

Study of Lung Cancer Incidence  
in Relation to Historic Potential for  
Exposure to Chromium  
in Jersey City

# Approach

- Question: Have lung cancer incidence rates differed within Jersey City in a way that is related to historic chromium exposure?
- Compare lung cancer rates in populations grouped by **historic** potential for exposure to chromium

# Steps

- Define study population and time period
- Determine numbers of “observed” cancer cases
- Estimate number of “expected” cancer cases
  - Based on state rates and study population age
- Compare “observed” to “expected”
  - Standardized incidence ratio (SIR)
  - Statistical test to determine if difference is likely due to chance alone

# Cancer Incidence Data

- New Jersey State Cancer Registry
  - 25 years of complete data: 1979-2003
- All incident cancer cases among New Jersey residents are required by law to be reported
  - Hospitals
  - Reporting agreements with other states
- Geographic assignment of cases based on reported address of residence at diagnosis

Classification of Historic  
Chromium Exposure Potential  
for Census Areas in Jersey City

**DRAFT FOR PUBLIC  
COMMENT**

Sept 12, 2006

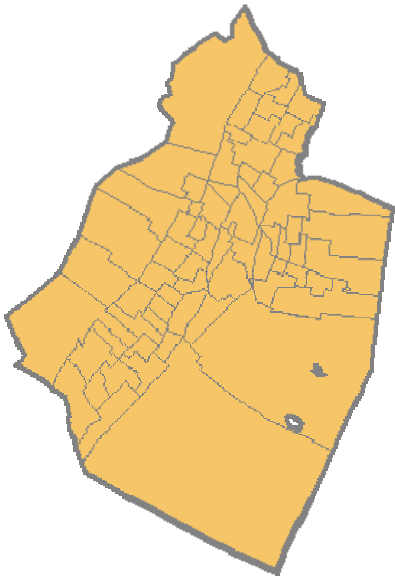
# Population Exposure Categorization

- Census areas are being categorized as follows:
  - High historical exposure potential
  - Medium/Low ( or uncertain) exposure potential
  - Little/No exposure potential
- Based on characteristics and locations of chromium sites relative to populations in the census area

# Census Areas

- Population information is available at several geographic scales
  - municipality
  - census tract - 67 census tracts in Jersey City
  - census block group - several block groups per census tract, composed of multiple blocks
    - there are 161 census block groups in Jersey City
  - census block
- The current plan is to conduct the study based on census tracts and/or block groups

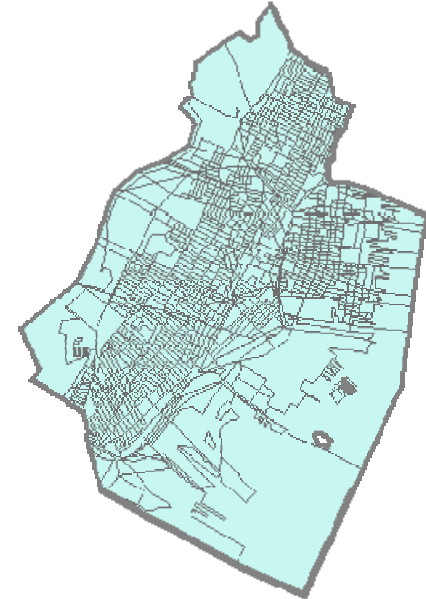
# Census Areas



**Tracts, 67 areas**



**Groups, 161 areas**



**Blocks, 1391 areas**

- The current plan is to conduct the study based on census tracts and/or block groups



# Criteria for Classifying a Census Area as High Exposure Potential

- A census area (tract or block group) is included in the list of HIGH exposure areas if it met one or more of the following criteria:

# Criteria for High Exposure Potential Area

- **The concentration of chromium at a site**
  - greater than 900 parts per million hexavalent chromium (CrVI), if CrVI was measured
  - greater than 9,000 parts per million total chromium if only total chromium was measured at the site
    - 9,000 parts per million is the average of the maximum at each site

# Criteria for High Exposure Potential Area

- **Potential for airborne exposure**
  - even if a census area does not have any chromium sites, chromium particles can be transported from nearby sites in other census groups
  - approximately 300 ft is the maximum distance from the center of a site that could receive a significant amount of chromium through air transport based on modeling

# Criteria for High Exposure Potential Area

- **Potential for airborne exposure** (continued)
  - because chromium can be transported from the edge of a site as well as the middle, and because we don't know the area of each site, we increased the potential transport distance to 600 ft from the middle of each site
  - so any census area with population within 600 ft of a HIGH site is included in the HIGH grouping

# Criteria for High Exposure Potential Area

- **Community Input**

- Identification of other sites and census areas based on information and concerns of the community is the process we are beginning here.
- Also, digital information on chromium site size and boundaries from private sources would aid this analysis

# Examples of Census Group Areas Identified Based on Exposure Potential

- The following are examples of some of the census groups that were either selected for inclusion in the HIGH historical exposure potential category, or that were not selected for specific reasons:

# Case 1 = Census Group is High

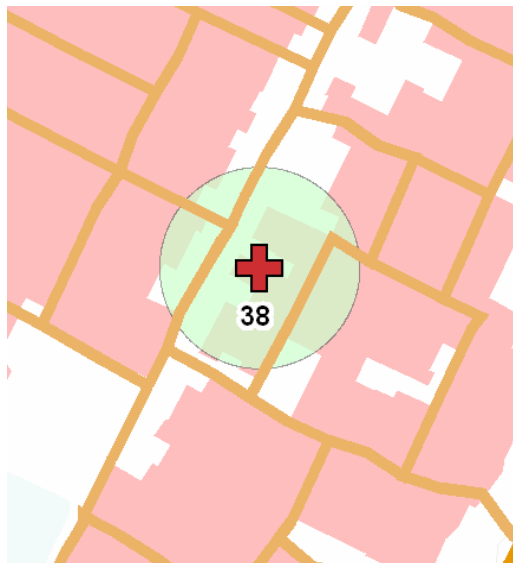
-The chromium concentration at a site was high.

*(red cross = 900ppm or higher CrVI)*

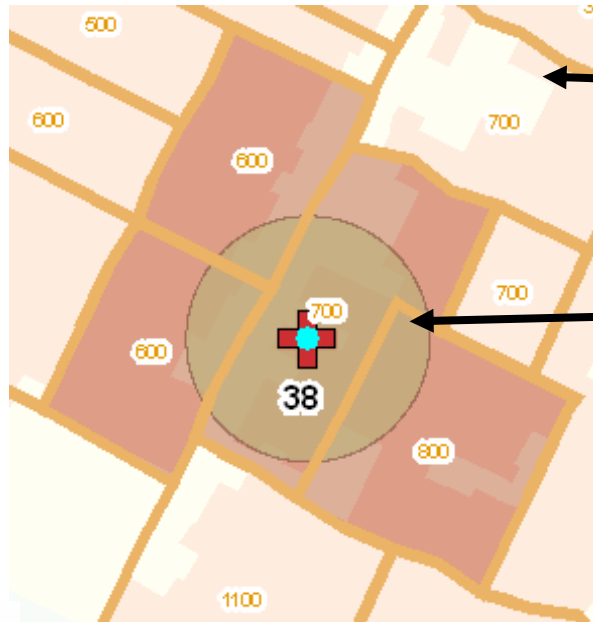
-There was possible airborne transfer offsite.

*(green buffer of 600 feet)*

-Residential areas fell within the range of airborne transport



Residential Landuse (built before 1985)



Other

High – 4 Groups

all overlapping blockgroups are ranked High, even those without sites inside them.

# Case 2 = Census Group not HIGH

-The chromium concentration at a site was high.

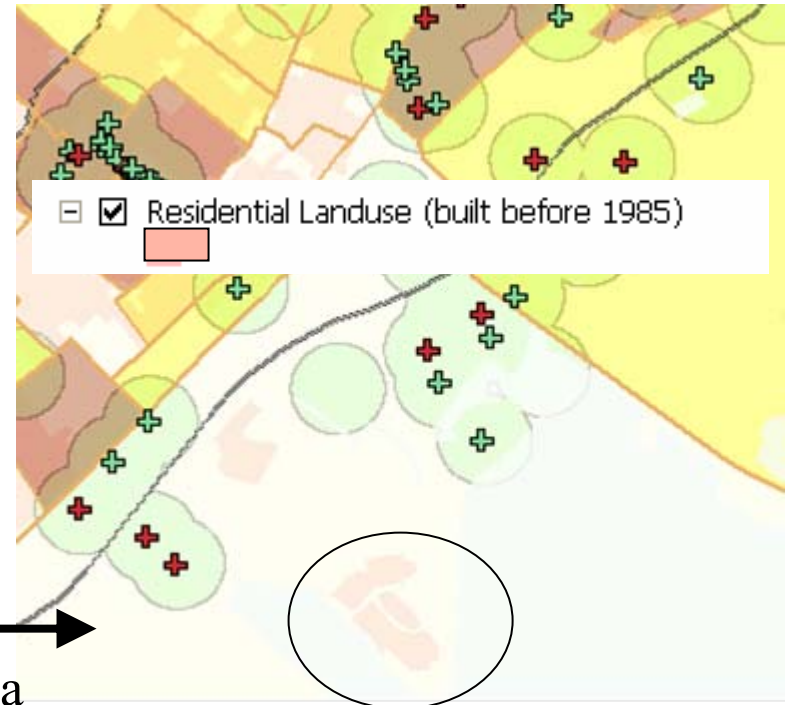
*(red cross = 900ppm or higher CrVI)*

-There was possible airborne transfer offsite.

*(green buffer of 600 feet)*

**-No Residential areas fall within the areas possibly containing contaminated dust.**

- Census BlockGroups (2000)  
txt\_CrRank
- High Exposure Potential
- Other Exposure Potential (Med./Low)
- Other Exposure Potential (None or Unsubstantial)



Group with many high sites ranked Other  
No site's airborne buffer overlaps a residential area



# Case 3 = Census Group not HIGH

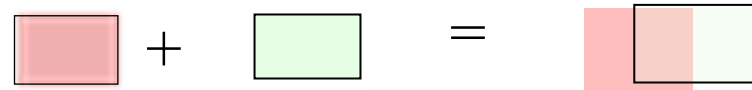
-There are no nearby sites.

*(no green or red crosses, and no buffer areas)*

-There was possible no airborne transfer able to reach the group.

*(no green buffer overlapping the census group area)*

-Residential areas are NOT exposed to areas possibly containing contaminated dust.



Residential Landuse (built before 1985)

Census BlockGroups (2000)

txt\_CrRank

High Exposure Potential

Other Exposure Potential (Med./Low)

Other Exposure Potential (None or Unsubstantial)



# Case 4 = Census Group not HIGH





-There are nearby sites.

*(green crosses, chromium VI concentration below 900 ppm)*

-There was possible airborne dust able to reach the group area.

*(green buffer overlapping the census group area)*

-Residential areas are exposed to areas possibly containing low concentrations of contaminated dust.

- Residential Landuse (built before 1985)  

  - Census BlockGroups (2000)  
txt\_CrRank
    -  High Exposure Potential
    -  Other Exposure Potential (Med./Low)
    -  Other Exposure Potential (None or Unsubstantial)
- 