

Lead poisoning

PROTOCOL CHECKLIST

- Enter available information into Merlin upon receipt of initial report
- Review information on lead poisoning and its epidemiology ([see page 2](#)), case definition ([see page 4](#)), and laboratory testing ([see page 5](#))
- Review the blood lead labs records to determine the case definition (see page 4).
- Report the case in Merlin. Ensure that the case is correctly classified as a 'suspect' or 'confirmed' case. (see page 4).

For suspected cases:

- Do not complete case report form (CRF) in Merlin until a follow-up test is done. A follow-up test should be done within three months of initial test.
- Re-assess the case definition after the follow-up test is received. If the case is a:
 - 'False positive' close the case in Merlin.
 - 'Confirmed case' please follow the guidelines below.

For confirmed cases:

- Contact the caregiver: Interview case-patient**
 - Assess environmental risk factors, possible sources of exposures, eating habits, behaviors, and health, housing situations.
 - Educate about sources of lead, exposure pathways, and methods of prevention (e.g. lead safe work practices).
 - Recommend that siblings and household contacts less than 6 years old be tested.

- Contact health care provider:**

(Note: This activity should only be performed for children less than 6 years old)

- Assure that follow-up tests are performed according the recommended guidelines.
- Recommend conducting a neurological examination and chelation therapy treatment for cases with blood lead levels greater than or equal to 45 µg/dL.
- Recommend that siblings and household contacts less than 6 years old be tested

- Enhanced disease investigation:**

(Note: This activity is required for lead poisoned children (less than 6 years old) with a confirmed blood lead level ≥ 20 µg/dL or two confirmed blood lead levels ≥ 15 µg/dL taken more than 3 months apart.)

- Conduct an environmental health investigation
- Refer cases for lead-related housing remediation services (if needed).

- Conclude the investigation:**

- Close the case when the blood lead level has declined below 10µg/dL for at least six months.

Lead Poisoning

1. DISEASE REPORTING

A. Purpose of reporting and surveillance

1. To estimate the prevalence of elevated blood-lead levels among at-risk children in Florida.
2. To assure appropriate and timely follow-up care of children with elevated blood-lead levels.
3. To prevent occurrence of new cases of the disease and exacerbation of illness in existing cases by early identification of lead exposure sources and disease risk factors.
4. To gather epidemiologic and environmental data on lead poisoning cases to target future public health interventions.

B. Legal reporting requirements 64D-3; Florida Administrative Code (FAC).

1. Lead poisoning is listed as a notifiable disease in Chapter 64D-3 F.A.C. County Health Departments (CHDs), healthcare providers, laboratories and other public health personnel are required to report the occurrence of notifiable diseases as defined in the rule. Confirmed lead poisoning cases must be reported to the Florida Department of Health by end of the next business day following laboratory findings.
2. Laboratories, health care providers and CHDs that conduct analysis of blood lead samples are required to report all blood lead tests. This includes results received through the use of portable testing devices, such as the Lead Care II Analyzer. The results of ALL blood lead tests are reportable to the Florida Department of Health in an approved electronic format by the end of the next business day following laboratory findings.

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic agent

Lead, a heavy metal that does not break down, can accumulate in the body causing serious and permanent health problems to people of all ages. Lead poisoning can be acute or chronic. Acute lead poisoning occurs when an individual ingests or inhales a large amount of lead into the body over a short period of time. Chronic lead poisoning occurs when small amounts of lead are ingested or inhaled over a period of several months or years.

B. Description of illness

Lead poisoning is a serious environmental health problem that has life-long effects on children. Even at low levels, childhood lead poisoning has been linked to learning disabilities, behavioral problems and developmental delays. All children under the age of 72 months are potentially at risk for lead poisoning because children naturally have more hand-to-mouth activity, and their developing bodies absorb lead more readily than adults. Children less than six years of age (especially low-income children) living in homes built before 1978, foreign-born children, and children whose families participate in

activities such as the use of leaded pottery and non-western home remedies have an increased risk of lead poisoning.

Lead exposure in children can cause learning disabilities, mental retardation, impaired visual and motor functioning, stunted growth, behavioral problems, neurological and organ damage, and hearing loss (Agency for Toxic Substances and Disease Registry [ATSDR], 1995). In adults, exposure is associated with hypertension and reproductive complications. Lead is also highly toxic to the unborn fetus because it can breach the placenta, and result in birth defects and developmental delays (National Safety Council, 2004).

C. Sources of lead exposure

1. Lead-based paint hazards: Lead-based paint found in older homes is still the most important source of lead exposure in the environment. As homes with lead-based paint age, the paint begins to deteriorate. Deterioration is exacerbated around friction surfaces, surfaces affected by weatherization, and areas exposed to leaks or other types of structural damage. The dust created when paint breaks down is easily accessible to children since it often settles on floors or bare soil where they are most likely to play. Renovation or construction work done in older homes containing lead-based paint or other leaded material, such as ceramic tile, pipes or glass, can also create lead dust in the environment of a child.

Although it is difficult to determine the actual number of properties in Florida that contain lead-based paint hazards, a review of 2000 U.S. Census data for Florida indicates that there are approximately 433,000 housing units built before 1950 and approximately 2 million housing units built before 1970. This is a concern because lead-based paint containing up to 50% lead was in widespread use through the 1940s. The use and manufacture of lead-based paint declined during the 1950s and thereafter; however, lead-based paint continued to be available for use in residential dwellings until 1978.

2. Take-Home lead from occupations and hobbies: A number of businesses and industries use lead or lead products in Florida. By-products from these industries have been linked with elevated blood lead levels in adults and children. Parents or caretakers whose occupations or hobbies expose them to lead have the potential to transfer hazardous lead dust from their place of work or recreation to the car, home or yard where it becomes accessible to young children or women of childbearing age. This type of exposure is called “take-home” exposure.

3. Consumer products: In Florida, consumer products containing unsafe levels of lead are a small yet concerning source of lead exposure to children. Products of significance include children’s jewelry, toys, vinyl mini-blinds, lead-glazed pottery, fishing lures and sinkers, tile, and ammunition. To prevent the use of lead contaminated products, the Childhood Lead Poisoning Prevention Program created the Lead Alert Network. This network notifies the public about consumer products that have been recalled due to their lead content. Individuals may join the Lead Alert Network by visiting the following Childhood Lead Poisoning Prevention website:

<http://www.doh.state.fl.us/environment/community/lead/index.html>. For information on previously recalled products with unsafe levels of lead, please refer to the following Consumer Product Safety Commission (CPSC) website: <http://www.cpsc.gov/>

4. **Home or folk remedies and cultural practices:** Some common home or folk remedies and/or cultural practices involve lead. These practices include giving children azarcon or greta for health ailments, using kohl or surma for face and body painting or decoration, and eating imported candies.

5. **Hobby/Occupational practices:** Using lead-glazed or painted pottery, hobbies and occupations associated with cottage industries such as battery recycling and car repair may be a source of lead exposure.

D. At-risk populations

Individuals from all social and economic levels can be affected by lead poisoning. However, children under the age of 6 years are considered to be at risk because they tend to put their hands or other objects into their mouths, they absorb a greater percentage of lead, and their developing bodies are more vulnerable to the effects of lead. Children at the greatest risk are those 9 months of age to 2.5 years of age, and those living at or below the poverty line that live in older housing.

E. Treatment

Recommend Primary care providers consider oral chelation therapy treatment (e.g. succimer) for cases with a confirmed blood lead levels greater than or equal to 45 µg/dL.

F. Lead poisoning in Florida

More than 3,000 new cases of childhood lead poisoning (blood lead level \geq 10 micrograms per deciliter) have occurred in Florida since 2000, with 190 new cases identified in 2009. According to CDC, Florida currently ranks eighth in the nation for number of estimated children with elevated blood lead levels. It's further estimated that there are 7,400 children with elevated blood lead levels in nine Florida cities that have a population of or greater than 100,000. In total it is estimated that 22,000 children may be poisoned in the state.

3. CASE DEFINITION

A. Clinical description

Often asymptomatic but may result in impaired neurobehavioral development, low IQ, slow nerve conduction, peripheral neuropathies, and encephalopathy.

B. Laboratory criteria for diagnosis

Confirmed: Blood lead level \geq 10 micrograms per deciliter of whole blood measured from a venous specimen

OR

Blood lead level \geq 10 micrograms per deciliter measured from **TWO** capillary draws taken **within 12 weeks** of one another

Suspect: Blood lead level \geq 10 micrograms per deciliter measured from a single capillary draw or, Blood lead level \geq 10 micrograms per deciliter of blood with no test type indication.

C. Case classification

No symptoms necessary; case classifications provided in the "laboratory criteria for diagnosis"

D. Comment

1. Florida Department of Health (FDOH) considers all blood lead tests to be evidence of a suspicion of lead poisoning, thus they must be reported to the FDOH by laboratories, hospitals or physicians who conduct on-site blood lead analysis. Requiring these entities to report all blood lead results to FDOH enables program to assess disease prevalence rates and screening rates. This provides the necessary data to identify risk areas in Florida and design an effective prevention program. Although all blood lead test results must be reported by laboratories, hospitals or physicians who conduct on-site blood lead analysis, county health department disease investigators should only report suspect and confirmed cases in Merlin. In addition, lead poisoning disease investigations should be performed for children 0 to 16 years old whose test results meet the strict definition of confirmed as described above in laboratory criteria.
2. The reportable level of lead poisoning in Florida is the same for children as for adults (see laboratory criteria above.)
3. Once a child or adult has had an initial confirmed elevated blood lead level test result of ≥ 10 micrograms per deciliter, if he or she has additional follow-up test results, regardless of the test type, these confirmed results are to be included with initial case information and not reported as a new case.
4. Capillary tests with an initial blood lead level of ≥ 10 micrograms per deciliter with a venous or capillary follow-up test result ≥ 10 micrograms per deciliter, taken **within 12 weeks** of one another should not be classified as a suspect case. If a case is initially reported as *suspect* (see case definition above) and then a confirmatory venous or capillary test result is received, the suspect case needs to be updated to the *confirmed* case status.
5. ***The Childhood Lead Poisoning Screening and Case Management Guide*** is a resource available for CHD disease investigators and health care providers. It contains additional information on disease investigation, lead poisoning testing, case management, and requirements for environmental investigations. This guide can be found at the following link: http://www.doh.state.fl.us/environment/community/lead/pdfs/CM_Guide_Final_Version.pdf

Questions regarding disease investigations for lead poisoning cases should be directed to the Department of Health, Florida Healthy Homes and Lead Poisoning Prevention Program at (850) 245-4444 x2694 or (850) 245-4299.

4. CASE INVESTIGATION

A. Lead poisoning disease investigation overview for confirmed cases

1. Lead poisoning disease investigation is initiated when a lead poisoned child (0 to 16 years old) has a confirmed blood lead level of $\geq 10\mu\text{g/dL}$. When the CHD receives an initial elevated blood lead laboratory report, the designated disease investigator should enter the child's demographic, clinical, risk/source, attach follow-up blood lead tests (elevated and non-elevated results) and document any other relevant information into Merlin (the state surveillance system for reportable diseases) under code 94890.
2. Cases should remain 'open' until the case meets the case closure criteria (see section 3B-5). Disease investigation emphasis should be placed on responding to children with

the highest blood lead level and children less than six years old with any elevated blood lead level.

B. Routine disease investigation

County health departments should conduct routine investigation for lead poisoned children (less than 6 years old) with a confirmed blood lead level greater than or equal to 10 µg/dL.

Exception: For lead poisoned children 6 to 16 years old, it is recommended that **ONLY** investigation activities indicated under items 1 to 3 and 5 should be conducted.

1. **Evaluate the diagnosis:** Review the blood lead lab reports to ensure that cases are correctly classified as per the Florida Department of Health lead poisoning case definition. After the diagnosis status has been verified report the case in Merlin.
2. **Report the case:** Report the case in Merlin and ensure that cases are correctly classified as per the Florida Department of Health lead poisoning case definition. Confirmed and suspected cases are required to be reported in Merlin. However, disease investigation should not be initiated for suspected cases until they attain the status of confirmed cases (i.e. case investigations are only done for suspect cases that have a follow-up blood lead result greater than or equal to 10 µg/dL within three months). CHDs are strongly encouraged to contact the primary health care provider to ensure that a follow-up test is done for suspected cases within three months. If a follow-up blood lead test was not reported for suspected cases with three months, close the case by selecting the case closure reason 'Out of compliance' in Merlin on the follow-up/closure extended data screen.
3. **Perform a case investigation:** Case investigations should be conducted only for all confirmed lead poisoned children.
 - **Contact the caregiver:** Contact the family/caregiver by phone or mail. A template family/caregiver notification letter can be found in the Lead Poisoning Screening and Case Management Guide & Technical Field Guide at: <http://www.doh.state.fl.us/environment/medicine/lead/education.htm>
 - Interview the family/caregiver by phone or at the child's residence to assess the environmental risk factors, eating habits, behaviors, and health, housing situations. Findings from this interview should be reported in Merlin on the risk/sources extended data screen.
 - Educate the family/caregiver about sources of lead, exposure pathways, and methods of prevention (e.g. lead safe work practices). Educational outreach provided by the disease investigator should be documented in Merlin on the follow-up/closure extended data screen.
 - Inform the caregiver to have siblings and household contacts less than six years old tested for lead poisoning.
4. **Notify the health care provider:** Contact the health care provider by phone, mail, or fax. CHDs should only perform this activity for lead poisoned children less than six years old.
 - Request that the health care provider discuss the importance of the recommended medical follow-up with the family. Assure that the health care provider conduct follow-up blood lead tests according the recommended

Childhood Lead Poisoning Screening and Case Management Guidelines, Appendix B.

- Request that the health care provider test siblings and household contacts less than six years of age for lead poisoning. A template health care provider notification letter can be found in the Lead Poisoning Screening and Case Management Guide & Technical Field Guide at: <http://www.doh.state.fl.us/environment/medicine/lead/education.htm>
 - Recommend that the health care provider consider providing developmental screenings for children (less than 6 years old) with confirmed blood lead levels greater than or equal to 10 µg/dL. Assure that the health care provider considers conducting a neurological examination and chelation therapy treatment for cases with confirmed blood lead levels greater than or equal to 45 µg/dL. If chelation therapy is performed, document the specific treatment information in Merlin on the clinical information extended clinical data screen.
 - Assure that the health care provider discuss with family/caregiver provisions for long-term developmental follow-up. Recommend that the health care provider refers the family to developmental programs and community resources, if needed. If it is known that such referrals were made, document the information in Merlin on the follow-up/closure extended data screen.
5. **Conclude the investigation:** The case should be closed when the child's blood lead level has declined below 10µg/dL for at least six months. A case can be closed based on administrative provisions if at least three documented attempts are made to locate or gain access to the child's family/caregiver have failed. Document these attempts in Merlin on the follow-up/closure extended data screen.

C. Enhanced disease investigation.

Enhanced Disease Investigation is required for lead poisoned children (less than 6 years old) with a confirmed blood lead level ≥ 20 µg/dL or two confirmed blood lead levels ≥ 15 µg/dL taken more than 3 months apart.

1. **Conduct an environmental health investigation:** A certified Environmental Protection Agency (EPA) lead risk assessor should conduct the environmental inspections. If you need assistance in obtaining an assessor please contact the Florida Healthy Homes and Lead Poisoning Prevention Program, at the contact information provide above. An inspection should be conducted at the child's home and other sites where the child spends a significant amount of time. An environmental history of the child's exposure can be used to identify possible sources of lead exposure. Measurements of environmental lead levels, including at minimum, house dust; paint that is not intact or subject to friction; exposed soil, especially in play area and other appropriate media that could promote lead exposure. Findings from this investigation should be reported in Merlin on the environmental investigation extended data screen.
2. Refer cases for lead-related housing remediation services (if needed). The environmental risk assessor should make recommendations for lead remediation and facilitate interventions to reduce ongoing exposures to lead. Remediation of lead in residential settings should be done in accordance with the EPA's Renovation, Repair and Painting (RRP) Rule. If remediation or abatement was performed, reported the

information in Merlin on the environmental investigation/follow up/closure extended data screen.

5. ROUTINE PREVENTION

A. Prevention recommendations

1. Make sure your child does not have access to peeling paint or chewable surfaces painted with lead-based paint.
2. Pregnant women and children should not be present in housing built before 1978 that is undergoing renovation. They should not participate in activities that disturb old paint or in cleaning up paint debris after work is completed.
3. Create barriers between living/play areas and lead sources.
4. Regularly wash children's hands and toys. Hands and toys can become contaminated from household dust or exterior soil. Both are known lead sources.
5. Regularly wet-mop floors and wet-wipe window components. Because household dust is a major source of lead, parents should wet-mop floors and wet-wipe horizontal surfaces every 2-3 weeks. Windowsills and wells can contain high levels of leaded dust. They should be kept clean. If feasible, windows should be shut to prevent abrasion of painted surfaces or opened from the top sash.
6. Prevent children from playing in bare soil; if possible, provide them with sandboxes. Parents should plant grass on areas of bare soil or cover the soil with grass seed, mulch, or wood chips, if possible. Until the bare soil is covered, parents should move play areas away from bare soil and away from the sides of the house.
7. To further reduce a child's exposure from non-residential paint sources:
 - Avoid using traditional home remedies and cosmetics that may contain lead;
 - Avoid eating candies imported from Mexico;
 - Avoid using containers, cookware, or tableware to store or cook foods or liquids that are not shown to be lead free;
 - Remove recalled toys and toy jewelry immediately from children. Check Lead Recalls lists.
 - Shower and change clothes after finishing a task that involves working with lead-based products such as stain glass work, bullet making, or using a firing range.
8. You may also visit the FL-DOH website for additional educational information on lead poisoning: <http://www.doh.state.fl.us/environment/medicine/lead/education.htm>.

5. IMPORTANT LINKS

A. Florida Department of Health (FL-DOH):

<http://www.myfloridaeh.com/medicine/lead/index.html>

B. Centers for Disease Control and Prevention (CDC):

<http://www.cdc.gov/nceh/lead/>

C. Environmental Protection Agency (EPA):

<http://www.epa.gov/lead/>

D. Lead Poisoning Screening and Case Management Guide & Technical Field Guide
(available at DOH Lead Poisoning home page):

<http://www.doh.state.fl.us/environment/medicine/lead/education.htm>

E. Environmental Protection Agency Renovation, Repair and Painting (RRP) Rule

<http://www.epa.gov/lead/pubs/lrrpprepub.pdf>