

Clean Soil Fact Sheet

Lead-Free Keiki For a Healthy Future

If you are considering starting a home garden or your home has a garden already, this fact sheet will provide you with information about how to minimize exposure to lead, arsenic, and organochlorine pesticide (OCP) contamination in soil.

Unintentional ingestion of contaminated soil is the primary source of exposure to lead, arsenic, and OCPs in soil. Dirt on hands from normal play activities, working in a garden, or residual dirt on produce grown in gardens can result in accidental ingestion of contaminated soil. Soil can also be carried into the home on hands, shoes and clothing, or as airborne dust. Once inside the home, the contaminated soil can be deposited on floors, furniture, or other objects used by children.

Young children are at high risk for lead poisoning because their bodies are still developing and absorb more lead. Playing on the ground and putting their hands or other objects in their mouth increases a young child's risk of accidentally swallowing or breathing in lead from their environment. A child exposed to lead may not seem sick, but their health and brain development may be affected causing learning and behavior problems in school. Long-term exposure to high levels of OCPs or Arsenic can also be harmful to young children. Therefore, it is very important to grow produce in clean soil.



How did our soil get contaminated?

Lead's elevated presence in the environment generally comes from its historic use in paint and gasoline. The use of lead in house paint was banned in 1978, but it still exists in the interior and exterior paint of many older buildings in Hawai'i. Soil around the perimeter of buildings can become contaminated with lead as paint chips off of exterior walls and falls to the ground. In addition, some types of older roofing nails may contain lead. When they fall to the ground, lead can be released from the nails and contaminate the soil. Lead in gasoline was completely banned in 1995, but decades of leaded gasoline use often contaminated soils near highways and roads. Lead does not degrade in soils but can be spread through natural or human soil disturbances over time or can be transported by erosion to adjacent areas.



Avoid planting garden's around the perimeter of buildings to minimize exposure to soil contaminants.



Building raised garden beds and using store bought soil can help reduce soil contaminants in your garden.

Arsenic is primarily found in soil along building foundations, fence lines, or property lines due to arsenic-based herbicides, insecticides and/or rodenticides that were used from the 1920s through the 1940s. Since inorganic arsenic is stable in the environment, it can remain in soil for many years.

OCPs are a group of pesticides used for termite control in and around wooden buildings from the mid-1940s to the late 1980s. They were also used in agricultural fields to control insects. OCPs commonly used in Hawaii included chlordane, aldrin, dieldrin, heptachlor, and DDT. The highest concentrations of OCPs in soil are typically found in the top 1 to 2 feet of soil and up to 1 to 3 feet away from a buildings perimeter. OCPs break down very slowly in the environment and are not detectable by smell or sight. As a result, OCPs may still be found in treated soils at levels of concern to human health.

What can I do to prevent exposure to contaminated soil?

- Wash hands thoroughly after playing outside, after working in the garden, and prior to eating.
- Avoid tracking soil into the home by leaving shoes outside and using door mats and boot scrapers. Clean up right away if soil is tracked inside.
- Maintain dense landscaping, gravel, or permanent cover, such as asphalt or concrete, close to building foundations, roads, and driveways to prevent children from playing in soil where higher contaminant levels can be found.
- Keep children from playing in bare dirt.
- Use planter boxes or raised garden beds if your home garden has not been tested and use soil that has been commercially packaged and labeled for growing food crops. A permeable geotextile fabric can be placed between the untested soil and overlying clean soils to help identify and maintain the boundary between the two layers.
- Plant gardens at least 10 feet away from building foundations, roads, and driveways. Gardens built with new soil still need to be located away from building perimeters and foundations. Busier roads or highways may require a larger buffer zone.
- Do not use any pesticides or herbicides in your home garden due to potential health hazards for children.
- Use non-toxic, non-leaching materials for raised garden beds, containers, stakes or trellises. Do not use pressure-treated wood which can contain arsenic. Used tires, single-use plastics, old railroad ties, and other similar materials should not be used due to potential contaminants.
- Bring in clean sand for sandboxes.
- Wash all fruits and vegetables from the garden with clean, running water before bringing them into your home. Wash again carefully with a 1% vinegar solution or soapy water to remove any remaining soil particles. Discard outer leaves before eating leafy vegetables. Peel and remove the outer skin of root and tuber vegetables before eating. Do not compost the produce peelings and unused plant parts for use back in your garden.

How do I test my soil for contamination?

Do it yourself: The multi-increment sampling approach for soil testing is advised because it provides a good estimate of the average concentration of contaminants in a specific area of soil. A multi-increment sample is made up of multiple soil samples or increments collected across the area of concern. The multiple soil increments are combined to form a single multi-increment sample. It is important to use clean tools to sample soil, a clean container to mix it, and clean bags to store it. Small amounts of contaminants, especially fertilizer or lime, can distort the analysis results. See the section below for information on where you can send your sample to for analysis. **Watch video at <https://www.youtube.com/watch?v=GM7-19oSfD8> for advice on how to properly collect a soil sample.**

Hire a Contractor: Hire a local environmental consulting firm in Hawaii to collect soil samples and send the samples to a lab.

Where can I get my soil tested?

University of Hawaii at Manoa - Department of Tropical Plant and Soil Sciences, Agricultural Diagnostic Service Center

See instructions at <https://www.ctahr.hawaii.edu/oc/freepubs/pdf/SCM-9.pdf>.

Environmental Laboratories in Hawaii or on the Mainland

Call to confirm. Some labs may not test soil samples.

Hazard Evaluation and Emergency Response Office (HEER)

Call 808-586-4249 for advice on sampling, hiring a contractor, or choosing a laboratory.

FOR MORE INFORMATION

Hawaii Childhood Lead Poisoning Prevention Program

Hawaii State Department of Health

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