

Children lead exposure management

Blood lead levels		Management
µg/dL	µmol/L	
<2	<0.10	• No intervention required
2-9.9	0.10-0.47	• Discuss health risks, provide patient education • Discuss dietary interventions such as adequate intake of Iron, Calcium and Vitamin C
10-14.9	0.48-0.67	• Identify exposure source, decrease exposure, dietary Interventions • Identify if there are data for exposure of other children in the same community • Repeat BLLs within 3 months
15-19.9	0.68-0.96	• Continue environmental control, dietary interventions • If levels persist for > 3 months in this range, proceed as below
20-44.9	0.97-2.16	• Prompt medical evaluation with a complete physical exam, neurodevelopmental screening and additional blood work such as: Haemoglobin, Hematocrit, and Iron levels. • If lead ingestion is suspected, an abdominal X ray should be taken
45-69.9	2.17-3.37	• As per above, environmental exposure control, full medical evaluation, including neurodevelopmental screening • Additional bloodwork as above, plus Zinc Protoporphyrin and Erythrocyte Protoporphyrin levels. • Succimer therapy
>70	>3.38	• Parenteral EDTA administration • Hospitalization

References:

- Environmental Health Clinic - Women's College Hospital - Dr. R. Bray; Health Canada: Chronic lead exposure among Canadians: A pilot Study. Blood lead reporting management strategies.
- Medical management guideline for lead exposed adults. Revised 04/2007 Association of Occupational and Environmental Health Clinics.
- Recommendations for Medical Management of Adult Lead Exposure. Kossnet et

- al. Environmental Health Perspectives Volume 115 | Number 3 | March 2007
- AAP – Policy statement. Lead exposure In children:Prevention, Detection and Management. PEDIATRICS Vol. 116 No. 4 October 2005, pp. 1036-1046
- CDC. Interpreting and managing Blood Lead Levels<10 µg/dL in children and reducing childhood exposure to Lead. Nov 2007, Recommendations of CDC's Advisory Committee on Childhood Lead Poisoning Prevention
- CDC. Managing elevated blood lead levels among young children: Recommendations from the Advisory Committee on Childhood lead Poisoning Prevention, March 2002

Resources and Contacts for Family Physicians:

Environmental Health Clinic - Women's College Hospital -
Tel: 416-351-3764

Health Canada – Lead. www.hc-sc.gc.ca

Canadian Housing and Mortgage Corporation (CHMC)
Lead in older homes http://www.cmhc-schl.gc.ca/en/co/maho/yohoyohe/inaiqu/inaiqu_007.cfm

CDC- Lead poisoning
<http://www.cdc.gov/nceh/lead/>

AAP-Policy statement:Lead exposure in children:
Prevention, Detection and Management
http://aappolicy.aappublications.org/policy_statement/index.dtl#J

Toronto Public Health. Tel: 416 338 7600

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LEAD EXPOSURE SCREENING

AND

MANAGEMENT IN PRIMARY CARE

Lead exposure can pose a significant health risk to children and adults. Current evidence shows that there is no safe threshold for blood lead levels (BLLs), and deleterious health effects can be seen even at levels < 10 µg/dL (0.48 µmol/L).

Children are more vulnerable to lead exposure and toxicity. Elevated BLLs in children result in cognitive and behavioral problems, decreased IQ, distractibility, hyperactivity and ADHD, decreased academic performance, and poor organizational skills, to mention a few.

In adults chronic exposure can cause hypertension, decreased GFR, changes in cognition, anemia and infertility.

Pregnant women can experience preterm births and an increase in spontaneous abortions.

Canadian screening guidelines emphasize targeted, rather than universal screening for children.

There are no screening guidelines for adults/pregnant women.

Although blood lead levels have been steadily decreasing as a result of environmental and industrial regulations, there are still groups at risk, such as young children, recent immigrants and those working in industries where there is occupational lead exposure.



Women's
College
Hospital



Environmental
Health Clinic

SCREENING QUESTIONNAIRE

Children

- Does your child live in or regularly visit a house/apartment /daycare built before 1950?
- Have there been renovations/remodeling going on at your house within the last 6 months?
- Does your child live close to an industrial complex?
- Does your child have a sibling/playmate who has had lead poisoning?
- Is there peeling, flaking paint inside/outside your house?
- Have you seen your child eating paint chips?
- Has your child recently moved to Canada (< 6 months ago)?
- Does your child spend time with anyone who works in the mining, smelting and construction industries (including painting, welding) or in the manufacturing of bullets, stained glass, and lead batteries?
- Does your child regularly play with toys bought outside Canada or USA?
- Do you use imported pottery, ceramics or lead crystal for cooking, storing or serving food and drinks?
- Has your child ever used traditional/folk medicine such as Litargirio, Greta, Azarcon, Paylooah or Liga?
- ▶ If the response is yes to one of the questions, consider checking BLL.

Adults and Pregnant Women

- Do you work in the mining, smelting, or construction industries (including painting, welding) or in the manufacturing of lead batteries, ceramics, pottery, stained glass and bullets?
- Do you live in a house/apartment built before 1950 and/or with ongoing renovations in the last 6 months?
- Do you drink tap water from a house/apartment/building built before 1950?
- Do you have hobbies such as target shooting, preparing lead shot or fishing sinkers, stained glass, lead pottery making?
- Do you use traditional/folk medicine such as Litargirio, Greta, Azarcon, Paylooah?
- Do you use imported pottery, ceramics or lead crystal for cooking, storing or serving food and drinks?
- ▶ If the response is yes to one of the questions, consider checking BLL.

References:

- CDC 2009. Recommendations for blood lead screening of Medicaid eligible children aged 1-5, an updated approach to targeting a group at high risk MMWR Aug 2009
- Rourkebabyrecord.ca -Port Colbourne lead task force questionnaire <http://www.mcmaster.ca/mieh/documents/Pb%20exposure%20questionnaire.pdf>
- CDC. Elevated Blood Lead Levels in Refugee Children--New Hampshire, 2003--2004. MMWR. January 21, 2005; 54(2):42-46.
- CDC. Lead Poisoning Associated with Use of Traditional Ethnic Remedies--United States. MMWR. July 16, 1993; 42(27):521-524.
- CDC. Childhood Lead Poisoning from Commercially Manufactured French Ceramic Dinnerware--New York City, 2003. MMWR. July 9, 2004; 53(26):584-586.
- CDC, NIOSH Safety and health topic: Lead
- CDC. Lead poisoning associated with Ayurvedic medication – Five states 2000-2003 MMWR July 2004
- Canadian Task Force on Preventive Health Care – Summary table of recommendations – Screening children for lead exposure in Canada
- Intellectual impairment in children with blood lead levels below 10 mcg/dL. NEJM, 2003, Volume 348: 1517-1526 Canfield et al.

Adult lead exposure management

Blood lead levels		Management
µg/dL	µmol/L	
<2	<0.10	• No intervention necessary
2-9.9	0.10-0.47	• Identify exposure source, discuss health risks, provide patient education
10-19.9	0.48-0.96	<ul style="list-style-type: none"> • Identify and decrease lead exposure especially for pregnant women • Dietary interventions - adequate intake of Calcium, Iron and Vitamin C • Repeat BLLs within 3 months • Consider removal from exposure source if repeated BLLs >10µg/dL (0.48 µmol/L), especially if medical comorbidities • Consider family BLLs • Consider consultations with Occupational Medicine or Toronto Public Health
20-39.9	0.96-1.92	<ul style="list-style-type: none"> • As above, plus: • Removal from lead exposure • Medical evaluation – additional bloodwork- Creatinine, Blood Urea Nitrogen, Haemoglobin, Hematocrit • Consider family BLL • Consultations as appropriate
40-79.9	1.93-3.85	<ul style="list-style-type: none"> • As above, plus prompt medical evaluation • If symptomatic and BLLs >50µg/dL (2.41µmol/L) consider chelation therapy
>80	>3.86	<ul style="list-style-type: none"> • As above, plus urgent medical evaluation, • Probable chelation therapy

To convert from µmol/L to µg/dL multiply by 20.72

The Occupational Safety and Health Administration Agency (OSHA) suggests removal of exposed employee from lead source if BLLs > 50 µg/dL (2.41 µmol/L). A physician can recommend that a person be removed at a lower dose if certain medical comorbidities exist, such as: creatinine > 133 µmol/L for men and > 115 µmol/L for women, proteinuria, cognitive dysfunction, pregnancy and neurological disorders. High risk professions are advised to monitor their employees with monthly BLLs for the first 3 months and then, every 6 months as long as BLLs < 10 µg/dL (0.48µmol/L).