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How Good Nutrition Can Combat Effects of Lead in Water

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COLUMBUS, Ohio -- Children are especially susceptible to the dangers of ingesting lead from drinking water or any other source, says a registered dietitian nutritionist with [Ohio State University Extension](#). But parents can help limit the health impact by making sure their children eat a well-balanced diet, especially that they get enough calcium, iron and vitamin C.

“The best defense against lead for anyone is a healthy lifestyle,” said Pat Bebo, leader of OSU Extension’s Community Nutrition Program and interim assistant director in charge of Extension’s [Family and Consumer Sciences](#) programs. OSU Extension is the outreach arm of The Ohio State University’s [College of Food, Agricultural, and Environmental Sciences](#). Bebo also holds an appointment with Ohio State’s [College of Education and Human Ecology](#), which partners with CFAES in outreach and research.

“But it’s especially important for children, because their digestive system is much more efficient at absorbing lead. Children’s bodies may absorb up to 50 percent of the lead they ingest, while adults absorb just 10 to 15 percent.

“Absorption is greatest on an empty stomach. Infants and children up to age 6 are at the greatest risk.”



An overall healthful diet, particularly one high in calcium, iron and vitamin C, can mitigate the effects of lead poisoning, especially in children. (photo: iStock)

Lead poisoning has been in the news recently after reports of dangerous amounts of lead in public drinking water supplies in Flint, Michigan, and Sebring, Ohio. But lead ingestion can also come from lead paint, particularly from houses built before 1978, lead dust and lead in contaminated soil. Lead poisoning can cause cognitive delays and behavior problems, and can harm the brain, kidneys and other organs.

Bebo said calcium is the most important nutrient to help combat lead ingestion.

“Picture a cell, any cell in the human body,” Bebo said. “They all have receptors that allow nutrients to enter the cell and do their work. When the right nutrient matches up with a receptor, the cell will let it in.

“It just so happens that calcium and lead compete for the same receptors, but lead is a much better fit. So there must be enough calcium circulating in the body to bind to the cell receptors first. Then the lead is less likely to be absorbed.”

The recommended amount of calcium for children up to 6 months is 200 milligrams a day; 260 milligrams for children 6 to 12 months; 700 milligrams for those 1 to 3 years old; 1,000 milligrams for those 4 to 8 years old; and 1,300 milligrams for those 9 to 18 years old. A cup of milk has about 300 milligrams of calcium. Other good sources are other dairy products such as cheese and yogurt, as well as dark green leafy vegetables and calcium-enriched orange juice.

Getting enough iron is also important, as it can prevent iron-deficiency anemia that can be caused by lead.

“Iron is needed in our red blood cells to absorb oxygen,” Bebo said. “If there’s not enough iron circulating in the body and you’re taking in toxic amounts of lead, then the lead will interfere with the uptake of iron by the red blood cells and as a result you could become anemic.

“If you are getting enough iron in your diet, it will compete with the lead for entry into the red blood cells.”

Infants up to 6 months need just 0.27 milligrams of iron per day, but those 6 to 12 months need 11 milligrams. Children 1-3 years need 7 milligrams; 4-8 years, 10 milligrams, and 9-13 years, 8 milligrams. Boys 14-18 need 11 milligrams a day, and girls that age need 15 milligrams.

Iron-rich foods include iron-fortified breakfast cereals; lean red meat, turkey, chicken and fish; green leafy vegetables; and kidney beans and lentils.

Getting enough vitamin C is also necessary, Bebo said, as it helps the body better absorb iron. Vitamin C-rich foods include citrus fruits, red and other bell peppers, cantaloupe, tomatoes, broccoli, potatoes, sweet potatoes and other fruits and vegetables.

“Basically, what I tell people is to follow MyPlate,” online at www.choosemyplate.gov, Bebo said. “A healthy diet won’t completely eradicate the threat of lead. But it can go a long way, especially in children up to age 6, to limit the level of toxicity.”

It’s important not to rely on supplements to get the recommended amount of these nutrients, Bebo said.

“There’s no evidence that supplements have any better effect than eating a balanced diet, and it’s too easy to go overboard using supplements. That could put you at risk for toxicity as well — you don’t want that, either.”

Getting enough physical activity and hydration is also important, Bebo said, “to make sure the organs can flush the system and to keep a healthy body weight so additional fat mass won’t be available to allow the body to store harmful minerals.”

OSU Extension offers two Community Nutrition programs that allow low-income Ohioans to learn more about how to maintain a healthy diet. The Expanded Food and Nutrition Education Program is offered 20 counties, and Supplemental Nutrition Assistance Program-Education sessions are offered in 80 counties. Anyone interested can contact their OSU Extension county office to find where the nearest program is, or they can find information at fcs.osu.edu/nutrition.

“It doesn’t have to be complicated,” Bebo said. “In fact, it’s simple. But you have to know some basics about good nutrition, and Extension is here to help provide that information.”

Parents can learn more about lead and reducing their children’s exposure to it from the U.S. Environmental Protection Agency at www.epa.gov/lead.

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