

## Occupational exposure to inorganic lead

Lead is a non-biodegradable toxic heavy metal with no useful physiologic purpose. BC workers most at risk for exposure to inorganic lead are those involved in:

- Manufacture/recycling of car batteries.
- Construction and demolition.
- Base-metal mining and smelting.

Occupational exposure regulations are more stringent in Canada than in many other jurisdictions, but in certain circumstances WorkSafeBC does cover occupational diseases that result from employment abroad. Further information is available on [www.WorkSafeBC.com](http://www.WorkSafeBC.com) (just enter “lead: preventing exposure to work” in the search box at the top right corner of the screen).

### Exposure

The routes of exposure for inorganic lead are inhalation and ingestion. Adverse effects are reproductive toxicity, neurotoxicity, hematological toxicity, renal toxicity, and hypertension. Inorganic lead compounds are also considered probable human carcinogens (IARC group 2A).

Inorganic lead exposure in adults is usually occupational and, like all occupational diseases, should be considered in terms of exposure and disease.

### Exposure assessment

Current and past occupational history—including second jobs and jobs outside Canada—should focus on work activities known to involve possible lead exposure.

Non-occupational exposures could include volunteer or weekend activities such as renovation, use of imported lead-glazed dishes, or exposure to lead-adulterated marijuana and ethnic (ayurvedic) medications. “Take-home” exposure could affect spouses and children in contact with lead dust

**Table. Criteria for interpreting blood lead levels.**

Level	Retest advice	Action advice
<1.0 µmol/L or <20 µg/dL	None or annually	None specific
1.0–1.74 µmol/L or 20–30 µg/dL	q 6/12	Caution! Minimize exposure
1.75–2.49 µmol/L or 35–49 µg/dL	q 3/12	Alert! Minimize exposure
≥2.5 µmol/L or ≥50 µg/dL	q 1/12 until acceptable to a physician	Removal! Remove worker from exposure until BLL acceptable to a physician and exposure minimized

brought home from the workplace.

Objective evidence of exposure to inorganic lead is best measured by the blood lead level (BLL), which rises quickly, reaching a steady state within about a month. Urinary lead is not a good measure of inorganic lead exposure.

For WorkSafeBC’s recommended interpretation of BLLs see the **Table**.

In spite of the data listed in the **Table**, current evidence supports a cautious approach and recommends a BLL of <10 mg/dL. Pregnant women should have BLL <5 mg/dL, and there is no safe BLL identified for fetuses or children younger than 6 years of age.

### Medical diagnosis

The medical consequences of lead poisoning vary but, in general, correlate with rising BLL. Toxicity can lead to symptoms such as:

- Mild: fatigue, emotional irritability, and cognitive or sleep disturbances.
- Moderate: headache, fatigue, nausea, appetite and bowel changes, muscle and joint pain, and decreased libido.
- Severe: abdominal pain, peripheral neuropathy, and encephalopathy.

Diagnosis should be based on a clear history of exposure, elevated

BLL, and consistent signs and symptoms.

### Medical treatment

Medical treatment is to stop the exposure and carefully follow up with appropriate clinical assessments and serial BLLs. The decision to remove a worker from exposure should be based on both clinical status and BLL. Chelation is considered for symptomatic patients with BLLs >50 mg/dL, and those with BLLs >80–100 mg/dL.

### For further information or assistance

If you are concerned about the evaluation of a worker’s exposure or BLL results, or wish to discuss a field assessment of possible workplace exposure, please speak to an occupational hygiene officer or occupational medical advisor at WorkSafeBC, phone 604 231-8888 or toll free 1 888 967-5377.

—Ailve McNestry, MB, CCFP, CCBOM

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