

Lead Poisoning Case Management

Best Practices

There are several guiding principles to consider when making recommendations for children with EBLs. Some children with EBLs come from economically disadvantaged families who may have difficulty meeting the daily challenges of life and who may be overwhelmed if presented with a long list of interventions. Thus, better results may be achieved by focusing on the most important recommendations and assisting caregivers in implementing them. Involve the whole family, including the EBL child and caregiver in the development of the individualized, written plan. Encouraging and supporting families without making them feel guilty for their child's EBL or making unrealistic demands on them may offer the greatest benefit to the child.

Case managers should obtain the caregiver's signed consent for services on the first visit.

General Case Management Responsibilities

1) **Trace the case**

The local public health authority or health department is responsible for locating and interviewing the parent or guardian to obtain the required information and make the appropriate referrals, including, but not limited to, nutrition counseling, iron deficiency testing, WIC services and housing remediation agencies. Lead poisoning prevention services for clients of private practitioners require coordination of care to obtain the necessary medical records to adequately trace the case and intervene for the child. Encourage the caregiver to notify the case manager and medical provider **immediately if the family moves. Notify OLPPP.**

2) **Educate the parent or guardian**

The case manager counsels the parent or guardian on the need for confirmatory and/or follow-up blood lead tests. The case manager should provide the parent or guardian with information about lead poisoning, including its effects on young children, sources of lead and ways to mitigate these hazards in order to prevent further elevation of the child's lead levels. The main topics for education are risk reduction, nutrition, good hygiene practices and housekeeping tips to prevent further exposure. Refer to the Oregon Lead-Based Paint Program (971-673-0440/503-731-4500 or www.healthoregon.org/lead) for information on appropriate techniques for remodeling or renovating older houses or facilities.

3) **Refer the parent or guardian to lead hazard remedial services if available: Identification and management of the lead hazard should be the top priority!**

Control immediate hazards. Interventions to reduce ongoing exposure could include:

- Replacing or stabilizing the paint in building components containing non-intact leaded paint.
- Replacing or repairing windows and other building systems to eliminate the abrasion of leaded paint.

- Covering or replacing bare lead-contaminated soil.
- Conducting specialized cleaning to reduce lead loading in house dust.
- Sealing or covering floors to make them smooth and cleanable.

4) **Provide case management appropriate for the BLL:**

At blood lead levels of 5-9 µg/dL (Level of Concern): Recent studies suggest that lead absorption is harmful at any concentration and that no safe level of lead exposure exists (Canfield et al. 2003; Lanphear et al. 2000, 2005b; Schwartz 1994; U.S. CDC 1991). Discuss possibility of confirmatory/venous draw with caregiver. Provide risk reduction education and send educational materials to caregiver.

At confirmed blood lead levels 10 to 19 µg/dL. Parents should receive education regarding lead poisoning that includes information about: 1) the causes and effects of lead poisoning; 2) the need for follow-up blood lead testing; 3) possible sources of lead intake and means of reducing intake; 4) nutrition, emphasizing the need for adequate nutrition and food high in iron and calcium; and 5) resources for further information. The environmental investigation should be completed within established time frame so lead hazards can be reduced. The child's medical provider should be consulted. These children should be tested for iron deficiency. It is important to make sure that these children's blood lead levels do not increase.

At confirmed blood lead levels 20 to 44 µg /dL. Parents should receive education regarding lead poisoning that includes information about: 1) the causes and effects of lead poisoning; 2) the need for follow-up blood lead testing; 3) possible sources of lead intake and means of reducing intake; 4) nutrition, emphasizing the need for adequate nutrition and food high in iron and calcium; and 5) resources for further information. The environmental investigation should be completed so lead hazards can be reduced. The child's medical provider should be consulted and children should have a complete physical. Case follow-up should also ensure that sequential testing for blood lead along with review of the child's clinical status is performed within one month.

At confirmed blood lead levels 45-69 µg /dL. Children with confirmed venous blood lead levels of 45 µg/dL to 659 µg/dL require faster action. Case follow-up and environmental investigation should begin within one to two days. The homes of these children must be remediated before they are allowed to return. Children whose blood results reach this level are placed on chelation therapy. Children receiving chelation therapy need more intense case management to monitor compliance and follow-up blood lead testing. Increased communication with the physician will be necessary.

At confirmed blood lead levels 70 µg/dL. Children with confirmed blood lead levels at or above 70 µg/dL constitute a medical emergency and must be hospitalized immediately. They are at highest risk for severe, permanent neurologic damage due to lead exposure and must be given highest priority for follow-up. Case follow-up and environmental investigation should be started within 24 hours and should include the child's home and potential sites of exposure, such as a relative's home or a child care center or home. The homes of these children must be remediated before they are allowed to return. The case follow-up and environmental inspection should include the same components as listed previously.

Educational Interventions for Caregivers

I. General Recommendations:

A. Tailor educational interventions to each child and caregiver.

Select the interventions and information that are most appropriate to the child. Devise a written plan with specific recommendations to reduce the child's exposure to identified sources of lead in consultation with the caregivers and give a copy of the plan to them. (See sample follow-up letter).

B. Continue educational efforts beyond a one-time intervention.

Monitor children's follow-up BLLs. If a child's BLL is not decreasing, discuss the case with the medical provider and OLPPP to determine whether lead sources are being overlooked. Case managers or EHS may need to make further home visits to assess new lead sources and ensure that caregivers understand and are carrying out recommended interventions.

C. Environmental Recommendations

Prompt and effective control of the sources of children's lead exposure is the highest priority. Ensure that all sites lived in or regularly visited by a child with an EBLL are inspected jointly with the caregiver to identify potential sources of lead exposure. Have the residential environment visually inspected. Measure environmental lead levels in house dust, bare soil and other media as appropriate.

D. Provide information about potential sources of lead.

If caregivers are informed of lead sources identified during the environmental inspection, as well as other potential sources, they may change their attitudes and behaviors in ways that result in secondary prevention. Therefore, encourage caregivers to examine their yards and homes for chipping paint, especially areas where their child spends a good deal of time.

E. Explain that lead remediation should be conducted by trained workers.

Improperly conducted remodeling, repair and paint preparation (e.g., grinding or sanding lead-based paint and thus producing lead dust, or allowing children access to areas of abatement/remediation) may actually increase children's lead exposure. Therefore, recommend that these activities be conducted by certified professionals. However, if caregivers choose to perform the work themselves, direct them to resources that will at least give them guidance in how to conduct the work safely.

F. Discuss and demonstrate methods that caregivers can implement to reduce their children's lead exposure.

While verbal instructions and written materials are useful, it is important to demonstrate methods of reducing children's lead exposure whenever possible. Demonstrating these methods at the child's home can help in overcoming language and cultural barriers. Encouraging caregivers to practice the methods demonstrated and provide corrective feedback if necessary should help them better understand and adhere to the recommended interventions. Most of these interventions are simple, pose no risk and should help reduce children's risk for lead exposure.

II. Recommendations for Caregivers: Exposure from Housing Sources

- A. Create barriers between living/play areas and lead sources.** Leaded paint tastes sweet, which may encourage children to ingest deteriorating paint. Until remediation is completed, caregivers should clean and/or isolate sources of lead. Advise them to close and lock doors to keep children from deteriorated paint on walls and to use temporary barriers such as contact paper or duct tape to cover holes in walls or to block children's access to other sources of lead.
- B. Control hazards.** Lead-safe work practices must be used when renovating or repairing lead-based paint hazards. EPA/HUD have published detailed guidelines for residential lead hazard control work. Prompt and effective environmental management should be the highest priority of case management.
- C. Regularly wash children's hands and toys.** Hands and toys can become contaminated from household dust or exterior soil, both known reservoirs of lead. Washing a child's hands may also enhance caregiver-child interaction and reduce the transmission of infectious diseases. Urge caregivers to buy toys that can be easily washed. If the family cannot make the house lead-safe than encourage changing hygiene behaviors to include hand washing and cleaning areas where the child spends time.
- D. Regularly wet mop floors and wet wipe window components.** Because household dust is a major source of lead, advise caregivers to wet mop floors and wet wipe horizontal surfaces every 2-3 weeks. Since windowsills and wells can contain high levels of leaded dust, they should be kept clean and, if feasible, shut to prevent abrasion of painted surfaces. Advise caregivers to use disposable cleaning materials or reusable materials used only for cleaning. Encourage the use of separate containers for washing and rinse solutions. The EPA recommends the use of a general-purpose, nonphosphate cleaner. In studies that found house dust control to be associated with a decrease in children's mean BLL, professional house cleaners used a powdered detergent rather than bleach or ammonia.

- E. Vacuum carpets before wet mopping floors; cover carpeted areas with throw rugs.** A HEPA vacuum is recommended when cleaning lead containing dust. The HEPA vacuum has a special filter that can pick up and hold small pieces of lead. If a HEPA vacuum is not available, vacuuming may increase children’s lead exposure by bringing lead-contaminated dust from deep in the carpet to its surface. Therefore, advise caregivers to initially vacuum carpeted floors and subsequently wet clean the carpets. After cleaning the carpets, caregivers should wet mop noncarpeted floors to remove dust aerosolized by vacuuming. Advise caregivers to place throw rugs over carpeted children’s play areas and to consider replacing the carpet if it is extremely contaminated with dust.
- F. Leave shoes at the door; use washable entryway mats.** Contaminated exterior soil can be tracked into homes on shoes.
- G. Prevent children from playing in lead contaminated soil; if possible, provide them with sandboxes.** Advise caregivers to limit their children’s play in lead-contaminated bare soil. Also advise them to either plant grass on areas of bare soil or cover the soil with grass seed, mulch, or wood chips if possible. Until the bare soil is covered, advise caregivers to move play areas away from bare soil and away from the perimeter of the house. Sandboxes with covers can provide an alternative place for children to play; when not in use, sandboxes should be covered.
- H. Discuss the potential for lead-contaminated water, if appropriate.** Lead in drinking water is rarely a primary source of EBLs. Some water sources can become contaminated from lead solder. If household water is a suspected source of lead exposure, advise caregivers to implement the following interventions pending the results of water testing:
- 1. Do not drink or cook with hot tap water.** Lead is more soluble in warm water.
 - 2. Run the tap water cold** for 1-2 minutes in the morning, and then fill a pitcher with the water. The water is then available that day for drinking, cooking, and formula preparation.

III. Recommendations for Caregivers: Exposure from Non-Housing Sources

A. Describe ways to eliminate work- and hobby-related exposure.

Household members who are exposed to lead from occupations or hobbies may bring lead into the home on lead-contaminated clothing, shoes, and hair. A list of occupations and hobbies associated with home lead exposure can be found in the introduction.

B. For work-related lead sources, advise the caregivers to:

- If possible, reduce their lead exposure in the workplace.
- Shower before leaving work or as soon as possible.
- Change clothes before going home and leave soiled clothing at work to be laundered by the employer. If this is not possible, change clothes in an area at home that is inaccessible to children and wash contaminated clothing separately from the rest of the family laundry.
- Protect inside of vehicle from contamination with a towel/blanket.
- Store street clothes in separate areas of the workplace to prevent contamination.
- Leave all lead-containing or lead-contaminated material at the workplace.
- Obtain a referral to an occupational health clinic if the caregiver has an EBLL.
- Prevent children from visiting the work area.

C. For hobby-related lead sources, advise the caregivers to:

- Separate hobby areas from living areas.
- Prevent children from visiting hobby areas.
- Have anyone engaging in “lead hobbies” change clothes either before entering the home or in an area that is inaccessible to children.
- Wash contaminated clothing separately from the rest of the family laundry.
- Substitute lead-free materials where possible.
- Properly store and dispose of toxic substances.

D. Discuss the hazards of food containers, folk remedies, or cosmetics contaminated with lead.

Food items, home remedies and cosmetics that may contain lead are listed in the introduction section of this handbook.

- Advise caregivers not to use containers, cookware, or tableware purchased abroad to store, cook or serve foods or liquids unless they are shown to be lead-free.
- Advise caregivers not to use folk remedies and cosmetics purchased abroad unless they are shown to be lead-free.

IV. Nutritional Recommendations

A. Discuss dietary interventions:

Nutritional measures have not yet been proven to have a clinically important impact on EBLLs in children. However, children with EBLLs are often at risk for poor nutrition, and their caregivers should receive nutritional counseling to help these children obtain a well-balanced and age-appropriate diet.

Test children at risk for anemia at the recommended ages. Evaluate the diet of children at risk for anemia, paying particular attention to dietary iron, vitamin C, calcium and total fat intake. USDA Food Pyramid recommendations are appropriate for EBLL children who are not iron-deficient.

Refer eligible families to food supplementation programs such as the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). An EBLL is a condition that should qualify older children who might otherwise not be candidates for participation in the program.

Advise caregivers to provide children with an adequate intake of iron-containing foods. Recommend that they:

- Introduce iron-fortified cereal and/or pureed meats at appropriate developmental stages.
- Provide one serving of lean red meat per day to older children or discuss vegetarian alternative with nutritionist or medical provider.
- Do not recommend iron supplements except under supervision of a physician or nutritionist, and only when iron deficiency/anemia is documented.

Encourage caregivers to provide children with adequate intake of vitamin C-containing foods. Recommend that they:

- Provide two servings of fruit juices or fruits per day.
- Provide supplements only under the supervision of a physician or nutritionist.

Encourage caregivers to provide children with adequate intake of calcium (500 mg/day @ 1-3 years; 800 mg/day @ 4-8 years). Recommend that they:

- Provide two servings per day of dairy products or other calcium-rich foods.
- Provide supplements only under the supervision of a physician or nutritionist.

Do not encourage a low-fat diet as a means of lowering children's EBLLs. Not only is there no clinical evidence to support the implementation of such a diet, but dietary fat is an important component of diets of children under 2 years of age. Encourage caregivers to avoid excessive intake of fat for children over 2 years of age.

Always keep recommended interventions within the ability of the caregiver to implement them.

V. Medical Recommendations

A. Coordinate medical care.

Coordination of care is critical to successful case management. For each child, an individualized plan of follow-up must be devised and implemented. Case managers need to maintain open lines of communication with primary care providers, public health officials and caregivers. Encourage a multidisciplinary approach. Provide lead poisoning resources and educational materials to medical providers as needed.

B. Discuss the importance of regular medical follow-up.

All children with BLLs ≥ 20 $\mu\text{g}/\text{dL}$ should have physical exams to assess for high-risk behaviors and to identify possible behavioral and neurodevelopmental disorders. For more guidance on evaluating children with EBLs see **Healthcare Provider Medical Evaluation and Recommendations for Children with Elevated Blood Lead Levels**.

Follow-up blood tests are the best way to determine the success of environmental and other interventions. Therefore, remind caregivers to make and keep follow-up appointments for blood tests. Remind caregivers that EBLs do not come down quickly. When recommending follow-up appointments, follow the schedule in the Lead Investigative Guidelines. Inform all current and future medical care providers of the child that the child had an EBL. This is important even when the child's BLL is no longer elevated. Any child that has **ever** had an EBL should have ongoing neurodevelopmental monitoring with special attention during critical transition points:

- **First grade: Children begin acquiring academic skills.**
- **Fourth grade: They use these basic skills to learn new material.**
- **Sixth/seventh grade: They need higher order planning and organizational skills.**

C. Review the meaning and risks of EBLs.

D. Remind caregivers that:

- Children with EBLs are often asymptomatic.
- Knowing the source of lead is critical to preventing further exposure.
- Neurodevelopmental effects of EBLs are usually not immediately identifiable. Since the effects of lead poisoning may only become apparent after a child is in school, be aware that effects may occur later.