



ABOUT YOUR HOUSE

LEAD IN OLDER HOMES

CE 62

Who May Be at Risk?

- Do you live in a home built before 1960?
- Was the plumbing in your home installed before 1990?
- Do you live near an industry (such as a lead-battery recycling factory) where lead has been used?

Approximately one out of four Canadian dwellings was built prior to 1960. It is best to assume that a dwelling constructed before 1960 contains leaded paint. If you answered “yes” or “I don’t know” to any of the above questions, your family may be at risk of lead exposure. While not all older homes pose lead hazards, some do, and there are precautionary measures that you need to be aware of as a homeowner or tenant. Read on to learn more.

Wasn't Lead Phased Out of Paint and other Products?

Yes. Beginning in the mid-1970s the federal government began reducing the amount of lead legally allowed in paint. In the mid-1980s canners voluntarily stopped using lead solder for canned goods. In December 1990, leaded gasoline was banned for most applications. These protective measures have aided in reducing average blood lead levels of Canadian children over the past two decades; however, there are still some children in Canada who remain at risk of lead exposure.

Residential Sources of Lead

The three main sources of lead exposure in housing come from

- water
- soil
- paint/paint dust

Water: In most of Canada, the concentration of lead in natural water supplies is very low. However, significant levels of lead in drinking water can result from the use of lead

solder in plumbing, lead service connections that link the house to the main water supply, or lead pipes in the home. Check with your province's drinking water regulator to confirm the regulations or guidelines for lead in drinking water which apply to you. All jurisdictions base their requirements on the Guidelines for Canadian Drinking Water Quality, which specify that the lead level in drinking water drawn from a tap allowed to run until the water gets cold must be below 10 parts per billion. Lead was, at one time, the choice material for use in service connectors, the pipe that brings household water from the city or town water main. It was also commonly employed in “well-built” homes prior to 1920 and 50 per cent lead solder was used to join household plumbing until the late 1980s. Learn about testing your water for lead.

Soil: Due to the historic use of leaded gasoline, urban soils, especially near major highways, may have higher lead levels than rural areas. Soil near some industrial areas

can also be high in lead; and the soil surrounding the perimeter of houses and apartments with painted siding can become contaminated over time due to paint deterioration or refinishing activities. Protect your children by washing their hands before meals, and at regular intervals, especially after playing outside. Teach children to remove their shoes before coming inside. Learn how to test your soil for lead.

Paint/Paint Dust: In Canada, until the 1960s, lead was added in significant quantities to household and industrial paints. It is rare for houses built after 1960 to have significant quantities of leaded paint, but some exceptions will exist. Paint chinks, peels, or is eroded over time, especially in high-friction areas such as windows, doorways, stairwells and painted flooring. Exterior painted surfaces such as porches, railings and banisters can also deteriorate due to weathering, creating lead dust hazards. Lead dust may be created during renovations. Lead dust is often imperceptible. Children pick up (and ingest) lead dust on their hands. Learn how to test your home for lead dust and lead in paint.

Occupational Exposure:

Occupational lead exposure can occur, for example, from working in battery manufacturing, painting, nonferrous smelting, radiator repair, brass and bronze foundries, pottery production, scrap metal recycling, firing ranges, and wrecking and demolition. Lead can also enter the home from contaminated work clothes.

Other: Examples of other sources of lead that Canadians may be exposed to are contaminated meat from wild game due to the use of lead shot to hunt; consumer products that contain lead such as costume jewellery, lead-wicked candles and some plastic mini blinds; hobbies that involve smelting lead such as the production of jigs, lures, and sinkers; and the restoration, stripping and refinishing of furniture with lead-based paint.

Why Is Lead so Dangerous?

Lead is what is known as a neurotoxicant or a brain poison. Even in very small amounts, lead can harm the developing brain and nervous system of fetuses and young children, which can lead to behavioural and learning difficulties. Lead can also interfere with the way that hemoglobin (the oxygen carrying part of blood) is produced. Lead can disturb processes essential to vitamin D and calcium metabolism. Chronic, or long-term lead exposure, can lead to high blood pressure and peripheral vascular disease. It is generally agreed that there is no safe level of lead exposure, although risk of suffering adverse health effects from lead exposure will decline as exposure declines.

Why Are Children so Vulnerable?

Young children explore using their mouths. Toys, blankets—almost any object that tiny hands can pick up will find its way to curious mouths. For this reason the most common way that children become lead

poisoned is through hand-to-mouth behaviour—and the most common source of lead exposure for young children is lead dust. Children absorb lead into their bodies more efficiently than adults. Lead dust tends to accumulate at floor level where young children spend a lot of their time crawling and playing. Lead dust also collects on horizontal surfaces such as windowsills, stairwells and porch railings.

Pregnant women and women of childbearing age need to be careful too. Once lead enters the human body, it is circulated in the blood stream. While some lead is excreted, much of it is stored in bone. Lead stored in bone can be released later during pregnancy. Lead has the ability to cross the placenta and poison a developing fetus. Lead can also be released into breast milk. For these reasons women of childbearing age need to be extremely careful and avoid exposure to lead. Anyone undertaking home renovations, but particularly women of childbearing age, should be knowledgeable about lead precautionary measures and follow all applicable safe work practices.

Testing for Lead in Children

The only way to know if your child has been exposed to lead is to have your child's blood lead level checked. Infants are particularly vulnerable once they begin crawling and exploring—around the age of six months. If you suspect your child has been exposed, a test can be ordered by your family doctor. Ten micrograms of lead per decilitre of blood—10 µg/dL (0.48 micromoles per litre)—is our current level of concern in Canada. If your child's blood lead level approaches or exceeds this number, you should suspect a source of lead exposure in your child's environment, and take steps to identify and remove the source(s), and consult your physician.

Testing Your Home for Lead

While not all older homes contain leaded paint, assume your house does until you have had a laboratory analysis of your paint or paint dust. While lead paint usually does not pose a problem if it is intact, it does become a hazard once it is disturbed. Here are the various methods for determining if your house contains lead hazards.

1. Testing Drinking Water for Lead

If your house was built prior to 1990, there is the possibility for elevated lead levels in your water due to leaded pipes or leaded solder. If it was built prior to 1960, you may have leaded services. In these cases, testing is essential to determine the amount of lead in your drinking water. Any testing of your drinking water should be done by a laboratory which has been accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL), who are partnered with the Standards Council of Canada (SCC). Although lead test kits are available from stores for drinking water, they are not generally considered accurate or reliable.

Well water: Submersible pumps, especially the leaded-brass variety can release lead into drinking water. People dependent upon well water should have their water tested for lead levels.

See the appendix for instructions on how to take a drinking water sample.

2. Testing Soil for Lead

Most soil lead comes from flaking and peeling exterior paint, local industrial sources, or the historic use of lead in gasoline. Lead doesn't break down quickly in soil. It remains for long periods, sometimes decades. Be especially careful if you plan to have a vegetable garden in

urban soils or adjacent to a major road; sometimes it is easier to bring in new soil for such gardening.

See the appendix for instructions on how to take a soil sample for lead analysis.

3. Lead Dust Sampling

Lead in dust testing is fairly simple and can be done by anyone. Dust testing is useful following renovation activities where lead paint is present. The results can show whether your clean-up has been adequate prior to moving back into a space. Note that a carpet exposed to lead from years of accumulation or renovations is difficult to clean effectively. There is no simple test for the amount of lead dust in carpets. Replacing the carpet may be your safest option.

See the appendix for instructions on how to take a lead dust swab on a hard floor or surface.

4. Paint Chip Sampling

Collecting a paint chip sample and having it analyzed is easy and relatively inexpensive. The result will indicate an accurate measurement of the lead loading in paint. Test your paint before beginning any renovation work in an older house.

See the appendix for instructions on how to take a paint chip sample.

Reducing Your Exposure to Lead in Your House

What do I do if my drinking water contains lead?

The test results will let you know if you need to take steps to reduce the amount of lead in your water. If both the standing sample and the flushed sample are under 10 micrograms lead per litre ($\mu\text{g/L}$), your drinking water is fine. If the flushed sample is under 10 $\mu\text{g/L}$, but the standing sample is over, then run your water until it is cold before using it for drinking or cooking. To avoid wasting water each time you want to drink, consider keeping a container of flushed water handy in the fridge. Other options are to flush your toilet or take a shower first thing in the morning before taking drinking water. If both flushed and standing samples are over 10 $\mu\text{g/L}$, contact your City or Town's public works department to investigate the problem. Some municipalities provide free water testing for lead.

If the problem turns out to be lead service connectors or lead from your house plumbing, you need to look at replacement of these systems. This can be costly. A good interim measure is to either purchase bottled water or a filter that is effective for reducing lead in water. Make sure any product you buy is certified as meeting the NSF International standard for reducing lead by a certification organization accredited by the Standards Council of Canada.

What do I do if my soil contains lead?

There are some simple steps you can take to protect your children:

1. Remove outside shoes when entering a house.
2. Wash children's hands thoroughly with soap and water when they come in from playing outside.
3. Vacuum your home regularly.
4. Damp mop floors and damp dust horizontal surfaces regularly.
5. Plant shrubs, grass and plants near "drip lines," and on any bare patches of soil to cover areas that are high in lead.
6. Build containers or raised beds filled with "new" soil over contaminated areas.
7. Wash all food thoroughly before eating.
8. Avoid planting root crops and tuberous crops such as potatoes in contaminated soil.

What do I do if the dust sample is high in lead?

You will need to determine where the lead is coming from, either high exterior levels in soil or road dust, or high interior levels, usually from leaded paint in poor condition. Tests of your soil or the dust at your entranceway, along with paint testing, will help to identify your problem. Until you sort this out and take appropriate action, diligent housecleaning will reduce your

exposure to high levels of lead in house dust.

What do I do if my home contains lead paint?

Sometimes the best option, when dealing with lead-based paint in good condition, is to leave it alone. Homeowners untrained in lead precautionary measures can create a big problem when removing lead. Removing sources of lead-based paint takes specialized knowledge. As an interim measure, homeowners and tenants may be able to keep lead dust levels under control by regular damp mopping of floors; damp dusting horizontal surfaces such as windowsills and stairs; and regular vacuuming of carpets. Exterior windowsills that are chipping and flaking can be covered with metal cladding.

Where small amounts of paint are flaking, a homeowner can repair minor problem areas at little risk—if caution is observed.

Instructions for Repairing Small Areas

1. Remove all rugs, drapes, children's toys and furniture near the work area.
2. Keep children away from the work area.
3. Attach a plastic sheet to the baseboards below the work area with heavy duty tape. Spread the plastic 2 metres (6 ft.) in all directions from the work area. Cover any wall-to-wall carpeting with a clean plastic sheet.

4. Remove work shoes when stepping off the plastic sheet to avoid tracking lead dust into other areas or wear removable paper booties over footwear.
5. Use a proper respirator, if you have one. However, even an N95 paper mask should reduce your inhalation exposure by at least a factor of 10.
6. Mist the area to be repainted using a water bottle that has a fine spray. Misting helps contain dust to the work area.
7. Lightly sand using an abrasive sponge or wet/dry sandpaper. Keep the area moist. If using a sponge, rinse it frequently. Keep a rinse bucket of water nearby.
8. When surfaces are prepared, smooth the area with a skim coat of drywall compound.
9. Prime the surface using the best grade primer available.
10. Repaint. The CMHC fact sheet *Painting: Walls, Ceilings and Floors* can give you advice on choosing the proper paint.
11. Clean up. See section “Cleaning up after the work has been done.”

Repairing Large Areas

In some situations painted surfaces are in poor condition. Often, paint chips are visibly flaking. These areas need immediate attention—but exercise caution. Repairing lead-painted surfaces can create more lead dust. You may want to consider hiring an experienced contractor for jobs such as:

- tearing down plaster walls
- sanding large painted surfaces (such as, the side of a house or a complete room)
- trim removal
- window or door replacement
- carpet replacement—carpets can be reservoirs of lead dust
- tearing up old flooring
- tearing down ceilings
- removing old drop-ceilings—dust can accumulate above ceiling panels
- stripping leaded paint using chemical strippers, heat guns, or other methods
- wallpaper stripping

Some Important Precautions:

1. Never attempt these large jobs on your own until you are familiar with proper lead precautionary measures. The CMHC research report *Lead Precautionary Measures* details the proper methods of dealing with high dust producing jobs.

A free copy can be ordered by calling CMHC at:
1 800 668-2642 in Canada or
outside Canada (613) 748-2367.

2. Always be sure to follow lead precautionary measures when repairing plaster or lead painted surfaces.
3. Always wear protective clothing such as coveralls, goggles and gloves.
4. Use a proper respirator. Extensive work will create a high exposure that requires more protection than can be provided by paper masks.
5. Never power sand, sand blast, water blast, or burn off lead paint with a heat gun. These activities create hazardous levels of lead dust or fumes.
6. Limit the spread of lead-contaminated dust. If leaded dust is kept only to the work area, this will protect the people in the rest of the house.
7. Never carry construction waste through clean living spaces unless it is wrapped in heavy plastic bags or sheets. If using dumpsters and chutes for debris, keep them covered.
8. All chemical paint strippers use potentially harmful substances, so take proper safety precautions and follow manufacturers instructions (see Health Canada publication, *It's Your Health: The Safe Use of Paint Strippers*).

9. If water damage is causing painted surfaces to chip and peel, this problem needs to be addressed first. The CMHC fact sheet *Attic Venting, Attic Moisture and Ice Dams* can help you deal with a leak in the ceiling. The CMHC fact sheet *Before You Start Your Renovations/Assessing the Renovation Project* can help you assess your home's current condition to determine if there are significant problems that you must deal with before or during the renovation project.
10. Consider hiring an experienced contractor for high-risk jobs. All workers who will potentially be disturbing lead-paint surfaces whether it be a window installer, a painter, a renovator, etc, should have the skills to apply appropriate lead precautionary safety measures. However, there is no legal requirement in Canada for workers to take this type of course, and training programs are not widely available. One option is to locate a contractor who is familiar with asbestos removal. The basic principles for asbestos removal are the same for lead. Provide your contractor with a copy of the CMHC booklet *Lead Precautionary Measures*. The CMHC fact sheet *Hiring a Contractor* provides useful tips on finding the "right" contractor.

Cleaning Up After the Work Has Been Done

It is important to follow good cleaning principles following any type of work that disturbs lead paint. For cleaning floors and horizontal surfaces, you will need:

- paper towels
- mist bottle
- two buckets
- rags
- detergent (such as, dishwasher or laundry detergent)
- mop

Start at the top and work downwards. If an area is still very dusty, continue to wear a respirator and protective outer clothing. See *Lead Precautionary Measures* booklet. Pick up large paint chips with a damp paper towel. For smaller pieces, mist with water to contain the dust, then push into a dust pan and dispose. Wet any protective plastic sheets, and then fold them together keeping dirty sides inward. Bag and seal plastic sheeting after each job is completed. Do not re-use sheeting. Use a vacuum (preferably a HEPA vacuum) to clean all horizontal surfaces such as ledges, sills, moldings and dusty surfaces. Make sure to vacuum the corners and cracks of trim and between floor boards. Vacuum wood floors using a floor brush. Vacuum carpeting with a carpet beater. Go over the areas slowly. Following vacuuming, damp wipe and mop all surfaces. Squeeze dirty water from mop-heads and rags

into an empty bucket. Use a separate pail to rinse mop-heads and rags using clean rinse water. Change rinse water often. Replace cloths and mop-heads frequently. Use paper towel initially for very dirty surfaces. Do not let children or pets back into the area until a lead dust swab has been taken to ensure clean-up has been thorough. See the appendix for instructions on how to take a lead dust swab.

For More Information

Canada Mortgage and Housing Corporation (CMHC) and Health Canada (HC): *Lead in Your Home*. CMHC: 2004

CMHC research report: *Lead Precautionary Measures* (1992). This report details the proper methods of dealing with high dust producing jobs. **A free copy can be ordered by calling CMHC at: 1 800 668-2642** in Canada or outside Canada (613) 748-2367.

CMHC research report: *Advice on the Use of Chemical Strippers to Remove Leaded Paint* (1992). This report reviews chemical strippers commonly sold in Canada and recommends safety precautions that should be followed when using these products.

Health Canada publication, *It's Your Health: The Safe Use of Paint Strippers* http://www.hc-sc.gc.ca/iyh-vsv/prod/strippers-decapants_e.html

Health Canada. *It's Your Health: Lead Based Paint*

http://www.hc-sc.gc.ca/iyh-vsv/prod/paint-peinture_e.html

Standards Council of Canada

<http://www.scc.ca>

The following American sources may also be useful (documents available only in English):

Lead Paint Safety: A Field Guide for Painting, Home Maintenance, and Renovation Work. A good illustrated reference guide for homeowners and contractors. A copy (86 pages) can be downloaded from the U.S. Environmental Protection Agency website: <http://www.epa.gov/lead/leadsafetybk.pdf>

U.S. Environmental Protection Agency Lead Sampling Technician Course <http://www.epa.gov/lead/leadsamplingtech.htm>

Livingston, D. (2000). *Maintaining a lead safe home: A do-it-yourself manual for homeowners, property managers, and contractors.* (3rd ed.). Landover, MD: Colortone Press.

Appendix

Collecting a Drinking Water Sample

In most cases, water that is sampled for metals is taken directly from the tap (usually the kitchen tap).

Generally, the homeowner will be provided with appropriate sampling bottles and specific sampling instructions by the testing laboratory. In cases where these are not provided, you will need:

- two small, clean, clear plastic bottles with lids that fasten securely
- labels
- marking pen

When sampling for lead, take two samples:

1. An overnight, or standing sample, is a tapwater sample taken usually first thing in the morning. This water has been sitting in the pipes overnight, or for at least six hours, and will give you a clearer picture of how much lead is accumulating in your pipes.
2. A flushed sample is water that has been let to run for approximately three minutes, until all water that has been resting in the household pipes has been flushed out. Flushed water will be cold because it is water coming from the water main (buried under the street).

The time needed for flushing the lines depends upon the length of plumbing coming from the water main, the diameter of the plumbing itself, and how open the taps are during flushing.

What to do:

1. Collect 250 ml or about one cup of water for each sample.
2. Keep samples separate; label them “flushed” and “unflushed.”
3. Refrigerate and store samples in a clean, clear plastic water bottle.
4. Fill out a laboratory form describing your samples and the date they were collected. See [Sample Laboratory Form](#) at the end of this document.
5. Send your samples to an accredited laboratory for analysis. To find a lab, search the Yellow Pages™ www.yellowpages.ca using the search words “Laboratories - Analytical and Testing”

Interpreting the results

The Guidelines for Canadian Drinking Water Quality for lead are 10 micrograms lead per litre water (10 µg/L) or 0.01 milligrams of lead per litre water (0.01 mg/L). If the laboratory tests indicate levels higher than this, you should take the steps listed above to reduce your exposure to the lead in your drinking water.

Collecting a Soil or Outside Dust Sample

A good area from which to take a soil sample is immediately adjacent to the building, if the building has had exterior paint. Other good places to sample are children's play areas, on the walkway to your house, or a vegetable garden.

You will need:

- small plastic bags with a zip enclosure
- labels
- marking pens
- tablespoon

What to do:

1. Collect two heaping tablespoons of soil from the area of concern. From a walkway, sweep the dust into a pile until approximately two teaspoons are collected.
2. Place soil in plastic bag and seal.
3. Label the bag noting the location where the sample was taken (for example, in front of steps, back garden).
4. Fill out a laboratory form describing your samples and the date they were collected. See Sample Form.
5. Send your samples to a laboratory for analysis. To find a lab search the Yellow Pages™ www.yellowpages.ca using the search words "soil testing."

Interpreting the results

The recommended level of lead in residential soil is 140 mg/kg (milligrams per kilogram) or µg/g (micrograms per gram) according to the Canadian Council of Ministers of the Environment Guidelines.

Collecting a Lead Dust Sample Inside the House

What you will need:

- small plastic bags with a zip enclosure
- an unopened package of disposable wipes
- measuring tape
- labels
- markers
- masking tape

Choose a site where children are likely to play. Take samples especially from areas where paint may be chipping or flaking, or where it is characteristically dusty. Higher risk areas are window sills and window wells.

What to do:

1. Choose and outline the area that you want to sample. Floors: Using masking tape, outline an area on the floor that measures 12 in. X 12 in. (or 1 sq. ft.). Windows: Using masking tape, outline an area on the interior sill that measures 4 in. X 4 in.
2. Use a clean disposable wipe.
3. Place the wipe fully opened and flat on the surface at one corner

of the area to be wiped. For the first pass, wipe side to side with a rubbing motion in an "S" pattern over the whole test area once. Be sure to wipe the entire area.

4. Fold the wipe, contaminated side inward.
5. Do a second pass with the same wipe cloth, this time wiping from top to bottom, again in an "S" pattern, over the whole test area. When sampling, it is okay to rub across the tape, but try not to rub the surface outside the tape. Be sure to remove all visible dust within the sampling area.
6. When the second pass is completed, fold the wipe, contaminated side inward, and place in an unused, clean plastic bag and seal.
7. Label the bag with the date and location of the sample (for example, "living room floor below north window", Dec. 2, 2004)
8. After sampling, remove the masking tape from the floor.
9. Wash hands thoroughly.
10. Repeat steps 1-9 for each sample taken.
11. Fill out a laboratory report. See Sample Form.
12. Send your samples to a laboratory for analysis. To find a lab search the Yellow Pages™ www.yellowpages.ca using the search words "soil testing" or "paint testing."

Interpreting the Results

American clearance levels for lead dust in pre-1978 housing and child-occupied facilities:

- 40 $\mu\text{g}/\text{ft}^2$ for smooth interior surfaces
- 250 $\mu\text{g}/\text{ft}^2$ for window sills
- 400 $\mu\text{g}/\text{ft}^2$ for window troughs

Note: Dust standards for interior window sills are 250 $\mu\text{g}/\text{ft}^2$ (micrograms per square foot). Your window sill sample was taken from an area measuring 1/9 square feet (ft^2). To convert your results to square feet, multiply your results by 9. For example, if your dust wipe results taken from your kitchen windowsill contain 30 μg (micrograms) of lead dust, multiply this number by 9 to get 270 $\mu\text{g}/\text{ft}^2$. This new figure, 270 $\mu\text{g}/\text{ft}^2$, is above the U.S. standard 250 $\mu\text{g}/\text{ft}^2$ for safe lead dust levels on windowsills. In cases such as this, you may want to consider repainting the window frames and sills using a high grade primer followed by a good quality paint. If you suspect that the window is creating lead dust through the friction of opening and closing you may want to consider window replacement.

Collecting a Paint Chip Sample

What you will need:

- small plastic bags with a zip enclosure
- small utility knife
- putty knife
- hair dryer
- labels
- markers

What to do:

1. To collect a chip, measure an area 2 cm X 2 cm on the wall or trim you want to test.
2. Cut the area using a utility knife making sure to cut through all the painted surfaces.
3. Using a putty knife, scrape off the paint sample; place in a baggie and seal.
4. Include any paint residue left on the wood.
5. Label the baggie with the location where the sample was taken (for example, “front stairway banister”) and send your sample to a lab that does paint analysis.

To find a lab near you, search the Yellow Pages™ www.yellowpages.ca using the search terms “soil analysis” or “paint testing”.

Interpreting the Results

You will receive a result in milligrams of lead (mg). Divide this by 4, to get the amount of lead per square cm (cm^2). A result of less than 1 mg/cm^2 is relatively safe. Some surfaces with leaded paint will exceed 10 mg/cm^2 . The risks are proportionately greater with these higher loadings.

SAMPLE LABORATORY FORM

Project Location: Joiner House			Sampler's (signature):	
			Print Name:	
Sample no.	Sample Type	Sampling Location	Date	Actual Dimensions
1	Dust	Living room window sill (north)	June 25, 2004	4 in. x 4 in.
2	Paint Chip	Front porch banister	June 25, 2004	2 cm x 2 cm
3	Water	Kitchen tap, flushed sample	June 25, 2004	
4	Soil	By front steps	June 22, 2004	

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