



GENERAL RECOMMENDATIONS FOR REDUCING CONTACT WITH HARMFUL METALS IN URBAN SOILS

If you are concerned about exposure to metal contaminants in urban agriculture, here are some simple—and mostly free—steps you can take to reduce your exposure.

Change your behavior	What can you do, specifically?
Do not drink water out of rain barrels. While city water is safe, hoses can become contaminated so it's best not to drink from them either.	<p>Bring a full water bottle with you when going to work on site.</p> <p>If a large group typically gardens together, consider bringing a large insulated beverage (e.g., “Igloo”) cooler filled with water to the garden.</p> <p>If drinking municipal water from spigot, let it run at least ten minutes once before using at beginning of season, and at least 1-2 minutes before use each time after that.</p>
Reduce skin contact with soil.	<p>Wear gloves, closed-toed shoes, long pants, and long sleeves, especially when interacting with contaminated soil. Brush off/dump out soil that accumulates in gloves, shoes, and pockets before going indoors.</p> <p>Dust off any soil from your hands before leaving the site and wash your hands as soon as possible after gardening.</p>
Do not allow children to eat soil or crawl on ground in garden.	Establish designated play areas that reduce soil contact. Choose grassy areas over soil, if possible.
Avoid bringing soil into your home.	<p>Take shoes and dirty clothes off before entering your home.</p> <p>Keep tools on site or clean them before transporting home.</p> <p>When transporting plants (including harvested produce), remove as much soil as possible before putting them in bags, baskets, or vehicles.</p> <p>Avoid bringing pets on site.</p>
Reduce exposure to contaminants on the surface of urban-grown fruits and vegetables.	<p>Minimize consumption of produce on-site.</p> <p>Wash and peel urban-grown produce, especially root vegetables, in clean sink before consuming.</p> <p>Remove outer leaves of green leafy and cruciferous vegetables (e.g., broccoli, cauliflower) before eating.</p>
Reduce exposure to contaminants in urban-grown fruits and vegetables.	Vary where you get your produce. For example, source some of your fruits and vegetables from other sources such as farmers markets, grocery stores, or other sites.

<u>Make your farm or garden safer</u>	<u>What can you do, specifically?</u>
Avoid build-up of harmful metals in the water.	Let municipal water run for ten minutes once at the beginning of season, and then for 1-2 minutes before use each time after that.
Avoid parts of the site known to be contaminated.	Don't grow edible plants in contaminated areas. Don't put compost piles on top of contaminated areas.
Avoid growing near known sources of pollution.	Avoid growing near busy roads, demolished buildings, industrial sites, and other known sources of pollution. If possible, grow in a place with less potential for water to drain onto site. For example, avoid growing downhill from a road, building, or downspout.
Grow exclusively in raised beds using imported soil.	Don't use treated wood, railroad ties, or vehicle tires to build raised beds. Try to buy compost, fertilizer or topsoil from vendors that test their materials for contaminants. Use landscaping fabric and/or build raised beds high enough to make sure plant roots do not reach contaminated soil.
Reduce the potential for dust	Use mulch on non-growing area soils (e.g., walkways) to prevent the "kicking up" of dust. Avoid mulches made from treated wood, if possible.

Some other thoughts:

- ▶ Children, infants, and pregnant women are more vulnerable to some of these pollutants. Following some of these recommendations may be even more important for them.
- ▶ The amount of exposure to harmful metals on site increases as you spend more time there. If you are concerned with exposure, take steps to maximize your time efficiency at the farm or garden.

THE ORIGIN OF AND CONCERNS WITH METALS IN URBAN SOIL

Metals are a group of substances/elements that exist naturally in all rural and urban soils on the earth. Metals can also be released into the environment by human activities, often causing higher levels of metals in urban soils than rural soils.

- ▶ Some metals (e.g., arsenic, barium, cadmium, chromium, lead, and nickel) are harmful and can make people sick. Other metals (e.g., calcium, copper, iron, magnesium, manganese, phosphorus, potassium, and zinc) are considered essential for human and/or plant health and can be beneficial in certain amounts.
- ▶ Most soils, water, and produce have some small amounts of harmful metals. There is no clear line of what is considered “safe”. In most cases, there is no immediate health concern, but there may be increased risks with high amounts of exposure over long periods of time. If the amount of a metal is higher than a guidance value, it wise to reduce contact with that soil, water, or produce item whenever possible. It is always a good idea to follow “General recommendations for reducing contact with metals in urban soils” provided in this report.

The following picture shows some of the sources of metals. It also shows some ways that you might come into contact with them while working in the garden or eating urban-grown fruits and vegetables.

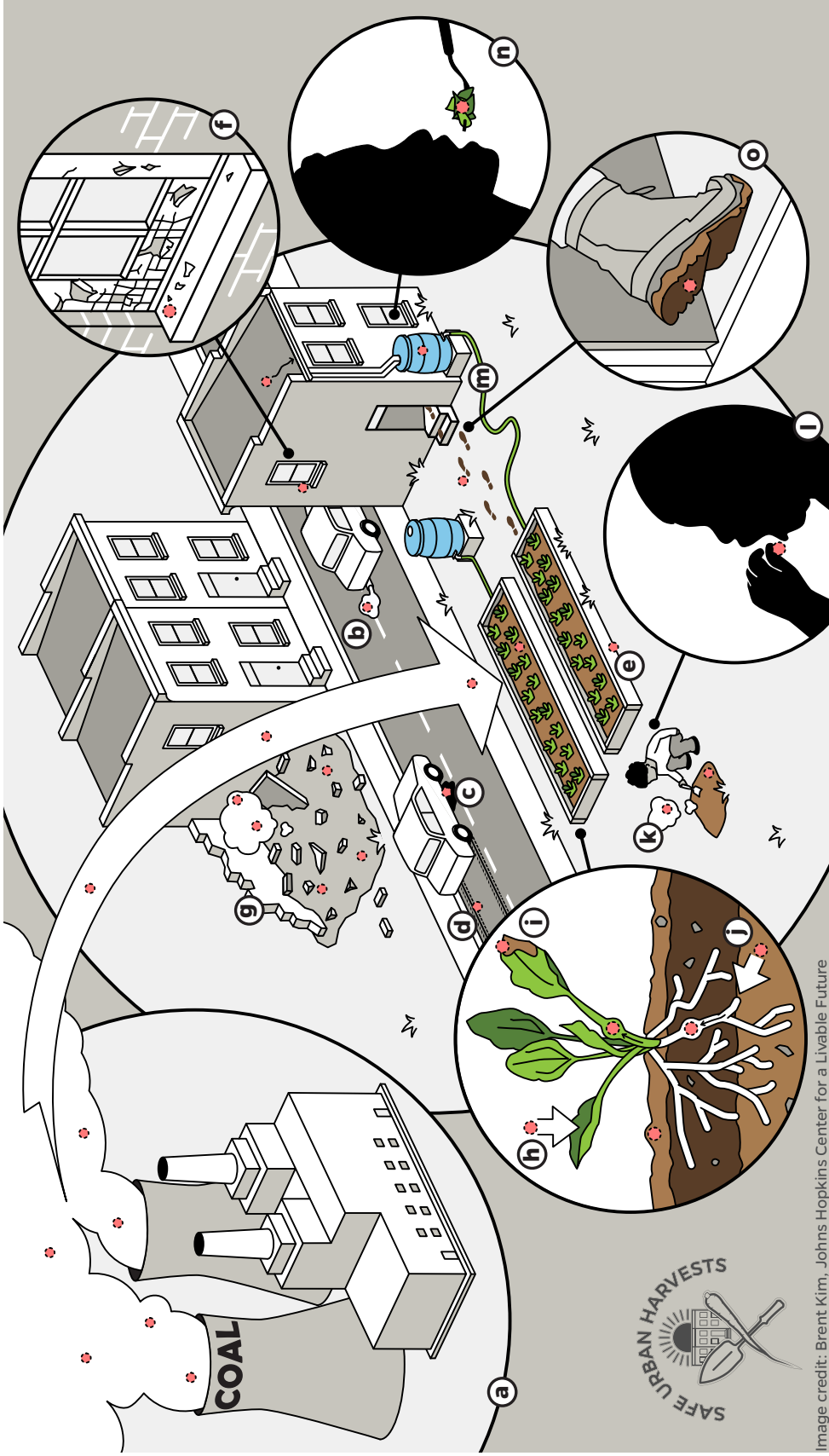


Image credit: Brent Kim, Johns Hopkins Center for a Livable Future

Where do harmful metals come from?

- Industrial sources, such as coal power plants (a)
- Vehicle exhaust (b), automotive fluids (c), and tire wear (d)
- Treated lumber (e), such as for raised beds
- Chipping lead paint (f)
- Demolition of old houses (g)
- Historic uses of leaded gasoline and certain pesticides

How can metals contaminate urban-grown fruits and vegetables?

- Airborne dust containing metals can settle on or stick to the outside of fruits and vegetables (h)
- Soil can stick to the outside of fruits and vegetables (i)
- Metals in contaminated soil can be taken up inside fruits and vegetables (j)

How can I come into contact with metals?

- Breathing or swallowing airborne dust (k)
- Unintentionally swallowing contaminated soil while working or playing in it (l)
- Drinking water from a contaminated irrigation source (m)
- Eating contaminated fruits or vegetables (n)
- Tracking soil into your home (o)
- Direct skin contact with contaminated soil

ADDITIONAL RESOURCES

The following documents are available on the Safe Urban Harvests study website. They contain additional information about the study and resources for urban agriculture in Baltimore.

[Methods: How samples were collected, analyzed, and interpreted](#)

[Meet our Safe Urban Harvests study team](#)

[Grant and assistance opportunities for Baltimore community gardens and urban farms](#)

MORE INFORMATION ABOUT METALS

If you would like more information about the six metals harmful to human health, please refer to the Agency for Toxic Substances and Disease Registry’s Frequently Asked Questions factsheets (“ToxFAQs”) for these metals. These factsheets describe the most common sources of exposure and the most severe health effects that may result from frequent contact with high levels of these metals. *Please note that not all of the information in these factsheets is relevant to the urban agriculture context. Some information may only apply to high level exposures typical in industrial workplaces.* The factsheets are available at:

Arsenic: <https://www.atsdr.cdc.gov/toxfaqs/tfacts2.pdf>

Barium: <https://www.atsdr.cdc.gov/toxfaqs/tfacts24.pdf>

Cadmium: <https://www.atsdr.cdc.gov/toxfaqs/tfacts5.pdf>

Chromium: <https://www.atsdr.cdc.gov/toxfaqs/tfacts7.pdf>

Lead: <https://www.atsdr.cdc.gov/toxfaqs/tfacts13.pdf>

Nickel: <https://www.atsdr.cdc.gov/toxfaqs/tfacts15.pdf>