

## **Chapter 4**

# **Case Management and Follow Up**

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# Chapter Case Management and Follow-up

## Reporting and Follow-Up Procedures

Children are classified according to the risk for adverse effects of lead based solely on blood lead measurement. Even children with confirmed lead poisoning can be asymptomatic. The urgency and type of follow-up required are based on a child's risk classification. Diagnostic testing should be conducted according to the schedule listed below (**Table 1**). Always report blood lead test results to parents.

**Table 1. DIAGNOSTIC TESTING SCHEDULE**

<b>Initial Test Result (<math>\mu\text{g}/\text{dL}</math>)</b>	<b>Perform Diagnostic test on venous blood within:</b>
5-9	3 months
10-19	1 month
20-44	1 week
45-59	48 hours
60-69	24 hours
$\geq 70$	Immediately, as an emergency lab test.

## Clinical Follow-up

The follow-up schedule for blood lead testing is explained in **Table 2. Follow-up Schedule for Diagnostic/ Confirmed Blood Lead Levels**. Providers may use capillary blood lead tests for follow-up, unless the child's test result puts him in a new risk category, which would require a new diagnostic test to be performed. For example, if a child was confirmed at the 10-19 µg/dL level, but the follow-up test result was 20 µg/dL, that child will need a venous test to confirm them at the 20-44 µg/dL level.

**Form EHS 3651: Exposure History of Child with Elevated Blood Lead Level.** This form should be used by the health care provider to assist in the determination of potential sources of lead exposure for a child with a confirmed blood lead level  $\geq 5$  µg/dL and to educate the family about lead poisoning. Explain to parents why these questions are necessary and how they may relate to their child's blood lead levels. This form should be completed when the child's confirmatory test result is discussed with the parent or guardian.

Send Form EHS 3651 to NC CLPPP when BOTH tests results are known. Form EHS 3651 can be faxed to (919) 841-4015 or mailed to NC CLPPP, 1934 Mail Service Center, Raleigh NC 27699-1937. *NCLEAD users may scan and attach the 3651 form to the Child Event in the NCLEAD System.*

### **Form EHS 3651 is also used as a referral form to Environmental Health for a Lead Investigation.**

For a child with a confirmed blood lead level (10-19 µg/dL):

1. Fill in the entire form and check all answers.
2. Obtain the name and address of the owner of the child's primary residence.
3. Retain the original copy of the form at the local health department or provider's office with the child's medical record. Send a copy of the form to the address listed above.

For a child with a confirmed lead poisoning ( $\geq 20$  µg/dL):

1. Fill in the entire form and check all answers.
2. Obtain the name and address of the owner of the child's primary residence.
3. Retain the original copy of the form at the local health department or provider's office with the child's medical record. Send a copy to the local lead investigator as a referral for an environmental investigation.

<http://ehs.ncpublichealth.info/docs/ehsdir2015.pdf>

**Table 2. NORTH CAROLINA DIVISION OF PUBLIC HEALTH  
FOLLOW-UP SCHEDULE FOR DIAGNOSTIC / CONFIRMED BLOOD LEAD LEVELS  
FOR CHILDREN UNDER THE AGE OF SIX**

Blood Lead Level	Response (Clinical and environmental follow-up is based on the rounded test result.)
<p><b>&lt;5 µg/dL</b> (reported result less than 4.50 µg/dL)</p>	<ul style="list-style-type: none"> <li>• Report blood lead test result to parent &amp; document notification</li> <li>• Educate family about lead sources, environmental assessment &amp; prevention of lead exposure</li> <li>• Perform another blood lead test at age 2, earlier if risk of exposure increases</li> </ul>
<p><i>All diagnostic (i.e., confirmation) tests should be performed as soon as possible within the time periods listed below.</i> If diagnostic test result falls into a lower category - follow response for that risk category. If diagnostic or follow-up test result falls in a higher category – conduct another (venous) diagnostic test based on the higher risk category &amp; follow response for that risk category.</p>	
<p><b>5-9 µg/dL</b> (reported result 4.50- 9.49 µg/dL)</p> <p>(Diagnostic test within 3 months)</p>	<ul style="list-style-type: none"> <li>• Report blood lead test result to parent &amp; document notification</li> <li>• Educate family about lead sources, environmental assessment &amp; prevention of lead exposure</li> </ul> <p><b>If diagnostic test result is 5-9 µg/dL</b></p> <ul style="list-style-type: none"> <li>• Conduct nutritional assessment and refer to the WIC Program</li> <li>• Take environmental history to identify lead sources &amp; emphasize the importance of environmental assessment to identify and mitigate lead hazards</li> <li>• Continue follow-up testing every 3 months until 2 consecutive tests are &lt;5 µg/dL</li> <li>• Test other children under the age of six in same household</li> </ul>
<p><b>10-19 µg/dL</b> (reported result 9.50- 19.49 µg/dL)</p> <p>(Diagnostic test within 1 month)</p>	<ul style="list-style-type: none"> <li>• Report blood lead test result to parent &amp; document notification</li> <li>• Educate family about lead sources and prevention of lead exposure</li> </ul> <p><b>If diagnostic test result is 10-19 µg/dL</b></p> <ul style="list-style-type: none"> <li>• Conduct nutritional assessment and refer to the WIC Program</li> <li>• Take environmental history to identify sources of lead exposure</li> <li>• Refer to local health department for environmental investigation</li> <li>• Continue follow-up testing every 1-3 months until 2 consecutive tests are &lt;5 µg/dL</li> <li>• Test other children under the age of six in same household</li> </ul>
<p><b>20-69 µg/dL</b> (reported result 19.50- 69.49 µg/dL)</p> <p>(Diagnostic test within 1 week at 20-44 µg/dL within 48 hours at 45-59 µg/dL within 24 hours at 60-69 µg/dL)</p>	<ul style="list-style-type: none"> <li>• Report blood lead test result to parent &amp; document notification</li> <li>• Educate family about lead sources and prevention of lead exposure</li> </ul> <p><b>If diagnostic test result is 20-69 µg/dL</b></p> <ul style="list-style-type: none"> <li>• Conduct nutritional assessment and refer to the WIC Program</li> <li>• Take environmental history to identify sources of lead exposure</li> <li>• Refer to local health department for required environmental investigation</li> <li>• Provide clinical management</li> <li>• Refer children to CDSA* Early Intervention or CC4C** as appropriate</li> <li>• Refer to Social Services as needed for housing or additional medical assistance</li> <li>• Continue follow-up testing every 1 month until 2 consecutive tests are &lt;5 µg/dL</li> <li>• Test other children under the age of six in same household</li> </ul>
<p><b>≥70 µg/dL</b> (reported result greater than or equal to 69.50 µg/dL)</p> <p>(Diagnostic test immediately as emergency lab test)</p>	<ul style="list-style-type: none"> <li>• Report blood lead test result to parent &amp; document notification</li> <li>• Educate family about lead sources and prevention of lead exposure</li> </ul> <p><b>If diagnostic test result is ≥70 µg/dL</b></p> <ul style="list-style-type: none"> <li>• Hospitalize child and begin medical treatment immediately</li> <li>• Conduct nutritional assessment and refer to the WIC Program</li> <li>• Take environmental history to identify sources of lead exposure</li> <li>• Refer to local health department for required environmental investigation</li> <li>• Refer children to CDSA* Early Intervention or CC4C** as appropriate</li> <li>• Refer to Social Services as needed for housing or additional medical assistance</li> <li>• Continue follow-up testing every 1 month until 2 consecutive tests are &lt;5 µg/dL</li> <li>• Test other children under the age of six in same household</li> </ul>

\*Children’s Developmental Service Agency

\*\*Care Coordination for Children

**Table 3. Clinical Evaluation**

Medical History	Ask about symptoms, developmental history, mouthing activities, pica, previous blood lead level measurements and family history of lead poisoning.
Exposure History (EHS Form 3651)	Ask about age, condition, and on-going remodeling or repainting of primary residence and other places where the child spends time (including secondary homes and child care centers). Determine whether child is being exposed to lead-based paint hazards at any or all of these places. Ask about occupational and hobby histories of adults with whom the child spends time. Determine whether the child is being exposed to lead from an adult's workplace or hobby. Ask about other sources of potential lead exposure, including dust or soil in or outside of dwelling.
Nutritional History (Nutritional Assessment CLPPP form)	<ul style="list-style-type: none"> <li>• Take a diet history, including the frequency of the child's meals, snacks and beverages.</li> <li>• Assess the child's intake of iron, vitamin C, calcium and zinc-rich food sources.</li> <li>• Ask about the source of water used for cooking, drinking and for preparing infant formula.</li> <li>• Ask about pica, or possible ingestion of non-food items.</li> <li>• Evaluate the child's iron status using appropriate laboratory tests.</li> </ul> Ask about participation in Food and Nutrition Services (food stamps) and WIC.
Physical Examination	Pay particular attention to the neurologic examination and to the child's psychosocial and language development. A standardized developmental screening test is recommended. Developmental progress should be monitored carefully. If there are delays or lags, the child should be referred to the appropriate agency for further assessment.
Referrals	See Section on Referrals in this Chapter

**Comments:**

- Exposure history. State and local health departments may provide additional questions about local exposure sources.
- Nutritional status. Identified nutritional problems should be corrected. Ensure that children are eating at least 3 meals and 2 snacks daily. Smaller and more frequent meals may be helpful since absorption of lead may be increased when the stomach is empty. Deficiencies of iron, calcium and zinc may increase lead absorption or toxicity. A diet high in fat may result in increased lead absorption. A low hemoglobin or hematocrit may predispose the child to absorb lead easier.
- Physical examination. Findings of language delay or other neurobehavioral or cognitive problems should prompt referral to appropriate programs. Children may need early intervention programs and further examinations during the early school years to facilitate entry into an appropriate educational program.

## Referrals:

**Nutritional Services:** Referral to the WIC Program should be considered for all children under five years of age who may be eligible. WIC Program eligibility criteria include:

- ◆ Being a resident of North Carolina or receiving health care in North Carolina. Aliens are eligible to apply as long as they reside in the state.
- ◆ Having a family income less than 185% of the U.S. Poverty Income Guidelines. A person receiving Medicaid, Work First Temporary Assistance to Needy Families (TANF), or Food and Nutrition Services (Food Stamps) automatically meets the income eligibility requirement.
- ◆ Being at nutritional risk. A nutritionist or other health professional conducts a nutritional assessment at no cost to the participant, usually at the local WIC Program office. Examples of nutritional risk conditions are listed below.
  - Anthropometric measurements that indicate or put a child at risk for being underweight or overweight
  - A hemoglobin or hematocrit level that indicates iron-deficiency anemia
  - Documented nutrition-related medical conditions
  - Inadequate dietary intake
  - Conditions that predispose a child to elevated blood-lead levels such as inadequate nutritional patterns, dental conditions, or having a parent or caretaker who has limited ability to make feeding decisions and/or prepare food (e.g. mental retardation, or having a history of alcohol or drug abuse).

Information about the North Carolina WIC program is available from your county health department or by accessing information on the following website: <http://www.nutritionnc.com>.

**Early Intervention.** Children with confirmed lead poisoning ( $\geq 20$   $\mu\text{g/dL}$ ) are eligible for Early Intervention Services. Children birth to 36 months of age should be referred to the Children's Developmental Service Agency (CDSA) for Early Intervention as an entitlement of the Individuals with Disabilities Act. The CDSA contact information may be found at <http://www.bearly.nc.gov/index.php/contact/cdsa>.

**Care Coordination for Children (CC4C).** Children birth to age three who are at risk for developmental delay or disability, long term illness and/or social, emotional disorders and children ages birth to five who have been diagnosed with developmental delay or disability, long term illness and/or social, emotional disorder may be eligible for the program. For referral information, contact the local health department.

**Lead Team.** Comprehensive services are best provided by a team that includes the health-care provider, care coordinator, community health nurse or health advisor, environmental specialist, social services liaison, and housing specialist. Coordination of care, environmental services (i.e., identifying and controlling sources of lead exposure) and relocation to safe housing are typically provided or coordinated by the health department.

**Housing/Social Services/Educational Services.** Refer children to appropriate services if problems such as inadequate housing, lack of routine health care, or need for early intervention educational services are identified. Because childhood lead exposure is often associated with poverty, children with EBLs may also have problems such as inadequate housing, lack of

routine medical care, and poor nutrition. Children may also need educational services, and the team may be instrumental in ensuring that children with a history of EBLs receive early intervention or special education services for which they are eligible. The health department may also provide referral sources, such as social service agencies, parent support groups and housing services.

## Chelation

Children with confirmed blood lead levels  $\geq 45$   $\mu\text{g}/\text{dL}$  may be candidates for chelation therapy, especially if they are having neurological symptoms. Children with confirmed blood lead levels  $\geq 70$   $\mu\text{g}/\text{dL}$  should be hospitalized immediately at a facility with a pediatric intensive care unit (PICU) and considered for chelation therapy, regardless of symptoms. Providers must weigh the risks and benefits of chelation therapy separately for each patient. Initially, chelation will cause a rapid drop in blood lead levels within a week; however, blood lead levels may rise again and therapy may need to be repeated. Providers wishing to discuss medical treatment and follow-up of specific children with lead poisoning may contact the following physician associated with the Childhood Lead Poisoning Prevention Program:

**Dr. David L. Eldridge**  
Department of Pediatrics  
ECU School of Medicine  
Greenville, NC 27858  
Phone: 252-744-2535

## Educating Families



The first opportunity to educate families about the causes and consequences of a child's elevated blood lead level (EBL) usually occurs in the health-care provider's office. Anticipatory guidance should be provided prenatally and again when children are 3-6 months of age. Parental guidance at these times might prevent some lead exposure and the EBLs that often occur during a child's second year of life. When children are 12 and 24 months of age, parental guidance should be provided at well-child visits when the personal-risk questionnaire is administered and/or the blood lead test is performed.

Anticipatory guidance on lead poisoning covers many of the same areas as the **Family Lead Education** provided to children with elevated blood lead levels.

Discuss with families:

- ◆ Their child's blood lead level (if testing has taken place) and what it means.
- ◆ Potential adverse health effects of lead exposure.
- ◆ Sources of lead and suggestions on how to reduce exposure. (See Chapter 1 Sources and attached list "Alternative Cosmetics, Food Additives, and Medicines that Contain Lead") Include discussion of ceramic dishes and traditional remedies as possible sources of lead.



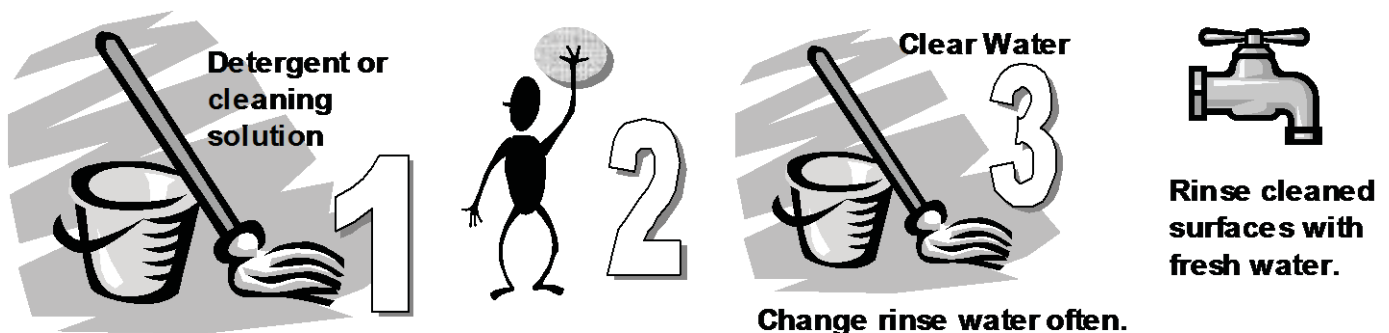
- ◆ Wet cleaning to remove lead-contaminated dust on floors, windowsills and other surfaces. Discuss the ineffectiveness of dry methods of cleaning, such as sweeping or vacuuming (unless a HEPA vacuum is used) for lead removal. HEPA stands for High Efficiency Particulate Air, and this type of vacuum cleaner is designed to remove extremely small particles from surfaces, including lead dust.
- ◆ The importance of good nutrition in reducing the absorption of lead. If there are poor eating habits and dietary patterns, discuss ways to improve the diet, and in particular ensure there is adequate intake of iron, vitamin C, calcium and zinc. Encourage regular meals and snacks.
- ◆ The need for follow-up blood lead testing to monitor the child's blood lead level, as appropriate.
- ◆ Results of environmental investigation, as appropriate.
- ◆ Hazards of improper removal of lead-based paint. Particularly hazardous are open-flame burning, power sanding, water blasting, methylene chloride-based stripping, and dry sanding or scraping.
- ◆ Other educational materials on lead sources, prevention of exposure, and remediation include the “Do's and Don'ts” brochure (available in English and Spanish), fact sheets located at the end of the manual, and publications from the EPA and other federal agencies' lead programs.

Health departments may provide printed materials, flipcharts and videos to assist in the family education process. Health care providers should discuss short-term repercussions of elevated blood lead levels (e.g., the need for follow-up testing / treatment and the need to control lead hazards in the child's environment) and long-term repercussions (e.g., the potential for future learning problems and the availability of early intervention services).

## Recommended Cleaning Method

The **Two-Bucket Method** is recommended for lead cleaning, to ensure that lead debris is not re-deposited onto cleaned surfaces, walls, and floors.

1. Place sponge or mop into bucket of detergent or cleaning solution.
2. Wipe surface.
3. Place contaminated sponge or mop into second bucket of rinse water, allowing debris to fall to the bottom. **Do not rinse surfaces with this water.**
4. Repeat Steps 1-3.
5. Change rinse water often.





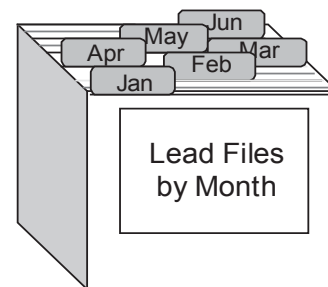
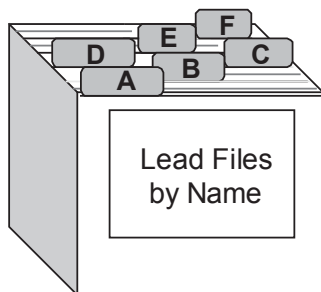
### Other Acceptable Cleaning Methods

- Use a wet-mop with disposable cleaning cloths and change the cloths often. Dispose of used cloths and seal the trash bag when finished.
- Put cleaner in a spray bottle and spray onto the surface, so that you only need one bucket of rinse water. Change rinse water often.

For more information, go to <http://www2.epa.gov/lead/protect-your-family-lead-your-home> to read the EPA's "Protect Your Family from Lead in Your Home."

### Other Helpful Tips

- When testing children for blood lead levels, try to obtain multiple telephone numbers for follow-up contact.
- Lead follow-up is easiest to do when using computerized tickler files. In the absence of these, a double-tickler file system has been used successfully by many health care providers. In this system, first file children's cards/record by name, in order to respond to questions from providers, schools, etc. A second file should be kept by dates, to keep track of testing and follow-up schedules.



- Coordinate WIC Program appointments and lead testing whenever possible to repeat blood tests. When reviewing WIC PROGRAM charts for immunization status, look for blood lead levels.
- Children previously referred to WIC need a re-referral for the reason of blood lead levels  $\geq 5$   $\mu\text{g}/\text{dL}$ , so that their nutritional interventions may be tailored to prevent further lead absorption.
- Communication between the Medical Home and the Environmental Health Specialist is critical to ensure that children are not lost to appropriate follow-up. This may be facilitated by meeting at least quarterly to review state surveillance reports.
- **Be sure to use Medicaid numbers on lab slips for children who are on Medicaid!** Omission of the Medicaid number means that the State Laboratory cannot be reimbursed for processing a specimen.