Preventing and Testing for Childhood Lead Poisoning

A Reference Guide for Physicians and Health Care Providers

If you need more information, call

Illinois Department of Public Health
Illinois Lead Program
866-909-3572 or 217-782-3517
TTY (hearing impaired use only) 800-547-0466
Guidelines for Illinois Physicians and Health Care Providers

December 2015

Illinois Department of Public Health
Illinois Lead Program
525 W. Jefferson St., Third Floor
Springfield, IL 62761
217-782-3517

The Illinois Department of Public Health is providing you with these recommendations for lead risk evaluation and blood lead testing. This document summarizes key guidelines and directs you to more detailed sources of information and related agencies.

Several dedicated pediatricians, child advocates and local health department staff participated in the development of this document. Their various backgrounds and interest in protecting Illinois children from the harmful effects of lead poisoning helped immensely with the development of this reference guide. Their input was vital and should help physicians and child advocates who treat young children.

WHO CAN I CONTACT FOR MORE INFORMATION?

Illinois Lead Program
Lead Education Materials, Parental Handouts, Physician Guidelines, Childhood Blood Lead Test Reporting
217-782-3517
www.dph.illinois.gov/topics-services/environmental-health-protection/lead-poisoning-prevention

Illinois Department of Public Health
Information and Referral Hotline
866-909-3572
TTY (Hearing impaired use only)
800-547-0466

State Laboratory – Springfield
217-782-6562

Lead Abatement Program
For information about licensed lead inspectors or lead abatement contractors, or about abatement/remediation funds
217-782-3517

Chicago Department of Public Health
Childhood Lead Poisoning Prevention Program
312-747-LEAD, 312-746-7810 or 312-746-7820
www.cityofchicago.org/health
OTHER LEAD POISONING RESOURCES
5. The Centers for Disease Control and Prevention, Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention: Appropriate level at which to initiate chelation therapy. www.cdc.gov/nceh/lead/casemanagement/caseManage_main.htm
10. Lead Safe Illinois For information about legal services and lead information. www.leadsafeillinois.org/
11. National Lead Information Center — www.epa.gov/lead
12. Alliance to End Childhood Lead Poisoning www.nchh.org/Portals/0/Contents/Another_Link_in_Chain.pdf

TABLE OF CONTENTS

The Risk of Lead Poisoning in Illinois Children ............................................ 1
Children at Highest Risk ........................................................................... 1
Medical Evaluation and Management for Pregnant Women .................... 2
Transfer of Maternal Lead to the Fetus and Infant .................................... 4
Newborn of a Lead-Bearing Mother ......................................................... 4
Major Sources of Lead Poisoning ............................................................. 5
Effects of Lead ...................................................................................... 5
Acute Symptoms of Lead Poisoning ......................................................... 6
Under Illinois Law You Must Conduct Blood Lead Tests and Risk Evaluations, as Appropriate ................................................................. 6
Which Children are Required by Law to Have Blood Lead Tests? .......... 7
Which Children Should be Evaluated Using the Childhood Lead Risk Questionnaire? ................................................................. 7
Testing Commendations for International Adoptee Children ................. 7
Testing Recommendations for Refugee Children ..................................... 8
Blood Lead Sample Collection ............................................................... 8
Follow-Up Blood Lead Testing ............................................................... 8
Reporting Obligations ......................................................................... 10
Public Health Follow-Up Services ........................................................ 10
Children Need Proof of a Blood Lead Test or Risk Evaluation Before Admission to a Child Care Facility or School ............................................... 11
Management of Children with Blood Lead Levels ≤10 Mg/Dl .................. 11
Preventive Counseling Should Focus on: .............................................. 11
Management of Elevated Blood Lead Levels ......................................... 12
Treatment Recommendations Vary by Child’s Blood Lead Level .......... 13
Treatments by Blood Lead Level ......................................................... 14
Chelation Cautions ............................................................................. 16
Resources ......................................................................................... 18 - 28
THE RISK OF LEAD POISONING IN ILLINOIS CHILDREN

Childhood lead poisoning is a preventable environmental health problem. Each year thousands of children continue to be exposed to lead from various sources. However, leaded paint remains the major source of exposure for children, and still exists in 75% of Illinois’ older housing.

In Illinois, approximately 300,000 blood lead tests are conducted annually by local health departments, pediatric, family medicine and other health providers. Approximately 2,500 Illinois children have been determined to have a blood lead level (BLL) ≥10 µg/dL and are receiving case management services from IDPH nurses or delegate agency staff.

CHILDREN AT HIGHEST RISK

Research has determined that lead poisoning is not equally distributed among children in the United States. High-risk populations include:

- **Young children and those with persistent oral behaviors.**
  The most common way for children to get lead into their body is by ingesting it. Frequent hand exposures to surfaces with lead-containing dust (e.g., crawling on the floor, playing at a window) and oral behaviors promote lead ingestion.

- **Children residing in older homes.**
  Nationally, an estimated 22 percent of U.S. children six years of age and younger, live in a home where there is a lead hazard (defined as lead in an accessible condition, such as deteriorated lead-containing paint, or lead-contaminated dust or dirt). Of homes built before 1940, an estimated 68 percent have a lead hazard; 43 percent of homes built between 1940 and 1959 have a lead hazard. Rental units where low-income families and young children reside are most likely to have a lead hazard.
    - In Illinois, 23 percent of homes were built before 1940 and 24 percent were built between 1940 and 1959.
    - In Chicago, 38 percent of homes were built before 1940 and 31 percent were built between 1940 and 1959.

- **Children in low-income households**
  Based on 2014 Illinois childhood blood lead information, approximately, 1 in 100 Illinois children tested, aged 12 to 72 months and enrolled in Medicaid/All Kids, had a BLL ≥10 µg/dL and 1 in 15 of these children had a BLL ≥5 µg/dL.

- **Children with low iron**
  Absorption of lead increases in the low-iron state. Iron deficient children can absorb up to about 50 percent of the lead they ingest.
• **Newborn of Lead-bearing mother**
  If a child is born to a woman with a known elevated blood lead level, (EBLL) the infant’s BLL is expected to be that of the mother.

• **Racial disparity** in lead poisoning has narrowed across the years. Still, in Illinois, African-American children are 1.5 times more likely to have an EBLL compared to white children.4

### MEDICAL EVALUATION AND MANAGEMENT FOR PREGNANT WOMEN

Blood lead testing of all pregnant women in the United States is not recommended. However, the Centers for Disease Control and Prevention (CDC) recommends that pregnant women be evaluated for risk for lead exposures. Those having a risk factor for lead exposure should have blood lead measured when initiating prenatal care. IDPH has developed a questionnaire, Prenatal-risk Evaluation for Lead Exposure, for evaluation of pre-natal lead risk exposure to help identify pregnant women in need of blood lead testing, see Appendix A. If the pregnant woman answers “yes” to any of the questions, she is at risk for lead exposure and a venous blood lead test should be performed.

Pregnant women at highest risk for having an EBLL include: exposure to lead contaminated dust during renovation/repair work in pre-1978 housing; workers in several high-risk occupations; foreign-born recent immigrants; and those practicing high-risk behaviors, such as pica. Because lead persists for years in the body, the lead exposures may have occurred before pregnancy.

CDC’s Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women discusses strategies for the provision of medical care for pregnant women having a BLL at or greater than 5 µg/dL and public health actions to reduce lead exposures for pregnant women who have a BLL at or greater than 10 µg/dL. Effective January 2015, IDPH’s Lead Program provided services to pregnant women who have a venous BLL at or greater than 10 µg/dL. Services include an environmental assessment to identify and reduce lead exposures, education on applying recommended nutritional practices, recommendations about breastfeeding and infant follow-up care.

Medical management strategies include counseling about lead avoidance, nutritional assessment and follow-up blood lead testing. Nutritional strategies can act as a protective mechanism to reduce lead absorption.

Pregnant women with confirmed BLLs at or greater than 45 µg/dL should be considered as high-risk pregnancies and their cases should be managed in consultation with experts in lead poisoning and high-risk pregnancy.

Chelation therapy should be considered for pregnant women with confirmed BLLs at or greater than 45 µg/dL on a case-by-case basis, in consultation with an expert in lead poisoning.
### Table 1: Frequency of Maternal Blood Lead Follow-up Testing During Pregnancy and Actions for Lead Management Care of Pregnant Women

<table>
<thead>
<tr>
<th>Blood Lead Level µg/dL</th>
<th>Actions for Care of Pregnant Women</th>
<th>Time Frame for Follow-up Blood Lead Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 µg/dL</td>
<td>• Provide anticipatory guidance and health education materials</td>
<td>• No follow-up testing needed</td>
</tr>
</tbody>
</table>
| 5 – 9 µg/dL            | • Provide anticipatory guidance and health education materials  
|                        | • Communicate with parent/guardian to attempt to determine source of lead exposure  
|                        | – If occupational exposure, review proper use of personal protective equipment and consider contacting employer  
|                        | • Assess nutritional adequacy and provide nutritional management, as needed                                                                                                                                                    | • Within 1 month, obtain a maternal BLL or cord BLL at delivery                                                |
| 10 – 14 µg/dL          | • Above actions  
|                        | • Notify health department  
|                        | • Refer for environmental investigation and control current lead hazards  
|                        | • Refer occupationally exposed women to occupational medicine specialists  
|                        | • Recommend removal from occupational exposure                                                                                                                                                                                    | • Within 1 month, obtain a maternal BLL or cord BLL at delivery                                                |
| 15 – 24 µg/dL          | • Above actions                                                                                                                                                                                                                     | • Within 1 month and then every 2 - 3 months, obtain a maternal BLL or cord BLL at delivery.  
|                        |                                                                                                                                                                                                                                   | • More frequent testing may be indicated based on risk factor history.                                          |
| 25 – 44 µg/dL          | • Above actions                                                                                                                                                                                                                     | • Within 1 – 4 weeks and then every month, obtain a maternal BLL or cord BLL at delivery.                      |

### WEB LINKS TO LAW

**Illinois Lead Poisoning Prevention Act**
Illinois Compiled Statutes, Public Health, 410 ILCS 45/  

**Illinois Administrative Code, Title 77, Part 845, Lead Poisoning Prevention Code**
www.ilga.gov/commission/jcar/admincode/077/07700845sections.html

**Testing Requirements**
www.ilga.gov/commission/jcar/admincode/077/077008450B00550R.html

**Proof of Blood Lead Testing (paragraph d)**
www.ilga.gov/commission/jcar/admincode/077/077008450B00550R.html

**Illinois Department of Public Health Childhood Lead Risk Questionnaire, ZIP codes, and Guidelines**
www.dph.illinois.gov/sites/default/files/forms/formsohpchildhood-lead-risk-questionnaire.pdf

**Reporting Requirements**
www.ilga.gov/commission/jcar/admincode/077/077008450B00600R.html
APPENDIX D
ILLINOIS CHILDHOOD LEAD POISONING EVALUATION AND TESTING ALGORITHM

Child presents for a Well Child Visit between the ages of 6 and 84 months

Has the Child had a previous BLL?

<table>
<thead>
<tr>
<th>NO</th>
<th>YES</th>
</tr>
</thead>
</table>

One previous BLL <10 µg/dL

Two previous BLLs <10 µg/dL with no change in status of housing or potential exposure since last testing

Previous BLL ≥ 10 µg/dL

Does the child live in a high risk ZIP code? (See reverse of questionnaire for listing of high risk ZIP codes) or (see pages 20 and 21)

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
</table>

Complete the Childhood Lead Risk Questionnaire (to be used particularly at ages 1 and 2 years, and to evaluate changes in lead exposures for older children) (see page 22)

ONE OR MORE POSITIVE RESPONSES

Perform capillary or venous testing for BLL

Re-evaluate at the next Well Child Visit

<10 µg/dL

10-19 µg/dL

Follow up with venous test within 3 months (or sooner if there is concern for increasing BLL or the child is less than 1 year old)

20-44 µg/dL

Follow up with venous test within 1 week – 1 month

45-59 µg/dL

Follow up with venous test within 48 hours

60-69 µg/dL

Follow up with venous test within 24 hours

≥70 µg/dL

Do venous testing immediately

Blood Lead Level µg/dL | Actions for Care of Pregnant Women | Time Frame for Follow-up Blood Lead Tests
---|---|---
45 – 69 µg/dL | • Above actions • Treat as high-risk pregnancy • Consider chelation therapy: Consult with an expert in lead poisoning | • Within 24 hours and then at frequent intervals depending on clinical interventions and trend in BLLs. • Consultation with a clinician experienced in the management of pregnant women with BLLs in this range is strongly advised. Obtain a maternal BLL or cord BLL at delivery. |
≥70 µg/dL | • Medical emergency • Chelation therapy • Above actions | Above actions

Source: Centers for Disease Control and Prevention, Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women

TRANSFER OF MATERNAL LEAD TO THE FETUS AND INFANT

Lead is transferred to the fetus during pregnancy and to the infant through breast milk. Adequate calcium intake during both pregnancy and lactation reduces maternal circulating lead somewhat (by about 10 percent) and, thus, can reduce transfer. Breastfeeding has many beneficial effects, and it should be encouraged unless the mother’s BLL is ≥40 µg/dL.

Table 2: Action for Lactating Women

<table>
<thead>
<tr>
<th>BLL µg/dL</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 39 µg/dL</td>
<td>• Breastfeeding should be encouraged</td>
</tr>
<tr>
<td>5 – 39 µg/dL</td>
<td>• Breastfeeding may be continued if infants BLLs are monitored</td>
</tr>
<tr>
<td>≥40 µg/dL</td>
<td>• Lactation should be continued, but breast milk should be pumped and discarded until BLLs &lt;40 µg/dL</td>
</tr>
</tbody>
</table>

Source: Centers for Disease Control and Prevention, Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women

NEWBORN OF A LEAD-BEARING MOTHER

If a child is born to a woman with known EBLL, the BLL of the newborn should be monitored closely. An infant’s BLL is expected to be equal to that of the mother. If the BLL of the infant is ≥10 µg/dL, appropriate case management activities should take place.

While outreach, education and primary prevention are most important in identified high-risk locations, they can be beneficial to all communities, regardless of risk factor.
EFFECTS OF LEAD

No safe level of lead has been identified for children. Lead damages the developing brain and nervous system, leading to:

- Reduced cognitive potential and increased learning disabilities;
- Higher risk for behavior problems, including aggression and hyperactivity;
- Interference with red blood cell formation leading to anemia (at BLL ≥40 µg/dL); and
- In its most advanced stages, seizures, coma and sometimes death.

*MAJOR SOURCES OF LEAD POISONING*

- Lead-based paint and lead-contaminated-dust in older homes
- Unsafe renovation or remodeling practices causing lead-contaminated dust (likely with scraping or sanding of paint containing lead)
- Outdoor exposures to soil or track-in of soil contaminated with lead (from past exterior paint deterioration, past use of leaded gasoline, deposition from past industrial emissions or industrial contamination)
- Specialty foods, such as imported Mexican candies and spices from various countries
- Imported food cans with lead solder seams (production banned in United States)
- Some traditional medicines or cosmetics
- Pottery with glazes containing lead
- Parental hobbies or occupations that involve exposures to lead
- Toys, oral piercings, jewelry or other objects containing lead (medical provider judgment on a case-by-case basis)
- Water contamination from the corrosion of lead solder, pipes or fixtures. (On average, drinking water contributes to low levels of lead exposure and may be minimized by flushing waterlines, using cold water or using water filters. You may consult Environmental Protection Agency Safe Drinking Water Hotline, 1-800-426-4791, for more information). You may obtain a fact sheet on the various sources of lead poisoning including specific hobbies and occupations by contacting the Illinois Lead Program.

APPENDIX C

**Childhood Lead Risk Questionnaire**

ALL CHILDREN 6 MONTHS THROUGH 6 YEARS OF AGE MUST BE EVALUATED FOR LEAD POISONING

(410 ILCS 45/6.2)

A blood lead test should be performed on children:
- with any "Yes" or "Don’t Know" response
- living in a high-risk ZIP code area
- all Medicaid-eligible children should have a blood lead test prior to 12 months of age and 24 months of age. If a Medicaid-eligible child between 36 months and 72 months of age has not been previously tested, a blood lead test should be performed.

If responses to all the questions are "No":
- re-evaluate at every well child visit or more often if deemed necessary

<table>
<thead>
<tr>
<th>Child's name</th>
<th>Response</th>
<th>Today's date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Birthday</td>
<td>ZIP Code</td>
</tr>
</tbody>
</table>

Respond to the following questions by circling the appropriate answer.  

1. Is this child eligible for or enrolled in Medicaid, Head Start, All Kids or WIC?   
   Yes   No   Don’t Know

2. Does this child have a sibling with a blood lead level of 10 mcg/dL or higher?   
   Yes   No   Don’t Know

3. Does this child live in or regularly visit a home built before 1978?   
   Yes   No   Don’t Know

4. In the past year, has this child been exposed to repairs, repainting or renovation of a home built before 1978?   
   Yes   No   Don’t Know

5. Is this child a refugee or an adoptee from any foreign country?   
   Yes   No   Don’t Know

6. Has this child ever been to Mexico, Central or South America, Asian countries (i.e., China or India), or any country where exposure to lead from certain items could have occurred (for example, cosmetics, home remedies, folk medicines or glazed pottery)?   
   Yes   No   Don’t Know

7. Does this child live with someone who has a job or a hobby that may involve lead (for example, jewelry making, building renovation or repair, bridge construction, plumbing, furniture refinishing, or work with automobile batteries or radiators, lead solder, leaded glass, lead shots, bullets or lead fishing sinkers)?   
   Yes   No   Don’t Know

8. At any time, has this child lived near a factory where lead is used (for example, a lead smelter or a paint factory)?   
   Yes   No   Don’t Know

9. Does this child reside in a high-risk ZIP code area? (see reverse side of page for list)   
   Yes   No   Don’t Know

If there is any "Yes" or "Don’t Know" response; and
- the child has proof of two consecutive blood lead test results (documented below) that are each less than 10 mcg/dL (with one test at age 2 or older), and
- there has been no change in the child’s living conditions, a blood lead test is not needed at this time.

Test 1: Blood Lead Result _____mcg/dL Date __________

Test 2: Blood Lead Result _____mcg/dL Date __________

Signature of Doctor/Nurse                                Date

Illinois Lead Program
866-809-3572 or 217-782-3517
TTY (hearing impaired use only) 800-547-0466

Printed by Authority of the State of Illinois
APPENDIX B (continued)

PEDIATRIC LEAD POISONING HIGH-RISK ZIP CODE AREAS

|----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|

ACUTE SYMPTOMS OF LEAD POISONING

Despite experiencing the effects of lead on behavior and development, most children with EBLLs have no obvious acute symptoms. Symptoms of severe lead poisoning may include:

- Irritability
- Headaches
- Vomiting
- Seizures
- Anemia/fatigue
- Loss of appetite and/or weight loss
- Stomachaches and cramping/constipation

Because these symptoms are not specific to lead poisoning, blood lead testing is the only effective way to detect lead poisoning.

UNDER ILLINOIS LAW YOU MUST CONDUCT BLOOD LEAD TESTS AND RISK EVALUATIONS, AS APPROPRIATE

IDPH has identified ZIP code areas in which children have an increased risk for exposure to lead due to higher percentages of older homes and low-income families (see Appendix B). Illinois law mandates that every physician and health care provider must obtain a blood lead measurement on children living in high-risk ZIP code areas. Children living in low risk ZIP code areas must be evaluated using the Childhood Lead Risk Questionnaire (see Appendix C) and those deemed at risk through the evaluation process must receive blood lead testing as described below. (Refer to page 24 for web link to the Act). (See Appendix D, Evaluation and Testing Algorithm on page 23).
WHICH CHILDREN ARE REQUIRED BY LAW TO HAVE BLOOD LEAD TESTS?

1. CHILDREN ELIGIBLE FOR MEDICAID OR ALL KIDS HEALTH INSURANCE are required to have a blood lead test prior to one and two years of age. If a child presents at ages one and two years with an unknown blood lead status, a BLL is required. For children ages three through six years, with unknown blood lead test status or increased lead exposure, a BLL is required.

2. CHILDREN LIVING IN HIGH-RISK ZIP CODE AREAS (REGARDLESS OF THEIR ELIGIBILITY FOR MEDICAID/ALL KIDS) are required to have a blood lead test at ages one and two years. If a child presents at ages one and two years with unknown blood lead status, a BLL is required. For children ages three through six years, with an unknown blood lead status or increased lead exposure, a BLL is required.

3. ALL CHICAGO CHILDREN ARE CONSIDERED TO LIVE IN A HIGH RISK ZIP CODE. A blood lead test should be performed. Lead evaluation and testing guidelines may differ for the city of Chicago. For current information for the Chicago Department of Public Health you may access their Web site at www.cityofchicago.org/health.

WHICH CHILDREN SHOULD BE EVALUATED USING THE CHILDHOOD LEAD RISK QUESTIONNAIRE?

1. EVALUATION OF CHILDREN LIVING IN LOW-RISK ZIP CODE AREAS should start by using the Illinois Childhood Lead Risk Questionnaire, which has been developed to determine the need for blood lead testing at ages one and two years and to evaluate changes in exposures to lead for older children. (Available by visiting the IDPH website at www.dph.illinois.gov)

2. CHILDREN WITH ANY QUESTIONNAIRE RESPONSE answered “YES” or “DON’T KNOW,” need a blood lead test at approximately ages one or two years. If past blood lead tests are known and are <10 µg/dL, additional blood lead testing at ages three and older is not needed unless risk for exposure to lead has increased.

TESTING COMMENDATIONS FOR INTERNATIONAL ADOPTEE CHILDREN

These children should have a blood lead test upon entering the United States. (Additional testing and medical care related to blood lead results should adhere to state and local policies and laws, as above).
**How do I identify pregnant women in need of blood lead testing?**

The CDC has recommended that pregnant women routinely be evaluated for risk for lead exposures. Those having a risk factor for lead exposure should have blood lead measured when initiating prenatal care. IDPH has developed a questionnaire for evaluation of pre-natal lead risk exposure to help identify pregnant women in need of blood lead testing.

**What blood lead level is considered “elevated” in a pregnant woman?**

The CDC has published recommended strategies of medical care for pregnant women having a BLL at or above 5 µg/dL and public health actions to reduce lead exposures for pregnant women who have a BLL at or above 10 µg/dL. National surveys indicate that about 1% of U.S. women of child-bearing age have a BLL at or above 5 µg/dL and 0.3% have a BLL at or above 10 µg/dL.

**How do I provide care for pregnant women who have a BLL at or above 5 µg/dL?**


**How will the IDPH Lead Program help me manage lead exposures for a pregnant woman with a BLL at or above 10 µg/dL?**

Effective January 2015, the Illinois Department of Public Health Lead Program will provide services to pregnant women who have a BLL at or above 10 µg/dL. Services IDPH will provide will include an environmental assessment to identify and reduce lead exposures, education on applying recommended nutritional practices, and recommendations on breastfeeding and infant follow-up.

**Key points for lead evaluation and nutrition for pregnant and lactating women:**

- Avoidance of lead exposure remains the primary prevention strategy
- All pregnant and lactating women should be evaluated for adequacy in their diets including iron status
- Refer women in need of assistance to WIC or the Supplemental Nutrition Assistance Program (SNAP)
- Consultation with a clinician experienced in the management of pregnant women with BLLs is strongly advised

---

**TESTING RECOMMENDATIONS FOR REFUGEE CHILDREN**

1. All refugee children six months to 16 years of age must be tested within 90 days of entry to the United States. Pre-existing health conditions such as malnutrition, and iron deficiency, along with cultural, language, and economic barriers may increase refugee children’s risk for exposures to lead.

2. For ALL refugee children aged six months to six years, repeat the blood lead test three to six months after the child is in a permanent residence. All children with an initial BLL of 5 µg/dL or greater should have repeat testing, as indicated. Evaluation of risks for exposure to lead may warrant repeat testing of older children with initial BLLs <10 µg/dL.

Further information on blood lead testing and management for this population can be obtained from IDPH.

**BLOOD LEAD SAMPLE COLLECTION**

- Venous blood samples analyzed at a licensed laboratory are considered to most accurately reflect body lead burden.
- Blood specimens that are analyzed using a Lead Care II or equivalent will be considered as capillary specimens.
- Blood collected via finger stick can be used for testing. Environmental contamination can be minimized if proper collection technique is followed. Elevated finger stick tests require confirmation. A venous sample analyzed at a licensed laboratory is the preferred confirmation method.
- For children who are a difficult stick, two finger stick capillary tests conducted within a 12 week period analyzed at a licensed laboratory can be considered confirmatory and the initiation of services for the child should be considered.
- Filter paper sampling is used by some providers. Elevated results need confirmation using a method other than filter paper collection. Filter paper lead results may be less accurate in children with anemia.

**FOLLOW-UP BLOOD LEAD TESTING**

If there is reason to believe that the BLL may rise rapidly, follow-up testing sooner than that presented in Table 3 may be indicated. Timing of additional testing is based on medical and environmental assessments and follow-up test results.
Table 3. Schedule for Follow-up Venous Blood Lead Testing

<table>
<thead>
<tr>
<th>Venous blood lead level</th>
<th>Early follow-up (first 2 – 4 tests after identification)</th>
<th>Late follow-up (after BLL begins to decline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference value – 9 µg/dL</td>
<td>3 months (optional)</td>
<td>6 - 9 months (optional)</td>
</tr>
<tr>
<td>10 – 14 µg/dL</td>
<td>3 months</td>
<td>6 - 9 months</td>
</tr>
<tr>
<td>15 – 19 µg/dL</td>
<td>1 – 3 months</td>
<td>3 – 6 months</td>
</tr>
<tr>
<td>20 – 24 µg/dL</td>
<td>1 – 2 months</td>
<td>1 – 3 months</td>
</tr>
<tr>
<td>25 – 44 µg/dL</td>
<td>2 – 4 weeks</td>
<td>1 month</td>
</tr>
<tr>
<td>≥ 45 µg/dL</td>
<td>As soon as possible</td>
<td>Chelation with subsequent follow-up</td>
</tr>
</tbody>
</table>

See the Centers for Disease Control and Prevention (CDC) treatment and case management recommendations: Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention, U.S. Dept. of Health and Human Services, Public Health Service, March 2002. (Refer to page 25 for Web link) To obtain a printed copy of the new Case Management document, you may call (toll-free) 888-232-6789.

NOTE: If there is a BLL of 5 – 9 µg/dL, consideration should be given to repeating the blood lead test sooner than the testing guidelines, especially for a child aged <2 years (blood lead is likely to be on the rise in this age group), or if testing was done in winter or spring, (when blood lead results are generally lower).
of body stores of lead. Repeat testing is recommended within seven to 21 days, until the BLLs are stable. A two-week interval between courses is recommended unless the clinical condition indicates a need for more rapid intervention. Succimer chelates are excreted in urine; therefore, adequate hydration is essential. In the succimer chelation trial elevations of liver enzymes and blood count abnormalities were similar in placebo and drug treatment groups.13

Post Chelation Follow-Up:
Recheck BLLs seven to 21 days after treatment. Determine if retreatment is necessary. Then, follow the testing schedule for EBLLs as shown on Table 3.

In children who received chelation therapy, repeat hospitalization and treatment with BAL and CaNa₂EDTA are indicated if the blood lead concentration rebounds to ≥70 µg/dL or if symptoms are present. When the rebound level is <70 µg/dL and there are no symptoms, treatment with Succimer can be considered.

Do not discharge a child from the hospital until a lead safe environment can be assured. For some children, appropriate alternative housing is necessary while all lead hazards in his/her home or elsewhere are being controlled and eliminated. Lead-safe housing (usually with friends or relatives) where the child can live with his/her family during the entire abatement/remediation process through clean up should be identified.

BLLs may remain elevated for prolonged periods. The expected time for 50 percent of children with a BLL of 25-29 µg/dL to reach a BLL <10 µg/dL is 24 months.

Children with past EBLLs need monitoring and may need referrals for further evaluation and services. For any questions, concerns or for referrals to speak with medical doctors with experience in the treatment of lead poisoned children, please contact IDPH at 217-782-3517.

REPORTING OBLIGATIONS

Directors of private laboratories that perform blood lead analyses are required by Illinois law to report all results to the IDPH, INCLUDING LEVELS BELOW 10 µg/dL. (Refer to page 24 for Web link to law).10 This includes all blood lead tests analyzed in medical office laboratories and tests performed using Lead Care desk top analyzers. NOTE: All tests at all BLLs must be reported to the IDPH along with child identifying information.

- BLL ≥10 µg/dL must be reported within 48 hours.
- Results <10 µg/dL must be reported within 30 days of the end of the month in which the test was performed.

Every physician, health care provider, nurse, hospital administrator or public health officer who has verified information of any child’s blood lead result is required to report this information to the IDPH lead program. Providers using the IDPH Lab are not required to report blood lead tests processed at that laboratory.

Check with your laboratory regarding their reporting status. About 20 percent of blood lead results sent by laboratories to the IDPH have insufficient information to identify the child’s home address, or even the county in which the child lives. Child identifying information is needed for home evaluation and nurse case management. When in doubt, report.

Reports should be made to the Illinois Lead Program reporting system:
Phone: 217-782-3517 Fax: 217-557-1188

A blood lead fax reporting form is available at:
http://www.dph.illinois.gov/sites/default/files/forms/bloodleadresultsreportform-7-13-2015_0.pdf

PUBLIC HEALTH FOLLOW-UP SERVICES

Follow-up and case management services are provided for children throughout Illinois. Some local health departments also offer free or low cost blood lead testing. Contact your local health department if you have questions regarding follow-up services. Contact the Illinois Lead Program or your local health department for more information.
CHILDREN NEED PROOF OF A BLOOD LEAD TEST OR RISK EVALUATION BEFORE ADMISSION TO A CHILD CARE FACILITY OR SCHOOL

Under Illinois law, a parent or guardian of any child between the ages of six months through six years is required to provide certification from a physician or health care provider that his or her child has been tested or received an evaluation for lead exposures in accordance with Illinois guidelines (using the Childhood Lead Risk Questionnaire) before that child may be admitted to a licensed day care center, day care home, preschool, nursery school, Head Start, kindergarten or other licensed child care facility. This statement must be provided prior to admission and subsequently in conjunction with required physical examinations. See the Illinois Lead Poisoning Prevention Act. (Refer to page 24 for Web link).

MANAGEMENT OF CHILDREN WITH BLOOD LEAD LEVELS <10 µg/dL

Evaluation for environmental exposure to lead and counseling are a necessary and recommended part of all health maintenance visits.

Lead education handouts are available for FREE through IDPH’s website or by contacting the Department toll free at 866-909-3572. Parent handouts to assess risk for exposure to lead and to recommend ways to reduce exposures also can be downloaded from the city of Chicago website at: http://www.cityofchicago.org/city/en/depts/cdph/supp_info/food_environ/childhood_lead_poisoningpreventionandhealthyhomesprogram.html.

PREVENTIVE COUNSELING SHOULD FOCUS ON:

- Effects of lead
- Sources of lead exposure
- Methods to reduce exposures to lead (Be sure to caution families that special procedures and training are needed before disturbing paint containing lead. They can contact their local health department for further advice.)
- Ensuring iron sufficiency to reduce absorption of ingested lead and promoting healthy nutritional status including adequate calcium intake
- Educating families about ways to identify sources of lead in their home and their child’s environment

For recommendations from the CDC Advisory Committee on Lead Poisoning Prevention, clinicians should read Interpreting and Managing Blood Lead Levels <10 µg/dL in Children and Reducing Childhood Exposures to Lead, which is available at: http://www.cdc.gov/MMWR/preview/mmwrhtml/rr5608a1.htm.

CHELATION CAUTIONS

Contact your local or state lead poisoning prevention program, local poison control center, or IDPH with questions. A child with an EBLL and signs or symptoms consistent with encephalopathy should be chelated in a center capable of providing appropriate intensive care services.

The appropriate level at which to initiate chelation therapy and which drugs are most appropriate is controversial. A double-blinded, randomized, controlled trial of up to three 26-day courses of Succimer treatment of young children with BLLs <45 µg/dL lowered their blood lead, but failed to improve their neurodevelopmental test scores. (Refer to page 26 for Web link).

Chelation therapy is addressed in an American Academy of Pediatrics, 1995 document on pharmaceutical agents in the treatment of lead poisoning. (Refer to page 26 for Web link).

Some chelation agents may be difficult to locate. If you experience difficulties in locating chelation please contact the Lead Program at 217-782-3517 or 866-909-3572.

Succimer (Chemet)

The Food and Drug Administration has approved Succimer for use in lead poisoned children with BLLs ≥45 µg/dL. Succimer (Chemet) is an oral chelating agent which lowers BLLs. The drug’s specificity for lead substantially reduces the risk of essential mineral depletion associated with conventional parenteral chelating agents.

Indications and Usage - Succimer is indicated for the treatment of lead poisoning in children with BLLs ≥45 µg/dL. An active, ongoing reduction in exposures to lead should always accompany use of Succimer.

Dosage and Administration - Dosage should begin at 350 mg/m² per dose orally three times daily for five days. The dose should then be reduced to 350 mg/m² per dose two times daily for an additional two weeks. Doses based on administration of 10 mg/kg dose results in substantial under-dosing for most young children. The total length of a single treatment course is 19 days. Succimer is in capsule form (100 mg) containing beads. The capsule can be separated and the beads mixed with food or fruit juice drinks for young children who cannot swallow the capsule whole. The beads and liquid can have a “rotten egg” sulfur odor due to the presence of the sulfhydryl moieties in the molecular structure.

Side Effects - Adverse effects have been reported in very few instances. The most common are gastrointestinal symptoms and rash.

Monitoring Parameters - Baseline and post-chelation therapy blood lead concentrations are, of course, important parameters to follow in patients being treated with Succimer. An expected rebound in blood lead after one 19-day course of Succimer is to 78 percent of the baseline level, due to redistribution.
### Table 5. Treatments by Blood Lead Level (continued)

<table>
<thead>
<tr>
<th>BLL</th>
<th>Recommendation</th>
</tr>
</thead>
</table>
| 45 – 69 µg/dL| • Above actions, plus:  
|              | • Confirm the BLL with repeat venous sample within 48 hours.                     |
|              | • Consider hospitalization and/or chelation therapy (managed with the assistance of an experienced provider). Succimer (oral, 350 mg/m² dose) or CaNa₂ EDTA (IV, 1000 mg/m²/day x 5 days, in divided doses).  
|              | • Perform specific evaluation of the child, such as abdominal x-ray to initiate bowel evacuation if lead sources, such as paint chips, are identified.  
|              | • Do not start iron therapy if on CaNa₂ EDTA.                                  |
|              | • Ensure adequate hydration.                                                   |
|              | • Monitor urine for heme.                                                       |
|              | • A minimum of two weeks between courses is recommended, unless more prompt treatment is indicated. |
|              | • Ensure safety of the home with respect to lead hazards, isolation of the lead source, family social situation, and chronicity of the exposure are factors that may influence management. |
| >70 µg/dL    | • Hospitalize and monitor BLLs.                                                |
|              | • Abdominal radiograph to check for lead chips, evacuate bowel as needed.       |
|              | • Begin management with BAL (IM, BAL 450 mg/m²/day, Q4 hours, x up to three days; four hours after a first BAL dose initiate CaNa₂EDTA therapy – rational CaNa₂EDTA transiently increases BLLs, while BAL does not.  
|              | • Stop BAL when BLL <50 µg/dL                                                 |
|              | • CaNa₂EDTA for five days by continuous infusion or in divided doses.           |
|              | • Ensure adequate hydration.                                                   |
|              | • Monitor urine for heme.                                                       |
|              | • A minimum of two weeks between courses is recommended, unless more prompt treatment is indicated. |
|              | • Do not start iron therapy if on CaNa₂EDTA.                                   |
| SYMPTOMATIC CHILDREN | • Above with these modifications:  
|              | • Use BAL, as above x three days and CaNa₂EDTA 1500 mg/m²/day x five days.     |
|              | • Interrupt therapy for two days and repeat treatment, as necessary.           |

### MANAGEMENT OF ELEVATED BLOOD LEAD LEVELS

Medical management services for children with EBLLs fall into four categories:

- Medical evaluation and repeat testing
- Education
- Social services referral to assist in obtaining other needed services for the family
- Referral/coordination with the local health department

#### 1. MEDICAL EVALUATION

**CONFIRM AND MONITOR BLOOD LEAD LEVELS WITH SERIAL TESTING, AS INDICATED**

- **Clinical history**, including clinical symptoms, oral behaviors, nutritional and iron status, family history of lead poisoning, and previous blood lead test results
- **Environmental history**, including exposures/sources of lead (in the home and other places where the child spends time) and occupational histories of adults in the household
- **Developmental screening**, with further evaluations as needed
- **Evaluation of nutritional status**, particularly to identify and address iron insufficiency. Identification of early iron deficiency requires specialized testing (beyond a hemoglobin or complete blood count), using a test such as a ferritin level.

Serial blood lead measurements should be interpreted appropriately. Laboratories are allowed to be within ±4 µg/dL or 10 percent of an expected value, whichever is greater. Thus, a change of 5 µg/dL or more may represent a change in exposures. Some laboratories can achieve a proficiency of ±2 µg/dL.

#### 2. EDUCATION

- Advise families to identify and address sources of lead for their child. Families can contact their local health department for advice.
- Caution families never to disturb lead paint surfaces themselves without first being trained to do this safely. While repairs are made, **the entire family should be out of the home until thorough post-repair cleanup is completed**. Contractors trained and licensed to perform repairs are available in many areas. Some local health departments provide lead hazard training to property owners to conduct safe repairs. Unsafe disturbance of lead-containing paint can increase the potential for exposures to lead.
TREATMENT RECOMMENDATIONS VARY BY CHILD’S BLOOD LEAD LEVEL

For a full discussion of treatment recommendations for children with EBLLs, clinicians should read Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention (chapter 3), a CDC publication. (Refer to page 25 for Web link or to order).

Table 4. Chelation Agents

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Generic Name</th>
<th>Chemical Name</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Disodium Versenate</td>
<td>Edetate disodium calcium</td>
<td>Calcium disodium ethylenediamine tetra acetate</td>
<td>CaNa₂EDTA</td>
</tr>
<tr>
<td>BAL in Oil</td>
<td>Dimercaprol</td>
<td>2, 3-dimercapto-1-propanol</td>
<td>BAL</td>
</tr>
<tr>
<td>Chemet</td>
<td>Succimer</td>
<td>Meso 2, 3-dimercapto-1-propanol</td>
<td>DMSA</td>
</tr>
</tbody>
</table>

Table 5. Treatments by Blood Lead Level

<table>
<thead>
<tr>
<th>BLL (µg/dL)</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5</td>
<td>- Review lab results with family.</td>
</tr>
<tr>
<td></td>
<td>- Repeat the BLL in 6-12 months if the child is at high risk or risk changes during the timeframe. Ensure levels are done at 1 and 2 years of age.</td>
</tr>
<tr>
<td></td>
<td>- For children tested at age &lt;12 months, consider retesting in 3-6 months as lead exposure may increase as mobility increases.</td>
</tr>
<tr>
<td></td>
<td>- Perform routine health maintenance including assessment of nutrition, physical and mental development, as well as iron deficiency risk factors.</td>
</tr>
<tr>
<td></td>
<td>- Provide anticipatory guidance on common sources of environmental lead exposure.</td>
</tr>
<tr>
<td>5 – 14</td>
<td>- Above actions, plus:</td>
</tr>
<tr>
<td></td>
<td>- Re-test venous BLL within 1-3 months to ensure the lead level is not rising. If the lead level is stable or decreasing, retest the BLL in 3 months.</td>
</tr>
<tr>
<td></td>
<td>- Take a careful environmental history to identify potential sources of exposures. Consider other children who may be exposed.</td>
</tr>
<tr>
<td></td>
<td>- Provide education and information for source identification and avoidance.</td>
</tr>
<tr>
<td></td>
<td>- Provide nutritional counseling related to calcium and iron.</td>
</tr>
<tr>
<td></td>
<td>- Ensure iron sufficiency with adequate laboratory testing (CBC, ferritin, CRP) and treatment per AAP guidelines. Consider starting a multivitamin with iron.</td>
</tr>
<tr>
<td></td>
<td>- Perform structured developmental screening evaluations at child health maintenance visits, as lead’s effect on development may manifest over years.</td>
</tr>
<tr>
<td></td>
<td>- Ensure that all blood lead test results are reported to Illinois Department of Public Health.</td>
</tr>
<tr>
<td></td>
<td>- Refer to public health department for environmental investigation and public health nurse visit at 10 µg/dL as mandated by local regulations. Some jurisdictions mandate such a referral at 5 µg/dL.</td>
</tr>
<tr>
<td>15 – 44</td>
<td>- Above actions, plus:</td>
</tr>
<tr>
<td></td>
<td>- Confirm the BLL with repeat venous sample within 1 to 4 weeks.</td>
</tr>
<tr>
<td></td>
<td>- Monitor BLLs monthly until stable and lead hazards have been identified and remediated, then can lengthen testing intervals.</td>
</tr>
<tr>
<td></td>
<td>- Perform specific evaluations depending on child and exposure history. Generally, abdominal x-ray is not recommended. Any treatment for BLLs in this range should be done in consultation with an expert.</td>
</tr>
<tr>
<td></td>
<td>- Refer to latest CDC and American Academy of Pediatrics recommendations related to chelation management.</td>
</tr>
</tbody>
</table>
TREATMENT RECOMMENDATIONS VARY BY CHILD’S BLOOD LEAD LEVEL

For a full discussion of treatment recommendations for children with EBLLs, clinicians should read Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention (chapter 3), a CDC publication. (Refer to page 25 for Web link or to order).

Table 4. Chelation Agents

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Generic Name</th>
<th>Chemical Name</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium Disodium Versenate</td>
<td>Edetate disodium calcium</td>
<td>Calcium disodium ethylenediamine tetra acetate</td>
<td>CaNa₂EDTA</td>
</tr>
<tr>
<td>BAL in Oil</td>
<td>Dimercaprol</td>
<td>2, 3-dimercapto-1-propanol</td>
<td>BAL</td>
</tr>
<tr>
<td>Chemet</td>
<td>Succimer</td>
<td>Meso 2, 3-dimercaptosuccinic acid</td>
<td>DMSA</td>
</tr>
</tbody>
</table>

Table 5. Treatments by Blood Lead Level

<table>
<thead>
<tr>
<th>BLL</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5 µg/dL</td>
<td>• Review lab results with family.</td>
</tr>
<tr>
<td></td>
<td>• Repeat the BLL in 6-12 months if the child is at high risk or risk changes during the timeframe. Ensure levels are done at 1 and 2 years of age.</td>
</tr>
<tr>
<td></td>
<td>• For children tested at age &lt;12 months, consider retesting in 3-6 months as lead exposure may increase as mobility increases.</td>
</tr>
<tr>
<td></td>
<td>• Perform routine health maintenance including assessment of nutrition, physical and mental development, as well as iron deficiency risk factors.</td>
</tr>
<tr>
<td></td>
<td>• Provide anticipatory guidance on common sources of environmental lead exposure.</td>
</tr>
<tr>
<td>5 – 14 µg/dL</td>
<td>• Above actions, plus:</td>
</tr>
<tr>
<td></td>
<td>• Re-test venous BLL within 1-3 months to ensure the lead level is not rising. If the lead level is stable or decreasing, retest the BLL in 3 months.</td>
</tr>
<tr>
<td></td>
<td>• Take a careful environmental history to identify potential sources of exposures. Consider other children who may be exposed.</td>
</tr>
<tr>
<td></td>
<td>• Provide education and information for source identification and avoidance.</td>
</tr>
<tr>
<td></td>
<td>• Provide nutritional counseling related to calcium and iron.</td>
</tr>
<tr>
<td></td>
<td>• Ensure iron sufficiency with adequate laboratory testing (CBC, ferritin, CRP) and treatment per AAP guidelines. Consider starting a multivitamin with iron.</td>
</tr>
<tr>
<td></td>
<td>• Perform structured developmental screening evaluations at child health maintenance visits, as lead’s effect on development may manifest over years.</td>
</tr>
<tr>
<td></td>
<td>• Ensure that all blood lead test results are reported to Illinois Department of Public Health.</td>
</tr>
<tr>
<td></td>
<td>• Refer to public health department for environmental investigation and public health nurse visit at 10 µg/dL as mandated by local regulations. Some jurisdictions mandate such a referral at 5 µg/dL.</td>
</tr>
<tr>
<td>15 – 44 µg/dL</td>
<td>• Above actions, plus:</td>
</tr>
<tr>
<td></td>
<td>• Confirm the BLL with repeat venous sample within 1 to 4 weeks.</td>
</tr>
<tr>
<td></td>
<td>• Monitor BLLs monthly until stable and lead hazards have been identified and remediated, then can lengthen testing intervals.</td>
</tr>
<tr>
<td></td>
<td>• Perform specific evaluations depending on child and exposure history. Generally, abdominal x-ray is not recommended. Any treatment for BLLs in this range should be done in consultation with an expert.</td>
</tr>
<tr>
<td></td>
<td>• Refer to latest CDC and American Academy of Pediatrics recommendations related to chelation management.</td>
</tr>
</tbody>
</table>
### Table 5. Treatments by Blood Lead Level (continued)

<table>
<thead>
<tr>
<th>BLL</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>45 – 69 µg/dL</td>
<td>• Above actions, plus:&lt;br&gt;• Confirm the BLL with repeat venous sample within 48 hours.&lt;br&gt;• Consider hospitalization and/or chelation therapy (managed with the assistance of an experienced provider). Succimer (oral, 350 mg/m² dose) or CaNa₂EDTA (IV, 1000 mg/m²/day x 5 days, in divided doses).&lt;br&gt;• Perform specific evaluation of the child, such as abdominal x-ray to initiate bowel evacuation if lead sources, such as paint chips, are identified.&lt;br&gt;• Do not start iron therapy if on CaNa₂EDTA.&lt;br&gt;• Ensure adequate hydration.&lt;br&gt;• Monitor urine for heme.&lt;br&gt;• A minimum of two weeks between courses is recommended, unless more prompt treatment is indicated.&lt;br&gt;• Ensure safety of the home with respect to lead hazards, isolation of the lead source, family social situation, and chronicity of the exposure are factors that may influence management.</td>
</tr>
<tr>
<td>&gt;70 µg/dL</td>
<td>• Hospitalize and monitor BLLs.&lt;br&gt;• Abdominal radiograph to check for lead chips, evacuate bowel as needed.&lt;br&gt;• Begin management with BAL (IM, BAL 450 mg/m²/day, Q4 hours, x up to three days; four hours after a first BAL dose initiate CaNa₂EDTA therapy – rational CaNa₂EDTA transiently increases BLLs, while BAL does not.&lt;br&gt;• Stop BAL when BLL &lt;50 µg/dL&lt;br&gt;• CaNa₂EDTA for five days by continuous infusion or in divided doses.&lt;br&gt;• Ensure adequate hydration.&lt;br&gt;• Monitor urine for heme.&lt;br&gt;• A minimum of two weeks between courses is recommended, unless more prompt treatment is indicated.&lt;br&gt;• Do not start iron therapy if on CaNa₂EDTA.</td>
</tr>
</tbody>
</table>

### MANAGEMENT OF ELEVATED BLOOD LEAD LEVELS

Medical management services for children with EBLLs fall into four categories:

- **Medical evaluation and repeat testing**
- **Education**
- **Social services referral to assist in obtaining other needed services for the family**
- **Referral/coordination with the local health department**

#### 1. MEDICAL EVALUATION

**CONFIRM AND MONITOR BLOOD LEAD LEVELS WITH SERIAL TESTING, AS INDICATED**

- **Clinical history**, including clinical symptoms, oral behaviors, nutritional and iron status, family history of lead poisoning, and previous blood lead test results
- **Environmental history**, including exposures/sources of lead (in the home and other places where the child spends time) and occupational histories of adults in the household
- **Developmental screening**, with further evaluations as needed
- **Evaluation of nutritional status**, particularly to identify and address iron insufficiency. Identification of early iron deficiency requires specialized testing (beyond a hemoglobin or complete blood count), using a test such as a ferritin level.

Serial blood lead measurements should be interpreted appropriately. Laboratories are allowed to be within ±4 µg/dL or 10 percent of an expected value, whichever is greater. Thus, a change of 5 µg/dL or more may represent a change in exposures. Some laboratories can achieve a proficiency of ±2 µg/dL.

#### 2. EDUCATION

- Advise families to identify and address sources of lead for their child. Families can contact their local health department for advice.
- Caution families never to disturb lead paint surfaces themselves without first being trained to do this safely. While repairs are made, the entire family should be out of the home until thorough post-repair cleanup is completed. Contractors trained and licensed to perform repairs are available in many areas. Some local health departments provide lead hazard training to property owners to conduct safe repairs. Unsafe disturbance of lead-containing paint can increase the potential for exposures to lead.
CHILDREN NEED PROOF OF A BLOOD LEAD TEST OR RISK EVALUATION BEFORE ADMISSION TO A CHILD CARE FACILITY OR SCHOOL

Under Illinois law, a parent or guardian of any child between the ages of six months through six years is required to provide certification from a physician or health care provider that his or her child has been tested or received an evaluation for lead exposures in accordance with Illinois guidelines (using the Childhood Lead Risk Questionnaire) before that child may be admitted to a licensed day care center, day care home, preschool, nursery school, Head Start, kindergarten or other licensed child care facility. This statement must be provided to admission and subsequently in conjunction with required physical examinations. See the Illinois Lead Poisoning Prevention Act. (Refer to page 24 for Web link).

MANAGEMENT OF CHILDREN WITH BLOOD LEAD LEVELS <10 µg/dL

Evaluation for environmental exposure to lead and counseling are a necessary and recommended part of all health maintenance visits.

Lead education handouts are available for FREE through IDPH’s website or by contacting the Department toll free at 866-909-3572. Parent handouts to assess risk for exposure to lead and to recommend ways to reduce exposures also can be downloaded from the city of Chicago website at: http://www.cityofchicago.org/city/en/depts/cdph/supp_info/food_environ/childhood_lead_poisoningpreventionandhealthyhomesprogram.html.

PREVENTIVE COUNSELING SHOULD FOCUS ON:

- Effects of lead
- Sources of lead exposure
- Methods to reduce exposures to lead (Be sure to caution families that special procedures and training are needed before disturbing paint containing lead. They can contact their local health department for further advice.)
- Ensuring iron sufficiency to reduce absorption of ingested lead and promoting healthy nutritional status including adequate calcium intake
- Educating families about ways to identify sources of lead in their home and their child’s environment

For recommendations from the CDC Advisory Committee on Lead Poisoning Prevention, clinicians should read Interpreting and Managing Blood Lead Levels <10 µg/dL in Children and Reducing Childhood Exposures to Lead,11 which is available at: http://www.cdc.gov/MMWR/preview/mmwrhtml/rr5608a1.htm.

CHELATION CAUTIONS

Contact your local or state lead poisoning prevention program, local poison control center, or IDPH with questions. A child with an EBLL and signs or symptoms consistent with encephalopathy should be chelated in a center capable of providing appropriate intensive care services.

The appropriate level at which to initiate chelation therapy and which drugs are most appropriate is controversial. A double-blinded, randomized, controlled trial of up to three 26-day courses of Succimer treatment of young children with BLLs <45 µg/dL lowered their blood lead, but failed to improve their neurodevelopmental test scores. (Refer to page 26 for Web link).

Chelation therapy is addressed in an American Academy of Pediatrics, 1995 document on pharmaceutical agents in the treatment of lead poisoning.12 (Refer to page 26 for Web link).

Some chelation agents may be difficult to locate. If you experience difficulties in locating chelation please contact the Lead Program at 217-782-3517 or 866-909-3572.

Succimer (Chemet)

The Food and Drug Administration has approved Succimer for use in lead poisoned children with BLLs ≥45 µg/dL. Succimer (Chemet) is an oral chelating agent which lowers BLLs. The drug’s specificity for lead substantially reduces the risk of essential mineral depletion associated with conventional parenteral chelating agents.

Indications and Usage - Succimer is indicated for the treatment of lead poisoning in children with BLLs ≥45 µg/dL. An active, ongoing reduction in exposures to lead should always accompany use of Succimer.

Dosage and Administration - Dosage should begin at 350 mg/m² per dose orally three times daily for five days. The dose should then be reduced to 350 mg/m² per dose two times daily for an additional two weeks. Doses based on administration of 10 mg/kg dose results in substantial under-dosing for most young children. The total length of a single treatment course is 19 days. Succimer is in capsule form (100 mg) containing beads. The capsule can be separated and the beads mixed with food or fruit juice drinks for young children who cannot swallow the capsule whole. The beads and liquid can have a “rotten egg” sulfur odor due to the presence of the sulfhydryl moieties in the molecular structure.

Side Effects - Adverse effects have been reported in very few instances. The most common are gastrointestinal symptoms and rash.

Monitoring Parameters - Baseline and post-chelation therapy blood lead concentrations are, of course, important parameters to follow in patients being treated with Succimer. An expected rebound in blood lead after one 19-day course of Succimer is to 78 percent of the baseline level, due to redistribution.
of body stores of lead. Repeat testing is recommended within seven to 21 days, until the BLLs are stable. A two-week interval between courses is recommended unless the clinical condition indicates a need for more rapid intervention. Succimer chelates are excreted in urine; therefore, adequate hydration is essential. In the succimer chelation trial elevations of liver enzymes and blood count abnormalities were similar in placebo and drug treatment groups.13

Post Chelation Follow-Up:
Recheck BLLs seven to 21 days after treatment. Determine if retreatment is necessary. Then, follow the testing schedule for EBLLs as shown on Table 3.

In children who received chelation therapy, repeat hospitalization and treatment with BAL and CaNa₂EDTA are indicated if the blood lead concentration rebounds to ≥70 µg/dL or if symptoms are present. When the rebound level is <70 µg/dL and there are no symptoms, treatment with Succimer can be considered.

Do not discharge a child from the hospital until a lead safe environment can be assured. For some children, appropriate alternative housing is necessary while all lead hazards in his/her home or elsewhere are being controlled and eliminated. Lead-safe housing (usually with friends or relatives) where the child can live with his/her family during the entire abatement/remediation process through clean up should be identified.

BLLs may remain elevated for prolonged periods. The expected time for 50 percent of children with a BLL of 25-29 µg/dL to reach a BLL <10 µg/dL is 24 months.

Children with past EBLLs need monitoring and may need referrals for further evaluation and services. For any questions, concerns or for referrals to speak with medical doctors with experience in the treatment of lead poisoned children, please contact IDPH at 217-782-3517.

REPORTING OBLIGATIONS
Directors of private laboratories that perform blood lead analyses are required by Illinois law to report all results to the IDPH, INCLUDING LEVELS BELOW 10 µg/dL. (Refer to page 24 for Web link to law).10 This includes all blood lead tests analyzed in medical office laboratories and tests performed using Lead Care desk top analyzers. NOTE: All tests at all BLLs must be reported to the IDPH along with child identifying information.

- BLL ≥10 µg/dL must be reported within 48 hours.
- Results <10 µg/dL must be reported within 30 days of the end of the month in which the test was performed.

Every physician, health care provider, nurse, hospital administrator or public health officer who has verified information of any child’s blood lead result is required to report this information to the IDPH lead program. Providers using the IDPH Lab are not required to report blood lead tests processed at that laboratory.

Check with your laboratory regarding their reporting status. About 20 percent of blood lead results sent by laboratories to the IDPH have insufficient information to identify the child’s home address, or even the county in which the child lives. Child identifying information is needed for home evaluation and nurse case management. When in doubt, report.

Reports should be made to the Illinois Lead Program reporting system:
Phone: 217-782-3517 Fax: 217-557-1188
A blood lead fax reporting form is available at:
http://www.dph.illinois.gov/sites/default/files/forms/bloodleadresultsreportform-7-13-2015_0.pdf

PUBLIC HEALTH FOLLOW-UP SERVICES
Follow-up and case management services are provided for children throughout Illinois. Some local health departments also offer free or low cost blood lead testing. Contact your local health department if you have questions regarding follow-up services. Contact the Illinois Lead Program or your local health department for more information.
Table 3. Schedule for Follow-up Venous Blood Lead Testing

<table>
<thead>
<tr>
<th>Venous blood lead level</th>
<th>Early follow-up (first 2 – 4 tests after identification)</th>
<th>Late follow-up (after BLL begins to decline)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference value 9 µg/dL</td>
<td>3 months (optional)</td>
<td>6 - 9 months (optional)</td>
</tr>
<tr>
<td>10 – 14 µg/dL</td>
<td>3 months</td>
<td>6 - 9 months</td>
</tr>
<tr>
<td>15 – 19 µg/dL</td>
<td>1 – 3 months</td>
<td>3 – 6 months</td>
</tr>
<tr>
<td>20 – 24 µg/dL</td>
<td>1 – 2 months</td>
<td>1 – 3 months</td>
</tr>
<tr>
<td>25 – 44 µg/dL</td>
<td>2 – 4 weeks</td>
<td>1 month</td>
</tr>
<tr>
<td>≥ 45 µg/dL</td>
<td>As soon as possible</td>
<td>Chelation with subsequent follow-up</td>
</tr>
</tbody>
</table>

See the Centers for Disease Control and Prevention (CDC) treatment and case management recommendations: Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention, U.S. Dept. of Health and Human Services, Public Health Service, March 2002. (Refer to page 25 for Web link) To obtain a printed copy of the new Case Management document, you may call (toll-free) 888-232-6789.

NOTE: If there is a BLL of 5 – 9 µg/dL, consideration should be given to repeating the blood lead test sooner than the testing guidelines, especially for a child aged <2 years (blood lead is likely to be on the rise in this age group), or if testing was done in winter or spring, (when blood lead results are generally lower).
How do I identify pregnant women in need of blood lead testing?
The CDC has recommended that pregnant women routinely be evaluated for risk for lead exposures. Those having a risk factor for lead exposure should have blood lead measured when initiating prenatal care. IDPH has developed a questionnaire for evaluation of pre-natal lead risk exposure to help identify pregnant women in need of blood lead testing.

What blood lead level is considered “elevated” in a pregnant woman?
The CDC has published recommended strategies of medical care for pregnant women having a BLL at or above 5 µg/dL and public health actions to reduce lead exposures for pregnant women who have a BLL at or above 10 µg/dL. National surveys indicate that about 1% of U.S. women of child-bearing age have a BLL at or above 5 µg/dL and 0.3% have a BLL at or above 10 µg/dL.

How do I provide care for pregnant women who have a BLL at or above 5 µg/dL?

How will the IDPH Lead Program help me manage lead exposures for a pregnant woman with a BLL at or above 10 µg/dL?
Effective January 2015, the Illinois Department of Public Health Lead Program will provide services to pregnant women who have a BLL at or above 10 µg/dL. Services IDPH will provide will include an environmental assessment to identify and reduce lead exposures, education on applying recommended nutritional practices, and recommendations on breastfeeding and infant follow-up.

Key points for lead evaluation and nutrition for pregnant and lactating women:
- Avoidance of lead exposure remains the primary prevention strategy
- All pregnant and lactating women should be evaluated for adequacy in their diets including iron status
- Refer women in need of assistance to WIC or the Supplemental Nutrition Assistance Program (SNAP)
- Consultation with a clinician experienced in the management of pregnant women with BLLs is strongly advised

TESTING RECOMMENDATIONS FOR REFUGEE CHILDREN
1. All refugee children six months to 16 years of age must be tested within 90 days of entry to the United States. Pre-existing health conditions such as malnutrition, and iron deficiency, along with cultural, language, and economic barriers may increase refugee children’s risk for exposures to lead.

2. For ALL refugee children aged six months to six years, repeat the blood lead test three to six months after the child is in a permanent residence. All children with an initial BLL of 5 µg/dL or greater should have repeat testing, as indicated. Evaluation of risks for exposure to lead may warrant repeat testing of older children with initial BLLs <10 µg/dL.

Further information on blood lead testing and management for this population can be obtained from IDPH.

BLOOD LEAD SAMPLE COLLECTION
- Venous blood samples analyzed at a licensed laboratory are considered to most accurately reflect body lead burden.
- Blood specimens that are analyzed using a Lead Care II or equivalent will be considered as capillary specimens.
- Blood collected via finger stick can be used for testing. Environmental contamination can be minimized if proper collection technique is followed. Elevated finger stick tests require confirmation. A venous sample analyzed at a licensed laboratory is the preferred confirmation method.
- For children who are a difficult stick, two finger stick capillary tests conducted within a 12 week period analyzed at a licensed laboratory can be considered confirmatory and the initiation of services for the child should be considered.
- Filter paper sampling is used by some providers. Elevated results need confirmation using a method other than filter paper collection. Filter paper lead results may be less accurate in children with anemia.

FOLLOW-UP BLOOD LEAD TESTING
If there is reason to believe that the BLL may rise rapidly, follow-up testing sooner than that presented in Table 3 may be indicated. Timing of additional testing is based on medical and environmental assessments and follow-up test results.
WHICH CHILDREN ARE REQUIRED BY LAW TO HAVE BLOOD LEAD TESTS?

1. CHILDREN ELIGIBLE FOR MEDICAID OR ALL KIDS HEALTH INSURANCE are required to have a blood lead test prior to one and two years of age. If a child presents at ages one and two years with an unknown blood lead status, a BLL is required. For children ages three through six years, with unknown blood lead test status or increased lead exposure, a BLL is required.

2. CHILDREN LIVING IN HIGH-RISK ZIP CODE AREAS (REGARDLESS OF THEIR ELIGIBILITY FOR MEDICAID/ALL KIDS) are required to have a blood lead test at ages one and two years. If past blood lead tests are known and are <10 µg/dL, one and two years of age. If a child presents at ages one and two years with an unknown blood lead status, a BLL is required. For children ages three through six years, with unknown blood lead test status or increased lead exposure, a BLL is required.

3. ALL CHICAGO CHILDREN ARE CONSIDERED TO LIVE IN A HIGH RISK ZIP CODE. A blood lead test should be performed. Lead evaluation and testing guidelines may differ for the city of Chicago. For current information for the Chicago Department of Public Health you may access their Web site at www.cityofchicago.org/health.

WHICH CHILDREN SHOULD BE EVALUATED USING THE CHILDHOOD LEAD RISK QUESTIONNAIRE?

1. EVALUATION OF CHILDREN LIVING IN LOW-RISK ZIP CODE AREAS should start by using the Illinois Childhood Lead Risk Questionnaire, which has been developed to determine the need for blood lead testing at ages one and two years and to evaluate changes in exposures to lead for older children. (Available by visiting the IDPH website at www.dph.illinois.gov)

2. CHILDREN WITH ANY QUESTIONNAIRE RESPONSE answered “YES” or “DON’T KNOW,” need a blood lead test at approximately ages one and two years. If past blood lead tests are known and are <10 µg/dL, additional blood lead testing at ages three and older is not needed unless risk for exposure to lead has increased.

TESTING COMMENDATIONS FOR INTERNATIONAL ADOPTEE CHILDREN

These children should have a blood lead test upon entering the United States. (Additional testing and medical care related to blood lead results should adhere to state and local policies and laws, as above).
## APPENDIX B (continued)

### PEDIATRIC LEAD POISONING HIGH-RISK ZIP CODE AREAS

<table>
<thead>
<tr>
<th>Logan</th>
<th>McDonough</th>
<th>Ogle</th>
<th>Rock Island</th>
<th>Vermilion</th>
<th>Winnebago</th>
</tr>
</thead>
<tbody>
<tr>
<td>62512</td>
<td>61411</td>
<td>61007</td>
<td>61201</td>
<td>60932</td>
<td>61077</td>
</tr>
<tr>
<td>62518</td>
<td>61416</td>
<td>61030</td>
<td>61236</td>
<td>60942</td>
<td>61101</td>
</tr>
<tr>
<td>62519</td>
<td>61420</td>
<td>61047</td>
<td>61239</td>
<td>60960</td>
<td>61103</td>
</tr>
<tr>
<td>62548</td>
<td>61422</td>
<td>61049</td>
<td>61259</td>
<td>60963</td>
<td>61104</td>
</tr>
<tr>
<td>62543</td>
<td>61438</td>
<td>61054</td>
<td>61265</td>
<td>61810</td>
<td></td>
</tr>
<tr>
<td>62635</td>
<td>61440</td>
<td>61084</td>
<td>61279</td>
<td>61831</td>
<td></td>
</tr>
<tr>
<td>62643</td>
<td>61470</td>
<td>61091</td>
<td></td>
<td>61832</td>
<td></td>
</tr>
<tr>
<td>62666</td>
<td>61475</td>
<td></td>
<td></td>
<td>61833</td>
<td></td>
</tr>
<tr>
<td>62671</td>
<td>62334</td>
<td></td>
<td></td>
<td>61834</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Macon</th>
<th>McHenry</th>
<th>Menard</th>
<th>McLean</th>
<th>Mercer</th>
<th>Menard</th>
</tr>
</thead>
<tbody>
<tr>
<td>62514</td>
<td>60034</td>
<td>61529</td>
<td>61701</td>
<td>61231</td>
<td>61813</td>
</tr>
<tr>
<td>62521</td>
<td>61551</td>
<td>61803</td>
<td>61602</td>
<td>61267</td>
<td>61839</td>
</tr>
<tr>
<td>62522</td>
<td>61720</td>
<td>61604</td>
<td>61605</td>
<td>61277</td>
<td>61929</td>
</tr>
<tr>
<td>62523</td>
<td>61722</td>
<td>61606</td>
<td></td>
<td>61724</td>
<td>61893</td>
</tr>
<tr>
<td>62526</td>
<td>61287</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62537</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62551</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62593</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>62621</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Macoupin</th>
<th>Perry</th>
<th>Piatt</th>
<th>Pike</th>
<th>Piute</th>
<th>Platte</th>
</tr>
</thead>
<tbody>
<tr>
<td>62009</td>
<td>61731</td>
<td>61381</td>
<td>6261</td>
<td>62094</td>
<td>62214</td>
</tr>
<tr>
<td>62033</td>
<td>61737</td>
<td>62891</td>
<td></td>
<td>62640</td>
<td>62214</td>
</tr>
<tr>
<td>62069</td>
<td>61770</td>
<td>62897</td>
<td></td>
<td></td>
<td>62214</td>
</tr>
<tr>
<td>62085</td>
<td></td>
<td></td>
<td></td>
<td>61231</td>
<td></td>
</tr>
<tr>
<td>62089</td>
<td></td>
<td></td>
<td></td>
<td>61260</td>
<td></td>
</tr>
<tr>
<td>62443</td>
<td></td>
<td></td>
<td></td>
<td>62443</td>
<td></td>
</tr>
<tr>
<td>62676</td>
<td></td>
<td></td>
<td></td>
<td>62676</td>
<td></td>
</tr>
<tr>
<td>62679</td>
<td></td>
<td></td>
<td></td>
<td>62679</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Madison</th>
<th>Monroe</th>
<th>Marion</th>
<th>Marshall</th>
<th>Massac</th>
</tr>
</thead>
<tbody>
<tr>
<td>62002</td>
<td>61355</td>
<td>62095</td>
<td>62006</td>
<td>62053</td>
</tr>
<tr>
<td>62004</td>
<td></td>
<td>62010</td>
<td></td>
<td>62056</td>
</tr>
<tr>
<td>62009</td>
<td></td>
<td>62020</td>
<td></td>
<td>62075</td>
</tr>
<tr>
<td>62090</td>
<td></td>
<td>62024</td>
<td></td>
<td>62077</td>
</tr>
<tr>
<td>62095</td>
<td></td>
<td>62029</td>
<td></td>
<td>62089</td>
</tr>
<tr>
<td>62096</td>
<td></td>
<td>62032</td>
<td></td>
<td>62137</td>
</tr>
<tr>
<td>62099</td>
<td></td>
<td>62036</td>
<td></td>
<td>62142</td>
</tr>
<tr>
<td>62100</td>
<td></td>
<td>62038</td>
<td></td>
<td>62157</td>
</tr>
<tr>
<td>62106</td>
<td></td>
<td>62042</td>
<td></td>
<td>62164</td>
</tr>
<tr>
<td>62121</td>
<td></td>
<td>62048</td>
<td></td>
<td>62177</td>
</tr>
<tr>
<td>62126</td>
<td></td>
<td>62057</td>
<td></td>
<td>62185</td>
</tr>
<tr>
<td>62127</td>
<td></td>
<td>62062</td>
<td></td>
<td>62193</td>
</tr>
<tr>
<td>62136</td>
<td></td>
<td>62067</td>
<td></td>
<td>62215</td>
</tr>
<tr>
<td>62137</td>
<td></td>
<td>62068</td>
<td></td>
<td>62220</td>
</tr>
<tr>
<td>62142</td>
<td></td>
<td>62072</td>
<td></td>
<td>62225</td>
</tr>
<tr>
<td>62149</td>
<td></td>
<td>62083</td>
<td></td>
<td>62230</td>
</tr>
<tr>
<td>62157</td>
<td></td>
<td>62084</td>
<td></td>
<td>62235</td>
</tr>
<tr>
<td>62164</td>
<td></td>
<td>62089</td>
<td></td>
<td>62239</td>
</tr>
<tr>
<td>62177</td>
<td></td>
<td>62095</td>
<td></td>
<td>62244</td>
</tr>
<tr>
<td>62185</td>
<td></td>
<td>62099</td>
<td></td>
<td>62249</td>
</tr>
<tr>
<td>62193</td>
<td></td>
<td>62100</td>
<td></td>
<td>62254</td>
</tr>
</tbody>
</table>

### ACUTE SYMPTOMS OF LEAD POISONING

Despite experiencing the effects of lead on behavior and development, most children with EBLs have no obvious acute symptoms. Symptoms of severe lead poisoning may include:

- Irritability
- Headaches
- Vomiting
- Seizures
- Anemia/fatigue
- Loss of appetite and/or weight loss
- Stomachaches and cramping/constipation

Because these symptoms are not specific to lead poisoning, blood lead testing is the only effective way to detect lead poisoning.

### UNDER ILLINOIS LAW YOU MUST CONDUCT BLOOD LEAD TESTS AND RISK EVALUATIONS, AS APPROPRIATE

IDPH has identified ZIP code areas in which children have an increased risk for exposure to lead due to higher percentages of older homes and low-income families (see Appendix B). Illinois law mandates that every physician and health care provider must obtain a blood lead measurement on children living in high-risk ZIP code areas. Children living in low risk ZIP code areas must be evaluated using the Childhood Lead Risk Questionnaire (see Appendix C) and those deemed at risk through the evaluation process must receive blood lead testing as described above. (Refer to page 24 for web link to the Act). (See Appendix D, Evaluation and Testing Algorithm on page 23).
MAJOR SOURCES OF LEAD POISONING

- Lead-based paint and lead-contaminated-dust in older homes
- Unsafe renovation or remodeling practices causing lead-contaminated dust (likely with scraping or sanding of paint containing lead)
- Outdoor exposures to soil or track-in of soil contaminated with lead (from past exterior paint deterioration, past use of leaded gasoline, deposition from past industrial emissions or industrial contamination)
- Specialty foods, such as imported Mexican candies and spices from various countries
- Imported food cans with lead solder seams (production banned in United States)
- Some traditional medicines or cosmetics
- Pottery with glazes containing lead
- Parental hobbies or occupations that involve exposures to lead
- Toys, oral piercings, jewelry or other objects containing lead (medical provider judgment on a case-by-case basis)
- Water contamination from the corrosion of lead solder, pipes or fixtures. (On average, drinking water contributes to low levels of lead exposure and may be minimized by flushing waterlines, using cold water or using water filters. You may consult Environmental Protection Agency Safe Drinking Water Hotline, 1-800-426-4791, for more information).

You may obtain a fact sheet on the various sources of lead poisoning including specific hobbies and occupations by contacting the Illinois Lead Program.

EFFECTS OF LEAD

No safe level of lead has been identified for children. Lead damages the developing brain and nervous system, leading to:

- Reduced cognitive potential and increased learning disabilities;
- Higher risk for behavior problems, including aggression and hyperactivity;
- Interference with red blood cell formation leading to anemia (at BLL ≥40 µg/dL); and
- In its most advanced stages, seizures, coma and sometimes death.
APPENDIX D
ILLINOIS CHILDHOOD LEAD POISONING EVALUATION AND TESTING ALGORITHM

Child presents for a Well Child Visit between the ages of 6 and 84 months

Has the Child had a previous BLL?

NO                     YES

One previous BLL <10 µg/dL

Two previous BLLs <10 µg/dL with no change in status of housing or potential exposure since last testing

Previous BLL ≥ 10 µg/dL

Evaluate and obtain BLL’s as advised for the specific level (see page 9)

Does the child live in a high risk ZIP code? (See reverse of questionnaire for listing of high risk ZIP codes) or (see pages 20 and 21)

Evaluate and obtain BLL’s as advised for the specific level (see page 9)

YES                     NO

Complete the Childhood Lead Risk Questionnaire (to be used particularly at ages 1 and 2 years, and to evaluate changes in lead exposures for older children) (see page 22)

Perform capillary or venous testing for BLL

Re-evaluate at the next Well Child Visit

<10 µg/dL

Reapply risk evaluation instrument at subsequent Well-Child visits

10-19 µg/dL

Follow up with venous test within 3 months (or sooner if there is concern for increasing BLL or the child is less than 1 year old)

20-44 µg/dL

Follow up with venous test within 1 week – 1 month

45-59 µg/dL

Follow up with venous test within 48 hours

60-69 µg/dL

Follow up with venous test within 24 hours

≥70 µg/dL

Do venous testing immediately

Recommendations for subsequent evaluation, testing and treatment are based on the follow-up blood test.

TRANSFER OF MATERNAL LEAD TO THE FETUS AND INFANT

Lead is transferred to the fetus during pregnancy and to the infant through breast milk. Adequate calcium intake during both pregnancy and lactation reduces maternal circulating lead somewhat (by about 10 percent) and, thus, can reduce transfer. Breastfeeding has many beneficial effects, and it should be encouraged unless the mother’s BLL is ≥40 µg/dL.

Table 2: Action for Lactating Women

<table>
<thead>
<tr>
<th>Blood Lead Level* µg/dL</th>
<th>Actions for Care of Pregnant Women</th>
<th>Time Frame for Follow-up Blood Lead Test†</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 39 µg/dL</td>
<td>• Breastfeeding should be encouraged</td>
<td>• Within 24 hours and then at frequent intervals depending on clinical interventions and trend in BLLs.</td>
</tr>
<tr>
<td>5 – 39 µg/dL</td>
<td>• Breastfeeding may be continued if infants BLLs are monitored</td>
<td>• Consultation with a clinician experienced in the management of pregnant women with BLLs in this range is strongly advised. Obtain a maternal BLL or cord BLL at delivery.</td>
</tr>
<tr>
<td>≥40 µg/dL</td>
<td>• Lactation should be continued, but breast milk should be pumped and discarded until BLLs &lt;40 µg/dL</td>
<td>Above actions</td>
</tr>
</tbody>
</table>

Source: Centers for Disease Control and Prevention, Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women

NEWBORN OF A LEAD-BEARING MOTHER

If a child is born to a woman with known EBLL, the BLL of the newborn should be monitored closely. An infant’s BLL is expected to be equal to that of the mother. If the BLL of the infant is ≥10 µg/dL, appropriate case management activities should take place.

While outreach, education and primary prevention are most important in identified high-risk locations, they can be beneficial to all communities, regardless of risk factor.
## Table 1: Frequency of Maternal Blood Lead Follow-up Testing During Pregnancy and Actions for Lead Management Care of Pregnant Women

<table>
<thead>
<tr>
<th>Blood Lead Level µg/dL</th>
<th>Actions for Care of Pregnant Women</th>
<th>Time Frame for Follow-up Blood Lead Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 µg/dL</td>
<td>• Provide anticipatory guidance and health education materials</td>
<td>• No follow-up testing needed</td>
</tr>
<tr>
<td>5 – 9 µg/dL</td>
<td>• Provide anticipatory guidance and health education materials • Communicate with parent/guardian to attempt to determine source of lead exposure – If occupational exposure, review proper use of personal protective equipment and consider contacting employer • Assess nutritional adequacy and provide nutritional management, as needed</td>
<td>• Within 1 month, obtain a maternal BLL or cord BLL at delivery</td>
</tr>
<tr>
<td>10 – 14 µg/dL</td>
<td>• Above actions • Notify health department • Refer for environmental investigation and control current lead hazards • Refer occupationally exposed women to occupational medicine specialists • Recommend removal from occupational exposure</td>
<td>• Within 1 month, obtain a maternal BLL or cord BLL at delivery</td>
</tr>
<tr>
<td>15 – 24 µg/dL</td>
<td>• Above actions</td>
<td>• Within 1 month and then every 2 - 3 months, obtain a maternal BLL or cord BLL at delivery. • More frequent testing may be indicated based on risk factor history.</td>
</tr>
<tr>
<td>25 – 44 µg/dL</td>
<td>• Above actions</td>
<td>• Within 1 – 4 weeks and then every month, obtain a maternal BLL or cord BLL at delivery.</td>
</tr>
</tbody>
</table>

## WEB LINKS TO LAW

- **Illinois Lead Poisoning Prevention Act**
  Illinois Compiled Statutes, Public Health, 410 ILCS 45/

- **Illinois Administrative Code, Title 77, Part 845, Lead Poisoning Prevention Code**

- **Testing Requirements**

- **Proof of Blood Lead Testing (paragraph d)**

- **Illinois Department of Public Health Childhood Lead Risk Questionnaire, ZIP codes, and Guidelines**
  [www.dph.illinois.gov/sites/default/files/forms/formsohpchildhood-lead-risk-questionnaire.pdf](http://www.dph.illinois.gov/sites/default/files/forms/formsohpchildhood-lead-risk-questionnaire.pdf)

- **Reporting Requirements**
MEDICAL EVALUATION AND MANAGEMENT FOR PREGNANT WOMEN

Blood lead testing of all pregnant women in the United States is not recommended. However, the Centers for Disease Control and Prevention (CDC) recommends that pregnant women be evaluated for risk for lead exposures. Those having a risk factor for lead exposure should have blood lead measured when initiating prenatal care. IDPH has developed a questionnaire, Prenatal-risk Evaluation for Lead Exposure, for evaluation of pre-natal lead risk exposure to help identify pregnant women in need of blood lead testing, see Appendix A. If the pregnant woman answers “yes” to any of the questions, she is at risk for lead exposure and a venous blood lead test should be performed.

Pregnant women at highest risk for having an EBLL include: exposure to lead contaminated dust during renovation/repair work in pre-1978 housing; workers in several high-risk occupations; foreign-born recent immigrants; and those practicing high-risk behaviors, such as pica. Because lead persists for years in the body, the lead exposures may have occurred before pregnancy.

CDC’s Guidelines for the Identification and Management of Lead Exposure in Pregnant and Lactating Women discusses strategies for the provision of medical care for pregnant women having a BLL at or greater than 5 µg/dL and public health actions to reduce lead exposures for pregnant women who have a BLL at or greater than 10 µg/dL. Effective January 2015, IDPH’s Lead Program provided services to pregnant women who have a venous BLL at or greater than 10 µg/dL. Services include an environmental assessment to identify and reduce lead exposures, education on applying recommended nutritional practices, recommendations about breastfeeding and infant follow-up care.

Medical management strategies include counseling about lead avoidance, nutritional assessment and follow-up blood lead testing. Nutritional strategies can act as a protective mechanism to reduce lead absorption.

Pregnant women with confirmed BLLs at or greater than 45 µg/dL should be considered as high-risk pregnancies and their cases should be managed in consultation with experts in lead poisoning and high-risk pregnancy.

Chelation therapy should be considered for pregnant women with confirmed BLLs at or greater than 45 µg/dL on a case-by-case basis, in consultation with an expert in lead poisoning.

• Newborn of Lead-bearing mother
  If a child is born to a woman with a known elevated blood lead level, (EBLL) the infant’s BLL is expected to be that of the mother.

• Racial disparity in lead poisoning has narrowed across the years. Still, in Illinois, African-American children are 1.5 times more likely to have an EBLL compared to white children.4
THE RISK OF LEAD POISONING IN ILLINOIS CHILDREN

Childhood lead poisoning is a preventable environmental health problem. Each year thousands of children continue to be exposed to lead from various sources. However, leaded paint remains the major source of exposure for children, and still exists in 75% of Illinois’ older housing.

In Illinois, approximately 300,000 blood lead tests are conducted annually by local health departments, pediatric, family medicine and other health providers. Approximately 2,500 Illinois children have been determined to have a blood lead level (BLL) ≥10 µg/dL and are receiving case management services from IDPH nurses or delegate agency staff.

CHILDREN AT HIGHEST RISK

Research has determined that lead poisoning is not equally distributed among children in the United States. High-risk populations include:

- **Young children and those with persistent oral behaviors.**
  The most common way for children to get lead into their body is by ingesting it. Frequent hand exposures to surfaces with lead-containing dust (e.g., crawling on the floor, playing at a window) and oral behaviors promote lead ingestion.

- **Children residing in older homes.**
  Nationally, an estimated 22 percent of U.S. children six years of age and younger, live in a home where there is a lead hazard (defined as lead in an accessible condition, such as deteriorated lead-containing paint, or lead-contaminated dust or dirt). Of homes built before 1940, an estimated 68 percent have a lead hazard; 43 percent of homes built between 1940 and 1959 have a lead hazard. Rental units where low-income families and young children reside are most likely to have a lead hazard.
    - In Illinois, 23 percent of homes were built before 1940 and 24 percent were built between 1940 and 1959.
    - In Chicago, 38 percent of homes were built before 1940 and 31 percent were built between 1940 and 1959.

- **Children in low-income households**
  Based on 2014 Illinois childhood blood lead information, approximately, 1 in 100 Illinois children tested, aged 12 to 72 months and enrolled in Medicaid/All Kids, had a BLL ≥10 µg/dL and 1 in 15 of these children had a BLL ≥5 µg/dL.

- **Children with low iron**
  Absorption of lead increases in the low-iron state. Iron deficient children can absorb up to about 50 percent of the lead they ingest.
OTHER LEAD POISONING RESOURCES


5. The Centers for Disease Control and Prevention, Managing Elevated Blood Lead Levels Among Young Children: Recommendations from the Advisory Committee on Childhood Lead Poisoning Prevention: Appropriate level at which to initiate chelation therapy. www.cdc.gov/nceh/lead/casemanagement/caseManage_main.htm


10. Lead Safe Illinois For information about legal services and lead information. www.leadsafeillinois.org/

11. National Lead Information Center — www.epa.gov/lead

12. Alliance to End Childhood Lead Poisoning www.nchh.org/Portals/0/Contents/Another_Link_in_Chain.pdf
Guidelines for Illinois Physicians and Health Care Providers

December 2015

Illinois Department of Public Health
Illinois Lead Program
525 W. Jefferson St., Third Floor
Springfield, IL 62761
217-782-3517

The Illinois Department of Public Health is providing you with these recommendations for lead risk evaluation and blood lead testing. This document summarizes key guidelines and directs you to more detailed sources of information and related agencies.

Several dedicated pediatricians, child advocates and local health department staff participated in the development of this document. Their various backgrounds and interest in protecting Illinois children from the harmful effects of lead poisoning helped immensely with the development of this reference guide. Their input was vital and should help physicians and child advocates who treat young children.

WHO CAN I CONTACT FOR MORE INFORMATION?

Illinois Lead Program
Lead Education Materials, Parental Handouts, Physician Guidelines, Childhood Blood Lead Test Reporting
217-782-3517
www.dph.illinois.gov/topics-services/environmental-health-protection/lead-poisoning-prevention

Illinois Department of Public Health
Information and Referral Hotline
866-909-3572
TTY (Hearing impaired use only)
800-547-0466

State Laboratory – Springfield
217-782-6562

Lead Abatement Program
For information about licensed lead inspectors or lead abatement contractors, or about abatement/remediation funds
217-782-3517

Chicago Department of Public Health
Childhood Lead Poisoning Prevention Program
312-747-LEAD, 312-746-7810 or 312-746-7820
www.cityofchicago.org/health
Preventing and Testing for Childhood Lead Poisoning

A Reference Guide for Physicians and Health Care Providers

If you need more information, call

Illinois Department of Public Health
Illinois Lead Program
866-909-3572 or 217-782-3517
TTY (hearing impaired use only) 800-547-0466