



Vol. 19, No. 3
June 2009

Lead Poisoning Among Children

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Lead poisoning is one of the most common and preventable environmental health problems today. The Center for Disease Control and Prevention (CDC) establishes the level of 10 micrograms per deciliter ($\mu\text{g}/\text{dL}$) or greater to be the recommended level of concern regarding an elevated blood lead level. Almost half a million children in the United States are estimated to have elevated blood lead levels of at least 10 $\mu\text{g}/\text{dL}$ (micrograms per deciliter). According to 2008 Missouri blood lead testing data, 1,114 (1.2%) of children under the age of six were identified with elevated blood lead levels (**See Map by County below**).

What is Lead Poisoning?

Lead is a shiny, silver-colored metal found naturally in the earth's crust. It has historically been used in a variety of products including paints, gasoline, batteries, bullets, and some vinyl products such as mini-blinds. Fine particles of processed or recycled lead and/or lead dust become a health hazard when they are taken into the body through inhalation (breathing) and/or ingestion (swallowing).

Lead affects almost every organ and system in the body, especially the brain, central nervous system, kidneys, and immune system. Lead can also decrease calcium absorption in the body making it hard to obtain the nutrients it needs to stay healthy. It is most harmful to young children under six years of age and especially to children less than three years of age due to their rapidly developing and immature body systems.

Health Effects of Lead

The effects of lead exposure are generally the same whether it enters the body through swallowing or by breathing it in. Often there are few symptoms to indicate a child may have lead poisoning, yet the health effects can be long term. The most common health effects can include but are not limited to the following:

- Lower IQ levels;
- Learning difficulties;
- Attention deficits;
- Behavioral problems;
- Interference with growth; and
- Hearing problems.

Pathways of Lead Poisoning

Lead can be absorbed into the body through the stomach or by breathing it in. Since young children often tend to put things in their mouths, lead can enter the stomach by swallowing contaminated foods, beverages, soil, dust or paint chips. Children are especially

vulnerable to inhaling lead dust from deteriorated paint in poorly maintained older housing. A pregnant woman with lead in her body can pass it along to her baby before the baby is even born. The baby can be exposed to lead poisoning if the mother inhales or swallows lead before or during pregnancy. Even if she is exposed to lead before pregnancy, there may be lead stored in her bones that is released into the bloodstream during pregnancy and can be harmful to the baby.

Sources of Lead Poisoning

-Paint

The primary lead hazard to children in Missouri is deteriorated (peeling, chipping, or flaking) lead-based paint. For many years lead was added to paints to help make them more durable. Lead-based paint was banned for residential or home use nationwide in 1978. Any home built before 1978 may contain leaded paint. The highest risk of lead exposure for children is found in homes built before 1950, when most paint contained a high percentage of lead. According to the Bureau of the Census, in 2007 a little more than twenty-two percent (22.4%) of the housing stock in Missouri was built before 1950. In 2000 the Census reported that 75 of 115 counties in Missouri had greater than twenty percent pre-1950 housing stock. The risks of lead poisoning are greater when lead paint is in deteriorated condition and when lead paint (even intact paint) is located on surfaces that children may chew on or bite. Lead paint on windows and door frames is of concern because they are friction surfaces, meaning they are rubbed back and forth. This is due to the repeated opening and closing of these windows and doors. The lead dust that comes

from paint is also an issue. When remodeling and repair is done on older homes, the surface of the paint is disturbed. The dust can be released into the air and easily inhaled by children. Also, if the dust is not properly cleaned up or contained, the dust can settle on floors, furniture, toys, etc. Children may crawl through it or drag their toys, pacifiers or objects they put in their mouths. Listed below are other sources of lead poisoning.

-Mines and Smelters

Lead mining and smelting are an important part of Missouri's history and another source of lead poisoning. Missouri has been the dominant lead-producing state in the nation since 1907. Most early lead came from the Old Lead Belt district of southeast Missouri in the Park Hills-Bonne Terre area, and in the Tri-State Zinc-Lead district in southwest Missouri around Joplin. Today, much of the state's lead production comes from the New Lead Belt, also known as the Viburnum Trend district. This district is a very narrow, 35-mile-long ore district extending southward from the small town of Viburnum, Iron County, in southeast Missouri. Mining waste products in these areas have in the past, and may still, end up on driveways, in yards, or even in children's play areas. Dust, air and soil around mining activity areas have shown elevated levels of lead contamination. **(See Map of Missouri Mining Areas below).**

-Soil and dust

-Occupations and Hobbies

- Smelting and refining of metals
- Working with Batteries
- Manufacturing of motor vehicle parts and accessories
- Automotive repair shop workers

- Home remodeling
- Firing range workers
- Working with industrial machinery and equipment
- Refinishing furniture
- Burning lead-painted wood
- Folk or cultural remedies such as:

-Other sources

- Alarcon
- Alkohl
- Azarcon
- Bali goli
- Coral
- Ghasard
- Greta
- Liga
- Pay-loo-ah
- Rueda
- Imported toys, and jewelry
- Cultural medicines
- Cosmetics
- Casting ammunition, fishing weights
- Making stained glass
- Making pottery

Physicians, Parents, Case Managers and Environmental Risk Assessors are Key

Reducing the child's elevated lead level depends on the efforts of an organized team. Physicians and case managers play an important role as members of the organized team, as do parents and environmental risk assessors, in the care of children with elevated lead levels. As an organized group they all work together to provide an important variety of functions, inclusive of but not limited to some of the following:

- Providing specific education about Childhood Lead Poisoning;
- Assessing the factors that can impact the child's elevated lead level such as sources of possible lead exposure, the child's general status, nutrition, child's habits, family interactions, and community resources;
- Developing a plan of selected interventions based upon the results of team assessments with input from the organized team;
- Monitoring for an ongoing decrease in the child's blood lead level;
- Maintaining an active role in helping the child to avoid continued lead exposure and looking at whether the recommendations from the team members are being used in order to help the lead level go down;
- Evaluating the effects of using the recommended steps; and
- Deciding whether the original plan of interventions might need to be changed to help the lead level go down.

Also, it's important for parents to work closely with the other team members to help the lead level go down and prevent further exposures.

Better Local Lead Poisoning Resources

The Department of Health and Senior Services (DHSS) has a program that is dedicated to Childhood Lead Poisoning Prevention (CLPPP). This program works to assist doctors, and nurses by providing information and methods to screen or test patients under the age of six for lead. State guidelines describe the treatment aspects of children with elevated blood lead levels (EBL) of at least ten micrograms per deciliter (10 µg/dL). Follow-up activities and case management are generally provided for children with an EBL of 10 µg/dL and greater. These activities assist in helping the family understand the causes and health effects of childhood lead poisoning along with interventions that can

reduce the current elevation, and help prevent repeated elevations. Lead poisoning prevention educational materials are developed and distributed to help increase both the awareness and needed actions to prevent and reduce lead poisoning within the general public. DHSS works with the local public health agencies (LPHAs), the medical community, other state agencies, businesses, schools, and community organizations in efforts to prevent childhood lead poisoning.

Community Lead Poisoning Factors

Community factors which increase the risk of lead poisoning include:

- Older housing stock (built pre-1950) within the community;
- Lower education levels within the community; and
- Increased levels of poverty (families with low incomes are more likely to live in older, substandard housing).

Resources for Child Care Providers

In areas of the state that are designated as High Risk or Universal Testing Areas, child care providers are given information from the DHSS regarding proof of lead testing requirements, as well as information on how to obtain lead poisoning education materials for use with parents.

The Home Environment

Most young children spend a great deal of time at their home. That is why it is important to understand that the source of lead poisoning is usually found in the home. The Missouri Public Health System provides lead risk assessments to detect the hazardous sources of lead exposure in children's homes. This service is provided for children under the age of six who have a blood lead sample from a vein that results in a level of 15 µg/dL or greater. A risk assessment is performed by a professional that is trained and licensed by the DHSS Lead Licensing Program. The assessor speaks with the child's family to determine areas of the home where the child spends the most time. X-ray Fluorescence Analyzers (XRFs) are used to test dust, soil and water samples to determine if and where lead hazards exist. Upon completing the assessment and receiving the environmental sample results, the risk assessor then provides the property owner and/or occupant (if other than the owner) with information about where the lead hazards are and recommendations for reducing the lead hazards. The risk assessor revisits the home at an agreed-upon time to make sure the lead hazards are reduced and the recommendations have been completed.

Barriers at home

- Poverty
- Living in substandard housing
- Lack of availability of better housing within the community
- Difficulty finding source of the poisoning
- Difficulty controlling child's behavior
- Hygiene
- Home maintenance
- Family customs and beliefs
- Family strain- ill caregivers, siblings

Health System Barriers

- Some healthcare providers may not be aware of which areas of the state are High Risk or Non-High Risk and the requirements for each.

- Parents/guardians may not be aware of the requirements and may not discuss these with the child's physician at the time of an office visit.
- Some physicians may not have lead testing as part of their in-office services and therefore may send the child to be tested at another location. If a parent is sent to another location for the lead test they may not be successful at arriving at the testing location for a variety of reasons.
- Some families may not have health insurance coverage.
- There may also be a lack of reporting laboratory results of blood lead testing.

What Can I do to Protect Myself and My Family From Exposure to Lead?

- Learn about lead poisoning and how to prevent it.
- Keep your home clean by wet mopping and wet wiping surfaces on a regular schedule. Completely rinse mops and sponges after cleaning dusty or dirty areas in the home. Always wash these separate from other laundry if you suspect or know you have lead dust in your home.
- Make sure anything your child may put in his or her mouth is clean and safe. Wash pacifiers, bottles, toys including stuffed toys on a regular basis.
- Make sure children wash hands before meals, after play, and before bedtime. Keep play areas clean.
- Help your family eat a nutritious well balanced diet. Talk with your child's physician about diet specifics related to absorption of lead dust.
- If you suspect or know that you may have lead dust in your carpet use a vacuum with a HEPA filter to help trap the lead dust particles.
- Try to keep children from chewing on painted surfaces like cribs, playpens, or window sills.
- Supervise your child's play time. Have children play in grassy areas instead of bare soil areas.
- Be aware that imported toys and jewelry can contain unsafe amounts of lead and some have been recalled.
- Check the Consumer Product Safety Commissions (CPSC) Web site or the DHSS Childhood Lead Poisoning Web sites listed at the end of this article, for recalls by year on toys, jewelry and other items that have been found to contain unsafe levels of lead.
- If you have a job or hobby that involves lead, learn about and follow any safety rules that apply.
- Don't cook or store foods in imported ceramics, leaded crystal or open metal containers.
- Be aware of lead safe work practices when remodeling.
- Avoid occupational hazards- wear protective equipment to help reduce exposure, practice good hygiene, and wash work clothes separate from other family laundry.

Conclusion

The effects of lead poisoning cannot easily be seen or felt, but it's important to know that it can be prevented. There are state, local, and community agencies that can help you understand and prevent lead poisoning. It's never too early to start using your new knowledge about lead poisoning to help you decide to have your child lead tested, and to help you reduce the likely sources of lead exposure in your home.

Resources for Lead Poisoning

<http://www.dhss.mo.gov/ChildhoodLead/>

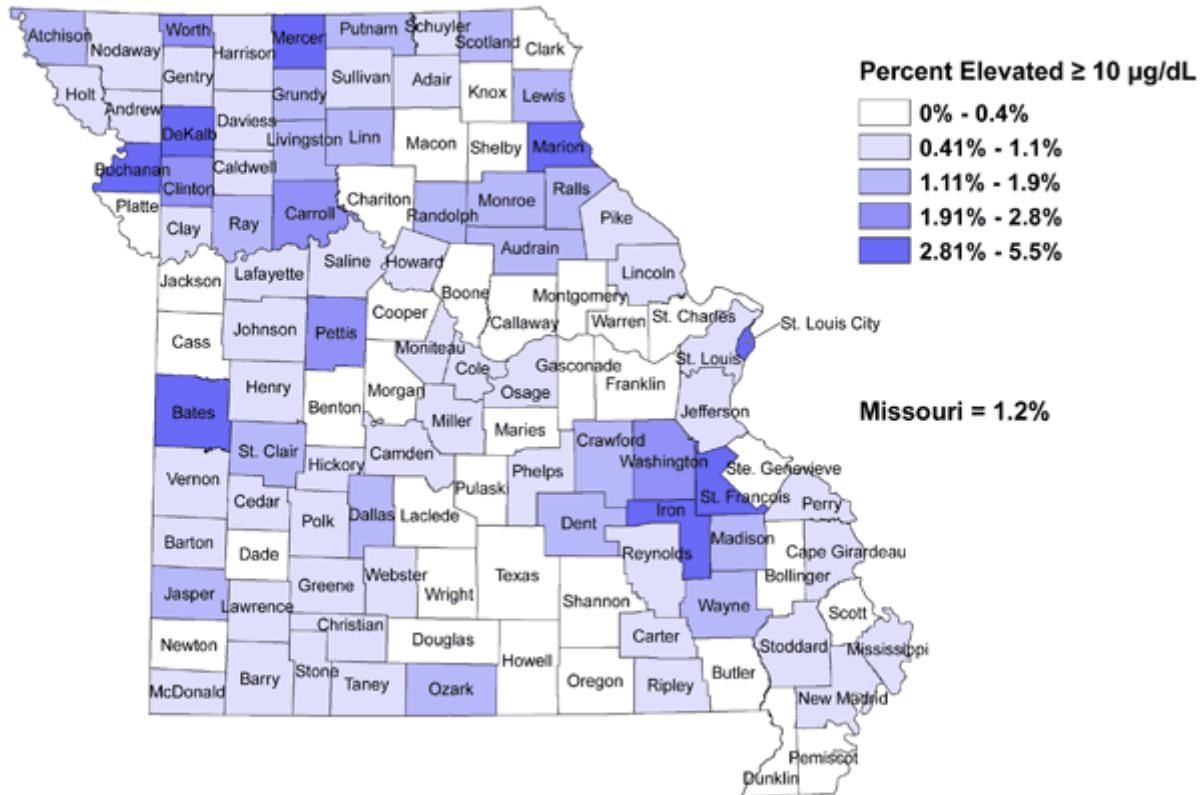
<http://www.cpsc.gov/>

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

<http://www.hud.gov/offices/lead/>

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

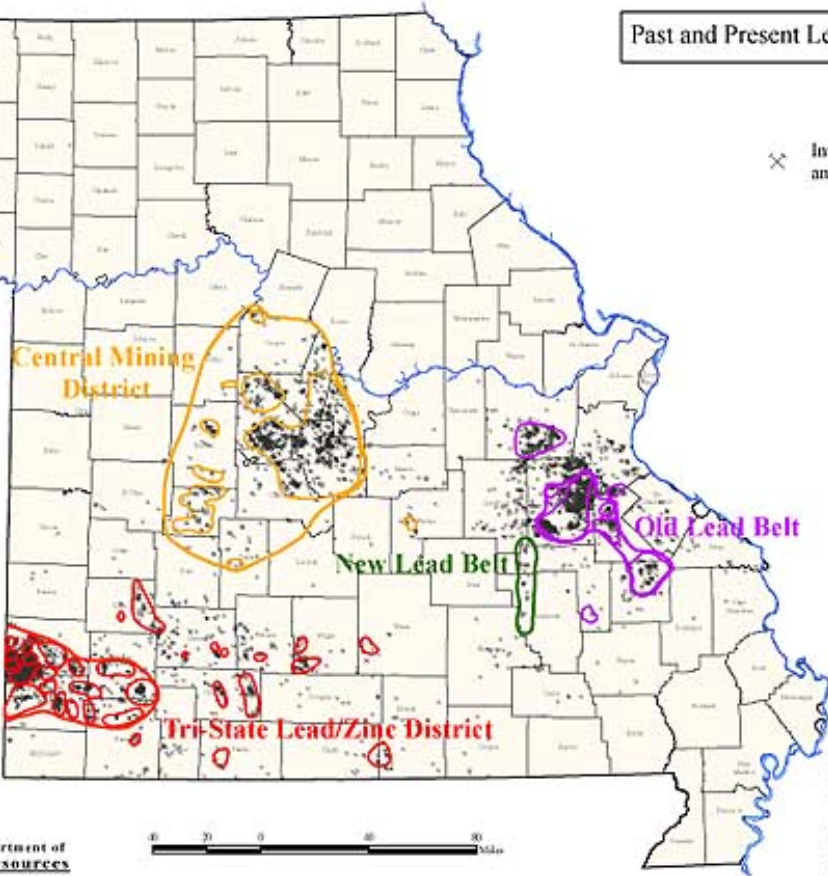
Lead Poisoning Among Children Under Age 6 in Missouri, by County, 2008



Data Source: Missouri Dept. of Health and Senior Services
 Map Prepared by: University of Missouri Extension, Office of Social and Economic Data Analysis (OSED)A
 Map Generated on June 25, 2009

Past and Present Lead Mining in Missouri

✕ Inventory of Mines, Occurrences and Prospects in Missouri (IMOP)



Map created by Valerie Wilde on May 2000

The map can be found at [M. Siegfried/LeadInventory/Lead_Map/Date/LeadMining_0511.mxd](#)

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