



***Environmental Public Health Tracking  
Social Determinants of Health Pilot Project***

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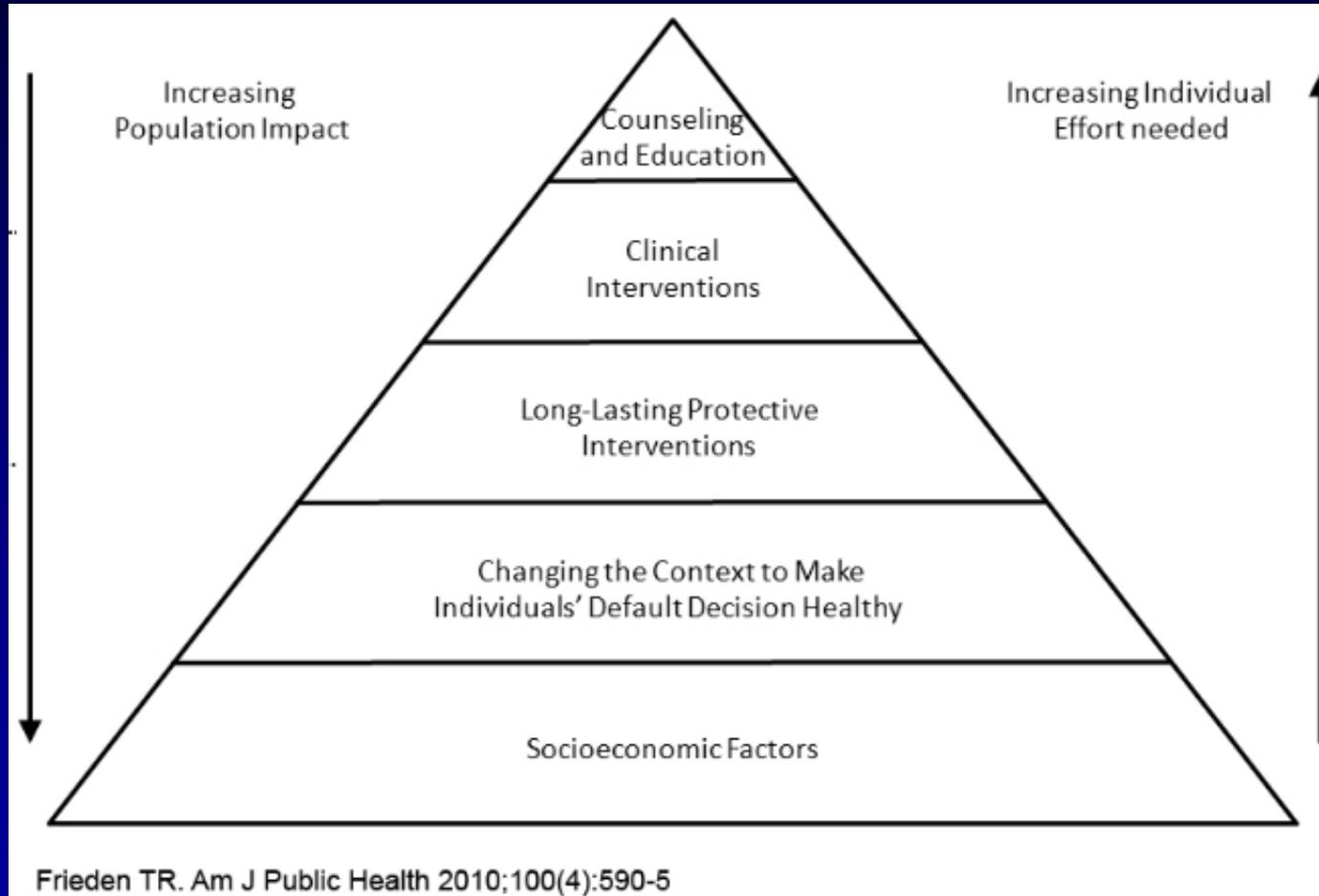
***518-402-7986***

***CSTE Webinar, March 12, 2015***

*“You can’t solve a problem  
until you can measure it.”*

*Senator Daniel Patrick Moynihan*

# Social Determinants of Health



*No exposure to an environmental hazard can be fully understood without understanding the socio-demographic characteristics that make up a community.*

*The risk of living in an unhealthy community is not uniformly distributed across all races, and income levels.*

# EPHT Social Determinants of Health Project Goals

- 1. Create database of social determinants of health indices to better understand health outcomes and environmental conditions among vulnerable populations.**
- 2. Conduct a pilot projects using geospatial tools for the assessment of socio-demographic characteristics of health or environmental disparities.**
- 3. Select the most useful indices and develop messaging about how to use the indices and tools to support investigations of health disparities at the sub-county level.**

# Social Vulnerability Index for Disaster Management

BE Flanagan, EW Gregory,  
EJ Hallisey, JL Heitgerd,  
B Lewis

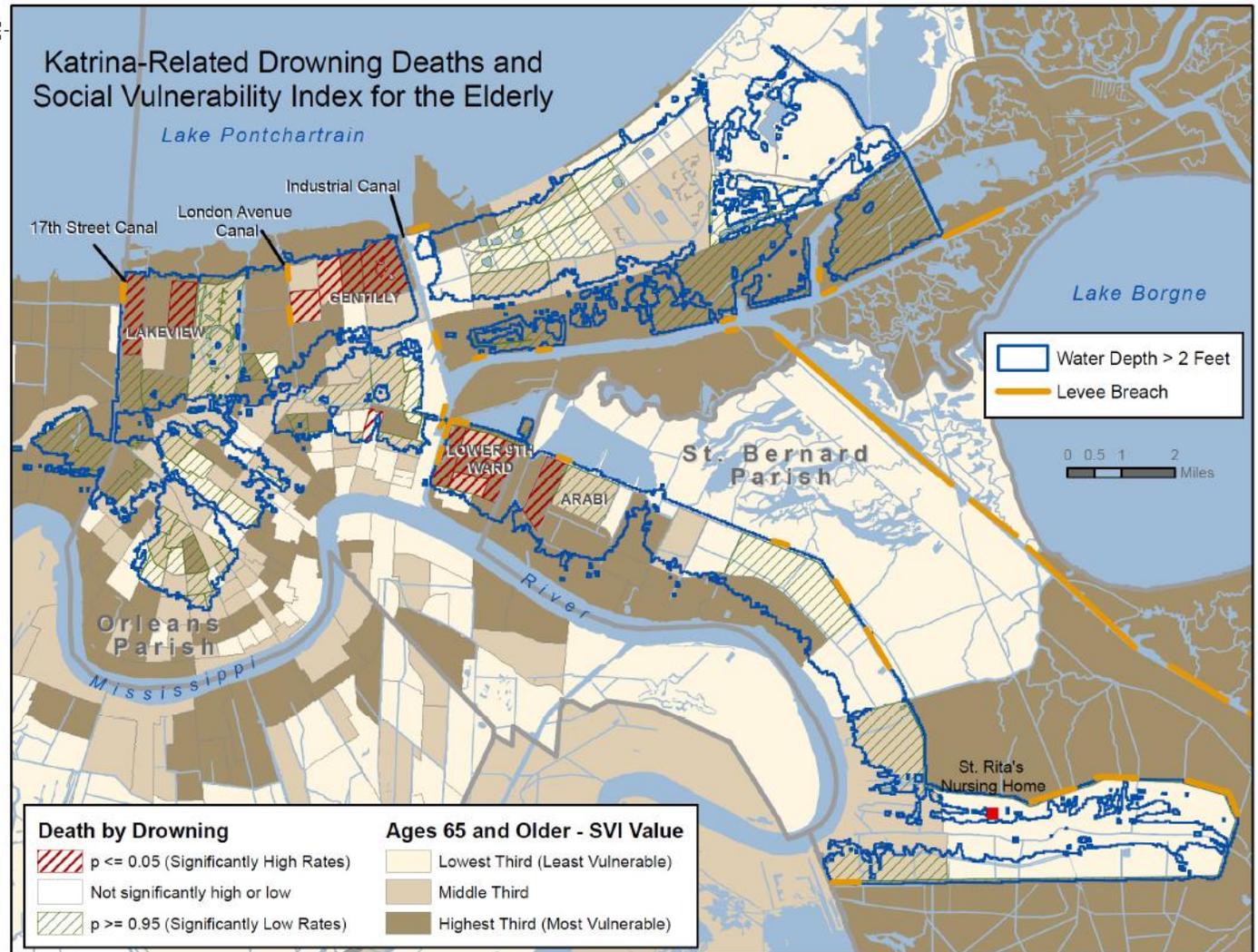
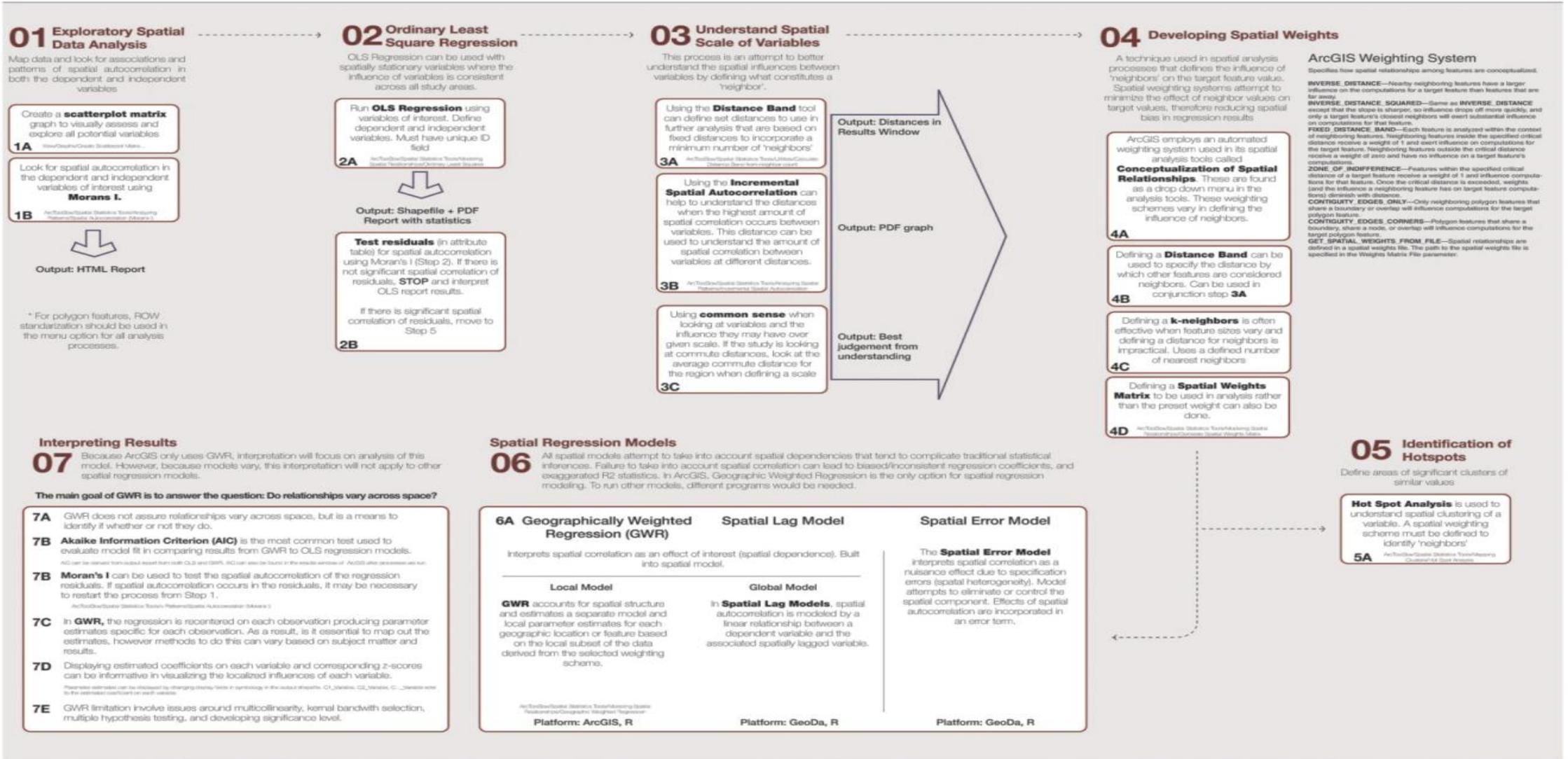


Figure 2. Overlay of Katrina-related drowning deaths and the elderly social vulnerability index (SVI) value, i.e., percentile rankings for population older than age 65 years. Data sources: NOAA 2006, Louisiana Department of Health and Hospitals 2006, Swenson 2009, Jonkman et al. 2009, and U.S. Census Bureau 2000b.

## Assessment of socio-demographic characteristics of health or environmental disparities.

Tracking Program	Content Areas	
Colorado	Low birth weight	Acute myocardial infarction
Florida	Acute myocardial infarction	
Massachusetts	Childhood lead poisoning	
Missouri	Elevated lead poisoning	
New Hampshire	Low birth weight	Acute myocardial infarction
New York City	Childhood lead poisoning	
<b>New York State</b>	<b>Low birth weight</b>	<b>Air quality data (NATA)</b>
Oregon	Adult body mass index	
Utah	Low birth weight	

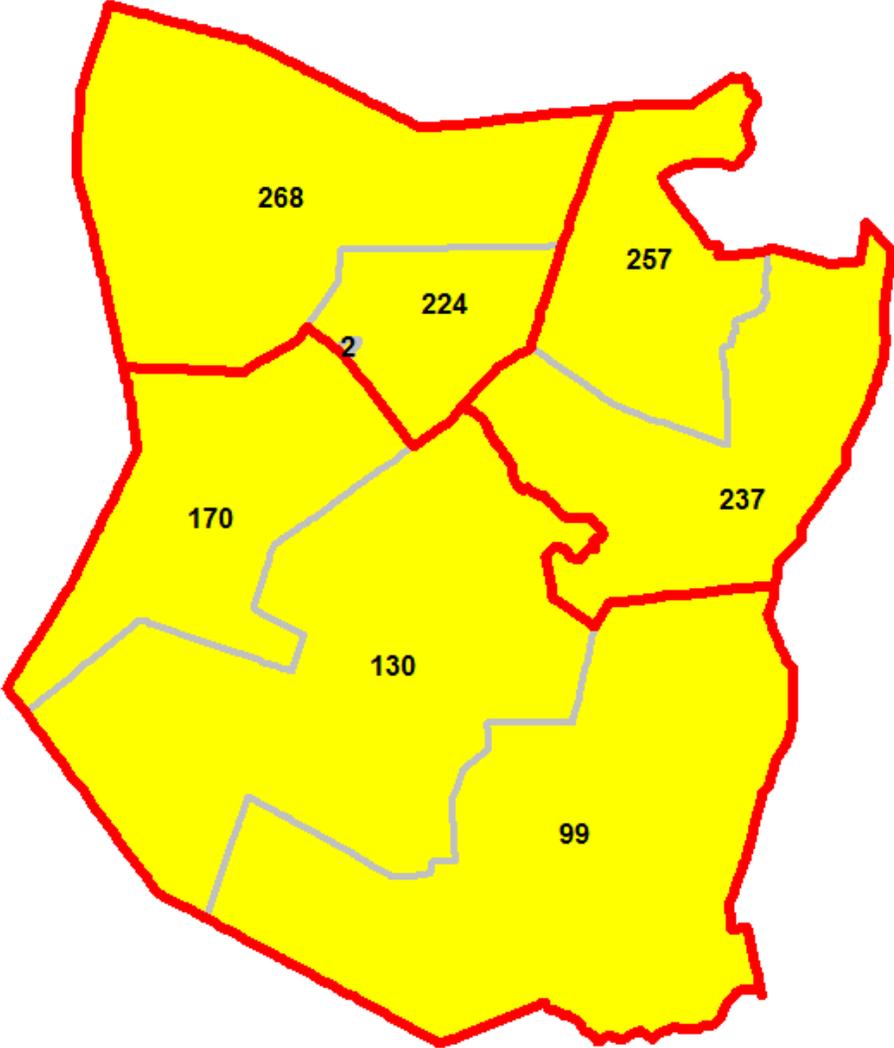
## Low Birth Weight & Myocardial Infarction Analyses Framework



# NYSDOH Geographic Aggregation Tool

- Merge small areas with neighboring areas to provide more stable rates of disease and/or protect confidentiality.
  - Started with 2,781 census tracts for NY State excluding NY City.
  - Merged neighboring tracts so each region contained at least 250 births. Resulted in 1,264 regions.

# Merging Areas to Provide Stable Rates

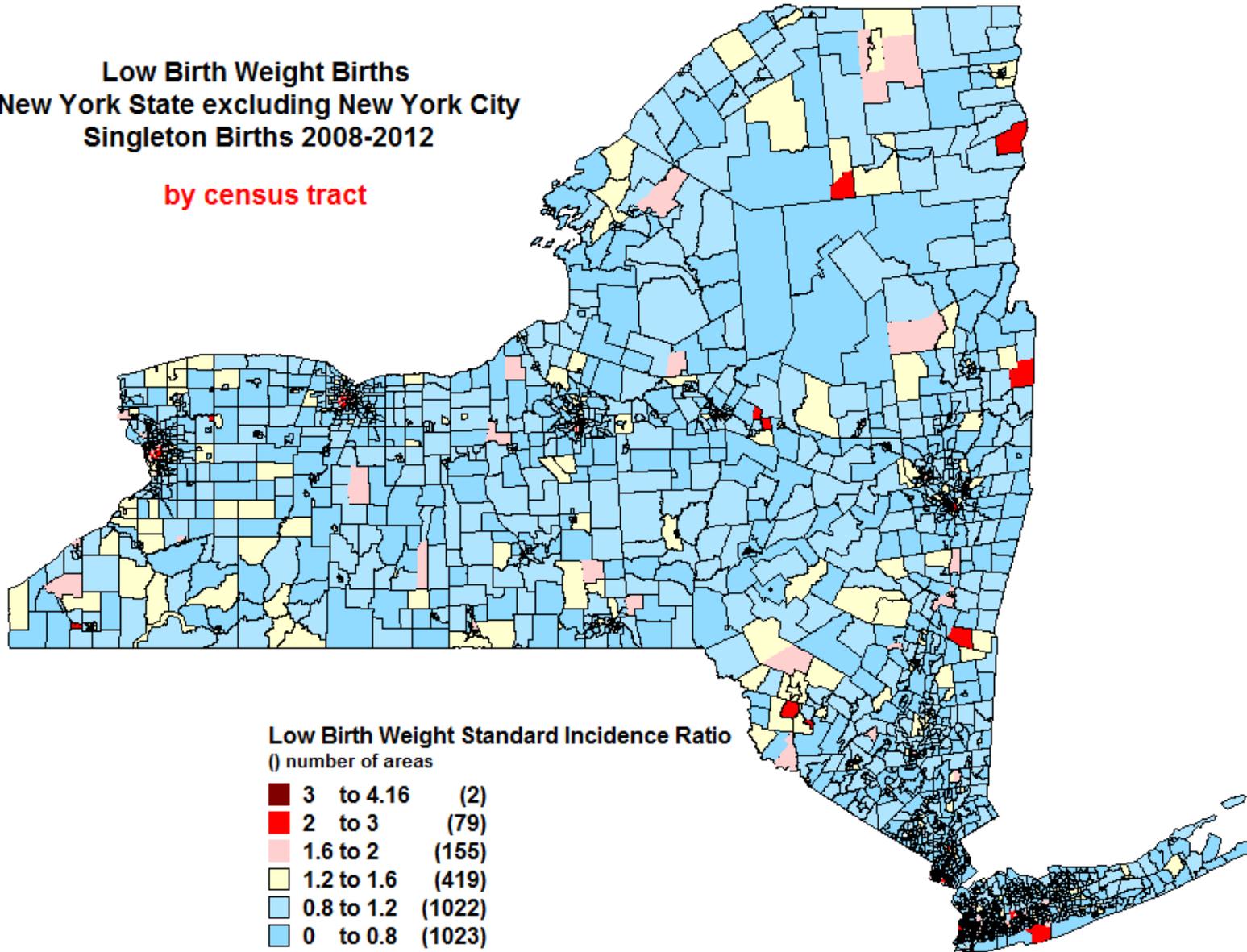


Original Census Tracts with birth counts

Region with a minimum of 250 births

**Low Birth Weight Births  
New York State excluding New York City  
Singleton Births 2008-2012**

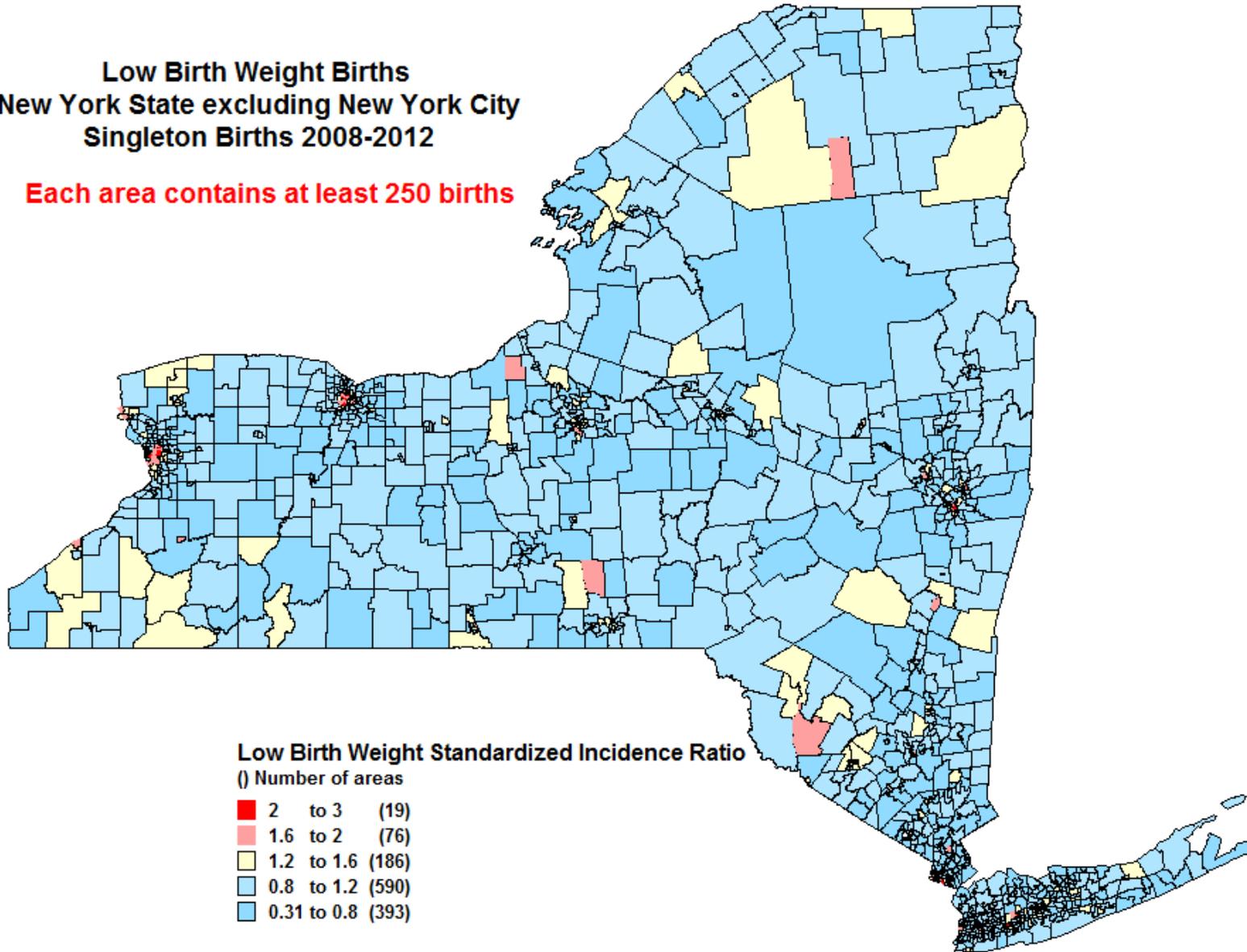
**by census tract**



number of areas=2700

**Low Birth Weight Births  
New York State excluding New York City  
Singleton Births 2008-2012**

**Each area contains at least 250 births**



number of areas=1,264

*"the areal units used in many geographical studies are arbitrary, modifiable, and subject to the whims and fancies of whoever is doing, or did, the aggregating"*

*Stan Openshaw*

*Dr. Openshaw showed the Modifiable Areal Unit Problem (MAUP) is a source of statistical bias that can drastically affect the results of hypothesis testing.*

# Regression (OLS) Analysis of Percent Low Birth Weight before and after aggregation.

Original Census Tracts

Parameter	Estimate	P value
Intercept	3.7963	<.0001
% Poverty	0.1118	<.0001
% Black	0.0709	<.0001
% Poverty <sup>2</sup>	-0.0015	<.0001
% Black <sup>2</sup>	-0.0003	0.0125
Poverty X Black	0.0005	0.0110

$R^2 = 0.35$

Aggregated to at least 250 births

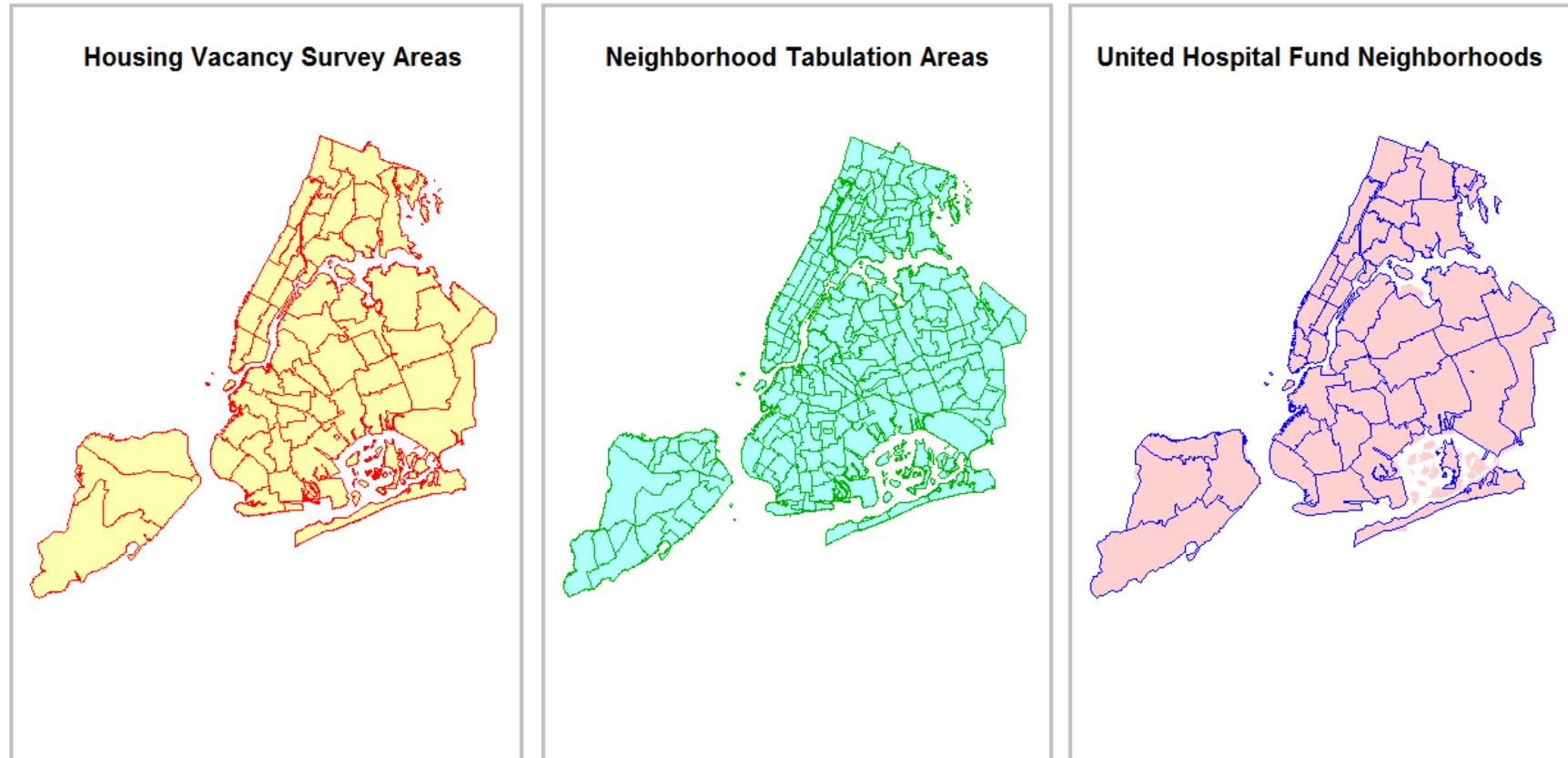
Parameter	Estimate	P value
Intercept	3.8546	<.0001
% Poverty	0.1001	<.0001
% Black	0.0740	<.0001
% Poverty <sup>2</sup>	-0.0011	<.0001
% Black <sup>2</sup>	-0.0003	0.0099
Poverty X Black	0.0003	0.2530

$R^2 = 0.58$



# A Challenge

How do we aggregate health outcome cases into areas,  
or do we use predefined areas created for other purposes?



all three zone classification schemes shown above are used by by the City of New York

Geographic Aggregation Tool  
<http://www.albany.edu/faculty/ttalbot/GAT/>