

normal lead levels. To avoid this, ask the compost source if they have their compost tested.

3. **Use raised beds and bring in soil.** Raised beds must be coupled with good ground cover or mulch on the soil surrounding the bed, to prevent splash up.
4. **Plant fruiting crops** like tomatoes, squash and peppers, if soil is suspected to have elevated lead levels.
5. **Add mulch** to dilute and cover contaminated soil.

Diet Choices to Protect against the Harmful Effects of Lead

Foods with iron, calcium, and vitamin C can help reduce the body's absorption of lead.

CALCIUM	VITAMIN C	IRON
Cream Soups	Kale	Sweet Potatoes
Cheese	Spinach	Brussel Sprouts
Yogurt	Broccoli	Potatoes
Milk	Soybeans	Peas
		Bell Peppers
		Grapefruit
		Oranges
		Kiwi
		Parsley
		Seaweed
		Oysters
		Dried Fruit
		Red Meat
		Seafood
		Poultry
		Beans
		Peas

Remediate Soil or Cap and Cover

It is recommended to test your soil to make sure that it is safe for gardening. If elevated lead levels are found, you should take action. Based on the EPA and NYS DEC lead level limits, we suggest not gardening with levels higher than 400ppm. Soil remediation can be expensive, so another alternative is to use the "cap and cover" technique, which contains contaminated soil in place with raised beds on top, with purchased soil. To do this, put a layer of straw and compost on the ground before adding the new soil. Some recommended soil brands are "Black Cow" and "Dr. Earth" which have very low soil toxicity and can be purchased at the Home Depot.

Soil testing

Brooklyn College offers soil sampling—you can send them a sample of your soil and get results in 2-3 weeks. Check the Brooklyn College ESAC website for sampling instructions. <http://www.brooklyn.cuny.edu/web/academics/centers/esac/services/soil.php>

Send the completed sample submission forms with your method of payment to:

Attn: Dr. Zhongqi (Joshua) Cheng
Department of Earth and Environmental Sciences
Brooklyn College
2900 Bedford Avenue
Brooklyn, NY 11210



NEIGHBORS ALLIED FOR GOOD GROWTH



1. The "Greenpoint" dataset in the study included the 11211 and 11222 zip codes. The zip code for Greenpoint is 11222. East Williamsburg is 11211. NAG and elected officials have requested DOHMH for zip code level data. As of November 2016, the agency has refused to provide such data, citing "confidentiality issues," but also not stating the written law or policy for their refusal to provide the information.

2. Data is from 52 samples in the 11222 zip code, tested by Brooklyn College Environmental Sciences Analytical Center (ESAC) between 2009-2014. Median is the value at which half the values are below and half are above -- if all of the pieces of data are written down in order, it is the number in the center. Average is the value resulting if all of the pieces of data are added up and divided by the total number of entries. When comparing data, scientists often prefer to cite the median as a more accurate picture of the entire data set, because the number is not skewed by outliers. Greenpoint's median lead soil value of 477 ppm means that at least 50% of the tested samples are above the EPA's hazard limit of 400ppm.

3. Tatiana Morin, Director at Brooklyn College Urban Soils Institute.

Inside page Image Source: New York City Department of Health and Mental Hygiene, Lead Poisoning in New York City: Continued Decline in 2012, pages 12-13 (March 2014)

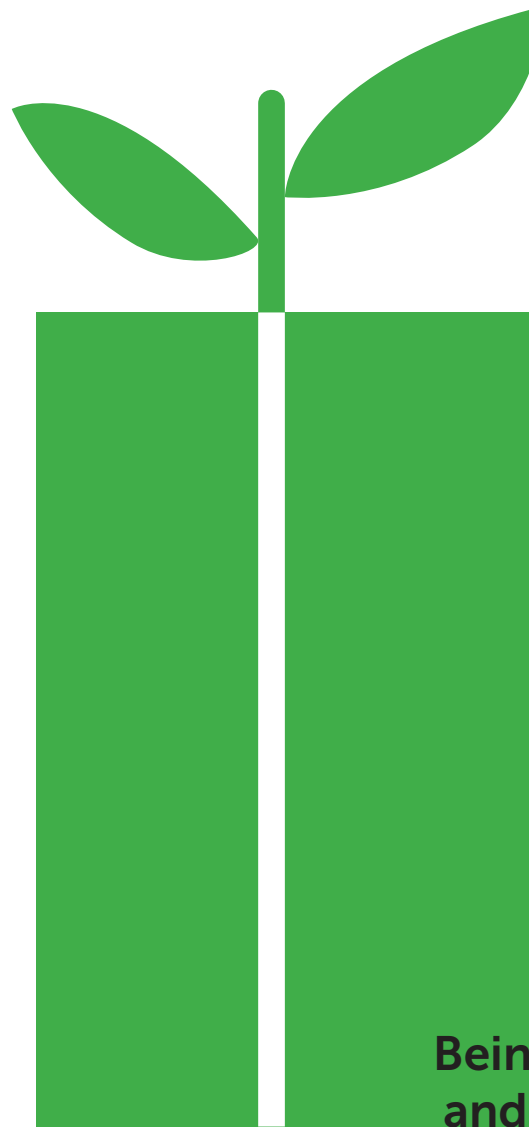
NAG Info:

Check out Nag-Brooklyn.org for more information about lead in Greenpoint.

On our website, you'll also find our **lead education toolkit**, for educators and parents. With our toolkit, you can personalize a lesson plan for your classroom, find hands-on activities to engage with children regarding soil safety, and find printable, educational material to display around your home or school!

Also take a look at our **Toxicity Map!** It's a resource to better understand the toxic sites in North Brooklyn.

Neighbors Allied for Good Growth
110 Kent Avenue
Brooklyn, NY 11249
718-384-2248
www.nag-brooklyn.org



Lead in Garden Soil

Being smart and staying safe with our North Brooklyn soil



What is Lead?

- In its natural state, lead is an element in the carbon group found just about everywhere on earth. Lead is represented on the periodic table as the symbol Pb.
- Historically, lead compounds were used as additives in paints, plumbing and gasoline, resulting in the wide-spread contamination of soil, particularly in urban areas.
- Lead is not usually taken up by plant roots or found in edible fruits or vegetables in large amounts, unless the plants are grown in very acidic soil conditions. However, soil containing lead can attach to or get stuck in the surfaces of plant leaves and skins in significant amounts.

How is Lead in Soil Harmful?

- Lead is a neurotoxin with known harmful effects. The United States Center for Disease Control states that there is no safe level of lead in the blood stream. Even low levels of lead in blood have been shown to affect IQ, ability to pay attention, and academic achievement.
- Lead poisoning is when lead levels build up in a person's blood. In terms of health risk demographics, the biggest dangers exist for pregnant women and children under six.
- According to the World Health Organization, lead exposures can cause lasting nervous system disorders and brain development issues in young children. Pregnant women's exposure to lead can cause miscarriages, stillbirths, premature labor, and birth defects.
- Ingestion and inhalation are the most common forms of lead exposure.
- Lead-contaminated soil particles that wind up on plant surfaces or skins can be a significant source of dietary exposure. This is especially a problem with leafy greens and root vegetables.
- The electrical impulses that carry the information that pass through our nervous system use sodium, potassium, calcium and other electrolytes to function. Calcium acts as a "gatekeeper" on the neural cells, "opening the door" to the cell for sodium and potassium to flow through. Lead can permanently take calcium's place, disrupting important neural signaling. Lead can take the place of calcium because it is able to act as a molecular mimic.
- Some scientists believe that the fall of the Roman empire could be connected to lead pipes and tap water, with over 100x more lead than local spring water!



Rates of children newly identified with elevated blood lead levels, per 1,000 children

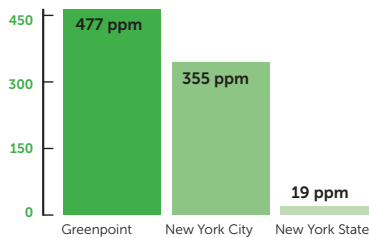
Lead Data in Greenpoint

Children's Blood Lead Levels

According to a 2014 New York City Department of Health and Mental Hygiene (DOHMH) report which analyzed 2012 data, children in Greenpoint and a part of Williamsburg tested as having elevated blood lead levels at over four times the city average! This was the highest rate in the entire city.

Median Soil Levels

Source: data from Brooklyn College ESAC



Soil Lead Levels

The United States Environmental Protection Agency (EPA) considers lead above 400 ppm to be a "hazard" for bare soil children's play areas. In Greenpoint, the median lead soil level is 477

ppm, the average level is 674 ppm, and the highest individual sample level measured was 5608ppm. This means that more than half of the tested samples are above the EPA's hazard limits! These high lead levels in Greenpoint soil represent an exposure risk, which likely contribute to the elevated blood lead levels found in Greenpoint children.

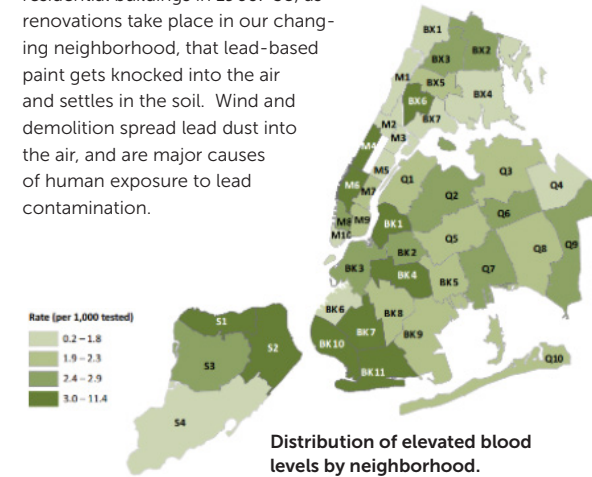
Why does our area have lead in soil, and elevated lead blood levels?

Historically, Greenpoint's waterfront access made it a prime location for shipping. As a result, this area became home to industries, many which used a variety of potentially harmful materials, including lead, in their operations. Here are some examples:

- Waste transfer stations result in high truck traffic and poor air quality. Until the mid 1970's, there was lead in diesel gas which settled along the busy truck routes of Greenpoint, as the trucks emitted their fumes. In 1996, the U.S. Clean Air Act banned the sale of leaded fuel for use in on-road vehicles- but between those years, a lot of damage was done.
- "Historic fill" was a process used during industrialization to fill in land for development. Land was filled in with a mixture of chemical and industrial waste (including lead) and garbage. Although soil in one area of a property

may not show lead contamination, due to variations in historic fill, contamination can vary widely by spots just inches apart.

- More than 60% of NYC's housing stock was built before the city banned the use of lead-based paint in residential buildings in 1960. So, as renovations take place in our changing neighborhood, that lead-based paint gets knocked into the air and settles in the soil. Wind and demolition spread lead dust into the air, and are major causes of human exposure to lead contamination.



How to Prevent Lead Poisoning

Wash your hands! Practices to Reduce Your Body's Exposure to Lead

EPA recommends that children and adults leave their shoes at the door or use doormats, and wash their hands. Also, when harvesting make sure to thoroughly wash the veggies!

Safe Gardening

Don't be scared! It is possible to safely garden in Greenpoint!

Practices to Reduce Lead Absorption by Plants: Most plants don't naturally absorb lead. Lead is more likely to be found in tiny sticky dust particles that stick to the outside parts of plants. To minimize absorption of lead by plants, a number of control measures may be taken:

1. **Test soil for pH and phosphorous.** Maintain soil pH levels above 6.5. Lead is relatively unavailable to plants when the soil pH is above this level. If pH is lower than 6.5, add limestone. Lead is also less available when soil phosphorus levels are high.
2. **Add organic matter to your soil.** In soils with high lead levels, organic matter will significantly reduce lead availability. Good sources of organic matter include composted leaves, food scraps, neutral peat, and manure. Avoid leaf mulch obtained along highways or city streets as it may contain higher than