

A resource for BC physicians handling cases of exposure to toxic substances in the environment

BC Drug and Poison Information Centre (DPIC) has recently joined Environmental Health Services (EHS) at the BC Centre for Disease Control (BCCDC). Together we provide comprehensive medical and public health expertise about cases of environmental exposures to toxic substances.

Case study

A family physician from a rural BC community contacted the DPIC regarding a 2-year-old girl with a blood lead level of 1.29 $\mu\text{mol/L}$ (26.7 $\mu\text{g/dL}$). The child was brought in by the mother who was concerned about delayed speech and poor social interaction. The medical assessment revealed developmental delay including fine motor skills. The child exhibited pica, the consistent consumption of non-nutritious material. A consulting pediatrician ordered screening blood work and suggested the developmental delay was consistent with autism. DPIC toxicologists were consulted for the blood lead level, and recommended to not chelate at this point but to start with nutritional and exposure assessments. All family members sharing a residence were tested for lead exposure. There were no other children among them. An environmental investigation conducted by an EHS physician and regional health authority staff found multiple potential exposure sources including deteriorating interior and exterior paint. Samples were sent for testing. The investigation was ongoing at the time of writing and health protection meas-

ures will be considered, if appropriate, once the environmental investigation is completed.

Lead is a well-known environmental contaminant with significant health effects. Chronic lead poisoning in children is an insidious process causing neurological effects such as decreased IQ, attention deficit and impaired motor coordination.¹ Evidence suggests that fetal exposure also causes neurologic damage.²

The major sources of lead exposure for Canadian children are dust and paint chips indoors. Exposure occurs when dust is tracked indoors from outdoor sources, and dust and chips are formed from leaded paint in older houses that is degrading or exposed during renovation. Infants and young children are particularly susceptible due to their frequent hand-to-mouth activity, as are toddlers and older children with pica. Other exposure sources include imported products such as toys, costume jewelry, cookware, cosmetics, and alternative medications. Two Health Canada recalls of children's jewelry in 2010 serve as reminders that avoidable sources of lead exposure for children are still an issue.

There is no known safe level of lead exposure. Although the Health Canada guidance value* for lead in blood is 0.48 $\mu\text{mol/L}$ (10 $\mu\text{g/dL}$), evidence demonstrates that permanent cognitive deficits occur in children with lower blood lead levels (BLLs) in the range of 0.10 to 0.48 $\mu\text{mol/L}$.^{3,4} The magnitude and nature of these effects vary based on individual and social-environmental factors (e.g., early childhood development).⁴ Cog-

nitive deficits associated with lead exposure can ultimately manifest as poor school performance, fewer years of employment, and reduced earnings. Prevention of lead exposure in children can result in profound increases in societal productivity. For example, one US estimate found that the decrease in BLLs for preschoolers from the late 1970s to the late 1990s (0.72 $\mu\text{mol/L}$, 15 $\mu\text{g/dL}$) resulted in average IQ increase of 2.2 to 4.7 points, which corresponded with a \$100 billion to \$319 billion economic benefit for each year's cohort of 3.8 million 2-year-olds (in US dollars for the year 2000).⁵

Our case study illustrates the complementary roles of the Drug and Poison Information Centre and the Environmental Health Services. DPIC provides a toll-free province-wide telephone information service staffed by specially trained pharmacists, nurses, and clinical toxicologists. DPIC provides expertise on clinical management of intoxications including use of antidotes and appropriate medical follow-up. Public health physicians at EHS work with regional health authorities to conduct investigations into cases of toxic exposures where the public may be at risk—for example those involving exposure in public venues (e.g., carbon monoxide in a hockey arena) and those involving exposure sources that may be widely distributed (e.g., consumer products). Together we provide a comprehensive service from clinical care to health protection.

Physicians interested in clinical support and/or public health follow-up of cases may reach the 24/7 BC Drug and Poison Information Centre

This article is the opinion of the BCCDC and has not been peer reviewed by the BCMJ Editorial Board.

*Health Canada defines a *guidance value* as the level above which action may be considered to reduce exposure.

at 604 682-5050 or 1 800 567-8911. For assistance with public health follow-up including exposure assessment and health protection, physicians may contact their medical health officer or EHS directly at 604 707-2440.

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References

1. Agency for Toxic Substances and Disease Registry (ATSDR). Lead toxicity. What are the physiologic effects of lead exposure? Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service, Case Studies in Environmental Medicine (CSEM); 2007 Aug. Accessed DD MONTH 2011. www.atsdr.cdc.gov/cssem/lead/pbphysiologic_effects2.html.
2. U.S. Centers for Disease Control and Prevention. Guidelines for the identification and management of lead exposure in pregnant and lactating women. In: Ettinger AS, Wengrovitz AG, Portier C, Brown MJ (eds). Atlanta, GA: US Department of Health and Human Services; 2010.
3. Bellinger DC. Very low lead exposures and children's neurodevelopment. *Curr Opin Pediatr* 2008;20:172.
4. Binns HJ, Campbell C, Brown MJ. Interpreting and managing blood lead levels of less than 10 microg/dL in children and reducing childhood exposure to lead: Recommendations of the Centers for Disease Control and Prevention Advisory Committee on Childhood Lead Poisoning Prevention. *Pediatrics* 2007;120:e1285-e1298.
5. Grosse SD, Matte TD, Schwartz J, et al. Economic gains resulting from the reduction in children's exposure to lead in the United States. *Environ Health Perspect* 2002;110:563-569.

Evidence is everywhere

The term “evidence-based medicine” first appeared in the medical literature in the early 1990s. Today the concept is almost ubiquitous in clinical practice, with its attendant high expectation of improvement in outcome.

To paraphrase David Sackett, evidence-based medicine is the combination of judicious use of current best evidence, clinical expertise, and patient preferences in clinical decision making. But determining what evidence is best evidence can be a complicated undertaking. Barriers to the adoption of these principles can be daunting, and include the time it takes to search out the “best,” wading through irrelevant retrieval, lack of easy access to resources, and cost.

The College helps busy clinicians overcome these obstacles by maintaining access to high-quality EBM resources through its website. Point-of-care tools such as ACP PIER and BMJ Point of Care are easily accessible through the Library's

section of www.cpsbc.ca. These tools provide evidence-based recommendations for diagnosis and treatment and are specially designed to provide quick and authoritative answers. A search of Ovid Medline under “Search Medline, etc” gives the user access to a number of full-text EBM resources, including the Cochrane Collection. Filters known as “clinical queries” in Medline, along with the subject subset “systematic reviews,” helps narrow down a broad search to those articles that provide the “best” evidence.

To reduce the hurdles of access further, the Library also subscribes to over 2000 electronic journals, with free access for College registrants. If time is of concern, the Library offers accredited courses in evidence-based medicine searching to help clinicians develop expertise in search techniques and filtering evidence. And if time for learning is also short, the College librarians are available to provide evidence-based bibliographies on request.

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Upcoming articles in the *BCMJ*—September 2011

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Mental health promotion for seniors (Kiraly)	Geriatric depression (Weise)
Cognitive behavioral therapy with older adults (Cox & D'Oyley)	Geriatric drinkers (Rogers)