

## Health Fact Sheets

# Lead, mercury and cadmium concentrations in Canadians, 2012 and 2013



Statistics  
Canada

Statistique  
Canada

Canada

---

## How to obtain more information

For information about this product or the wide range of services and data available from Statistics Canada, visit our website, [www.statcan.gc.ca](http://www.statcan.gc.ca).

You can also contact us by

email at [STATCAN.infostats-infostats.STATCAN@canada.ca](mailto:STATCAN.infostats-infostats.STATCAN@canada.ca)

telephone, from Monday to Friday, 8:30 a.m. to 4:30 p.m., at the following numbers:

- |   |                |
|---|----------------|
| • Statistical Information Service                             | 1-800-263-1136 |
| • National telecommunications device for the hearing impaired | 1-800-363-7629 |
| • Fax line  | 1-514-283-9350 |

### Depository Services Program

- |                  |                |
|------------------|----------------|
| • Inquiries line | 1-800-635-7943 |
| • Fax line       | 1-800-565-7757 |

## Standards of service to the public

Statistics Canada is committed to serving its clients in a prompt, reliable and courteous manner. To this end, Statistics Canada has developed standards of service that its employees observe. To obtain a copy of these service standards, please contact Statistics Canada toll-free at 1-800-263-1136. The service standards are also published on [www.statcan.gc.ca](http://www.statcan.gc.ca) under “Contact us” > “Standards of service to the public.”

## Note of appreciation

Canada owes the success of its statistical system to a long-standing partnership between Statistics Canada, the citizens of Canada, its businesses, governments and other institutions. Accurate and timely statistical information could not be produced without their continued co-operation and goodwill.

## Standard table symbols

The following symbols are used in Statistics Canada publications:

- . not available for any reference period
- .. not available for a specific reference period
- ... not applicable
- 0 true zero or a value rounded to zero
- 0<sup>s</sup> value rounded to 0 (zero) where there is a meaningful distinction between true zero and the value that was rounded
- <sup>P</sup> preliminary
- <sup>r</sup> revised
- X suppressed to meet the confidentiality requirements of the *Statistics Act*
- <sup>E</sup> use with caution
- F too unreliable to be published
- \* significantly different from reference category ( $p < 0.05$ )

Published by authority of the Minister responsible for Statistics Canada

© Minister of Industry, 2015

All rights reserved. Use of this publication is governed by the Statistics Canada [Open Licence Agreement](#).

**An HTML version is also available.**

*Cette publication est aussi disponible en français.*

---

# Lead, mercury and cadmium concentrations in Canadians, 2012 and 2013

Lead, mercury and cadmium all exist in the environment and can therefore be found in trace amounts in the blood of Canadians. Chronic and high-level exposure to these metals can cause health issues including musculoskeletal and/or neurological problems (see About lead, mercury and cadmium). Lead, mercury and cadmium blood concentrations were measured in respondents aged 3 to 79 years in the Canadian Health Measures Survey (CHMS) in 2012 and 2013.

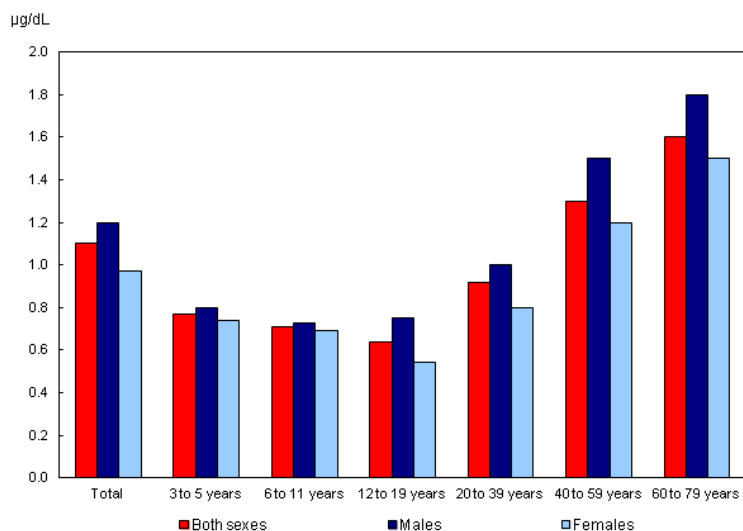


## Lead

In 2012 and 2013, the vast majority (96%) of Canadians aged 3 to 79 years had detectable levels of lead in their blood. The average concentration of blood lead was 1.1 micrograms per decilitre ( $\mu\text{g}/\text{dL}$ ). Males had a significantly higher blood lead concentration (1.2  $\mu\text{g}/\text{dL}$ ) compared with females (0.97  $\mu\text{g}/\text{dL}$ ) (Chart 1). Of all age groups, young people aged 12 to 19 years had the lowest blood lead concentration (0.64  $\mu\text{g}/\text{dL}$ ), while the oldest age group, 60 to 79 years, had the highest (1.6  $\mu\text{g}/\text{dL}$ ) (Chart 1). Canadians aged 20 to 79 years had a significantly higher blood lead concentration (1.2  $\mu\text{g}/\text{dL}$ ) compared with those aged 3 to 19 years (0.68  $\mu\text{g}/\text{dL}$ ) (data not shown).

Cigarette smoke is a known source of lead exposure for Canadians. Individuals aged 12 to 79 years, who reported smoking cigarettes daily or occasionally, had a significantly higher blood lead concentration (1.5  $\mu\text{g}/\text{dL}$ ) compared with non-smokers (1.0  $\mu\text{g}/\text{dL}$ ) (data not shown).

**Chart 1**  
Lead concentrations in blood ( $\mu\text{g}/\text{dL}$ ) in Canadians aged 3 to 79, by sex and age group, household population, Canada, 2012 and 2013



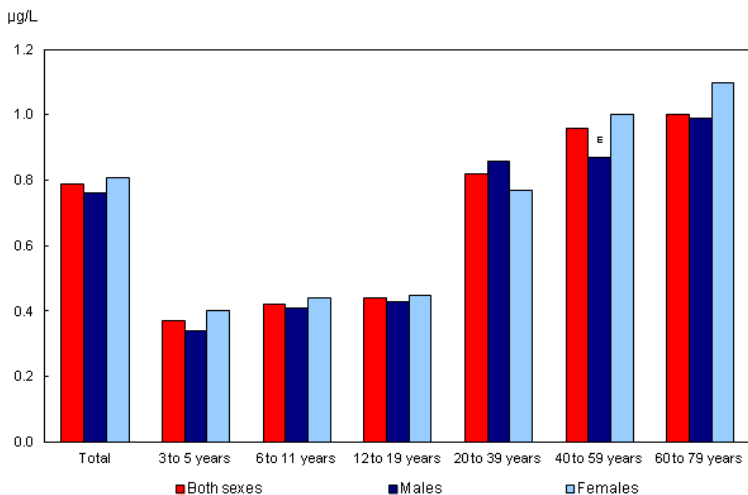
**Note:** Concentrations are presented as a geometric mean, which is a type of average that is less influenced by extreme values than the traditional arithmetic mean. The geometric mean provides a better estimate of central tendency for highly skewed data. This type of distribution is common in the measurement of environmental chemicals in blood and urine.  
**Source:** Canadian Health Measures Survey, 2012 and 2013

Health Canada has a blood lead guidance value for the general population of 10  $\mu\text{g}/\text{dL}$ .<sup>1</sup> A guidance value is the level above which follow-up actions may be considered to reduce exposure. Nearly all of Canadians aged 3 to 79 had a blood lead concentration below that level (data not shown).<sup>2</sup>

## Mercury

In 2012 and 2013, the CHMS detected total mercury in the blood of 61% of Canadians aged 3 to 79 years. Total mercury includes organic (such as methylmercury) and inorganic mercury. The average concentration of total mercury in blood was 0.79 microgram per litre ( $\mu\text{g}/\text{L}$ ) (Chart 2). The average concentration was similar for males (0.76  $\mu\text{g}/\text{L}$ ) and females (0.81  $\mu\text{g}/\text{L}$ ). Average concentrations of total mercury in blood tended to be higher in the older age groups (Chart 2). Adults aged 20 to 79 years had a higher concentration of total mercury in blood (0.92  $\mu\text{g}/\text{L}$ ) compared with children and youth aged 3 to 19 years (0.42  $\mu\text{g}/\text{L}$ ) (data not shown).

**Chart 2**  
**Total mercury concentrations in blood (µg/L) in Canadians aged 3 to 79, by sex and age group, household population, Canada, 2012 and 2013**



Use with caution (data with a coefficient of variation from 16.6% to 33.3%)

**Note:** Concentrations are presented as a geometric mean, which is a type of average that is less influenced by extreme values than the traditional arithmetic mean. The geometric mean provides a better estimate of central tendency for highly skewed data. This type of distribution is common in the measurement of environmental chemicals in blood and urine.

**Source:** Canadian Health Measures Survey, 2012 and 2013

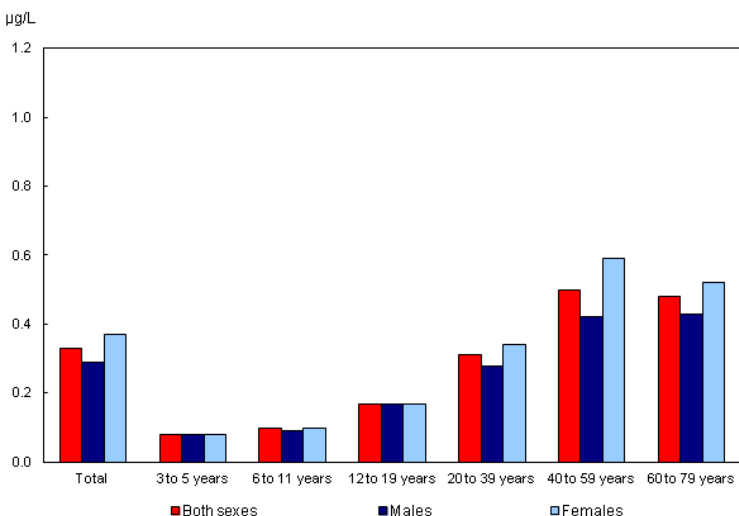
Mercury, specifically methylmercury, is commonly found in certain types of fish or seafood.<sup>3</sup> Canadians who reported eating fish or seafood known to have higher levels of methylmercury (such as shark, marlin, swordfish, fresh/frozen/canned tuna) within the last month, had a significantly higher concentration of total mercury in their blood (1.9 µg/L), compared with those that did not report eating any of those types of fish or seafood (0.68 µg/L) within the past month (data not shown).

Health Canada has established a guideline for mercury blood concentration of 20 µg/L for the general adult population and 8 µg/L for children, pregnant women and women of childbearing age.<sup>3</sup> Nearly all Canadians aged 3 to 79 had blood mercury concentrations below the general adult population guideline levels (data not shown).<sup>4</sup>

## Cadmium

In 2012 and 2013, the CHMS detected cadmium in the blood of 85% of the Canadian population aged 3 to 79 years. The average blood cadmium concentration was 0.33 µg/L. There was no significant difference between males (0.29 µg/L) and females (0.37 µg/L) (Chart 3). Average concentrations of cadmium in blood tended to be higher in the older age groups (Chart 3). Adults aged 20 to 79 years had a significantly higher concentration of cadmium in blood (0.42 µg/L) compared with children and youth aged 3 to 19 years (0.12 µg/L) (data not shown).

**Chart 3**  
**Cadmium concentrations in blood (µg/L) in Canadians aged 3 to 79, by sex and age group, household population, Canada, 2012 and 2013**



**Note:** Concentrations are presented as a geometric mean, which is a type of average that is less influenced by extreme values than the traditional arithmetic mean. The geometric mean provides a better estimate of central tendency for highly skewed data. This type of distribution is common in the measurement of environmental chemicals in blood and urine.

**Source:** Canadian Health Measures Survey, 2012 and 2013

In addition to being a known source of lead, cigarette smoke is also a known source of cadmium exposure. People who reported smoking cigarettes daily or occasionally had a significantly higher concentration of cadmium (1.6 µg/L) in their blood compared with non-smokers (0.22 µg/L; data not shown).

There is currently no intervention level set out by Health Canada for cadmium in blood.

## About lead, mercury and cadmium

Lead is a naturally occurring metal released into the environment by natural processes including erosion and volcanic activity.<sup>3</sup> However, through industrial activities, including the historical use of leaded gasoline, lead has been released into the environment. People may also be exposed to lead through the food they eat, the water they drink and cigarettes they smoke.<sup>1, 4</sup>

Lead can be harmful to people of all ages. Although 10 µg/dL is the concentration at which action is recommended to reduce lead exposure, there is evidence to indicate that negative health effects are occurring at lower concentrations of exposure.<sup>1</sup> In infants and children, exposure to low levels of lead may have subtle effects on their intellectual development and behaviour.<sup>1</sup> They are particularly vulnerable to the harmful effects of lead because their growing bodies absorb lead more easily and get rid of it less efficiently than adults. In adults, the strongest scientific evidence to date suggests low levels of lead exposure may cause a small increase in blood pressure.<sup>1</sup>

Mercury is a naturally occurring heavy metal. Use of mercury in consumer products has decreased over the years but it still may be found in products such as medical devices (thermometers, dental amalgam and certain blood pressure devices). Organic mercury, such as methylmercury, may be absorbed following the consumption of certain types of fish and seafood.<sup>3</sup>

Total mercury levels in blood above the recommended guidelines (> 20 µg/L) may cause numbness and tingling in the extremities, blurred vision, deafness, lack of muscle coordination and intellectual impairment, as well as adverse effects on the cardiovascular, gastrointestinal and reproductive systems. Prenatal exposure may interfere with development of the central nervous system and can cause neurological and developmental delays in the unborn baby.<sup>3</sup>

Cadmium is present in the environment from natural processes, such as forest fires and volcanic emissions, and from industrial activities such as smelting. The main sources of exposure to Canadians are through ingestion of food, or inhalation at heavy metal/cadmium smelter workplaces, and cigarette smoke.<sup>5</sup>

Lead concentrations were measured in whole blood and are presented in micrograms per decilitre (µg/dL). Total mercury and cadmium concentrations were also measured in whole blood, but are presented as micrograms per litre (µg/L). All concentrations are presented as a geometric mean, which is a type of average that is less influenced by extreme values than the traditional arithmetic mean. The geometric mean provides a better estimate of central tendency for highly skewed data. This type of distribution is common in the measurement of environmental chemicals in blood and urine.

## Data

Additional information on lead, mercury, cadmium and many other environmental substances are presented in Health Canada's *Third Report on Human Biomonitoring of Environmental Chemicals in Canada*.

Additional information is available at [Canadian Health Measures Survey](#).

For more information on the Canadian Health Measures Survey, please contact Statistics Canada's National Contact Centre (toll-free 1-800-263-1136; 1-514-283-8300; [infostats@statcan.gc.ca](mailto:infostats@statcan.gc.ca)).

## Notes

- <sup>1</sup> Health Canada. 2013. *Final human health state of the science report on lead*. (accessed April 27, 2015).
- <sup>2</sup> The coefficient of variation for this estimate was too high to reliably report a specific value.
- <sup>3</sup> Health Canada. 2004. *Mercury – Your Health and the Environment. A Resource Tool*. (accessed April 27, 2015).
- <sup>4</sup> Agency for Toxic Substances and Disease Registry (ATSDR). 2007. *Toxicological profile for lead*. U.S. Department of Health and Human Services, Atlanta, Georgia.; (accessed April 27, 2015).
- <sup>5</sup> Health Canada. 1994. *Cadmium and its Compounds*. (accessed April 27, 2015).