

Background to the Health Care Provider Blood Lead Guidance

Rationale for blood lead testing

- Blood lead testing can establish a diagnosis of lead poisoning in the relatively rare case where a patient presents with symptoms compatible with lead toxicity.
- There is also a rationale for performing blood lead testing in asymptomatic individuals if there is reason to believe that they may have an unusual source of exposure. Should their blood lead level be markedly higher than the population mean, follow up of the individual by public health authorities may identify sources of lead exposure that can be reduced. . These sources may be unique to the individual or may also affect other family members, neighbours, co-workers, or others who likewise share activities which were associated with the first identified patient. Examples of possible sources of exposure which may produce elevated blood lead levels are presented in the guidance document.
- Epidemiologic studies comparing groups of people with different levels of lead exposure have shown subtle health effects at very low levels of lead. These effects include reduced neurocognitive development in young children and increased blood pressure and decreased renal tubular function in adults. These effects can be demonstrated in epidemiologic studies but are not discernible in individuals.

Rationale on Intervention Levels of 5µg/dL and 10µg/dL

- Research on lead related effects on children's neurocognitive development has failed to demonstrate any threshold of effect. At levels typically found in the Canadian population today, these adverse effects are not detectable in individual children; however, they may still be of concern at a population level. Although blood lead levels (BLL) continue to drop and are probably lower now than at any time in the last century, the absence of any threshold for lead's adverse effects in the population provides a rationale for further efforts to identify and reduce sources of lead exposure to the Canadian population. The intervention levels recommended are therefore based on the likelihood of investigations detecting a source of exposure that might be actionable and not on the presence or absence of risk.
- Currently, mean BLL in Canadian children 6-11 is approximately 0.8µg/dL and the 95th percentile is 1.9µg/dL. Average BLLs are highest in Canadians aged 60-79, with males at 2.0µg/dL and females 1.7µg/dL; the 95th percentile is 4.2µg/dL for both males and females, according to the 2009-2011 CHMS data.

Interpretation and Action

- A BLL of 5µg/dL in a child is a relatively unusual finding. An atypically high BLL may be related to an unusual exposure or to nutritional deficiencies, such as iron deficiency or low dietary intake of calcium, which may increase absorption of lead, or low dietary intake of vitamin C, which may decrease renal excretion of lead.
- The level of 10µg/dL was chosen for possible public health investigation of an individual because it generally indicates an unusual source of lead contamination beyond the baseline population level and because follow up of individuals above 10µg/dL has sometimes resulted in identification of a reducible source that explains the individual's elevated BLL. Such sources may include work exposures, neighbourhood exposures from smelters or other lead-emitting facilities, exposures specific to the individual arising from dust in the home or hobbies involving lead, or contaminated foods, drugs or nutritional supplements and consumer products.
- Where individuals have BLL >10µg/dL, targeted investigation for the source of exposure may identify a source that could be abated or secondary contacts that may have also been exposed.
- In general, investigation of individual BLLs under 10µg/dL yields few sources of exposure or secondary contacts and, as a result, is not productive.
- Where communities or identifiable subgroups have BLL significantly different than population norms, investigation of sources of lead exposure at the community level may be worthwhile even if BLL are below 10µg/dL.