

CADMIUM in the garden

Cadmium is a heavy metal that has both natural and man-made sources. Cadmium is often a byproduct from mining other metals like zinc and copper, and is also found in fossil fuel emissions and fertilizers. It is used in a variety of products including batteries, metal coatings, and pigments.

Summary for Gardeners

- » Plants take up more cadmium if soils are acidic (pH below 6) or have a high amount of salts.
- » Adding organic matter or agricultural lime (to raise soil pH) can limit how much cadmium is taken up by plants.
- » Cadmium levels are often higher in leafy greens than other produce.
- » Only long-term, sustained exposure at low or moderate levels poses a health risk.

Sources of cadmium exposure

Cadmium exposure can occur in and outside the garden. Cadmium is usually found at very low levels in soils, but hotspots from man-made sources may also exist. Below are some of the main sources that release cadmium into the environment.

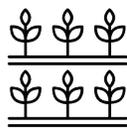
Once in the environment, we can be exposed in a few different ways (see exposure section to the right).



nearby industry Power plant emissions and other industries that use cadmium can release the metal into air, water, and soil.



traffic Emissions from nearby busy roads may increase cadmium in soil. The closer these roads are, the more likely high cadmium levels may be found.



in-garden sources Old tires and galvanized steel may be cadmium sources. Try to use other materials in the garden, especially for edible crops



housing One study found that older neighborhoods tended to have higher levels of cadmium in soils.



fertilizer Cadmium occurs naturally in phosphate rock, which is used for fertilizer. Past use of phosphate fertilizer may be a source of cadmium in soils.

Exposure to cadmium in the garden

How am I exposed? Eating, breathing, or direct skin contact with contaminated soil particles, or eating contaminated produce, can all be routes of exposure.

Are my garden plants safe to eat? Leafy greens tend to have higher concentrations of cadmium, followed by herbs and roots. Fruits have low cadmium levels. Overall, garden and supermarket produce tend to have similar levels of cadmium.

Should I be worried? Exposure to moderate levels of cadmium in soils or produce poses no immediate health risk, but limiting exposure (especially for children) is still a good idea. It is important to remember that there are many health benefits to home and community gardening.

Limit children's exposure

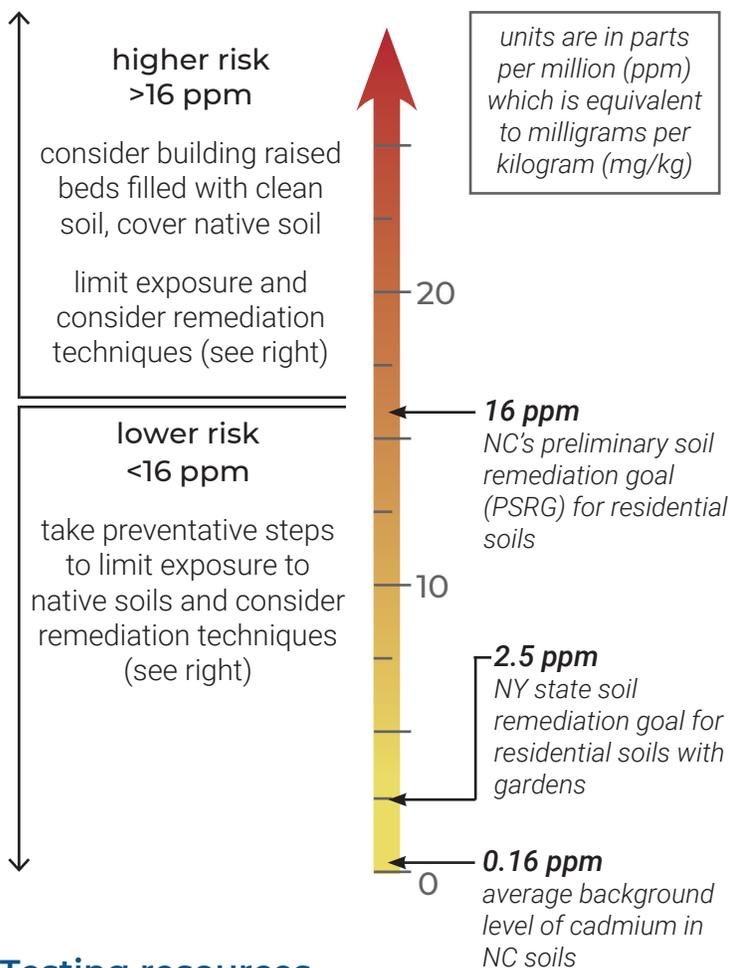
- Small doses matter. Children breathe, eat, and drink more relative to their size than adults
- Their bodies and brains are still developing
- Children spend more time on the ground and often put things (like dirt) into their mouths
- They have more skin surface area than adults, so skin exposure also matters



CADMIUM in the garden

Making sense of regulatory standards

No official standards have been established in North Carolina for acceptable levels of cadmium *in garden soils*. The guidelines and background values below can help you determine whether cadmium levels in your garden soil might require further attention.



Testing resources



How to test your soil and interpret the results: <https://sites.nicholas.duke.edu/superfundcec/gardens/soil-testing/>



Well water testing for cadmium: <https://epi.dph.ncdhhs.gov/oe/wellwater/howtotest.html>



Still have questions about cadmium soil testing? Email us at superfund@duke.edu

Health impacts of cadmium

Cadmium is a known human carcinogen (it can cause cancer). Low or moderate levels of cadmium in soil do not pose any immediate risk, but consistent exposures over long periods of time can increase cancer risks.

Eating food or drinking water with very high levels of cadmium can severely irritate the stomach, leading to vomiting and diarrhea (this is uncommon).

Other health effects are still being researched. Animal studies have shown that cadmium can harm development and reproduction, lung function (if inhaled), and lead to kidney disease.

Reduce cadmium exposure in the garden

- Adding compost or other organic matter from a contaminant-free source may help limit cadmium uptake by plants. Check the [NC Composting Council](#) website to find STA or OMRI certified compost
- Adding agricultural lime (to raise soil pH) can also limit plant uptake
- Thoroughly wash produce grown in cadmium-contaminated soil, to remove any soil or dust
- If your soil cadmium levels are high, consider **not** planting leafy greens such as lettuce, spinach, and swiss chard (which take up more cadmium)
- Conduct a soil safety training to teach exposure reduction strategies to all garden users
- Visit our website below for our factsheet on [10 Healthy Garden Habits](#)

For more information visit:

<https://sites.nicholas.duke.edu/superfundcec/gardens/>

