

PROMOTING HEALTHY ENVIRONMENTS FOR CHILDREN

Lead



KEY POINTS

- The most common sources of lead exposure in children are lead-laden dust and paint chips from deteriorating lead paint on interior surfaces. Children living in poverty and children living in pre-World War II housing are at increased risk.
- Lead acts as a neurotoxicant to the developing brain, resulting in potentially irreversible damage, even at low blood lead levels (BLL).
- Pediatricians should assess for lead risks in children 6 years and younger.
- Disparities persist that disproportionately expose low-income, minority, and marginalized children to lead.

CLINICAL GUIDANCE

- Lead impacts the developing brain and can lead to cognitive impairment with decreased IQ. This can result in poor academic achievement, shortened attention span, and abnormal behaviors.
- Lead can impact other organs including the kidneys, blood, bones, and reproductive tract.
- Symptomatic high-dose lead exposure may present as headaches, abdominal pain, loss of appetite, vomiting, constipation, clumsiness, agitation, decreased activity, stupor, coma, and convulsions.

Treat acutely symptomatic children as medical emergencies. Implement medical assessment and management. Separate them immediately from further exposure to lead to prevent further injury.

Prevention is key!

- Risk assessments for sources of lead in the child's environment should be completed at well-child visits between 6 months and 6 years (Bright Futures). If concerned about lead-based paint or other source of lead, obtain a BLL and provide family with anticipatory guidance on reducing sources of lead exposure.
- Consult local health departments or regional Pediatric Environmental Health Specialty Unit (PEHSU) to determine recommendations for obtaining BLLs in your jurisdiction. Note that:
 - Children with Medicaid must receive a BLL at 12 and 24 months (or once between 24 and 72 months if no previous record exists).
 - Children with developmental disorders, pica behavior, or poor cognitive abilities are at increased risk for lead exposure and may warrant monitoring with BLLs.
 - Recent immigrants, refugees, or international adoptees should be tested at the earliest opportunity.

To diagnose elevated BLLs:

- Use a venous BLL — it's the Gold Standard.
- If a finger-stick or capillary sample was used for a screening test, confirm elevated levels with a venous sample to rule out potential contamination

The management of elevated BLLs is multifaceted.

- The current reference value for BLL = 3.5µg/dL (representing the top 97.5%tile of BLLs).
- Any child with a confirmed venous BLL \geq 3.5µg/dL should be directed to case management and exposure mitigation:
 - Take an environmental history to identify and eliminate the source of lead.
 - Implement mitigation measures in the home, such as dust precautions, removing shoes at the threshold of the domicile before going inside, careful and frequent handwashing, damp mopping floors, washing windowsills, baseboards, and plastic toys, etc.
 - Some health departments have lead programs that provide lead inspections of the home for children with elevated BLLs.
 - Home remediation should be performed by a Lead-Safe Certified contractor.
 - Provide nutritional counselling to ensure adequate intake of calcium, vitamin D, and iron. Iron supplementation may be warranted if deficiency confirmed on lab test.
 - Additional evaluation (eg, abdominal radiograph) may be warranted based on the history.
 - Follow-up BLLs at recommended intervals depending on their initial BLL.
 - Perform a structured developmental screening per recommendations in Bright Futures. Refer the child to Early Intervention or other therapeutic program.
 - Consult with a toxicologist or a PEHSU about chelation therapy for children with BLL >45 mcg/dL.
- Immigrant, refugee, and internationally adopted children may be at increased risk for lead exposure and should be tested for elevated blood lead concentrations when they arrive in the US.

FOR MORE INFORMATION

The following resources offer additional information regarding lead toxicity and exposure:

- [Prevention of Childhood Lead Toxicity](#) – AAP Policy Statement
- [Recommendations on Medical Management of Childhood Lead Exposure and Poisoning](#) – PEHSU Resource
- [Childhood Lead Poisoning Prevention](#) – CDC Resources
- [Lead Exposure and Lead Poisoning](#) – AAP Resources
- [Pediatric Environmental Health, 4th Edition](#) – AAP Policy Manual
- [Pediatric Environmental Health Specialty Units](#)
- [Blood Lead Levels in Children: What Parents Need to Know](#) – HealthyChildren.org
- [Bright Futures](#) – Prevention and health promotion for infants, children, adolescents, and their families