



Healthy Soils: Information about testing your yard or garden

All soils contain metals. Arsenic, lead, cadmium and other metals occur naturally in soils. Due to Oregon's volcanic past, arsenic is common. Lead is also common because of its long use in lead-based paint and in leaded gasoline.

Should I test my yard or garden soil?

Before you decide to test, consider how likely it is for you or others to come into contact with (and be exposed to) the soil. Is your yard covered by grass, mulch, rock or other materials? It's harder for people to come into contact with the soil when bare ground is covered. A person must come into contact with a level of contamination high enough for it to be harmful to their health. The way people are exposed is also an important factor to health. For example, a person must swallow soil to be exposed because metals stick to soil particles. Metals do not absorb through skin and the particle size is too large to get into the lungs.

Swallowing soil is of most concern for young children who play on the ground, in dirt and frequently put their hands in their mouths. Children and adults should wash their hands before eating and after playing outdoors.



Getting started – create a sampling plan and think about:



Soil depth

For soil in a grass/sod covered yard (or lawn), you will want to collect soil samples less than six inches below the surface. For an area of your yard where digging at depths below six inches is a common activity (e.g., a garden or children's play area), then your soil samples will need to be collected at a deeper level.

Note: Advice for testing nutrients and pH in soil may direct you to sample at levels deeper than six inches. Collect soil samples at depths that will let you know your soil quality as well as your health risks.



Past and current use

Information about past uses, current uses and your knowledge of your property should direct your testing. Do you live in an area that was once agricultural, next to a gas station, dry cleaner, on a former landfill or near a busy road? Your yard's previous use will help determine which contaminants to look for. Also consider the source of any top soil or soil amendments for the same reasons.



Samples from different parts of your yard

It may help to keep samples from specific areas of your yard separate from one another. A sample taken close to the exterior walls of a home or building built before 1980 has a higher likelihood that it will test higher for lead. You may have an area of your yard where children play and dig in the soil. Part of your yard may include in-ground or raised garden beds, another area of your yard may be covered with sod. By keeping soil samples separate you will be able to identify where specific contaminants are and where to lower contamination levels and potential risks.



Note: Some metals occur naturally in soils. OHA recommends testing for metals. It's also important to test for indicators of soil health such as nutrient and pH levels. Nutrient-rich soil with a neutral pH decreases the risks of contaminants moving through the food chain and harming people.

What your yard or garden soil test results mean

Interpreting yard or garden soil tests involves comparing results for each contaminant to screening levels. There are no garden-based federal or state agency standards for soil screening levels; because of this, OHA recommends three screening steps.

- 1** The baseline, *first type of screening* is the Department of Environmental Quality (DEQ) estimate of the background levels for metals. Comparing your soil sample results to background levels lets you know if your results are higher than what is naturally occurring or expected for your region.
- 2** The *second type of screening* is DEQ's residential screening levels. These are risk-based concentrations (RBCs) that establish soil cleanup levels based on proposed reuse for contaminated sites. Residential reuse requires the most stringent cleanup level as it assumes children and families will live on the property.
- 3** The *third type of screening* level was developed by the Agency for Toxic Substances and Disease Registry (ATSDR). These public health screening levels are called *Environmental Media Evaluation Guides* and *Reference Dose Media Evaluation Guides*. Public health screening levels are different because they are calculated to assess human health risks.

If you live in the Portland basin region, use the background numbers listed in the table to compare individual results against screening levels. Background levels for other regions in Oregon are found at <http://www.oregon.gov/deq/FilterDocs/cu-bkgrmetals.pdf>.

Screening level comparisons

Metal	1 DEQ Portland Basin background	2 DEQ residential screening levels	3 ATSDR screening levels
Aluminum	52,300	77,000	50,000
Arsenic	8.8	0.43	15
Cadmium	0.63	78	5
Total chromium ^e	76	120,000	75,000
Chromium+6	NA	0.3	45
Cobalt	33	23	500
Iron	36,100	55,000	NA
Lead	79	400	NA
Manganese	1,800	1,800	2,500
Mercury	0.23	23	15
Nickel	47	1,500	1,000
Selenium	0.71	390	250
Uranium	3	230	150

What to do if your yard or garden soil tests higher than screening levels

All of the values included in the above table are for screening purposes only. Soil testing results higher than screening levels do not confirm health risks. Rather, they help to identify levels that may call for more evaluation and steps to reduce potential exposures to soil. In urban soils, it is not uncommon to find metals near or above screening levels.

Adding compost and keeping garden soil near neutral pH creates healthier plants and makes it harder for metals and other contaminants to get into plants. With that in mind, the risks for exposure to metals for urban gardeners are likely much lower than the risks calculated by the residential exposure assumptions used.

Further evaluation and steps to take

For further evaluation contact the Environmental Public Health Section at the Oregon Health Authority Public Health Division at ehap.info@state.or.us or 971-673-0440.

Steps to reduce health risks from metal contamination in your soils.

- Use clean soil and compost.
- Maintain soil nutrients and pH.
- Cover (or mulch) bare ground where soil is exposed.
- Test your soil.
- If contamination is higher than screening levels, build raised garden beds with clean soil and avoid the use of treated wood.

Ways to avoid swallowing soil:

- Watch over children who play in yards and gardens to prevent swallowing of soil.
- Avoid overhead watering. Water plants near the soil to avoid soil splash.
- Take off shoes and do not track soil into your home.
- Wash your hands.
- Wash and/or peel foods.

Additional resources for interpreting soil test results

Oregon Health Authority, Public Health Division, Healthy Gardening <http://www.healthoregon.org/gardening>

Understanding Your Test Results: Metals in Garden Soils and Vegetables – New York State Department of Health and Cornell University <http://cwmi.css.cornell.edu/UnderstandingTestResultsMetalsSoilsVeg.pdf>

Healthy Soils, Healthy Communities – Metals in Urban Garden Soils – New York State Department of Health and Cornell University http://cwmi.css.cornell.edu/Metals_Urban_Garden_Soils.pdf



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