

# LEAD POISONING

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## 1. The Disease Definition

### A. Clinical Description

Lead has adverse effects on nearly all the body's organ systems. It is especially harmful to the developing brains and nervous systems of children under the age of 6 years. At very high blood lead levels, children can have severe brain damage or even die. It is recognized that even low levels of lead can have adverse health impacts on children and there really is no safe level of exposure for children. At blood lead levels as low as 5 micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ), children's intelligence, hearing, and growth can be affected. This damage can be stopped if a child's lead exposure is reduced. A number of studies have estimated that a child's IQ will drop by one to three points for every increase of 10  $\mu\text{g}/\text{dL}$  in the child's blood lead level. In a community, the presence of lead-poisoned children can be associated with an increase in the number of children with developmental deficits and learning disorders.

#### Adults

The health effects of lead in adults include weakness or loss of feeling in arms or legs, headaches, irritability, depression, high blood pressure, anemia, and infertility.

Many lead-poisoned adults do not have symptoms. Some, however, may have trouble remembering and concentrating, tire easily, or be unable to sleep. Adults may also have the symptoms mentioned above. They are more likely to have these symptoms if their lead levels are high for a long time. Adults who have high blood lead levels for a long time may also become anemic. Men may have a low sperm count. Women may have trouble becoming pregnant.

#### Children

Most lead-poisoned children do not show any signs of the disease. Some, however, may be easily excited, unable to pay attention, have stomachaches, or be more tired than usual. Lead-poisoned children may have learning and behavior problems as they grow older. Children with very high lead levels may develop seizures, become unconscious, or even die.

### B. Sources of Exposure

#### Children

Iowa's children are most commonly poisoned by lead-based paint in homes built before 1960. It becomes a hazard as it deteriorates and lead-based paint chips end up on the floors and in window wells throughout the home as well as in the soil around the exterior. The paint chips also crumble and become part of the dust on the floors and window troughs. These homes are considered to have lead-based paint throughout. Young children who live there become lead-poisoned when they put paint chips or exterior soil in their mouths or when they get house dust and soil on their hands and put their hands in their mouths. Children can also be poisoned by dust on the clothes of parents who work with lead and by ethnic remedies such as azarcon.

#### Adults

Adults are usually lead-poisoned by breathing lead fumes and lead dust. They can also get lead dust on their hands, face and clothes. Then, if they eat, smoke, or apply cosmetics without washing their hands and face, they ingest lead dust. Most Iowa adults become lead-poisoned by working with lead in their jobs. Lead is used in lead battery production, welding, radiator repair, metal cutting, and sandblasting. Some adults have been lead-poisoned at home by removing lead-based paint from older homes or by remodeling such homes without following safety guidelines. Some adults are lead-poisoned by working with lead in hobbies like molding bullets, stripping furniture, or making stained glass items. Anything that produces lead dust or fumes can cause lead poisoning.

## C. Population at Risk

All of Iowa's children under age 6 years are considered at risk for lead poisoning. Adults who work with lead on the job or in a hobby are also considered to be at risk.

Among children born in Iowa in 2010, 98 percent had at least one blood-lead test before the age of 6. Statewide, the prevalence of confirmed elevated blood-lead levels ( $>10 \mu\text{g}/\text{dL}$ ) among this group was 0.65 percent, about the same as the national average.

## D. Diagnosis, Treatment, and Prognosis. The only way to tell if a person is lead-poisoned is to get a blood-lead test.

### Children

All Iowa children under the age of 6 should be tested regularly for lead poisoning. This test is required for children who are enrolled in Medicaid. Many children have normal blood-lead levels at 6-12 months of age. However, these same children may become lead-poisoned when they are older and more active, so it is important to get their blood lead tested at least once a year until they are 6 years old. Children are considered to have an elevated a blood lead level if the level is above 5 micrograms per deciliter. Initial testing can be done with a capillary blood sample. Capillary blood lead levels greater than or equal to 10 micrograms per deciliter should be confirmed with a venous blood-lead test.

### Adults

Employers may be required to provide blood-lead testing for adults who work with lead on the job. Adults who have recently remodeled an older home or removed paint from it or who work with lead in a hobby should get a blood-lead test. Adult males and adult females who do not plan to have children should keep their blood-lead levels less than 25 micrograms per deciliter. Adult females who plan to have children should keep their blood-lead levels less than 10 micrograms per deciliter because lead can cross the placenta and poison an unborn child. Venous blood-lead samples should be used for adults.

The primary "treatment" for both adults and children is to reduce exposure to lead. The primary medical treatment is frequently monitoring the patient's blood-lead levels to determine whether exposure to lead is actually being reduced. Testing for iron deficiency is often indicated.

Children with blood-lead levels greater than or equal to 45 micrograms per deciliter, and adults with blood-lead levels greater than or equal to 80 micrograms per deciliter, should be treated with chelating agents. An occupational health physician may prescribe chelating agents for adults with lower blood lead levels on a case-by-case basis.

The reduction of exposure to lead will cause blood-lead levels to drop and will prevent further damage. However, any neurological damage that has already resulted from lead exposure cannot be reversed.

## E. Prevention of Exposure

For children, the primary method of preventing exposure is to maintain lead-based paint in older homes in good condition and to use safe work practices when disturbing lead-based paint. For adults, the primary method to prevent exposure through the workplace and hobbies is to use engineering controls to reduce air-lead levels and to use protective clothing and respirators to reduce inhalation and ingestion of lead.

## 2. Reporting Criteria

### A. Disease Reporting

The results of all blood-lead testing done on both adults and children must be reported to the Bureau of Lead Poisoning Prevention at the Iowa Department of Public Health. For patients under the age of 16 years, blood-lead test results greater than or equal to 20 micrograms per deciliter must be reported by telephone to the Bureau of Lead Poisoning Prevention at 800-972-2026. This allows the bureau to start the follow-up process as soon as possible. Providers with concerns about lower blood-lead levels or any questions about blood-lead

testing or lead poisoning are also welcome to call the bureau. All results, including those reported by phone, must be reported electronically or on paper. The following information must be reported for each blood-lead test result:

- Patient's name, address, and date of birth.
- Name and address of provider ordering the test.
- Name of the laboratory that performed the analysis.
- Date of sample collection.
- Whether the test is capillary or venous.
- Results in micrograms per deciliter.

If this information is not included, the bureau will contact the laboratory and/or provider to get it. Some laboratories and providers have been hesitant because they believe it is a violation of the Health Insurance Portability and Accountability Act (HIPAA). However, the Iowa Administrative Code requires reporting of this information, and HIPAA states that providers must follow the law and report it.

Iowa regulations require both the health-care provider and the laboratory to report. However, the regulations also state that the provider does not need to report if the analytical laboratory reports all results to the bureau. Providers should check periodically to ensure that their hospital laboratory and/or analytical laboratory is reporting all blood-lead test results to the bureau.

## **B. References**

Iowa Department of Public Health  
Lead Poisoning Prevention  
<https://idph.iowa.gov/lpp>