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Lead poisoning

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Original Article: <http://www.mayoclinic.com/health/lead-poisoning/FL00068>

Definition

Lead poisoning occurs when lead builds up in the body, often over a period of months or years. Even small amounts of lead can cause serious health problems. Children under the age of 6 are especially vulnerable to lead poisoning, which can severely affect mental and physical development. At very high levels, lead poisoning can be fatal.

Lead-based paint and lead-contaminated dust in older buildings are the most common sources of lead poisoning in children. Other sources of lead poisoning include contaminated air, water, soil, and some toys and cosmetics. Although lead is still found widely in the environment, you can take a number of steps to help protect yourself and your family.

Symptoms

Initially, lead poisoning can be hard to detect — even people who seem healthy can have high blood levels of lead. Signs and symptoms usually don't appear until dangerous amounts have accumulated.

Although lead can affect almost every part of your body, it usually targets the oxygen-carrying protein in red blood cells (hemoglobin) first. In time, it attacks your nervous system.

Symptoms in children

The signs and symptoms of lead poisoning in children may include:

- Irritability

- Loss of appetite
- Weight loss
- Sluggishness and fatigue
- Abdominal pain
- Vomiting
- Constipation
- Unusual paleness from anemia
- Learning difficulties

Symptoms in newborns

Babies in the womb who are exposed to lead through their mothers may have:

- Learning difficulties
- Slowed growth

In some cases, these problems may persist beyond childhood.

Symptoms in adults

Although children are primarily at risk, lead poisoning is also dangerous for adults. Even exposure to amounts of lead too low to cause symptoms in the short term may increase the risk of high blood pressure and mental decline in the future. Symptoms in adults may include:

- Pain, numbness or tingling of the extremities
- Muscular weakness
- Headache
- Abdominal pain
- Memory loss
- Mood disorders
- Reduced sperm count, abnormal sperm
- Miscarriage or premature birth in pregnant women
- Fatigue

Causes

Lead is a metal that occurs naturally in the earth's crust, but human activity — mining, burning fossil fuels and manufacturing — has caused it to become more widespread. Lead was also once a key ingredient in paint and gasoline and is still used in batteries,

solder, pipes, pottery, roofing materials and some cosmetics.

Sources of lead contamination include:

- **Soil.** Lead particles that settle on the soil from gasoline or paint can last for years. Lead-contaminated soil is still a major problem around highways and in some urban settings.
- **Water.** Lead pipes, brass plumbing fixtures and copper pipes soldered with lead can release lead particles into tap water.
- **Lead paint.** The use of lead-based paints for homes, children's toys and household furniture has been banned in the United States since 1978. But lead-based paint is still on walls and woodwork in many older homes and apartments. Most lead poisoning in children results from eating lead-based paint chips. Glazes found on ceramics, china and porcelain also can contain lead that leaches into food. Lead may be found in toys and other products produced abroad.
- **Household dust.** Household dust can contain lead from paint chips or soil brought in from outside.
- **Some imported canned food.** Although lead solder in food cans is banned in the United States, it's still used in some countries.
- **Traditional remedies and cosmetics.** Some cases of lead poisoning have been traced to the use of certain traditional medicines from India and other South Asian countries. Litargirio, a peach-colored powder popularly used in the Dominican Republic, contains very high levels of lead and should not be used. Kohl is a traditional cosmetic, often used as eyeliner. Testing of various samples of kohl has revealed high levels of lead.

Risk factors

People most at risk of harmful effects from lead in their body include:

- **Babies and children under 6 years of age.** Infants and young children are more likely to be exposed to lead than are older children. They may chew paint chips, and their hands may be contaminated with lead dust. Young children also absorb lead more easily and sustain more harm from it than do adults and older children.
- **Children living in older homes.** Although the use of lead-based paints has been banned since the 1970s, older homes and buildings often retain remnants of this paint.
- **Children living below the poverty level.** Although any child can be exposed to lead, children from low-income families are disproportionately affected, often because they live in older or unrenovated housing. Nonwhite children tend to have higher rates of lead poisoning.

- **People with lead amalgams in their teeth.** Although lead is no longer used to fill cavities in children's teeth, some adults may still have these fillings.
- **Pregnant women.** Because lead can harm an unborn child, pregnant women or women likely to become pregnant are especially at risk.
- **Certain adults.** Adults who breathe in lead dust while remodeling a home, making stained glass or refinishing furniture are also at risk.

Progress reducing lead poisoning

Public health efforts have helped to decrease the percentage of children with elevated blood lead levels from more than 4 percent in the early 1990s to less than 2 percent among children ages 1 to 5 today.

Complications

Exposure to even low levels of lead — 10 micrograms (a microgram is one-millionth of a gram) in a deciliter (1/2 cup) of blood — can cause damage over time, especially in children. The greatest risk is to brain development, where irreversible damage may occur. Higher levels — 25 micrograms per deciliter of blood — can damage the kidneys and nervous system in both children and adults. Very high lead levels may cause seizures, unconsciousness and possibly death.

Complications in children

Health problems in children caused by elevated blood lead levels may include:

- Anemia
- Decreased muscle and bone growth
- Hearing damage
- Learning disabilities
- Nervous system and kidney damage
- Poor muscle coordination
- Speech, language and behavior problems

Complications in adults

High levels of lead in adults may lead to:

- Anemia
- Cataracts
- Damage to reproductive organs in men
- Digestive problems
- High blood pressure

- Memory and concentration problems
- Muscle and joint pain
- Nerve disorders
- Pregnancy complications, including miscarriage, preterm delivery and stillbirth

Preparing for your appointment

If you think you or your child has been exposed to lead, see your doctor or contact your local public health department. A simple test can help determine blood lead levels. To help make the appointment easier:

- **Write down any symptoms or changes in behavior you may have noticed.** Lead poisoning doesn't always cause obvious symptoms, but sometimes a common problem, such as stomach pain or constipation, can be a sign of lead poisoning.
- **Write down key personal information**, including any recent life changes. For instance, have you moved to a different home or apartment, especially one built before 1978? Have your children switched schools? Do they visit friends or relatives who live in older buildings? Do you have a new job that might expose you to lead?
- **Make a list of important medical information for you and your family**, including recent surgical procedures, the names of all medications taken and any other health conditions.
- **Write down questions** to ask your doctor. For instance, you'll want to ask about the long-term effects of lead exposure, how lead poisoning is treated, and how you can prevent further exposure.

Tests and diagnosis

The Centers for Disease Control and Prevention (CDC) recommends that states test children for lead poisoning at ages 1 and 2. The CDC also recommends testing for children ages 3 to 6 if they:

- Have never been tested before
- Receive public assistance, such as Medicaid
- Live in or frequently visit a home built before 1950 or a home built before 1978 that was recently remodeled
- Have a friend or sibling who has had lead poisoning

Doctors usually use a simple blood test to detect lead poisoning. A small blood sample is taken from a finger prick or from a vein. Lead levels in the blood are measured in micrograms per deciliter (mcg/dL). An unsafe level is 10 mcg/dL or higher.

Treatments and drugs

The first step in treating all degrees of lead poisoning is to remove the source of the contamination. If you can't remove lead from your environment, you may at least be able to reduce the likelihood that it will cause problems. For instance, sometimes it might be better to seal in, rather than remove, old lead paint. Your local health department can recommend ways to identify and reduce lead in your home and community.

For children and adults with relatively low lead levels, simply avoiding exposure to lead may be enough to reduce blood lead levels.

Treating higher levels

For more severe cases, your doctor may recommend:

- **Chelation therapy.** In this treatment, you take a medication that binds with the lead so that it's excreted in your urine.
- **EDTA therapy.** Doctors treat lead levels greater than 45 mcg/dL of blood with a chemical called ethylenediaminetetraacetic acid (EDTA). Depending on your lead level, you may need more than one treatment. In such severe cases, however, it may not be possible to reverse damage that has already occurred.

Children with lead toxicity may also be iron deficient and are treated with iron supplements, if needed.

Prevention

You can take some simple measures to help protect you and your family from lead poisoning. These may include:

Lead assessment

- **Have a professional check your home for lead.** Home lead tests may not be reliable.
- **Talk to your landlord.** If you live in a rental property and your child has an elevated blood lead level, your landlord may be required to take certain actions to reduce your lead exposure. If you live in public housing, there may be a requirement to assess the lead risk and correct the situation if a high lead level is found.

Everyday tasks

If you live in or near an area that contains lead, these suggestions can help reduce your risk:

- **Wash your children's hands** after outdoor play, before eating and at bedtime.
- **Clean your floors** with a wet mop and wipe furniture, windowsills and other dusty surfaces with a damp cloth.

- **Run cold water for at least a minute before using**, if you have older plumbing containing lead pipes or fittings. Don't use hot tap water to make baby formula or for cooking.

Home renovation

If you're doing minor remodeling or touch-up work in an older house with lead-based paint, take precautions:

- **Wear protective equipment and clothing.** Change your clothes, take a shower and wash your hair before leaving the job. Don't shake out work clothes or wash them with other clothes.
- **Be careful where you eat.** Don't eat or drink in an area where lead dust may be present.
- **Don't attempt to remove the lead paint by sanding.** Sanding surfaces painted with lead is hazardous because it generates large amounts of small particles.
- **Don't use an open-flame torch to remove paint.** The flame produces lead particles small enough to inhale.
- **Use caution in painting over old lead paint with new, lead-free enamel.** Removing old lead paint may not always be possible. If the paint is on tight, without many chips, you can paint over it. You can also use paneling, drywall or encapsulation, which is similar to a very thick coat of paint.

References

April 8, 2009

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