

## Lead Exposure in Children

### Key Messages

- Be aware that while most children show no clinical symptoms, lead exposure can result in learning and behavior problems. Exposures at higher levels can present with anemia, abdominal pain, vomiting, seizures, symptoms of encephalopathy, hypertension, or kidney problems and can lead to organ damage and death.
- Educate parents and assess children up to age 6 years at each well-child visit AND test those at risk, including all children at ages 1 and 2 years, as mandated (New York State's "Dakota's Law"). Consider testing older children with a history of elevated blood lead levels (BLLs), foreign residency, eating nonfood items, sickle cell disease, or developmental delays.
- Use the Online Registry to view children's BLLs, find management recommendations, and access New York City Department of Health and Mental Hygiene (NYC DOHMH) home inspection results. To report a hospital admission or discuss a case, call 646-632-6002.

### Recommended Lead Risk Assessment Questions for Children

*Use these questions at each well-child visit to assess lead exposure. If the answer to any question is "yes," draw a blood lead test.*

*Review the chart and/or Online Registry to determine when the child last received a blood lead test or lead risk assessment.*

- **Is the child due for their required tests for age 1 year or age 2 years?** *Children at these ages typically have hand-to-mouth behavior, placing them at greater risk. The recommended time frames for these tests are ages 9 to 15 months AND 21 to 27 months.*
- **Is the child younger than age 6 years AND not previously tested?** *Medicaid requires a test for children up to age 6 years. Enrollment in preschool/day care and the Early Intervention Program requires blood lead documentation.*

**Ask parents/guardians:**

**Since the child's last blood lead test and/or lead risk assessment in [month/year]:**

- **Has your child or any of their siblings, playmates, or other household members had a high BLL?** *Venous samples are recommended for follow-up testing.*
- **Has your child spent time in a home with peeling or damaged paint or a building undergoing renovation?** *About 67% of NYC housing was built before 1960 when lead-based paint for residential use in NYC was banned.*
- **Has your child spent any time outside of the United States?** *Children born outside of the United States, particularly children who are refugees or internationally adopted, should be tested when they arrive in the United States and again 3 to 6 months after they have settled in permanent housing.<sup>a</sup>*
- **Does your child put nonfood items such as painted toys, metal jewelry, paint chips, or soil in their mouth?** *Children with autism and sickle cell disease often eat nonfood items placing them at particular risk.*
- **Has your family used products from other countries, such as health remedies, spices, food, or clay pots?**
- **Has your child come in contact with someone whose job or hobby involves exposure to lead?** *Examples include bridge repainting or repair; construction or demolition, home painting or renovation, automotive or electronics repair; furniture refinishing, or working with firearms, jewelry, pottery, stained glass, metals, or color pigments.*

<sup>a</sup>Among NYC children whose families were interviewed between 2016 and 2020, elevated BLLs have been found in at least 2 children emigrating from (in descending order of frequency): Bangladesh, Pakistan, Haiti, Georgia, Guatemala, India, Ecuador, Honduras, Dominican Republic, Afghanistan, Mexico, Guinea, Egypt, Yemen, Nigeria, Uzbekistan, Guyana, Côte d'Ivoire, Nepal, China, Ghana, Gambia, Jamaica, Burkina Faso, Senegal, Togo, Algeria, Liberia, El Salvador, Mali, Morocco, Russian Federation, Tajikistan, United Arab Emirates, Republic of the Congo, Germany, Greece, Peru, Saudi Arabia, Trinidad and Tobago, Albania, Armenia, Benin, Belarus, Bhutan, Democratic Republic of the Congo (Zaire), United Kingdom, Guinea-Bissau, Israel, Niger, Sudan, Syrian Arab Republic, and Venezuela.

### Recommended Educational Messages

- Keep your child away from peeling paint and home repairs that disturb paint.
- Report peeling paint to your landlord. Call 311 if repairs are not made or to report repair work creating dust.
- Frequently wash hands, toys, pacifiers, bottles, and other items your child puts in their mouth.
- Clean floors, windowsills, and dusty places often with wet mops and wet cloths.
- Avoid using health remedies from other countries. Keep cosmetics and religious/cultural powders such as kohl, kajal, surma, and sindoor away from children. Some of these products may contain high levels of lead. See [nyc.gov/hazardousproducts](https://www.nyc.gov/hazardousproducts).
- Avoid using imported clay pots and dishes to cook, serve, or store food, and do not use pottery that is chipped or cracked.
- Avoid eating candies, spices, and foods purchased in other countries. Keep jewelry, amulets, and painted maracas away from children. These items may contain lead.
- Run your tap for at least 30 seconds, until the water is noticeably colder, before using it for drinking, cooking, or making baby formula any time a faucet has not been used for several hours.
- If any household members have jobs or hobbies that expose them to lead, keep your child away from their work clothes and tools. Wash work clothes separately from other laundry and remove shoes and work clothes before entering the house.

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### Recommended Management of Children

BLL (µg/dL)	Recommendations
<b>3.5 to &lt;20</b>	<ul style="list-style-type: none"> <li>• Assess potential sources of exposure by asking the <b>Recommended Lead Risk Assessment Questions</b> (see reverse).</li> <li>• Provide <b>Recommended Educational Messages</b> (see reverse).</li> <li>• Evaluate for adequate intake of calcium and iron. Adequate stores may decrease gastrointestinal absorption of lead.</li> <li>• If a fingerstick specimen, confirm with venous specimen within time frame specified in <b>Recommended Follow-up Blood Lead Test Schedule for Children</b> below. Venous specimens are more accurate than fingerstick specimens.</li> <li>• Report BLLs not displayed on the Online Registry to the NYC DOHMH via the Online Registry (<a href="http://nyc.gov/health/cir">nyc.gov/health/cir</a>). If unable to submit electronically, you may fax the reports to 347-396-8935.</li> <li>• If analyzing specimens in your office using a point-of-care device (LeadCare®), report BLLs within 5 days.</li> <li>• Monitor BLL as per <b>Recommended Follow-up Blood Lead Test Schedule for Children</b> below.</li> <li>• Monitor development even after BLLs decrease. Consider this child at risk for developmental and behavioral problems.</li> <li>• Consider referring patients persistently eating nonfood items for behavior modification therapy.</li> <li>• The NYC DOHMH may:               <ul style="list-style-type: none"> <li>◦ Provide information on lead sources and strategies to reduce exposure to the family and health care provider.</li> <li>◦ Inspect homes to assess potential lead sources and order landlords to repair any identified lead paint hazards.</li> <li>◦ Refer children aged &lt;35 months to Early Intervention for developmental monitoring.</li> </ul> </li> <li>• To access inspection results, visit the <i>risk assessment and home inspection results</i> link on the "Immunization and Lead History" page of the Online Registry (<a href="http://nyc.gov/health/cir">nyc.gov/health/cir</a>).</li> </ul>
<b>20 to &lt;45</b>	<p><b>All actions for BLLs 3.5 to &lt;20 µg/dL, and</b></p> <ul style="list-style-type: none"> <li>• Evaluate for iron-deficiency anemia, often associated with lead poisoning.</li> <li>• Consider abdominal x-ray if paint chips or other solid lead ingestion is suspected; if radio-opaque particles are found or recent ingestion is witnessed, use a cathartic.</li> </ul>
<b>≥45</b>	<p><b>All actions for BLLs 3.5 to &lt;45 µg/dL, and</b></p> <ul style="list-style-type: none"> <li>• Arrange hospitalization and chelation according to the "Recommended Chelation Protocol for Children with BLLs ≥45 µg/dL," at <a href="https://www1.nyc.gov/assets/doh/downloads/pdf/lead/lead-chelation.pdf">https://www1.nyc.gov/assets/doh/downloads/pdf/lead/lead-chelation.pdf</a>.</li> <li>• Perform a complete neurologic exam.</li> <li>• Confirm BLL with venous specimen processed as an emergency test before providing chelation, unless symptoms of encephalopathy are present.</li> <li>• Obtain abdominal x-ray to look for paint chips/other solid lead ingestion; if radio-opaque particles are found or recent ingestion is witnessed, use a cathartic.</li> <li>• Monitor erythrocyte protoporphyrin (EP) levels to help assess timing of exposure.</li> <li>• Child must receive chelation therapy in, and be discharged to, a lead-safe environment. Do not discharge the child until the NYC DOHMH inspects the home.</li> <li>• Inform the NYC DOHMH of hospital admission by calling 646-632-6002.</li> <li>• The NYC DOHMH can provide:               <ul style="list-style-type: none"> <li>◦ Referrals to providers with expertise in treating lead poisoning. For consultations in the evenings and on weekends, call the Poison Control Center at 212-POISONS (764-7667).</li> <li>◦ Referrals to temporary lead-safe housing.</li> </ul> </li> </ul>

### Recommended Follow-up Blood Lead Test Schedule for Children

Fingerstick BLLs ≥3.5 µg/DL		Venous BLLs ≥3.5 µg/DL		
Capillary Test Result (µg/dL)	Confirmatory Venous Test	Venous BLL (µg/dL)	Early Follow-up Test (first 2 to 4 tests after identification)	Late Follow-up Test (after BLL begins to decline)
<b>3.5 to &lt;10</b>	Within 3 months <sup>a</sup>	<b>3.5 to &lt;10</b>	1 to 3 months <sup>a</sup>	6 to 9 months
<b>10 to &lt;20</b>	Within 1 month	<b>10 to &lt;20</b>	1 to 3 months <sup>a</sup>	3 to 6 months
<b>20 to &lt;45</b>	Within 2 weeks	<b>20 to &lt;45</b>	2 weeks to 1 month	1 to 3 months
<b>≥45</b>	Immediately	<b>≥45</b>	As soon as possible	Chelation with follow-up

<sup>a</sup>Health care providers may choose to repeat BLLs within 1 month for patients newly identified with an elevated BLL to confirm that BLL is not rising rapidly