



Lead

Answers to Frequently Asked Questions

What is lead?

Lead is a naturally occurring bluish-gray metal found in the earth's crust. Prior to our current knowledge of the health hazards of lead, it was widely used in products such as gasoline, paints, batteries, metal products and ammunition -- just to name a few. Because lead is toxic, its use in the U.S. has been dramatically reduced since the 1980's.

Lead in the environment

Although lead occurs naturally in the environment, most of the high levels of lead found come from human activities and products.

Lead does not break down in the environment. Once lead falls on to soil, it usually sticks to the soil particles. If the soil is uncovered and open to the air or becomes disturbed, lead-contaminated dust is created. This dust can be easily breathed in or swallowed. During construction activities, the possibility of lead-contaminated dust is an important concern.

Gardens grown in lead-contaminated soils may contain lead. Fruits, grains and vegetables (especially root vegetables such as beets, carrots, parsnips, radishes, turnips, and rutabagas) absorb some of the lead through their roots. There is also the possibility of lead-contaminated dust falling onto crops.

Inside some older homes, lead can be found in lead-based paint, lead-contaminated dusts from the paints and even in older lead pipes that carry water. A child can easily eat lead paint chips, breathe or ingest the dust on their fingers.

How does lead get in your body?

You may be exposed to lead by breathing (inhalation), eating/drinking (ingestion) or by skin contact (dermal contact). However, only very small amounts of lead can get into your body through dermal contact. Inhalation and ingestion of lead-contaminated dust and soil are the main health concerns.

How does lead affect your health?

The harmful effects of lead are the same whether it is breathed or swallowed. The main target for lead toxicity is the nervous system, including the brain. But lead can negatively affect every organ of the body.

Children are most vulnerable to lead poisoning because they play outside, close to the ground or in the dirt. Small children also put their fingers in their mouths. Compared to adults, a bigger proportion of the amount of lead swallowed will enter the blood in children. About 99% of the amount of lead taken into the body of an adult will leave in the waste within a couple of weeks. But only about 32% of the lead taken into the body of a child will leave in the waste.

Lead exposure in the womb, in infancy, or in early childhood may also slow mental development and lower intelligence later in childhood. Lead can cause irritability and aggressive behavior in children. If pregnant women have high levels of lead in their bodies, fetuses exposed to lead in the womb may be born prematurely and have lower weights at birth. In some cases, pregnant women with high levels of exposure to lead may have miscarriages.

Some other harmful health effects of lead include damaged kidneys, damaged male reproductive system, severe "stomachaches," a poor appetite, sleep disorders, and hearing problems. Lead can also decrease reaction time and affect the memory.

Is there a medical test to determine whether I have been exposed to lead?

Yes, there is a test to see if you have been exposed to lead. The primary screening method is the measurement of total lead in the blood. This test can tell if you have been recently exposed to lead.

Also, exposure to lead can be evaluated by measuring the erythrocyte protoporphyrin (EP) in the blood sample. EP is a part of red blood cells known to increase when the amount of lead in the blood is high. However, the EP level is not sensitive enough to identify children with elevated blood lead levels below about 25 micrograms per deciliter ($\mu\text{g}/\text{dL}$). For this reason, total lead is the primary method of screening.

Lead can also be measured in teeth or bones by X-ray techniques. These tests can tell about long-term exposure but are not widely available.

How can families reduce the risk of exposure to lead?

The most important way a family can lower exposures to lead is to avoid exposure to lead-contaminated soil and dust sources, avoid lead-based paint chips, avoid water from lead-lined pipes and avoid some plastic products made outside the United States.

The swallowing of lead-contaminated soil or dust is a very important exposure pathway for children. This problem can be reduced in many ways. Regular hand and face washing to remove lead dust and soil, especially before meals, can lower the possibility that lead on the skin is accidentally swallowed while eating. Families can lower exposures to lead by regularly cleaning the home of dust and tracked-in soil. Door mats can help lower the amount of soil that is tracked into the home and removing your shoes before you enter the house will also help. Planting grass and shrubs over bare soil areas in the yard can lower contact that children and pets may have with soil and the tracking of soil into the home. Also, wash all produce grown in lead-contaminated soils before eating.

Families whose members are exposed to lead-contaminated soil and dust can minimize the exposure to children by changing and bagging their work clothes before they are brought into the home for cleaning. Also, they should immediately wash their hands or shower.

It is important that children have proper nutrition and eat a balanced diet of foods that supply adequate amounts of vitamins and minerals, especially a diet high in calcium and iron. Good nutrition lowers the amount of swallowed lead that passes to the bloodstream and also may lower some of the toxic effects of lead.

What are the federal health recommendations?

The Centers for Disease Control and Prevention (CDC) considers children to have an elevated blood-lead level if the lead in the blood is at or above 5 µg/dL. CDC are recommending environmental assessments PRIOR to blood lead screening of children at risk for lead exposure and to monitor the status of children with a confirmed blood-lead level of ≥5 µg/dL until all recommended environmental investigations and mitigation strategies are complete. Medical treatment

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may be necessary in children if the lead concentration in blood is higher than 45 µg/dL.

The Environmental Protection Agency (EPA) requires that the concentration of lead in air that the public breathes be no higher than 1.5 micrograms per cubic meter (µg/m³) averaged over 3 months. EPA regulations no longer allow lead in gasoline. The Clean Air Act Amendments (CAAA) of 1990 banned the sale of leaded gasoline as of December 31, 1995.

The EPA regulations also limit lead in drinking water to 0.015 milligrams per liter (mg/L). The 1988 Lead Contamination Control Act requires the Consumer Product Safety Commission (CPSC), EPA, and the states to recall or repair water coolers containing lead. This law also requires new coolers to be lead-free. In addition, drinking water in schools must be tested for lead, and the sources of lead in this water must be removed.

To help protect small children, CPSC requires that the concentration of lead in most paints available through normal consumer channels be not more than 0.06%. The Federal Hazardous Substance Act (FHSA) bans children's products containing hazardous amounts of lead.

The EPA has also developed standards for lead paint hazards, lead in dust, and lead in soil. To educate parents, homeowners, and tenants about lead hazards, lead poisoning prevention in the home, and the lead abatement process, EPA has published several general information pamphlets. Copies of these pamphlets can be obtained from the National Lead Information Center or from various Internet sites, including <http://www.epa.gov/opptintr/lead>.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological profile for lead. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information?

Ohio Department of Health
Bureau of Environmental Health and Radiation Protection
Health Assessment Section
246 N. High Street
Columbus, Ohio 43215
Phone: (614) 728-9452

This fact sheet was developed in cooperation with the Agency for Toxic Substances and Disease Registry.



Lead Contamination in Gardens

Answers to Frequently Asked Questions

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Lead in the environment:

Lead does not break down in the environment. Once lead falls on to soil, it usually sticks to the soil particles and remains a long-term source of lead exposure. If the soil is uncovered and open to the air or becomes disturbed, lead- contaminated dust can be created. This dust can be easily breathed in or swallowed.

The possibility of dust being created at a lead-contaminated site is an important public health concern. Activities such as construction, where you are moving dirt and disturbing large areas, are very concerning because construction sites often create a lot of dust.

Other activities such as gardening also disturb and expose soils and may create small amounts of dust. But more importantly, some garden vegetables grown in lead- contaminated soils may contain lead. Certain vegetables (especially root vegetables such as beets, carrots, turnips, radishes, potatoes and rutabagas) easily absorb (uptake) some of the lead through their roots. There is also the possibility of lead-contaminated dust falling onto crops such as lettuce, spinach or other leafy vegetables.



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How does lead affect your health?

The harmful effects of lead are the same whether it is breathed or swallowed. The main target for lead toxicity is the body's nervous system, including the brain. But lead can harm every organ of the body.

Children are most vulnerable to lead poisoning because they play outside, close to the ground or in the dirt. Small children also put their fingers in their mouths. Compared to adults, a bigger proportion of the amount of lead swallowed will enter the blood in children. About 99% of the amount of lead taken into the body of an adult will leave in the waste within a couple of weeks. But only about 32% of the lead taken into the body of a child will leave in the waste.

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Lead can also be measured in teeth or bones by using X-ray techniques. These tests can tell about long-term exposure but are not widely available.

How can families reduce their exposure to lead?

One important way a family can lower their exposure to lead is to avoid exposure to lead-contaminated soil and dust sources. The swallowing of lead-contaminated soil or dust is a very important exposure pathway for children and gardeners.

Helpful hints:

- Washing your hands to remove lead dust and soil, especially before meals, can lower the possibility that lead on the skin is accidentally swallowed while eating.
- Families can lower exposures to lead by regularly cleaning the home of dust and tracked-in soil.
- Door mats can help lower the amount of soil that is tracked into the home and removing your shoes before you enter the house will also help.
- Covering bare soil with clean sand, wood chips, gravel or grass can lower contact that children and pets may have with soil
- and the tracking of soil into the home.
- Bag gardening-work clothes before they are brought into the home for cleaning.
- Immediately wash your hands or shower after working with lead-contaminated soils.

It is important that children have proper nutrition and eat a balanced diet of foods that supply adequate amounts of vitamins and minerals, especially a diet high in calcium and iron. Good nutrition lowers the amount of swallowed lead that passes to the bloodstream and also may reduce some of the toxic effects of lead.

Good Gardening Practices:

- Plant gardens away from roads, driveways and old painted structures that may contain lead-based paints.
- Protect gardens against air-borne lead by erecting a fence or plant a hedge between your garden and bare soils.
- Grow crops in raised beds or containers with lead-free soil.
- Estimate the amount of soil in your garden and mix one-third the total volume of soil with organic material such as peat moss, compost and manure. Organic mulch worked into soil, especially fresh manure, binds the lead so it is not available to be taken up by plants.

Note: Avoid the use of bone meal.

- Plant fruiting crops such as tomatoes, peppers, squash, cucumbers, peas, beans, corn, melons, strawberries, etc.
- Limit planting leafy vegetables such as lettuce, spinach or greens. Avoid planting root crops such as carrots, beets, turnips, potatoes and radishes. If you grow leafy vegetables, discard old and outer leaves of the vegetable and scrub and peel any root crops before eating. **DO NOT** compost these materials!
- Wash vegetables with 1% vinegar in water solution (1 - 2 ounces vinegar per gallon of water). Use a stiff brush to scrub vegetables before eating.
- Lime the soil as recommended by your soil test to obtain a pH of 6.5. Lime can be found at farm and garden supplies stores.

If you are worried about gardening in lead-contaminated soils, bring in lead-free soil, install raised beds, try container gardening and/or mix the soil with organic material. Fresh fruits and vegetables not only taste good, they are good for you. You don't have to stop gardening!

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2007. Toxicological profile for lead.

Ohio Department of Health Childhood Lead Poisoning Prevention Program Phone: (877) 668-5323 or (614) 466-1450

The Ohio State University Cooperative Extension HYG-1149-93

Where can I get more information?

Ohio Department of Health
Bureau of Environmental Health and Radiation Protection
Health Assessment Section
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**Environmental
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Division of Environmental Response and Revitalization
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Roseville Residential Lead Sampling

Roseville's Rich Pottery History

The village of Roseville, located along the Muskingum-Perry County line in Southeastern Ohio, is famous for its long history of pottery production. From the late 1800s through the 1960s, potteries in this area were recognized nationwide as leaders in producing cookware and decorative pieces. Vast clay reserves suitable for ceramics could be found easily in the region. Many prominent potteries operated in the area, including Robinson Ransbottom, Nelson McCoy, Hoadley Pottery, Brush Pottery, C.V. Lowry Pottery, Roseville Stoneware, Roseville Ceramics Ungemach Pottery, Cookson Pottery, Friendship Pottery, and Alpine Pottery. Additionally, Roseville was home to many small facilities called "bluebird potteries," often with just one craftsman and one or two family members.

What is the source of lead contamination?

During the height of production, pottery was fired at very high temperatures (over 2,000 degrees Fahrenheit). Lead was used as a base material for the glaze because it can withstand a wide temperature range. Lead emissions in the earlier years of the pottery industry were high; at that time, no lead standards existed. As the pottery industry has grown and the dangers of lead have been further documented, the use of lead in the pottery-making process has been significantly reduced, replaced by no-lead and/or low-lead glazes.

Disposal practices historically were not monitored or documented. Disposal of waste glaze material that contained potentially high levels of lead commonly occurred with the disposal of "off-spec" pottery waste. The off-spec pottery waste, referred to locally as pottery-chuck, was abundantly available and widely utilized as fill material throughout the village. This historic and unregulated disposal method allowed for an undetermined amount of lead-based glaze material to be disposed of sporadically throughout the village.

What lead sampling and cleanup have already occurred?

Under a cooperative agreement with the United States Environmental Protection Agency (U.S. EPA), Ohio Environmental Protection Agency (Ohio EPA) conducted a geographically focused lead investigation from 1996-1998. This investigation was called the Geographic Initiative of the Crooksville Roseville Pottery Area of Concern (CRPAC). The purpose was to determine if pottery operations in the CRPAC from the late 1800s through the 1960s had increased certain heavy metals in soil, ground water, surface water, and outdoor (ambient) air. During the investigation, residences were randomly selected for soil sampling in the Roseville/Crooksville area. The soil and ground water samples collected in 1997 indicated elevated lead levels in shallow soils and ground water throughout the CRPAC. The sampling detected lead concentrations above 10,000 parts per million (ppm) in soils at numerous locations.

As a result, the village and the U.S. EPA have cleaned up multiple properties throughout Roseville, including Brush Pottery, Ungemach Pottery, Hull Pottery, Friendship Pottery, the American Legion Trailer Park, and Roseville Primary School.

Why is more sampling necessary?

Historic clean-up efforts in the Roseville area have focused on the known former industrial pottery facilities and adjacent homes. Knowing that the off-spec pottery waste (pottery-chuck) was used as fill material throughout the village in the past, lead contamination is anticipated throughout residential areas.

Roseville Residential Lead Sampling

What should you expect during sampling?

Ohio EPA will collect soil samples at residential properties throughout Roseville to evaluate the presence of lead in the soil. To sample a property, Ohio EPA must obtain permission from the property owner or an individual authorized to give such consent. A property owner can grant consent by submitting a consent form that can be accessed and submitted at the Roseville Municipal Building located at 107 N. Main Street in Roseville, Ohio. Consent forms will also be mailed to residents and can be signed and mailed back to Ohio EPA at 2195 E. Front Street, Logan, Ohio 43138. Ohio EPA plans to conduct this sampling in 2024 and possibly into 2025.

A few days before the sampling, Ohio EPA will mark the proposed sampling locations with a white flag and the Ohio Utility Protection Service will ensure there are no underground utilities present at the proposed locations. If utilities are present, the proposed sampling locations will be adjusted.

On the day of the sampling, Ohio EPA will use hand tools to remove a small area of grass and dig no more than six inches for each sample. The number of samples collected on each property will depend primarily on the size of the property. Approximately eight ounces of soil will be collected into a glass jar for each sample. Once the soil samples are collected, the remaining soil will be put back into the holes, and the removed grass will be replanted. The soil samples will be sent to a laboratory for analysis. After Ohio EPA receives and reviews the laboratory data, a letter will be sent providing the laboratory results to the property owner (and tenant, if applicable).

Will your property need to be cleaned up?

If lab results show a property has lead levels in soil exceeding the newly updated residential lead standard (200 ppm), Ohio EPA will refer the property to U.S. EPA to conduct a cleanup of the property.

What can you expect during cleanup?

U.S. EPA will evaluate the referral package from Ohio EPA. If cleanup is needed, U.S. EPA will request access to the property and permission to clean the lead-contaminated soil. Soil cleanup for lead in residential areas includes removing the top layer of contaminated soil (typically a maximum of two feet deep) replacing it with clean topsoil, and replanting grass. U.S. EPA will establish the schedule for cleaning up individual properties.

Contact

For more information, contact Max Moore at max.moore@epa.ohio.gov or 614.644.2160.



Roseville Lead Sampling Access Memorandum and Form

The Ohio Environmental Protection Agency (Ohio EPA) is planning to collect soil samples from residential properties across Roseville that may have been impacted by historic pottery manufacturing and/or associated waste disposal. The purpose of the sampling is to evaluate the presence of lead in the soil as it pertains to historic pottery operations in the area. As part of this sampling effort, Ohio EPA is requesting access to collect soil samples on your property.

In order to sample the property, Ohio EPA must obtain permission from the property owner or an individual authorized to give such consent. A consent form is included with this memorandum. By signing the consent form, the signer gives permission for Ohio EPA personnel, and their representatives, to enter the property and collect soil samples. Ohio EPA is currently planning to conduct sampling in the area through the end of 2024.

Several days prior to the sampling, Ohio EPA will mark the proposed sampling locations with white flags and the Ohio Utility Protection Service (OUPS) will ensure that there are no underground utilities present at the proposed sampling location. If utilities are present, the proposed sampling locations may be adjusted.

On the day of the sampling, Ohio EPA and/or their representatives, will use hand tools to remove a small area of grass and dig a temporary hole not exceeding 6 inches in depth. A soil sample will be collected from each hole and placed into a glass jar. Once the soil samples are collected, any remaining soil will be placed back into the holes and the grass cover will be re-installed. The soil samples will then be sent to a laboratory for analysis. After Ohio EPA receives and reviews the laboratory data, a letter will be sent providing the laboratory results to the property owner (and tenant, if applicable).

If there are tenants on the above-mentioned property, please provide their names and phone numbers so we may also notify them of the planned investigation and include them in coordinating access to enter the property.

A prompt response to this request is appreciated. If you have questions regarding this request for access, please contact Racheal Davies at Racheal.Davies@epa.ohio.gov or (740) 380-5246. Thank you for your assistance.

