1. DISEASE REPORTING

1.1 Purpose of Reporting and Surveillance

1. To assess the magnitude of lead exposure in Oregon.
2. To identify all tested individuals with elevated blood lead levels (EBLL).
3. To identify the sources of lead exposure for individuals with EBLL and to identify, notify, and evaluate others who may be at risk from those sources.
4. To ensure that individuals with EBLL receive proper medical management, including follow-up, until their blood lead concentration drops to acceptable levels.
5. To ensure that adequate environmental follow-up occurs, in order to reduce or eliminate the risk of further lead exposure from identified sources for the affected child and any family members, playmates, etc. who could also be exposed to the same source.
6. For occupational exposures, to ensure that the Oregon Occupational Safety and Health Division (OR-OSHA) is provided a list of firms with at least one employee having a blood lead level (BLL) 10 micrograms per deciliter (μg/dL) and above on a quarterly basis; and to collect data needed to develop strategies to minimize occupational lead exposure.

1.2 Laboratory Disease Reporting Requirements

1. Laboratories must report all blood lead test results directly to the Oregon Health Authority (OHA) within seven days [333-018-0015 4(d)]. Lead poisoning (see definition) must be reported within one local health department working day [333-018-0015 4(c)]; results can be sent electronically or faxed to (971) 673-0457.
2. Oregon law requires labs that send an average of >30 records per month to OHA to submit the data electronically. Please contact OHA at 971-673-1111 for Electronic Laboratory Reporting (ELR) initiation, assistance, and approval.

1.3 Clinician Disease Reporting Requirements

1. Clinicians using point-of-care portable analyzers for blood lead testing are required to report all blood lead test results directly to OHA within seven days [333-018-0015 4(d)]. Lead poisoning (see definition) must be reported within one local health department working day [333-018-0015 4(c)]; results can be sent electronically or faxed to (971) 673-0457. For more information on reporting, contact OHA at 971-673-0440.
1.4 Local Health Authority Reporting and Follow-Up Responsibilities

1. OHA will refer childhood EBLL reports received directly from labs or clinicians to the Local Public Health Authorities (LPHA) for follow-up. If the LPHA is notified directly of an EBLL test result, they should report the case to OHA using case report form OHA 42-10.

2. Forms that should be used for reporting and recording the results of follow-up investigations are available from the Lead Poisoning Prevention Program at (971) 673-0440 or at www.healthoregon.org/lead. Except for initial reporting, different forms are used for children and adults; they are listed in Tables 1 and 2, respectively. Fax completed forms to the Lead Poisoning Prevention Program at (971) 673-0457, or mail to 800 NE Oregon St., Suite 640, Portland, OR 97232.

Table 1. Lead Poisoning Forms for Children (< 18 years old)

<table>
<thead>
<tr>
<th>Form Title</th>
<th>Form Number</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated Blood Lead Reporting Form</td>
<td>OHA 42-10</td>
<td>All cases with BLL ≥ 5 μg/dL</td>
</tr>
<tr>
<td>Oregon Childhood Lead Poisoning Prevention Program Lab Slip</td>
<td>OCLPPP 01</td>
<td>Lab slip for blood lead test analysis</td>
</tr>
<tr>
<td>Medical Information Form</td>
<td>OCLPPP MIF 01</td>
<td>All confirmed EBLLs ≥ 10 μg/dL</td>
</tr>
<tr>
<td>Elevated Blood Lead Investigation Questionnaire</td>
<td>OCLPPP EIQ 01</td>
<td>All confirmed EBLLs ≥ 10 μg/dL</td>
</tr>
</tbody>
</table>

Table 2. Lead Poisoning Forms for Adults (≥ 18 years old)

<table>
<thead>
<tr>
<th>Form Title</th>
<th>Form Number</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elevated Blood Lead Reporting Form</td>
<td>OHA 42-10</td>
<td>All cases with BLL ≥ 10 μg/dL</td>
</tr>
<tr>
<td>Physician Interview Form</td>
<td>OHA 44-2</td>
<td>All cases with BLL ≥ 25 μg/dL</td>
</tr>
<tr>
<td>Adult Lead Case Interview Form</td>
<td>OHA 44-3</td>
<td>All cases with BLL ≥ 25 μg/dL</td>
</tr>
</tbody>
</table>

2. LEAD POISONING AND ITS EPIDEMIOLOGY

2.1 Background

Lead is a naturally occurring soft metal found in rocks and soil. Throughout history, it has been used for a variety of purposes (e.g. glazing pottery, soldering). Characteristic features of lead toxicity, including anemia, colic, and coma, were noted by Hippocrates in ancient times.¹ Lead serves no useful biologic purpose in the human body, and recent evidence demonstrates that multiple health effects can occur at lead levels once considered safe.² The insidious nature of lead poisoning means that the only way to know if an adult or child has an EBLL is to perform a blood test. Lead poisoning continues to be an important environmental and occupational health problem.
2.2 Description of Illness

A. Absorption and Distribution
Ingestion and inhalation are the typical routes of lead exposure. The most common source of lead exposure is ingestion of lead-containing dust. The rate of lead uptake is affected by an individual’s developmental stage, route of exposure, and nature of the lead compounds to which the individual is exposed. Nutritional status is also important; a healthy diet high in iron and calcium and low in fat may slow the rate of lead absorption.

Absorption depends on the form of the lead. Inhaled, airborne lead is almost totally absorbed, while ingested lead absorption rates may vary from 10% in adults to 50% in children and pregnant women. Lead is absorbed more efficiently from dust from sanded lead-based paint than from whole paint chips. The most dangerous exposure is to lead vapors (formed whenever lead is melted) or other respirable lead compounds. Absorbed lead is detectable in blood, soft tissue and bone. The half-life of lead varies from about a month in blood, 1-1.5 months in soft tissue, and about 25-30 years in bone.

For the purposes of these guidelines, persons with EBLLs are considered to have lead poisoning. Lead poisoning can affect both children and adults, although the effects may vary markedly with age. It is convenient, albeit somewhat artificial, to divide lead poisoning into an acute disease that relates to current BLLs, and a chronic disease that relates to the cumulative effects of body lead burden. In both cases, the most prominent signs and symptoms are neurological. Bear in mind that persons with very high BLLs (≥70 μg/dL in children, ≥100 in adults) should be treated as medical emergencies, regardless of overt symptoms. Ingestion of a metallic object that may contain lead can result in an EBLL within hours. Ingestion of any object that may contain lead should be treated as a medical emergency and treatment should include a blood lead test and abdominal x-ray.

B. Acute Disease
Acute exposure to lead generally means exposure for a short time, but at high levels. Blood lead levels increase quickly after an acute exposure. The most common symptom of acute lead poisoning is colicky abdominal pain evolving over days to weeks. Constipation, diarrhea, and nonspecific complaints of irritability, fatigue, weakness and muscle pain may also occur. These symptoms are seldom caused by BLLs less than 50 μg/dL. In more severe cases, warning signs of acute, serious brain swelling include vomiting, irritability, restlessness, tremors, and progressive drowsiness. These symptoms may herald the onset of seizures, coma, and possibly death. The BLLs associated with encephalopathy in children vary from study to study, but BLLs of 70-80 μg/dL or greater appear to indicate a serious risk.

C. Chronic Effects
Chronic lead exposure generally means exposure to low to moderate levels of lead over a long period of time. Recent studies suggest that lead absorption is harmful at any concentration and that no safe level of lead exposure exists. Relatively low blood lead levels rarely cause overt signs and symptoms, but such exposure can cause permanent damage—especially in young children—including decreased IQ, developmental delays and behavioral disturbances. In adults, late effects of chronic lead toxicity include chronic renal failure, hypertension, gout, and chronic encephalopathy.
2.3 Sources of Lead Exposure

A. Paint
Lead was used in common house paint until 1978 when the Consumer Product Safety Commission (CPSC) restricted the amount of lead in household paint. Many buildings built before 1978 have lead-based paint both inside and outside. Housing built before 1950 is at even greater risk of having lead-based paint, and having a higher concentration of lead in the paint. Lead paint in good condition poses little risk. Chipping, peeling or chalking lead paint is a common source of ingestible lead dust and may be a hazard.

B. Dust
Lead paint dust is the most common source of lead exposure for children. Lead in this form is much more easily absorbed. Interior house dust can become contaminated with lead as the result of the deterioration or disturbance of leaded paint, the tracking in of contaminated soil, and the fallout of airborne lead particulate from industrial or vehicular sources. Fine lead dust, and resulting contamination, can be created when painted surfaces rub against each other, such as where double hung windows slide up and down or when doors open and close. Lead in dust is increased after older paint has been disturbed through remodeling, renovation, paint preparation or repair.

C. Occupational Exposures and “Secondary Transmission”
While lead poisoning is not a communicable disease per se, household contacts of persons with occupational, vocational, or other exposures may risk secondary transmission to lead dust or other compounds brought home. Many occupations can expose a worker to lead. Some of the occupations that carry a potential for exposure to lead include remodeling/renovation, painting, building demolition, construction, battery recycling, radiator repair, and bridge construction. Individuals who work in a lead environment may bring lead dust into their car or home on their clothes and bodies, unintentionally exposing family members. Observation of good hygiene practices is important to avoid bringing lead dust into the home from the work place. These include washing or showering and changing out of work clothes/shoes before leaving for home or entering a vehicle.

D. Hobby Sources
Many hobbies use lead (e.g., making or handling lead shot/bullets, fishing weights/sinkers, toy soldiers, stained glass solder, ceramic glazing, etc.). Heating and melting lead is particularly dangerous because of the formation of lead vapor, so respirator use and adequate ventilation are essential to prevent exposure. Other hobbies that carry a potential for exposure to lead include home remodeling and painting, furniture refinishing, welding, auto or boat repair, and target shooting at firing ranges. Hobbyists can protect their families by keeping the hobby activity away from living areas and by showering or changing clothes/shoes before entering the home.

E. Folk Medicines and Cosmetics
Lead has been found in some traditional (folk or home remedies) medicines used by East Indian, Indian, Middle Eastern, West Asian, and Hispanic cultures. Lead and other heavy metals are put into certain folk medicines intentionally because these metals are thought to be useful in treating some ailments. Sometimes lead accidentally gets into the folk medicine during grinding, coloring, or other methods of preparation. Medications such as greta, alarcon, rueda and azarcon, used in the Latino
community for stomach ailments (empacho), or “pay-loo-ah,” similarly used by many Southeast Asians, may be as much as 90% lead by weight. Cosmetic products are a primary source of lead in Asian and Arab countries. Application of Kohl results in lead exposure primarily via hand-to-eye-to-mouth movement and subsequent ingestion of particles.

F. Tableware
Imported, old, handmade, or poorly glazed ceramic dishes and pottery may contain lead. Lead may additionally be present in leaded crystal, pewter and brass dishware. In these pieces, acid substances may interact chemically with the glaze and accelerate the lead release. Therefore, acidic foods (such as orange, tomato and other fruit juices, tomato sauces, wines, and vinegar) stored in improperly glazed containers are potentially the most dangerous. If it is unknown whether a particular tableware item contains lead, the item should not be used to store, cook or serve food or beverages.

G. Water
Most well or city water does not naturally contain lead. Lead in drinking water is an infrequent source of lead poisoning in Oregon. Lead leaches into drinking water from brass faucets, lead solder that connects the pipes, or lead pipes. Hot water is particularly corrosive and should not be used for drinking, cooking, or preparing infant formula. The cold-water tap should be flushed for several minutes each morning or after sitting until there is a noticeable change in temperature of the water before any water is consumed.

H. Soil
Soil may contain lead from deteriorating, exterior lead-based paint or deposition from years of leaded gasoline use or industrial emissions. Lead-contaminated soil can be tracked into the home. Children may come into contact with lead by playing in bare soil or from the soil on vegetables planted in the garden. In addition, individuals with pica may eat lead-contaminated soil.

I. Miscellaneous Sources
Use of lead solder in the processing of canned foods in the United States has been discontinued; therefore, lead in food has been dramatically reduced. Imported food products may still contain lead as some foreign manufacturers may use lead solder in cans. Food may also be contaminated with lead from the soil during the growing process. Lead has been found in some consumer candies imported from Mexico. Certain candy ingredients such as chili powder and tamarind may be a source of lead exposure. Lead sometimes gets into the candy when processes such as drying, storing, and grinding the ingredients are done improperly. Additionally, lead has been found in the wrappers of some imported candies. The ink of these plastic or paper wrappers may contain lead that leaches into the candy.

There continues to be an ever-increasing array of household products that contain lead, especially imported products. In recent years, lead has been found in vinyl miniblinds, curtain weights, calcium supplements, hair dyes, crayons, and children’s jewelry and toys. Ingestion of any object that may contain lead should be treated as a medical emergency and treatment should include a blood lead test and abdominal x-ray.
2.4 Occupational Exposures and OR-OSHA Involvement

OSHA standards govern occupational lead exposure in General Industry and Construction. These standards have very specific guidelines on blood lead monitoring of workers and provisions for removing workers from exposure when their average blood lead levels exceed 50 μg/dL. The OSHA is responsible for ensuring follow-up of EBLL in occupationally exposed adults and referral of cases to OR-OSHA as needed. Listings of firms with at least one employee having a BLL 10 μg/dL and above are provided to OR-OSHA on a quarterly basis.

3. TESTING METHODS AND CASE DEFINITIONS

3.1 Testing Methods

Blood lead testing is the only acceptable laboratory test for screening and confirming lead poisoning. Venipuncture is preferred for specimen collection, but capillary testing is acceptable if care is taken to properly clean and prepare the finger. Capillary samples are easier to contaminate because of the possibility of lead containing dust and dirt on the hand or under the fingernails. All capillary BLLs of 5 μg/dL (children or pregnant women) or higher must be followed with a confirmatory venous test. Several tests have been found to be insensitive and/or imprecise as screening tests for lead, and are not recommended. These include: erythrocyte protoporphyrin (EP) measured as either free erythrocyte protoporphyrin (FEP) or zinc protoporphyrin (ZPP); basophilic stippling; urine testing; and assays of hair or fingernail lead levels.

3.2 Case Definitions

A. Childhood Reference Value

Child (< 18 years): ≥ 5 μg/dL

In 2010, the Centers for Disease Control and Prevention (CDC) Advisory Committee on Childhood Lead Poisoning Prevention (ACCLPP) established a workgroup to redefine the level at which children are considered to have EBLLs. In 1991, CDC defined BLLs of ≥10 μg/dL as the “level of concern” for children aged 1-5 years. Based on a growing body of studies of adverse health effects with BLLs <10 μg/dL, ACCLPP recommended that the term “level of concern” be replaced with a reference value. The reference value is based on the 97.5th percentile of BLLs in U.S. children aged 1-5 years from two consecutive cycles of the National Health and Nutrition Examination Survey (NHANES). The current upper reference interval value of the 97.5th percentile is 5μg/dL. On May 13, 2012, CDC accepted the ACLPPP recommendations and adopted the reference value of ≥5 μg/dL.

B. Pregnancy

Pregnant and Lactating Women: ≥ 5 μg/dL

C. Public Health Action Level (based on local resources)

Child (< 18 years): ≥ 10 μg/dL
Adult (≥ 18 years): ≥ 25 μg/dL
D. Surveillance

Child (<18 years): All BLLs
Adult (≥ 18 years): ≥ 10 μg/dL

4. SCREENING SCHEDULES AND MEDICAL MANAGEMENT

4.1 Overview
The goal of lead screening is to identify individuals who have been exposed to lead, provide appropriate interventions and reduce the risk of exposure. If an EBLL is detected, the nature of care and the frequency of follow-up testing vary with the patient’s age and BLL. Whatever the age, individuals with EBLLs (or their caregiver) should be educated about what lead poisoning is and what they can do about it. The single most important factor in managing lead poisoning is identifying and reducing exposure to lead. A variety of culturally appropriate educational pamphlets are available; they should be sent to the family or individual identified as having an EBLL.

4.2 Anticipatory Guidance
Anticipatory guidance regarding lead hazard identification and risk reduction measures should be a routine part of an ongoing educational approach for pregnant women, children and their families. Medical providers should provide source identification and risk reduction educational materials. There is no safe level of lead and the majority of children and adults in the U.S. have blood lead levels less than 2 μg/dL. Individuals should reduce lead exposure and maintain the lowest possible blood lead level.

Lead exposure during pregnancy is especially problematic as lead can cross the placenta and interfere with normal development of the fetal brain. Pregnant women can be exposed to lead through all of the sources described previously. Pregnant or women likely to become pregnant should try to avoid exposure and maintain lead levels below 5 μg/dL and as low as possible. Anticipatory guidance should focus on decreasing the risk of exposure to lead by advising against activities such as remodeling or repainting the baby’s room or restoring old furniture. Women exposed occupationally may need special counseling.

4.3 Screening Protocols for Children
All children should be assessed for risk of lead poisoning by administration of the Oregon Lead Risk Assessment Questionnaire (see below). This questionnaire should be administrated at 1 and 2 years of age and between 3 and 5 years of age if not previously screened. If the answer to any question is “Yes” or “Don’t know” a blood lead test should be performed. Follow-up questions may be needed to clarify responses.

- Has your child lived in or regularly visited a home, child care or other building built before 1950?
- Has your child lived in or regularly visited a home, child care or other building built before 1978 with recent or ongoing painting, repair and/or remodeling?
- Is your child enrolled in or attending a Head Start program?
Does your child have a brother, sister, other relative, housemate or playmate with lead poisoning?

Does your child spend time with anyone that has a job or hobby where they may work with lead? Examples: painting, remodeling, auto radiators, batteries, auto repair, soldering, making sinkers, bullets, stained glass, pottery, going to shooting ranges, hunting or fishing.

Do you have pottery or ceramics made in other countries or lead crystal or pewter that are used for cooking, storing or serving food or drink?

Has your child ever taken any traditional home remedies or used imported cosmetics? Examples: Azarcon, Alarcon, Greta, Rueda, Pay-loo-ah, or Kohl

Has your child been adopted from, lived in or visited another country?

Do you have concerns about your child’s development or behavior?

4.4 Screening Protocols for Pregnant and Breastfeeding Women

The purpose of screening pregnant women is to identify women exposed to lead who can benefit from the knowledge of their lead exposure and prevent additional exposure or adverse effects to themselves or their fetuses. Identifying maternal lead exposure prior to conception or early in the pregnancy offers the most benefit to the fetus. The following questionnaire should be administrated at the earliest contact with the patient. If the answer to any question is “Yes” or “Don’t know” a blood lead test should be performed. Follow-up questions may be needed to clarify responses.

Do you live in a house or apartment building built before 1978 with recent or ongoing remodeling, repairs or painting?

Do you or anyone in your household have a job that may involve lead?

Do you or anyone in your household have a hobby or activity that may involve lead?

Have you recently eaten or chewed crushed potter, soil, paint chips, clay, or other things that are not food?

Do you have pottery or ceramics made in other countries or leaded crystal or pewter that are used for cooking, storing or serving food or drink?

Have you recently taken any traditional home remedies or used imported cosmetics such as kohl?

Have you recently lived in or visited another country?

4.5 Diagnostic Blood Lead Testing

Blood lead testing should also be considered as part of a diagnostic work-up of any individual regardless of age with the following symptoms:

Behavioral problems (applies to children): aggression, hyperactivity, attention deficit, school problems, learning disabilities, excessive mouthing or pica behavior and other behavior disorders.
Developmental problems (applies to children): growth, speech and language delays and/or hearing loss.

Symptoms or signs consistent with lead poisoning: irritability, headaches, vomiting, seizures or other neurological symptoms, anemia, loss of appetite, abdominal pain/cramping or constipation.

Ingestion of foreign body.

4.6 Follow-up for Elevated Blood Lead Results

A. Childhood Cases

Any capillary screening BLL above 5 μg/dL must be confirmed with a venous sample. The higher the BLL on the capillary test, the more urgent the need for venous confirmatory testing. Exception to confirmatory testing schedule: If recent known exposure (e.g. foreign body ingestion, recent remodeling) confirm as soon as possible for all blood lead levels.

Table 3 is to be used as guidance. Case managers and clinicians should consider individual patient characteristics and caregiver capabilities and adjust the frequency of follow-up tests accordingly.

Table 3. Follow-up Schedule for Childhood Blood Lead Results

<table>
<thead>
<tr>
<th>BLL (μg/dL)</th>
<th>Confirmation Testing (venous)</th>
<th>Follow-Up Testing (venous)</th>
<th>Case-Management</th>
</tr>
</thead>
</table>
| 5-9        | 1-3 months                    | 3 months                  | Clinician case management:  
|            |                               |                           | • Perform confirmatory testing. Confirm recent known exposure as soon as possible.  
|            |                               |                           | • Assist family in identifying possible lead exposure source.  
|            |                               |                           | • Provide risk reduction education and refer to housing remediation services if applicable and/or available.  
|            |                               |                           | • Provide nutritional education and refer to WIC as needed. If WIC enrolled, notify local WIC program of EBLL for nutritional assessment.  
|            |                               |                           | • Ensure follow up testing.  
|            |                               |                           | • Include history of EBLL in problem list of child’s permanent medical record.  
|            |                               |                           | • Conduct neurodevelopmental monitoring.  
|            |                               |                           | • See CDC guidelines for more medical management recommendations.  
| 10-19      | 1 month                       | 3 months                  | Clinician case management: ALL OF THE ABOVE.  
| LPHA case management: As local resources allow.  
|            |                               |                           | • Send letter to caregiver confirming child’s BLL.  
|            |                               |                           | • Complete environmental questionnaire over phone or perform on-site investigation to determine possible lead hazards.  
|            |                               |                           | • Take environmental samples as needed and resources allow.  
|            |                               |                           | • Send environmental sampling results and copy of questionnaire to clinician.  
|            |                               |                           | • Refer family to lead hazard control services if applicable and/or available.  
|            |                               |                           | • Refer family to WIC, social services, public assistance and early intervention as needed.  

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<table>
<thead>
<tr>
<th>BLL (µg/dL)</th>
<th>Confirmation Testing (venous)</th>
<th>Follow-Up Testing (venous)</th>
<th>Case-Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-44</td>
<td>7 days</td>
<td>1 month</td>
<td>ALL OF THE ABOVE, PLUS: Children with BLLs &gt; 20 µg/dL should have a complete physical exam.</td>
</tr>
<tr>
<td>45-59</td>
<td>2 days</td>
<td>Chelation with subsequent follow-up.</td>
<td>Above actions plus chelation therapy. Follow-up testing schedule determined by medical provider.</td>
</tr>
<tr>
<td>60-69</td>
<td>1 day</td>
<td>Chelation with subsequent follow-up.</td>
<td>Above actions plus chelation therapy. Follow-up testing schedule determined by medical provider.</td>
</tr>
<tr>
<td>&gt;70</td>
<td>Immediately as an emergency lab test</td>
<td>Chelation with subsequent follow-up.</td>
<td>Above actions, plus hospitalize child for chelation therapy immediately. Follow-up testing schedule determined by medical provider. The child should not be permitted to return to any environment that would expose him/her to lead.</td>
</tr>
</tbody>
</table>

B. Adult Cases

- **25-49 µg /dL**
  
  OHA will interview the patient’s physician (OHA 44-2) to obtain suspected source of exposure and determine if other household members, especially children and pregnant women, are also being exposed. If exposure source is non-occupational OHA will complete the Adult Lead Case Interview form (OHA 44-3). Educational materials will be provided to patient.

- **50 µg /dL**
  
  Same actions, plus: If occupational exposure, worker should be transferred to a job that does not expose the employee to lead.

- **60 µg/dL**
  
  BLLs at this level should be considered urgent. The Oregon Poison Center (1-800-222-1222) is a referral source for physicians requesting advice on treatment of adults. The greatest concern with adult cases is determining the source of exposure and determining whether other individuals are at risk from the same lead source.

5. MANAGING SPECIAL SITUATIONS

5.1 Lead exposure during pregnancy

Lead exposure during pregnancy is especially problematic, since lead can cross the placenta and interfere with normal development of the fetal brain. High levels of lead during pregnancy can also cause miscarriage, stillbirth, low infant birth weight and premature delivery. Pregnant women can be exposed to lead through all of the sources described previously. Because lead is stored in bone, women who have worked or been exposed to lead in the past may have higher lead levels because lead can be released into the blood during pregnancy. Pregnant or women likely to become
pregnant should try to avoid exposure and maintain lead levels below 5 μg/dL and as low as possible. Guidance for pregnant women should focus on proper nutrition, sources of lead exposure and ways to reduce exposure before and during pregnancy. Risk factors such as pica, poor nutrition, county of origin, immigrant status, hobbies and occupations should be discussed. Women exposed occupationally may need special risk-reduction counseling. For more information on lead exposure during pregnancy and breast-feeding see CDC’s Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women at http://www.cdc.gov/nceh/lead/publications/LeadandPregnancy2010.pdf

Table 4: Follow-up Schedule for Elevated Blood Lead Results during Pregnancy (See CDC guidelines for medical management of lead exposure in lactating women, neonates and infants)

<table>
<thead>
<tr>
<th>Venous BLL (μg/dL)</th>
<th>Clinician Case-Management</th>
</tr>
</thead>
</table>
| 5-14              | • Attempt to determine lead exposure source and counsel on avoiding further exposure, including pica behavior.  
• Provide risk reduction education and refer to housing remediation services if applicable and/or available.  
• Assess nutritional adequacy and counsel on eating a balanced diet with adequate iron and calcium intake. Refer to WIC as needed.  
• For occupationally exposed women, discuss personal protective equipment and consider contacting the employer to encourage reducing exposure.  
• Ensure follow up testing as recommended in CDC guidance.  
• See CDC’s Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women for more recommendations. |
| 10-14             | ALL OF THE ABOVE, PLUS:  
• Refer occupationally exposed women to occupational medicine specialist and remove from workplace lead exposure. |
| 15-44             | ALL OF THE ABOVE, PLUS:  
• Support environmental sampling and refer to housing remediation services if applicable and/or available. |
| >45               | ALL OF THE ABOVE, PLUS:  
• Treat as high-risk pregnancy and consult with an expert in lead poisoning on chelation and other treatment decisions. |

5.2 Chelation therapy

Chelating agents solubilize lead, depleting it from soft and hard tissue and thereby reducing its acute toxicity. While chelation therapy is considered a mainstay in the medical management of children with BLLs >45 μg/dL, it should be used with caution. Treatment with chelating agents lowers BLLs, but does not improve scores on tests of cognition, behavior, or neuropsychological functions except in patients with extremely high BLLs. Primary care providers (PCP) should consult with the OHA Lead Poisoning Prevention Program or Oregon Poison Center prior to using chelating agents. In the short term, chelation can redistribute body lead, causing an increase in lead concentrations in soft tissue, including the brain. Some chelators may remove essential minerals, such as calcium, iron, zinc, copper and other trace minerals, as well as lead. There is general agreement that individuals with very high BLLs (in children > 45 μg/dL; in adult >100 μg/dL) should be chelated. Patients with lower BLLs (children <25 μg/dL; adults <65 μg/dL) are usually not
chelated unless symptomatic and/or unresponsive to removal from exposure. For patients with in-between BLLs, chelation may or may not be appropriate.

6. CASE CLOSURE (APPLIES TO CHILD CASES ONLY)

6.1 Laboratory case closure
Child’s BLL has declined to below 5 μg/dL on two consecutive tests at least three months apart.

6.2 Administrative case closure
Child is lost to follow-up. If child/family moves out of state, please notify the Lead Poisoning Prevention Program so they can notify the health department in the state where the child has relocated. The case can also be closed if the medical provider or family does not plan on further follow-up testing. There should be at least three documented attempts to contact the family, whether by phone or letters. If possible, the last attempt to reach family should be through certified mail.

REFERENCES


RESOURCES

1. Oregon Lead Poisoning Prevention Program at www.healthoregon.org/lead
2. CDC Guidelines for Identification and Management of Lead Exposure: www.cdc.gov/nceh/lead
3. Northwest Pediatric Environmental Health Specialty Unit (PEHSU) for written guidance and clinician consultation: http://depts.washington.edu/pehsu/index or 1-877-KID-CHEM.

UPDATE LOG

July 2011: Updated to reflect Oregon Health Authority. Updated to reflect change in adult surveillance case definition.

June 2013: Updated to reflect new CDC guidance on childhood lead reference value. Updated with additional information from CDC’s guidance for lead exposure in pregnant and lactating women.