PREVENT CANCER NOW

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**Submission Regarding Lead in Drinking Water**

By email to Health Canada: water_eau@hc-sc.gc.ca

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*Prevent Cancer Now* is a national Canadian Civil Society Organization that focuses on primary cancer prevention, with least-toxic approaches to minimize exposures that contribute to the hallmarks of cancer.

*Prevent Cancer Now* welcomes the consultation on lead in drinking water, as lead may be an important but under-recognized contributor to disability and chronic disease, including cancer. The consultation document is a rich review of multiple sources of lead over time, and of exposures to lead in drinking water. We are of the opinion that stronger Canadian government responses regarding lead, particularly early in life, could engender improvements in public health and intellect, ultimately reaping great social and monetary benefits.

*Prevent Cancer Now* has concerns regarding important elements of the drinking water consultation:

1. **How lead is measured in drinking water.** We agree that drinking water quality must be measured at the tap, but are concerned that an emphasis on "typical" exposures will miss the atypical exposures that result in harm, such as consuming tap water after a lengthy stagnation period such as early morning or upon return from work or school, formula use (including using hot water, that is typically higher in lead), or routinely drinking from an affected fountain. Awareness of water preservation and costly water bills discourage 10 minutes or even 5 minutes of routine flushing, and the consultation document indicates greatly increased lead levels in samples following 6 hours versus 30 minutes stagnation. Drinking fountains are rightly identified as a particular concern.
   We disagree that sampling should be done following flushing or during full occupancy. We cannot assume that flushing of school plumbing is carried out, or even would be particularly effective for "dead end" fixtures. ***Mid-summer, fully stagnant sampling is most likely to identify a potential problem in schools, and fully stagnant sampling should be preferred generally. Following this test, follow-up with further investigation of lead source(s), and remediation options should ensue.***

   By analogy, bike helmets and seatbelts are not instituted for "typical" exposures, and this approach is not appropriate when atypical lead exposures may have life-changing consequences. Longer term (over six hours) stagnation sampling should be prioritized. Thirty minute or post-flushing tests may assist in decision-making for short term actions to reduce exposure, but not to decisively eliminate lead poisoning.

   ***Given uncertainties and vagaries of water testing for lead, testing according to a clear, precautionary protocol, should be widely available at no cost, including for those contemplating a pregnancy and new home-buyers.***

2. **Actions that will be triggered by findings of particular lead levels in water.** Lead service lines for water have no place in the 21st century, and long term projections from the United States indicate that savings from avoiding the health implications of lead exposure

represent significant public health savings. The dramatic incremental improvements with complete versus partial lead pipe replacements, months-long elevated risks with partial replacement, and prohibitively high costs to homeowners for individual arrangements, should be included in funding decision-making. ***Provincial and federal government programs stand to benefit, so all levels of government should rightfully contribute to the costs to get lead out of Canadians' water.***

**What the "acceptable" level should be.** A level of 5µg/L is suggested as a measurable level, that is half of the current acceptable level. This level of analytical feasibility is in contrast to lower levels reported in the consultation document (clearly lower levels can be measured), and the ALARA (As Low As Reasonably Achievable) aspirational goal set in the United States. A hazard of an action level is that inaction may be condoned when highly desirable lead reductions are indeed possible and feasible.

A related concern is that the blood lead action level or level of concern has not been revised in Canada. We recommend that given the "no safe level" status of lead, and that it is largely a preventable exposure, the level of concern should be set such that Canada responds to situations where an individual's blood lead is above the 90$^{th}$ percentile in the Canadian Health Measures Survey (CHMS). This standard could be protective for populations not included or potentially under-represented in the CHMS but who may be at higher risks from environmental exposures, such as aboriginal and remote populations.

3. **Keeping up with research, and monitoring for lead.** Following the publicity regarding lead in the drinking water in Flint, Michigan, no increased efforts were evident in Canada, in terms of responses from Health Canada to paediatricians, or public health. The present consultation document has only a single 2016 reference, and does not mention Flint or the sequelae (water testing and investigations of child blood levels from routine screening), in terms of individual, municipal or state responses – other US jurisdictions were identified that were at least as contaminated. This is surprising, given the allegations before US courts because of the lack of due diligence in public health in this case. Canadian paediatricians need education and guidance for much broader lead surveillance in young children.

## Context

Lead has no business in our bodies – it is not an essential mineral. Canadians are routinely exposed to lead, and there is no "safe" level of exposure.

Lead exposures generally peaked during the second half of the 1900s, whereupon lead was removed from gasoline and paint. Today, we continue to live with lead in the soil and indoor dust, in food and water, in many products (e.g. crystal glass, bronze or brass, pottery glaze, leaded glass, and illegally in some cosmetics, paints, plastics and trinkets), tobacco smoke, hobbies (e.g. antiques), occupational exposures, and aviation fuel emissions. Point sources include coal- and heavy-oil fired electricity generation, and mining, refining and industries. Lead in batteries is largely recycled. Occupational exposures continue from both known (e.g. aviation, waste industries, and battery recycling) and unrecognized sources (e.g. use and recycling of items with lead used as a stabilizer or pigment). The consultation document clearly indicates that drinking water offers the next opportunity for significant reductions in lead exposure, and the time has come.

Historically the abundance, and ease of mining, refining and working lead resulted in its incorporation in waterworks and many products Lead water supply pipes were the norm in early Canadian cities, and many remain in use, slowly dissolving and shedding lead-containing scale into the water supply.

Drinking water can be a significant source of lead exposure, and most of that lead arises from older pipes, and brass fittings and lead solder, although some may arise from groundwater, which is a particular concern given the number of Canadian residents who rely on well water. We attach a recent research report stemming from the Atlantic PATH project. Unlike research presented in the consultation document, in this work lead concentrations were highest in water originating from dug wells, followed by drilled wells and then municipal water.[1] Differences in the Hamilton area findings cited in the consultation document demonstrate a need for awareness and actual lead measurements, and research into effects of acidity and hardness versus primary lead sources in groundwater.

## Health Effects of Lead

As scientists who have examined toxic elements in Canadians, we take this opportunity to lay out a "bottom line" understanding, as a basis for more protective approaches and standards regarding lead.

**There is no "safe" level of lead.** With progressing research, scientists and doctors see incremental harms from lead, at lower and lower levels. Even at blood lead levels below 2µg/dL – one fifth the Canadian action level – children's brains may affected.[2] There is also evidence linking the cumulative exposure of lead in older adults to a number of chronic conditions and mortality,[3,4] such as cognitive decline.[5]

**Early-life lead is not monitored in Canada.** Children's blood lead levels peak between 1-3 years of age, but we have little Canadian data on this critical developmental period. In the United States, the blood lead of children at risk – on Medicaid or food aid – is routinely screened from 6 months to 6 years of age.

**Early detection and action can save brains, distress and money.** Rapid intervention to remove the source of lead has the potential to result in substantial financial savings, with improved productivity in lieu of special programs in education and support, and responding to aggressive and criminal behaviour.[6,7] Women's College Hospital Environmental Health Clinic physicians have reported that exposure sources are routinely identified when children's blood levels are below 10µg/dL, but above the norm. Recognizing the life-changing importance of early detection of elevated lead exposure, a California Bill proposes universal blood lead level screening of the very young (6 months to 6 years of age).[8] For young Canadian children blood lead level determinations are rare rather than routine, representing an important data gap. Nevertheless, similarities between the countries, and the fact that Health Canada often refers to American data when Canadian information is lacking, suggests that considerable, diverse benefits would be comparable in Canada.

**Lead has pervasive physiological effects**, affecting basic enzymes and haemoglobin, and promoting inflammatory processes, leading to chronic diseases including cardiovascular disease and cancer. Lead also impairs kidney function and bone strength.

**In conclusion,** we encourage Health Canada to move forward with a focus on preventive public health by reducing lead levels in drinking water, and also taking actions to monitor and reduce lead levels in young children to below the 90$^{th}$ percentile in the youngest children. Both urban and rural water supplies must be addressed. We look forward to Canadian healthcare taking initiatives to look for and to address lead in our youngest children, as well as in our water.

Respectfully submitted,

Meg Sears, PhD Chair, Prevent Cancer Now Meg@PreventCancerNow.ca

Ellen Sweeney, PhD Board Member, Prevent Cancer Now)

## References

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