

POSSIBLE SOURCES OF LEAD EXPOSURE

Lead-based paint and lead contaminated dust are the most common sources of lead exposure for children.

Paint

Lead was added to house paint until 1978 when the Consumer Product Safety Commission (CPSC) restricted the amount of lead added to household paint. Many buildings built before 1978 have lead-based paint inside and outside. Nationwide, lead remains in approximately 74 % of all housing built before 1978 (HUD 2000). Housing built before 1950 is at even greater risk of having lead-based paint; the older the building, the more likely it is to contain lead paint. Lead paint in good condition is not usually a problem except in places where painted surfaces rub against each other and create dust, such as where windows open and close. Chipping, peeling or chalking lead paint is a common source of ingestible lead dust and is a hazard. The condition of leaded paint more accurately predicts lead exposure than the lead content of paint by itself. Lead-based paint may also be found on older toys, furniture and playground equipment.

Dust

Lead paint dust is the most common source of lead exposure for children. Lead in this form is much more easily absorbed. Interior house dust can become contaminated with lead as the result of the deterioration or disturbance of leaded paint, the tracking in of contaminated soil, and the fallout of airborne lead particulate from industrial or vehicular sources. Fine lead dust, and resulting contamination, can be created when painted surfaces rub against each other, such as where windows or doors open and close. Paint dust can gather on household surfaces, especially floors, carpeting and windowsills. Dust may also collect on toys, bottles, pacifiers and other objects that children may put into their mouths. Lead in dust is increased after older paint has been disturbed through remodeling or repainting. Home renovations and remodeling contribute to nearly half of the childhood lead poisonings in Oregon. The amount of lead in house dust has a strong correlation with the blood lead levels (BLLs) of young children and is more predictive of elevated blood lead levels (EBLLs) in children than the amount of lead in house paint. The risk of having an EBLL extends well below the 40 $\mu\text{g}/\text{ft}^2$ EPA standard allowed for dust on floors and studies done by the National Center for Healthy Housing in 2008 recommend lowering the standard for floors to 10 $\mu\text{g}/\text{ft}^2$.

Other sources of lead poisoning are less prevalent. The body's lead level is cumulative and therefore, can increase with exposure to several low level sources.

Soil

Soil can become contaminated with lead due to the breakdown of lead-based paint on buildings and playground equipment. The soil near roads or highways may contain high lead levels from years of exhaust fumes and pollution from cars that once used leaded gasoline. Lead has also been deposited in the soil from industries using lead. Outside play areas and food gardens should be located away from homes and buildings and areas that could be contaminated by heavy traffic. Potentially hazardous levels of lead in soil are not uncommon. Soil lead content is an important predictor of children's risk for an EBLL, though less important than the lead content of interior dust. Soil samples taken from play areas in a yard have a stronger relationship to children's BLLs than samples taken from other locations.

Water

Most well or city water does not naturally contain lead. Lead in drinking water is an infrequent source of lead poisoning in Oregon. Lead gets into drinking water from the corrosion of lead solder that connects the pipes or brass faucets. Lead from solder is most commonly found in homes built between 1970 and 1985. In 1986 and 1988, the Clean Drinking Water Act restricted the use of lead in pipes, solder, and other plumbing components. The amount of lead in water depends on the types and amounts of minerals in the water, how long the water stays in the pipes, the water's acidity, and its temperature. Infants consuming formula prepared with lead-contaminated water may be at particular risk because of the large amount of water they consume relative to their body size. If lead in plumbing is suspected, water from a hot water tap should not be used for drinking or food preparation. The cold-water tap should be flushed for several minutes each morning or after sitting until there is a noticeable change in temperature of the water before any water is consumed.

Tableware

Imported, old, handmade, or poorly glazed ceramic dishes and pottery may contain lead. Lead may also be found in leaded crystal, pewter and brass dishware. Some pottery, especially earthenware made by individuals and in small cottage industries abroad, may not have been fired properly. In these pieces, acid substances may interact chemically with the glaze and accelerate the lead release. Therefore, acidic foods (such as orange, tomato and other fruit juices, tomato sauces, wines, and vinegar) stored in improperly glazed containers are potentially the most dangerous. You cannot always tell by looking at a dish whether it contains lead. The only way to know for sure is to test or have the tableware tested for lead. The Federal Drug Administration (FDA) has established standards for lead in tableware that are based on the amount of lead that can leach from tableware into food. If it is not known whether a particular tableware item contains lead, the item should not be used to store, cook or serve food or beverages. If any tableware starts to show a dusty or chalky gray residue after washing, discontinue using the item. Purchase dishes with labels that state the item is lead-free or suitable for food use.

Hobbies

Welding, auto or boat repair, the making of ceramics, stained glass, bullets, and fishing weights are hobbies that may use lead. Other hobbies that carry a potential for exposure to lead include furniture refinishing, home remodeling, painting and target shooting at firing ranges. A more complete list of hobbies and occupations that may involve lead may be found on the document titled, "Possible Sources of Lead" at the end of this document. By following a few simple precautions, hobbyists can reduce the risk of exposure to lead and protect themselves and their families.

Occupational sources

Many occupations can expose a worker to lead. Some of the occupations that carry a potential for exposure to lead include building demolition, painting, remodeling/renovation, construction, battery recycling, radiator repair, and bridge construction. People who work in a lead environment may bring lead dust into their vehicle or home on their clothes and bodies exposing family members. Good hygiene needs to be observed to avoid bringing lead dust into the home from the work place.

Food Supply

Lead solder is no longer used in the processing of canned foods in the United States, therefore, lead in food has been dramatically reduced. Imported food products may contain lead as some foreign manufactures use lead solder in cans. In recent years, lead has been found in candy from Mexico. The lead ink from the paper wrapper may contaminate the candy, especially if these products are acidic tamarind and/or tejocote fruit. Tamarind is sticky and lead from pesticides, fertilizers or the soil can attach to the fruit. Many of the candies contain chili's that may not have been cleaned before being milled, so soil, which may contain lead, is thrown into the mix. Candy is also sometimes packaged in small clay pots. To give these pots a shiny look, they are covered with a glaze called Greta, which contains lead. The lead then leaches into the candy. Other food wrappers and grocery store vegetable bags may also be printed with lead. Bread wrappers and vegetable bags should not be turned inside out and reused. Food may also be contaminated with lead from the soil during the growing process.

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Home Remedies and Cosmetics

Immigrant families bring to Oregon unique items associated with their customs and traditions. Many home remedies, particularly popular in some ethnic communities, may contain up to 100% lead. Of lead poisoned children in Oregon, approximately 6-12% were exposed to lead through contact with objects or products brought or imported from their parent's native land. This is likely an underestimate because cultural sources are more obscure than housing hazards and less readily assessable for laboratory testing. Indeed, for over 16-25% of all cases no source could be identified despite an environmental investigation. Children who been adopted from, lived in or traveled to other countries are potentially at higher risk for lead poisoning. The use of products imported from Asian countries or use of these products during travel to Asia may increase the risk of exposure. Cosmetic products are a primary source of lead in these countries. Application of Kohl results in lead exposure primarily via hand-to-eye-to-mouth movement and subsequent ingestion of particles. Identifying cultural sources requires thorough investigation of the home, knowledge of cultural practices, language appropriate materials, and translators, as well as application of good, basic epidemiologic practice. Reducing the lead exposure in these cases is especially difficult when family traditions are challenged.

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Possible Sources of Lead

Occupational

Painters
Home remodelers/renovators
Construction/demolition workers
Bridge maintenance/repair
Auto body repairers/painters
Battery manufacturers/recyclers
Radiator repairers/manufacturing
Furniture refinishers
Plumbers, pipe fitters
Roofers
Lead miners, smelters, & refiners
Glass, copper and brass manufacturers
Boat builders/painters/repair/maintenance
Ceramics making /glaze mixing
Printers (ink)
Plastic & rubber manufacturers
Police officers
Firing range instructors
Steel welders or cutters
Jewelry-making
Gas station attendants
Aircraft repair
X-ray shielding/film radiology

Hobbies and Related Activities

Home remodeling/renovation
Car or boat repair
Glazing/making pottery
Reloading/target shooting at firing ranges
Furniture refinishing
Making/handling lead shot and fishing weights/sinkers
Using lead soldering/welding
Oil painting (artistic)
Using pastel art pencils
Making stained glass
Jewelry making
Using/making diving & exercise weights
Repairing old painted wooden or metal toys

Environmental/Other

Lead-based paint (pre-1978)

Soil/dust near lead industries, roadways, lead-painted houses
Plumbing and solder
Cosmetics & hair dye
Imported vinyl mini-blinds
Imported ceramic tiles for the kitchen/bathroom
Building materials:
Gutters, flashing, tile, window glazing
Ceramicware/glazed pottery
Porcelain bathtubs
Leaded glass/pewter
Leaded gasoline (race, collector cars)
Soldered seams-imported canned food
Soldered copper pipes
Submersible pumps in wells
Brass plumbing fixtures
Bronze, pewter, leaded crystal
Electronics manufacturers
Pesticides
Imported crayons
Storage batteries
Plastic insulation on electrical wiring and old telephone wiring
Candle wicks

Ingested Sources

Traditional/home remedies (Azarcon, Greta, Pay-loo-ah, Kohl, Ayurvedic). See our website for a listing of other home remedies that may contain lead.
Imported candy and candy wrappers
Supplements (calcium)

For more on sources of lead or preventing lead poisoning
www.healthoregon.org/lead

References

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