



**FREE  
BLOOD LEAD  
TESTING**

**Saturday, February 23, 2019**

**10a.m.-4 p.m.**

**Palmerton Area Junior High School  
3529 Fireline Road  
Palmerton, PA 18071**

**To pre-register call 1-877-PA-HEALTH**

**Walk-ins welcome, appointments preferred.**

**The distribution of this information through the Palmerton Area School District should not be construed as District support for, sponsorship of, or endorsement of any activity described herein. Families are cautioned to investigate carefully both the organization and the activity it is offering to determine the appropriateness of participation for their children.**

**Lead poisoning** affects children's growth, learning and behavior.

In pregnant women, it can cause high blood pressure, premature birth or even miscarriage.

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**Children  
and adults  
of all ages are  
welcome.**

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If you have a primary health care provider, **talk to them first** about insurance-covered blood testing



# Agency for Toxic Substances & Disease Registry Health Consultation Summary

## American Zinc Recycling, Palmerton, Carbon County, PA

### Background

On January 24, 2017, the United States Environmental Protection Agency (EPA) Region 3, asked the Agency for Toxic Substances and Disease Registry (ATSDR) to conduct a public health evaluation of the community's current exposures to lead in the air near the operating American Zinc Recycling (AZR) facility. The AZR facility is in Palmerton, Carbon County, Pennsylvania. In the evaluation, ATSDR also summarized available childhood blood lead information for this community. ATSDR released the American Zinc Recycling Letter Health Consultation on July 31, 2018.

Full ATSDR report available at:

<https://www.atsdr.cdc.gov/HAC/pha/AmericanZincRecycling/AmericanZincRecyclingLCH508.pdf>

Smelting operations began at this location in 1898 (smelting is a process of applying heat to ore in order to extract out a base metal). Environmental contamination related to smelting operations led to the listing of the nearby Palmerton Zinc Pile on the National Priorities List in 1983. The Centers for Disease Control and Prevention (CDC), ATSDR, and the Pennsylvania Department of Health (PADOH) have conducted a broad range of public health assessment and health study activities in Palmerton over the years.

### What did ATSDR's Health Consultation Evaluate?

The letter focused on the community's possible exposure to lead in the air. ATSDR conducted a preliminary analysis of EPA's air modeling results (Figure 1) and evaluated air monitoring data from the PA Department of Environmental Protection (PADEP) from a National Ambient Air Quality Standard (NAAQS) air monitor in Palmerton.<sup>1</sup> The NAAQS for lead in air is 0.15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) in total suspended particulate as a 3-month average.

### Key Findings

- A public health concern was identified for lead in air within 3 miles of the American Zinc Recycling facility. Young children and pregnant women are most at risk from lead exposures. Lead can pass from a mother to her unborn baby. Too much lead in your body can:
  - put you at risk of miscarriage
  - cause your baby to be born too early or too small; and
  - hurt your baby's or young child's brains, kidneys, and nervous systems or cause your child to have learning or behavior problems.<sup>2</sup>
- The rates of elevated blood lead levels in children living in Carbon County are similar to statewide rates. However, due to the small numbers of children involved, specific rates for Palmerton are not available to determine whether blood lead levels in children are different in the immediate area near the AZR facility.
- Air modeling results suggest that higher concentrations of lead than those measured at the existing air monitoring station are possible in the Palmerton community.

### Recommendations and Next Steps

**Environmental agencies** should consider further actions to reduce lead emissions from this facility as well as:

- Conduct particle deposition modeling,
- Review additional available PADEP air monitoring data,
- Consider additional air monitoring,
- Obtain further information about levels of lead in surface soil, and

<sup>1</sup> Air *modeling* is a mathematical simulation of how chemicals in air move and react in the atmosphere to affect ambient air quality. Air *monitoring* is the process of collecting samples of air in order to estimate the concentration of chemicals in the air at that location.

<sup>2</sup> CDC, Lead Poisoning, [https://www.cdc.gov/nceh/lead/tools/are\\_you\\_pregnant.pdf](https://www.cdc.gov/nceh/lead/tools/are_you_pregnant.pdf).

- Evaluate fugitive emissions from the facility boundary and existing permits to ensure that all emission sources and potential offsite concentrations of site related chemicals do not pose a public health hazard.

**Health agencies** should continue to evaluate and share community health information and continue to:

- Evaluate and conduct further analyses of child and adult blood lead levels in Palmerton/Carbon County, and
- Discuss the need to increase blood lead screening activities and health provider outreach in Palmerton, PA.

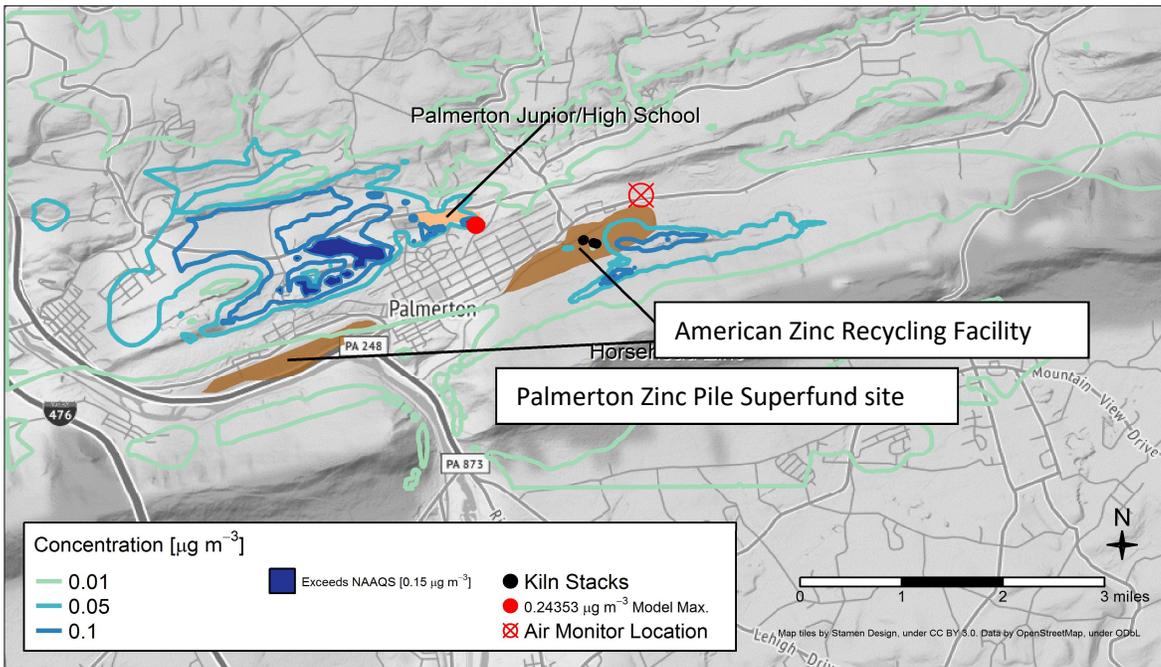
**Families** should:

- Reduce children's and pregnant women's exposures to lead, including avoiding sources that contain lead including lead-based paint; brass; lead-containing toys, candies, or tableware; traditional folk medicines; contaminated soil/dust; and lead from hobbies/jobs (e.g., stained glass, firearm ammunition, fishing weights, welding, and home renovation), and
- Test children's blood for lead following guidance from CDC<sup>3</sup> and the American Academy of Pediatrics.<sup>4</sup>

Please talk to your health professional or call PADOH's Lead Information Line at 1 800 440 LEAD (5323) if you have concerns about exposure to lead and want more information on steps you can take to reduce exposures.

For questions about ATSDR's report, please contact Dr. Karl Markiewicz, Senior Toxicologist, ATSDR Region 3 at 215 814 3149, [kvm4@cdc.gov](mailto:kvm4@cdc.gov) or Lora Werner, Regional Director, ATSDR Region 3 at 215 814 3141, [lkw9@cdc.gov](mailto:lkw9@cdc.gov).

Figure 1: Modeled 3-month average lead concentrations in air near AZR site in Palmerton, PA



**Figure Notes:**

Model period based on 2002 - 2010 Onsite Meteorological Data using AERMOD Version 16216.

Contours of highest rolling 3-month average design values processed by LEADPOST. (LEADPOST is a post-processing tool that calculates design values from monthly AERMOD output.)

Areas exceeding National Ambient Air Concentration (NAAQS) are highlighted in blue.  
 $\mu\text{g}/\text{m}^3$ : Micrograms per cubic meter

<sup>3</sup> CDC, Recommended Actions Based on Blood Lead Level, 2018. Available at: [https://www.cdc.gov/nceh/lead/acclpp/actions\\_blls.html](https://www.cdc.gov/nceh/lead/acclpp/actions_blls.html).

<sup>4</sup> American Academy of Pediatrics, Detection of Lead Poisoning, 2016.

Available at: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/Detection-of-Lead-Poisoning.aspx>.



CDC's National Center for Environmental Health  
 Agency for Toxic Substances and Disease Registry

## WHAT IS LEAD?

Lead is a bluish-gray metal with no smell or taste that can be found in air, water and soil. Lead is also used in industrial and consumer products. Lead is toxic to humans. Manmade exposure sources of lead, such as mining, manufacturing, burning fossil fuels, lead-based paints and even toys are a serious public health threat and environmental issue, particularly for children.

## HOW DOES LEAD GET INTO MY BODY?

Lead gets into your body by drinking water with lead, eating food grown in lead-contaminated soil, putting objects that contain lead into your mouth and breathing air contaminated with lead dust and fumes.

## WHAT CAN LEAD DO TO MY CHILDREN OR ME?

Lead is toxic. There is no known safe blood-lead level—the measure of lead in a person’s body. It can do great harm, especially to young children because their developing bodies absorb more lead than adults do, and their brains and nervous systems are more sensitive to damage from lead exposure.

While there is no safe blood-lead level, if a child’s level is 5 µg/dL or above, it is considered elevated and indicates that additional follow-up is needed. Even low levels of lead can affect children’s IQ scores, the ability to pay attention and academic achievement. In adults, lead can cause high blood pressure and kidney damage. More serious effects, such as aggression, coma, convulsions and even death have been reported.

## HOW CAN I KEEP MY FAMILY SAFE?

- Ask your pediatrician to test your child for lead through a blood test. All children should be tested twice before their second birthday.
- If you live in a home built before 1978, test paint and dust in the home for lead, especially if you are renovating. Make sure you use contractors who are certified to perform the renovations.
- Regularly test your drinking water for lead and consider using a water treatment system. Your home’s pipes or service line could be a contamination source even if you are connected to a public water system.
- If you are exposed to lead dust at work, be sure to shower and change clothes before going home.

## RESOURCES FOR MORE INFORMATION

The department’s toll-free lead information line is 1-800-440-LEAD. You can call this line to speak to someone about your lead questions.

For a list of certified lead professionals, visit the [Pennsylvania Department of Labor and Industry](#).

[Childhood Lead Surveillance Program](#) tracks and monitors childhood lead activity in the state. The program publishes yearly reports on the number of children tested for lead and their blood lead levels.

[Adult Blood Lead Epidemiology and Surveillance](#) (ABLES) tracks and monitors adult lead activity in the state.

**If you have any questions, contact us at [env.health.concern@pa.gov](mailto:env.health.concern@pa.gov).**



<b>DATE:</b>	02/08/2019
<b>TO:</b>	Health Alert Network
<b>FROM:</b>	Dr. Rachel Levine, Secretary of Health
<b>SUBJECT:</b>	<b>Update: Exposures to lead in the air near the American Zinc Recycling LLC (AZR) facility in Palmerton, Carbon County, PA</b>
<b>DISTRIBUTION:</b>	Carbon, Northampton, Luzerne, Monroe, Lehigh, and Schuylkill Counties
<b>LOCATION:</b>	n/a
<b>STREET ADDRESS:</b>	n/a
<b>COUNTY:</b>	n/a
<b>MUNICIPALITY:</b>	n/a
<b>ZIP CODE:</b>	n/a

**This transmission is a “Health Advisory”:** provides important information for a specific incident or situation; may not require immediate action.

**HOSPITALS:** PLEASE SHARE WITH ALL MEDICAL, PEDIATRIC, NURSING AND LABORATORY STAFF IN YOUR HOSPITAL

**EMS COUNCILS:** PLEASE DISTRIBUTE AS APPROPRIATE

**FQHCs:** PLEASE DISTRIBUTE AS APPROPRIATE

**LOCAL HEALTH JURISDICTIONS:** PLEASE DISTRIBUTE AS APPROPRIATE

**PROFESSIONAL ORGANIZATIONS:** PLEASE DISTRIBUTE TO YOUR MEMBERSHIP

**Summary**

- The Pennsylvania Department of Health (DOH) is working with the federal Agency for Toxic Substances and Disease Registry (ATSDR) to review residents’ exposure to lead in the air near the American Zinc Recycling LLC (AZR) facility, formerly Horsehead Zinc, currently operating in Palmerton, Carbon County, Pennsylvania.
- ATSDR recently completed a study that evaluated the community’s current exposure to lead in the air.
- Persons who may be at most risk for increased lead exposure include young children and pregnant women.
- If you are concerned about lead levels in your blood, please consult with your healthcare provider.
- **DOH will conduct a free blood lead testing clinic for the Palmerton community on February 23, 2019, from 10 a.m. to 4 p.m. (snow date: March 9, 2019, same time and place). The clinic will be held at the Palmerton Area Junior High School at 3529 Fireline Rd, Palmerton, PA 18071. Walk-ins are welcome though appointments are preferred and can be scheduled in advance by calling 1-877-PA-HEALTH.**

## **Summary (Continued)**

**All ages are welcome to participate in the clinic. Residents with primary healthcare providers should talk to them about insurance-covered blood lead testing first.**

- Call the Pennsylvania Department of Health's Lead Information Line at 1-800-440-LEAD (1-800-440-5323) if you have concerns about exposure to lead and want more information on steps you can take to reduce exposures.

## **Background on Lead Exposure**

Sources of lead emissions vary from one area to another. Major sources of lead in the air across the country are ore and metals processing as well as piston-engine aircraft operating on leaded aviation fuel. Other sources are waste incinerators, utilities and lead-acid battery manufacturers. The highest air concentrations of lead are usually found near lead smelters.

Due to Environmental Protection Agency's (EPA) regulatory efforts, including the removal of lead from motor vehicle gasoline, levels of lead in the air decreased by 98 percent between 1980 and 2014.

When a person is exposed to lead, it distributes throughout the body in the blood and is accumulated in the bones. Depending on the level of exposure, lead can adversely affect the nervous system, kidney function, immune system, reproductive and developmental systems, and the cardiovascular system. Lead exposure also affects the oxygen carrying capacity of the blood. Adverse lead effects most commonly encountered in current populations are neurological effects in children and cardiovascular effects (e.g., high blood pressure and heart disease) in adults. Infants and young children are especially sensitive to even low levels of lead exposure, which may contribute to behavioral problems, learning deficits, and lowered IQ.

Pregnant women may have a higher risk for miscarriage.<sup>1</sup> Lead in the mother's bloodstream can pass to her unborn baby. The baby's lead exposure may cause it to be born too early or too small. Damage to the baby's developing brain may also occur.

## **National Ambient Air Quality Standards (NAAQS) for Lead**

The EPA issued Sept. 16, 2016 a decision to retain the existing 2008 standards without revision, based on a review of air quality criteria for lead. Lead standards are 0.15 micrograms per cubic meter ( $\mu\text{g}/\text{m}^3$ ) lead in total suspended particles as a 3-month average.

<https://www.epa.gov/lead-air-pollution/national-ambient-air-quality-standards-naaqs-lead-pb>.

## **ATSDR Study Findings**

Pennsylvania DOH is working with our federal partners at ATSDR to review possible exposure to lead in the air near AZR's facility in Palmerton, Carbon County, PA.

A recent study by the ATSDR evaluated the community's current exposures to lead in the air near the AZR facility. The agency reported levels detected at the Palmerton NAAQS monitor exceeded a 3-month rolling average of 0.15  $\mu\text{g}/\text{m}^3$  one time (in May 2015) over the 2013-2015 monitoring period. Using air modeling data, the highest estimated rolling 3-month average lead concentration was 0.244  $\mu\text{g}/\text{m}^3$ . The amount of lead in the air within 3 miles of the AZR facility,

based on modeling results and monitoring data, could present a public health hazard. Young children and pregnant women are at most risk from lead exposure. ATSDR also summarized available childhood blood lead information for this community. ATSDR released the AZR Letter Health Consultation on July 31, 2018, available at:

[https://www.atsdr.cdc.gov/HAC/pha/AmericanZincRecycling/American\\_Zinc\\_Recycling\\_LCH\\_508.pdf](https://www.atsdr.cdc.gov/HAC/pha/AmericanZincRecycling/American_Zinc_Recycling_LCH_508.pdf)

The study focused on health risks associated with exposure to lead in the air. ATSDR evaluated air monitoring data from the Pennsylvania Department of Environmental Protection.

The rates of elevated blood lead levels in children living in Carbon County are similar to statewide rates. However, due to the small numbers of children involved, specific rates for Palmerton are not available to determine whether blood lead levels in children are unusually high in the immediate area near the AZR facility.

Air modeling results suggest higher concentrations of lead than those measured at the existing air monitoring station are possible in the Palmerton community.

### **Recommendations for Healthcare Providers and Community Members**

- Reduce children’s exposure to sources of lead, including lead-based paint, lead-containing toys, and contaminated soil/dust.
- Test children’s blood for lead, following guidance from the CDC<sup>2</sup> and American Academy of Pediatrics<sup>3</sup>.
- Call PADOH’s Lead Information Line at 1-800-440-LEAD (5323) if you have concerns about exposure to lead and want more information on steps you can take to reduce exposures.

Please submit your questions about the AZR facility documents to [env.health.concern@pa.gov](mailto:env.health.concern@pa.gov).

<sup>1</sup>CDC – [“Lead Poisoning-Are You Pregnant?” fact sheet](#)

<sup>2</sup>CDC, Recommended Actions Based on Blood Lead Level, 2018. Available at: [https://www.cdc.gov/nceh/lead/acclpp/actions\\_blls.html](https://www.cdc.gov/nceh/lead/acclpp/actions_blls.html).

<sup>3</sup>American Academy of Pediatrics, Detection of Lead Poisoning, 2016. Available at: <https://www.aap.org/en-us/advocacy-and-policy/aap-health-initiatives/lead-exposure/Pages/Detection-of-Lead-Poisoning.aspx>.

Categories of Health Alert messages:

**Health Alert:** conveys the highest level of importance; warrants immediate action or attention.

**Health Advisory:** provides important information for a specific incident or situation; may not require immediate action.

**Health Update:** provides updated information regarding an incident or situation; unlikely to require immediate action.

This information is current as of February 8, 2019 but may be modified in the future.

# Are You Pregnant?

## Prevent Lead Poisoning. Start Now.

Lead poisoning is caused by breathing or swallowing lead. Lead can pass from a mother to her unborn baby.

### Too much lead in your body can:

- Put you at risk of miscarriage
- Cause your baby to be born too early or too small
- Hurt your baby's brain, kidneys, and nervous system
- Cause your child to have learning or behavior problems

### Lead can be found in:

- Paint and dust in older homes, especially dust from renovation or repairs
- Candy, make up, glazed pots, and folk medicine made in other countries
- Work like auto refinishing, construction, and plumbing
- Soil and tap water

**Contact your local health department to learn more.**



**Now is the time to keep your baby safe from lead poisoning.  
Here's what you can do:**

**1**

**Watch out for lead in your home.**

Most lead comes from paint in older homes. When old paint cracks and peels, it makes dangerous dust. The dust is so small you cannot see it. You can breathe in lead dust and not even know it.

Home repairs like sanding or scraping paint can make dangerous lead dust. Pregnant women should not be in the house during cleaning, painting, or remodeling a room with lead paint.

**Tip:** If you live in an older home, have your home inspected by a licensed lead inspector.

**2**

**Eat foods with calcium, iron and vitamin C.**

These foods may help protect you and your unborn baby.

- **Calcium** is in milk, yogurt, cheese, and green leafy vegetables like spinach.
- **Iron** is in lean red meat, beans, cereals, and spinach.
- **Vitamin C** is in oranges, green and red peppers, broccoli, tomatoes, and juices.

**3**

**Talk to your doctor.**

Talk to your doctor about any medicines or vitamins you are taking. Some home remedies and dietary supplements have lead in them. It is important that you tell your doctor about any cravings you are having such as eating dirt or clay.

**Contact us for more information:**

Please talk to your health professional or call PADOH's Lead Information Line at 1-800-440-LEAD (5323) if you have concerns about exposure to lead and want more information on steps you can take to reduce exposures.

Please contact Dr. Karl Markiewicz, Senior Toxicologist, Agency for Toxic Substances and Disease Registry (ATSDR) Region 3 at 215-814-3149, [kvm4@cdc.gov](mailto:kvm4@cdc.gov) or Lora Werner, Regional Director, ATSDR Region 3 at 215-814-3141, [lkw9@cdc.gov](mailto:lkw9@cdc.gov) if you have questions about recent public health evaluations related to lead in Palmerton.



# Prevent Childhood Lead Poisoning

Exposure to lead can seriously harm a child's health.



Damage to the brain and nervous system



Slowed growth and development



Learning and behavior problems



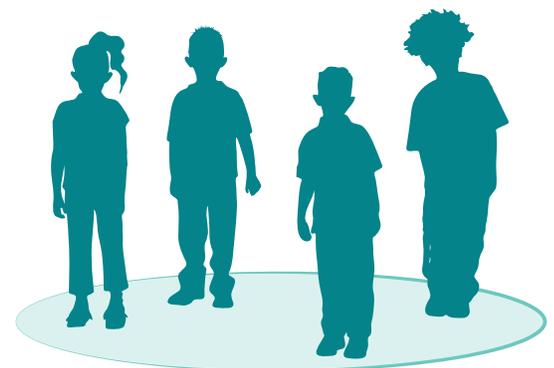
Hearing and speech problems

**This can cause:**

Lower IQ

Decreased ability to pay attention

Underperformance in school



# The good news: Lead poisoning is **100%** preventable.

Take these steps to make your home lead-safe.



**Talk with your child's doctor** about a simple blood lead test. If you are pregnant or nursing, talk with your doctor about exposure to sources of lead.



Talk with your local health department about **testing paint and dust in your home for lead** if you live in a home built before 1978.



**Renovate safely.** Common renovation activities (like sanding, cutting, replacing windows, and more) can create hazardous lead dust. If you're planning renovations, use contractors certified by the Environmental Protection Agency (visit [www.epa.gov/lead](http://www.epa.gov/lead) for information).



**Remove recalled toys and toy jewelry from children and discard as appropriate.** Stay up-to-date on current recalls by visiting the Consumer Product Safety Commission's website: [www.cpsc.gov](http://www.cpsc.gov).



Visit [www.cdc.gov/nceh/lead](http://www.cdc.gov/nceh/lead) to learn more.

Please talk to your health professional or call PADOH's Lead Information Line at 1-800-440-LEAD (5323) if you have concerns about exposure to lead and want more information on steps you can take to reduce exposures. Please contact Dr. Karl Markiewicz, Senior Toxicologist, Agency for Toxic Substances and Disease Registry (ATSDR) Region 3 at 215-814-3149, [kvm4@cdc.gov](mailto:kvm4@cdc.gov) or Lora Werner, Regional Director, ATSDR Region 3 at 215-814-3141, [lkw9@cdc.gov](mailto:lkw9@cdc.gov) if you have questions about recent public health evaluations related to lead in Palmerton.

# IMPORTANT!

## Lead From Paint, Dust, and Soil in and Around Your Home Can Be Dangerous if Not Managed Properly

- Children under 6 years old are most at risk for lead poisoning in your home.
- Lead exposure can harm young children and babies even before they are born.
- Homes, schools, and child care facilities built before 1978 are likely to contain lead-based paint.
- Even children who seem healthy may have dangerous levels of lead in their bodies.
- Disturbing surfaces with lead-based paint or removing lead-based paint improperly can increase the danger to your family.
- People can get lead into their bodies by breathing or swallowing lead dust, or by eating soil or paint chips containing lead.
- People have many options for reducing lead hazards. Generally, lead-based paint that is in good condition is not a hazard (see page 10).



# Protect Your Family From Lead in Your Home



## Are You Planning to Buy or Rent a Home Built Before 1978?

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Did you know that many homes built before 1978 have **lead-based paint**? Lead from paint, chips, and dust can pose serious health hazards.

### Read this entire brochure to learn:

- How lead gets into the body
- How lead affects health
- What you can do to protect your family
- Where to go for more information

### Before renting or buying a pre-1978 home or apartment, federal law requires:

- Sellers must disclose known information on lead-based paint or lead-based paint hazards before selling a house.
- Real estate sales contracts must include a specific warning statement about lead-based paint. Buyers have up to 10 days to check for lead.
- Landlords must disclose known information on lead-based paint and lead-based paint hazards before leases take effect. Leases must include a specific warning statement about lead-based paint.

### If undertaking renovations, repairs, or painting (RRP) projects in your pre-1978 home or apartment:

- Read EPA's pamphlet, *The Lead-Safe Certified Guide to Renovate Right*, to learn about the lead-safe work practices that contractors are required to follow when working in your home (see page 12).



## Consumer Product Safety Commission (CPSC)

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The CPSC protects the public against unreasonable risk of injury from consumer products through education, safety standards activities, and enforcement. Contact CPSC for further information regarding consumer product safety and regulations.

### CPSC

4330 East West Highway  
Bethesda, MD 20814-4421  
1-800-638-2772  
[cpsc.gov](http://cpsc.gov) or [saferproducts.gov](http://saferproducts.gov)

## U. S. Department of Housing and Urban Development (HUD)

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HUD's mission is to create strong, sustainable, inclusive communities and quality affordable homes for all. Contact HUD's Office of Healthy Homes and Lead Hazard Control for further information regarding the Lead Safe Housing Rule, which protects families in pre-1978 assisted housing, and for the lead hazard control and research grant programs.

### HUD

451 Seventh Street, SW, Room 8236  
Washington, DC 20410-3000  
(202) 402-7698  
[hud.gov/offices/lead/](http://hud.gov/offices/lead/)

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This document is in the public domain. It may be produced by an individual or organization without permission. Information provided in this booklet is based upon current scientific and technical understanding of the issues presented and is reflective of the jurisdictional boundaries established by the statutes governing the co-authoring agencies. Following the advice given will not necessarily provide complete protection in all situations or against all health hazards that can be caused by lead exposure.

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U. S. EPA Washington DC 20460  
U. S. CPSC Bethesda MD 20814  
U. S. HUD Washington DC 20410

EPA-747-K-12-001  
June 2017

## U. S. Environmental Protection Agency (EPA) Regional Offices

The mission of EPA is to protect human health and the environment. Your Regional EPA Office can provide further information regarding regulations and lead protection programs.

**Region 1** (Connecticut, Massachusetts, Maine, New Hampshire, Rhode Island, Vermont)

Regional Lead Contact  
U.S. EPA Region 1  
5 Post Office Square, Suite 100, OES 05-4  
Boston, MA 02109-3912  
(888) 372-7341

**Region 2** (New Jersey, New York, Puerto Rico, Virgin Islands)

Regional Lead Contact  
U.S. EPA Region 2  
2890 Woodbridge Avenue  
Building 205, Mail Stop 225  
Edison, NJ 08837-3679  
(732) 321-6671

**Region 3** (Delaware, Maryland, Pennsylvania, Virginia, DC, West Virginia)

Regional Lead Contact  
U.S. EPA Region 3  
1650 Arch Street  
Philadelphia, PA 19103  
(215) 814-2088

**Region 4** (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee)

Regional Lead Contact  
U.S. EPA Region 4  
AFC Tower, 12th Floor, Air, Pesticides & Toxics  
61 Forsyth Street, SW  
Atlanta, GA 30303  
(404) 562-8998

**Region 5** (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin)

Regional Lead Contact  
U.S. EPA Region 5 (DT-8J)  
77 West Jackson Boulevard  
Chicago, IL 60604-3666  
(312) 886-7836

**Region 6** (Arkansas, Louisiana, New Mexico, Oklahoma, Texas, and 66 Tribes)

Regional Lead Contact  
U.S. EPA Region 6  
1445 Ross Avenue, 12th Floor  
Dallas, TX 75202-2733  
(214) 665-2704

**Region 7** (Iowa, Kansas, Missouri, Nebraska)

Regional Lead Contact  
U.S. EPA Region 7  
11201 Renner Blvd.  
WWPD/TOPE  
Lenexa, KS 66219  
(800) 223-0425

**Region 8** (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming)

Regional Lead Contact  
U.S. EPA Region 8  
1595 Wynkoop St.  
Denver, CO 80202  
(303) 312-6966

**Region 9** (Arizona, California, Hawaii, Nevada)

Regional Lead Contact  
U.S. EPA Region 9 (CMD-4-2)  
75 Hawthorne Street  
San Francisco, CA 94105  
(415) 947-4280

**Region 10** (Alaska, Idaho, Oregon, Washington)

Regional Lead Contact  
U.S. EPA Region 10  
Solid Waste & Toxics Unit (WCM-128)  
1200 Sixth Avenue, Suite 900  
Seattle, WA 98101  
(206) 553-1200

## Simple Steps to Protect Your Family from Lead Hazards

### If you think your home has lead-based paint:

- Don't try to remove lead-based paint yourself.
- Always keep painted surfaces in good condition to minimize deterioration.
- Get your home checked for lead hazards. Find a certified inspector or risk assessor at [epa.gov/lead](https://www.epa.gov/lead).
- Talk to your landlord about fixing surfaces with peeling or chipping paint.
- Regularly clean floors, window sills, and other surfaces.
- Take precautions to avoid exposure to lead dust when remodeling.
- When renovating, repairing, or painting, hire only EPA- or state-approved Lead-Safe certified renovation firms.
- Before buying, renting, or renovating your home, have it checked for lead-based paint.
- Consult your health care provider about testing your children for lead. Your pediatrician can check for lead with a simple blood test.
- Wash children's hands, bottles, pacifiers, and toys often.
- Make sure children eat healthy, low-fat foods high in iron, calcium, and vitamin C.
- Remove shoes or wipe soil off shoes before entering your house.

## Lead Gets into the Body in Many Ways

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### Adults and children can get lead into their bodies if they:

- Breathe in lead dust (especially during activities such as renovations, repairs, or painting that disturb painted surfaces).
- Swallow lead dust that has settled on food, food preparation surfaces, and other places.
- Eat paint chips or soil that contains lead.

### Lead is especially dangerous to children under the age of 6.

- At this age, children's brains and nervous systems are more sensitive to the damaging effects of lead.
- Children's growing bodies absorb more lead.
- Babies and young children often put their hands and other objects in their mouths. These objects can have lead dust on them.



### Women of childbearing age should know that lead is dangerous to a developing fetus.

- Women with a high lead level in their system before or during pregnancy risk exposing the fetus to lead through the placenta during fetal development.

## For More Information

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### The National Lead Information Center

Learn how to protect children from lead poisoning and get other information about lead hazards on the Web at [epa.gov/lead](http://epa.gov/lead) and [hud.gov/lead](http://hud.gov/lead), or call **1-800-424-LEAD (5323)**.

### EPA's Safe Drinking Water Hotline

For information about lead in drinking water, call **1-800-426-4791**, or visit [epa.gov/safewater](http://epa.gov/safewater) for information about lead in drinking water.

### Consumer Product Safety Commission (CPSC) Hotline

For information on lead in toys and other consumer products, or to report an unsafe consumer product or a product-related injury, call **1-800-638-2772**, or visit CPSC's website at [cpsc.gov](http://cpsc.gov) or [saferproducts.gov](http://saferproducts.gov).

### State and Local Health and Environmental Agencies

Some states, tribes, and cities have their own rules related to lead-based paint. Check with your local agency to see which laws apply to you. Most agencies can also provide information on finding a lead abatement firm in your area, and on possible sources of financial aid for reducing lead hazards. Receive up-to-date address and phone information for your state or local contacts on the Web at [epa.gov/lead](http://epa.gov/lead), or contact the National Lead Information Center at **1-800-424-LEAD**.

Hearing- or speech-challenged individuals may access any of the phone numbers in this brochure through TTY by calling the toll-free Federal Relay Service at **1-800-877-8339**.

## Other Sources of Lead, continued

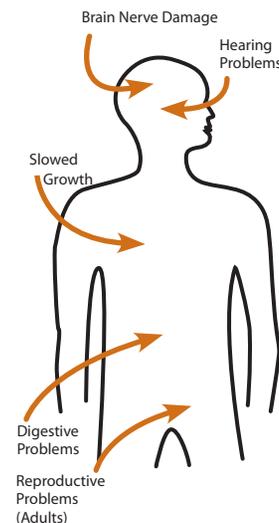
- **Lead smelters** or other industries that release lead into the air.
- **Your job.** If you work with lead, you could bring it home on your body or clothes. Shower and change clothes before coming home. Launder your work clothes separately from the rest of your family's clothes.
- **Hobbies** that use lead, such as making pottery or stained glass, or refinishing furniture. Call your local health department for information about hobbies that may use lead.
- Old **toys** and **furniture** may have been painted with lead-containing paint. Older toys and other children's products may have parts that contain lead.<sup>4</sup>
- Food and liquids cooked or stored in **lead crystal** or **lead-glazed pottery or porcelain** may contain lead.
- Folk remedies, such as "**greta**" and "**azarcon**," used to treat an upset stomach.

## Health Effects of Lead

**Lead affects the body in many ways.** It is important to know that even exposure to low levels of lead can severely harm children.

### In children, exposure to lead can cause:

- Nervous system and kidney damage
- Learning disabilities, attention-deficit disorder, and decreased intelligence
- Speech, language, and behavior problems
- Poor muscle coordination
- Decreased muscle and bone growth
- Hearing damage



While low-lead exposure is most common, exposure to high amounts of lead can have devastating effects on children, including seizures, unconsciousness, and in some cases, death.

Although children are especially susceptible to lead exposure, lead can be dangerous for adults, too.

### In adults, exposure to lead can cause:

- Harm to a developing fetus
- Increased chance of high blood pressure during pregnancy
- Fertility problems (in men and women)
- High blood pressure
- Digestive problems
- Nerve disorders
- Memory and concentration problems
- Muscle and joint pain

<sup>4</sup> In 1978, the federal government banned toys, other children's products, and furniture with lead-containing paint. In 2008, the federal government banned lead in most children's products. The federal government currently bans lead in excess of 100 ppm by weight in most children's products.

## Check Your Family for Lead

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**Get your children and home tested if you think your home has lead.**

Children's blood lead levels tend to increase rapidly from 6 to 12 months of age, and tend to peak at 18 to 24 months of age.

Consult your doctor for advice on testing your children. A simple blood test can detect lead. Blood lead tests are usually recommended for:

- Children at ages 1 and 2
- Children or other family members who have been exposed to high levels of lead
- Children who should be tested under your state or local health screening plan

**Your doctor can explain what the test results mean and if more testing will be needed.**

## Other Sources of Lead

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### Lead in Drinking Water

The most common sources of lead in drinking water are lead pipes, faucets, and fixtures.

Lead pipes are more likely to be found in older cities and homes built before 1986.

You can't smell or taste lead in drinking water.

To find out for certain if you have lead in drinking water, have your water tested.

Remember older homes with a private well can also have plumbing materials that contain lead.

### Important Steps You Can Take to Reduce Lead in Drinking Water

- Use only cold water for drinking, cooking and making baby formula. Remember, boiling water does not remove lead from water.
- Before drinking, flush your home's pipes by running the tap, taking a shower, doing laundry, or doing a load of dishes.
- Regularly clean your faucet's screen (also known as an aerator).
- If you use a filter certified to remove lead, don't forget to read the directions to learn when to change the cartridge. Using a filter after it has expired can make it less effective at removing lead.

Contact your water company to determine if the pipe that connects your home to the water main (called a service line) is made from lead. Your area's water company can also provide information about the lead levels in your system's drinking water.

For more information about lead in drinking water, please contact EPA's Safe Drinking Water Hotline at 1-800-426-4791. If you have other questions about lead poisoning prevention, call 1-800 424-LEAD.\*

Call your local health department or water company to find out about testing your water, or visit [epa.gov/safewater](http://epa.gov/safewater) for EPA's lead in drinking water information. Some states or utilities offer programs to pay for water testing for residents. Contact your state or local water company to learn more.

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\* Hearing- or speech-challenged individuals may access this number through TTY by calling the Federal Relay Service at 1-800-877-8339.

## Renovating, Repairing or Painting a Home with Lead-Based Paint

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**If you hire a contractor to conduct renovation, repair, or painting (RRP) projects in your pre-1978 home or childcare facility (such as pre-school and kindergarten), your contractor must:**

- Be a Lead-Safe Certified firm approved by EPA or an EPA-authorized state program
- Use qualified trained individuals (Lead-Safe Certified renovators) who follow specific lead-safe work practices to prevent lead contamination
- Provide a copy of EPA's lead hazard information document, *The Lead-Safe Certified Guide to Renovate Right*



**RRP contractors working in pre-1978 homes and childcare facilities must follow lead-safe work practices that:**

- **Contain the work area.** The area must be contained so that dust and debris do not escape from the work area. Warning signs must be put up, and plastic or other impermeable material and tape must be used.
- **Avoid renovation methods that generate large amounts of lead-contaminated dust.** Some methods generate so much lead-contaminated dust that their use is prohibited. They are:
  - Open-flame burning or torching
  - Sanding, grinding, planing, needle gunning, or blasting with power tools and equipment not equipped with a shroud and HEPA vacuum attachment
  - Using a heat gun at temperatures greater than 1100°F
- **Clean up thoroughly.** The work area should be cleaned up daily. When all the work is done, the area must be cleaned up using special cleaning methods.
- **Dispose of waste properly.** Collect and seal waste in a heavy duty bag or sheeting. When transported, ensure that waste is contained to prevent release of dust and debris.

To learn more about EPA's requirements for RRP projects, visit [epa.gov/getleadsafe](https://www.epa.gov/getleadsafe), or read *The Lead-Safe Certified Guide to Renovate Right*.

## Where Lead-Based Paint Is Found

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In general, the older your home or childcare facility, the more likely it has lead-based paint.<sup>1</sup>

**Many homes, including private, federally-assisted, federally-owned housing, and childcare facilities built before 1978 have lead-based paint.** In 1978, the federal government banned consumer uses of lead-containing paint.<sup>2</sup>

Learn how to determine if paint is lead-based paint on page 7.

**Lead can be found:**

- In homes and childcare facilities in the city, country, or suburbs,
- In private and public single-family homes and apartments,
- On surfaces inside and outside of the house, and
- In soil around a home. (Soil can pick up lead from exterior paint or other sources, such as past use of leaded gas in cars.)

Learn more about where lead is found at [epa.gov/lead](https://www.epa.gov/lead).

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<sup>1</sup> "Lead-based paint" is currently defined by the federal government as paint with lead levels greater than or equal to 1.0 milligram per square centimeter (mg/cm), or more than 0.5% by weight.

<sup>2</sup> "Lead-containing paint" is currently defined by the federal government as lead in new dried paint in excess of 90 parts per million (ppm) by weight.

## Identifying Lead-Based Paint and Lead-Based Paint Hazards

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**Deteriorating lead-based paint (peeling, chipping, chalking, cracking, or damaged paint)** is a hazard and needs immediate attention. **Lead-based paint** may also be a hazard when found on surfaces that children can chew or that get a lot of wear and tear, such as:

- On windows and window sills
- Doors and door frames
- Stairs, railings, banisters, and porches

**Lead-based paint is usually not a hazard if it is in good condition** and if it is not on an impact or friction surface like a window.

**Lead dust** can form when lead-based paint is scraped, sanded, or heated. Lead dust also forms when painted surfaces containing lead bump or rub together. Lead paint chips and dust can get on surfaces and objects that people touch. Settled lead dust can reenter the air when the home is vacuumed or swept, or when people walk through it. EPA currently defines the following levels of lead in dust as hazardous:

- 40 micrograms per square foot ( $\mu\text{g}/\text{ft}^2$ ) and higher for floors, including carpeted floors
- 250  $\mu\text{g}/\text{ft}^2$  and higher for interior window sills

**Lead in soil** can be a hazard when children play in bare soil or when people bring soil into the house on their shoes. EPA currently defines the following levels of lead in soil as hazardous:

- 400 parts per million (ppm) and higher in play areas of bare soil
- 1,200 ppm (average) and higher in bare soil in the remainder of the yard

**Remember, lead from paint chips—which you can see—and lead dust—which you may not be able to see—both can be hazards.**

The only way to find out if paint, dust, or soil lead hazards exist is to test for them. The next page describes how to do this.

## Reducing Lead Hazards, continued

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**If your home has had lead abatement work done** or if the housing is receiving federal assistance, once the work is completed, dust cleanup activities must be conducted until clearance testing indicates that lead dust levels are below the following levels:

- 40 micrograms per square foot ( $\mu\text{g}/\text{ft}^2$ ) for floors, including carpeted floors
- 250  $\mu\text{g}/\text{ft}^2$  for interior windows sills
- 400  $\mu\text{g}/\text{ft}^2$  for window troughs

For help in locating certified lead abatement professionals in your area, call your state or local agency (see pages 14 and 15), or visit [epa.gov/lead](http://epa.gov/lead), or call 1-800-424-LEAD.

## Reducing Lead Hazards

**Disturbing lead-based paint or removing lead improperly can increase the hazard to your family by spreading even more lead dust around the house.**

- In addition to day-to-day cleaning and good nutrition, you can **temporarily** reduce lead-based paint hazards by taking actions, such as repairing damaged painted surfaces and planting grass to cover lead-contaminated soil. These actions are not permanent solutions and will need ongoing attention.
- You can minimize exposure to lead when renovating, repairing, or painting by hiring an EPA- or state-certified renovator who is trained in the use of lead-safe work practices. If you are a do-it-yourselfer, learn how to use lead-safe work practices in your home.
- To remove lead hazards permanently, you should hire a certified lead abatement contractor. Abatement (or permanent hazard elimination) methods include removing, sealing, or enclosing lead-based paint with special materials. Just painting over the hazard with regular paint is not permanent control.



**Always use a certified contractor who is trained to address lead hazards safely.**

- Hire a Lead-Safe Certified firm (see page 12) to perform renovation, repair, or painting (RRP) projects that disturb painted surfaces.
- To correct lead hazards permanently, hire a certified lead abatement professional. This will ensure your contractor knows how to work safely and has the proper equipment to clean up thoroughly.

Certified contractors will employ qualified workers and follow strict safety rules as set by their state or by the federal government.

## Checking Your Home for Lead

You can get your home tested for lead in several different ways:

- A lead-based paint **inspection** tells you if your home has lead-based paint and where it is located. It won't tell you whether your home currently has lead hazards. A trained and certified testing professional, called a lead-based paint inspector, will conduct a paint inspection using methods, such as:
  - Portable x-ray fluorescence (XRF) machine
  - Lab tests of paint samples
- A **risk assessment** tells you if your home currently has any lead hazards from lead in paint, dust, or soil. It also tells you what actions to take to address any hazards. A trained and certified testing professional, called a risk assessor, will:
  - Sample paint that is deteriorated on doors, windows, floors, stairs, and walls
  - Sample dust near painted surfaces and sample bare soil in the yard
  - Get lab tests of paint, dust, and soil samples
- A combination inspection and risk assessment tells you if your home has any lead-based paint and if your home has any lead hazards, and where both are located.



Be sure to read the report provided to you after your inspection or risk assessment is completed, and ask questions about anything you do not understand.

## Checking Your Home for Lead, continued

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In preparing for renovation, repair, or painting work in a pre-1978 home, Lead-Safe Certified renovators (see page 12) may:

- Take paint chip samples to determine if lead-based paint is present in the area planned for renovation and send them to an EPA-recognized lead lab for analysis. In housing receiving federal assistance, the person collecting these samples must be a certified lead-based paint inspector or risk assessor
- Use EPA-recognized tests kits to determine if lead-based paint is absent (but not in housing receiving federal assistance)
- Presume that lead-based paint is present and use lead-safe work practices

There are state and federal programs in place to ensure that testing is done safely, reliably, and effectively. Contact your state or local agency for more information, visit [epa.gov/lead](https://www.epa.gov/lead), or call **1-800-424-LEAD (5323)** for a list of contacts in your area.<sup>3</sup>

## What You Can Do Now to Protect Your Family

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**If you suspect that your house has lead-based paint hazards, you can take some immediate steps to reduce your family's risk:**

- If you rent, notify your landlord of peeling or chipping paint.
- Keep painted surfaces clean and free of dust. Clean floors, window frames, window sills, and other surfaces weekly. Use a mop or sponge with warm water and a general all-purpose cleaner. (Remember: never mix ammonia and bleach products together because they can form a dangerous gas.)
- Carefully clean up paint chips immediately without creating dust.
- Thoroughly rinse sponges and mop heads often during cleaning of dirty or dusty areas, and again afterward.
- Wash your hands and your children's hands often, especially before they eat and before nap time and bed time.
- Keep play areas clean. Wash bottles, pacifiers, toys, and stuffed animals regularly.
- Keep children from chewing window sills or other painted surfaces, or eating soil.
- When renovating, repairing, or painting, hire only EPA- or state-approved Lead-Safe Certified renovation firms (see page 12).
- Clean or remove shoes before entering your home to avoid tracking in lead from soil.
- Make sure children eat nutritious, low-fat meals high in iron, and calcium, such as spinach and dairy products. Children with good diets absorb less lead.

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<sup>3</sup> Hearing- or speech-challenged individuals may access this number through TTY by calling the Federal Relay Service at 1-800-877-8339.



# Lead in Residential Soils: Sources, Testing, and Reducing Exposure

This article provides some background information about how lead behaves in soil.

 ARTICLES | UPDATED: SEPTEMBER 15, 2010



## Introduction

Lead occurs naturally in soils, typically at concentrations that range from 10 to 50 mg/kg (milligrams of lead per kilogram of soil, equivalent to parts of lead per million parts of soil, or ppm). Because of the widespread use of leaded paint before the mid-

1970s and leaded gasoline before the mid-1980s, as well as contamination from various industrial sources, urban soils often have lead concentrations much greater than normal background levels. These concentrations frequently range from 150 mg/kg to as high as 10,000 mg/kg at the base of a home painted with lead-based paint. Lead does not biodegrade, or disappear over time, but remains in soils for thousands of years.

Serious human health risks, particularly for children under 6 years of age, are associated with lead poisoning. It is estimated that between 5.9 and 11.7 million children nationwide potentially are exposed to lead in soil or dust. Low-level, chronic exposure to lead in contaminated residential soil can cause several developmental and behavioral problems in children. Among these are reduced IQ and attention span, hyperactivity, impaired growth, learning disabilities, hearing

loss, and insomnia. Once absorbed by the human body, lead is extremely difficult, if not impossible to remove. Therefore, not only is prevention of lead poisoning the best cure, but it may be the only cure.

This fact sheet provides some background information about how lead behaves in soil. It explains how soils become contaminated with lead and how people are exposed to lead in soils. Information also is provided about how to test soils for lead contamination and how to interpret the results of such testing. Finally, several measures are outlined that can reduce exposure to soil lead and prevent lead poisoning and its associated health risks.

## Lead in Soil

Soil lead is held tightly on the surfaces of very fine clay and organic matter particles. Therefore, when lead is added to the soil surface, it tends to accumulate in the upper 1 to 2 inches of soil unless the soil has been disturbed by activities such as excavation for building or tillage for landscaping and gardening. Added lead also will become most concentrated in very fine soil particles, which tend to stick to skin and clothing and form airborne soil dust.

Not all of the lead in soil is available to plants (or to the human body, should the soil be eaten). The availability of soil lead depends on how tightly it is held by soil particles and on its solubility (how much of it will dissolve in water). At low soil pH (pH<5, acidic conditions) lead is held less tightly and is more soluble. At near neutral or higher pH (pH>6.5, neutral to basic conditions) soil lead is held more strongly, and its solubility is very low. Lead is held very tightly by soil organic matter, so as organic matter increases, lead availability decreases.

Some lead added to soil may combine with other soil elements to form lead-containing minerals. One such mineral that has extremely low solubility is lead phosphate (pyromorphite). Formation of this mineral is favored by high soil pH and high levels of lead and phosphate, conditions that would occur with the application of ground agricultural limestone and large amounts of phosphate fertilizer to a lead-contaminated soil.

## Major Sources of Lead in Soils

Lead compounds were used as antiknock agents in gasoline until 1989. It is estimated that 4.5 to 5.5 million tons of lead used in gasoline remain in soil and

dust. Soils adjacent to heavy traffic volume areas in cities and busy roadways have the highest concentrations of lead. The other major source of lead in residential soils is leaded paint. It is estimated that leaded paint was used on about 75% of houses built before 1978, when it was banned. Chalking, leaching, flaking, weathering, scraping, and sandblasting of leaded paint result in lead deposits in the soil near the base of these houses, creating a "halo" of lead contamination. Although less widespread, airborne lead from industrial sources also may have contaminated some nearby residential soils.

## Exposure to Soil Lead

People are exposed to soil lead either from direct contact with contaminated soil or from contact with very fine soil particles carried into houses as airborne dust or on shoes, clothing, or pets. Lead is taken into the body by either ingestion (eating) or inhalation (breathing). Children 2-3 years of age are at high risk for ingesting lead because they are apt to mouth dirty items such as toys and pacifiers and to suck dirty fingers and hands. (It is estimated that young children consume around 200 mg of soil per day, about the volume of an aspirin tablet.) Some young children exhibit pica, the desire to eat soil, and consume much larger quantities. Exposure also may result from eating garden produce grown in or near contaminated soil. Lead can be taken up from the soil into plant tissues, or contaminated dust may settle on edible leaves and fruits.

## Testing Residential Soil for Lead

Soils can be tested to determine if they are contaminated with lead and, if so, what measures should be taken to reduce exposure to the lead. Soils around older houses or near roadways may be contaminated and should be tested. Several laboratories in Pennsylvania, including [Penn State's Agricultural Analytical Services Laboratory](#), have the facilities to conduct these tests. Contact your county extension agent or look in the yellow pages under "Laboratories" to obtain information about testing laboratories that offer this service to your area.

Before collecting any soil samples, contact the laboratory for any specific instructions, sampling kits, or forms that might be required. The steps described below typically are followed when collecting soil samples for lead analysis.

1. Select sites--Take samples from areas you suspect may have lead contamination such as near roadways or the base of an older home. Also collect samples from high-exposure areas such as garden sites and play areas. It is a good idea to sample each area separately and to make a map showing where each sample was collected.
2. Collect sample--In undisturbed areas, collect soil from the upper 1-2 inches of the soil. In areas where the soil has been disturbed, and in flower beds and vegetable gardens, collect 6-inch-deep samples. If a soil auger or corer is not available, use a shovel to dig a 6-inch-deep hole such that one side exposes a smooth vertical area of soil. Shave a 1-inch-thick slice of soil from this face, keeping it on the shovel. Then collect a 1-inch-wide sample from the center of this slice that reaches from the soil surface to a depth of 6 inches. Take 8-12 samples from a given area, put them together in a clean plastic bucket, and mix well. Take a small subsample (about a cup) and allow it to air dry. Do not heat in an oven or over a register. Put the air-dried sample in a clean plastic bag and seal and label it.
3. Send sample--Send the sample to a soil testing lab. You should request analysis for total sorbed lead (using EPA method 3050 or 3051 or its equivalent). You also should request analysis of pH, lime requirement, and soil phosphorus. If you need assistance interpreting the report you receive from the testing lab, contact your local extension office.

## Interpreting Soil Test Results

Laboratory test results normally will report soil lead concentrations in terms of  $\mu\text{g/g}$  (micrograms per gram), mg/kg, or ppm (parts per million). These are all equivalent units of measurement. The table below indicates the degree of lead contamination indicated by various soil lead concentrations. The following section provides information on measures that should be taken to reduce exposure at each level of contamination.

Soil Lead Level (Total Sorbed Lead Test)	Level of Lead Contamination mg/kg or ppm
Less than 150	None to very low
From 150 to 400	Low
From 400 to 1,000	Medium
From 1,000 to 2,000	High

Soil Lead Level (Total Sorbed Lead Test)	Level of Lead Contamination mg/kg or ppm
Greater than 2,000	Very high

## How to Reduce Exposure to Soil Lead

None to very low lead contamination (less than 150 mg/kg).

There is no need to be concerned about lead exposure from these soils. Recognize, however, that other possible sources of lead exposure exist such as home interiors or school or daycare playgrounds.

Low lead contamination (150 to 400 mg/kg).

Consider the following measures to reduce exposure to lead in these soils:

- Enforce a clean hands policy. Children should wash their hands when they come in from playing outside. Teach your children not to put their fingers in their mouths.
- Provide children with a covered sandbox, located away from areas where lead levels are highest. Discourage them from playing in areas of known or suspected lead contamination. Maintain a healthy grass sod on play areas, and cover bare soil with mulch. Place rubber mats or carpets over the soil in high wear areas such as under swings and at the bottoms of slides.
- Use the following gardening practices:
  - Locate vegetable gardens as far as possible from roads, driveways, and old painted structures. Lay out gardens to keep leafy green vegetables and other hard-to-wash vegetables far from areas of suspected or known lead contamination.
  - Incorporate one-third by volume organic material such as peat moss, compost, and manure into garden beds. For example, add three to four 4-cubic-foot bales of peat moss to 100 square feet of garden bed area.
  - Apply ground limestone (available at most lawn and garden stores) to the soil, as recommended by the soil test, to obtain a pH of 6.5 to 7.
  - Protect the garden area from airborne dust from contaminated soil areas (fine dust has the highest lead concentration). Erect a fence or plant a hedge between

the garden and known or suspected areas of contaminated soil. Lay down a mulch in the garden to cover bare soil.

- Wash all vegetables carefully with a 1% vinegar solution or soapy water. Rinse thoroughly after washing. Peel root crops and discard the outer and older leaves of leafy vegetables. Do not compost the peelings or leaves.

### **Medium lead contamination (400 to 1,000 mg/kg).**

**Take the following measures in addition to the practices described above:**

- Apply 11 lb. of triple super phosphate or concentrated super phosphate fertilizer (available at most lawn and garden stores) per 100 square feet of soil, and mix thoroughly to a depth of 6 inches. Phosphate fertilizer may lower soil pH as it reacts with the soil. One year after adding the fertilizer, test the soil again for pH and lime requirement. Apply ground agricultural limestone, as recommended by the soil test, to achieve a pH of 6.5 to 7.
- Cover the areas with mulch and restrict access of children or pets to these soil areas by erecting a fence or planting a dense evergreen ground cover.
- By following the gardening practices and phosphate fertilizer addition described above, this soil may be used safely to grow fruiting vegetable crops (tomatoes, peppers, squash, cucumbers, peas, beans, corn).
- Do not grow leafy vegetables (lettuce, spinach, kale, cabbage) or root crops (carrots, radishes, turnips, beets) in this soil. Grow these crops in raised beds filled with noncontaminated soil and organic materials.

### **High lead contamination (greater than 1,000 mg/kg).**

**Do not garden in this soil and do not allow children or pets to come into contact with it. Follow the steps described above to reduce lead availability and to keep the soil covered. If the highly contaminated soil is widespread and it is difficult to restrict access to the area, or if the soil lead concentration is greater than 2,000 mg/kg, contact your local health department, Penn State Extension office, or regional DEP office for specific advice on lead abatement measures that should be taken.**

## **Further Information**

**More information on this subject is available from the following agencies:**

## **Environmental Protection Agency (EPA)**

401 M Street, SW  
Washington, DC 20460-0003  
800-424-LEAD

## **Centers for Disease Control (CDC)**

Lead Poisoning Prevention Program  
1600 Clifton Rd., NE  
Atlanta, GA 30333  
800-232-4636

## **Alliance to End Childhood Lead Poisoning**

227 Massachusetts Avenue, NE, Suite 200  
Washington, DC 20002  
202-543-1147

## **United States Dept. of Housing and Urban Development (HUD)**

### **Healthy Homes and Lead Hazard Control**

451 7th Street, SW, Rm. B-133  
Washington, DC 20410-0000  
202-755-1805

## **National Lead Information Center**

1019 19th Street, NW, Suite 401  
Washington, DC 20036-5105  
800-LEAD-FYI

Prepared by Richard Stehouwer, assistant professor of environmental soils, and Kirsten Macneal, research associate, Department of Agronomy