Lead in residential drinking water

Lead in drinking water is a potential health concern in many Northern communities. For information on the possible health effects of lead in drinking water, please consult the HealthLinkBC file: https://www.healthlinkbc.ca/healthlinkbc-files/lead-drinking-water

What factors increase lead in drinking water?

Lead generally gets into drinking water from plumbing that contains lead. Three things can increase the amount of lead in drinking water:

- If the water sits **stagnant**
- If the pipes, solder, and fixtures in the **plumbing** in your home have a high lead content
- If your water is acidic or corrosive

Of these three, you can control two:

- Stagnation time: Controlled by water usage and periodic **flushing**
- Lead in plumbing: controlled by **replacing** older plumbing (pipes, solder, fittings, fixtures) containing lead.

How can I be sure if lead is a problem in my home?

A reasonable first step is to test the tap water used for drinking and food preparation in your home to see if lead levels are even a concern. There are dozens of home testing kits available online and in local hardware stores, but the results may not be trustworthy. **Northern Health recommends testing your tap water lead levels using a lab that's accredited by CALA (the Canadian Association for Laboratory Accreditation) for analysis of lead.** This testing is done by drawing a sample from a cold water drinking water tap, and submitting it to your chosen lab for analysis. There are 65 labs in Canada accredited to test lead in drinking water – the five in BC are listed in Error! Reference source not found. below.[1]

You can also ask the lab to test for pH, copper, iron, or other metals. These lab tests may cost $30 to $75, plus tax and shipping, depending on how many metals you choose to test for. The lab will have instructions on the type of bottle to use and how to ship the sample.

Table 1. BC Labs accredited to test for lead in drinking water.

Laboratory Name	City	Phone	Email
AGAT Laboratories - Burnaby	Burnaby	(778) 452-4003	pahl@agatlabs.com; vhill@agatlabs.com
ALS Canada Ltd.	Burnaby	(604) 253-4188 x288	quality.vancouver@ALSGlobal.com
CARO Analytical Services	Richmond	(780) 489-9100	mlabonte@caro.ca
Econotech Services Limited	Delta	(604) 526-4221	eduard.venczel@econotech.com
Maxxam Analytics International	Burnaby	(604) 639-2619	rchen2@maxxam.ca

[1] There are no accredited labs in Northern BC. ALS Canada operates a series of bottle depots in communities across Northern BC, in conjunction with Northern Labs in Prince Rupert.

When and how to collect a water sample

The next question facing a resident interested in testing their tap water is when and how to collect the sample. This really depends on what you want to find out. The Health Canada *maximum acceptable concentration* (currently 10 µg/L, proposed 5 µg/L) is based on long-term average exposure to lead. Different sampling methods are outlined in **Table 2** below. For most residential situations, either the conservative *first draw* method or the typical *30 minute stagnation* method will be most appropriate.

Table 2. Different sampling methods.

Objective	Method	Relation to average exposure
Worst case scenario (maximum lead)	First draw (FD)	Overestimates
Typical residential exposure	Thirty minute stagnation (30MS)	Approximates
Accurate residential exposure	Random daytime sampling (RDT)	Most accurate, but requires ~10 samples
Best case scenario (minimum lead)	Fully flushed (FF)	Underestimates

These sampling methods are described in detail in the **box** below.

What can I do to reduce lead in my drinking water?

Flushing

Periodic flushing is generally very effective, and is the lowest cost method of reducing lead exposure for most residents, but it does use more water and stresses wastewater systems. Flushing involves **running the cold water tap until the water is noticeably colder every time you use water for drinking or food preparation.** The length of time required for flushing depends on water pressure, your internal plumbing, and your pattern of water usage throughout the day – usually 15 seconds to 4 minutes is appropriate. Your finger is a good judge of when the water is as cold as it is going to get.

Replacing plumbing

Replacing leaded plumbing is expensive, but actually eliminates the source of the lead. **Look for a CSA logo verifying low lead content on any plumbing materials.**

Corrosion control

The corrosiveness of the water chemistry is generally under control of the water supplier (e.g., local government). There are ways homeowners can attempt to adjust the corrosiveness of water in the home (point-of-entry devices), but these are expensive and beyond the scope of this bulletin. **Northern Health recommends water suppliers use centralised treatment to control problems with corrosive water.**

Point-of-use filters

There are many options for *lead-removing filters* on your drinking water taps, available through your local hardware store**. Filters should state that they are certified to NSF/ANSI Standard 53 or 58 for lead reduction.** Options include:

- **Pour-through pitcher***:* Water drips through a filter in a water pitcher using gravity.
- **Faucet mount filter***:* Mounts on kitchen faucet. Uses diverter to direct water through a filter.
- **Counter-top filter connected to sink faucet***:* Connects to existing sink faucet through tubing.
- **Filter Plumbed-in to separate tap***:* Installs under a sink; filtered water is usually dispensed through a separate faucet directly to the kitchen sink.
- **Refrigerator filter***:* Installed in your refrigerator and typically dispensed through the refrigerator door.
- **Reverse Osmosis (RO)***:* Connects to your plumbing under the sink and uses a membrane filter to reduce lead (also can reduce minerals).

For more information on home water treatment units, and a listing of certified devices, consult the *Consumer Guide to Lead Filtration Devices*, available at: http://info.nsf.org/Certified/DWTU/listings_leadreduction.asp

For more information…

For information on residential exposure and sampling, or for advice on interpreting laboratory results, please contact your nearest Public Health Protection office (Health Unit) and ask to speak to an Environmental Health Officer, or email php@northernhealth.ca with "Lead testing" in the subject line.

Box 1. Different methods for collecting water samples for lead.

Excerpted from: Ministry of Health, July 2017, *Interim guidelines on evaluating and mitigating lead in drinking water supplies, schools, daycares and other buildings*, page 30-31.

FIRST DRAW (FD)

Purpose: To capture the highest levels of lead using long stagnation times.

During the stagnation period no water should be drawn from any outlet within the property (this includes the flushing of toilets). If any water is drawn during the stagnation period the result will be invalid.

- 6-8hr stagnation period then the collection of a 250 mL or 1L sample.

First draw gives the "worst case scenario". This may also be useful in conjunction with flushed samples to help determine if a specific fixture is contributing lead to the water. This protocol is not appropriate for assessing health risk based on average exposure to lead in drinking water, unless it confirms samples are below thresholds of concern.

THIRTY MINUTE STAGNATION (30MS):

Purpose: To capture typical exposures at residential sites, assess health risk, and set priorities.

A typical 30MS sampling protocol is to flush a tap for 5 minutes, then allow water to stand for 30 minutes. Two consecutive 1L samples are then taken and the results of the two samples are averaged.

30MS samples are more reproducible than RDT samples, and may be the most appropriate for single samples estimating lead risk in individual dwellings. Using two consecutive samples allows the estimation of the relative contribution of the fixture to the lead concentration. 30MS sampling is time consuming and may underestimate typical exposure to lead in drinking water.

RANDOM DAYTIME SAMPLING (RDT):

Purpose: To capture typical exposures at residential sites, assess health risk, and set priorities.

A sample is taken at a random time during a working day directly from the tap in a property without previous flushing. The stagnation of water in a distribution system influences the concentration of lead in a random manner. Health Canada recommends taking a 1L samples for sampling programs conducted at the community level.

RDT sampling is relatively inexpensive and convenient (per sample), but needs to be repeated numerous times to provide confidence in the results. Results are close to typical use when averaged over many samples. RDT sampling is better suited for determining system wide health risks than for individual sites. It requires 2-5 times more samples that 30MS sampling to provide statistically significant results.

FULLY FLUSHED (FF)

Purpose: To determine lead levels in plumbing after complete flushing of the system, or to infer lead levels from water mains.

Samples are taken after prolonged flushing of the tap in a premise in such way that the stagnation of water in the domestic distribution system does not influence the concentration of lead in the drinking water. In practice a sample is taken after flushing at least three plumbing volumes, a prescribed time, or after an observed temperature drop.