Lead has been known and used by humans for at least 5,000 years. But until recently there was no understanding of the hazards associated with lead intake. The Romans lined their water systems with lead, and for centuries lead was widely used in pottery glazes and paint pigments.

As our awareness of the dangers associated with lead increased, manufacturers reduced their use of lead in household products. For example, paint producers stopped using lead in interior house paint in the 1960's. In general, Americans are exposed to ever-decreasing levels of lead. But some people continue to ingest lead unknowingly. This publication discusses potential sources of lead in the home or office, standards for safe exposure, testing procedures, and ways to avoid lead intake.

Sources of lead
There are numerous sources of lead in the environment. You can reduce your exposure to three of these: old house paint, water, and ceramic ware.

Paint. Lead (specifically, lead carbonate and lead chromate) was once commonly used as a pigment and opacifying agent in both interior and exterior house paint. Although this practice stopped years ago, old homes may still have lead paint on the walls. Usually it is covered with layers of newer, lead-free paint.

Lead paint is a risk only to the person who eats it. This form of lead poisoning is limited to young children living in old, deteriorating homes and lacking adult supervision.

Water. Lead levels in drinking water are likely to be higher than acceptable if:

- the home or water system has lead pipes or lead connections to the city water system;
- the home is less than 5 years old and has copper pipes with lead solder (with normal water, most lead in solder has leached into the water after 5 years);
- the home has copper pipes with lead solder and you have soft water;
- the home has copper pipes with lead solder and water sits in the pipes for 6 or more hours.

Ceramic ware (pottery, china, or dinnerware). Lead has been a component in glaze materials since the beginning of civilization. It is used as a flux, an agent that makes the ingredients in the glaze melt and flow together to form a smooth, shiny surface. Cadmium, a toxic element, enhances the vividness of the glaze colors. If the glazes are properly formulated, painted, and fired, the final product will be safe to hold food.

There is no way to tell if ceramic ware has been safely produced by looking at it. Be wary of ceramic ware manufactured in the United States before 1971, antique pieces, and pottery made with low-fire glazes or techniques (raku, Native American pottery, overglaze hand-painted china, iridescent glazes such as luster ware, or raised-slip designs). Imported ceramics also are suspect, especially those items that can bypass FDA import testing programs. These include some catalog items and personal purchases made outside the U.S.

Health risks
Continuous exposure to high levels of lead can have toxic effects. Once ingested, lead is stored in the brain, kidneys, red blood cells, and nervous system. Symptoms of mild lead poisoning include decreased hemoglobin in red blood cells and kidney abnormalities. Long-term exposure severely damages the nervous system, kidney, liver, and reproductive organs. The degree of risk associated with lead ingestion depends on the length and amount of lead exposure and person’s age. Fetuses, infants, and young children are especially at risk. During rapid growth, they absorb greater proportions of lead than adults.

Lead affects a child’s central nervous system, eventually causing mental retardation. Even at low levels, lead can cause learning, behavioral, and growth disorders. Because fetuses, infants, and young children are at greatest risk, you should control their exposure to lead in paint, water, and ceramic ware. Pregnant and lactating women should be aware that fetuses and breastfed infants can have symptoms of lead toxicity even when they themselves suffer no ill effects.

This publication was prepared by Mary Ann Sward, Extension housing specialist, and Carolyn A. Raab, Extension food and nutrition specialist. It was reviewed by Margy Woodburn, professor and department head, and Florian Cerklewski, associate professor, Nutrition and Food Management; and by Frank Dost, Extension toxicologist, Oregon State University.
Standards for permitted exposure to lead

Two federal agencies develop and enforce the standards related to human exposure to lead. The U.S. Environmental Protection Agency (EPA) handles water-related issues, and the U.S. Food and Drug Administration (FDA) deals with lead in food and products used in the storage, preparation, and serving of food.

Water. The EPA standards limit the amount of lead in water to 50 parts per billion. In light of new health and exposure data, EPA has proposed tightening this standard to 20 ppb. If tests show that the level of lead in household water is in the area of 20 parts per billion or higher, you should reduce it, especially if there are children or pregnant women in your home.

Ceramic ware. Federal action levels for lead in ceramic ware were established by the FDA in 1971. The FDA standards do not limit the amount of lead or cadmium in the glaze or clay body; rather, they limit the amount that can be leached in testing. The standard is designed to prevent incorrect formulation and production of ceramic products. The laboratory test consists of filling the item to be tested with a 4 percent acetic acid solution at room temperature and measuring the amount of lead released over 24 hours. In 1971, allowable levels were set at 7 parts per million for lead and 0.5 parts per million for cadmium. In 1980, these levels were reduced; they now vary according to the size and shape of the item. The lowest allowable levels are on items used for storing acidic foods, since they represent the greatest potential health hazard. When the action level is exceeded, FDA can ask manufacturers or distributors to recall the products from the market. They also can deny entry of products into the country. Most manufacturers and large retail chains test their products, so you can ask for assurance that their products meet FDA guidelines.

Testing for lead

You can determine the levels of lead in your home by testing your old paint layers, water, and ceramic ware. The testing procedure is different for each of these materials. Ask for a list of state-certified testing laboratories at your county office of the OSU Extension Service or at your county health department. Be sure to specify whether you want to test paint, water, or ceramic ware.

Paint. In houses painted before 1971, you can determine whether lead-based paint was used by flaking off a sample from behind a radiator or the refrigerator. Send the paint chips to the testing laboratory with a request for information about lead content.

Water. Contact two or three firms on the state-certified list and ask about prices and how to collect the sample for testing. Some firms will send their own employee to take the sample, others will provide you with directions and a collection vial.

Ceramic ware. For testing ceramic ware you need to ask your county Extension office for laboratories that conduct the FDA leaching test for lead.

Home testing kits. Inexpensive home testing kits for lead in ceramic ware are now available. However, the accuracy and reliability of home-testing kits for lead have not been documented, so the consumer should be further advised that most kits are designed to indicate the presence of leached lead, not the specific level or amount being leached.

Microwave testing. Testing for lead content by heating the ceramic ware, filled with water, in the microwave oven is not an adequate test. Potential lead problems. Microwave ovens are sensitive to the presence of any metal (iron, for example, is a common and harmless ingredient in most pottery and many glazes), so this method is inconclusive. The presence of lead is not the problem; rather, it is that the lead could leach out of the ceramic ware and into the food.

Preventive measures

Once you have obtained the test results, compare them to the standards listed in this publication. If your lead levels are below the action levels, you can continue using your water and ceramic ware safely. If your test results indicate lead levels above the action levels, you should take immediate steps to reduce your lead intake. Stop using any ceramic ware in question. If you choose to keep the item for decorative purposes (not to come into contact with food), clearly mark “contains lead” on the bottom.

If your water test shows unacceptable levels of lead, try running your water for 2 or 3 minutes before you collect water, because lead continues to leach into the water as it is standing. If the water still shows unacceptable levels of lead after running for a few minutes, contact your county office of the OSU Extension Service or your county health department for recommendations. Finally, if you are concerned about the possibility of excessive lead intake, contact your physician or pediatrician. A blood test will reveal whether your family members have excessive lead in their systems.

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