0.5 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-S with MassLynx software)	Following an enzymatic deconjugation step, the analytes are extracted at pH 3 on an automated workstation by liquid-liquid extraction with a mixture of hexane:ethyl acetate (50:50). The extracts are brought to dryness, taken up in a solution of acetonitrile:water (25:75) and analysed by UPLC-MS-MS with an electrospray source in MRM negative mode.
Plasticizers **DINCH and TOTM metabolites** **Analytes** 1-MEHTM 2-MEHTM 4-MEHTM OXO-MINCH OH-MINCH trans-CX-MINCH cis-CX-MINCH trans-MINCH	Urine	E-496	170$	2.0 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-S with MassLynx software)	Following an enzymatic deconjugation step, the analytes are extracted at pH 3 on an automated workstation by liquid-liquid extraction with a mixture of hexane:ethyl acetate (50:50). The extracts are brought to dryness, taken up in a solution of acetonitrile:water (50:50) and analysed by UPLC-MS-MS with an electrospray source in MRM negative mode.
Plasticizers **TXIB and CHDA metabolites** **Analytes** cis-CHDA trans-CHDA HTMV TMPD	Urine	E-497	145$	0.5 mL	UPLC-MS-MS instrument (Waters Acquity UPLC; tandem mass detector Waters Xevo TQ-S with MassLynx software)	Following an enzymatic deconjugation step, the analytes are extracted at pH 3 on an automated workstation by liquid-liquid extraction with ethyl acetate. The extracts are brought to dryness, taken up in a solution of methanol:water (30:70) and analysed by UPLC-MS-MS with an electrospray source in MRM positive mode for TMPD and in negative mode for HTMV, *cis*- and *trans*-CHDA.
Pyrethroids metabolites **Analytes** cis-DCCA trans-DCCA cis-DBCA 4-F-3-PBA 3-PBA	Urine	E-491	185$	1.0 mL	GC-MS instrument (Gas chromatograph Agilent 6890N, mass detector Agilent 5975, injector and automatic sampler Agilent 7683B with ChemStation G1701EA and MassHunter software)	Following an enzymatic deconjugation step, the analytes are extracted at acidic pH by liquid-liquid extraction with hexane. The extracts are derivatized with diisopropylcarbodiimide (DIC) and hexafluoro 2-propanol (HFIP), extracted again with hexane and analyzed by GC-MS using selected ion monitoring (SIM) in negative chemical ionization (NCI) mode.