



Protecting Your Children from Exposure to Lead

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In January 2013, the Center for Disease Control (CDC) has revised its level on lead poisoning cutting in half the amount of lead that will direct medical monitoring in children from ages 1 to 5. Now any child with more than 5 micrograms per decilitre of lead in their blood will be considered at risk.

In April 2013, CDC officials reported that approximately 535,000 children have lead poisoning in the United States under the new lead level limits, regardless of the fact that house paint and gasoline no longer contain lead. Studies recently published in the '[Environmental Science & Technology](#)' Journal, state that seasonal fluctuation of children's blood lead levels in many post-industrial cities such as Detroit, Boston, Chicago and Washington, DC, indicate children are exposed to higher levels of lead from contaminated soil that turns into airborne dust in the summertime. Children exposed to lead from contaminated soil in yards and playgrounds may be the biggest threat to their health.

The CDC, after lowering the lead level limit, looked at old blood tests again from 1,653 children under the age of six to determine how many would have lead poisoning under the new definition and found that 3% (about 50 children) had blood lead levels higher than the new threshold limit - which is enough to cause learning and behaviour problems. David Rosner, a Columbia University public health historian stated, "It's likely that many children with lead poisoning have not been diagnosed. In the CDC study, elevated lead levels were discovered for a third of the children only when they were tested by researchers."

While it is recommended that the U.S. government devote public dollars to remove the threat of lead poisoning, Health officials state that parents need to eliminate and/or safely control all sources of lead in their children's environment.

High lead-levels in young children can affect their cognitive and behavioural development, cause learning disabilities, seizures, and even death in some cases. The effects of lead exposure are greatest in unborn children and those under five years of age who are most susceptible.

Statistics Canada – Policy Reviewed for Lead-Level Limits

On April 17, 2013, Health Canada released its Second Report on Human Biomonitoring of Environmental Chemicals in Canada. This technical report provides comprehensive data on the exposure of the Canadian population to environmental chemicals, such as bisphenol A and lead, and is the first to include data for children 3 to 5 years of age.

The data presently released for Cycle 2 was collected between 2009 and 2011, which includes a nationally representative sample of approximately 6,400 Canadians - aged 3 to 79 years of age. Cycle 1 was conducted from 2007 to 2009 and included approximately 5,500 Canadians aged 6 to 79 years. Sample collection for Cycle 3 (2012-2013) is in progress and will be completed by December 2013. Planning for Cycles 4 (2014-2015) and 5 (2016-2017) is underway.

"Most Canadians have blood lead levels much lower than the current blood lead intervention level."

Statistics Canada
April 17, 2013

In 2009 to 2011, 100% of Canadians aged 3 to 79 had lead in their blood; however, **almost all of the Canadian population had blood lead levels lower than the current blood lead intervention level of 10 µg/dL (micrograms per decilitre)**. The average lead level for 6 to 79 year olds was 1.2 µg/dL (micrograms per decilitre). This is about 11% lower than the average lead level reported in 2007 to 2009 and four times lower than the average level measured in the 1978 to 1979 Canada Health Survey.

Children aged 3 to 5 years had blood lead levels of 0.93 µg/dL (micrograms per decilitre) which is higher than the levels found in children and youth aged 6 to 19. Adults aged 60 to 79 had the highest lead levels, reaching 1.9 µg/dL. Males tend to have higher lead levels than females in all age groups, except in children aged 6 to 11 years where there is no difference in lead concentrations. The survey was not designed to provide estimates by sex for children 3 to 5 years of age.

	Total	Males	Females
3 to 79	1.2	1.3	1.1
3 to 5	0.93		
6 to 11	0.79	0.79	0.78
12 to 19	0.71	0.84	0.60
20 to 39	0.98	1.1	0.85
40 to 59	1.4	1.6	1.3
60 to 79	1.9	2.0	1.7

Note(s): A geometric mean 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 data is common in the measurement of environmental chemicals in blood and urine. The sample size for 3 to 5 year olds produces reliable national estimates for both sexes combined only.

Source(s): Canadian Health Measures Survey, 2009 to 2011.

The Canadian Health Measures Survey (CHMS) collected data from a nationally representative sample of Canadians aged 3 to 79 years from 18 collection sites across Canada. Basic demographic and health information was collected during a household interview, followed by a series of direct physical measurements taken at a mobile examination centre. Blood and urine samples were collected from consenting respondents aged 3 to 79. The CHMS measured lead in blood samples.

Children can be tested by paediatricians and local health departments to measure the lead-level in their blood. Parents please make sure to ask for the child's exact blood lead-level and don't accept a vague report that states 'normal' or 'negative'.

"The new levels are important not just for children in the USA but internationally because many nations use CDC benchmarks as their own", says Perry Gottesfeld, Executive Director at Occupational Knowledge International, a California-based non-profit group.

Lead is an inexpensive metal that has many industrial and commercial uses but it can cause very harmful health effects especially to the nervous system and kidneys. Exposure to even very low levels of lead can cause learning disabilities and other harmful effects on children's physical development.



To Reduce Your Family's Risk of LEAD EXPOSURE

➡ Lead Paint

If your home was built before 1976, assume that the original exterior and interior paint used on your home contains lead. Leaded paint that chips or peels from walls, window sills, floors and other surfaces is a serious health hazard especially for children who might peel it off and eat it.

Please use the guidelines in the booklet '**Lead in Your Home**' to remove the lead paint properly. If the renovations are carried out improperly they can greatly increase the risk of lead exposure from leaded paint. Please review this booklet before starting a renovation in an older home. Renovations should be scheduled at times when children are not present.

To obtain a printed copy please call 1-800-668-2642. Please click on ['Canada Mortgage and Housing Corporation'](#) to view the web site.



➡ Plumbing Systems

Lead can be found in the plumbing and water supply lines of some homes and child care centres. Lead is rarely found in natural water sources but can enter tap water through corrosion of water supply pipes. Water pipes made entirely of lead are rare but may still be present in buildings built before 1950. Until the late 1980's, all copper plumbing was joined with lead solder. When water sits in contact with these joints for several hours, lead can dissolve in the water, especially if the water is 'soft' or acidic. Some brass or chrome-plated taps and faucets can also contain lead, which can leach into drinking water, especially hot water. Although there may be

only tiny quantities of lead in drinking water, it is important to take precautions. Even low levels of lead can affect the developing brain. If you are concerned about elevated lead levels in your drinking water, contact your local Public Health Department.

Please Remember:

- ▶ Always let the water run until it is cold before using it for drinking, cooking, and especially for making baby formula.
- ▶ Flushing a toilet also helps to flush the water pipes.
- ▶ Do not use water from the hot water tap for cooking or drinking.
- ▶ If you use a water filter, check that it can remove lead and replace filters regularly as recommended by the manufacturer.
- ▶ If your home was built before the mid-1950s, ask municipal officials if water supply pipes are made of lead. If they are, ask about plans to remove lead water supply pipes.
- ▶ If feasible, replace lead-containing plumbing, including service lines and fittings.
- ▶ Have your water tested for lead. Call the Ministry of Environment, your local water supplier, utility, or public health unit, for more information.



▶ Costume Jewellery

Costume jewellery that contains lead is a health hazard for children who chew or suck on it. When you purchase children's jewellery, please enquire whether it contains lead. Discourage your children from placing non-food items into their mouths.

▶ Leaded Crystal

If drinks are stored in leaded crystal containers some lead may dissolve into the liquid. Do not store liquids in lead crystal containers or serve pregnant women or children drinks in crystal glasses.



▶ Toys

Lead may be present in painted toys both old and new. Lead or other metals may also be added to polyvinyl chloride (PVC) plastics to lend colour or fire resistance. Some PVC toys have been recalled in recent years due to high levels of lead. Avoid old, donated or inexpensive toys from unknown origins (i.e., the manufacturer or brand is not indicated on the toy). Choose unpainted or lead-free painted wood toys or cloth toys over plastic toys.

For disposal of products or materials containing lead, Health Canada advises contacting either your local municipality, or the local office of your provincial or territorial Ministry of the Environment.

➡ Arts & Crafts

Look for products with the “AP” and “CL” seals from the American Arts and Creative Materials Institute (ACMI) to indicate products that “conform with ASTM D-4236.” This label assures some level of safety. The ACMI seals indicate that radioactive elements, lead in children’s products, and substances banned by the US Federal Hazardous Substances Act are below levels considered to be unsafe. This is currently the only common safety label on art supplies.



The information below on disorders caused by lead poisoning was resourced from a 2010 publication called '**Advancing Environmental Health in Child Care Settings**', which was created by the [Canadian Partnership for Children's Health and Environment \(CPCHE\)](#).

Neurobehavioural and Neurodevelopmental Disorders

Information on trends is limited, but data collected during the 1990's through the National Longitudinal Survey of Children and Youth indicate that about one quarter of children in Canada aged six to 11 years have one or more learning or behavioural problems.⁶ While all the precise causes of learning disabilities or other neurobehavioural conditions are unclear, children are particularly at risk of exposure to some chemicals, such as lead and mercury, known to affect brain development and function.

Regulations Controlling the Use of Lead in Canada

Health Canada has established regulations controlling the use of lead in a wide range of children’s products. Lead could also be present in a number of items not intended for children, and may find their way into a dress-up area or be otherwise available to children such as:

- Keychain fobs
- Pewter figurines (It is a misconception that pewter does not contain lead. Whether manufactured in Canada or imported, pewter can contain lead.)
- Inexpensive jewellery, particularly items that are dull grey in colour, are heavy for their size and mark a piece of white paper when rubbed on it (In Canada, lead is regulated in jewellery intended for children but not in that intended for adults. Jewellery that meets the description above often contains lead.)
- Brightly coloured earthenware ceramics from China, Mexico and Italy.

Lead testing kits are available in many hardware stores and pharmacies. Note that these kits only indicate the presence or absence of lead, not the amount. Health Canada has deemed home lead testing kits to be unreliable.

Very Helpful Web Sites

For more information on the health effects of lead, please call Health Canada's Consumer Product Safety Bureau toll-free at 1-866-662-0666 or consult the following websites:

Lead-based Paint

www.hc-sc.gc.ca/english/iyh/products/leadpaint.html

Lead Crystal ware and Your Health

www.hc-sc.gc.ca/english/iyh/products/crystal_lead.html

Effects of Lead on Human Health

www.hc-sc.gc.ca/english/iyh/environment/lead.html

Toronto Public Health — Lead in Drinking Water

www.toronto.ca/health/lead/pdf/factsheet_lead_drinkingwater_0109.pdf

Ministry of Environment — Letter to all schools, private schools and day nurseries on the requirements of Ontario Regulation 243/07

www.ontario.ca/drinkingwater/158287.pdf

Ministry of Environment — Summary of Amendments to O. Reg. 243/07, Made under the Safe Drinking Water Act, 2002: Lead and Drinking Water for Schools, Private Schools and Day Nurseries

www.ontario.ca/drinkingwater/278820.pdf

Canada Mortgage and Housing Corporation — Lead in Older Homes

www.cmhc-schl.gc.ca/en/co/maho/yohoyohe/inaiqu/inaiqu_007.cfm

Health Canada — It's Your Health: Effects of Lead on Human Health

www.hc-sc.gc.ca/hl-vs/alt_formats/pacrb-dgapcr/pdf/iyh-vsv/environ/lead-plomb-eng.pdf

CPCHE — Child Health and the Environment: A Primer

Renovation information, pp. 108–109

www.healthyenvironmentforkids.ca/resources/child-health-and-environment-primer

CPCHE — Safe Renovations fact sheets

www.healthyenvironmentforkids.ca/collections/cpche-fact-sheets-feuillets-dinformation-pcsee

CPCHE — Online Collection on Metals: Lead in Paint

www.healthyenvironmentforkids.ca/collections/metals-lead-paint

Commonly asked questions about lead and the effects on our health are courtesy of Health Canada.

Lead

What is lead and where is it found?

Lead is a heavy, soft bluish-grey metal that occurs naturally in the earth's crust in small amounts (average concentrations of 5-50 micrograms per kilogram). Much higher concentrations are found in lead ores. Lead tastes sweet but does not have a special smell. It can be found everywhere in our environment, not only because it occurs naturally, but also because it's used extensively in modern industry (mining, manufacturing and burning of fossil fuels).

What are the beneficial uses of lead?

Lead is a soft, heavy, inexpensive metal, which makes it useful in the manufacture of many consumer products such as pipes, sheeting, and as filler in the automobile body industry. In Canada, the major use of lead is in the manufacture of (lead-acid) batteries used in automobiles. It is also used in ammunition, fishing weights, and solder. Lead pigments are added to glass to prevent radiation exposure from television and computer screens, to storage containers for nuclear waste and to x-ray shielding aprons. Lead-acid batteries account for the most significant proportion of global lead consumption.

How is the use of lead controlled in Canada?

There are many regulatory and non-regulatory initiatives to reduce or regulate Canadians' exposure to lead.

Regulatory action:

Health Canada is mandated, under the Government of Canada's Hazardous Products Act and Regulations, to protect Canadians from potential health hazards in consumer products. Currently, the following consumer products are specifically regulated for lead content under the Hazardous Products Act: paints, enamels and other liquid coating materials, decorative coatings on pencils and artists' brushes, liquid coatings on children's furniture and other articles intended for children, toys, equipment and other products for use by a child in learning or play, glazed ceramics and glassware, and kettles.

Health Canada has also developed a Lead Risk Reduction Strategy for Consumer Products to protect children from exposure to lead through consumer products. It proposes to regulate, under the Hazardous Products Act, the lead content of five categories of consumer products that children are likely to come into contact with:

1. Products likely to be ingested in significant quantities (e.g., children's crayons, chalk)
2. Products intended to be or likely to be placed in or near the mouth (e.g., pacifiers, baby bottle nipples, crib toys, mouthpieces for musical instruments)
3. Children's equipment, furniture, toys and other items intended for use by a child in learning or play (e.g., strollers, high chairs)

4. Products intended for use in preparing, serving, or storing food or beverages (e.g., cutlery, tableware, cooking utensils)
5. Consumer products intended to be or likely to be melted or burned in enclosed spaces (e.g., candles, incense, fuel for indoor lanterns).

The strategy will serve as the foundation for new lead content regulations under the Hazardous Products Act. The Food and Drugs Act controls the lead content in food and food packaging materials such as tin cans. The 1990 Gasoline Regulation under the Canadian Environmental Protection Act has resulted in the phasing-out of leaded gasoline in Canada. Other provisions under this Act have reduced air emissions of lead from major industrial sources.

Non-Regulatory Action:

Health Canada has promoted awareness of issues concerning lead and health by educating the public, health professionals, and industry. Health Canada, in partnership with various groups, has released many publications on topics such as lead and home renovations and lead risks associated with arts and crafts.

Other non-regulatory initiatives include the "Guidelines for Canadian Drinking Water Quality" and standards under the National Plumbing Code for plumbing fixtures that come into contact with potable water.

In Canada, drinking water quality is a responsibility shared between various levels of governments. Health Canada works closely with the Federal-Provincial-Territorial Committee on Drinking Water to establish the Guidelines for Canadian Drinking Water Quality. Each jurisdiction is then responsible for setting their own guidelines, objectives or enforceable regulations, usually based on the "Guidelines for Canadian Drinking Water Quality. The Canadian guideline for lead in drinking water is 0.010 mg/L.

There is also the Canadian National Plumbing Code which restricts lead solder from being used in new plumbing or in repairs to plumbing for drinking water supplies. Several provinces have also passed legislation limiting the amount of lead in solder used for drinking water supply lines.

To protect the safety and well-being of all Canadians, Health Canada investigates all products that are brought to the attention of the Department as being potential sources of lead exposure. In addition, Health Canada is monitoring the results of several large lead exposure studies in the United States and Europe, and continues to contribute to the body of knowledge on lead and health through studies on the effects of low-level lead exposure in primates.

Sources of Exposure

What are the sources of lead exposure?

Humans are exposed to lead in both outdoor and indoor environments. It is found in the air, soil, dust, drinking water, food and various consumer products. Concentrations of lead in the environment increased significantly following the industrial revolution, most dramatically since the 1920s, following the introduction of lead additives in automobile gasoline. However, over the past 25 years, Health Canada, Environment Canada, and other Canadian regulatory agencies have substantially reduced Canadian's exposure to lead by, for example, legislating and enforcing maximum lead concentrations in gasoline and house paints. Also, the use of lead-

soldered food cans has been virtually eliminated through an agreement negotiated with Canadian canneries.

Outdoor Environments

Should I be concerned about lead concentrations in the air?

Lead concentrations in the air have declined significantly since the introduction of unleaded gasoline in Canada in 1975. Currently, the level of lead in the air of most Canadian cities is below the detectable level so, generally, there is no need to be concerned. There could be some concern for people living near a point source, such as a smelter or refinery, where lead is released into the air through industrial emissions. However, the levels of lead from smelter emissions are regulated under the Canadian Environmental Protection Act (CEPA).

Should I be concerned about lead in soils?

Lead can be found everywhere in our environment. Most of the lead in soils comes from particles falling out of the air and from rocks that contain lead. Lead-contaminated dust and soil can cling to skin, hair, shoes, clothing and vehicles and can be carried indoors. Dust and soil can be a source of lead exposure for small children because they are close to the ground and because of their hand to mouth activity. It is, however, very unlikely that a child could inhale or consume an amount significant enough to result in elevated blood levels.

Is there lead in gasoline?

Concentrations of lead in the environment increased following the introduction of lead additives in automobile gasoline. Then, between 1973 and 1985, airborne lead concentrations fell considerably due to the increased use of unleaded gasoline. Since 1990, the use of leaded gasoline in motor vehicles has been prohibited in Canada, under the Canadian Environmental Protection Act (CEPA). Although leaded gasoline is no longer used in Canada as an on-road automotive fuel, lead particles from gasoline emissions are still a source of lead in our environment today. In addition, leaded gasoline is still being used in many countries, so contamination of the atmosphere continues.

Should I be concerned about lead concentrations in drinking water supplies?

In Canada, the concentration of lead in drinking water supplies do not represent a hazard to Canadians as concentrations are normally below the maximum acceptable concentration of 0.010 mg/L.

What are the potential sources of lead that could get into my home's water supply?

In Canada, the concentration of lead in drinking water is generally below the Canadian guideline of 0.010 mg/L as it leaves the treatment plant. However, lead may enter potable water at several points between water treatment plants and people's homes. The use of lead in valve parts or gaskets in treatment plants and the use of lead in older distribution mains and service

lines are all potential sources. In dwellings, pipe jointing compounds, soldered joints and brass fixtures are also possible sources of lead. If you are concerned about potential elevated lead levels in your home's drinking water, you can contact your municipality's public health inspector or environmental health officer.

How can I reduce the lead levels in tap water?

Lead levels in tap water will increase with the length of time water is left standing in pipes. At home, you can let tap water run before drinking it if it has been standing in the pipes for a few hours. Turn on the taps until the water runs cold first thing in the morning or at any other time when the water has been left standing in your home's plumbing system for a long time.

However, in many cases, normal domestic activities in the morning, such as showering and flushing toilets, should minimize the need to flush taps. To conserve water and avoid the extensive flushing of taps, you can also keep some drinking water in the refrigerator.

You can also minimize lead levels by using only cold water for drinking, cooking and making baby formula. Hot or warm water tends to acquire more lead, especially in those areas that have soft water. Lead contamination is more evident in areas with soft drinking water because this water tends to be acidic (low pH). Such conditions favour the leaching of lead from plumbing.

How does the level of lead in water from drinking water fountains compare to the level of lead in tap water?

Water from drinking fountains may have higher levels of lead than water from nearby taps because they contain more piping, soldered joints and fittings from which lead may leach. In addition, the water usually sits in the fountain for longer periods of time prior to use.

Does the age of my home affect the level of lead in drinking water?

Lead levels may be higher in old (pre-1950) or very new homes. In old homes, the problem often arises because of leaded distribution lines and service connections. In newer homes, excessive leaching from leaded solder and brass fixtures (e.g., faucets), may occur for the first year until a protective oxide layer has formed in the pipes.

Since 1990, the Canadian National Plumbing Code has restricted the use of lead solder in new plumbing and in repairs to plumbing for drinking water supplies. Several provinces have also passed legislation limiting the amount of lead in solder used for drinking water supply lines.

If you are concerned about potential elevated lead levels in your home's drinking water, you can contact your municipality's public health inspector or environmental health officer.

What can a municipality do to reduce lead levels in water?

A municipality can evaluate and potentially modify the water's alkalinity and pH levels. In addition, the municipality can use a corrosion inhibitor, which can react with the dissolved lead to form a protective coating on the inside of pipes to reduce the amount of lead leaching into drinking water.

How should I dispose of a product that contains lead?

Such products must be disposed of carefully to avoid contaminating the environment. When products such as waste oil, coloured newsprint, battery casings or lead-painted wood are burned, lead fumes or particles are released into the air and may be inhaled. When products such as batteries and paint scrapings are thrown out and make their way into landfills, or when lead shot, sinkers and jiggers are left in the environment, they create a lead reservoir. This reservoir slowly leaches into soils, sediments, and water.

In the environment, these products break down to form lead oxides, carbonates and other inorganic lead compounds. Lead in contaminated sediments can be stored in the tissues of a variety of species. Since humans are at the top of the food chain, we have a high probability of ingesting a portion of this lead as it makes its way through the food chain. In addition, surface water that contains lead can migrate into the soil and into groundwater reserves and enter water courses that may be used as sources of drinking water.

In many areas of Canada, special arrangements exist for the disposal of hazardous household wastes. Leaded products, such as paint scrapings and batteries, should not be discarded with the garbage. To find out how to dispose of old products, contact either your local municipality, or the local office of your provincial or territorial Ministry of the Environment.

Indoor Environments

How does lead get into my home?

Lead dust can cling to skin, hair, shoes, clothing and vehicles and can be carried indoors. Studies suggest that lead dust is also generated within the home from, for example, lead-based paints. In some homes, this may result in a significantly greater concentration of lead in household dust than in nearby outdoor soil and dust. Airborne lead dust settles on food, water, clothing and other objects and may subsequently be ingested.

Should I be concerned about household dust contaminated by lead?

Babies and small children can be exposed to lead because they can ingest household dust through their tendency to mouth or chew objects they come into contact with. Additionally, young children are more at risk because their breathing zone is close to floor level and because they breathe in more air per unit body weight than adults.

What types of workplace environments are potentially dangerous sources of lead exposure?

Workers in smelters, refineries, and other industries that use lead may be exposed to high levels of lead. For example, the recycling of automotive batteries, which are crushed and melted down, can release lead into the work environment. The families of people working in these industries may be exposed to high levels of lead from workers' clothing and equipment.

In Canada, most provincial governments require employers to monitor workers' exposure to lead in the workplace. If you have concerns, you should contact your employer's Workplace Health or Occupational Safety representative.

How can I determine if the sources of lead in my home contain harmful levels?

The best source to help you to evaluate the levels of lead in your home is a local public health inspector or environmental health officer.

Why was lead used in paints?

Lead was used to make paints dry quickly, wear well and to make colours vibrant. The soft, gray metal makes an excellent white pigment. Paint made with white lead pigment provides a high-quality, durable protective coating. The amount and kind of lead vary in different types of paint.

How is lead in paint now regulated?

The Liquid Coating Materials Regulations were enacted under the Hazardous Products Act in 1976 to restrict the lead content of paints and other liquid coatings on furniture, household products, children's products, and exterior and interior surfaces of any building frequented by children to 0.5% by weight. The Canadian Paint and Coatings Association (CPCA), the national trade association for Canada's paint manufacturers, recommended that the Canadian paint industry voluntarily stop using any lead compounds in consumer paints by the end of 1990. Over the years, the amount of lead in paint has continued to decrease, due to the co-operative efforts of government and industry. Regulations to decrease the amount of lead in paints and other liquid coating materials to 0.06% by weight are expected to be in place by the end of 2002.

How do I know if my home contains lead-based paint?

Paints made before 1950 contained large amounts of lead. In fact, some paint made in the 1940s contained up to 50% lead by dry weight. If your home was built before 1960, it was likely painted with lead-based paint. Since the 1950's, the use of lead has been more common in exterior paint than interior paint. Subsequently, the use of lead in paints decreased significantly. Currently, under the Hazardous Products Act, lead levels in indoor paint are limited to 0.5 per cent by weight. There are proposed regulatory changes for both interior and exterior consumer paints to limit lead in paints to 0.06 per cent by dry weight. In homes built after 1980, there is little need for concern about lead levels in interior paints. All post-1992 consumer paint produced in Canada or the US for indoor use is virtually lead-free.

How can I determine if there are dangerous levels of lead in paints used in my home?

You can determine the level of lead in your paint by scientific testing. Some large Canadian cities have contractors using X-ray fluorescence equipment to sense for lead on surfaces. Alternatively, the paint can be analyzed at a laboratory certified by the Standards Council of Canada (613-238-3222) or the Canadian Association for Environmental Analytical Laboratories. (613-233-5300).

What should I do about lead-based paint in my home?

Lead-based paint doesn't present a health hazard as long as it is not chipping or flaking and it isn't located where it can be chewed by young children (window sills, cribs, etc.). Removing the paint can often result in a more immediate hazard than simply leaving the painted area intact. A good option for dealing with lead-based paint is encapsulation, that is, covering the surface with vinyl wallpaper, wallboard or panelling. In areas out of children's reach, applying a few layers of non-lead paint to intact surfaces will help. Other good options include replacement and

chemical removal. Mechanical removal (e.g., sanding) should be avoided, especially when there are high levels of lead in the paint.

Why is mechanically removing leaded paint a problem?

Mechanically removing or disturbing old lead-based paint can release high levels of leaded dust into the air that can be breathed in or deposited around the home. Removal methods such as sanding send a cloud of paint dust and scatter paint chips through the whole house. The dust can contaminate the air and any exposed surfaces, including food. Removal methods involving heat guns and blowlamps vaporize the paint, filling the air with leaded fumes. All these processes contribute to build-up of lead throughout the environment.

How can I safely remove leaded paint?

For paint on doors or trim, have the wood stripped offsite, either professionally or outside in a well-ventilated space. For walls, ceilings or immovable trim, chemical strippers may be the best solution. Application strippers (paste applied with a brush) are best. All chemical paint strippers contain potentially harmful substances, so take care when using them. Alternatively, there are some very effective dust-collecting sanders or media blasters (e.g. plastic bead blasting) that are available on the market. Only use these products if they guarantee a dust-free work environment.

How can lead contaminate food?

Lead is everywhere in the environment and as a result; it is present in trace amounts in virtually all the foods we eat. In addition to naturally occurring lead, food can be contaminated from several sources.

Lead Dust on Crops:

Airborne lead dust can fall onto food crops or into soil from where it is absorbed into plants.

Lead Solder and Canned Foods:

The use of lead-soldered food cans has been virtually eliminated through an agreement negotiated with Canadian canneries. However, some imported foods are still packaged in lead soldered cans.

Lead Shot in Game Hunting:

There is concern about the use of lead shot in game hunting, particularly in communities which consume game regularly, such as those in northern regions. People can be exposed to lead when they eat animals hunted with lead shot, breathe in lead fumes at shooting ranges, or when lead shot is manufactured at home. Lead shot and lead fishing jigs and sinkers also are an environmental hazard. Lost lead shot, jigs and sinkers add lead to Canada's natural environment each year.

Leaded Crystal:

Leaded crystal is widely used for serving beverages. When the crystal comes in contact with beverages, especially acidic beverages such as port, wine, fruit juices and soft drinks, some lead dissolves into the liquid. The amount of lead that dissolves depends on the lead content of the crystal, the type of beverage and the length of time they are in contact with each other. Over the course of a meal, the amount of lead dissolved is very small (well below 200 parts per

billion), but beverages stored in crystal decanters can accumulate very high levels of lead. Scientists have found lead concentrations of up to 20 parts per million (ppm) in wines kept for weeks in crystal containers. Under the Food and Drugs Act, the maximum allowable lead concentration in Canadian beverages is 200 parts per billion.

To avoid exposure to high lead levels, do not store any beverage in crystal decanters for extended periods of time. Decanters should only be used for serving. Some of the surface lead can be removed from new crystal by soaking it in vinegar for 24 hours and thoroughly rinsing it. Do not wash crystal in the dishwasher as harsh detergents can increase the release of lead. Do not serve pregnant women or children drinks in crystal glasses.

Ceramic Ware Pottery:

Poorly-fired ceramic ware with a lead-based glaze can release lead into food (particularly acidic foods such as fruit juices, tomato sauces, etc). Under the Regulations of the Hazardous Products Act, leachable or releasable lead from ceramic food ware is limited to 0.5, 1.0, 2.0, or 3.0 mg/L, depending on the type and size of the ceramic ware. Lead exposure may occur, however, with pottery bought as souvenirs in foreign countries. This pottery can be a significant health hazard and should not be used for serving food.

Consumer Products

Which consumer products are known to contain lead?

Lead is used in many consumer products. It is used to manufacture products such as pipes, metal sheeting, and as filler in the automobile body industry. In Canada, the major use of lead is in the manufacture of (lead-acid) batteries, used in automobiles. It is also used in ammunition and solder. Lead pigments are added to glass to prevent radiation exposure from television and computer screens, storage containers for nuclear waste and x-ray shielding aprons. Lead-acid batteries account for the most significant proportion of global lead consumption.

Lead is widespread in the human environment, so manufacturing a product with zero lead is generally not possible. However, trace amounts of lead in a consumer product should not pose a health risk.

Health Canada has developed a Lead Risk Reduction Strategy for Consumer products to protect children from exposure to lead through consumer products. It proposes to regulate, under the Government of Canada's Hazardous Products Act, the lead content of five categories of consumer products that children are likely to come into contact with:

1. Products likely to be ingested in significant quantities (e.g., children's crayons, chalk)
2. Products intended to be or likely to be placed in or near the mouth (e.g., pacifiers, baby bottle nipples, crib toys, mouth pieces for musical instruments)
3. Children's equipment, furniture, toys and other items intended for use by a child in learning or play (e.g., strollers, high chairs)
4. Products intended for use in preparing, serving, or storing food or beverages (e.g., cutlery, tableware, cooking utensils)
5. Consumer products intended to be or likely to be melted or burned in enclosed spaces (e.g., candles, incense, fuel for indoor lanterns).

The strategy will serve as the foundation for new lead content regulations under the Hazardous Products Act.

Can I or my family be exposed to lead from using products such as lead batteries and computer monitors?

The risk associated with lead in consumer products depends on exposure to the lead. With products such as computer monitors and lead batteries, where the lead is inaccessible, the likelihood that a person will be exposed to the lead they contain is low. For children, the risks associated with lead in consumer products is greater because they are more likely to put their fingers and other objects into their mouth. To determine the risk associated with lead in consumer products, it is necessary to make a distinction between the total lead content of a product and the migratable or extractable lead content. Total lead content is the amount of lead found in a product, whereas the migratable lead content is the amount of lead released from a product. The amount of migratable lead from a product depends on the product's composition and the treatment it receives. A leaded product that has a coating of paint or other protective covering may have a very low migratable lead potential when new, but if the covering wears off, exposing the lead beneath, the risk becomes much higher.

Regulations under the federal Hazardous Products Act control lead in glazes on glassware and ceramics, and in kettles, toys or other products for use by a child in play or learning, and paints and other coating materials used on the interior or exterior of buildings, furniture and household items, to trace amounts.

How can I determine the lead content of my child's jewellery?

In the majority of products, it is not possible to look at an item and determine if it contains lead. In general, products containing a large proportion of lead tend to be soft and heavy for their size.

In the case of children's jewellery, it may not be possible to determine if it contains lead by simply looking at a piece. So consumers should ask the retailer for proof that the product does not contain lead. If the consumer has any doubts about such products in their child's possession, they should be removed immediately.

Consumers can tell if a candle has a lead core wick by removing any wax from the tip of the wick, and separating the fibre strands from the wick to see if the candle has a metallic core. If the candle has a metallic core, rub the core on a piece of white paper. If the mark left on the white paper is grey in colour, then the metallic core is probably lead.

Which art supplies may contain lead?

Art supplies that may contain inorganic lead pigments include inks, dyes, paints and pastels, wax crayons, and coloured glazes for pottery or glassware. Artist's paint contains a much wider range of pigments than children's paint and is more likely to include lead-based pigments. Lead came (grooved moulding into which glass is fitted) is often used in stain glass manufacture, and leaded solders are used in stained glass and enamel manufacture, glass-blowing, and jewellery-making.

The Department's proposed Lead Risk Reduction Strategy sets limits on lead content of children's art supplies and craft kits which could release lead vapours during use.

What are the risks involved in using art materials that contain lead?

In general, there is very little risk of health effects on children or other users if they use art supplies containing lead, if use is limited to an hour or two per week. Lead, however, accumulates in the body and can persist for months or years, so materials containing lead should be avoided whenever possible. For younger children, exposure to lead is likely only if there are accidents or misuse, such as tasting or swallowing art materials. Most pigments are unlikely to cause harm if they simply get onto the skin.

When pottery coated with lead-based glazes is fired in a kiln, or when lead solder is used in hobbies such as stained glass, glass blowing, enamelling and jewellery-making, the heat vaporizes the lead. These fumes are harmful when breathed in, and may settle on nearby surfaces as lead dust. Hands readily become contaminated with lead when lead came is being used in stained glass work. Lead on the hands may be ingested if people then put their hands in their mouth.

As an artist, how can I reduce the risk associated with exposure to lead?

To reduce the health risks associated with lead exposure, choose lead-free solders, enamels, pigments and glazes whenever possible. To avoid pigment dust, apply paints and enamels as liquids rather than powders, whenever possible. Primary or junior school children should not have access to powdered pigments. Good ventilation and good housekeeping are also very important. This includes firing pottery in a kiln with exhaust ventilation, using rubberized gloves when handling lead came and washing one's hands and workplace at the end of the art activity. Also, never put a paint brush in your mouth.

How do I know if my blinds contain lead?

Inexpensive, 1" (2.54 cm) horizontal PVC (plastic) mini-blinds made in China, Taiwan, Indonesia, Hong Kong and Mexico may contain lead-based paint. Since the release of a Health Canada advisory in 1996, these blinds have been voluntarily removed from the market by the manufacturer. Any installed mini-blinds of this nature should be removed from areas where there are children, such as homes, schools and child care facilities.

How do vinyl mini-blinds pose a risk of exposure to lead?

Aging vinyl mini-blinds produce high levels of lead dust when consistently exposed to the sun's UV rays. The degradation of the paint on the slats, as the blinds are exposed to sunlight, causes the release of lead dust which accumulates on the slat surfaces. Aside from inhaling lead dust, there is also the risk that children will ingest lead dust by licking or sucking the blinds.

How do some candles pose a risk of exposure to lead?

Some candles have wicks with a metallic core which may contain lead that can vapourize during burning. The resulting lead vapours and dust could pose a significant health risk, particularly to children and pregnant women.

In January 2001, Health Canada issued an advisory warning Canadians not to use candles with lead core wicks. The Department also urged the Canadian candle industry to stop manufacturing and importing candles with lead core wicks as safer alternatives such as zinc, tin cores and plain cotton wicks without metallic cores which exist.

Before buying candles and to allow you to make an informed purchasing decision, you should ask the retailer if they contain a lead core wick. For candles already in your possession, you can tell if they have a lead core wick by following three easy steps:

1. Remove any wax from the tip of the wick.
2. Separate the fibre strands from the wick to see if the candle has a metallic core.
3. If the candle has a metallic core, rub the core on a piece of white paper. If the mark left on the white paper is grey, then the metallic core is probably lead.

If you discover that your candle has a lead core wick, you should discard it. Health Canada is proposing a regulatory ban on the sale, import, or advertisement in Canada of candles containing lead in the cores of their wicks.

Does lead in children's toys represent a hazard?

Under the Hazardous Products Act, lead-based paint is not legal for use on toys sold in Canada. Most toy manufacturers voluntarily conform to European Standards which limit the amount of extractable lead in toys to 90 ppm. Toys made of soft vinyl (PVC) may contain small amounts of lead as a stabilizer. Health Canada's investigations have indicated that very few children's products on the Canadian market made from vinyl (PVC) plastic contain significant amounts of extractable lead. Health Canada's Lead Risk Reduction Strategy proposes statutory limits on total and leachable lead in children's toys and other products.

How do lead shot, jiggers and sinkers pose a risk of exposure to lead?

When lead shot, jiggers and sinkers are manufactured in home-based industries or hobbies, there is a risk of exposure to lead fumes and dust. Small manufacturers may be unaware of the hazards and not use personal protection equipment or other safety measures such as adequate ventilation. Without adequate safety measure, such activity will result in direct exposure to lead fumes and lead dust generated by the deposition of these fumes.

Lead shot and lead fishing jigs and sinkers also are an environmental hazard. Lost lead shot, jigs and sinkers add lead to Canada's natural environment each year.

Exposure and Human Health

What are the health effects at different lead levels?

The latest medical and scientific research shows that absorption of even very low levels of lead into the blood may have harmful health effects on the intellectual and behavioural development of infants and young children. Blood lead levels in the range of 10 to 15 micrograms per decilitre in fetuses, infants, and children have been associated with adverse neurobehavioural and cognitive changes. At levels above 40 micrograms per decilitre, there is a decrease in the body's capacity to produce red blood cells.

What are the routes of exposure to lead for children and adults?

Lead may enter the body through: the mouth (ingestion), the lungs (inhalation) or the skin (dermal route). The growing fetus may also be exposed to lead from the mother via the placenta. For the general population in Canada, the main exposure routes are through ingestion or inhalation. The most common route of entry is ingestion, except in industrial environments, where inhalation of lead fumes may play a larger role. Absorption of lead through the skin is rare.

Children are at greater risk of ingesting lead due to their frequent hand-to-mouth activity and normal tendency to mouth or chew objects they come into contact with (especially non-food products such as paint chips, furniture or toys).

How is inhaled or ingested lead absorbed into the blood?

In adults with a normal diet, 3-15% of ingested lead is absorbed into the blood by the intestine. Less than 5% of absorbed lead stays in the body. Depending on such factors as particle size, solubility, density and the individual's ventilation rate, approximately 30% to 50% of the airborne lead particulate inhaled by an adult are retained, of which nearly all (80%) are absorbed into the blood.

In children, the percent of lead absorbed and retained is much greater. Children eight or younger absorb 40-50% of ingested lead.

Where is lead stored in the body?

Regardless of the route of entry, lead is absorbed directly through the blood into tissue. Lead has no known biological function in the body. Once absorbed, it circulates in the bloodstream and either accumulates in tissues or is excreted as waste. Some of it is absorbed into soft tissue such as the liver, kidneys, pancreas and lungs. A very high proportion of absorbed lead is transferred to bone (hard tissue), where it accumulates over time and remains for long periods. The half-life (time for the body to excrete half the accumulated lead) is about 25 years. Therefore, high lead concentrations can stay in the body for many years after exposure to lead has stopped.

During periods of physiological stress (pregnancy or serious illness, for example), or when bone mass decreases with aging, the minerals stored in bones, including lead, go back into the bloodstream. An individual may therefore be at risk for release of stored lead into the bloodstream throughout a lifetime.

How is lead excreted from the body?

Lead is excreted from the body mainly through the kidneys and the intestine.

How do calcium and iron deficiencies affect lead absorption?

Studies indicate that deficiencies in some mineral nutrients, specifically calcium, iron and zinc, may increase the amount of lead absorbed, since lead molecules will attach at sites in body cells which these mineral nutrients would otherwise fill.

Why might blood lead levels be higher in women after menopause?

After menopause, women often develop osteoporosis, which is a progressive and serious loss of bone mass. As a result of loss of bone mass, lead stored in bone may be released into the blood.

What is lead "poisoning" compared to lead "exposure"?

Lead exposure refers to the entry of lead into the body, through ingestion, inhalation, the skin or the placenta. Lead poisoning occurs when there are adverse health effects due to lead in the body.

Is lead poisoning a common problem in Canada?

Very few cases of lead poisoning are documented in Canada each year. However, since low-level lead poisoning is often unrecognized, it is difficult to determine the number of Canadians affected by exposure to low levels of lead.

Are there noticeable and visible signs/symptoms of lead poisoning to look for?

Some of the more prominent symptoms of lead poisoning include headaches, irritability, abdominal pain, vomiting, anemia (general weakness, paleness), weight loss, poor attention span, noticeable learning difficulty, slowed speech development and hyperactivity. However, at very low exposure levels, lead may not produce specific symptoms, but still can produce subtle adverse effects on children's development.

How do I find out if I have been exposed to high lead levels? Is there a medical test to show whether I've been exposed to lead?

Through a simple blood test, a family doctor can determine your blood lead level and therefore how much lead you have been exposed to. This is the most useful screening and diagnostic test for lead exposure. For more information contact your doctor or the Poison Information Centre in your area.

What type of treatment exists to remove lead from blood?

Chelation therapy is a drug therapy to remove lead from the body by binding it firmly to a chemical agent. Since this therapy is costly, burdensome to families and poses significant risk of side effects, it is usually only considered when lead levels in the blood are very high. It should be used only with caution in young children with blood lead levels below 45 ug/dl.

How do pregnancy and breastfeeding affect blood lead levels?

Since lead can be found everywhere in our environment, it is impossible for pregnant women or women who are breastfeeding to avoid all exposure to lead and to avoid passing lead on to a fetus through the uterine wall or through breast milk. Despite this fact, Health Canada still recommends breastfeeding as the optimal method of feeding infants.

There are a number of actions pregnant or breastfeeding women can take to avoid unnecessary exposure. For example, they should not drink beverages from leaded crystal, use candles with lead core wicks, or inhale dust generated by the removal of leaded paint.

For additional advice and information, women should contact their health care practitioner.

Why are children and the developing fetus at a greater risk for adverse health effects associated with blood lead levels?

There are a number of reasons why a child and developing fetus are at greater risk for higher blood lead levels than adults. Because children are developing rapidly, they have a higher metabolic rate. As a result, they are more efficient at absorbing and retaining substances, including lead, than adults. Additionally, children have an increased soft tissue lead burden because their smaller skeletons store less lead. Compounding this, the developmental organs and systems of children are incomplete, making them less able to eliminate lead. Studies suggest that children are most susceptible to the neurological effects of lead in the first three years of life.

What are the blood lead levels in Canadian children? Should children be screened?

Blood lead levels of Canadian children are generally low, less than 10 micrograms per decilitre (ug/dl). In fact, there are very few documented cases in Canada of blood lead levels that require intervention of some form. In areas where there are unusual sources of lead exposure, such as a historic or ongoing problem of soil contamination from a smelter, higher blood lead levels have been observed. Routine blood lead testing may be necessary in these communities. If you live in one of these communities, you can contact your local medical officer of health for more information.

Resources:

- ➡ [Environmental Health Perspectives](#) – National Institute of Environmental Health Sciences
- ➡ [Center for Disease Control and Prevention](#) – Childhood Lead Poisoning
- ➡ [Reduce Your Exposure to Lead](#) – Healthy Canadians – Government of Canada
- ➡ [Blood Lead Concentrations in Canadians – 2009-2011](#) – Statistics Canada
- ➡ [Overview of the Second Report on Human Biomonitoring Of Environmental Chemicals in Canada](#) – Health Canada (includes extensive and comprehensive data on chemicals including Metals, Perfluoroalkyl substances, Phthalates, Bisphenol A, Triclosan, Organophosphate Pesticides, Pyrethroid Pesticides, 2,4-D pesticide, and Nicotine Exposure – Cotinine).
- ➡ [Chemical Substances Website](#) – Government of Canada
- ➡ [Lead and Human Health](#) – Health Canada
- ➡ [Canadian Health Measures Survey](#) – Statistics Canada