Human exposure to harmful substances

Canadian Environmental Sustainability Indicators

Environment and Climate Change Canada
Environnement et Changement climatique Canada

Canada

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Canadian Environmental Sustainability Indicators

Human exposure to harmful substances

October 2026

Table of contents

Human exposure to harmful substances 6

Mercury, lead, cadmium and bisphenol A in people living in Canada 6

Key results 6

Mercury 7

Key results 7

Lead 9

Key results 9

Cadmium 10

Key results 10

Bisphenol A 14

Key results 14

About the indicator 16

What the indicator measures 16

Why this indicator is important 16

Related initiatives 17

Related indicators 17

Data sources and methods 17

Data sources 17

Methods 18

Caveats and limitations 19

Resources 19

References 19

Related information 20

Annex 21

Annex A. Data tables for the figures presented in this document 21

List of Figures

Figure 1. Changes in the average concentrations of selected substances in people living in Canada, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....6
Figure 2. Average concentration of mercury in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....8
Figure 3. Average concentration of mercury in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....8
Figure 4. Average concentration of lead in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....9
Figure 5. Average concentration of lead in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....10
Figure 6. Average concentration of cadmium in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....11
Figure 7. Average concentration of cadmium in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....12
Figure 8. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024) 13
Figure 9. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....14
Figure 10. Average concentration of bisphenol A in urine in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....15
Figure 11. Average concentration of bisphenol A in urine in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....15

List of Tables

Table 1. Characteristics of the Canadian Health Measures Survey cycles 18
Table 2. Limit of detection of the Canadian Health Measures Survey by chemical substance 18
Table A.1. Data for Figure 1. Changes in the average concentrations of selected substances in people living in Canada, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....21
Table A.2. Data for Figure 1. Changes in the average concentrations of selected substances in people living in Canada, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....21
Table A.3. Data for Figure 2. Average concentration of mercury in blood in people living in Canada, by age group, 1 Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024) 22
Table A.4. Data for Figure 3. Average concentration of mercury in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024) 22
Table A.5. Data for Figure 4. Average concentration of lead in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....23
Table A.6. Data for Figure 5. Average concentration of lead in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....23
Table A.7. Data for Figure 6. Average concentration of cadmium in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024) 24
Table A.8. Data for Figure 7. Average concentration of cadmium in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024) 25
Table A.9. Data for Figure 8. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, aged 3 to 79, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)....25

Table A.10. Data for Figure 9. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024).....26
Table A.11. Data for Figure 10. Average concentration of bisphenol A in urine in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024) 26
Table A.12. Data for Figure 11. Average concentration of bisphenol A in urine in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024).....27

Human exposure to harmful substances

Chemical substances are present in air, soil, water, products and food. Humans are exposed to chemicals in many ways, including inhalation, ingestion and skin contact. Some of these substances can be hazardous to both humans and wildlife, even in small amounts.

Mercury and its compounds, lead, inorganic cadmium compounds and bisphenol A (BPA) are listed as toxic substances on the Toxic substances list (Schedule 1) under the *Canadian Environmental Protection Act, 1999* and are also subject to numerous federal risk management initiatives. These indicators present the average concentrations of mercury, lead, cadmium and BPA in people living in Canada.

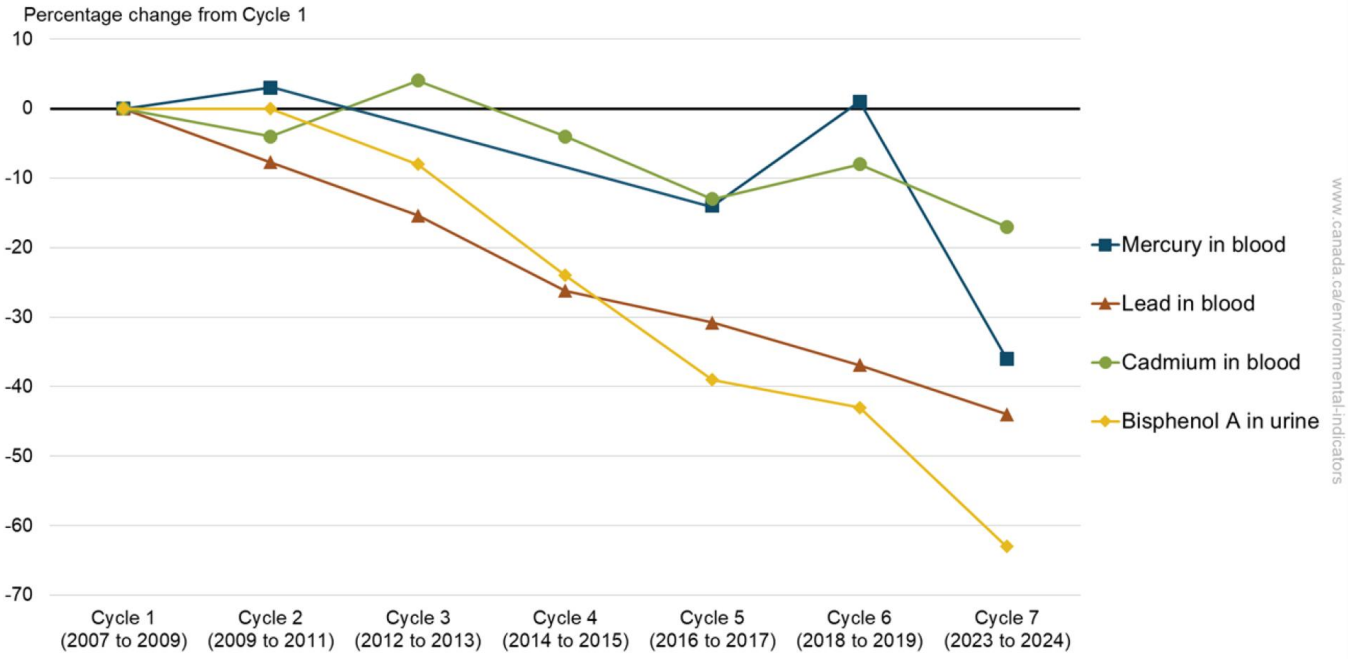
Mercury, lead, cadmium and bisphenol A in people living in Canada

The Canadian Health Measures Survey has conducted nearly 2 decades of national biomonitoring since 2007, with data collected in 2-year cycles or collection periods.

Key results

- Between Cycle 1 (2007 to 2009) and Cycle 7 (2023 to 2024),
    - biomonitoring data collected showed that the average concentrations in people living in Canada of mercury, lead, cadmium and bisphenol A (BPA) generally decreased

Figure 1. Changes in the average concentrations of selected substances in people living in Canada, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 1

Note: The chart presents the percentage change in the average (geometric mean) concentrations of selected substances in people living in Canada relative to Cycle 1 (2007 to 2009). The concentrations of mercury and lead in blood and bisphenol A in urine are from participants aged 6 to 79 years, and cadmium in blood are from participants aged 12 to 79 years who do not smoke. Averages for lead, and mercury and bisphenol A do not include children under the age of 6 years as they were not included in the Cycle 1 survey. Percent changes could not be calculated when poor detection affected the ability to calculate geometric means for the total population (when more than 40% of samples were below the limit of detection).
Source: Health Canada (2026a) Cadmium in people living in Canada. Health Canada (2026c) Lead in people living in Canada. Health Canada (2026d). Mercury in people living in Canada. Health Canada (2026e) Communication from Population Studies Division.

Between Cycle 1 (2007 to 2009) and Cycle 7 (2023 to 2024):

- average concentrations of mercury in blood showed a declining trend[1] with a decrease of 36% in people aged 6 to 79 years
- average concentrations of lead in blood showed a declining trend with a decrease of 44% in people aged 6 to 79 years
    - average blood lead concentrations declined by 85% since the 1978 to 1979 period[2]
- average concentrations of cadmium in blood showed a declining trend with a decrease of 17% in people aged 12 to 79 years who do not smoke
- average concentrations of BPA in urine showed a declining trend with a decrease of 63% in people aged 6 to 79 years

Mercury

Mercury is widespread in the environment. It is a naturally occurring metal that can be emitted by natural processes (like forest fires, melting permafrost, volcanic activity and soil and rock erosion) and is also released by many industrial processes, such as chemical manufacturing operations, metal mining and coal combustion. It can travel long distances in the atmosphere and settles everywhere in Canada, including sensitive areas such as the Canadian Arctic and the Great Lakes.

Mercury emissions are both a national and a global concern and can have significant negative impacts on human health and the environment. Mercury is toxic to humans and persists in the environment and accumulates in food chains over time.

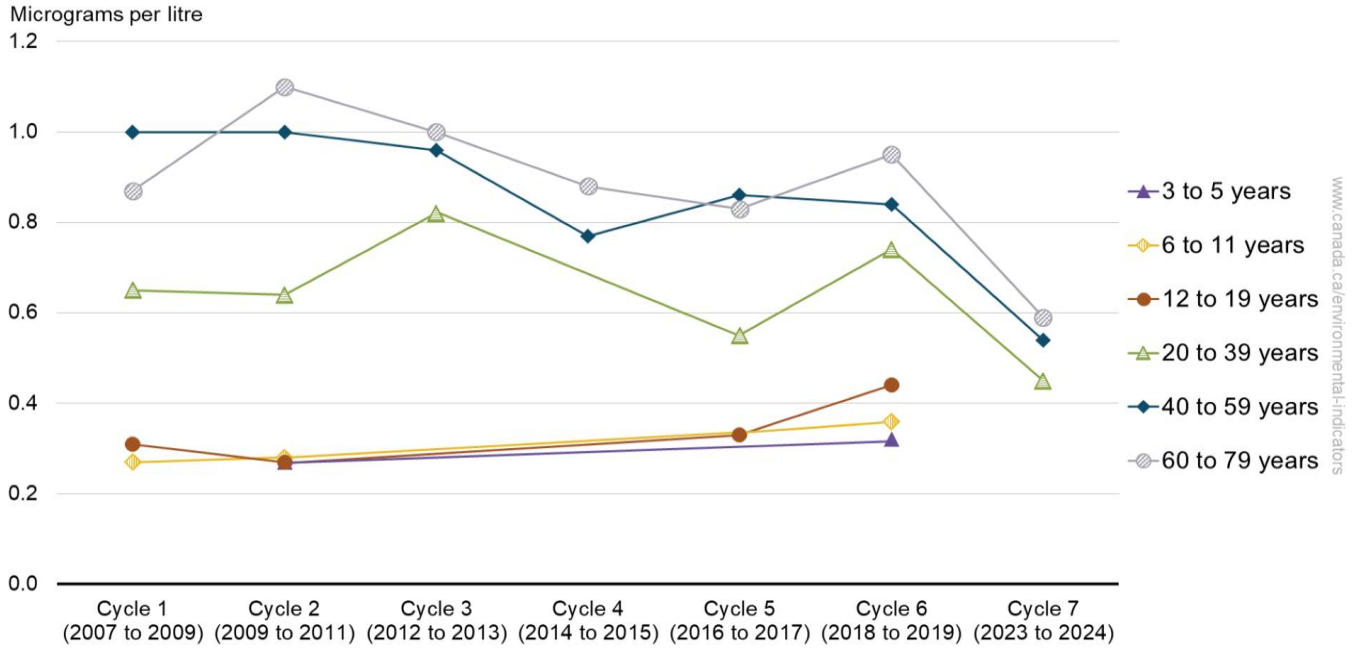
Key results

- Over the 7 cycles (2007 to 2024) of the Canadian Health Measures Survey, the average concentrations of mercury (measured as total mercury comprised of both organic and inorganic mercury) in the blood of people living in Canada
    - showed a declining trend with a decrease of 36% in people aged 6 to 79 years
    - showed adults typically have higher average concentrations compared to children and adolescents
    - were similar between females and males

[1] The declining trends for mercury, lead, cadmium and BPA are based on a statistical analysis of the biomonitoring data from Cycle 1 to Cycle 7. For more information on this analysis, refer to the Data sources and methods.

[2] The geometric mean was 47.9 micrograms per litre among people aged 6 to 79 years in 1978 to 1979 (Bushnik et al. 2010).

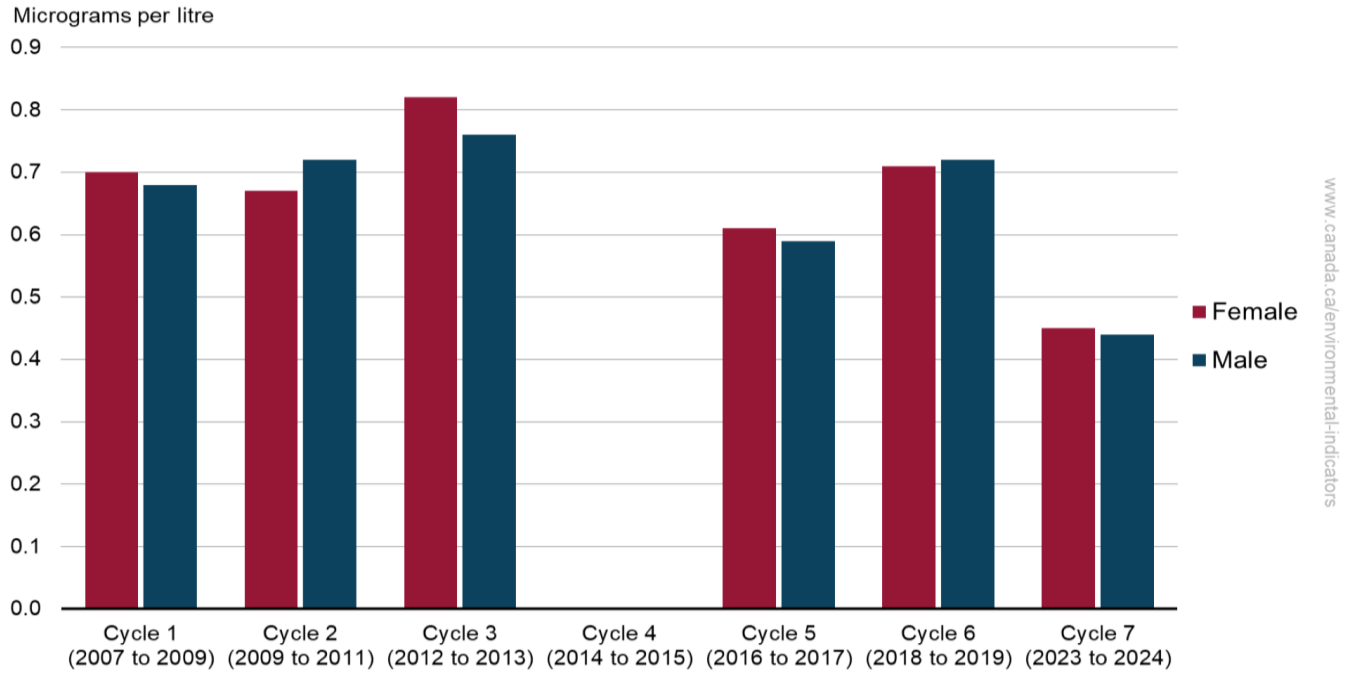
Figure 2. Average concentration of mercury in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 2

Note: Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as either data were not available or more than 40% of the samples were below the limit of detection). Mercury is shown as total mercury (organic and inorganic).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Figure 3. Average concentration of mercury in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 3

Note: Average refers to geometric mean. Cycle 4 does not include data due to poor detection affecting the ability to calculate geometric means (more than 40% of samples were below the limit of detection). Mercury is shown as total mercury (organic and inorganic).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Lead

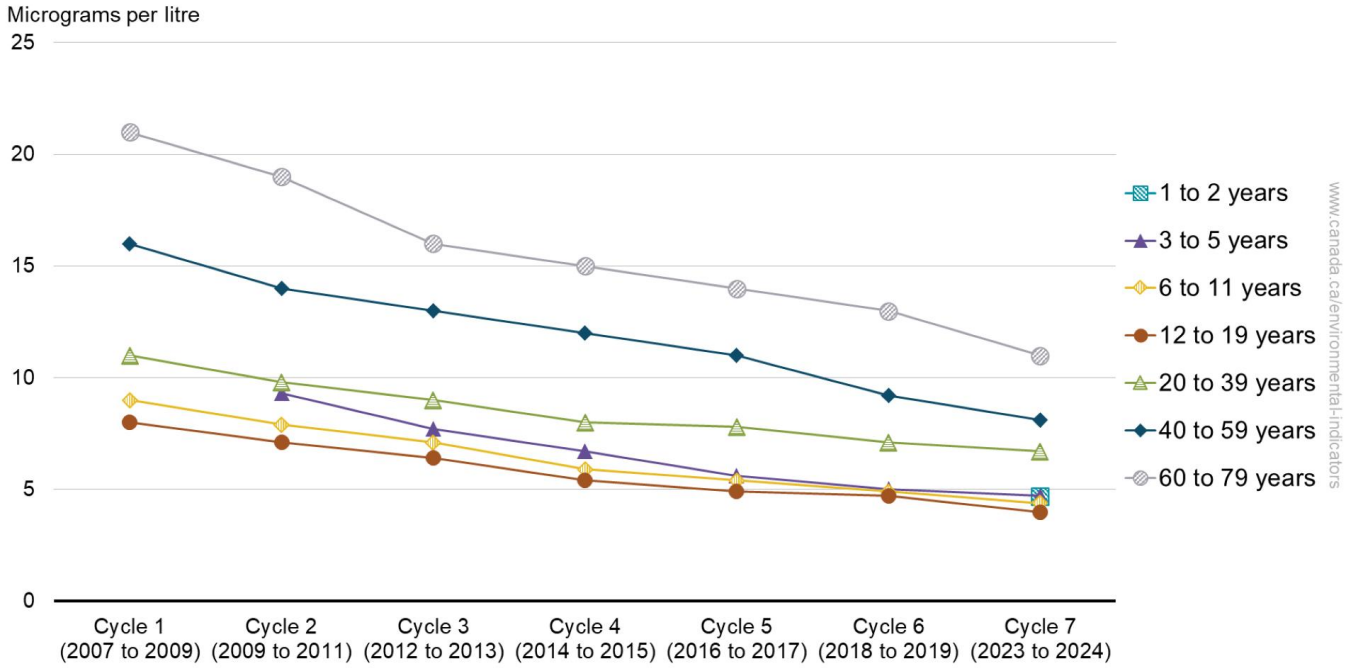
Lead is a naturally occurring element found in rock, water and soil that can be released during natural processes, such as weathering, rock and soil erosion and volcanic activity. It is used in the refining and manufacturing of products such as lead acid car batteries, lead shot and fishing weights, sheet lead, solder, some brass and bronze products, pipes, paints and some ceramic glazes. Lead can be deposited on land or water surfaces and then build up in soils, sediments, humans and wildlife.

Exposure to lead, even in small amounts, can be hazardous to both humans and wildlife. Exposure to trace amounts of lead occurs through soil, household dust, consumer products, food, drinking water and air.

Key results

- Over the 7 cycles (2007 to 2024) of the Canadian Health Measures Survey, the average concentrations of lead in the blood of people living in Canada:
  - showed a declining trend, decreasing by 44% in people aged 6 to 79 years
  - were lower in children than in adults
  - were highest in adults aged 60 to 79 years
  - were higher in males than in females

Figure 4. Average concentration of lead in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 4

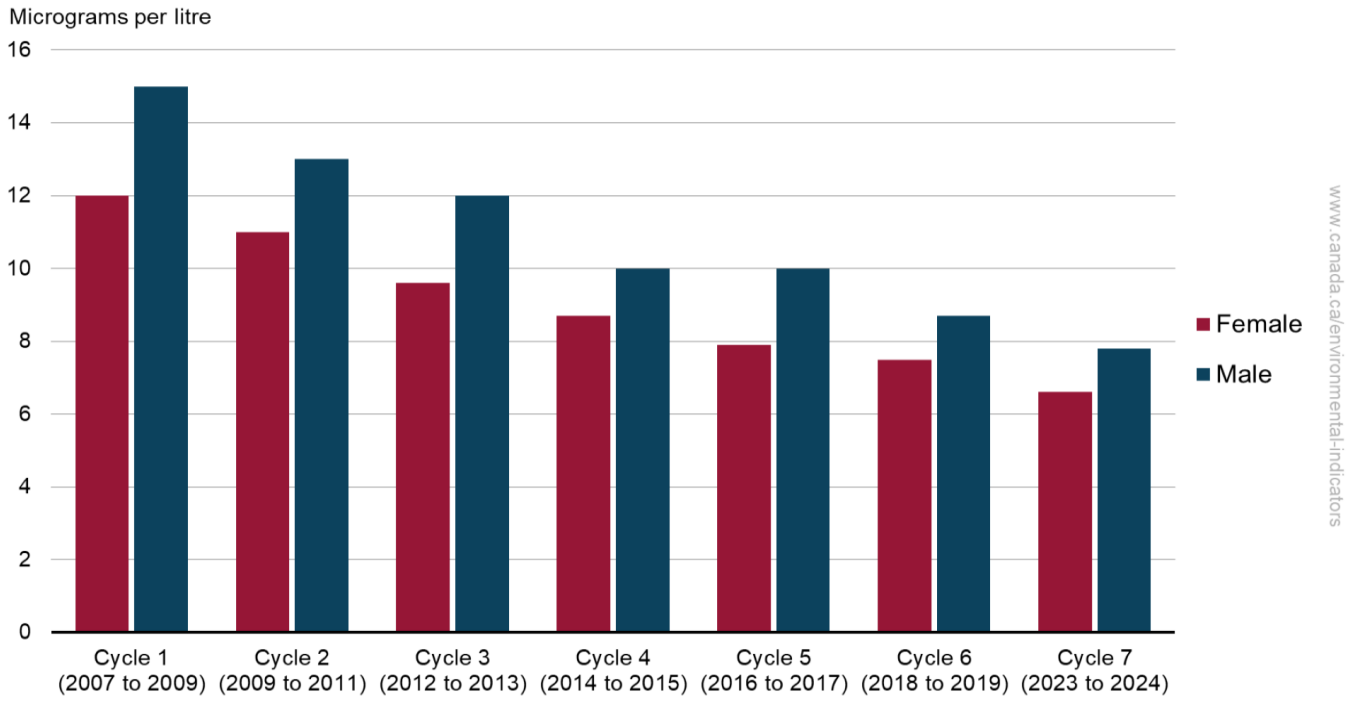
Note: Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as the age groups were not included in certain cycles).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Lead exposure in Canada has decreased by approximately 85% over the past 45 years.[3] This decrease is largely attributed to the phase-out of leaded gasoline, restrictions on the use of lead in consumer paints and other coatings on children's products, and elimination of lead solder in food cans.

[3] Bushnik et al. (2010) Lead and bisphenol A concentrations in the Canadian population. Health Report (3):7-18.

Adults aged 60 to 79 years consistently presented the highest concentrations of lead due to accumulation in teeth and bones over time. Children could be more vulnerable to exposure because of their hand-to-mouth behaviour, which increases their exposure to lead from dust and soil.

Figure 5. Average concentration of lead in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 5

Note: Average refers to geometric mean.
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

On average, males have greater concentrations of lead in their blood than females. This may be due in part to males having a higher volume of red blood cells, to which lead binds in the body.

Cadmium

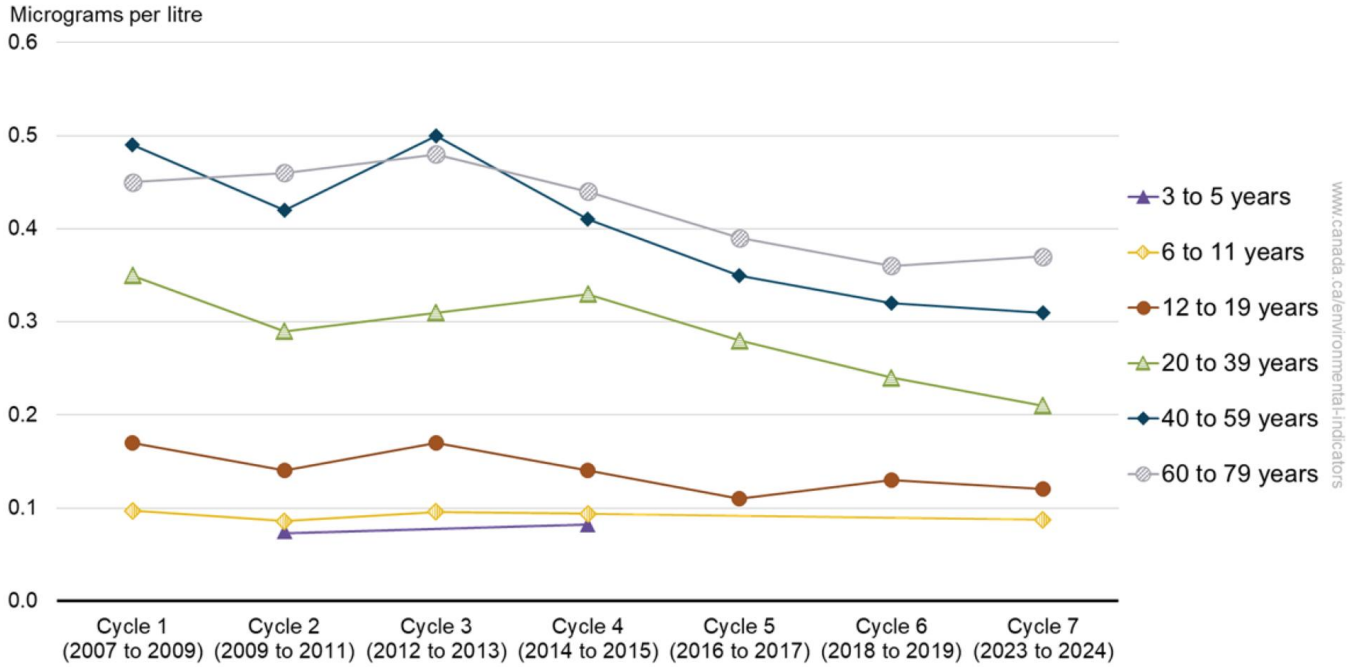
Cadmium is a naturally occurring metal found in the Earth's crust that can be released into the environment as a result of natural processes, including forest fires, volcanic emissions, and weathering of soil and bedrock. It is used in batteries and in electroplating to protect other metals from corrosion. It may be released directly into the environment from human activities such as non-ferrous smelting and refining, and fuel consumption for electricity generation or heating. Inhalation of cigarette smoke is a major source of cadmium exposure in people who smoke. People who do not smoke are exposed to cadmium through food, breathing in second-hand smoke, and, for some, occupational exposure. Other minor sources of exposure include drinking water, soil or dust, as well as inhalation and releases from consumer products.

Exposure to cadmium can be hazardous to humans and wildlife since it accumulates in the food chain over time.

Key results

- Over the 7 cycles (2007 to 2024) of the Canadian Health Measures Survey, the average blood cadmium concentrations among people living in Canada:
    - showed a declining trend, with a 17% decrease observed among people aged 12 to 79 years who do not smoke
    - were highest in adults aged 40 to 59 years and 60 to 79 years, in both the total population and the non-smoking population
    - were higher in females than in males

Figure 6. Average concentration of cadmium in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

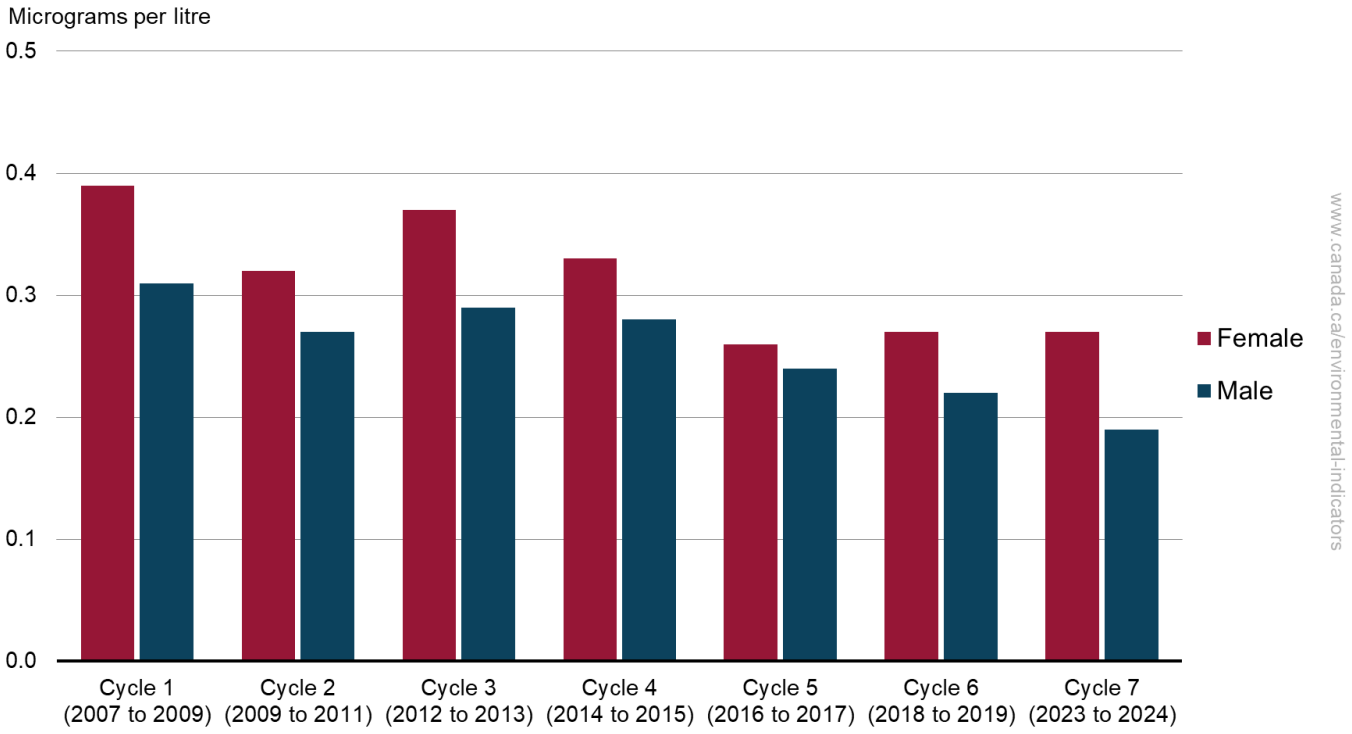


Data for Figure 6

Note: Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as either data were not available or more than 40% of the samples were below the limit of detection).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Adults aged 40 to 59 years and 60 to 79 years consistently had the highest average concentrations of cadmium in blood. Cadmium has a biological half-life (the time it takes to reduce the concentration by half) of about 10 to 12 years in the kidney and accumulates with age.

Figure 7. Average concentration of cadmium in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

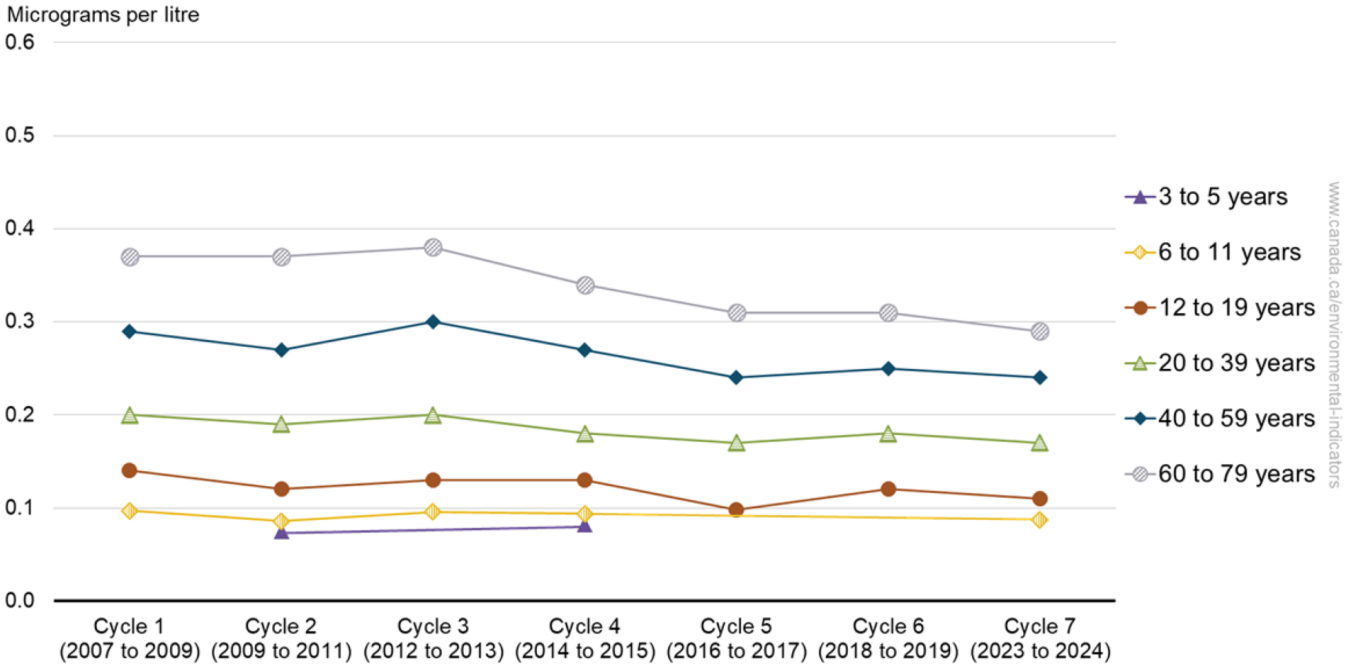


Data for Figure 7

Note: Average refers to geometric mean.
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Females on average have greater concentrations of cadmium in their blood than males. This is due in part to the average rate of gastrointestinal absorption of dietary cadmium. The gastrointestinal absorption rate in females is estimated to be 10% or higher, while in males it is estimated to be 5%.

Figure 8. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



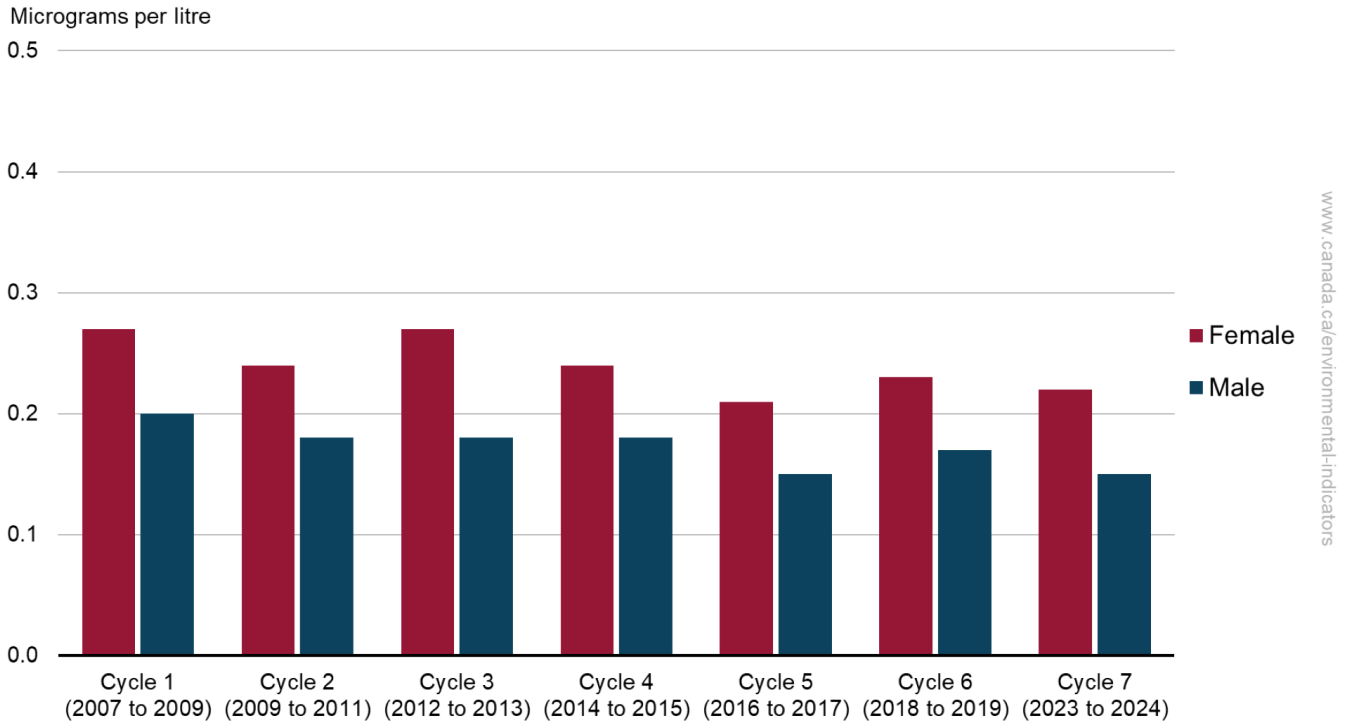
Data for Figure 8

Note: Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as either data were not available or more than 40% of the samples were below the limit of detection).
Source: Health Canada (2026e) Communication from Population Studies Division.

Adults aged 40 to 59 years and 60 to 79 years consistently had the highest average concentrations of cadmium in people who do not smoke.

According to Health Canada's Cadmium in people living in Canada report, data from the Canadian Health Measures Survey Cycle 7 (2023 to 2024) showed that people aged 12 to 79 years who currently smoke had more than 6 times the amount of cadmium in their blood than people who do not smoke, at 1.3 micrograms per litre compared to 0.2 micrograms per litre. Although, from 2007 to 2024, average cadmium levels decreased by 34% in people who currently smoke cigarettes.

Figure 9. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 9

Note: Average refers to geometric mean.
Source: Health Canada (2026e) Communication from Population Studies Division.

Among people who do not smoke, females on average have greater concentrations of cadmium in their blood than males.

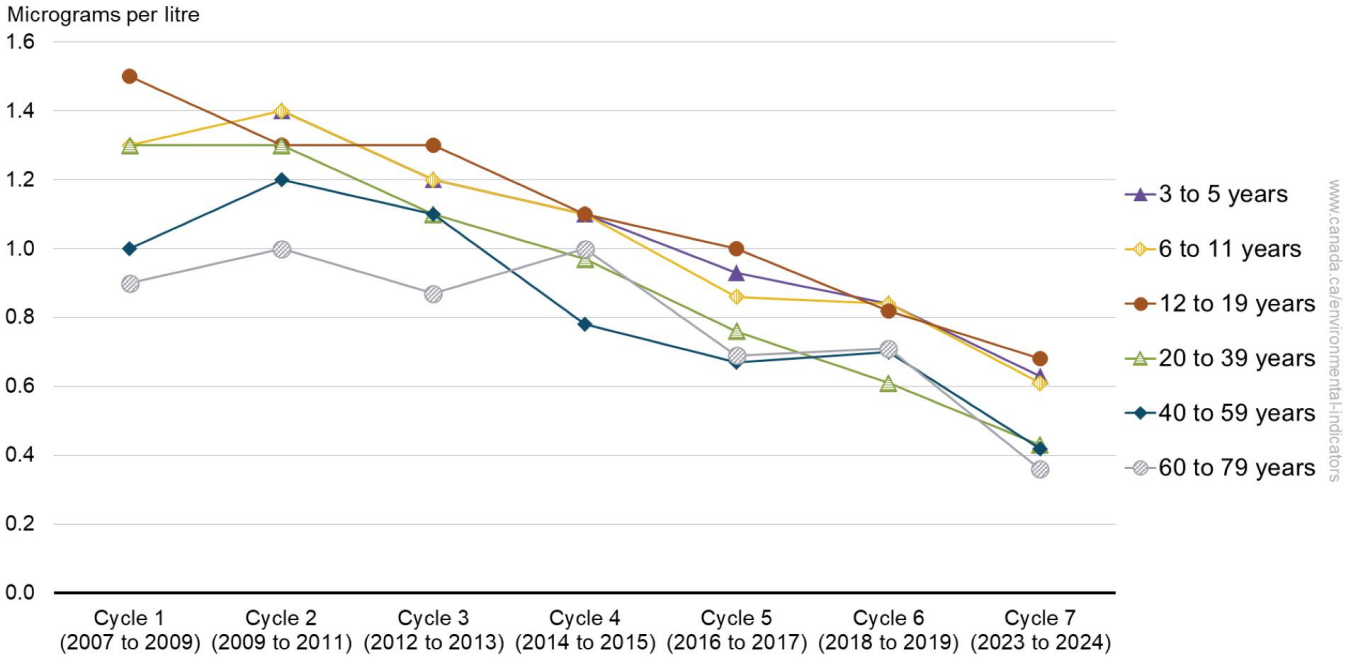
Bisphenol A

Bisphenol A (BPA) is a synthetic chemical that can have negative impacts on human health and the environment. BPA is found in food packaging and repeat-use plastic containers; it migrates from the packaging into food and drinks. Exposure can also occur from epoxy resins, thermal paper coatings (such as receipts and airline tickets), air, drinking water, soil, dust and the use of consumer products. The Government of Canada has concluded that current dietary exposure to BPA through food packaging is not expected to pose a health risk to the general population, including newborns and infants.

Key results

- Over the 7 cycles (2007 to 2024) of the Canadian Health Measures Survey, the average concentrations of BPA in the urine of people living in Canada:
    - showed a declining trend with a decrease of 63% in people aged 6 to 79 years
    - were higher in children and adolescents than in adults
    - were higher in males than in females

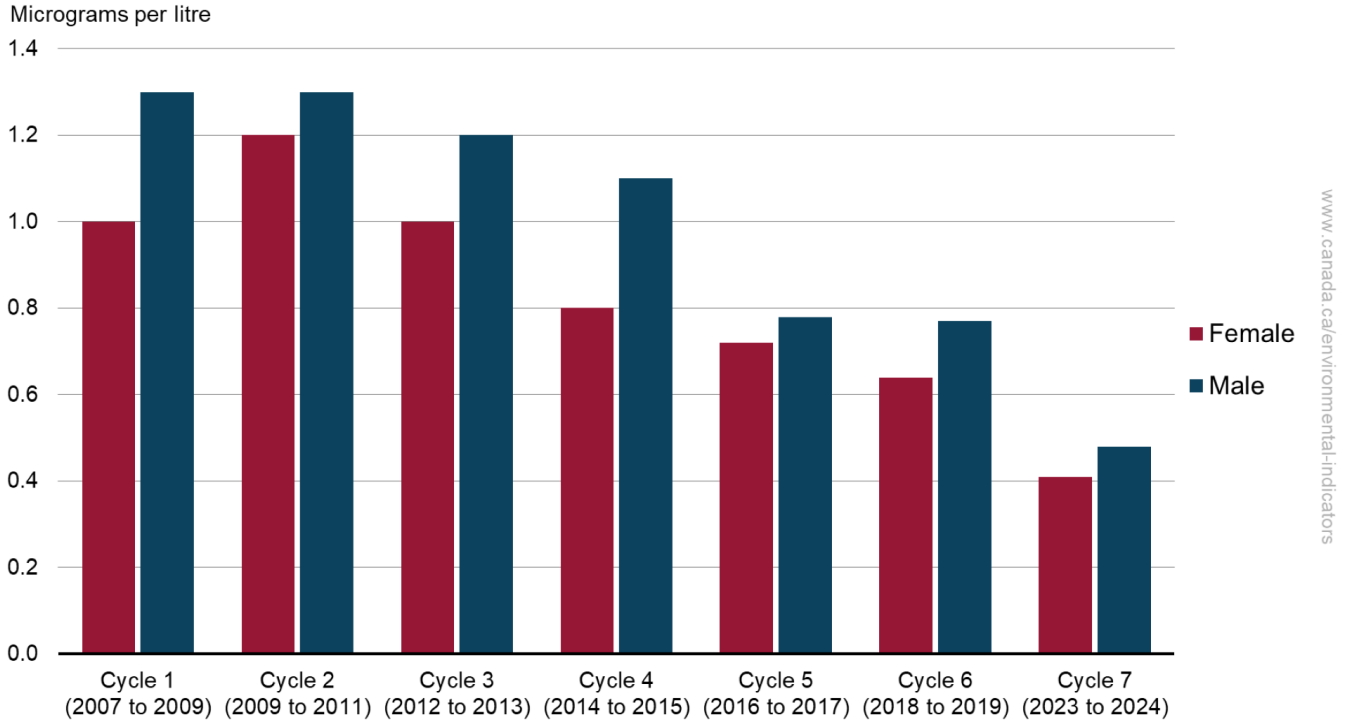
Figure 10. Average concentration of bisphenol A in urine in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 10

Note: Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as they were not included in a cycle).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Figure 11. Average concentration of bisphenol A in urine in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)



Data for Figure 11

Note: Average refers to geometric mean.
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

About the indicator

What the indicator measures

This indicator presents the concentrations of 4 substances (mercury, lead, cadmium and bisphenol A) in people living in Canada for the 7 survey cycles from 2007 to 2024 based on data collected as part of the Canadian Health Measures Survey. These substances were chosen from the Canadian Health Measures Survey because they complement other indicators from the Canadian Environmental Sustainability Indicators program. For each substance, the concentration in blood or urine is provided by age group and by sex when data are available.

Why this indicator is important

Chemical substances are everywhere, including in the air, soil, water, products and food, and can enter the body through ingestion, inhalation and skin contact. Mercury and its compounds, lead, inorganic cadmium compounds and bisphenol A (BPA) are on the Toxic substances list under Schedule 1 of the *Canadian Environmental Protection Act, 1999*. This means that these substances are "entering or may enter the environment in a quantity or concentration or under conditions that (a) have or may have an immediate or long-term harmful effect on the environment or its biological diversity; (b) constitute or may constitute a danger to the environment on which life depends; or (c) constitute or may constitute a danger in Canada to human life or health."

The Government of Canada uses a variety of methods, tools and models to assess human exposure to environmental chemicals and their potential health effects. Human exposure to chemicals can be estimated indirectly by measuring chemicals in the environment, food or products, or directly by biomonitoring. The Canadian Health Measures Survey measures environmental chemicals and/or their metabolites in blood and urine of participants. These indicators provide a snapshot of the survey results.

Through biomonitoring, the government can identify priorities, develop or revise risk management strategies, and track progress on policies put in place to reduce or control these substances.

More information

Mercury

Mercury is toxic to humans and persists in the environment and accumulates in food chains over time. It therefore poses a particular risk to populations, like the northern and Indigenous communities, who rely heavily on the consumption of predatory fish, such as freshwater trout or Arctic char, and traditional food items, including marine mammals.

Mercury exists in 3 forms: elemental mercury, inorganic mercury compounds and organic mercury compounds, such as methylmercury. Humans are exposed to methylmercury primarily through consumption of contaminated fish and seafood. Marine mammals or fish that are long-lived and feed on other fish can accumulate high levels of methylmercury. To a much lesser extent, the general population is also exposed to inorganic mercury from improper disposal of products containing mercury such as switches, batteries, thermometers and fluorescent lamps and from the use of dental amalgam.

The human health effects depend on various factors, such as the form and amount of mercury encountered, the length of exposure, and the age of the person exposed. Oral exposure to organic mercury compounds, such as methylmercury, can cause neurological damage and developmental neurotoxicity. Exposure of a fetus or young child to organic mercury can affect the development of the nervous system, including fine-motor function, attention, verbal learning and memory. High exposure to inorganic mercury can cause damage to the gastrointestinal tract and kidneys. Exposure to elemental mercury inhaled as mercury vapour may cause adverse neurological, respiratory and kidney effects.

Lead

Exposure to trace amounts of lead occurs through soil, household dust, consumer products, food, drinking water and air because of its natural abundance in the environment and its widespread use for much of the 20th century. In humans, exposure to very high levels of lead may result in vomiting, diarrhea, convulsions, coma and death. Chronic exposure to relatively low levels of lead may affect the central and peripheral nervous systems, blood pressure, and renal function and may result in reproductive problems and developmental neurotoxicity.

Cadmium

In humans, exposure to cadmium has been associated with gastrointestinal irritation and harmful effects to the kidneys and lungs. Cadmium and its compounds have been classified by Environment and Climate Change Canada and Health Canada as a probable carcinogen in humans when inhaled.

Bisphenol A

BPA is known as a hormone disruptor and can adversely affect the liver, the kidneys and reproduction, including fertility and development, in humans and wildlife. Although dietary exposure to BPA through food packaging is not expected to pose a health risk to people living in Canada, a precautionary approach has been taken to limit exposure of infants and newborns to BPA from food packaging. As part of these efforts, BPA has been prohibited in baby bottles sold in Canada since 2010.

Related initiatives

The indicator supports the measurement of progress towards the following 2022 to 2026 Federal Sustainable Development Strategy Goal 12: Reduce waste and transition to zero-emission vehicles.

In addition, the indicator contributes to the Sustainable Development Goals of the 2030 Agenda for Sustainable Development. They are linked to Goal 12, Responsible consumption and production and Target 12.4, "By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment."

Related indicators

The Air pollutant emissions indicators track emissions from human activities of 6 key air pollutants: sulphur oxides (SO_X), nitrogen oxides (NO_X), volatile organic compounds (VOCs), ammonia (NH_3), carbon monoxide (CO) and fine particulate matter ($PM_{2.5}$). Black carbon, which is a component of $PM_{2.5}$, is also reported. For each air pollutant, data are provided at the national, provincial/territorial and facility level and by major source.

The Emissions of harmful substances to air indicators track human-related emissions to air of 4 toxic substances, namely mercury, lead, cadmium and arsenic, and their compounds. For each substance, data are provided at the national, provincial/territorial and facility level and by source. Global emissions to air are also provided for mercury.

The Releases of harmful substances to water indicators track human-related releases to water of 4 toxic substances, namely mercury, lead, cadmium and arsenic, and their compounds. For each substance, data are provided at the national, provincial/territorial and facility level and by source.

Data sources and methods

Data sources

The indicator is based on data from the Canadian Biomonitoring Dashboard which reports results from the Canadian Health Measures Survey (the survey). The survey started in 2007, and data are collected in 2-year cycles.

More information

Statistics Canada, in partnership with Health Canada and the Public Health Agency of Canada, launched the survey to collect national-level data on important indicators of the Canadian population's health status, including those pertaining to environmental chemical exposure. The survey is representative of approximately 96% of the people living in Canada, aged 6 to 79 years (Cycle 1), 3 to 79 years (Cycle 2 to Cycle 6) and 1 to 79 years (Cycle 7).

Cadmium data for people who do not smoke and Bisphenol A data for total population were provided directly by Health Canada, Population Studies Division as of June 9, 2026.

Table 1. Characteristics of the Canadian Health Measures Survey cycles

Cycle	Temporal coverage	Spatial coverage	Age of participants in the sample
Cycle 1	March 2007 to February 2009	15 sites across Canada	6 to 79 years
Cycle 2	August 2009 to November 2011	18 sites across Canada	3 to 79 years
Cycle 3	January 2012 to December 2013	16 sites across Canada	3 to 79 years
Cycle 4	January 2014 to December 2015	16 sites across Canada	3 to 79 years
Cycle 5	January 2016 to December 2017	16 sites across Canada	3 to 79 years
Cycle 6	January 2018 to December 2019	16 sites across Canada	3 to 79 years
Cycle 7	January 2023 to December 2024	16 sites across Canada	1 to 79 years

Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Methods

Selected environmental chemicals were measured in the blood and/or urine of survey participants. For the national summary, the geometric mean of all results was calculated for each substance. The geometric mean was also calculated for results within the different age and sex groupings. A trend analysis was done to support statements regarding change over time in the total population.

More information

The geometric mean (or average) was used because it is less influenced by extreme values and provides a better estimate of central tendency compared to the arithmetic mean. It uses the product of a set of values, whereas an arithmetic mean uses the sum. The geometric mean is defined as the *n*th root of the product of *n* numbers.

For the laboratory methods used, there is a limit of detection. This is the lowest concentration of the substance that can be detected with 99% confidence. Results that fell below the limit of detection were assigned a value equal to half the limit of detection. If more than 40% of results were below the limit of detection, the geometric mean was not calculated.

There are some variations between cycles in analytical methods and limits of detection. For consistency and to ensure meaningful trend analyses across all cycles, chemical concentrations below the highest, most conservative, limit of detection (LODc) were replaced with values equal to the LODc, divided by 2.

Further information on survey methodology can be obtained directly from the surveys.

Table 2. Limit of detection of the Canadian Health Measures Survey by chemical substance

Substance	Limit of detection Cycle 1 (micrograms per litre)	Limit of detection Cycle 2 (micrograms per litre)	Limit of detection Cycle 3 (micrograms per litre)	Limit of detection Cycle 4 (micrograms per litre)	Limit of detection Cycle 5 (micrograms per litre)	Limit of detection Cycle 6 (micrograms per litre)	Limit of detection Cycle 7 (micrograms per litre)
Mercury	0.1	0.12	0.42	0.42	0.2	0.2	0.19
Lead	0.21	1.0	1.6	1.6	1.7	1.7	0.73
Cadmium	0.045	0.045	0.08	0.08	0.097	0.097	0.076
Bisphenol A	0.2	0.2	0.23	0.016	0.016	0.016	0.021

Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Trend analysis

The trend analysis was conducted using the R platform using the R survey package incorporating the survey sample weights (taking into account the unequal probability of selection into the survey as well as non-response) as described in Pollock et al (2021). All data considered in this analysis were log normally distributed; therefore, the results are based on the natural log transformation of the data. Data for each chemical were re-screened at the maximum detection limit across all cycles by applying half the highest analytical limit of detection. Chemical trends over time were evaluated using analysis of variance models that included the natural log-transformed chemical concentrations (continuous) as the dependent variable and cycle (categorical) as the predictor variable.

Caveats and limitations

The Canadian Health Measures Survey (the survey) is designed to provide national-level estimates, or regional level estimates when data from multiple cycles are combined, but it does not permit further breakdown of data by collection site. In addition, the survey design does not target specific exposure scenarios and consequently does not select or exclude participants based on their potential for low or high exposures to environmental chemicals.

More information

People living on reserves or in other Indigenous settlements in the provinces, residents of institutions, full-time members of the Canadian Forces, people living in certain remote areas, and people living in areas with a low population density were excluded from the survey.

Concentrations of total mercury, lead, and cadmium in blood and total bisphenol A in urine differ between cycles, owing in part to changes in the limit of detection. These changes were accounted for in the statistical testing of trends across cycles. Chemicals may be present and detectable in a person without causing an adverse health effect. Detection of a chemical indicates that exposure has occurred. However, biomonitoring alone cannot predict the health effects, if any, that may result from exposure. Factors such as age, health status, dosage, duration, frequency and timing of exposure and toxicity of the chemical must be considered in order to predict whether adverse health effects may occur.

Biomonitoring cannot tell us the source or route of exposure. The amount of chemical measured in a person's blood or urine is representative of the total amount present in the body at a given time from all sources (air, water, soil, food and consumer products) and all routes of exposure (ingestion, inhalation, skin contact).

Resources

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Related information

America's Children and the Environment. Biomonitoring: Bisphenol A

America's Children and the Environment. Biomonitoring: Mercury

Final Human Health State of the Science Report on Lead

Guidelines for Canadian Drinking Water Quality: Guidelines Technical Document – Cadmium

Human Biomonitoring of Environmental Chemicals

Bisphenol A (BPA)

Lead

Mercury

Annex

Annex A. Data tables for the figures presented in this document

Table A.1. Data for Figure 1. Changes in the average concentrations of selected substances in people living in Canada, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	Mercury in blood (percentage change from Cycle 1)	Lead in blood (percentage change from Cycle 1)	Cadmium in blood in people who do not smoke (percentage change from Cycle 1)	Bisphenol A in urine (percentage change from Cycle 1)
Cycle 1 2007 to 2009	0	0	0	0
Cycle 2 2009 to 2011	3	-8	-4	0
Cycle 3 2012 to 2013	n/c	-15	4	-8
Cycle 4 2014 to 2015	n/c	-26	-4	-24
Cycle 5 2016 to 2017	-14	-31	-13	-39
Cycle 6 2018 to 2019	1	-37	-8	-43
Cycle 7 2023 to 2024	-36	-44	-17	-63

Note: n/c = not calculated. The table presents the percentage change in the average (geometric mean) concentrations of selected substances in people living in Canada relative to Cycle 1 (2007 to 2009). Percent changes were not calculated for some cycles where geometric mean concentrations are not available. Average concentrations across cycles are presented in table A.2 below.
Source: Health Canada (2026a) Cadmium in people living in Canada. Health Canada (2026c) Lead in people living in Canada. Health Canada (2026d) Mercury in people living in Canada. Health Canada (2026e) Communication from Population Studies Division.

Table A.2. Data for Figure 1. Changes in the average concentrations of selected substances in people living in Canada, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	Mercury in blood (micrograms per litre)	Lead in blood (micrograms per litre)	Cadmium in blood in people who do not smoke (micrograms per litre)	Bisphenol A in urine (micrograms per litre)
Cycle 1 2007 to 2009	0.72	13	0.24	1.2
Cycle 2 2009 to 2011	0.74	12	0.23	1.2
Cycle 3 2012 to 2013	n/c	11	0.25	1.1
Cycle 4 2014 to 2015	n/c	9.6	0.23	0.91
Cycle 5 2016 to 2017	0.62	9.0	0.21	0.73
Cycle 6 2018 to 2019	0.73	8.2	0.22	0.68
Cycle 7 2023 to 2024	0.46	7.3	0.20	0.44

Note: n/c = not calculated. The table presents the average (geometric mean) concentrations of selected substances in people living in Canada. The concentrations of mercury and lead in blood and bisphenol A in urine are from participants aged 6 to 79 years and cadmium in blood in people who do not smoke are from participants aged 12 to 79 years. Averages for lead, mercury and bisphenol A do not include children under the age of 6 years as they were not included in the Cycle 1 survey. Some averages are not calculated due to poor detection

affecting the ability to calculate geometric means for the total population (i.e. more than 40% of samples were below the limit of detection). The averages presented were calculated using the most conservative limit of detection across cycles to enable meaningful comparisons and evaluation of statistical trends.
Source: Health Canada (2026a) Cadmium in people living in Canada. Health Canada (2026c) Lead in people living in Canada. Health Canada (2026d) Mercury in people living in Canada. Health Canada (2026e) Communication from Population Studies Division.

Table A.3. Data for Figure 2. Average concentration of mercury in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	1 to 2 years (micrograms per litre)	3 to 5 years (micrograms per litre)	6 to 11 years (micrograms per litre)	12 to 19 years (micrograms per litre)	20 to 39 years (micrograms per litre)	40 to 59 years (micrograms per litre)	60 to 79 years (micrograms per litre)
Cycle 1 2007 to 2009	n/a	n/a	0.27	0.31	0.65	1.00	0.87
Cycle 2 2009 to 2011	n/a	0.27	0.28	0.27	0.64	1.00	1.10
Cycle 3 2012 to 2013	n/a	n/c	n/c	n/c	0.82	0.96	1.00
Cycle 4 2014 to 2015	n/a	n/c	n/c	n/c	n/c	0.77	0.88
Cycle 5 2016 to 2017	n/a	n/c	n/c	0.33	0.55	0.86	0.83
Cycle 6 2018 to 2019	n/a	0.32	0.36	0.44	0.74	0.84	0.95
Cycle 7 2023 to 2024	n/c	n/c	n/c	n/c	0.45	0.54	0.59

Note: n/a = not available; n/c = not calculated. Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as either data were not available [n/a] or more than 40% of the samples were below the limit of detection [n/c]).Mercury is shown as total mercury (organic and inorganic).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Table A.4. Data for Figure 3. Average concentration of mercury in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	Females (micrograms per litre)	Males (micrograms per litre)
Cycle 1 2007 to 2009	0.70	0.68
Cycle 2 2009 to 2011	0.67	0.72
Cycle 3 2012 to 2013	0.82	0.76
Cycle 4 2014 to 2015	n/c	n/c
Cycle 5 2016 to 2017	0.61	0.59
Cycle 6 2018 to 2019	0.71	0.72

Survey period	Females (micrograms per litre)	Males (micrograms per litre)
Cycle 7 2023 to 2024	0.45	0.44

Note: n/c = not calculated. Average refers to geometric mean. Cycle 4 does not include data due to poor detection affecting the ability to calculate geometric means (more than 40% of samples were below the limit of detection). Mercury is shown as total mercury (organic and inorganic).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Table A.5. Data for Figure 4. Average concentration of lead in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	1 to 2 years (micrograms per litre)	3 to 5 years (micrograms per litre)	6 to 11 years (micrograms per litre)	12 to 19 years (micrograms per litre)	20 to 39 years (micrograms per litre)	40 to 59 years (micrograms per litre)	60 to 79 years (micrograms per litre)
Cycle 1 2007 to 2009	n/a	n/a	9.0	8.0	11.0	16.0	21.0
Cycle 2 2009 to 2011	n/a	9.3	7.9	7.1	9.8	14.0	19.0
Cycle 3 2012 to 2013	n/a	7.7	7.1	6.4	9.0	13.0	16.0
Cycle 4 2014 to 2015	n/a	6.7	5.9	5.4	8.0	12.0	15.0
Cycle 5 2016 to 2017	n/a	5.6	5.4	4.9	7.8	11.0	14.0
Cycle 6 2018 to 2019	n/a	5.0	4.9	4.7	7.1	9.2	13.0
Cycle 7 2023 to 2024	4.7	4.7	4.4	4.0	6.7	8.1	11.0

Note: n/a = not available. Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as the age groups were not included in certain cycles).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Table A.6. Data for Figure 5. Average concentration of lead in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	Females (micrograms per litre)	Males (micrograms per litre)
Cycle 1 2007 to 2009	12.0	15.0
Cycle 2 2009 to 2011	11.0	13.0
Cycle 3 2012 to 2013	9.6	12.0
Cycle 4 2014 to 2015	8.7	10.0

Survey period	Females (micrograms per litre)	Males (micrograms per litre)
Cycle 5 2016 to 2017	7.9	10.0
Cycle 6 2018 to 2019	7.5	8.7
Cycle 7 2023 to 2024	6.6	7.8

Note: Average refers to geometric mean.
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Table A.7. Data for Figure 6. Average concentration of cadmium in blood in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	1 to 2 years (micrograms per litre)	3 to 5 years (micrograms per litre)	6 to 11 years (micrograms per litre)	12 to 19 years (micrograms per litre)	20 to 39 years (micrograms per litre)	40 to 59 years (micrograms per litre)	60 to 79 years (micrograms per litre)
Cycle 1 2007 to 2009	n/a	n/a	0.097	0.17	0.35	0.49	0.45
Cycle 2 2009 to 2011	n/a	0.075	0.086	0.14	0.29	0.42	0.46
Cycle 3 2012 to 2013	n/a	n/c	0.096	0.17	0.31	0.50	0.48
Cycle 4 2014 to 2015	n/a	0.082	0.094	0.14	0.33	0.41	0.44
Cycle 5 2016 to 2017	n/a	n/c	n/c	0.11	0.28	0.35	0.39
Cycle 6 2018 to 2019	n/a	n/c	n/c	0.13	0.24	0.32	0.36
Cycle 7 2023 to 2024	n/c	n/c	0.087	0.12	0.21	0.31	0.37

Note: n/a = not available. n/c = not calculated. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as either data were not available [n/a] or more than 40% of the samples were below the limit of detection [n/c]).
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Table A.8. Data for Figure 7. Average concentration of cadmium in blood in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	Females (micrograms per litre)	Males (micrograms per litre)
Cycle 1 2007 to 2009	0.39	0.31
Cycle 2 2009 to 2011	0.32	0.27
Cycle 3 2012 to 2013	0.37	0.29
Cycle 4 2014 to 2015	0.33	0.28
Cycle 5 2016 to 2017	0.26	0.24
Cycle 6 2018 to 2019	0.27	0.22
Cycle 7 2023 to 2024	0.27	0.19

Note: Average refers to geometric mean.
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Table A.9. Data for Figure 8. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	1 to 2 years (micrograms per litre)	3 to 5 years (micrograms per litre)	6 to 11 years (micrograms per litre)	12 to 19 years (micrograms per litre)	20 to 39 years (micrograms per litre)	40 to 59 years (micrograms per litre)	60 to 79 years (micrograms per litre)
Cycle 1 2007 to 2009	n/a	n/a	0.097	0.14	0.20	0.29	0.37
Cycle 2 2009 to 2011	n/a	0.075	0.086	0.12	0.19	0.27	0.37
Cycle 3 2012 to 2013	n/a	n/c	0.096	0.13	0.20	0.30	0.38
Cycle 4 2014 to 2015	n/a	0.082	0.094	0.13	0.18	0.27	0.34
Cycle 5 2016 to 2017	n/a	n/c	n/c	0.098	0.17	0.24	0.31
Cycle 6 2018 to 2019	n/a	n/c	n/c	0.12	0.18	0.25	0.31
Cycle 7 2023 to 2024	n/c	n/c	0.087	0.11	0.17	0.24	0.29

Note: n/a = not available. n/c = not calculated. Average refers to geometric mean. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as either data were not available [n/a] or more than 40% of the samples were below the limit of detection [n/c]).
Source: Health Canada (2026e) Communication from Population Studies Division.

Table A.10. Data for Figure 9. Average concentration of cadmium in blood in people living in Canada for people who do not smoke, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	Females (micrograms per litre)	Males (micrograms per litre)
Cycle 1 2007 to 2009	0.27	0.20
Cycle 2 2009 to 2011	0.24	0.18
Cycle 3 2012 to 2013	0.27	0.18
Cycle 4 2014 to 2015	0.24	0.18
Cycle 5 2016 to 2017	0.21	0.15
Cycle 6 2018 to 2019	0.23	0.17
Cycle 7 2023 to 2024	0.22	0.15

Note: Average refers to geometric mean.
Source: Health Canada (2026e) Communication from Population Studies Division.

Table A.11. Data for Figure 10. Average concentration of bisphenol A in urine in people living in Canada, by age group, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	1 to 2 years (micrograms per litre)	3 to 5 years (micrograms per litre)	6 to 11 years (micrograms per litre)	12 to 19 years (micrograms per litre)	20 to 39 years (micrograms per litre)	40 to 59 years (micrograms per litre)	60 to 79 years (micrograms per litre)
Cycle 1 2007 to 2009	n/a	n/a	1.30	1.50	1.30	1.00	0.90
Cycle 2 2009 to 2011	n/a	1.40	1.40	1.30	1.30	1.20	1.00
Cycle 3 2012 to 2013	n/a	1.20	1.20	1.30	1.10	1.10	0.87
Cycle 4 2014 to 2015	n/a	1.10	1.10	1.10	0.97	0.78	1.00
Cycle 5 2016 to 2017	n/a	0.93	0.86	1.00	0.76	0.67	0.69
Cycle 6 2018 to 2019	n/a	0.84	0.84	0.82	0.61	0.70	0.71
Cycle 7 2023 to 2024	n/a	0.63	0.61	0.68	0.43	0.42	0.36

Note: n/a = not available. Averages for some age groups are not presented as they are not consistently available for all cycles (geometric means could not be calculated for certain age groups as they were not included in a cycle)..
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.

Table A.12. Data for Figure 11. Average concentration of bisphenol A in urine in people living in Canada, by sex at birth, Cycle 1 (2007 to 2009) to Cycle 7 (2023 to 2024)

Survey period	Females (micrograms per litre)	Males (micrograms per litre)
Cycle 1 2007 to 2009	1.0	1.3
Cycle 2 2009 to 2011	1.2	1.3
Cycle 3 2012 to 2013	1.0	1.2
Cycle 4 2014 to 2015	0.8	1.1
Cycle 5 2016 to 2017	0.72	0.78
Cycle 6 2018 to 2019	0.64	0.77
Cycle 7 2023 to 2024	0.41	0.48

Note: Average refers to geometric mean.
Source: Health Canada (2026b) Canadian Biomonitoring Dashboard.