Mercury in Canadians

December 2021

Health Canada Santé Canada

Canada

Health Canada is the federal department responsible for helping the people of Canada maintain and improve their health. Health Canada is committed to improving the lives of all of Canada's people and to making this country's population among the healthiest in the world as measured by longevity, lifestyle and effective use of the public health care system.

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BACKGROUND

What is mercury?

Mercury (CASRN 7439-97-6) is a naturally occurring metal that is liquid at room temperature. It exists in elemental, inorganic and organic forms and enters the environment through both natural and industrial processes. Mercury persists in the environment and can accumulate over time.

Where is mercury found?

Mercury is present in the environment, even in remote Arctic regions, because it is persistent, mobile and tends to accumulate in colder climates. Canada prohibits the manufacture and import of most mercury-containing products. However, certain essential products are exempt, such as dental amalgams and fluorescent lamps. Mercury is also found in certain foods, such as fish.

How are people exposed to mercury?

Mercury exposure in the general population is mainly through eating larger species of fish. Organic methylmercury is the primary form of exposure in that case. In Arctic communities, eating marine mammals is a major source of mercury. To a lesser extent, the general population is exposed to inorganic mercury from dental amalgams.

How is mercury measured in people?

Mercury is absorbed into the bloodstream after being ingested or inhaled. Mercury in urine is commonly measured to evaluate long-term exposure to its elemental and inorganic forms. Mercury concentrations in blood reflect recent dietary exposure to organic forms, particularly methylmercury.

What are the potential health impacts of mercury?

Exposure to organic mercury may cause neurological effects, including developmental neurotoxicity in fetuses and children. Inhaling mercury vapour may cause respiratory, cardiovascular, kidney and neurological effects. The International Agency for Research on Cancer has classified methylmercury compounds as possibly carcinogenic to humans.

What is the Government of Canada doing to lower human exposures to mercury?

Mercury is identified as toxic under the *Canadian Environmental Protection Act, 1999*. Mercury is subject to numerous federal risk management initiatives in Canada directed toward industrial releases. The *Products Containing Mercury Regulations* prohibit the manufacture and import of most mercury-containing products in Canada. However,

there are exemptions for a few essential products, such as fluorescent lamps, which are subject to mercury content limits. In addition, regulations under the *Canada Consumer Product Safety Act* limit the amount of mercury in surface-coating materials. Health Canada has established a methylmercury blood guidance value of 20 µg/L for the general adult population. For children, pregnant women and women of child-bearing age, the provisional methylmercury blood guidance value is 8 µg/L. Health Canada has also established maximum levels for mercury in fish sold to consumers. Guidelines are in place for mercury in Canadian drinking water. The Government of Canada continues to monitor and assess mercury.

DATA SOURCES

Table 1. Biomonitoring initiatives and their target populations

Initiative	Target population
Canadian Health Measures Survey (CHMS)	General Canadian population living in the 10 provinces
First Nations Biomonitoring Initiative (FNBI)	First Nations people living on-reserve south of the 60° parallel
Maternal-Infant Research on Environmental Chemicals (MIREC) study	Pregnant women and their infants recruited from obstetric and prenatal clinics in 10 cities across Canada
International Polar Year Inuit Health Survey (IPY IHS)	Inuit populations from the Inuvialuit Settlement Region (ISR), Nunavut and Nunatsiavut
U.S. National Health and Nutrition Examination Survey (NHANES)	General U.S. population

This fact sheet presents nationally representative data from the CHMS. These data are compared with data from the FNBI, the MIREC study, the IPY IHS and the U.S. NHANES.

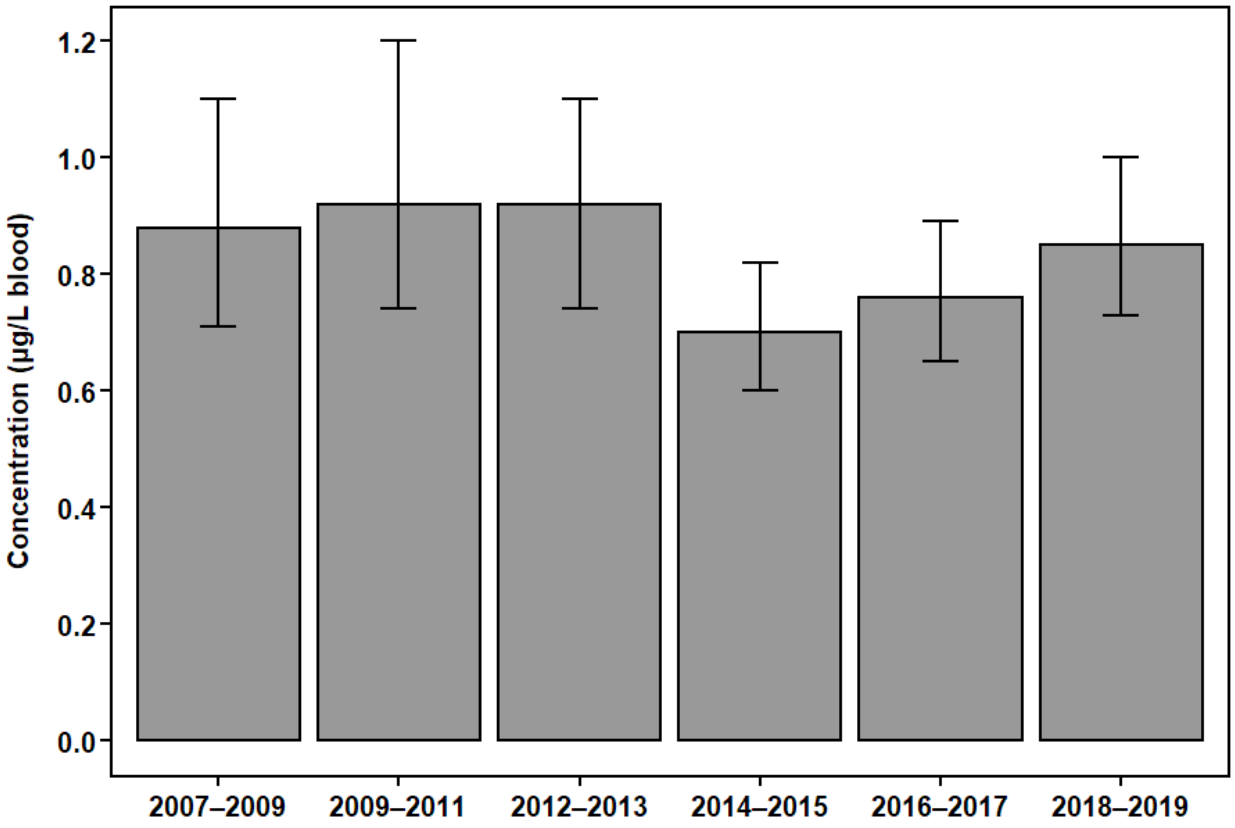
Table 2. Biomonitoring initiatives and their collection periods, participant age ranges, matrices sampled and biomarkers measured

Collection period	Age range (years)	Matrix	Biomarker
CHMS			
2007–2009	6 to 79	Blood	Total mercury
2009–2011	3 to 79	Blood	Total mercury
2012–2013	3 to 79	Blood	Total mercury
2014–2015	3 to 79	Blood	Total mercury
2016–2017	3 to 79	Blood	Total mercury
2018–2019	3 to 79	Blood	Total mercury
FNBI			
2011	20+	Blood	Total mercury
MIREC study			
2008–2011	18+	Blood	Total mercury
IPY IHS			
2007–2008	18+	Blood	Total mercury
U.S. NHANES			
2007–2008	1+	Blood	Total mercury
2009–2010	1+	Blood	Total mercury
2011–2012	1+	Blood	Total mercury
2013–2014	1+	Blood	Total mercury
2015–2016	1+	Blood	Total mercury

RESULTS

Canadian population

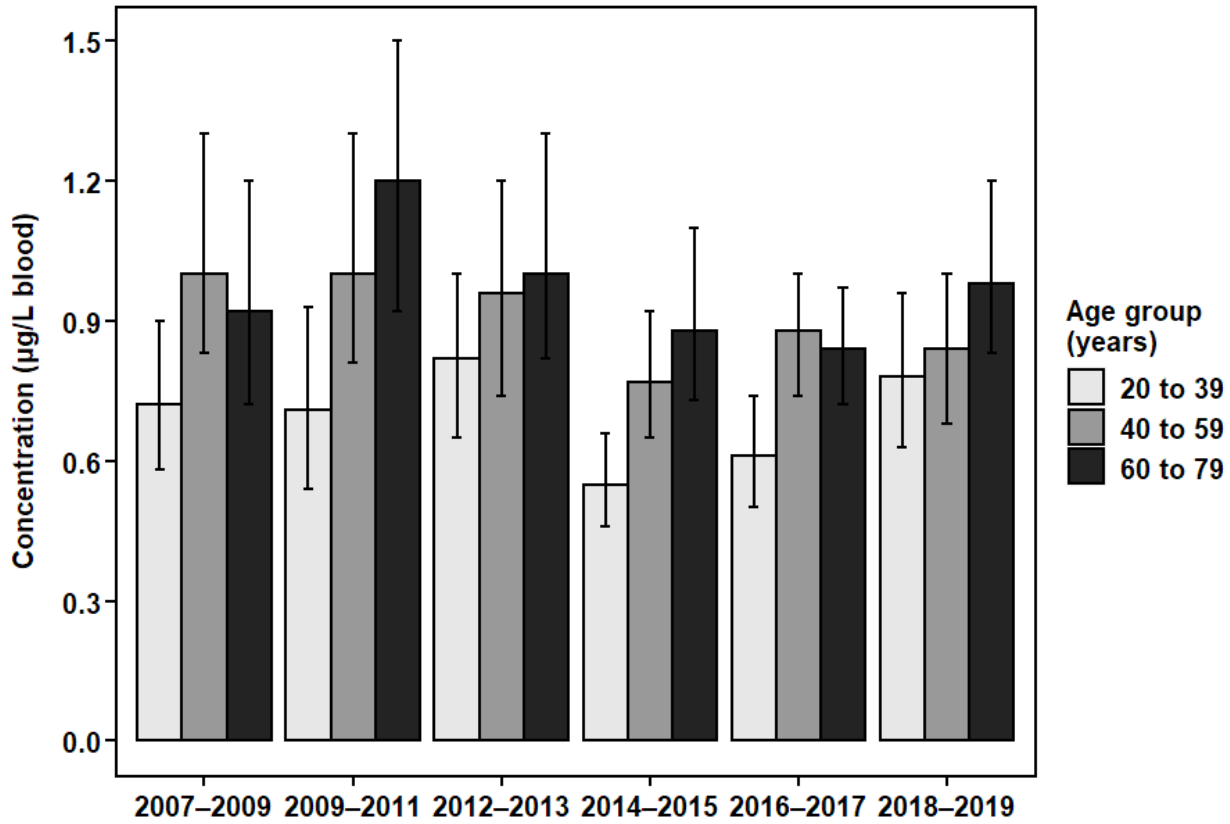
Figure 1. Mercury concentrations in the Canadian population aged 20 to 79. This figure shows the geometric mean concentrations of mercury in blood (µg/L) in the Canadian population from the CHMS (2007–2019).



Concentrations of mercury were relatively unchanged in the Canadian population from 2007–2019. There was no statistically significant change over time (P = 0.132).

Canadian population, by age group

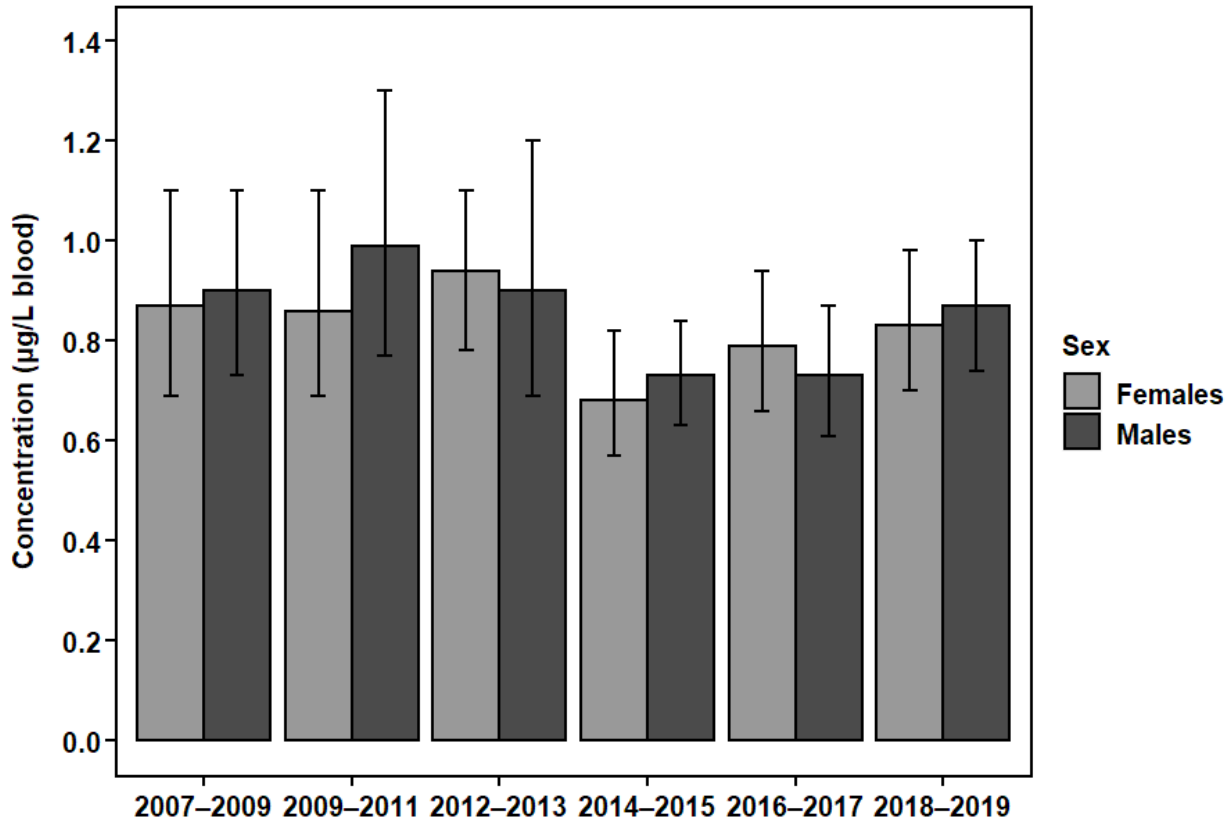
Figure 2. Mercury concentrations in the Canadian population, by age group. This figure shows the geometric mean concentrations of mercury in blood (µg/L) in the Canadian population by age group from the CHMS (2007–2019). Geometric mean mercury concentrations could not be calculated for individuals under 20 years old. This was because too many samples were below the analytical limit of detection.

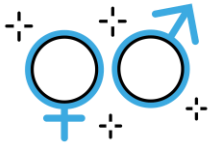


Concentrations of mercury were similar across age groups in the Canadian population.

Canadian population, by sex

Figure 3. Mercury concentrations in the Canadian population aged 20 to 79, by sex. This figure shows the geometric mean concentrations of mercury in blood (µg/L) in the Canadian population by sex from the CHMS (2007–2019).

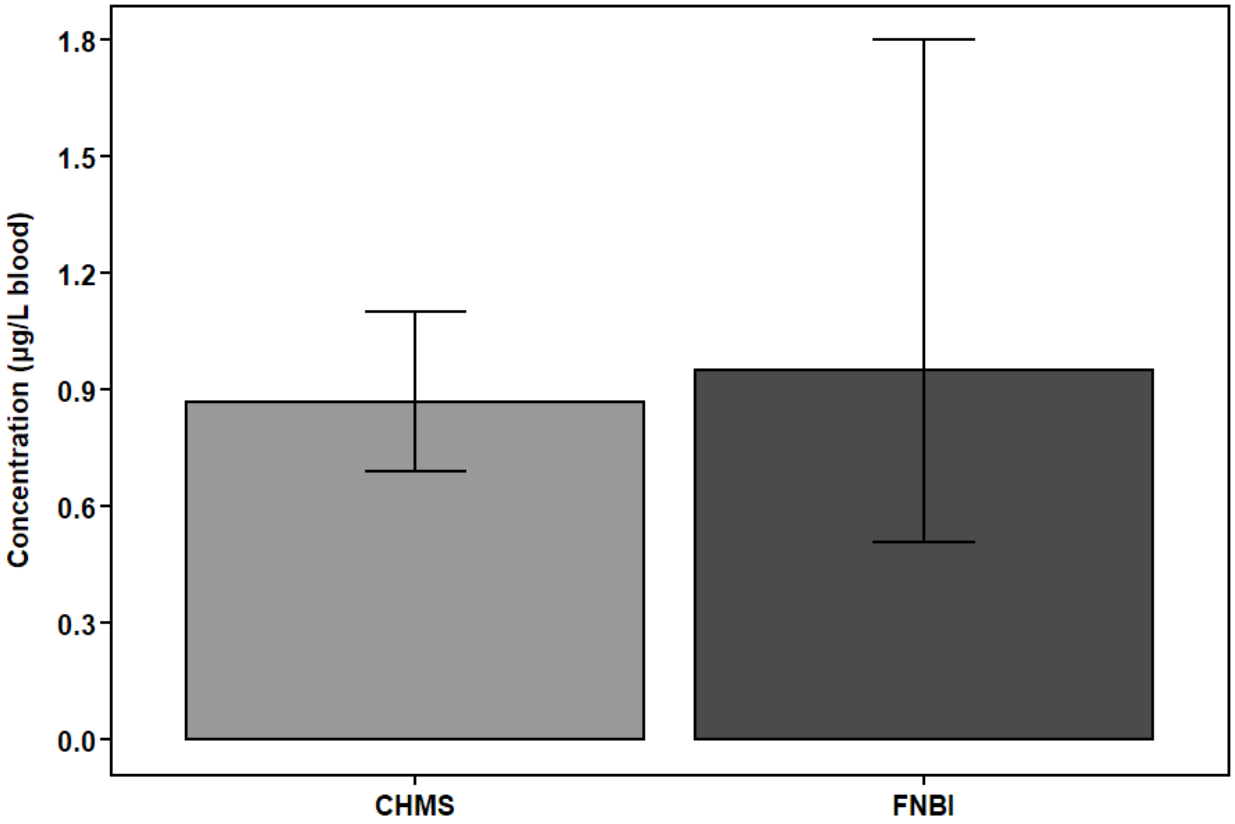




Concentrations of mercury were similar between females and males in the Canadian population.

Comparison of the general population and First Nations on-reserve population in Canada

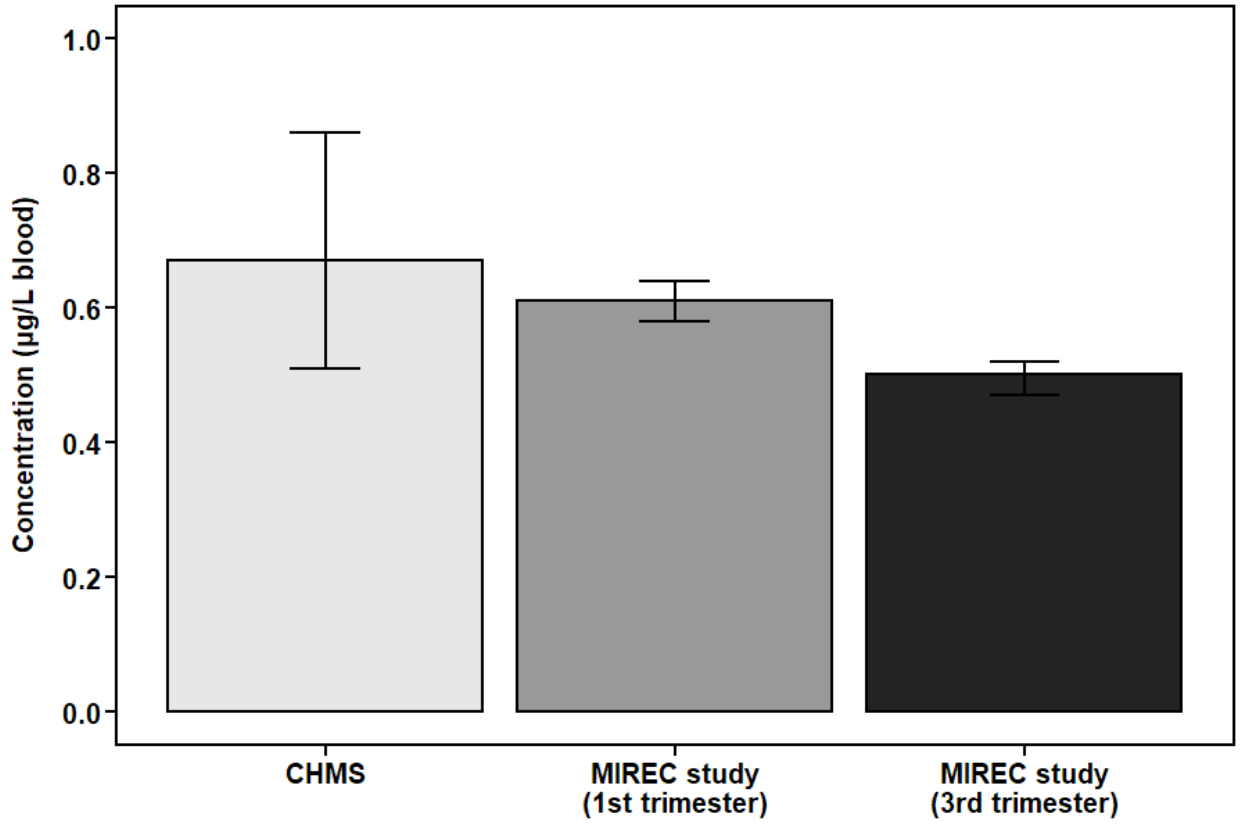
Figure 4. Mercury concentrations in the general population and First Nations on-reserve population in Canada. This figure shows the geometric mean concentrations of mercury in blood (µg/L) in the general population aged 20 to 79 from the CHMS (2009–2011) and in the First Nations on-reserve population aged 20 and older from the FNBI (2011).



Concentrations of mercury were similar between the general population and First Nations on-reserve population in Canada.

Comparison of women of child-bearing age and pregnant women in Canada

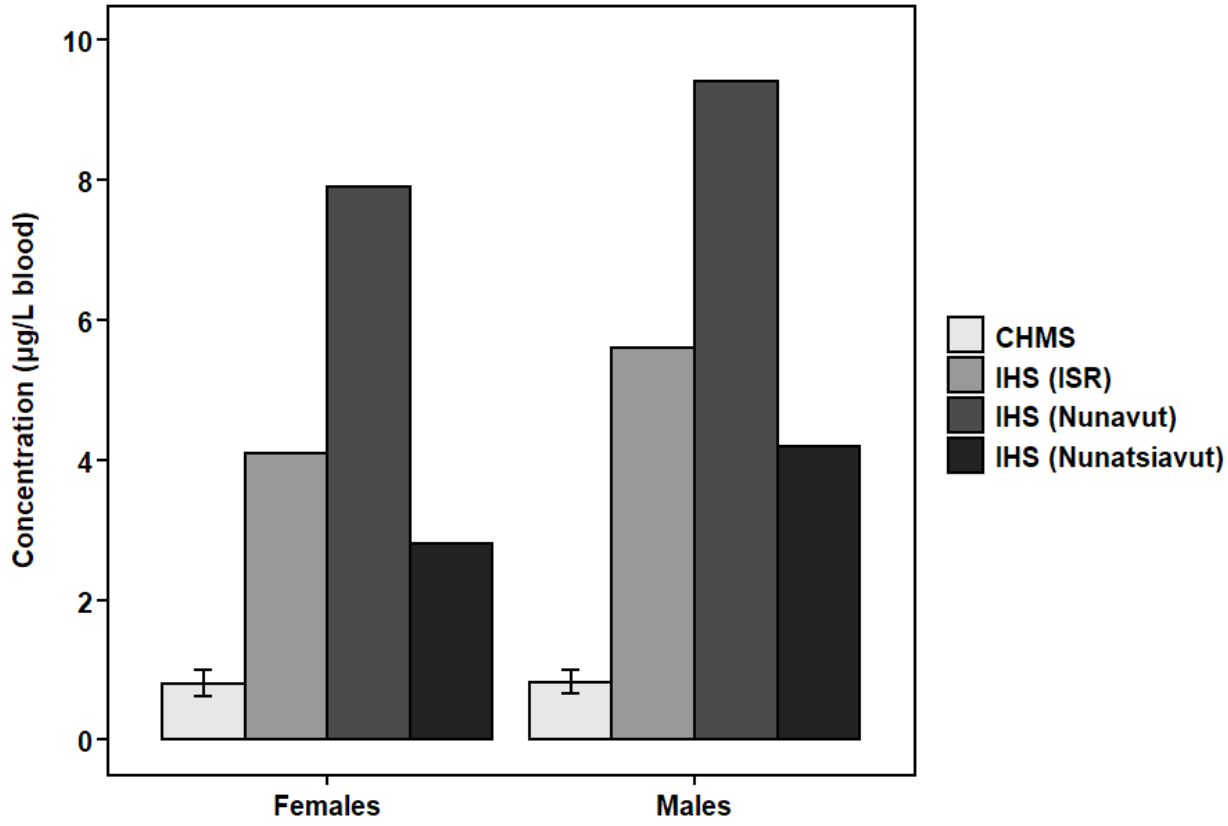
Figure 5. Mercury concentrations in women of child-bearing age and women in the first or third trimester of pregnancy in Canada. This figure shows the geometric mean concentrations of mercury in blood (µg/L) for women of child-bearing age (18 to 49) in the general population from the CHMS (2009–2011) and for women in the first or third trimester of pregnancy from the MIREC study (2008–2011).



Concentrations of mercury were similar between women of child-bearing age and women in the first or third trimester of pregnancy in cities across Canada.

Comparison of the general population and Inuit populations in Canada

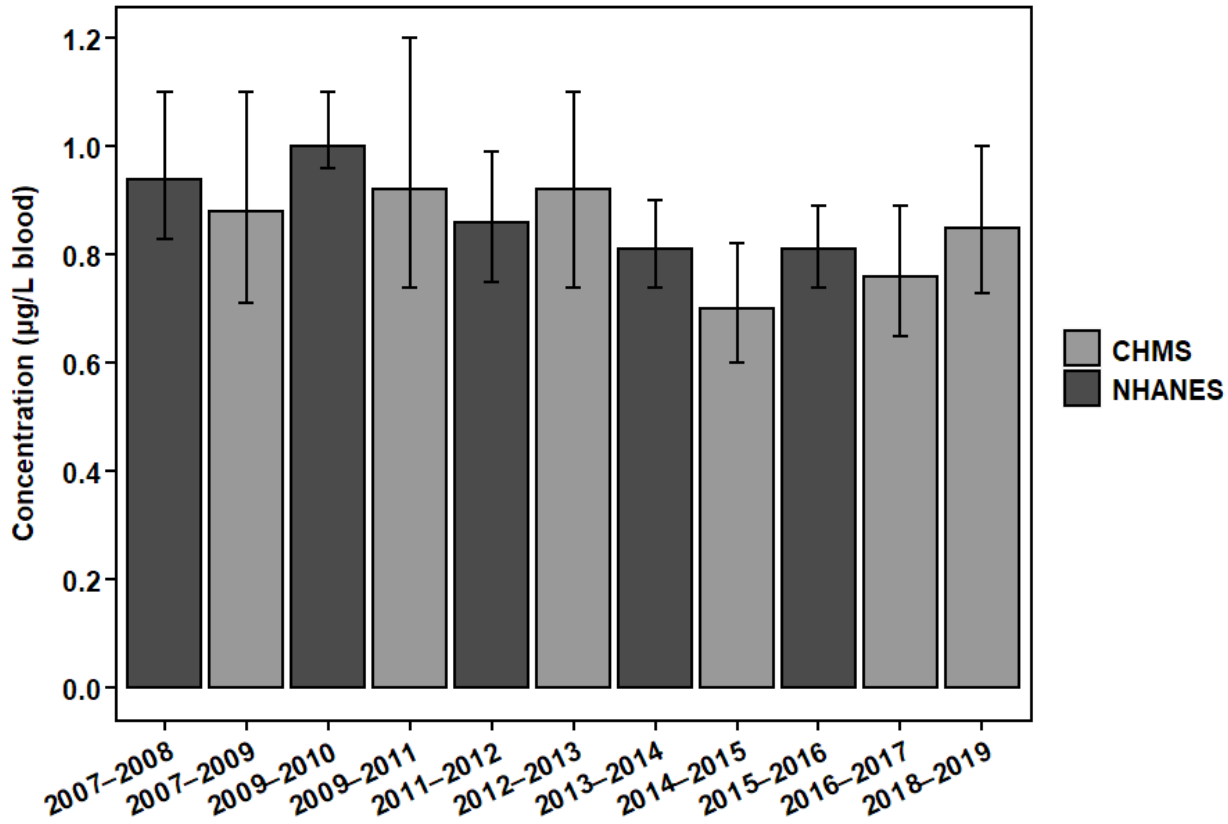
Figure 6. Mercury concentrations in the general population and Inuit populations in Canada, by sex. This figure shows the geometric mean concentrations of mercury in blood (µg/L) in females and males in the general population aged 18 to 79 from the CHMS (2007–2009) and in Inuit populations aged 18 and older in the ISR, Nunavut and Nunatsiavut from the IPY IHS (2007–2008).



Concentrations of mercury were higher in Inuit populations in the ISR, Nunavut and Nunatsiavut than in the general population in Canada.

Comparison of the Canadian and U.S. populations

Figure 7. Mercury concentrations in the Canadian and U.S. populations. This figure shows the geometric mean concentrations of mercury in blood (µg/L) in the Canadian population from the CHMS (2007–2019) and in the U.S. population from the NHANES (2007–2016). Note that there are slight differences between the surveys in sampling (such as the age ranges of participants) and analysis (such as the limits of detection).



Concentrations of mercury were similar between the Canadian and U.S. populations.

ADDITIONAL INFORMATION

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