FEHNCY

Food, Environment, Health and Nutrition of First Nations Children and Youth

Alimentation, environnements, nutrition et santé des enfants et jeunes des Premières Nations

Community Report

TEMPLATE

Table of Contents

Legend

Throughout this report, you will see some symbols. The figure below explains what they mean. A summary of the results is presented in the body of the report, and more information can be found in the Appendices.

What do these symbols mean?

Take-home message.

Results from your community compared to results from other studies.

A bit more information about the topic.

1. Study Overview

The Food, Environment, Health, and Nutrition of First Nation Children and Youth (FEHNCY) is a cross-Canada research study that is assessing the nutrition, health and environment of First Nations children and youth aged 3-19 in communities through partnerships and community participation (**Figure 1**).

The overall goal of FEHNCY is to provide the best evidence for government policy and community programming recommendations geared towards the improvement of First Nations child and youth health. The study also aims to build capacity within communities to address nutrition and environmental health issues, as well as to support health and well-being in general.

See **Error! Reference source not found.** for the FEHNCY research team.

Figure 1. FEHNCY study overview.

1.1. OCAP Principles

In aiming to promote health through research that is in keeping with Indigenous sovereignty, values, and traditions, the FEHNCY project follows the First Nations principles of Ownership, Control, Access, and Possession (OCAP®). These principles advise on how to conduct ethical research in partnership with First Nations, and provide guidance on how data should be collected, interpreted, stored, used, and shared (**Figure 2**).

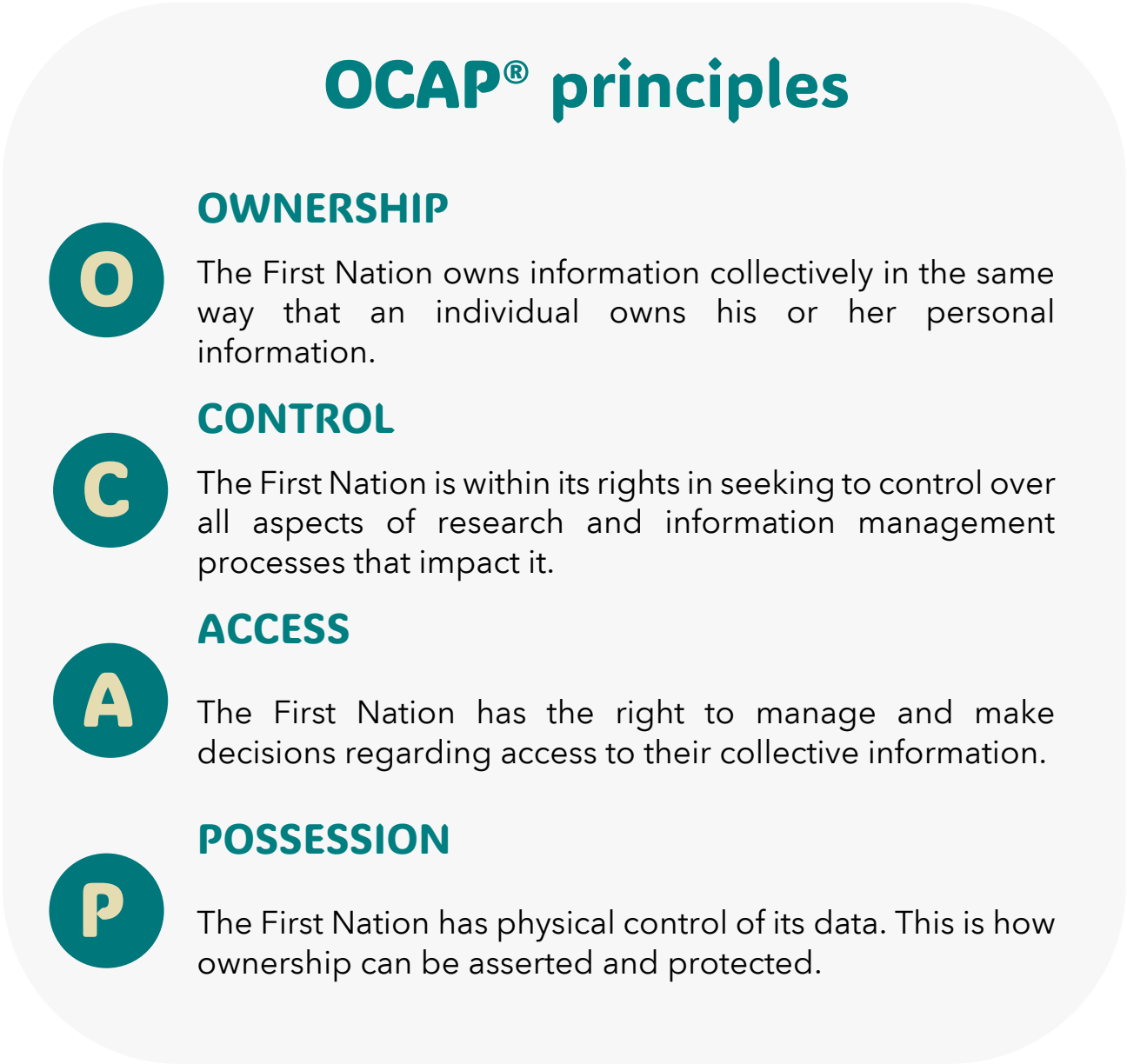
FEHNCY is a community-led research project, and community engagement is built into the project design, with early and continued engagement with community partners. Community research agreements are adapted to each First Nation's needs. Each community owns its data and receives a full anonymized quantitative dataset at a data training workshop organized after completion of the study. In keeping with ethical obligations to protect participant confidentiality and in accordance with OCAP®, summaries of qualitative data are returned to communities. Results are presented throughout the study to community partners, and participants receive reports with their individual results.

Ethical Considerations

The FEHNCY project was approved by six research ethics boards and follows the guidelines outlined by local/regional ethics boards (when applicable). The project also follows Chapter 9 of the Tri-Council Policy Statement: Ethical

Conduct for Research Involving the First Nations, Inuit, and Métis Peoples of Canada.

Figure 2. The principles of OCAP.



1.2. Community Engagement

We engage First Nations in the research and create opportunities to build capacity in communities and partnerships between researchers and the participating First Nations communities through community-based participatory research. We brought together the researchers and key people from the community to plan the implementation of the study in X by mutual agreement.

Community Advisory Circle

A Community Advisory Circle (CAC) was created with the purpose of guiding each step of implementation of the research project within the community to ensure that data were being collected respectfully, that communication materials being used were clear and culturally appropriate, that partners were kept up to date with all aspects of the project (data collection and community engagement activities) and that community members participated in the decision-making process. The CAC comprised of key community partners…

Community Researchers

All data were collected by X community members who were trained on the study procedures and their roles. Responsibilities of the community researchers (CRs) included supporting community engagement events and activities, recruiting participants, administering questionnaires, deploying air quality monitors, as well as supporting the health assessment implementation. The CRs

communicated directly with the FEHNCY coordinating team throughout the duration of the study, providing regular updates and feedback on study progress.

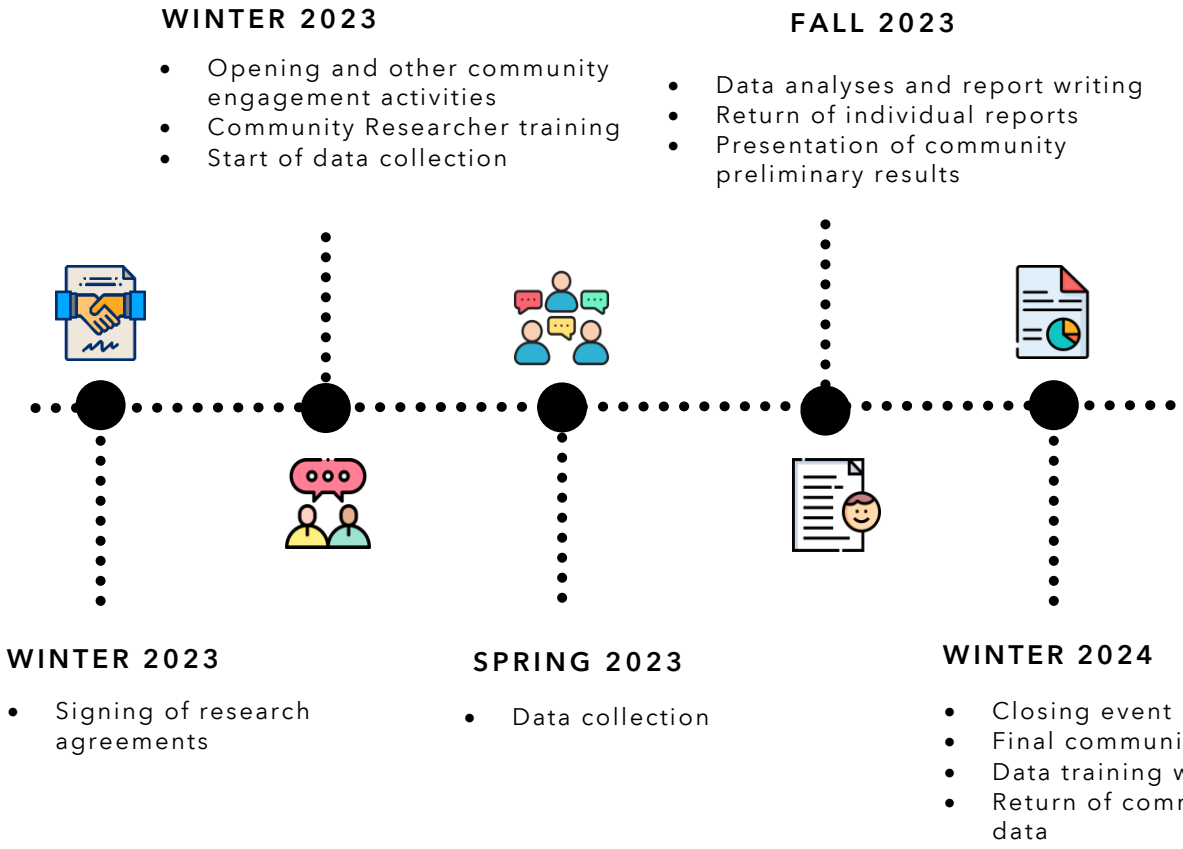
Community Engagement Activities

To open the project in X, a community-led information session was held on X so community members could come by and know more about the project and ask questions. A contest was held for youth to submit their drawings of what they thought a healthy community looked like. The project worked with the high school art teacher during art class for students to design their submissions. The CAC selected the winning design which was then interpreted and incorporated into the FEHNCY bundle by another local artist from the art center to do the patchwork. The idea for the Bundle was based on the Teiakonekwenhsatsikhetare (Our blood is sweet) historical wampum bundle which was started by Joe Jacobs, an Elder from Kahnawake, to raise awareness in Indigenous communities that diabetes can be overcome. In the same way that each First Nation visited added to the Teiakonekwenhsatsikhetare bundle from 1997-2017, the FEHNCY bundle will be added to by each First Nation participating in the study to raise awareness about the health of children and youth. During data collection, other activities such as the online intergenerational cooking video contest and the seed planting activities at the elementary school specifically engaged with youth in the community.

1.3. FEHNCY Timeline

Figure 3 shows the timeline of the FEHNCY project. In the fall of 202X, the opening event took place and data collection started. The closing event and the data training workshop marked the end of the project activities.

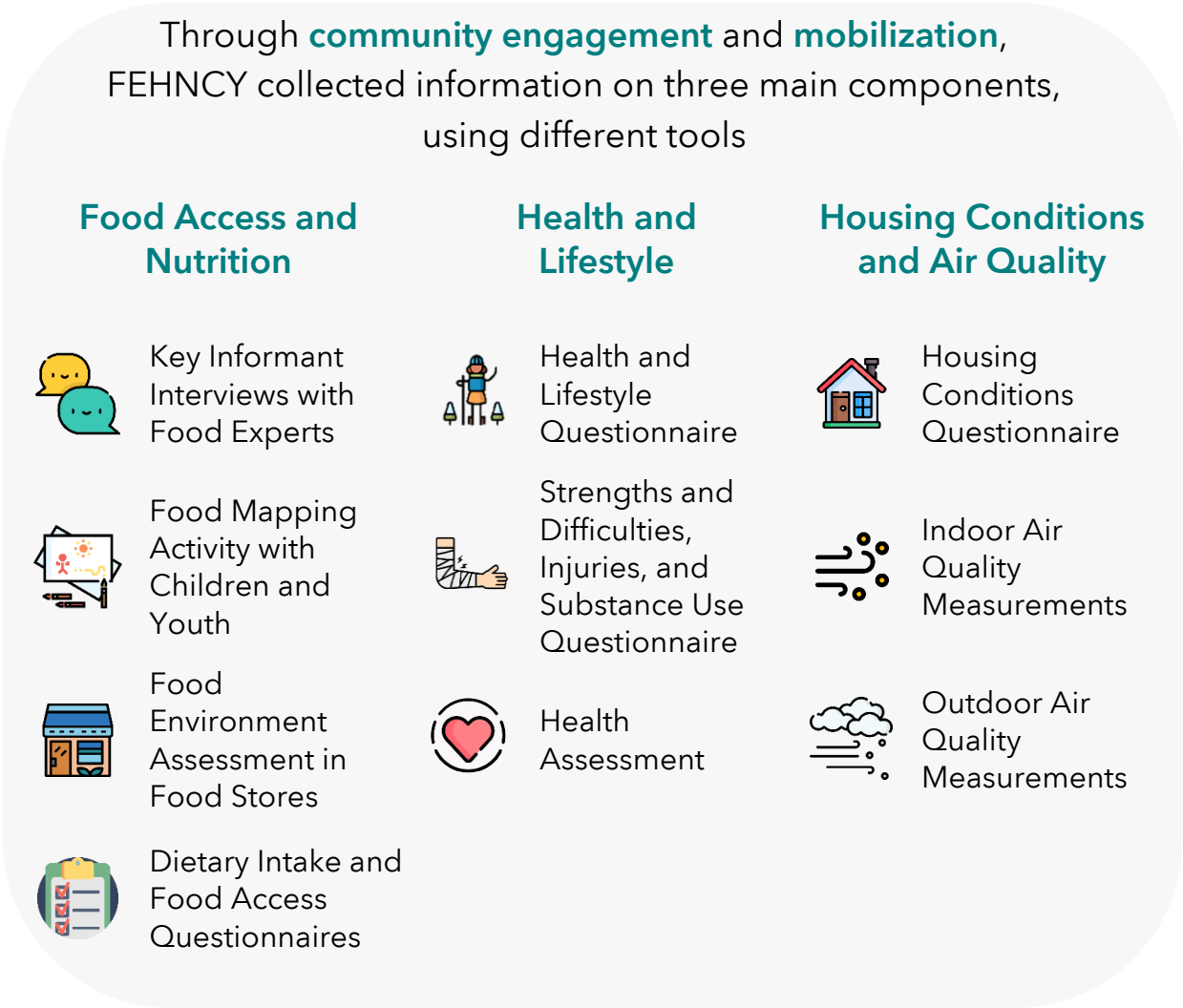
Figure 3. Timeline of the FEHNCY study.



1.4. Main Research Components and Methods

Data collection consisted of different methods (**Figure 4**), including interviews with food experts, talking circles with children and youth, questionnaires, health assessments of children and youth, as well as air quality measurements.

Figure 4. Main research components and methods used.



1.5. FEHNCY Participants

X local food experts

Key Informant Interviews were conducted with local food system experts to gather knowledge about community members' access to traditional, store-bought, and alternative food sources.

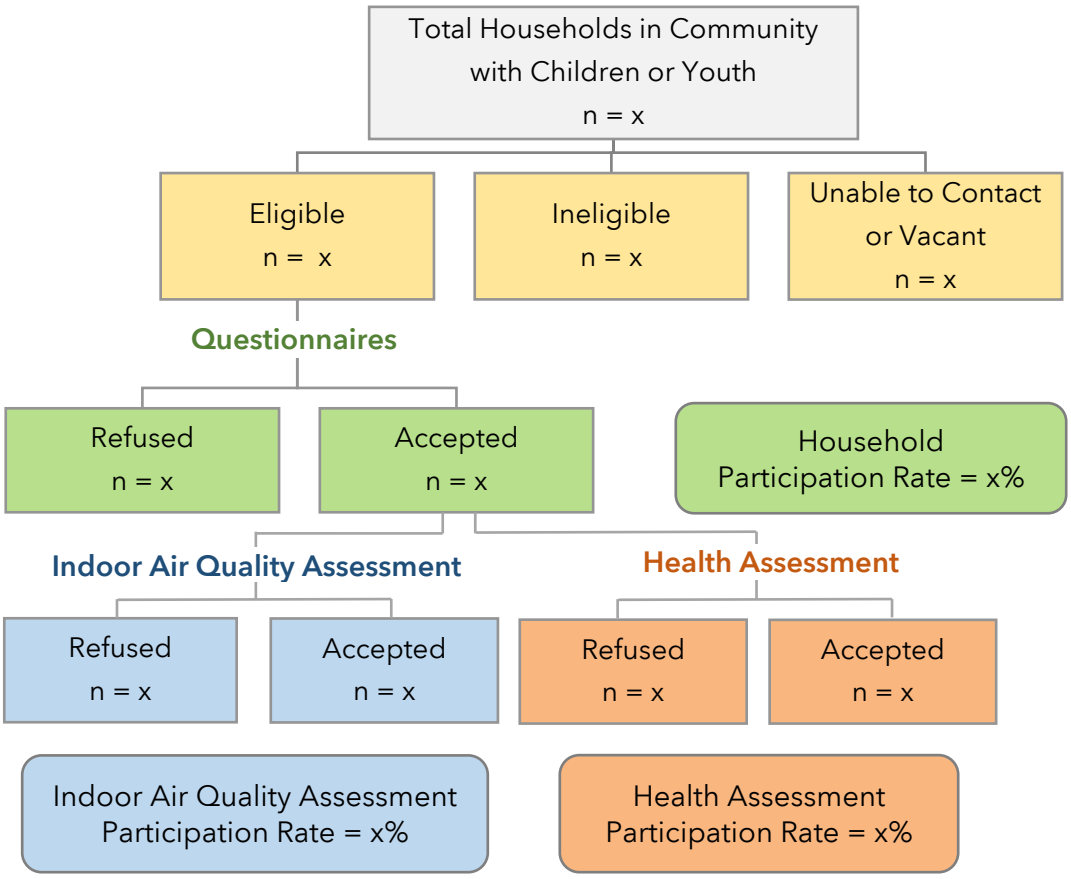
X children and youth aged 6 to 19

Children and youth were invited to participate in two **Food Mapping Activities** that consisted of talking circles where they explained their perspectives on availability and access to food within their home, school, and community food environments in a draw-and-tell manner.

X households with children and youth aged 3 to 19

Households with children or youth were approached to complete **questionnaires** about food access, diet, health, and housing conditions and have their homes assessed for **indoor air quality**. The children and youth were later invited to participate in a **health assessment**. **Figure 5** presents the household recruitment for the questionnaires, household indoor air quality assessment, and the individual health assessment.

Figure 5. Household recruitment and participation rates.



Description of the Survey Participants

In total, X households answered the FEHNCY questionnaires about food access and nutrition, health and lifestyle, and housing conditions.

Figure 6. Description of the children and youth (n=X).

Children and youth (3-19y)

X children and youth **agreed to participate** in the questionnaires.

X% were **female**.

X% attended **regular school**.

Xy is the mean **age** of the participating **children** and **youth**.

Age distribution of the children and youth

number of participants [%]

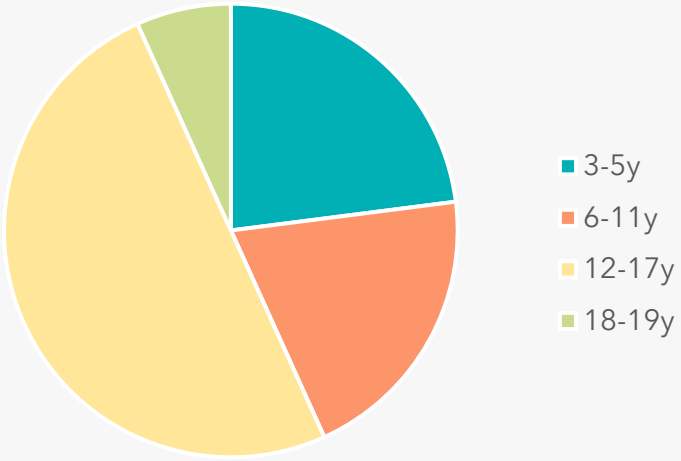
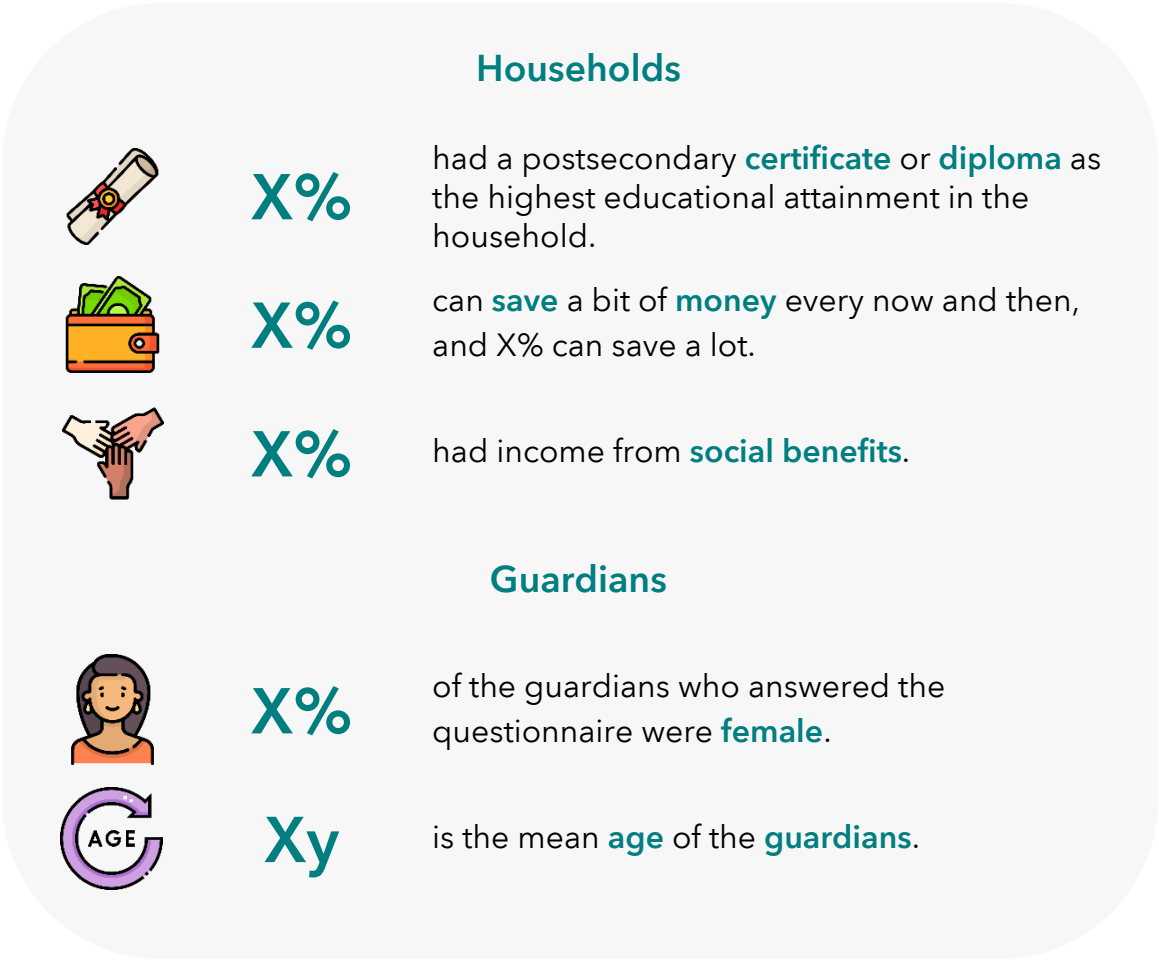


Figure 7. Description of the households and guardians of the children and youth (n=74).



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2. Food Access and Nutrition

All the conditions in which we acquire and consume food, that is, our **food environment**, can affect our health and well-being. Poor nutrition and environmental health contribute to the continuing gap in the health and well-being of First Nations children and youth. Obesity, diabetes, poor nutrition, and food insecurity are among the most critical issues for First Nations adults living on-reserve (1).

The Food Access and Nutrition part of this study assessed the family's food access, their perceptions of their food environment, as well as the extent of food insecurity in the home. It also assessed the children's and youth's food intake including from traditional and store-bought foods, and their overall diet quality. We also visited food stores in and around the community to assess the availability, price, variety, and quality of foods.

This part of the report presents the summary results of **Food Access Questionnaire**, **Traditional Food Frequency Questionnaire**, and the **Store-bought Food Frequency Questionnaire**, as well as the results from the **Food Store Assessments**. For more details see the Food and Nutrition Appendices.

2.1. Household Food Practices

Figure 8. Traditional food access (n=X).

Your **food environment** is all the conditions in which you **acquire** and **consume** food.

Traditional food

X% participated often or sometimes in community's **cultural events.**

X% said their traditional food **supply did not last**, and they could not get any more.

X% had traditional food **shared with them** often or sometimes in the past 12 months.

X% think traditional foods are **important** for their own **health**.

X% think traditional foods are **important** for their own **culture**.

X% participated in **traditional food gathering activities**, mostly berry picking and fishing.

X% of **children** and youth went **berry picking** with someone in the household.

X% of **children** and youth went **fishing** with someone in the household.

Figure 9. Household store-bought food acquisition and food preparation (n=X).

See **Error! Reference source not found.** for more information.

2.2. Food Stores Assessment

Figure 10. Assessment of three food stores in and around the community.

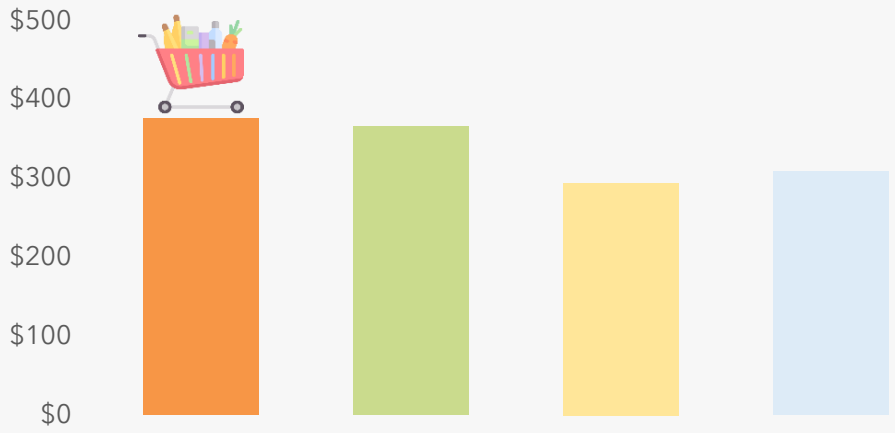
We assessed three **food stores** in and around the community and we observed that:

There was a **good/bad availability** and **variety** of healthy foods.

The healthy foods were all in **peak/bad condition**.

There were/were not **promotional elements** (such as posters and signs) for healthy foods (e.g., fruits and vegetables) and unhealthy foods (e.g., soft drinks and chips).

The Nutritious Food Basket estimates the **weekly cost** of a **healthy food** basket based on 61 foods to feed a **family of four**.



The cost of a healthy food basket in X is about **$X higher/lower** than in **X**, and about **$X higher** than in **X**.

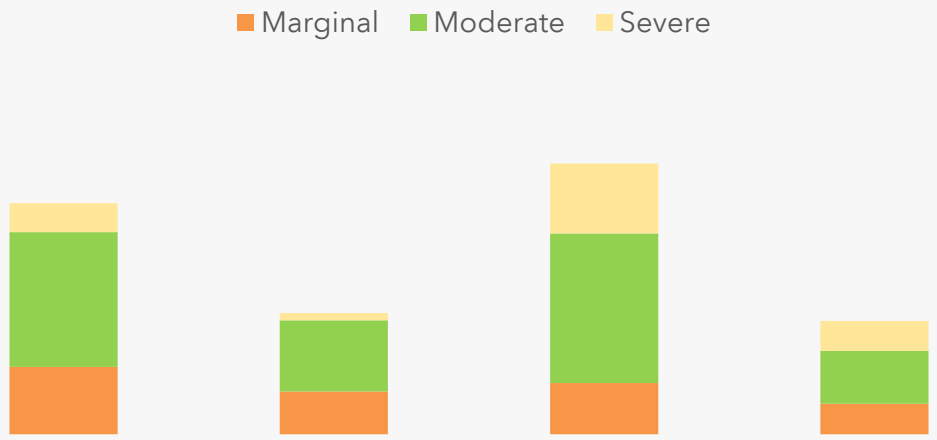
The **annual cost of groceries** was forecasted to **increase** by up to **$1,065.60** in 2023 compared to 2022, mainly for vegetables, dairy and meat (2).

See **Error! Reference source not found.** for more information.

2.3. Household Food Insecurity

Figure 11. Household food insecurity (n=X).

Food insecurity is when you are **uncertain** or **not able to acquire or consume** the **food** you would like to, as much and as often as you want.



Marginal food insecurity: households worried that their food would run out.
Moderate: households needed to buy lower quality or smaller amounts of food due to lack of money.
Severe: household members skipped meals, reduced their food intake, or went days without eating.
§ Unpublished data from the FNFNES study / ¤ Batal et al., 2021 / ǂ Tarasuk et al., 2022.

Household **food insecurity** in X had **doubled/decreased** in 202X compared to 201X.

Household **food insecurity** in X was **X times higher/lower** than the **national** level (4).

Food-insecure households may **allocate** limited resources away from many essential needs such as **housing** and **medication,** in addition to **food** (4).

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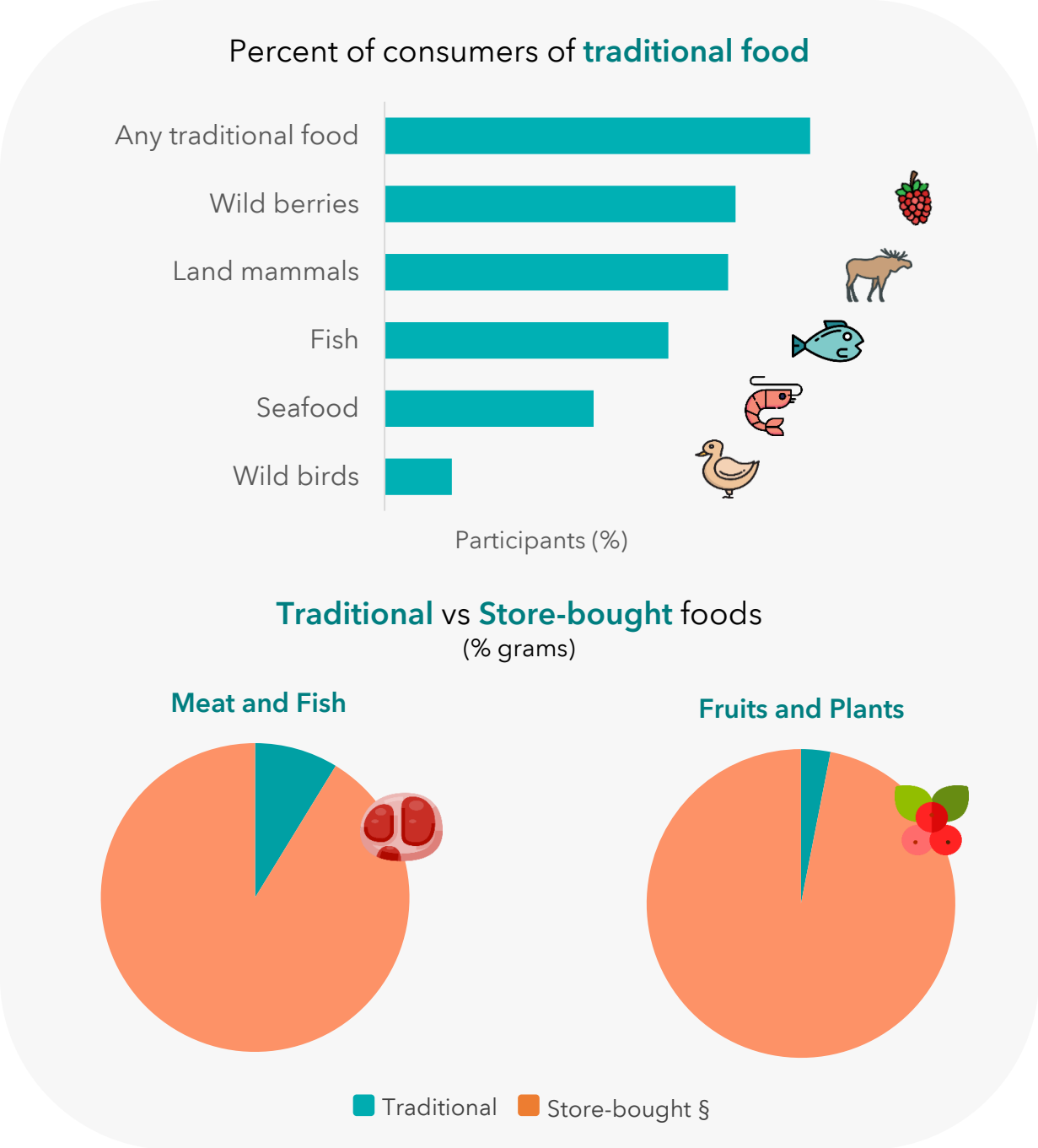
2.4. Traditional Food Consumption

Figure 12. Traditional food consumption by children and youth (n=X).



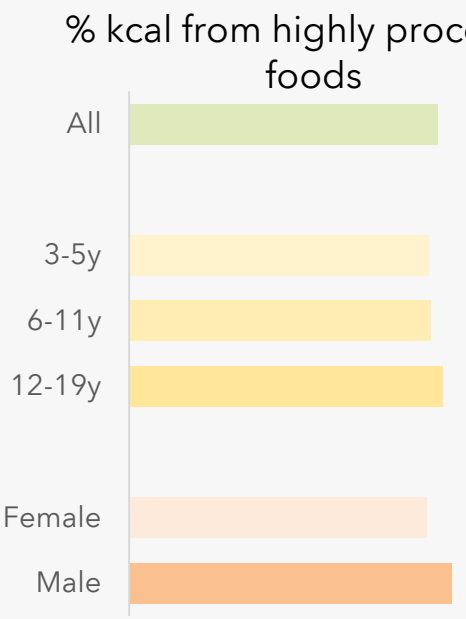
§ Store-bought meat and fish included fresh and frozen meat and fish. Store-bought fruits and plants included fresh and frozen fruits and vegetables.

See **Error! Reference source not found.** for more information.

2.5. Highly Processed Foods

Figure 13. Consumption of highly processed foods (% kcal) by children and youth (n=X).

Highly processed foods are low-cost, ready-to-heat or -eat that are filled with **salt**, **sugar**, and **saturated fat**.



Top 5 highest **energy** contributors

1 **Fast food**

2 **Ready-to-eat dishes**

3 **Pastries**

4 **Sweetened milk and dairy**

5 **Salty snacks**

Highly processed foods represent **X% of the total caloric intake** of children and youth in X. The main source is from...

Consumption of highly processed foods in X is **higher/lower than** in **Canada** in 2015, which ranged from 48% (2-5y) to 53% (13-18y males) (5).

High consumption of highly processed foods is associated with **chronic conditions** such as obesity (6).

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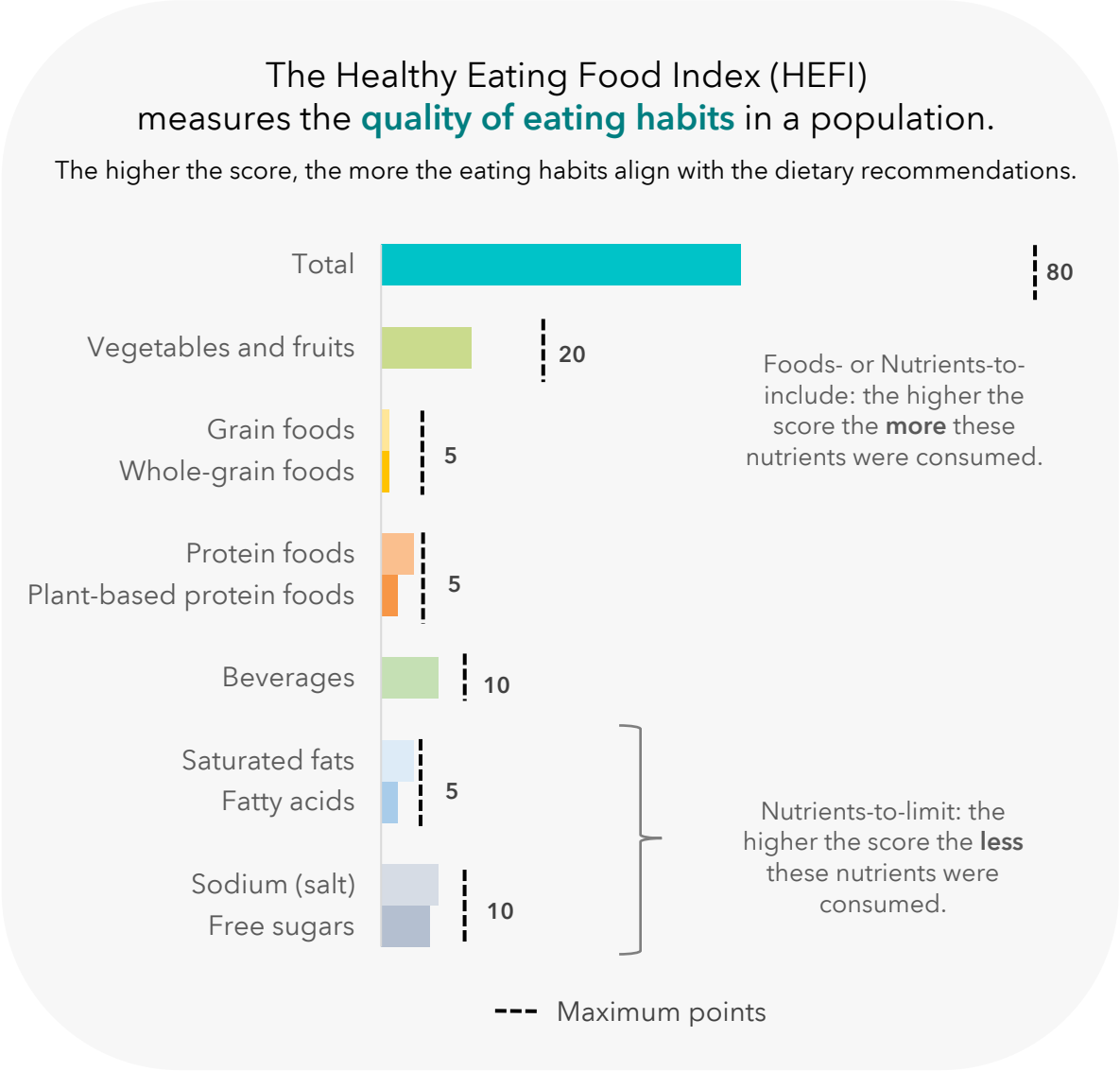
2.6. The Quality of Eating Habits

Figure 14. The quality of eating habits of children and youth (n=X).



Intakes of vegetables and fruits and whole grain foods were low/adequate. Intake of **saturated fat**, **sodium** (salt), and **free sugar** were high/low.

The HEFI score in X was slightly **higher/lower than** that found for children in **Canada** in 2015 (7).

Reducing consumption of **highly processed foods** is a good strategy to reduce intake of saturated fat, sodium, and free sugars.

See **Error! Reference source not found.** for more information.

2.7. Meal-eating Habits

Figure 15. Meal-eating habits by children and youth (n=X).

X% said they **changed their diet** in the past month due to a health problem or to eat healthier.

X% ate the evening **meal with** their **family** sitting at the dinner table at least 4 days/week.

X% sometimes or often used **electronic devices** or **watched TV** during evening **meals**.

X% ate meals from a **restaurant** at least once a week.

Eating meals with **family** has been associated with **healthier eating patterns** (8,9).

Using **electronic media** during meals is associated with **higher** intake of **highly processed foods** and higher body mass index (10,11).

See **Error! Reference source not found.** for more information.

3. Health and Lifestyle

First Nations children and youth are exposed to environmental risks including contaminants in water, food and soil, pesticides, and radiation (12,13). Children and adolescents are more sensitive to the effects of contaminants because their bodies and brains are under development (14,15). Indigenous peoples are considered among the most vulnerable because of their close connection to a particular area, one that they may be unwilling to leave due to close cultural, traditional and/or subsistence ties.

This part of the report presents the results from the **Health and Lifestyle Questionnaire**, and results from the **Health Assessment**, which took place a few weeks after the questionnaires were completed. For more information, see the Health and Lifestyle Appendices.

Health and Lifestyle Questionnaire

The Health and Lifestyle Questionnaire contained questions about physical activity and sedentary habits, overall health, and chronic conditions. In total, X children and youth answered the Health and Lifestyle questionnaire (see Description of Survey Participants).

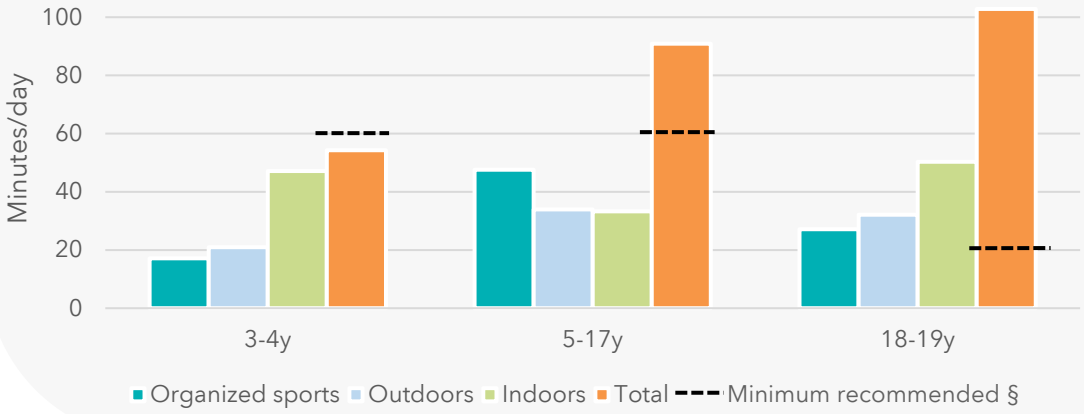
3.1. Physical Activity

Figure 16. Physical activity (n=X).

Physical activity includes activities that are part of our everyday life that make us **sweat a little** and **breathe harder** than normal, such as to getting from place to place or for recreation.

X% said they would like to do more physical activity.

X% said **lack of time** was the main **barrier** for practicing more physical activity.



§ The Canadian Society for Exercise Physiology, 2021.

In X, X% of children and youth **met/did not meet** the **physical activity target**. The prevalence of physical activity is higher/lower in X than the national rate (40%) in 2016 (17).

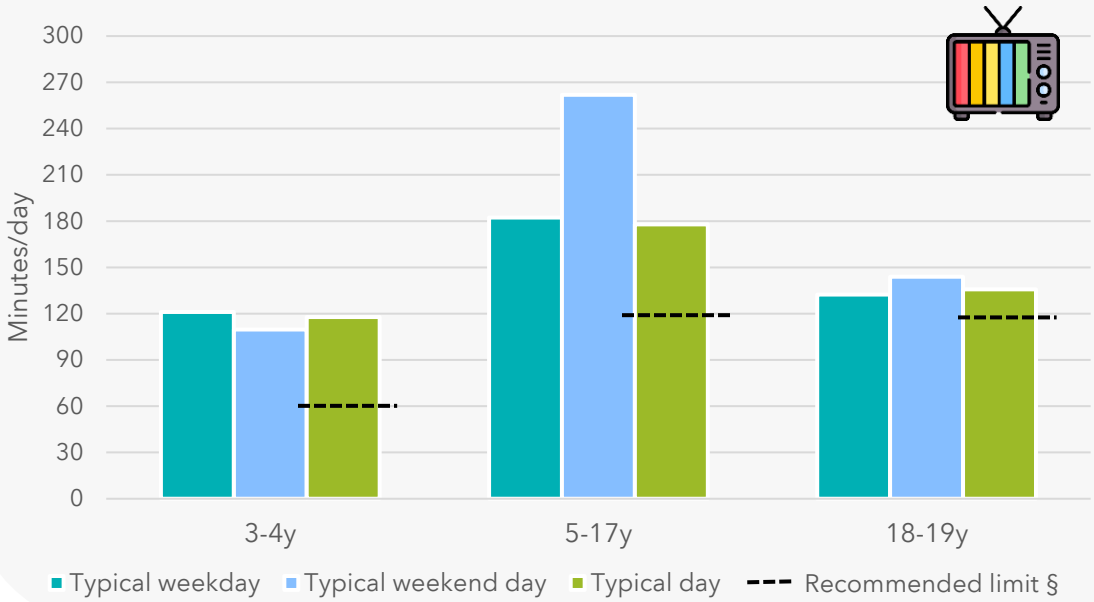
Being active reduces the risk of **chronic diseases**, while **maintaining** good **mental** and **physical health** (16).

See **Error! Reference source not found.** for more information.

3.2. Screen Time

Figure 17. Screen time (n=X).

Screen time includes time spent playing **video games**, watching **TV**, texting, on **social media**, or surfing the **internet for leisure** (not for homework).



§ The Canadian Society for Exercise Physiology, 2021.

On a typical day, most participants **spent** from X to X minutes **more/less than the recommended time** on **electronic devices**.

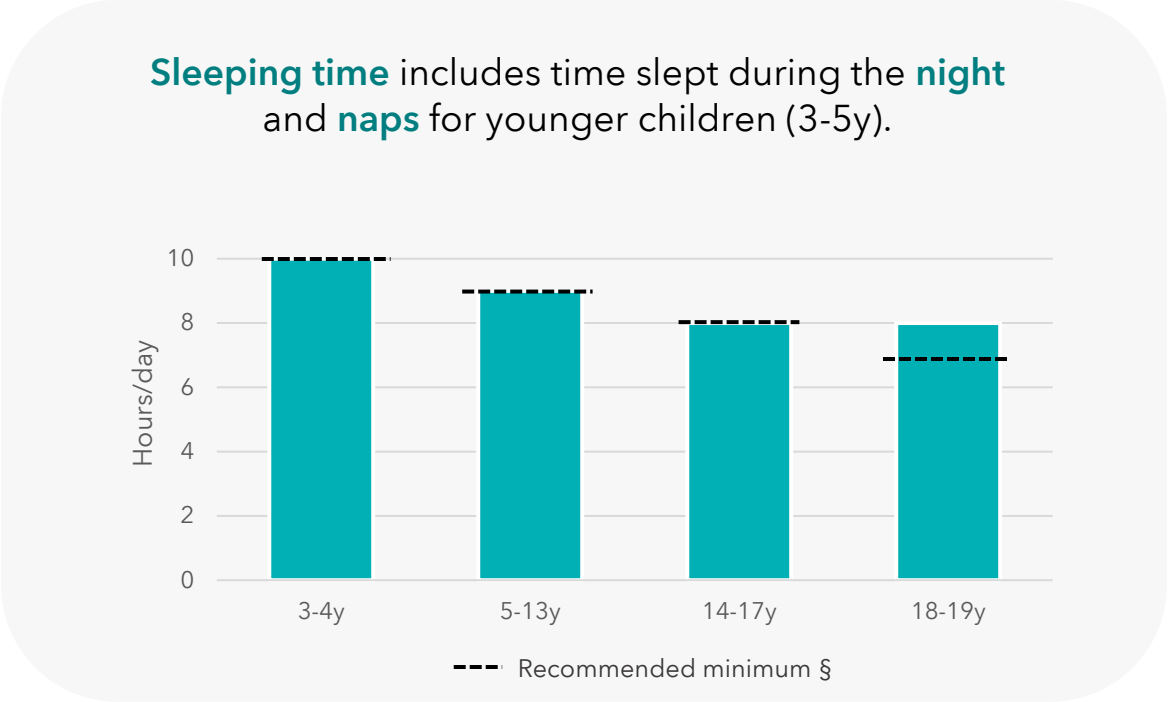
In X, **X%** of children and youth **spent more/less than the recommended time on their screens** compared to 47% of children in Canada in 2016 (17).

Spending **less time** on **sedentary** activities can help children learn new skills, do **better in school**, and maintain a **healthy body weight** (16).

See **Error! Reference source not found.** for more information.

3.3. Sleeping Habits

Figure 18. Hours of sleep (n=X).



§ The Canadian Society of Exercise Physiology, 2021.

In X, **X%** of children and youth **met** the **recommended hours of sleep,** which is higher/lower than the national rate (X%) in 2009 (17).

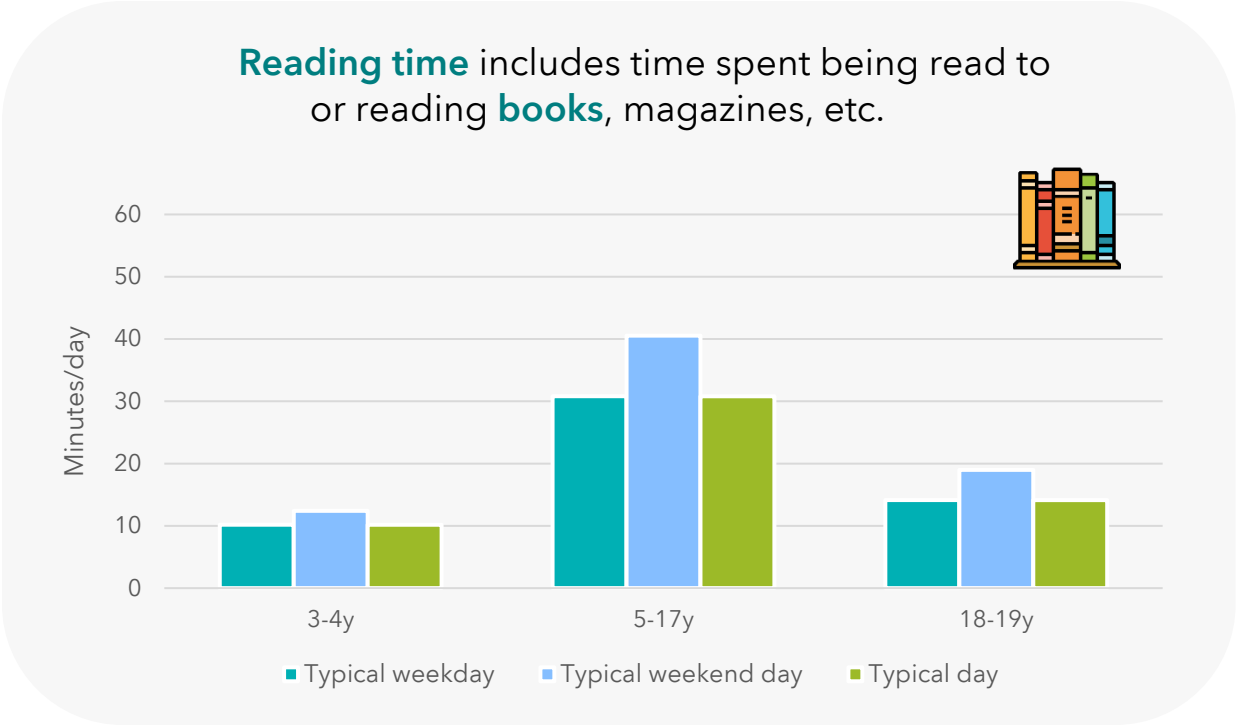
When combining **physical activity**, **screen-time** and **sleeping** recommendations, **X%** of children and youth **met all three recommendations**, which is higher/lower than the national rate (18%) (17).

Having **sufficient sleep** every day, practicing **physical activity**, and **minimizing** time spent on **sedentary** activities are important for **optimal health benefits** (16).

See **Error! Reference source not found.** for more information.

3.4. Reading Time

Figure 19. Time reading or being read to (n=X).



There is no minimum recommended for time spent reading but **children** should **prioritize** leisure activities such as **reading**, **playing outdoors**, and **crafting** over using electronic devices.

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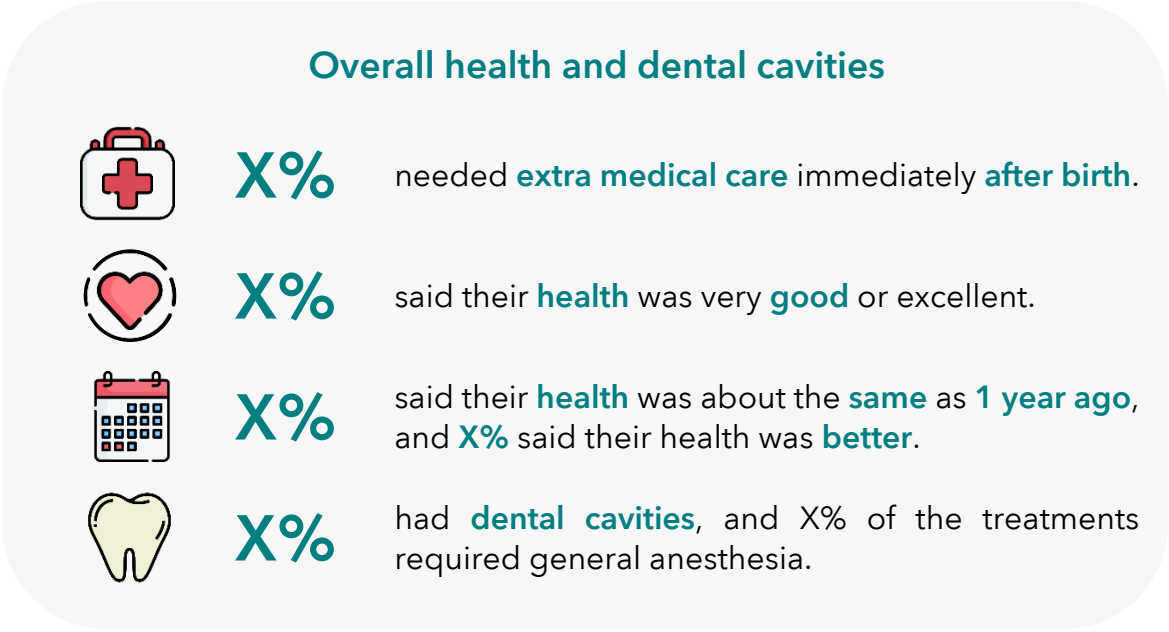
Overall Health and Dental Cavities

Figure 20. Overall health and dental cavities (n=X).



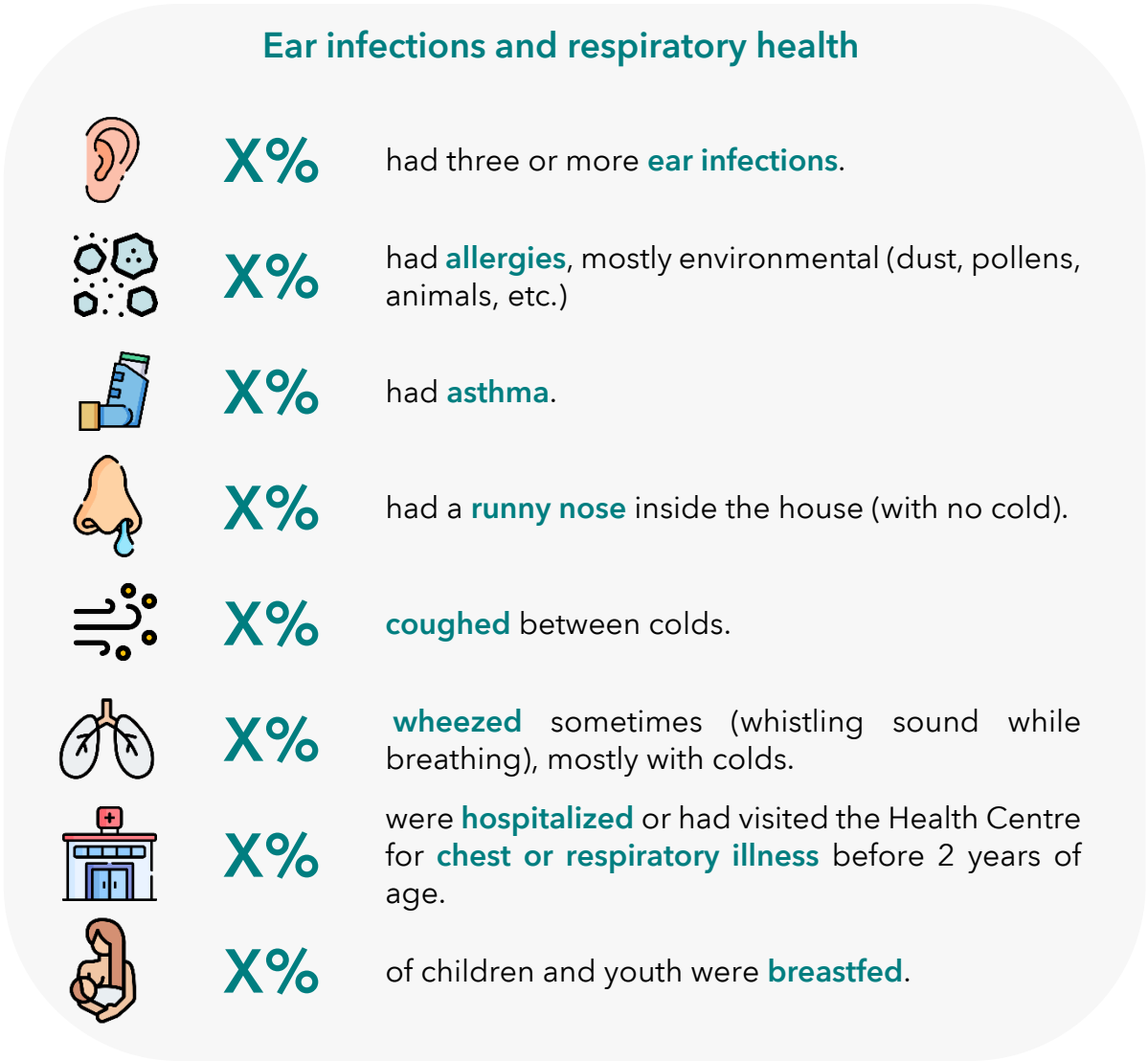
In Canada, **57%** of children (6-11y) and **59%** of youth (12-19y) had or have had **dental cavities** in 2007-2009 (18).

Dental cavities can cause **pain** and infection if left untreated, affecting the child's ability to **learn**, **speak**, **sleep**, and **eat** (18).

See **Error! Reference source not found.** for more information.

3.5. Ear Infections and Respiratory Health

Figure 21. Ear infections and respiratory health (n=X).



In **Canada**, **19%** of children and youth (10-19y) had **asthma** in 2011-2012 (19).

Runny nose between colds can be a sign of **allergies**, and **cough** between colds can be a sign of **asthma**.

Breastfeeding has a **protective** effect on the **respiratory health** in early childhood (20).

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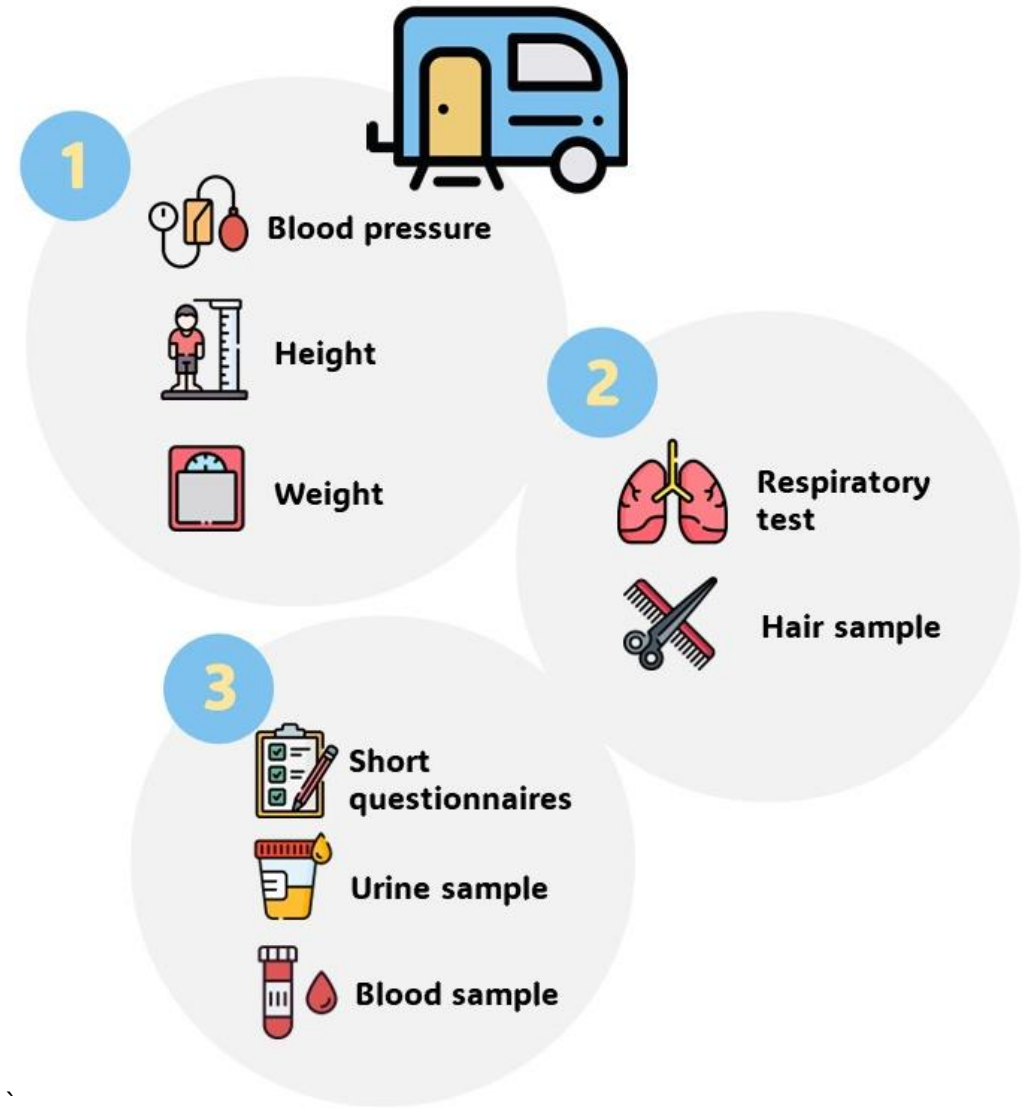
Health Assessment

A few weeks after the participants answered the questionnaires, they were invited to make an appointment for a health assessment (**Figure 22**). In total, X children and youth participated. See Error! Reference source not found. for m ore information about the methods, and Error! Reference source not found. for the Testing Fact Sheet which contains a short explanation of the analyses performed in the health assessment.

Figure 22. The stations at the health assessment appointment.



3.6. Description of Participants in the Health Assessment

Figure 23. Description of participating children and youth of the health assessment (n=X).

X is the number of children and youth that came to the **health assessment**.

X% were **female**.

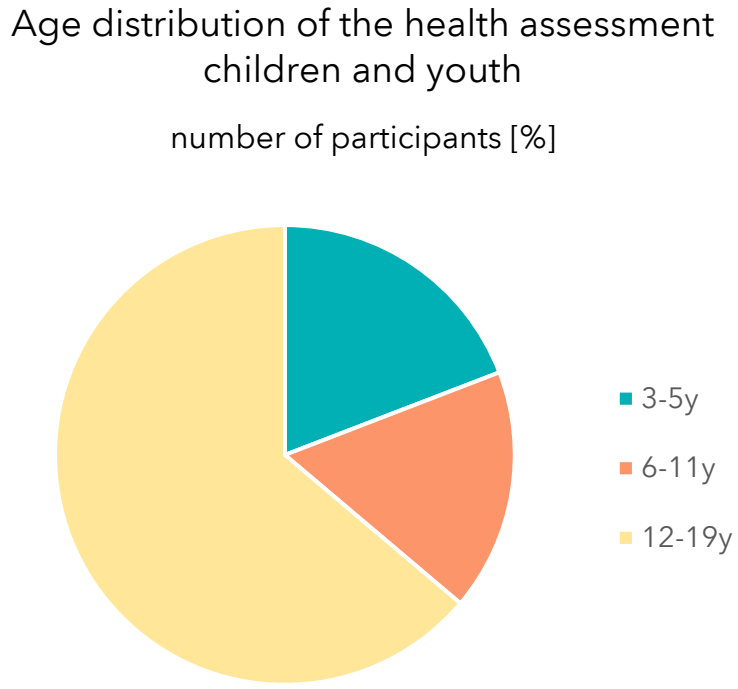
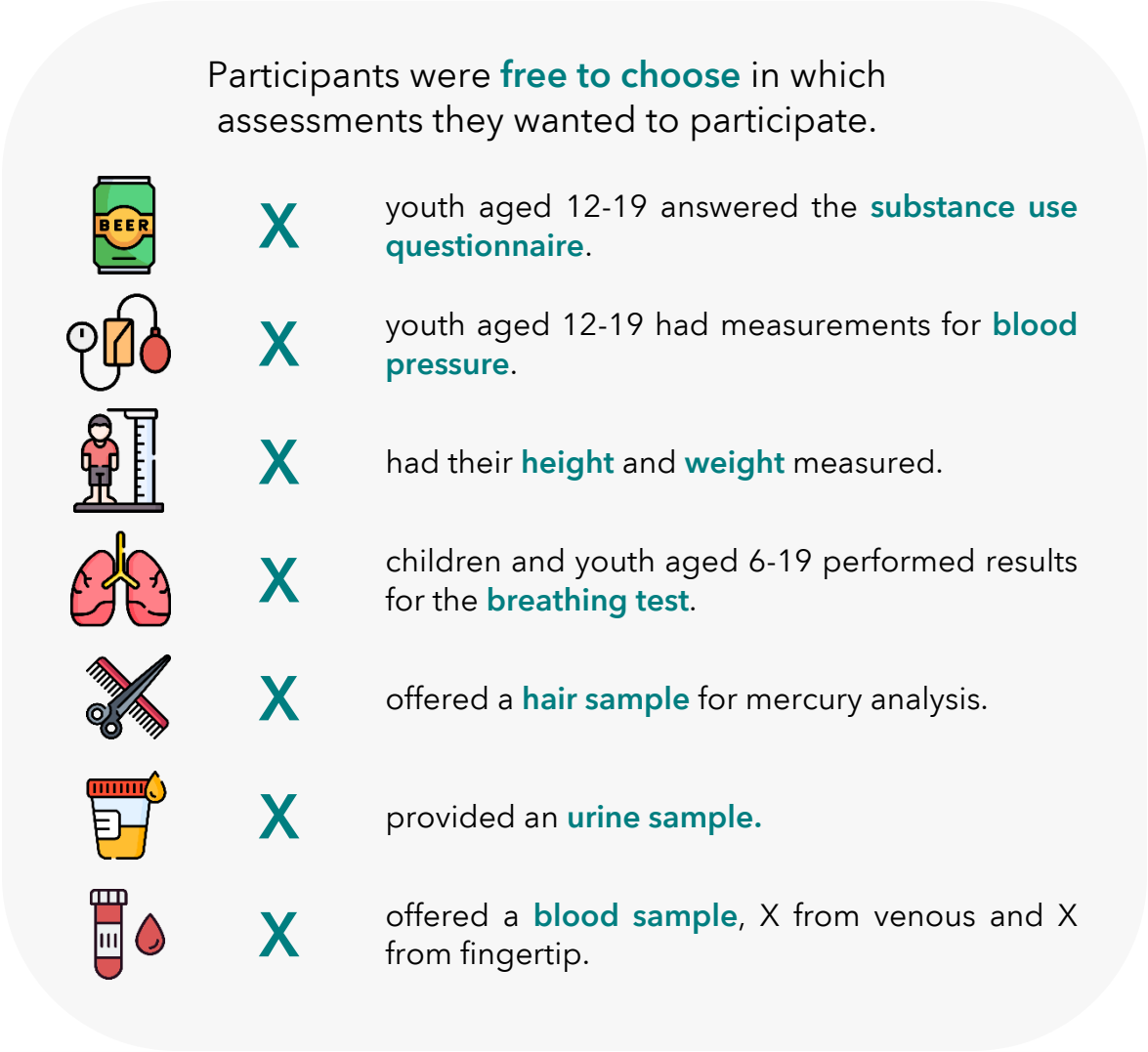

Age distribution of the health assessment children and youth
number of participants [%]
3-5y
6-11y
12-19y

Figure 24. Number of participants in the health assessments (n=X).



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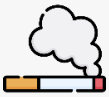
3.7. Substance Use Questionnaires

Figure 25. Drinking, smoking, and substance use by youth 12-19 years old (n=X).

Substance use questions were asked at the health assessment for youth aged **12-19**.

X% **drink** or had drunk **alcohol**, X% of them drink 1-3 times a month; no one drank every day.



X% **smoke** or had smoked commercial **cigarettes** or **e-cigarettes** (mostly e-cigarettes), and most not daily.

X% had used **cannabis** by smoking/vaping or consuming edible products, and most not daily.

X% youth reported consuming **other substances** such as cocaine, ecstasy, and opioids.

X% of the youth reported engaging in the use of either commercial **cigarettes**, **e-cigarettes**, or smoking or vaping **cannabis**.

In Canada, **37%** of youth (15-19y) reported **alcohol** use in the past 30 days (2019); **3%** were **smokers**, **35%** had tried **vaping** in their lifetime, and **23%** had tried smoking **cannabis** (2020) (21,22).

Preventing early substance use can help **reduce** potential **negative health effects** later in life (23).

See **Error! Reference source not found.** for more information.

3.8. Metabolic Health

Figure 26. Metabolic health (n=X).

Body mass index and blood pressure

X% had **excess weight**.

X% had **elevated blood pressure** (12-19y).

Blood lipids

X% had **high** levels of total **cholesterol**.

X% had **high** levels of **triglycerides** (a type of fat found in our blood).

X% had **low** levels of **HDL** (good cholesterol).

X% had **high** levels of **LDL** (bad cholesterol).

Blood sugar

X% had **high** non-fasting blood **glucose** §.

X% had **high** glycated hemoglobin suggesting **diabetes** (all previously diagnosed).

§ Participants were not fasting so if they just had a meal, blood glucose values may have been artificially elevated. Glycated hemoglobin, however, is not sensitive to the fasting state.

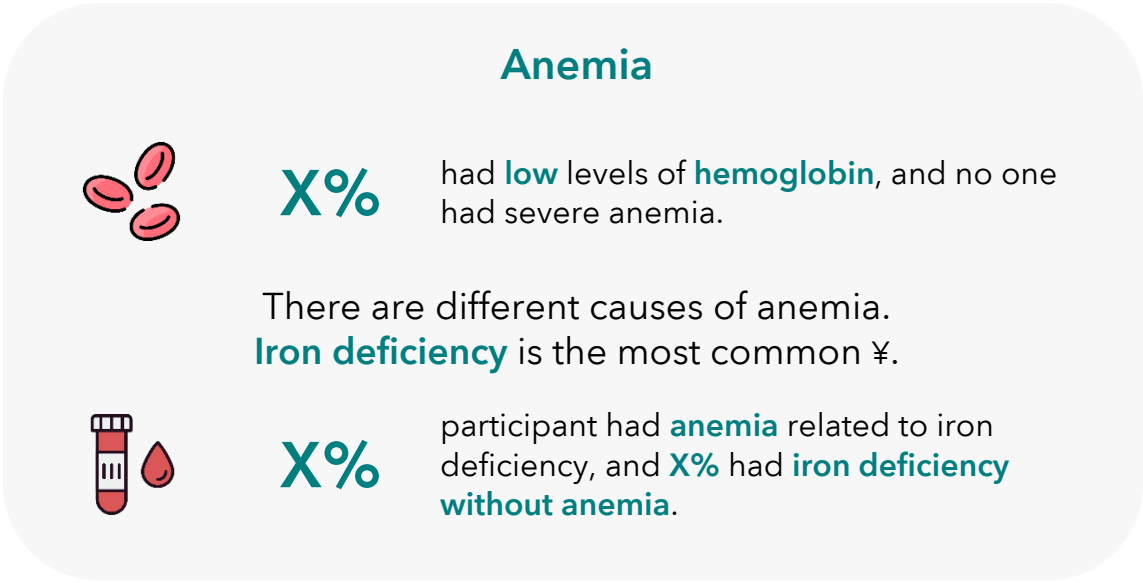
In **Canada**, 30% of children (5-17y) had **excess weight** in 2017, and less than 1% of children (12-17y) had **diabetes** in 2022 (24).

Fostering an **environment** that promotes **healthy eating** and **physical activity** is important for the **prevention** and management of **excess weight** and **diabetes** (25).

See **Error! Reference source not found.** for more information.

3.9. Anemia and Iron status

Figure 27. Anemia and iron status (n=X).



Prevalence of **anemia** was **17%** and **iron deficiency** was **21%** in four **First Nations** communities in 2015 (26).

Iron deficiency without anemia is an early stage of iron deficiency that may lead to iron deficiency anemia. Both can be prevented and treated by **increasing iron intake** through food and/or supplements, and the search for the origin of possible blood loss. Women are more vulnerable because of menstruation.

Iron-rich foods include meats, eggs, fortified cereals, dark green vegetables, nuts, seeds, and legumes. Include a vitamin C-rich food to enhance absorption from plant-based iron sources.

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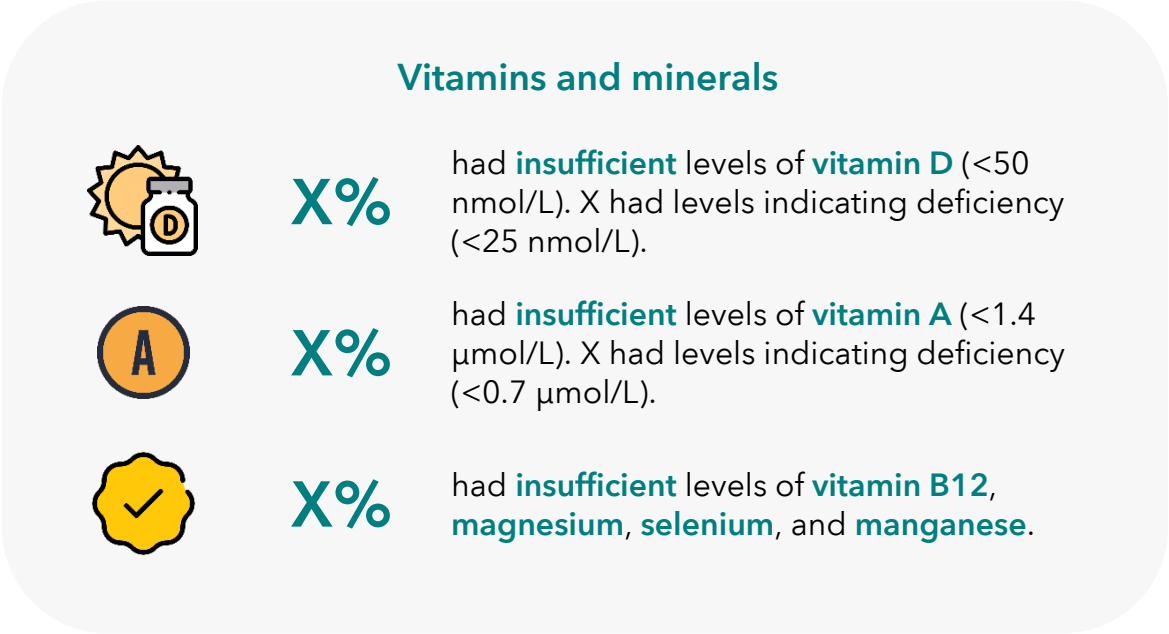
3.10. Vitamins and Minerals

Figure 28. Vitamins and minerals (n=X).



Vitamin A and **D insufficiency** are common in Indigenous children and youth (27).

Low levels of **vitamin A** and **D** are prevented by consuming **food sources**, and when needed, supplements. **Exposure** to the **sun** (using sunscreen to block harmful UV rays) promotes production of vitamin D by our skin.

Vitamin A-rich foods include liver, egg, orange fruits and vegetables, and dark-green vegetables.

Vitamin D-rich foods include fatty fish and fortified dairy products.

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3.11. Allergies and other blood cells

Figure 29. Allergies and other blood cells (n=x).

Allergies, markers of immune response, and platelets

X% had **IgE** levels **outside** the **typical values**. X of them reported having pets indoors.

X% had **normal** values of **platelets**, **white blood cells, neutrophils**, and **eosinophils**.

The prevalence of **IgE** levels **outside typical values** found in X is **higher/lower** to those found in the general **Canadian youth** population (28).

IgE levels are used to detect an immune response in the body due to food and environmental allergies (including those to pets), parasitic infections, etc.

White blood cells are a vital part of the immune system, they help the body fight infection and other diseases.

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3.12. Environmental Contaminants

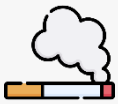
Figure 30. Environmental contaminants (n=X).

Environmental contaminants were measured in the hair, urine, and blood.

X% had **high** levels of hair and blood **mercury**.

X% had **high** blood levels of **lead**.

X% had **high** urine levels of **nickel**.



X% had **high** levels of blood and urine **cadmium**.

X% had **high** urine levels of **uranium.**

X% had **high** urine levels of **inorganic arsenic** (toxic type).

Few participants had…

The **threshold** levels in the Canadian youth population are **low**. This is because exposure to these metals is generally very low in the Canadian population.

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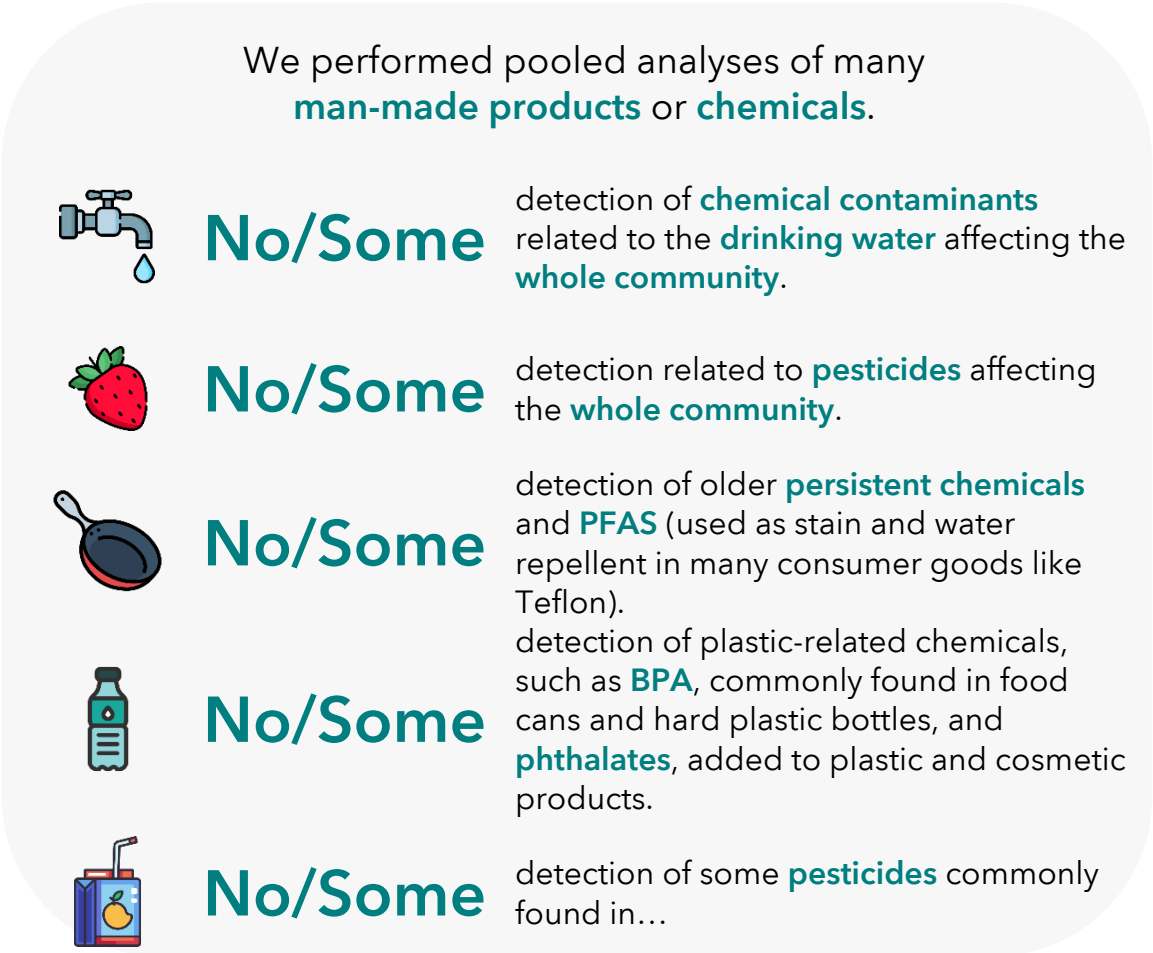
Figure 31. Man-made products or chemical contaminants.



Prevention is the key! Here are some tips to **prevent exposure** to these chemicals:

- **Avoid** drinking water from disposable **plastic bottles**; store tap water in BPA-free bottles or metal bottles instead.
- **Wash fruits** and **vegetables** well before eating them.
- **Choose** tap **water** over fruit juices.

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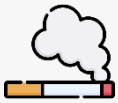
3.13. Exposure to Nicotine and Cannabis

Figure 32. Cotinine and THC (n=X).

Cotinine is a substance that indicates exposure to cigarettes or other products that contain nicotine, like e-cigarettes.



X% had **low/high** levels of **cotinine** in the urine which indicated they were **non-smokers/smokers** or **not exposed/exposed** to cigarette smoke.

THC is the main psychoactive constituent of cannabis and responsible for its intoxicating effects in the body.

X% had **low/high** levels of **THC** in the urine which indicated they **did not/consumed** cannabis and were **not/exposed** to second-hand cannabis smoke.

Most children and youth were…

Children and **youth exposed** to tobacco and cannabis are more **vulnerable** to their **harmful effects**.

Harmful effects from **tobacco** exposure include asthma, bronchitis, and pneumonia; and for **cannabis**, it includes impaired brain development, problems with attention, motivation, and memory (29,30).

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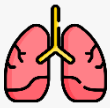
3.14. Lung Function

Figure 33. Lung function test (n=X).

The oscillometry test can assess markers of asthma and other chronic lung diseases



X% were **recommended** to have a **follow-up** at the Health Centre based on their **lung function test**.

X participants for whom a follow-up was suggested had a history of **respiratory illness.**

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4. Housing Conditions and Air Quality

Housing Conditions

Housing conditions are a key determinant of children and youth's physical and mental health (31,32). Overcrowding, poor ventilation, and mould growth have been reported in First Nations communities and could lead to poor indoor air quality, which could in turn lead to respiratory illness, such as asthma.

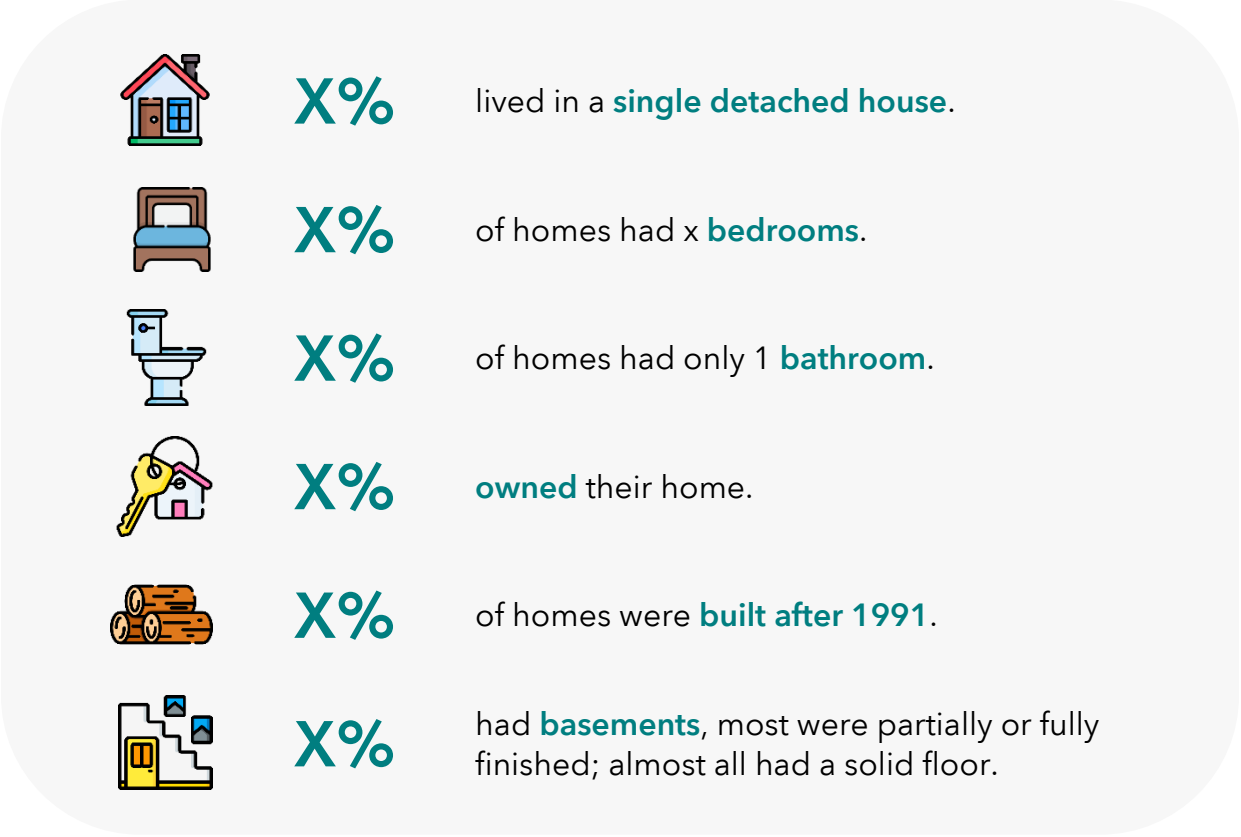
The Housing Conditions and Air Quality component of this study assessed the home environment that children were living in (using a questionnaire) and the level of indoor air pollution that they were exposed to (using monitors measuring various contaminants in the air).

The questionnaire aimed to capture general housing condition information that could be self-reported by the participants, such as overall housing characteristics, types of heating and ventilation, and occurrences of flooding and leaks. Questions were adapted from the Canada Mortgage and Housing Corporation Mould in Housing questionnaire (33).

This part of the report presents the summary results of the **Housing Conditions Questionnaire**, followed by the results from the **Air Quality Monitors**. See the Housing Appendices for more information about the methods as well as supplementary tables.

4.1. Description of Homes

Figure 34. Description of homes (n=X).



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4.2. Exterior Housing Conditions

Figure 35. Exterior housing conditions (n=X).

X% of homes needed **major repairs**.

X% of the **roofs** were in **fair** or **poor condition**.

X% of homes have **shifted** or **sank** since construction.

X% had **leakage problems** on the **exterior walls** of their home.

X% had **cracked**, **broken** or **missing windows**.

X% had **moisture-damaged** window frames, sills, or sashes.

X% had **cracked** or **broken exterior doors**.

X% had **poorly drained lots** around their home.

X% of households reported they needed **major repairs**.

In 2006, **45%** of First Nations **on-reserve homes** needed **major repairs**, compared to 36% in 1996 (34).

Homes in poor condition are more likely to experience moisture and indoor mold growth, which can affect the **health** and **well-being** of children and youth.

See **Error! Reference source not found.** for more information.

4.3. Flooding, Leaks and Condensation

Figure 36. Flooding, leaks, and condensation (n=X).

Floods and leaks can cause high indoor **moisture** and **mould**.

X% of homes had experienced a **flood**, most not in the past year.

X% had experienced **leaks** in the past 5 years, mostly due to rain/snow through leaks in the wall, window, or roof.

X% said that **bedrooms** were the room **most affected** by these **leaks.**

X% experienced **condensation** on their **windows** in the wintertime.

X% experienced **condensation** on their **basement walls**.

X% had evidence of **water leakage**, **penetration**, or **flooding** in the **basement**.

In X, **X** homes had experienced a **flood** or a **leak**.

It is important to **control leaks** and dampness indoors to **prevent mould** buildup.

See **Error! Reference source not found.** for more information.

4.4. Mould

Figure 37. Mould in the homes (n=X).

Mould will grow indoors if the home is **too damp,** but it is **preventable**.

X% smelled an **earthy, musty, or mouldy smell** in the home in the past 12 months.

X% experienced a **mould problem** in the past 12 months.

X% reported they had **medium** or **large mould problems**.

X% said that **bathrooms** were the most likely to be **affected by mould**, followed by the **basement**.

X% said **renovations** were successful at keeping **mould away**.

X% of participating homes reported they were affected by **mould**.

Unpublished data from the **Canadian** Housing Survey in 2018 showed that **5%** of homes **had** patches of **mould** larger than one square meter (35).

Exposure to indoor **mould** may increase the risk of **asthma** and **lung infections** (36).

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4.5. Heating and Ventilation

Figure 38. Heating and ventilation in homes (n=X).

Proper **heating** and **ventilation** in the home help to keep the **air clean** as well as prevent **mould**.

X% heated their homes primarily with **electric baseboards**, followed by wood stoves (X%).

X% had **working kitchen fans**; X% of these fans were ducted to the outside.

X% **always used** the **bathroom fan** when showering.

X% said the inside of their homes were **damp** or **humid.**

X% had a **heat recovery ventilator** (HRV); X% of those were working and being used

X% used a **dehumidifier** in the summer.

X% used a **humidifier** in the winter.

X% were able to keep a **comfortable temperature** during the **winter**, and X% keep it constant.

X% were able to keep a **comfortable temperature** during the **summer**, and X% have AC.

Wood stoves can contribute to poor indoor air quality if good wood-burning practices are not followed, they're back-drafting, and/or there are leaks in the flue. **Proper heating** and **ventilation** improve air circulation, which helps to **keep harmful pollutants out** of the air we breathe.

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4.6. Potential Sources of Indoor Air Pollution

Figure 39. Potential sources of indoor air pollution (n=X).

Common **household items** and **activities** can contribute to **poor air quality**.

X% of homes were near **unpaved** or **partially paved** roads.

X% were near something that produced dust or fumes; mainly **dusty roads**.

X% had **home renovations** done in the past month, mainly painting.

X% **stored paint** inside the home.

X% had used gasoline or **gasoline-powered devices inside** the home in the past month.

X% had **pets**, mainly dogs and cats.

X% had a **pest problem** in the past year.

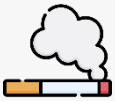
In Canada, 60% of households had **pets** in 2022 (37).

Dander (dead skin) **from pets** can negatively **affect air quality** because they remain in the air for a long time, worsening symptoms of asthma (38,39).

Figure 40. Smoking habits (n=X).

Smoking adds to **indoor air pollution**.

X% did **not allow smoking** inside their **homes**.



X% of participating children and youth had at least **one guardian** who **smoke.**

X% of **mothers smoked** through part or all of their **pregnancy** with the participating child.

In X, over **X in X** guardians (X%) **smoked** commercial **cigarettes**.

In Canada, **13%** of the population aged 18 and older **smoked** commercial cigarettes daily or occasionally (40).

Children can get exposed to harmful **chemicals** found in **cigarette smoke** which linger in smokers' **hair** and **clothing**, as well as through the inhalation of **second-hand smoke indoors** (41).

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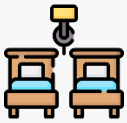
4.7. Crowding and Homelessness

Figure 10. Crowding and homelessness (n=X)

X is the **average number of people** per households with children.

X% of households were affected by **housing insecurity** (homelessness).

X% of households used rooms other than bedrooms for **sleeping**, such as the **dining** and **family rooms**.



X% of participating children **shared their bedroom** with others.

Similar to X results, the average number of people per **households with children** in Canada was **4** (42).

Overcrowding in homes can have a **negative effect** on children's **academic achievement**, **behavior**, and **health** (43).

See **Error! Reference source not found.** for more information.

4.8. Smoke and Carbon Monoxide Detectors

Figure 41. Smoke and carbon monoxide detectors (n=X).

Smoke and carbon monoxide **detectors**

X% had **smoke detectors** in their homes.

X% did **not** have **smoke detectors** near **bedrooms.**

X% had **carbon monoxide detectors.**

X% did **not** have **carbon monoxide** detectors near **bedrooms.**

It is extremely important for all homes to have **working** smoke and carbon monoxide **detectors**, especially near **bedrooms**.

In Canada, only **42%** of households had all **three fire safety devices**: smoke detector, carbon monoxide detector and fire extinguisher (44).

The leading cause of home **fires** is **cooking**, followed by **smoking** materials, such as tobacco products and e-cigarettes (45). Smoke and carbon monoxide **detectors** help to **save lives**.

See **Error! Reference source not found.** for more information.

4.9. Tap Water

Figure 42. Tap water (n=X).

Tap water

X% of homes had **tap water**.

X% of the tap water was supplied by the Nation's **piped distribution system**.

X% considered their tap water **unsafe to drink**.

X% often or sometimes **drank their tap water**.

X% use the **tap water** to **prepare food or beverages**.

X% received at least one **drinking water advisory** in the past year, most lasted a few months.

X% did not drink their tap water because of a **boil water order or advisory**.

Over **X in X** households had received a **drinking water advisory** in the past year.

In March 2023, there were **28** First Nations in Canada under **long-term boil water advisories** (46).

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Air Quality

Indoor and outdoor air quality are important determinants of health (47). Household air quality is impacted by various factors, including outdoor pollution, chemicals, and biological contaminants. Chronic exposure to poor indoor air quality can affect respiratory health and worsen medical conditions such as asthma and heart disease (47). Children are more susceptible to chronic exposure to indoor contaminants because their pulmonary systems are not yet completely developed, and they have faster breathing rates (48). Exposure at an early age can affect children's developing immune and respiratory systems (48). One important indoor contaminant is radon, a naturally occurring radioactive gas produced from the breakdown of uranium in soil and rock. Long-term exposure to high levels of radon in homes is associated with increased risk of lung cancer, especially in smokers (49).

Up to three monitors were installed in the participating households: indoor air quality egg monitor (which measures temperature, humidity, carbon dioxide, and particulate matter); a monitor that measures volatile organic compounds (VOC); and a monitor that measures radon levels. In addition, an outdoor air quality egg monitor was deployed in several locations in the community to assess outdoor air quality. This part of the report presents the summary results from the deployment of these monitors.

4.10. Indoor Air Quality Egg

Figure 43. Indoor air quality egg monitor (n=X).

Egg monitor

Indoor air quality egg monitor was deployed over a **5-day period** in **X households**.

X% was the average relative **humidity**, and X% of households had humidity above the guideline level of 55%.

X°C was the average **temperature**, and X% of households had temperatures outside the recommended range of 20-26°C.

X ppm was the average level of **carbon dioxide** (CO_2), and X% households had CO_2 levels above the guideline levels of 1000 ppm.

X µg/m³ was the average of **Particulate Matter 2.5 ($PM_{2.5}$)**, and X% of households had $PM_{2.5}$ above the guideline levels of 15 µg/m³.

Among the households with **high CO_2** levels, X% used a **wood stove** as a primary or secondary heating source (a common contributor of CO_2 levels), and X% did **not** have a **Heat Recovery Ventilator (HRV)** which is helpful for reducing indoor CO_2 levels.

Very **high humidity** increases the growth of **mould** and dust mites (50).

CO_2 indicates how well a house is **ventilated** (exchange of stale and fresh air). Poorly ventilated houses may trap more air pollutants, such as viruses (51).

$PM_{2.5}$ are **tiny particles in the air** made up of dust, dirt, and smoke. High $PM_{2.5}$ can increase the chances of lung infections and asthma in children (47).

See **Error! Reference source not found.** for more information.

4.11. Radon Detector

Figure 44. Radon (n=X).

Radon detector

Radon is a **radioactive gas** that is emitted from soil and rocks. It is invisible, odourless, and tasteless.

Detectors were deployed over a **90- to 180-day period** in **X households**; X households received 2 detectors to make sure that readings were accurate.

X **Bq/m^3** was the average level of **radon**.

X% of households had **high levels of radon** (≥ 200 Bq/m^3).

Radon can enter the house through cracks and gaps in **foundation floors** and **walls**.

Long-term exposure to high levels of **radon** can **increase** the **risk** of **lung cancer**, especially in smokers (49).

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4.12. Volatile Organic Compounds Tube

Figure 45. Volatile organic compounds (n=X).

VOC tube

Volatile organic compounds (VOC) are invisible chemicals that can be released into the air from products such as paints and cleaning products, or from activities such as cooking and smoking.

VOC tubes were deployed over a **5-day period** in a sub-sample of **X households**; X households received 2 tubes.

X µg/m³ is the average level of **benzene**.

X µg/m³ is the average level of **naphthalene**.

X µg/m³ is the average level of **toluene**.

X households had **high** levels of the **VOCs** benzene, naphthalene, and toluene.

Exposure to some **VOCs** is linked to **health problems** such as eye and throat irritation (52).

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4.13. Outdoor Air Quality Egg

An Outdoor Egg Monitor was placed in X in X locations to measure levels of tiny particles called particulate matter ($PM_{2.5}$ and PM_{10}). These tiny particles in the air are small enough to be breathed into one's lungs and come from burning of oil, gasoline, diesel fuel and wood. Dust from fires, waste burning, construction sites, landfills also contribute to PM_{10} levels.

Outdoor Egg monitor

The outdoor air quality egg monitor was deployed over a **5-day period** in **X locations**.

X ppm was the average level of outdoor **carbon dioxide** (CO_2). There is no guideline for outdoor CO_2 levels.

X µg/m³ was the average of outdoor **$PM_{2.5}$**, which is higher/below the guideline levels of 15 µg/m³.

X µg/m³ was the average of outdoor **PM_{10}**, which is higher/below the guideline levels of 45 µg/m³.

Outdoor levels were within/not within the World Health Organization's (WHO) recommended guidelines for particulate matter in outdoor air (53).

High levels of **outdoor** air **pollution** can **increase** the **risk** of **heart disease**, **strokes**, **lung cancer**, and **respiratory illnesses** (54).

See **Error! Reference source not found.** for more information.

5. Recommendations

References

1. Chan L, Fediuk K, Batal M, Sadik T, Tikhonov C, Ing A, et al. The First Nations Food, Nutrition and Environment Study (2008–2018)—rationale, design, methods and lessons learned. Can J Public Health. 2021 Jun;112(S1):8–19.

2. Charlebois S, Somogyi S, Music J, Rankin A, Taylor S, Keselj V, et al. Canada's Food Price Report 2023 13th Edition. 2022 [cited 2023 Jan 13]; Available from: https://rgdoi.net/10.13140/RG.2.2.36749.61929

3. Batal M, Chan HM, Fediuk K, Ing A, Berti PR, Mercille G, et al. First Nations households living on-reserve experience food insecurity: prevalence and predictors among ninety-two First Nations communities across Canada. Can J Public Health. 2021 Jun 28;112(Suppl 1):52–63.

4. Tarasuk V, Li T, Fafard St-Germain A. Household food insecurity in Canada, 2021. Toronto: Research to identify policy options to reduce food insecurity (PROOF) [Internet]. Toronto; 2022 [cited 2022 Dec 13]. Available from: https://proof.utoronto.ca/

5. Polsky JY, Moubarac JC, Garriguet D. Consumption of ultra-processed foods in Canada. Health Reports. 2020 Nov 18;31(11):3–15.

6. Nardocci M, Polsky JY, Moubarac JC. Consumption of ultra-processed foods is associated with obesity, diabetes and hypertension in Canadian adults. Can J Public Health. 2021 Jun;112(3):421–9.

7. Brassard D, Elvidge Munene LA, St-Pierre S, Gonzalez A, Guenther PM, Jessri M, et al. Evaluation of the Healthy Eating Food Index (HEFI)-2019 measuring adherence to Canada's Food Guide 2019 recommendations on healthy food choices. Appl Physiol Nutr Metab. 2022 May;47(5):582–94.

8. Hammons AJ, Fiese BH. Is frequency of shared family meals related to the nutritional health of children and adolescents? Pediatrics. 2011 Jun;127(6):e1565-1574.

9. Woodruff SJ, Hanning RM, McGoldrick K, Brown KS. Healthy eating index-C is positively associated with family dinner frequency among students in grades 6-8 from Southern Ontario, Canada. Eur J Clin Nutr. 2010 May;64(5):454–60.

10. Avery A, Anderson C, McCullough F. Associations between children's diet quality and watching television during meal or snack consumption: A systematic review. Matern Child Nutr. 2017 Oct;13(4):e12428.

11. Carson V, Janssen I. The mediating effects of dietary habits on the relationship between television viewing and body mass index among youth. Pediatr Obes. 2012 Oct;7(5):391–8.

12. Lemire M, Audrey Lavoie, Mariana Pontual, Matthew Little, Benoit Lévesque, Pierre Ayotte. Environmental Contaminants: Metals. Nunavik Inuit Health Survey 2017 Qanuilirpitaa? How are we now? [Internet]. Quebec: Nunavik Regional Board of Health and Social Services (NRBHSS) & Institut national de santé publique du Québec (INSPQ); 2017. Available from: https://nrbhss.ca/sites/default/files/health_surveys/Environmental_Contaminants-Metals_report_en.pdf

13. Willows N, Batal M. Nutritional Concerns of Aboriginal Infants and Children in Remote and Northern Canadian Communities: Problems and Therapies. In: Watson RR, Grimble G, Preedy VR, Zibadi S, editors. Nutrition in Infancy: Volume 1 [Internet]. Totowa, NJ: Humana Press; 2013 [cited 2023 Feb 9]. p. 39–49. (Nutrition and Health). Available from: https://doi.org/10.1007/978-1-62703-224-7_3

14. Health Canada. Environmental Contaminants [Internet]. 2004 [cited 2023 Feb 16]. Available from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/environmental-contaminants.html

15. Institute of Medicine and National Research Council. From Neurons to Neighborhoods: The Science of Early Childhood Development [Internet]. Washington, D.C.: National Academies Press; 2000 [cited 2023 Feb 16]. Available from: http://www.nap.edu/catalog/9824

16. CSEP. The Canadian Society for Exercise Physiology. Canadian 24-Hour Movement Guidelines. [Internet]. 2021 [cited 2022 Oct 19]. Available from: https://csepguidelines.ca/

17. Government of Canada SC. Physical activity and screen time among Canadian children and youth, 2016 and 2017 [Internet]. 2019 [cited 2023 Sep 18]. Available from: https://www150.statcan.gc.ca/n1/pub/82-625-x/2019001/article/00003-eng.htm

18. Health Canada. Canadian Health Measures Survey (CHMS): Oral Health Statistics 2007- 2009. [Internet]. 2010 [cited 2023 Sep 22]. Available from: https://www.canada.ca/en/health-canada/services/healthy-living/reports-publications/oral-health/canadian-health-measures-survey.html

19. Canada. Asthma and Chronic Obstructive Pulmonary Disease (COPD) in Canada, 2018 [Internet]. 2018 [cited 2023 Sep 22]. Available from: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/asthma-chronic-obstructive-pulmonary-disease-canada-2018.html

20. Di Filippo P, Lizzi M, Raso M, Di Pillo S, Chiarelli F, Attanasi M. The Role of Breastfeeding on Respiratory Outcomes Later in Childhood. Frontiers in Pediatrics [Internet]. 2022 [cited 2023 Sep 22];10. Available from: https://www.frontiersin.org/articles/10.3389/fped.2022.829414

21. Health Canada. Canadian Tobacco and Nicotine Survey (CTNS): summary of results for 2020 [Internet]. 2022 [cited 2023 Sep 22]. Available from: https://www.canada.ca/en/health-canada/services/canadian-tobacco-nicotine-survey/2020-summary.html

22. Health Canada. Canadian Alcohol and Drugs Survey (CADS): summary of results for 2019 [Internet]. 2021 [cited 2023 Sep 22]. Available from: https://www.canada.ca/en/health-canada/services/canadian-alcohol-drugs-survey/2019-summary.html

23. Public Health Agency of Canada. Preventing Problematic Substance Use in Youth [Internet]. 2018 Oct [cited 2023 Sep 22]. Available from: https://www.canada.ca/en/public-health/corporate/publications/chief-public-health-officer-reports-state-public-health-canada/2018-preventing-problematic-substance-use-youth.html

24. Public Health Agency of Canada PHA of. Tackling obesity in Canada: Childhood obesity and excess weight rates in Canada [Internet]. 2018 [cited 2023 Sep 22]. Available from: https://www.canada.ca/en/public-health/services/publications/healthy-living/obesity-excess-weight-rates-canadian-children.html

25. Swinburn BA, Caterson I, Seidell JC, James WPT. Diet, nutrition and the prevention of excess weight gain and obesity. Public Health Nutr. 2004 Feb;7(1A):123–46.

26. Tahir E, Ayotte P, Little M, Bélanger RE, Lucas M, Mergler D, et al. Anemia, iron status, and associated protective and risk factors among children and adolescents aged 3 to 19 years old from four First Nations communities in Quebec. Can J Public Health. 2020 Mar 13;111(5):682–93.

27. Moffatt MEK. Current status of nutritional deficiencies in Canadian Aboriginal people. Can J Physiol Pharmacol. 1995 Jun;73(6):754–8.

28. Asher MI, Montefort S, Björkstén B, Lai CK, Strachan DP, Weiland SK, et al. Worldwide time trends in the prevalence of symptoms of asthma, allergic rhinoconjunctivitis, and eczema in childhood: ISAAC Phases One and Three repeat multicountry cross-sectional surveys. The Lancet. 2006 Aug 26;368(9537):733–43.

29. Health Canada. Is cannabis safe to use? Facts for youth aged 13-17 years [Internet]. 2018 [cited 2024 Feb 9]. Available from: https://www.canada.ca/en/health-canada/services/publications/drugs-health-products/is-cannabis-safe-use-facts-youth.html

30. National Center for Chronic Disease Prevention and Health Promotion (US) Office on Smoking and Health. The Health Consequences of Tobacco Use Among Young People. In: Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General [Internet]. Centers for Disease Control and Prevention

(US); 2012 [cited 2024 Feb 9]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK99242/

31. Evans GW. CHILD DEVELOPMENT AND THE PHYSICAL ENVIRONMENT. Annu Rev Psychol. 2006;57:423–51.

32. Weitzman M, Baten A, Rosenthal DG, Hoshino R, Tohn E, Jacobs DE. Housing and Child Health. Current Problems in Pediatric and Adolescent Health Care. 2013 Sep 1;43(8):187–224.

33. CMHC. Mould in Housing: Information for First Nations Communities. Home Occupants Guide. [Internet]. Canada Mortgage and Housing Corporation; 2011. Available from: https://publications.gc.ca/collections/collection_2011/schl-cmhc/NH17-56-1-2011-eng.pdf

34. Statistics Canada. Housing conditions [Internet]. 2017 [cited 2023 Sep 12]. Available from: https://www150.statcan.gc.ca/n1/pub/89-645-x/2010001/housing-logement-eng.htm

35. Sun L, Miller JD, Van Ryswyk K, Wheeler AJ, Héroux M, Goldberg MS, et al. Household determinants of biocontaminant exposures in Canadian homes. Indoor Air. 2022 Jan;32(1):e12933.

36. Health Canada. Guide to addressing moisture and mould indoors [Internet]. 2011 [cited 2023 Sep 12]. Available from: https://www.canada.ca/en/health-canada/services/publications/healthy-living/addressing-moisture-mould-your-home.html

37. Canadian Animal Health Institute. 2022 - Latest Canadian Pet Population Figures Released | Communiqués de presse [Internet]. 2022 [cited 2023 Sep 25]. Available from: https://www.cahi-icsa.ca/fr/press-releases/2022-latest-canadian-pet-population-figures-released

38. Qualls M. IAQ Works. 2022 [cited 2023 Sep 27]. How To Improve Home Air Quality With Pets. Available from: https://iaq.works/source-control/how-to-improve-home-air-quality-with-pets/

39. Gergen PJ, Mitchell HE, Calatroni A, Sever ML, Cohn RD, Salo PM, et al. Sensitization and exposure to pets: The effect on asthma morbidity in the United States population. J Allergy Clin Immunol Pract. 2018;6(1):101-107.e2.

40. Health Canada. Smoking in Canada: What we know [Internet]. 2022 [cited 2023 Sep 13]. Available from: https://www.canada.ca/en/health-canada/services/smoking-tobacco/surveys-statistics-research/smoking-what-we-know.html

41. Sheu R, Stönner C, Ditto JC, Klüpfel T, Williams J, Gentner DR. Human transport of thirdhand tobacco smoke: A prominent source of hazardous air pollutants into indoor nonsmoking environments. Science Advances. 2020 Mar 4;6(10):eaay4109.

42. Statistics Canada. Appendix G - Estimated number of households and average household size by domain, Canada [Internet]. 2017 [cited 2023 Sep 12]. Available from: https://www150.statcan.gc.ca/n1/pub/62f0026m/2017002/app-ann-g-eng.htm

43. Solari CD, Mare RD. Housing crowding effects on children's wellbeing. Soc Sci Res. 2012 Mar;41(2):464–76.

44. Government of Canada SC. Canadians living in households with three fire safety devices,[1] by province, 2014 [Internet]. 2015 [cited 2023 Sep 13]. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/151028/cg-a001-png-eng.htm

45. Government of Canada SC. Fire incidents increase during the pandemic [Internet]. 2023 [cited 2023 Sep 7]. Available from: https://www150.statcan.gc.ca/n1/daily-quotidien/230608/dq230608a-eng.htm

46. Indigenous Services Canada. Statement on World Water Day 2023 [Internet]. 2023 [cited 2023 Sep 12]. Available from: https://www.canada.ca/en/indigenous-services-canada/news/2023/03/statement-on-world-water-day-2023.html

47. WHO. Household air pollution [Internet]. 2022 [cited 2023 Nov 30]. Available from: https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health

48. Bateson TF, Schwartz J. Children's response to air pollutants. J Toxicol Environ Health A. 2008;71(3):238–43.

49. Health Canada. Radon - What you need to know [Internet]. 2018 [cited 2023 Sep 27]. Available from: https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radon-what-you-need-to-know.html

50. Health Canada. Ventilation and the indoor environment. Ottawa: Health Canada; 2018.

51. Health Canada. Carbon dioxide in your home [Internet]. 2021 [cited 2023 Mar 27]. Available from: https://www.canada.ca/en/health-canada/services/publications/healthy-living/carbon-dioxide-home.html

52. Health Canada H. Volatile organic compounds [Internet]. 2017 [cited 2024 Jan 30]. Available from: https://www.canada.ca/en/health-canada/services/air-quality/indoor-air-contaminants/volatile-organic-compounds.html

53. WHO. Ambient (outdoor) air pollution [Internet]. 2022 [cited 2023 Nov 28]. Available from: https://www.who.int/news-room/fact-sheets/detail/ambient-(outdoor)-air-quality-and-health

54. Health Canada. Outdoor air pollution and health: Health effects [Internet]. 2022 [cited 2024 Jan 30]. Available from: https://www.canada.ca/en/health-canada/services/air-quality/outdoor-pollution-health/effects.html