

Community Gardeners & Soil Contaminants

A study by the Duke University Superfund Research Center

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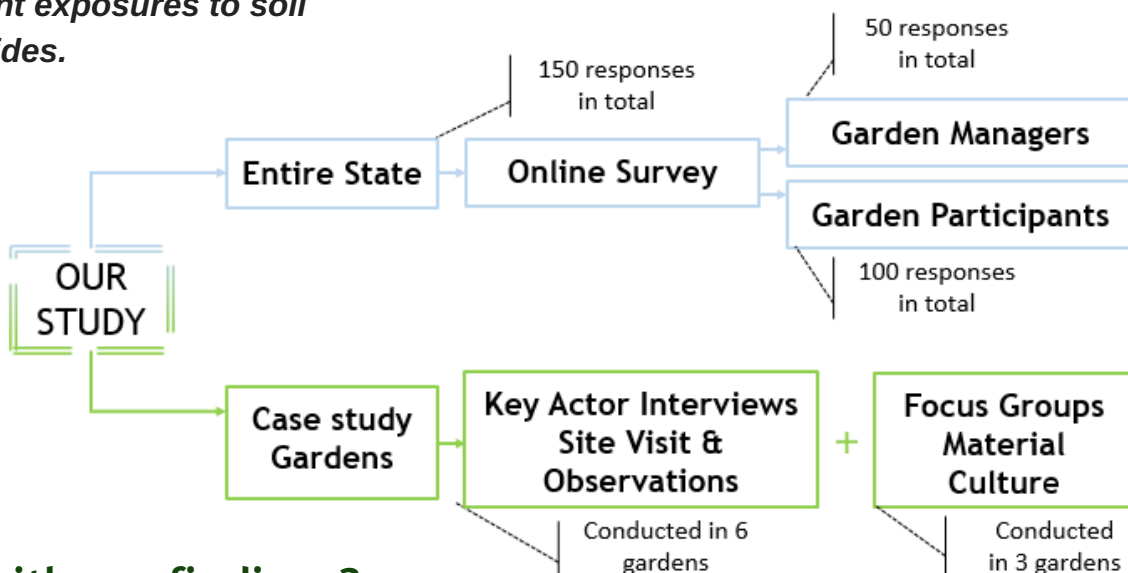
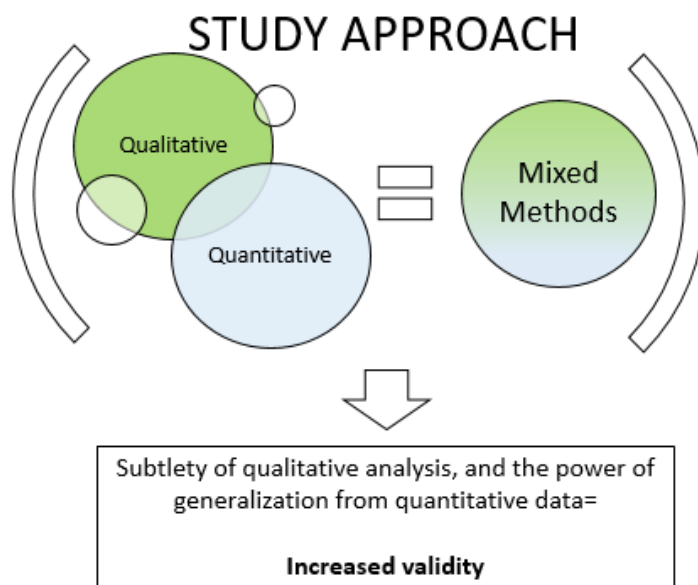
What were we studying?

Community gardens are great sources of fresh food and social connections. But as with any outdoor activity, there are some things to look out for when working in a garden, or eating what's grown there. Sometimes harmful substances, or **contaminants**, work their way into the soil and plants at a garden, causing health issues for people who are exposed to them over long periods of time. Young children, pregnant women, and senior citizens are the most likely to be affected.

Luckily, there are plenty of ways gardeners can stay safe and create a healthy garden. ***In this study, we talked to gardeners across North Carolina to find out what safety practices they're already using, whether they're concerned about soil contaminants, and ways they can prevent exposures to soil contaminants and pesticides.***



How did the study work?



What will we do with our findings?

There's a lot of information out there about soil contaminants, safe ways to use pesticides, and other garden safety practices. But it's not always easy to tell what information is accurate, find answers to specific questions, or decide what practices are best for your specific garden. So the Duke University Superfund Research Center plans to run a **communications campaign** to help community gardeners get access to important information in an accessible way! The communications campaign will use the findings of this study, since we now have a better idea of what additional topics related to soil contaminants people want to know about, and the best and most convenient ways for them to learn.

What are contaminants?

The word "contaminant" can refer to many different substances that - when not handled properly - can cause harm to people. Heavy metals, like lead, often come from old buildings or industrial sites on land that's now used for gardening. Historically, some lumber has been treated with arsenic, which can leach into soils. Mercury can sometimes come from the emissions of nearby power plants. Synthetic pesticides can also contaminate garden soils.



Where can contaminants come from?

Burning trash



- Polycyclic Aromatic Hydrocarbons (PAHs)
- Dioxins

Lead Paint



- Lead
- Barium
- Mercury

Treated Wood



- Arsenic
- Chromium

Industrial Sites



- Lead
- Trace elements

Pesticides



- Arsenic
- Lead and Mercury (historical)
- Chlordane

Manure/Dairy Lot



- Copper
- Zinc

Heavy Traffic



- Lead
- PAHs
- Zinc

Coal Ash



- Lead
- Arsenic
- Cadmium
- Mercury

In our research, we broke down the factors that can influence contaminant exposure into three main categories:

3 RESEARCH TOPICS:

Land Use

Management Choices


Individual Behaviors

- How was the land used before it became a garden? Was it ever a factory, or a farm? What is the surrounding land used for today (e.g. residences or businesses, etc.)?
- How is the garden is managed? Are there rules about what to plant? Are pesticides applied?
- How do individual gardeners use the garden? Do they wash their hands after gardening? Do they wash produce they harvest?



Photo by: mcbaker85 (communication4health, 2013).

How can gardeners stay safe and healthy?

- Learn about your soil! Free nutrient tests through the NC Department of Agriculture are helpful for nutrients and pH, but they won't give you information about most potential contaminants. To get your soil tested for lead, arsenic, or other substances, you will need to send soil samples to a certified lab. Read more here: <https://www.soils.org/discover-soils/soils-in-the-city/soil-contaminants/soil-testing>.
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- Wash your hands as soon as you're done gardening.
 - Wash the produce you harvest before eating it. Peeling root vegetables, like carrots or potatoes, may help to remove potential contaminated outer surfaces.
 - If you apply pesticides or herbicides in the garden, make sure you read instructions and warnings carefully, and always wear gloves and goggles! If you have a hard time understanding what a pesticide label means, ask for help.
 - Keep an eye on young children in the garden. If your soil is contaminated, you really don't want children eating it - whether it's accidental or on purpose!

What did our research tell us?

We observed a few common themes in the gardens we studied. Some of them may be correlated with increased possibility of contamination, although the only way to truly be sure if your garden is contaminated is to get a soil contaminant test done. Here are some of our notable findings:

Potential contaminant "red flags" that we observed:

- Buildings near the garden that were built before 1978
- Runoff from surrounding roadways and parking lots
- Lack of communication with neighbors about chemical use on lawns
- Uncertainty about the source of garden materials, such as compost and wood chips
- Infrequent use of gloves and other protective equipment
- Infrequent hand-washing directly after gardening

Common obstacles that gardens faced:

- Difficulty finding and interpreting information about soil contaminant testing results
- Limited access to information about land history and garden material origins
- Funding concerns that limit options when it comes to garden location and materials sourcing
- Limited human resources, as well as high volunteer turnover
- Lack of widespread knowledge about contamination

Where can gardeners find more information?

- **North Carolina Community Garden Partners:** <http://www.nccgp.org/>
A broad network of partner gardens in North Carolina. Website includes a map of gardens around the state and a rich library of resources for gardeners.
- **NC State Extension:** <https://www.ces.ncsu.edu/contact-us/>
Local Extension offices can assist with everything from safe gardening practices to master gardening techniques.
- **NC State Extension - Community Gardens:** <https://nccommunitygardens.ces.ncsu.edu>
Links to valuable information like soil contamination, heavy metals in soils, and soil testing.
- **Soil Testing:** <https://foodsafety.ces.ncsu.edu/foodsafety-soil-testing/>
The NC Department of Agriculture provides free nutrient and pH testing services to large-scale commercial farmers at no charge. Individual soil testing is available through private labs for approximately \$30-\$60 per sample, per contaminant.
- **ATSDR TOXFAQs:** <https://www.atsdr.cdc.gov/toxfaqs/Index.asp>
The Agency for Toxic Substances and Disease Registry at the Centers for Disease Control created the TOXFAQ summaries to respond to frequent questions about hazardous substances.
- **EJSCREEN - EPA Environmental Justice Screening Tool:** <https://www.epa.gov/ejscreen>
Combines environmental and demographic indicators in maps and reports.

Still have questions?

The Duke Superfund Research Center is here for you!

Contact us at SuperfundCEC@duke.edu

At the Duke Superfund Research Center, we focus on early life, low-dose exposures to toxins and their effects on human development that emerge later in life. We connect with government agencies, industry professionals, community organizations, K-12 teachers, and others to bring research and useful information about environmental health and toxic exposures to the public.



early life exposures, later life consequences

Visit our website
<http://sites.nicholas.duke.edu/superfund/>
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