

# Neighborhood Level Risk Analysis of Childhood Lead Poisoning

City of Atlanta 2005

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# Objective

**To assess lead testing of children at high risk for lead poisoning in the City of Atlanta**

# Overview

- **Childhood Lead Poisoning and City of Atlanta**
- **Methods**
  - **Constructing a Composite Risk Index (Factor Analysis)**
  - **Rapid Inquiry Facility (RIF) Tool**
- **Results & Discussion**
- **Conclusion**

# Georgia Lead Testing Guidelines

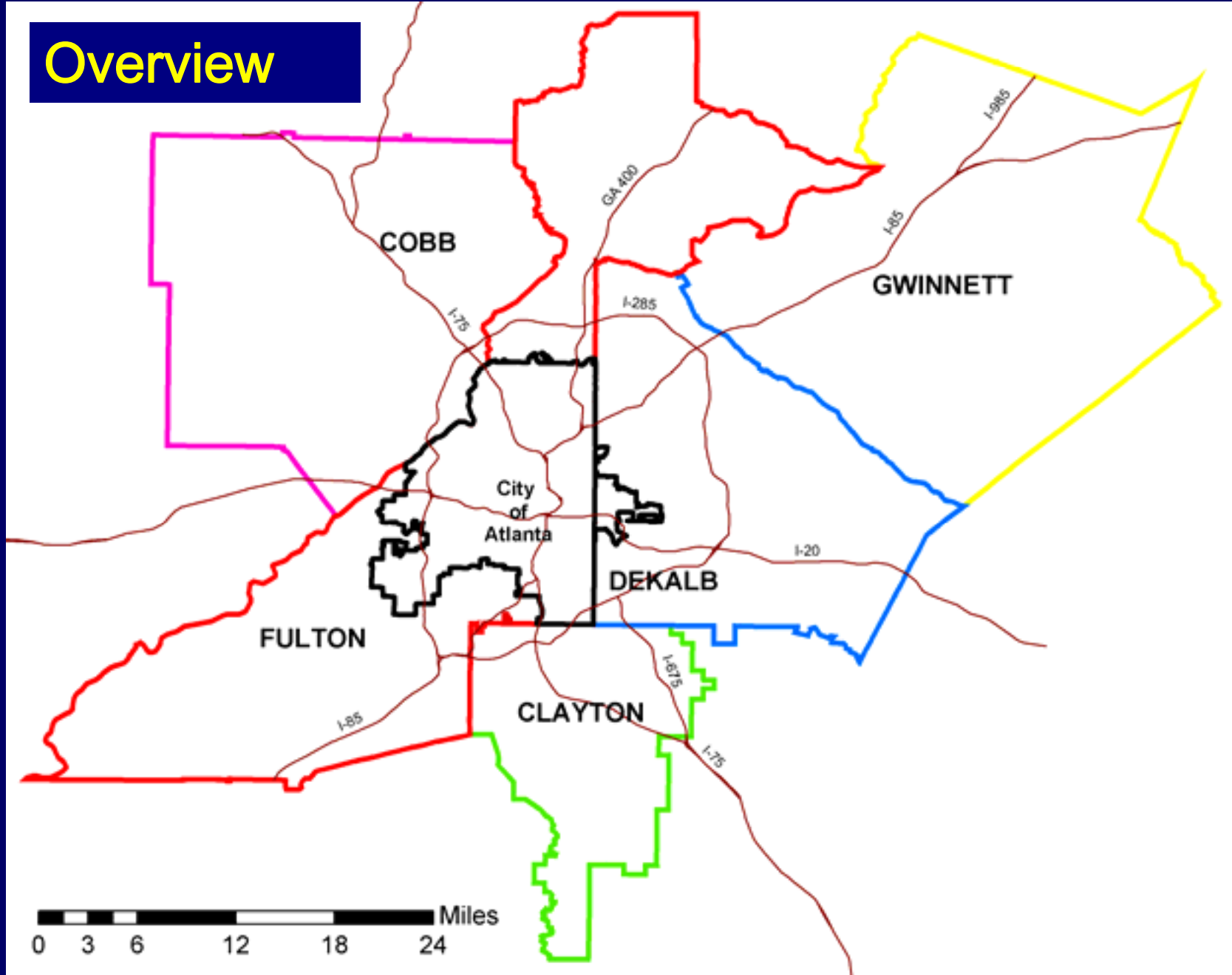
- **Risk should be verbally assessed for all children at 12 and 24 months of age**
- **Georgia children who should be tested:**
  - **their verbal assessment indicates risk**
  - **Medicaid/PeachCare for Kids/WIC eligible**
  - **reside in homes built before 1978**
  - **adopted from outside the United States**
  - **parents may be exposed to lead at work**

## **Focus on Neighborhood**

- **Risk for lead poisoning varies geographically**
- **Smaller geographic unit more accurate to assess risk**
- **Neighborhoods seem an ideal geographic resolution for assessing testing**
  - **Residents/physicians can easily identify their location by neighborhoods**
- **Amenable to outreach and interventions**

# Metro Atlanta Area

## Overview



# Methods

**Lead testing &  
WIC data (2005)**

**Birth data**

(01/01/03 To 12/31/05)

1. De-duplication of  
addresses

2. Geocoding

**Residential land**

**tax parcel data (2002)**

1. Selecting parcels with  
year structure built

2. Single and multi-  
family residential  
parcels

**Demographic data**

**from Census 2000**

1. Geo-processing of  
blocks

**Aggregation**

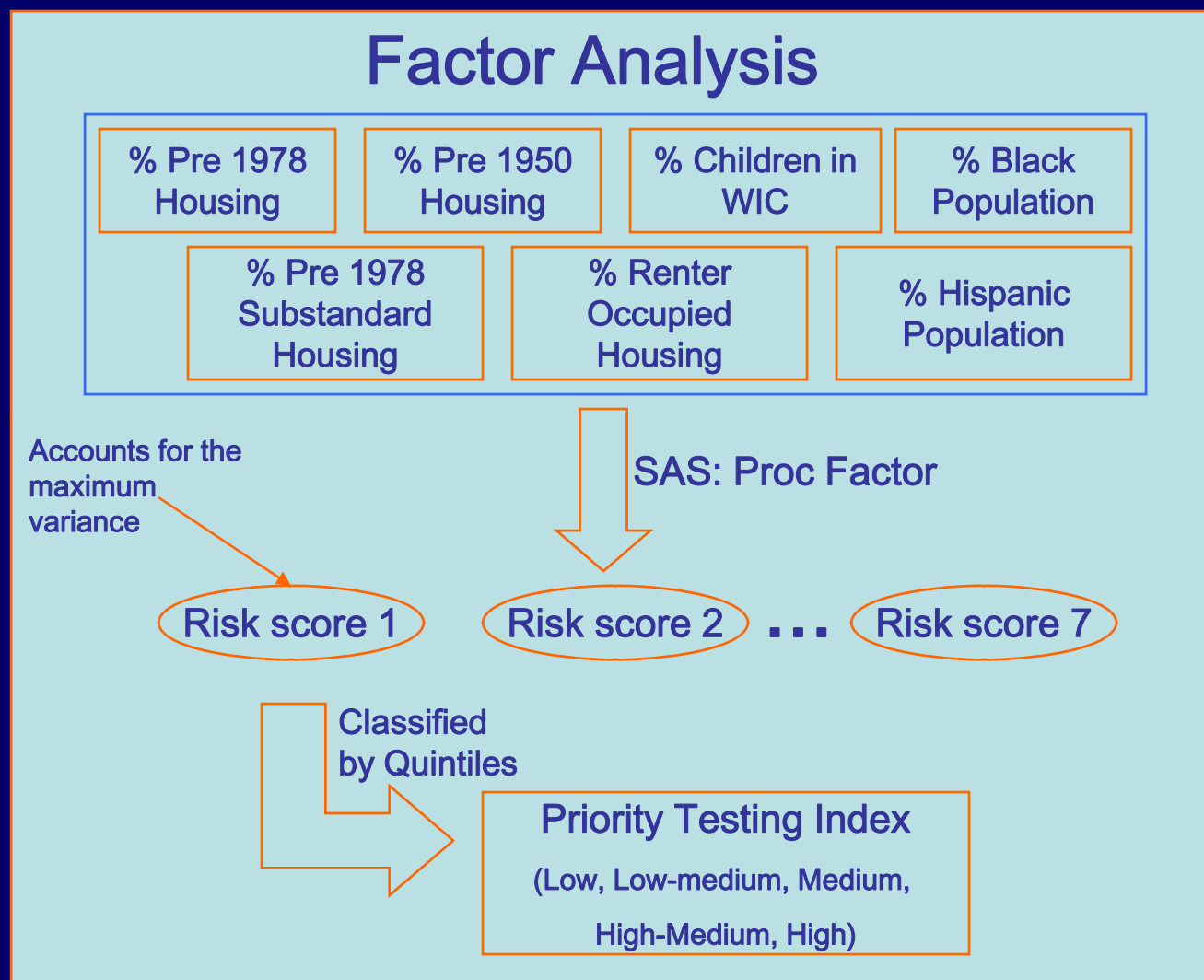
**Neighborhood  
level dataset  
for analysis**

# Methods: Neighborhood Risk

- **Created priority testing index**
  - To characterize risk by neighborhoods
  - Based on risk factors:
    - % of Pre-1978 housing
    - % of Pre-1950 housing
    - % of Substandard Pre 1978 Housing
    - % Renter Occupied Housing
    - % of WIC Children (0-3)
    - % of Black Population
    - % of Hispanic Population
- **Factor Analysis**
  - Reduce a large number of inter-related primary risk measures to a manageable number of risk scores



# Methods: Neighborhood Risk



**Risk Scores account for collective variability in the primary risk factors**

# Methods: Rapid Inquiry Facility (RIF)

- **Developed by Small Area Health Statistics Unit (SAHSU), Imperial College, London.**
- **The RIF is a tool that allows users to quickly assess possible relationships between the environment and health**
  - **Runs within the ArcGIS platform**
  - **Links spatial and non-spatial data**
  - **Disease mapping**
  - **Risk analysis around putative hazardous sources**
- **Latest adaptations enable RIF to be used in the U.S. for CDC's EPHT Program.**

# Methods: Rapid Inquiry Facility (RIF)

- Evaluate testing in high risk and low risk neighborhoods

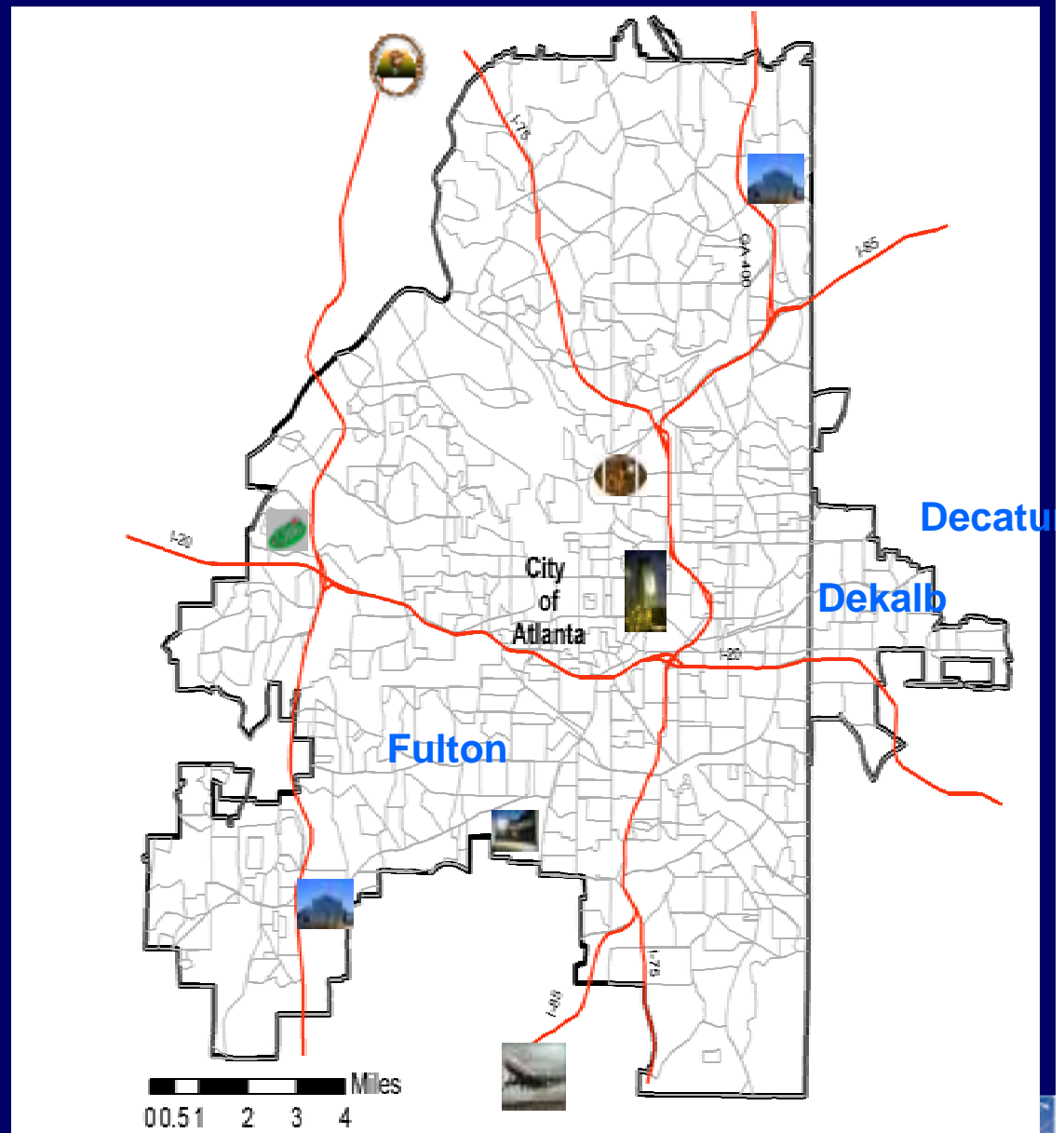
## Relative Testing Ratio

$$\frac{\text{Testing \% in Study Area}}{\text{Testing \% in Comparison Area}}$$

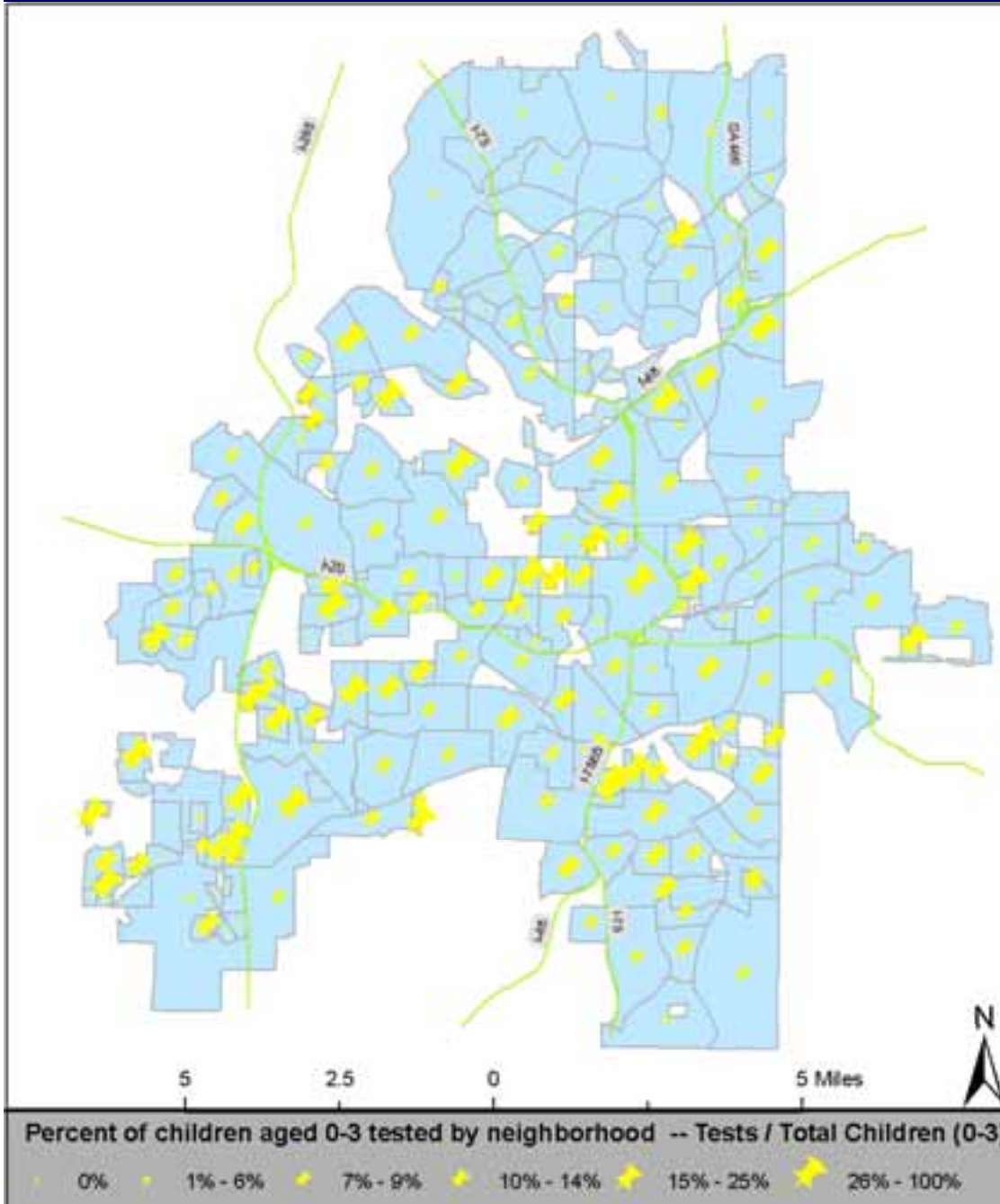
- **Comparison Area: Neighborhoods with Priority Testing Index equal to HIGH**
  - If testing occurs based on risk factors, then this area should have the high testing rates
- **Study Area: All other neighborhoods**
  - Neighborhoods with some or all risk factors present; testing should increase with risk

# Results

- **Demographics**
  - 236 neighborhoods in the city of Atlanta
  - 18,113 children aged (0-3) years
- **Testing and WIC**
  - 2,231 children tested for lead in 2005
  - 8,229 children aged (0-3) enrolled in WIC
- **Housing**
  - 75,286 residential parcels Pre1978
  - 47,142 residential parcels Pre1950

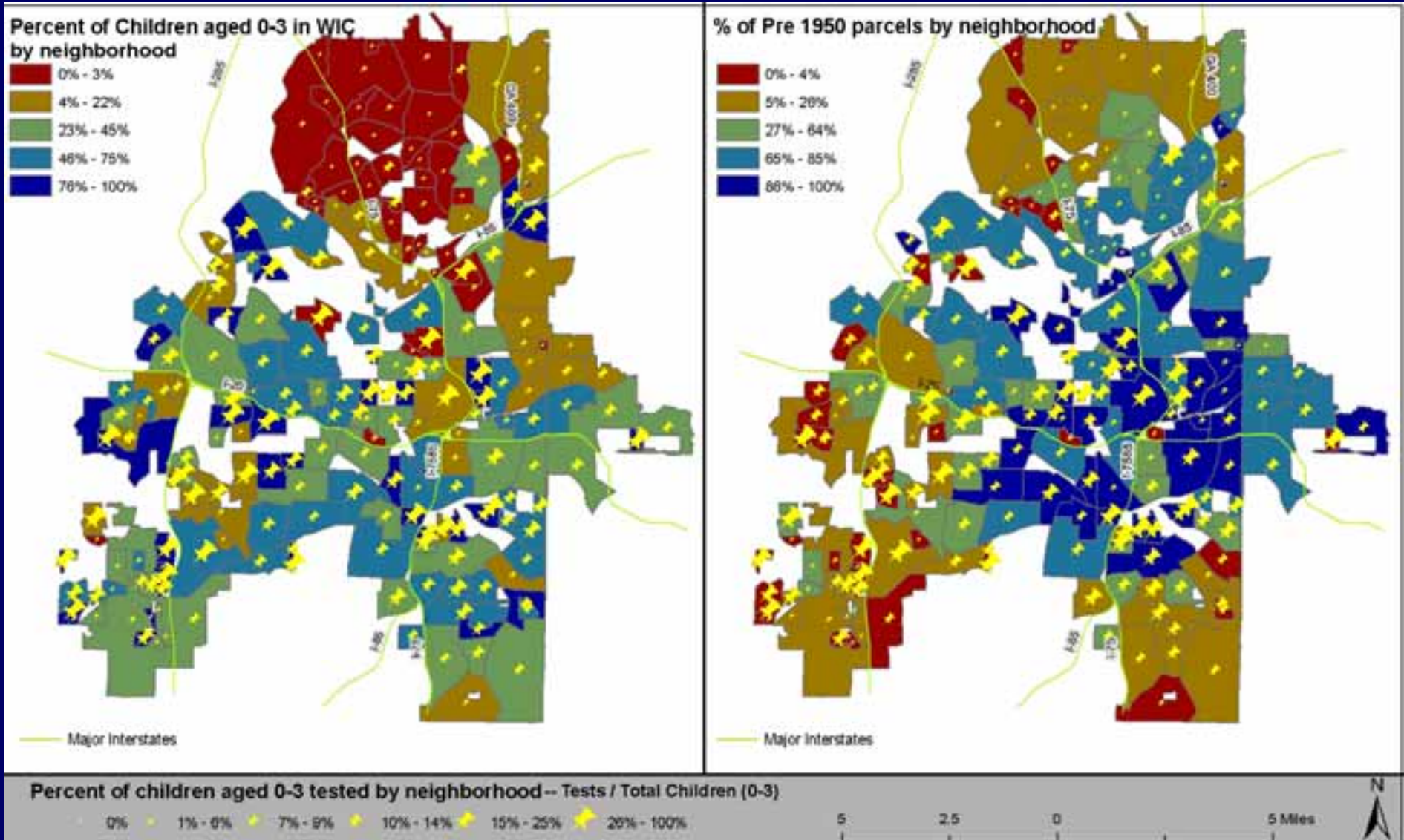


# Results



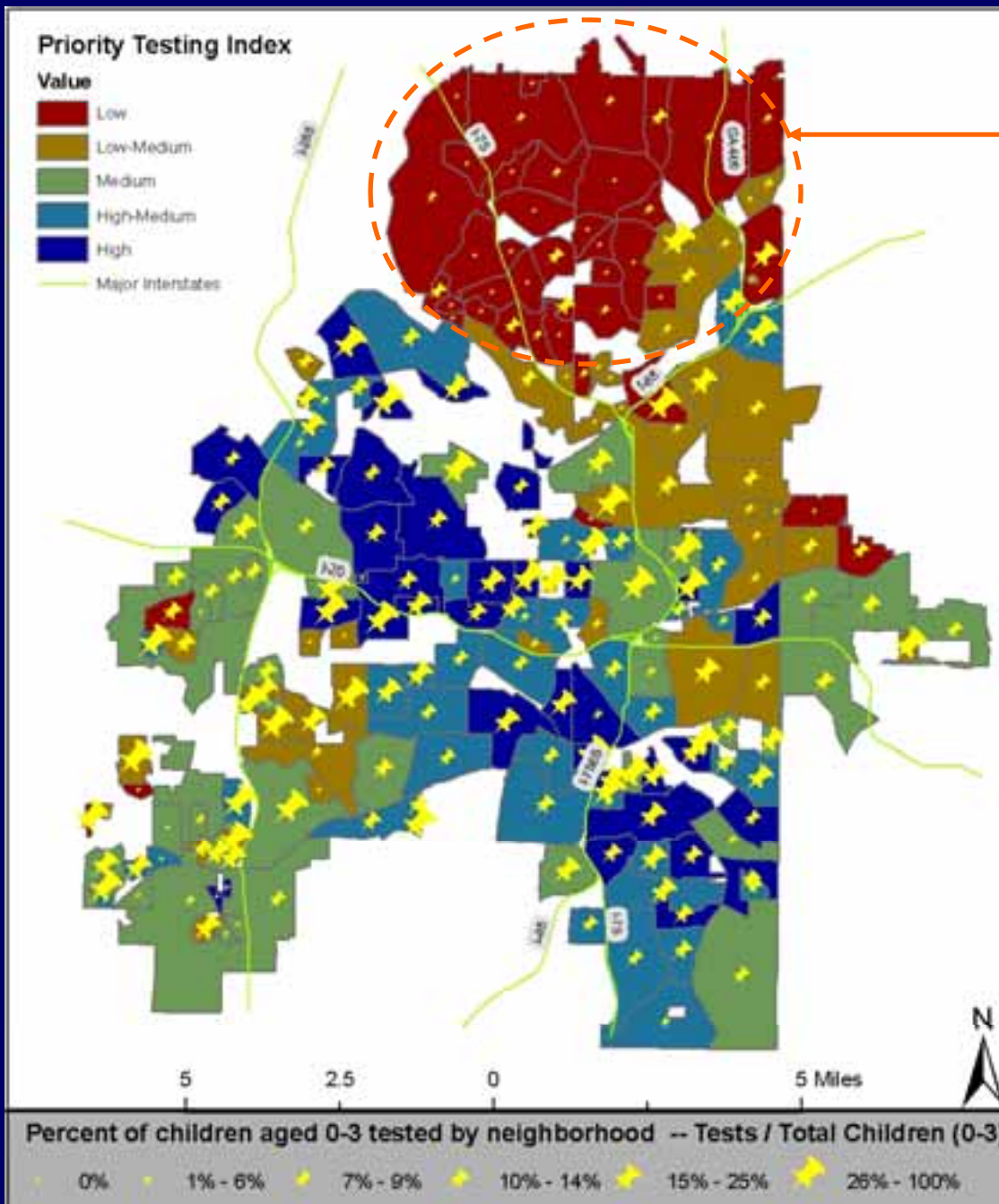
- Of the 18,113 children in the City of Atlanta, 2,231 (12%) were tested for lead
- Of children tested, 23 (1%) had elevated BLLs
- Overall low testing

# Results



- Pre 1950 housing concentrated in central Atlanta
- Testing does not match housing risk

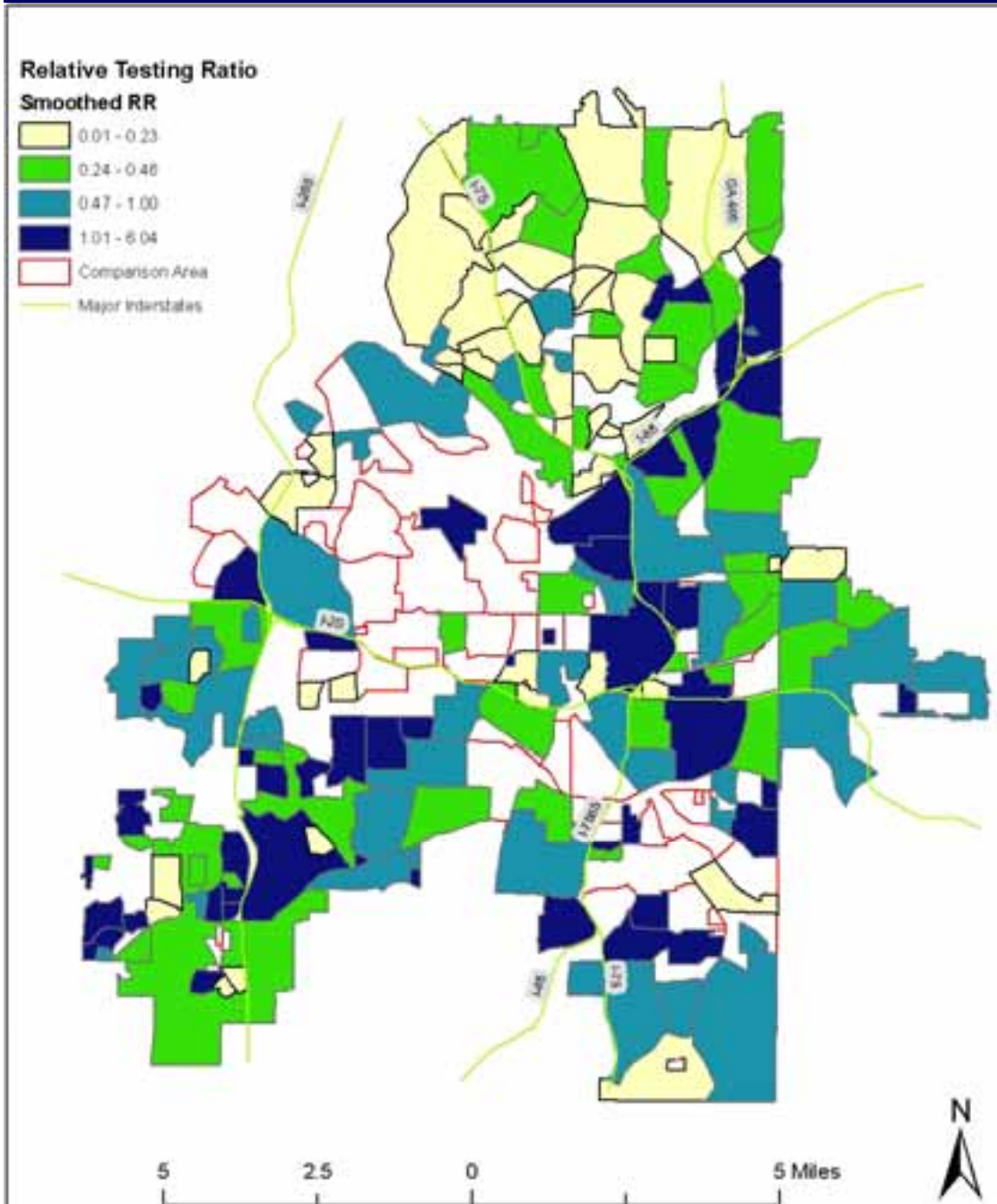
# Results



Very low or zero testing

High-risk Neighborhoods

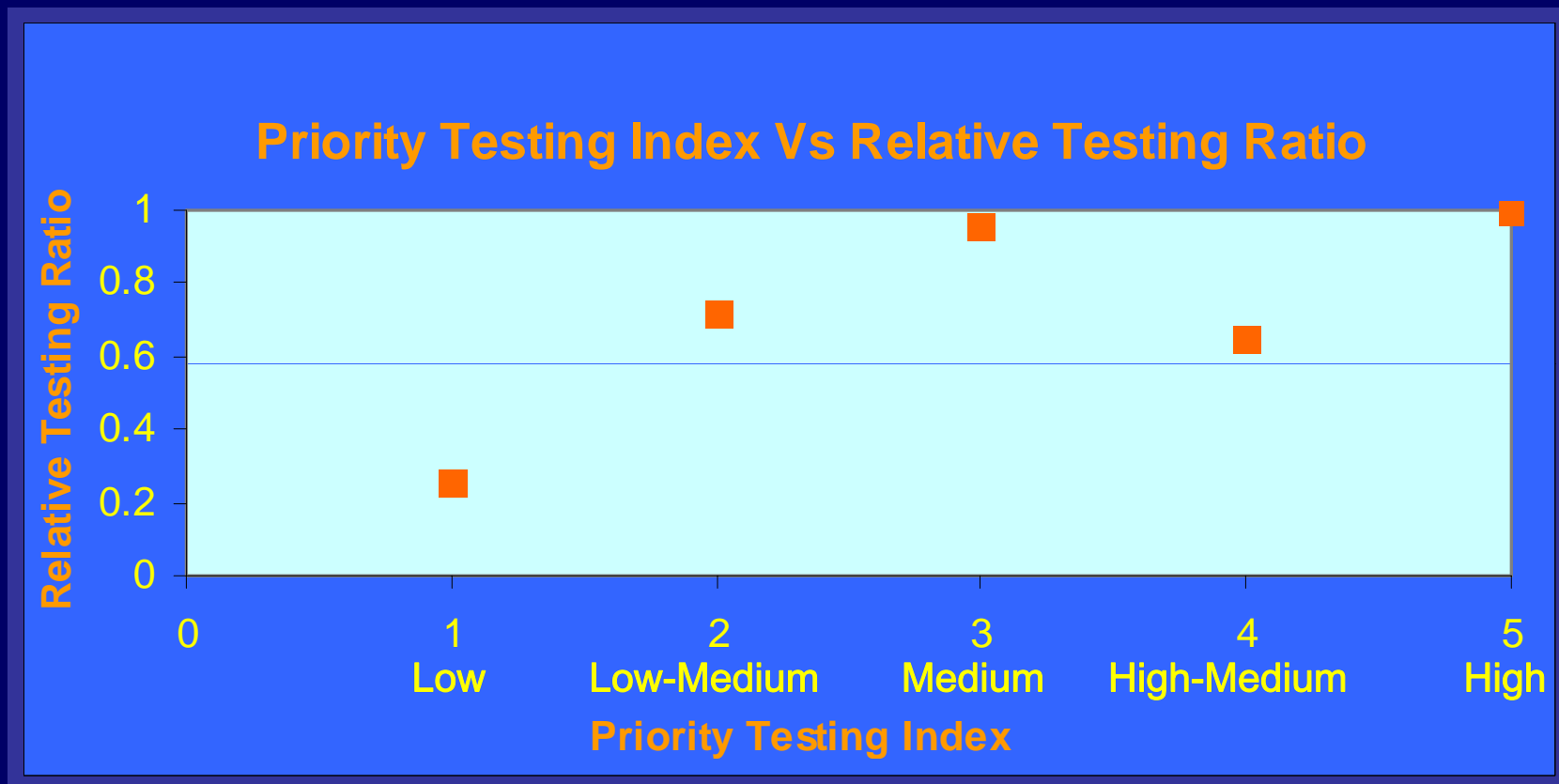
# Results



Testing % in some low-risk neighborhoods is higher than in comparatively high-risk neighborhoods



# Results



Testing is not effectively prioritized

## Discussion

- **In general, testing reflects the numbers of WIC children and not housing risk**
- **Creating a priority testing index was an approach to characterizing neighborhood risk**
- **Calculating a relative testing rate enabled us to assess whether testing is effectively prioritized**

# Discussion

- **Dissemination of information about high risk neighborhoods can be accomplished by community-based organization**
- **Maps can help communities and providers identify children living in high risk neighborhoods**
- **Maps can be generated for specific clinic/hospital service areas on neighborhood risk**
- **Primary prevention strategies are key for achieving the 2010 goal of eliminating childhood lead poisoning**

# Strengths and Limitations

- **Strengths**

- Use of tax parcel data enables accurate assessment of housing risk
- Smaller geographic units recognized by residents, such as neighborhoods, are better suited for outreach
- Computing a risk score using factor analysis helped to integrate various risk factors

- **Limitations**

- datasets used in our analyses used data covering different times

## Conclusion

- **Steps should be taken to improve compliance with existing testing priorities**
- **Methods maybe suited for other study areas where many risk factors may be present**



Thank you !!

RIF: <http://cdc.gov/nceh/tracking/sahsu.htm>

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