

Lead in Drinking Water: Sharing Details about Ontario's Response



A webinar hosted by
**Canadian Environmental
Law Association**

March 2, 2017

With speakers from:

Drinking Water Management Division, Ministry
of the Environment and Climate Change

and

Ontario Drinking Water Advisory Council

Get the **LEAD OUT**

Lead poisoning can harm your child. Lead poisoning can cause behavior and learning problems. By the time you notice it may be too late. Get your child tested for lead.

GET THE LEAD OUT!

Lead Free KIDS
for a Healthy Future

GET THE LEAD OUT

Get The **Lead out**
Flint, Michigan

Get the Lead Out of Fishing

www.replacelead.com

How often has this happened to you? You're fishing and a line gets caught, or a fish puts up a fight and gets away. You sigh, "So on some new tackle and keep fishing." For you, it's just a little lost fishing gear. For our loons, swans, and eagles, it can mean a death sentence. Every year, up to 52% of loons, up to 32% of trumpeter swans, and up to 25% of bald eagles die from lead poisoning.

What can you do?

Lead-free weights are readily available. Ask for - and buy - only lead-free fishing weights.

Get the lead out of your tackle box! Don't throw it away! Safely recycle your lead at a hazardous waste collection site.

Teach a man to fish and you feed him for a day.
Teach a man to fish responsibly without lead and you safely feed his children and grandchildren forever.

Prevent Lead Poisoning.

Get your home tested.
Get your child tested.
Get the facts!

Click here

Let's Get The Lead Out, NH!

Protect our Wildlife

GET THE LEAD OUT!
Neighborhood Soil Testing Registrations
Sat. April 23rd, 2016
2pm - 6pm

CITY OF COMMERCE

City of Commerce Teen Center
5107 Amer Ave, Commerce, CA 90040
Food Provided
Questions: 323.263.2113 / info@coycj.org

East Yard

GET THE LEAD OUT

Environmental Health & Safety
Kansas State University

From November 2008, many outdoor tape brands such as Fishertread, 3M, Frogger, Skanerick, and VWR (Canada) contained lead levels that exceed the hazardous waste disposal limits.

CHECK Check the inside of your outdoor tape if you are using any of the brands mentioned above. Most tapes with stripes at an angle contain lead. If it has any flake test "MUTCLAVU" most likely it's lead free.

DISPOSE Dispose of your lead outdoor tape as hazardous waste, place in bag with HAZARDOUS WASTE label on the bag and request a pickup at www.k-state.edu/safety/hazardouswaste/.

REPLACE Replace lead containing rolls of outdoor tape with a non-lead alternative before or through your lab safety representative. Some examples of lead-free outdoor tape tapes are:

- VWR-Archives Indicator Tape (VWR# 13380-040)
- VWR-Archives Indicator Tape Extra Thickness (VWR# 14121-204, 13347-018, 12149-018)
- 3M Medical, Lab, Lead Free Barrier Indicator Tape (3M Medical 107-048, 107-049)
- Polychrome Indicator Tape Product 4 (18886208, 10886120A, 4888612A, 1088612B, 1088612C)

Get the Lead Out!
Tons!
Another Lead-Safe Home

www.GetTheLeadOutCR.com

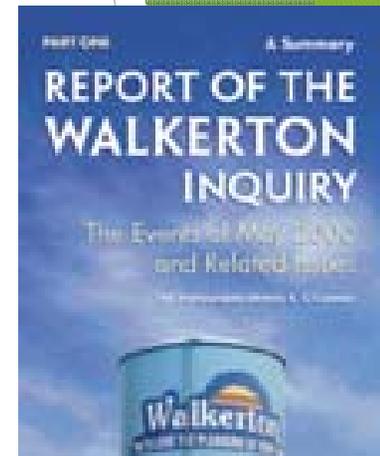
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Background

- ▶ The purpose of this webinar is to review Ontario's approach to the issue of lead in drinking water since 2007
- ▶ The approach built on the safety net established after the Walkerton drinking water crisis
- ▶ A broad-based approach was taken when lead arose as an issue in Ontario, building on the new multi-barrier approach

General Principles: Justice O'Connor

- ▶ Goal: ensure that drinking water systems allow water delivery with risk so negligible that an “informed person would feel safe drinking the water”
- ▶ Risks can be reduced by:
 - ▶ Multiple barriers to prevent contaminants from reaching consumers
 - ▶ Adopting a cautious approach to making decisions around drinking water safety
 - ▶ Sound quality management/operating systems
 - ▶ Effective regulation and oversight

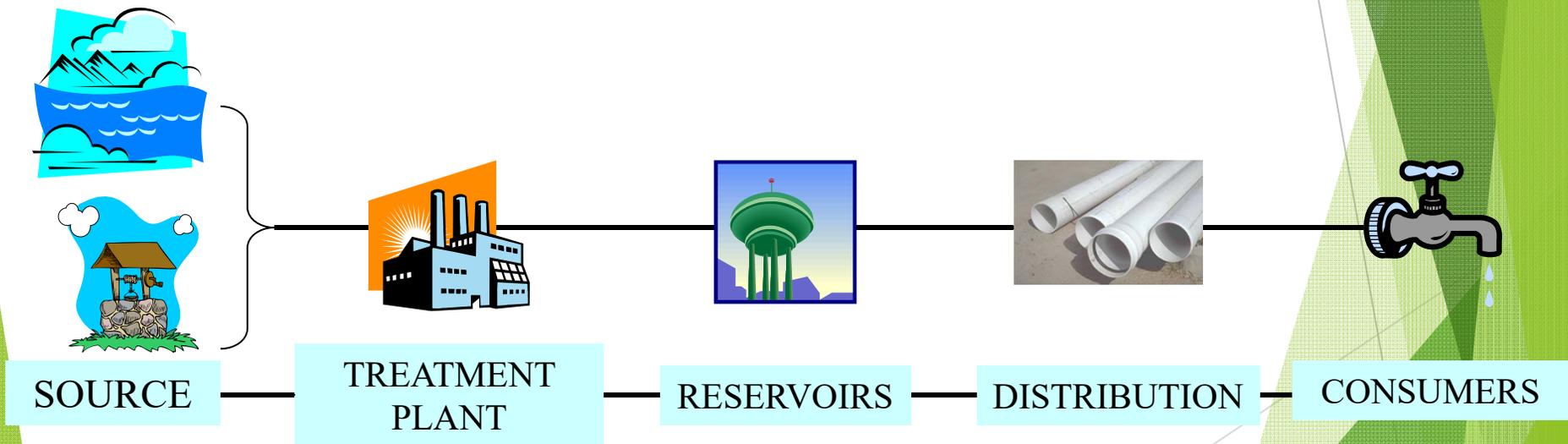


Provincial Roles and Responsibilities

- ▶ Justice O'Connor's Report: 121 Recommendations
 - ▶ Provincial government's role is to oversee a safe drinking water system
- ▶ Ministry has moved forward with development and implementation of a comprehensive approach to protecting drinking water
- ▶ Foundations of the transition have included:
 - ▶ Refining the governance structure for oversight of drinking water
 - ▶ Clear accountabilities and responsibilities
 - ▶ Lead ministry with primary responsibility - Ministry of the Environment
 - ▶ Development of a “source to tap” policy framework
 - ▶ Incorporates “multiple barrier” approach to protection
 - ▶ Mandatory abatement for compliance/enforcement

Source To Tap

More comprehensive; includes examination of “source-to-tap” issues, rather than focusing only on the treatment plant



Ontario Drinking Water Framework

- ▶ Most of current framework implemented between 2002 and 2007
 - ▶ e.g. drinking water standards were binding by regulation
- ▶ Office of the Chief Drinking Water Inspector instituted
- ▶ Ontario Drinking Water Advisory Council established
- ▶ Sampling requirements in regulation

April 20, 2007:
The Lead Issue Emerges in Ontario

The London Free Press

*“Lead in water: if you live inside
these lines, get your water
tested now.”*

Emergence of the Plan

- ▶ Immediately, Ontario's Chief Drinking Water Inspector deployed additional inspectors, retested, brought in international experts and worked with community to identify the issue and solve it
- ▶ Ministry engaged North American experts in water chemistry to help understand the science behind the elevated lead results
- ▶ Ministry offered assistance to City of London

Sampling

- ▶ In 2007 sampling was in water mains, not at tap
- ▶ Taking samples at tap was initially controversial
- ▶ Originally it was understood that responsibility ended at the service line (street connection)
- ▶ Water mains had been largely replaced over time and lead was not being detected
- ▶ Lead at consumer's tap arose when water pH was low and only way to determine if action was needed was with point of use sampling

Testing

- ▶ Following high lead levels in tap water in London, Ontario's Chief Drinking Water Inspector ordered testing for lead in 36 municipalities both in the distribution system and plumbing
 - ▶ Testing showed the over 46% had at least one plumbing sample that exceeded the Ministry standard for lead
- ▶ Source of lead was not in the distribution system, but in service lines and home plumbing
- ▶ The results of this testing, advice from the Ontario Drinking Water Advisory Council and the Chief Drinking Water Inspector, with input from the Chief Medical Officer of Health, were the foundation of the government's action plan for lead

Lead Action Plan Overview

- ▶ On June 7, 2007, the government introduced a multi-faceted approach to protect the public from exposure to lead in drinking water:
 - ▶ Purpose was to expand water safety protections and reduce potential levels of lead intake, especially for pregnant women and children six and under.
- ▶ A new regulation that protects children in schools, private schools and day nurseries (daycare centres).
- ▶ Funding assistance to affected schools for filters and/or bottled water as an interim protective measure.
- ▶ Funding assistance to low-income families with infants, young children and pregnant women, to help purchase filters for removing lead from the tap water.

Measures for protecting children

- ▶ Many schools, daycares in older buildings
- ▶ In addition to service lines, also issues of fixtures
- ▶ Water sitting overnight and weekends could have lead leached into the water
- ▶ Extensive water monitoring undertaken
- ▶ Instructions for daily flushing of lines (e.g. in the morning) issued and incorporated into regulation
- ▶ Focus of the regulation:
 - ▶ Flushing of plumbing
 - ▶ Sampling of taps and fixtures
 - ▶ Reporting of lead exceedances
 - ▶ Corrective actions
 - ▶ Record keeping

Municipal Drinking Water Systems

- ▶ Regulatory amendments enacted that protect the broader public who obtain their drinking water from municipal systems (O. Reg. 170/03), through community lead testing and corrosion control
- ▶ Municipalities required to include the costs of lead service pipe replacement in their financial planning processes
- ▶ Provided best practices, such as on-bill financing, for municipalities to help make lead service line replacement more affordable for homeowners
- ▶ Encouraged municipalities to conduct public education campaigns, such as inserts in water bill mailings.
- ▶ Provided expert advice to municipalities (e.g. on the preparation of corrosion control plans) which enabled municipalities to better control lead levels at customer taps

Corrosion Control to Reduce Lead in Water

A New Focus

- ▶ Historical focus of corrosion control in drinking water systems:
 - ▶ Protect integrity of infrastructure and maintain system's hydraulic capacity
 - ▶ Prevent/eliminate aesthetic and operational problems (e.g., red water, need for frequent water main swabbing/flushing)
- ▶ New focus of corrosion control – minimize release of lead into water from:
 - ▶ Lead containing distribution pipes and appurtenances, plumbing pipes, fittings and fixtures, and lead containing scales (incrustations) that may have been deposited on their internal surfaces as a result of earlier corrosion

Analysis of 2007-2016 Data

- ▶ 98% of samples taken for lead at schools and child care centres met the standard in 2015/16
- ▶ Flushing is working, but wastes water where lead is not an issue
- ▶ Studies showing variability in lead results from taps within the same facility
- ▶ No requirement to rotate sampling locations or sample fountains
- ▶ Lead more attributable to fixtures than lead service lines

2016 Regulatory Amendments

As a result of the analysis, the Ministry of the Environment and Climate Change:

- ▶ Mandated the sampling of drinking water fountains
- ▶ Addressed water conservation efforts by reducing the need for flushing in certain situations
- ▶ Recognized the use of NSF certified filters
- ▶ Standardized a minimum level of corrective actions

Corrective Action Amendments (1)

- ▶ For all exceedances discovered in flushed sample results...
- ▶ Notification procedure to Ministry of Environment and Climate Change, Ministry of Education and Public Health Unit would remain the same
- ▶ The ministry would recommend the fixture to be rendered inaccessible as soon as exceedance had been identified

Corrective Action Amendments (2)

- ▶ Based on consultations with the Public Health Unit the fixture could remain out of service until issue resolved
- ▶ Resolution could constitute
 - ▶ A flushed sample result below the standard
 - ▶ An NSF certified filter installation with corresponding verification sample result
 - ▶ Fixture replacement with corresponding verification sample result

Amendment Timelines

- ▶ Using a risk-based approach and considering the most susceptible population of children 6 years of age and younger, the Ministry is requiring:
 - ▶ Child Care Centres and Schools in the ‘Primary’ category would be considered the priority to have their sampling completed by 2020
 - ▶ All other Schools would have until 2022 to complete their sampling

Education & Outreach

- ▶ The Ministry is updating all O. Reg. 243/07 guidance material for stakeholders
- ▶ New template documents are in development; flushing record, sampling record & fixture inventory
- ▶ Facilities are encouraged to formulate a sampling plan to address the new requirements

Ontario Drinking Water Advisory Council (ODWAC)

- ▶ Recommendation from Walkerton Public Inquiry called for an Advisory Council on standards to:
 - ▶ advise the Minister of the Environment and Climate Change on drinking water standards, legislation, regulations, and issues to protect the water that Ontarians drink
- ▶ ODWAC is enabled through the *Safe Drinking Water Act, 2002*
- ▶ ODWAC was established in 2004

ODWAC, continued

- ▶ ODWAC's role is to ensure that the standard-setting process is transparent
- ▶ Membership of ODWAC – up to 15 individuals with expertise in engineering, medicine and public health, toxicology, microbiology, chemistry, hydrogeology, risk assessment, and utility operations
- ▶ Members are practitioners in academia, stakeholder associations (*including Ontario Water Works Association*), municipalities, laboratory testing and analysis, First Nations technical support, and government (Ontario Ministry of the Environment and Climate change and Ministry of Health and Long Term Care, Health Canada)

ODWAC Membership List

Members:

- Jim Smith, *Chair*
- Dr. Susan Andrews, U of Toronto
- Nick Benkovich, City of Greater Sudbury
- Ian Douglas, City of Ottawa
- Michèle Giddings, Health Canada
- Derek Hill, OFNTSC (First Nations)
- Rod Holme
- Dr. Peter Huck, U of Waterloo
- Dr. Alex Hukowich
- Dr. Robert Lannigan
- Dr. Ken Roberts
- John Rudnickas
- Joanne Thompson

Ministry Support Staff:

- Ministry of the Environment and Climate Change
- Ministry of Health and Long-Term Care

Drinking Water Standard for Lead

- ▶ Ontario's current drinking water standard for lead is 10 micrograms per litre and is consistent with Health Canada's Canadian Drinking Water Guideline which was set in 1992
- ▶ Health Canada has reviewed the science, health and treatment technology information since that time and has commenced a public consultation on their proposal for a more stringent drinking water guideline of 5 micrograms per litre
- ▶ ODWAC is reviewing Health Canada's proposal and Ontario's regulatory approach and experience to date re: lead

Sources of Lead

- ▶ **Air:** A key source of lead used to be the exhaust from gasoline that used lead as its anti-knock agent; now it is industrial discharges in some areas
- ▶ **Drinking Water:** Dissolution of lead due to corrosion of components is largely responsible for lead content (eg lead service lines, brass fixtures)
- ▶ **Food:** Foods are expected to contain lead in trace amounts
- ▶ **Soil:** Lead levels in soil are related to the history of the soil and/or proximity to industrial sources
- ▶ **Consumer Products:** Jewellery, art supplies, ceramic glazes, toys, electronics, batteries

Health Effects of Lead

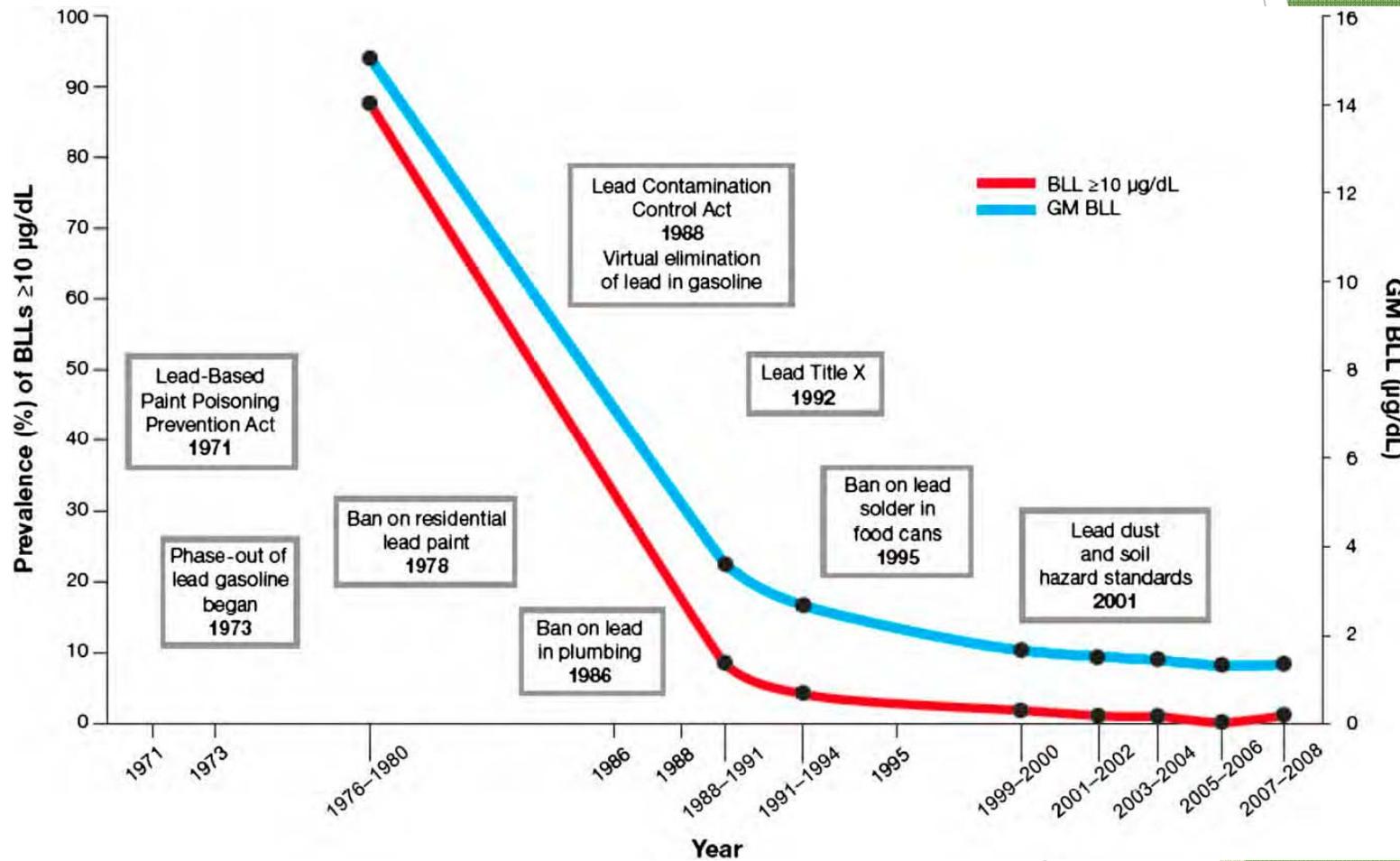
(from Health Canada, 2017)

- ▶ inorganic lead compounds classified as probably carcinogenic to humans, based on experimental animals. Cancer effects not main health effects of concern in humans
- ▶ toxicity of lead extensively documented in humans, based on blood lead levels (BLLs)
- ▶ effects studied include reduced cognition, increased blood pressure and renal dysfunction in adults, as well as adverse neurodevelopmental and behavioural effects in children
- ▶ strongest association observed to date is between increased BLLs in children and reductions in intelligence quotient (IQ) scores
- ▶ the threshold below which lead is no longer associated with adverse neurodevelopmental effects cannot be identified

Health Canada State of Science Report, 2011

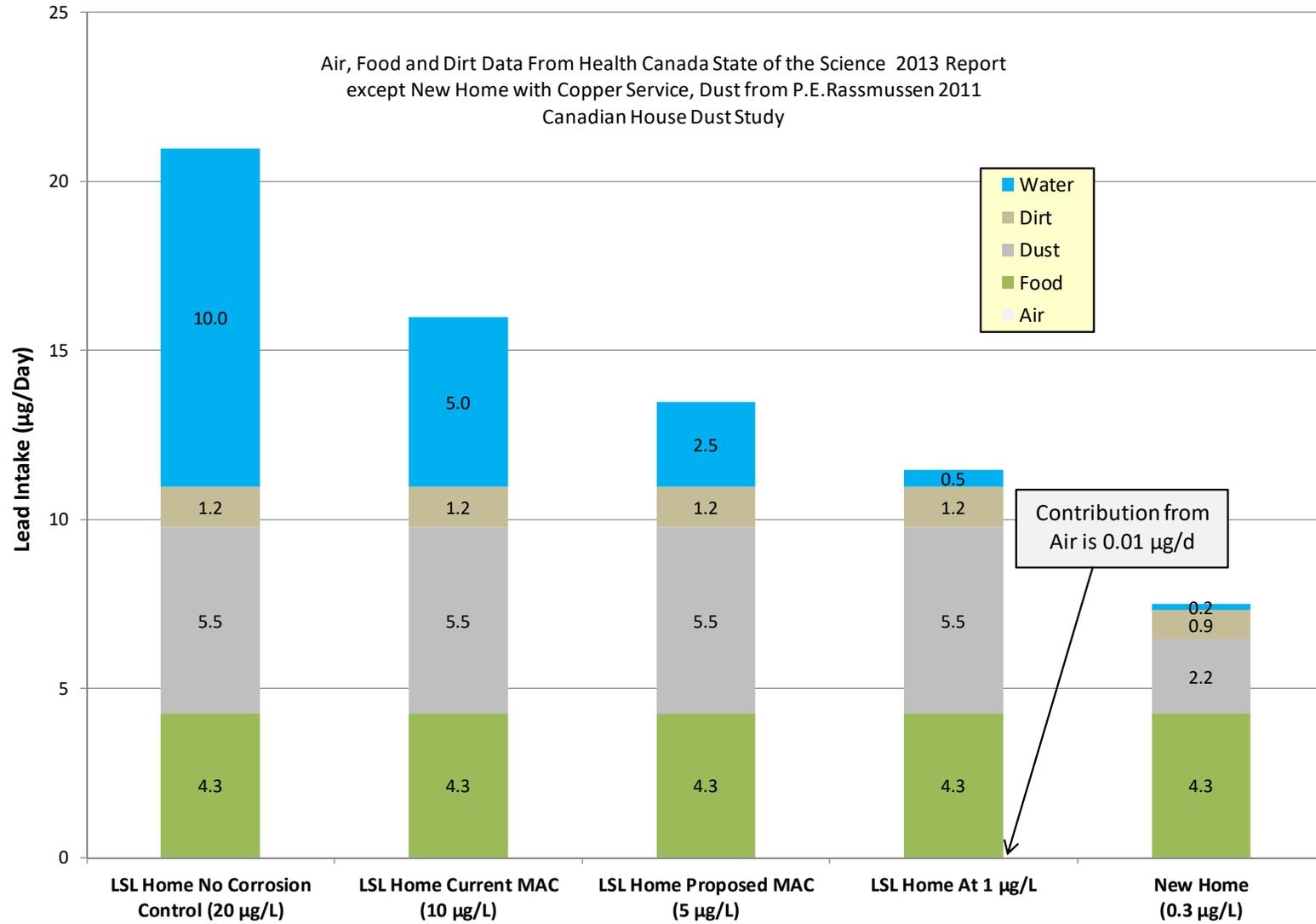
“In summary, although BLLs of Canadians have declined significantly over the past 30 years, health effects are occurring below the current Canadian blood lead intervention level of 10 µg/dL. Health effects have been associated with BLLs as low as 1-2 µg/dL; levels which are present in Canadians. Accordingly, additional measures to further reduce exposures of lead to Canadians are warranted.”

Timeline of lead poisoning prevention policies and blood lead levels in children aged 1-5 years, 1971-2008, USA.



Estimated Daily Lead Intake of Lead From All Sources For A 5 Year Old

Air, Food and Dirt Data From Health Canada State of the Science 2013 Report
 except New Home with Copper Service, Dust from P.E.Rassmussen 2011
 Canadian House Dust Study



Courtesy of Ian Douglas, ODWAC Member

Relationship between Pb in DW and Pb in Blood Lead Levels (BLL)

- ▶ Comparison of groups of children aged 6-24 months found that:
 - ▶ Children who lived in homes with drinking water Pb above 5 $\mu\text{g}/\text{L}$ had a BLL increase of 1 $\mu\text{g}/\text{dL}$ in comparison to children who lived in homes with DW Pb below 5 $\mu\text{g}/\text{L}$

Reference: Use of a Cumulative Exposure Index to Estimate the Impact of Tap-Water Lead Concentration on Blood Lead Levels in 1- to 5-Year-Old Children (Montreal, Canada) by Gerard Ngueta, Belkacem Abdous, Robert Tardif, Julie St-Laurent, and Patrick Levallois - 2016

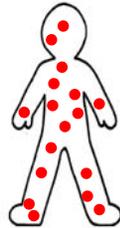
Impact on Children's Blood Lead Levels and IQ deficits

Drinking Water (Pb)

10 ppb



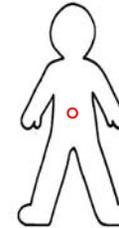
5 ppb



1 ppb



0.08 - 0.008 ppb



● 0.05 µg/dL BLL

↑ GM BLL (µg/dL)	1.5 µg/dL	0.75 µg/dL	0.15 µg/dL	0.012-0.0012 µg/dL
↓ IQ point	1.0-1.9	0.5-1.0	0.1-0.2	0.01-0.001

Background (0.8 µg/dL)



Health Canada Proposal

- ▶ In considering both treatment and analytical achievability and the health risks associated with exposure to lead from drinking water, the Federal-Provincial-Territorial Committee on Drinking Water has proposed a MAC of 0.005 mg/L (5 µg/L) for total lead in drinking water, based on a sample of water taken at the consumer's tap, using the appropriate protocol for the type of building being sampled.
- ▶ As this value exceeds the drinking water concentration associated with neurodevelopmental effects in children, every effort should be made to maintain lead levels in drinking water as low as reasonably achievable (or ALARA).
- ▶ Public Consultation Period: January 2017 to March 15, 2017

ODWAC's Review

ODWAC is undertaking a comprehensive review of Health Canada's proposal and Ontario's regulatory framework and experience to date including:

- ▶ Review of science policy approach for setting a standard for a non-threshold neurodevelopmental toxicant such as lead
- ▶ Review of ALARA and appropriate risk reduction measures for lead in drinking water:
 - ▶ Corrosion control for municipal drinking water systems
 - ▶ Lead Service Line Replacement as part of urban infrastructure renewal
 - ▶ Use of end of the tap filters
- ▶ Review of Ontario's current regulatory approach for requiring development of lead reduction strategies by municipalities, schools and day nurseries

Summary and Lessons Learned

- ▶ Walkerton taught us that drinking water safety cannot be taken for granted
- ▶ A redundant multi-barrier approach with public transparency and multiple types of oversight is essential
- ▶ Rapid action upon identifying a drinking water safety issue is enabled with a strong water safety net in place

Questions?

For more information, please contact:

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