Lead and Our Environment
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Lead is a toxic metal. If consumed or inhaled, it can affect nearly all systems in the body. As a result of many years of use in production, gas and paint, lead can be found in many places. In the 1970s, most of the lead in paints, gas, dishes and pottery was removed. While these efforts have reduced the risk of lead poisoning, the threat is still very large.

Lead poisoning is a very serious issue for young children and pregnant women. Lead is toxic to growing brains and nervous systems of fetuses and young children. We know a great deal more now about the dire effects of lead poisoning. In fact, in 1991, the Centers for Disease Control (CDC) lowered the safe blood lead level to less than 10 µg/dL. This value is a fraction of what it was just 30 years ago. Be aware of where lead exists in your environment and learn how to reduce or avoid it. This is a key step in reducing your and your family's risk of lead poisoning.

Lead Poisoning

Lead poisoning or plumbism is one of the most common child health problems in the United States. Children absorb more lead from water and food than adults. This is a larger problem if children have low intakes or blood levels of iron, calcium, protein or zinc. Plumbism is also a problem for adults breathing air or consuming water and food with high levels of lead.

People who work with lead and lead-based products or have hobbies which use lead are also at risk. Jobs and hobbies which use or expose lead include furniture refinishing, making stained glass and making pottery. Many other jobs expose adults to lead. Adults can "take home" lead on their clothing from working in areas where lead is used. If lead is used in your job, be aware that others in your home may be exposed to "take home" lead.

Anyone can have lead poisoning. People in the country can suffer from it, as can city dwellers. Lead poisoning occurs without regard to race, ethnic origin, income or social status. No region is without lead problems. Most people with lead poisoning do not know they have it. In general, plumbism involves the nervous system. Problems include lack of attention, learning problems, fatigue and even seizures and death. Acute poisoning is caused by consuming or injecting a large amount of easily absorbed lead. Symptoms include stomach pain, vomiting, diarrhea, black stools, collapse and coma.

Chronic plumbism occurs when less absorbable forms of lead are consumed, inhaled or absorbed through the skin. Chronic poisoning takes longer to develop than acute poisoning. Chronic lead poisoning can pass through a series of symptoms. Symptoms worsen as the level of lead in the blood and length of exposure to lead increases. Symptoms fall into three groups: early, mid-range and severe.

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Early-stage symptoms are loss of appetite, weight loss, hard stools, being edgy, some vomiting, being tired, headache, weakness, metal taste, lead line visible on the gums, loss of newly developed skills and anemia.

Mid-range stage symptoms are some vomiting, being edgy, being anxious, loss of coordination, pains in arms, legs, joints and stomach, sensory problems of hands and feet, menstrual problems and spontaneous abortion. Severe-stage symptoms are constant vomiting, periods of stupor, higher blood pressure, being delirious, seizures and coma.

Long-term effects of childhood lead poisoning are many and may include learning problems and high blood pressure in the adult years. Women exposed to lead as children experience increased numbers of spontaneous abortions or stillbirths and can have children with learning problems.

When children have high blood lead levels, they should be treated. Tests have shown that blood lead levels as low as 10 µg/dL whole blood can harm children. The CDC suggests children with blood lead levels of 15 µg/dL or higher receive individual health care. Below are steps to help children with high blood lead levels.

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SOURCES OF LEAD

There are many sources of lead in our environment. Major sources are lead-based paint and contaminated soil, dust, drinking water, air, food and related products. Prevent lead poisoning before it occurs. Learn where lead is in your environment and reduce or avoid these sources.

Class	Blood lead level(µg/dL)	Comments
I	≤9	A child in Class I is not considered lead poisoned.
II	10-14	Many children with blood lead levels in this range should trigger a communitywide project to prevent lead poisoning.
IIB	15-19	A child in Class IIB should receive nutritional and educational support and be tested for blood lead level often. If the blood lead level stays in this range, environmental study and needed changes should be made to reduce lead.
III	20-44	The environmental and medical background of a child in Class III should be reviewed. Such a child may need special drugs for lead poisoning.
IV	45-69	A child in Class IV will need both medical and environmental attention.
V	≥70	A child with Class V lead poisoning is a medical emergency. Medical and environmental changes must begin now.

Source: Preventing Lead Poisoning in Young Children. A Statement by the Centers for Disease Control. U.S. Department of Health and Human Services. Atlanta. October 1991.

HOUSEHOLD PAINT

Household paint is the most common source of lead exposure for children. The production of lead paint with more than 0.06 % lead was banned in 1978. However, much of the leaded paint used before 1978 remains in homes today. More than 74 percent of American homes built before 1980 contain lead paint. This is equal to over 3 million tons of lead. Children and adults can breathe in or eat paint dust at any time. Scraping or sanding painted walls or woodwork raises this risk. When making home improvements, limit dust generation. Because children often put items like their hands and toys in their mouths, children have a great risk of eating or breathing lead.

Lead-based paints are no longer allowed for use in homes or apartments. However, many older private homes and public housing units still contain these paints. Tips for reducing your risk:

- Keep painted surfaces in good repair so older layers of paint are not exposed, chipping or peeling.
- Do not allow children to eat paint chips.
- Hire only a professional to remove lead-based paints from any surface. People can poison themselves by burning or scraping off layers of paint because created paint fumes or dust can be inhaled. Lead dust, if not contained, sticks to household surfaces and can be spread into the air.

SOIL AND DUST

Lead from years of use in paint, gas, and industrial sources can be found in soil and dust. Today, little lead is used in the production of gas and paint. Because it does not decay or biodegrade, lead in the soil and dust stays around for many years. Soils near houses painted with leaded paints also can be contaminated. Other highly contaminated soils include those near roads and around smelters.

Not all soils contain lead. For those that do, limit your exposure by using these tips:

- Have children wash hands often after playing in soil.
- Clean areas often with a wet mop that gathers dust.
- Cover or replace contaminated soil around homes.

WATER

In general, lead levels in drinking water are low. However, lead can leach into drinking water from some water pipes and leaded solder at pipe joints. Lead leaching can occur at five points in home, school or office water systems: 1) lead connectors, 2) lead service lines or pipes, 3) lead-soldered joints, 4) water fountains and coolers that contain lead and 5) brass faucets and other fixtures that contain lead. Typically, lead pipes are found in homes built before the 1920s. Pipes made of copper soldered with lead came into general use in the 1950s.

Water that is acidic or soft can cause more problems than hard water. Hard water has minerals like calcium, iron and/or magnesium that do not allow lead to dissolve. Soft or acid water can dissolve lead and lead can become part of your water.

Water is not the major source of lead poisoning in children. However, children can absorb more than 50 percent of the lead found in water. Adults absorb between 30 percent and 50 percent of lead from water.

The U.S. Environmental Protection Agency (EPA) has set a drinking water limit for lead at 15 µg/l. Starting in 1992, local water systems must test for lead. If the water in more than 10 percent of tested households is higher than 15 µg/l, action must be taken. The supplier will be required to treat the system's water to reduce acidity. If this does not work, the suppliers will have 15 years to replace the pipes. Water supply owners, such as those who maintain private wells, are responsible for their own water quality.

For your water to contain lead, there must be a source. Sources include lead service lines to the house, brass faucets, and/or lead solder on water pipes. Lead is not a problem in everyone's home. Testing water for lead is a good idea, mainly in older homes or areas where corrosive water is prevalent.

If tests show proof of lead contamination in your drinking water, take steps to reduce lead. Anytime water has been idle for more than an hour, lead may leach in. If water has set for a long time, allow your tap to run for at least two minutes first. This can happen when water sets in pipes overnight. To prevent wasting water throughout the day, fill bottles for later use. Runoff water can be used for washing; watering plants you will not eat, such as flowers; or flushing the toilet. NOTE: If tap water is a major source of lead in your home, consider these lead-reducing ideas: reducing the water acidity, or removing or replacing water pipes.

Simply running the tap water does not replace these more effective actions.

Several steps can be taken to reduce lead content in water:

- Begin with testing your home's water. This will cost about $15. Do not run the water for six to eight hours before taking the water sample. Lead can leach from pipes into still water. To learn the lead content of your water, send a sample to a trained lab for testing. To find a lab in your state, call the EPA Hotline at 1-800-426-4791.
- If the test shows that lead levels are 20 µg/l or higher, let the water run 2 minutes before first using it. This flushes the lines. Do not use hot water for drinking or cooking since lead leaches more easily into hot water.
- Take further action. Call your local water supplier to find out about your water supply. Ask if your home/apartment is joined to the water main by lead service junctions. If so, find out if there are plans to replace the lines. If you own the lines, the supplier can help locate the name of a contractor to change them.
- Never use lead solder to install or repair pipes.

AIR

Until recently, leaded gas in cars was the main source of airborne lead in the United States. Amendments to the Clean Air Act will not allow the use of lead in gas after December 31, 1995. The highest amounts of airborne lead are near smelters and battery production plants. However, breathing airborne lead is now a minor exposure pathway for children.

FOOD AND FOOD-RELATED PRODUCTS

Food grown on lead-contaminated soils can contain high lead levels. However, most lead contamination from food does not start with the food. Packaging or the dishes used to serve food are the causes of most food-related lead contamination. By reducing lead in packaging and dishware, food sources of lead can be reduced.

Lead can get to foods through several pathways.

Rehydrating Food. If water added to rehydrate dried foods contains lead, the newly hydrated food also will contain lead. This can be a problem if the water is overheated before mixing with food. As heating occurs, water evaporates. Because lead does not evaporate from the water, the lead level increases. This problem was noted with infants drinking infant formula mixed with overheated water.

Adding Water to Infant Formula. Infants who drink powdered or concentrated formulas take in large amounts of water. In fact, they consume more water per unit of body weight as children than at any other time in their lives. Children can absorb about 40 percent of consumed lead from food and beverages.

When mixing dry or liquid formula, use bottled water or flush your water system before using tap water. To flush your system, run the cold water tap for two minutes before using it. Always start with cold tap water. Follow boiling directions on the package of formula. Boiling too long is not needed and could raise lead levels. Finally, make sure that the pan used to boil the water contains no lead.

Lead-Soldered Cans. In recent years, the amount of lead in the U.S. diet has been reduced. In 1982, the U.S. Food and Drug Administration reported that the average dietary lead intake for a 2-year-old child was about 30 µg/day. This decreased to 13 µg/day in 1985 and to about 5 µg/day in the period 1986-1988. Reducing the use of lead-soldered cans has been a major reason for this change. In 1980, 47 percent of food and soft drink cans made in the United States were lead soldered. By 1989, only 1.4 percent of canned foods made in the United States had lead solder. However, many imported canned products are still stored in lead-soldered cans. You cannot tell if a can has lead solder by looking. If your grocer is not sure, buy these items less often.

Wine Capsules. Lead foil wrappers, or "capsules," often cover the tops of wine bottles. This keeps air out of the wine and protects the cork from pests. When the foil is removed, it may leave a deposit of lead around the mouth of the bottle. This lead can become part of the wine as it is poured.

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The FDA is now drafting rules to restrict the sale of wine with lead foil capsules. These rules would affect wine produced in the United States and abroad. For now, to reduce lead intake from wine, remove the whole wrapper before serving wine. Wipe both the rim and the neck of the bottle with a cloth dampened with a little wine or vinegar. Acid in both vinegar and wine is more effective than water in removing lead.

Bread Wrappers. In 1991, a group of researchers found that bread wrappers imprinted with lead-based inks could be a source of lead. If the bag is turned inside out and reused, lead could become part of stored food. While this source of lead was not major, bread bags are now imprinted with new dyes with very little or no lead. Now, bread wrappers used inside-out for food storage are of little concern as a source of lead.

Ceramic Ware (dishes, pottery). Glazes used for ceramic ware can be a source of lead. High-acid foods can dissolve lead from the glaze and the lead can leach into the food. Three groups of ceramic ware can have high levels of lead. They are ceramic ware made before 1970, ceramic ware purchased outside the United States and pottery made with leaded glazes or low-temperature firing. In the early 1970s, rules were passed to reduce the amount of leachable lead in ceramic ware sold in the U.S. In the future, leachable lead in ceramic ware will be reduced even more. If you buy pottery from a local artist, ask about the glazes and firing process. If the artist does not know if lead-free glazes and high firing were used, test the pottery for lead. Or use the pottery for decorative purposes rather than to hold food or drink.

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Lead Testing Kits

You can test solder, ceramics, dust, paint chips, etc. for lead, with do-it-yourself lead testing kits. It costs less to do it yourself than having a lab test them. These tests are easy to use and tell if lead is present. They cannot tell how much lead is present. Look for lead testing kits in hardware stores and hobby/ceramic supply outlets. Kits may also be ordered from these dealers.

Lead Check Swabs
Hybrivet Systems, Inc.
P.O. Box 1210
Framingham, MA 01701
Phone 1-800-262-LEAD

Lead Check Swabs
Air Check, Inc.
P.O. Box 2000
Arden, NC 28704
Phone 1-800-247-2435

Lead Alert Kit
Frandon Enterprises, Inc.
P.O. Box 300321
Seattle, WA 98103
Phone 1-800-359-9000

Tests cost several dollars each. Buying many kits will reduce the cost per kit.

Leaded Crystal. Leaded crystal can be a source of lead contamination. Lead is added to glass to increase its brilliance, density and strength. Lead can be as much as 30 percent of the glass weight. When liquid stands in leaded crystal, lead can become part of the liquid. The longer liquid stands, the more lead will leach into the liquid. Most people do not use leaded crystal daily. Wine or alcohol stored in leaded crystal for a long time could be unsafe to drink. Pregnant women and young children should avoid daily use of leaded crystal.

Tips for limiting lead in food and food-related products:

- Make sure children's hands are clean before they eat.
- If using leaded crystal ware for drinking, do not use it daily. Also, do not use leaded crystal while pregnant, or let children use it. Lead crystal baby bottles should not be used for infant feedings. Do not store liquids in leaded crystal.
- Some imported foods are still packed in lead-soldered cans. If your grocer cannot tell you about the solder in an imported canned product, do not use the product often.
- If using older or imported ceramic products, avoid storing acid foods in them. Some high acid foods are fruits, fruit juices, tomatoes or tomato products, pickles and sauerkraut.

If you want to use older dishes or dishes with unknown lead levels, have them tested first. If they test high in lead, use them only for decorative purposes or dispose of them.

For more information about lead poisoning:

Copies of the CDC statement "Preventing Lead Poisoning in Young Children" are available from Publication Activities, Office of the Director, National Center for Environmental Health and Injury Control, CDC, MS-F29, 1600 Clifton Road, Atlanta, GA 30333.

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