

# **Chestnut Street Community Garden – Lead Contamination**

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# **Chestnut Street Community Garden – Lead Contamination**

- The science of soil lead contamination
  - Most urban soil lead comes from flaking house paint
  - Lead exposure is indicated by blood lead levels
  - Impact is cumulative
  - High blood lead levels are common in Hartford
  - Risk is related to exposure which is related to concentration of lead in soil

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- Science of soil lead contamination (cont.)
  - People are typically exposed to soil lead through
    - Inhalation
    - Ingestion due to dirty hands
    - Ingestion in contaminated food
  - EPA has set acceptable lead contamination levels in soil (residential = 500 ppm)
  - Lead doesn't usually leach

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- Science of soil lead contamination (cont.)
  - Lead can be removed from soil or exposure reduced through various methods
    - Removal and replacement of soil
    - Phytoremediation (plants take up lead)
    - Dilution with clean soil
    - Encapsulation (covering up)
    - Binding through addition of organic matter
    - Raising soil pH

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- Science of soil lead contamination (cont.)
  - Effects of lead poisoning in children include
    - Central nervous system damage
    - Kidney damage
    - Neurodevelopmental abnormalities
      - Attention impairment
      - Fine & gross motor skills

# Chestnut Street Community Garden – Lead Contamination

- Environmental justice - Hartford
  - Largest number of children under 6 (1990)
  - Highest rate of children in poverty (1990)
  - Highest percentage of at-risk housing (pre-1978)
  - Minority population (2000)
    - Black 36%
    - Hispanic 40.5%
    - White 17.8%

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- Environmental justice - Hartford
  - Per capita income \$18,007 (2001)
  - Poverty Rate 31% (2000)
  - 8th poorest city in U.S. with population over 100,000 (1990)
  - 21% owner-occupied homes
  - 3rd highest rate of children with elevated blood lead levels in CT

# Chestnut Street Community Garden – Lead Contamination

- 1997
  - Neighbors approached Knox to develop garden
  - City of Hartford grants permission for use
  - Committee formed of residents, House of Bread soup kitchen, Quirk Middle School staff, CT Dept. of Environmental Protection, Knox Parks Foundation
  - EPA grants \$10,000 for development - project designed
  - Connecticut Agricultural Experiment Station tests soil and discovers elevated lead levels



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- 1998
  - Phase I & II assessment performed
    - Part of site housed a paint store
    - Some lead levels as high as 2800 ppm
- 1999
  - City of Hartford clears most of lot and removes and replaces most soil
  - Students from Trinity College carry out phytoremediation project

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- Phytoremediation results
  - Most lead levels reduced to 500 ppm or less
  - Ashed plants yielded 10% lead
  - Lead reduction occurred only in top six inches of soil
- Question
  - Why does lead in plants not account for full reduction in soil lead levels?

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- 2000-2004
  - City removed all contaminated soil and replaced it with low quality but “clean” material
  - Community residents had left to group during the clean-up period. It has proven difficult to get them back.
  - Continued development of the garden has depended on outside volunteers and students from the school

# Chestnut Street Community Garden – Lead Contamination

Problem: neighborhood enterprises can't get access to the technology



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# Chestnut Street Community Garden – Lead Contamination

- Actions needed and questions raised
  - Does phytoremediation really work in such circumstances or is lead being leached?
  - How should people decide on proper treatment of a garden area?
  - What is the appropriate “safe” lead level for a community garden?
  - How can phytoremediation technology be made available for use in communities at reasonable cost?

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- Actions needed and questions raised (cont.)
  - How can threshold contamination levels be appropriately assessed short of formal sampling techniques ?
  - Given the prevalence of lead (and other contaminants) in urban soils, and the assumption that removal and disposal is normally the best treatment, how do we avoid loss of massive amounts of otherwise usable urban soil?



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- Actions needed and questions raised
  - Based on good science, public health considerations, and financial feasibility, what would be good public policy for dealing with soil contamination so that it doesn't significantly heighten the stress on owners of older urban properties but it does reduce the danger for people who might otherwise be exposed.

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A good primer on soil lead phytoremediation is available at [http://www.civil.nwu.edu/ehe/HTML\\_kag/Kimweb/MEOP/](http://www.civil.nwu.edu/ehe/HTML_kag/Kimweb/MEOP/)

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