

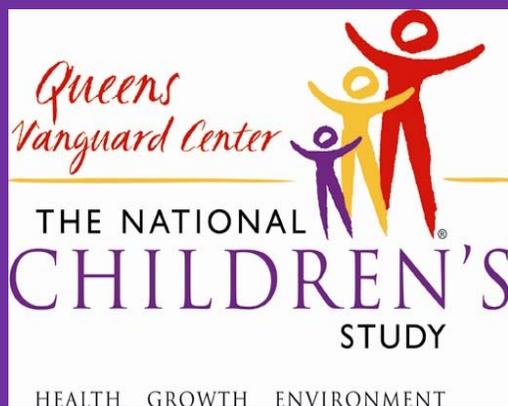
# Using Community Level Indicators in the National Children's Study:

**Assessing segment representativeness, evaluating recruitment performance, and building multi-level analytic models quantifying the impact on developmental outcomes of interactions between individual and community-level risk factors**

Howard F. Andrews<sup>1</sup>

James Quinn<sup>2</sup>, Suzy Allen<sup>3</sup>, Regina Zimmerman<sup>4</sup>, Cynthia Lendor<sup>3</sup>, Joseph Gilbert<sup>3</sup>, Kimberly Mantilla<sup>3</sup>, Shahnaz Alimokhtari<sup>6</sup>, Leonardo Trasande<sup>5</sup>, Perry Sheffield<sup>3</sup>, Andrew Rundle<sup>1</sup>, Virginia Rauh<sup>1</sup>, Ezra Susser<sup>1</sup>, Philip Landrigan<sup>3</sup>

<sup>1</sup>Columbia University Mailman School of Public Health <sup>2</sup>Columbia Center for International Earth Science Information Network, <sup>3</sup>Mount Sinai School of Medicine <sup>4</sup>New York City Department of Health & Mental Hygiene, <sup>5</sup>New York University, <sup>6</sup>University of Medicine and Dentistry of NJ—Environmental and Occupational Health Sciences Institute



# Community Characterization: Purpose

- Selecting NCS study segments representative of the county
- Informing stake-holders of the nature of the selected communities (segments)
- Developing tailored recruitment and outreach strategies
- Assessing the representativeness of a broad range of community characteristics, beyond those used in segment selection
- Determining predictors of recruitment and retention success
- In terms of the ultimate goal of the NCS: Determining the extent to which community-level risk factors interact with individual exposures to impact developmental outcomes

# Assessing Segment Representativeness

- Segment selection was based on limited number of key birth-related and census-based characteristics
- Goal is to define segments that are representative of the study location (PSU) as a whole
- Does planned representativeness with respect to one set of domains reflect representativeness with respect to a larger set of community domains?

# Nine Community Domains, 56 Indicators

- **Demographics** (14 indicators)
- **Socio-economics** (5 indicators)
- **Household Composition** (3 indicators)
- **Maternal/ Birth** (7 indicators)
- **Transit-related** (7 indicators)
- **Parks and Greenery** (4 indicators)
- **Safety and Social Disorder** (6 indicators)
- **Pollution Sources** (4 indicators)
- **Land Use** (6 indicators)

# Queens Census Tracts with Segments (n=43) vs. Tracts with no Segments (n=597)

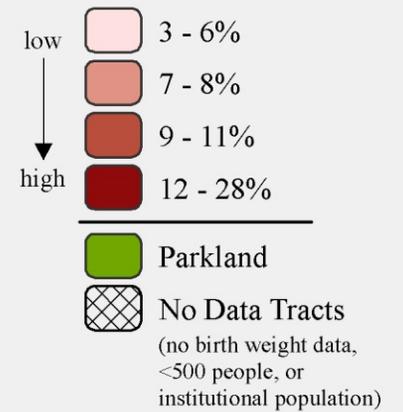
- Census tracts containing NCS segments are representative of Queens as a whole with respect to both average values and variability
- Significant differences found in only one of 56 indicators in both parametric and non-parametric tests:
  - % Female\* (52% non-NCS vs 51% NCS)
  - % Asian-Pacific Islander only\*\* (16% non-NCS vs 22% NCS)
  - % two or more races listed\*\* (6% non-NCS vs 5% NCS)
  - % births to Women <17\* (2% non-NCS vs 2% NCS)
  - Low Birth Weight\*\* (9% non-NCS vs 8% NCS)
  - **Bicyclists Injured in Car Accidents\*\*\* (1 in non-NCS vs 1 in NCS)**
  - % of Tract within ¼ mile of Point Source\*\* (4 in non-NCS vs 1 in NCS)

\*p<0.05 by Mann Whitney U; \*\*p<0.05 by t-test; \*\*\*p<.05 in both Mann Whitney U and t-test

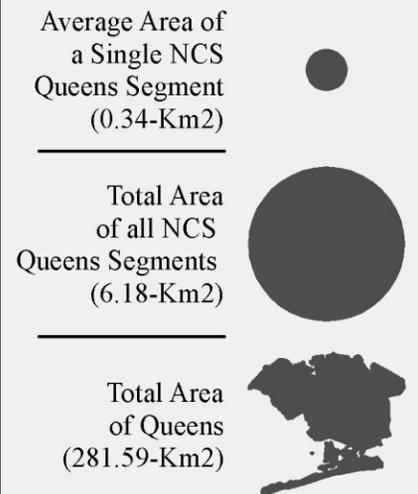
# Percent Low Birth Weight: Queens, New York

## Legend

% of Births with Low Birth Weight by 2000 Census Tracts and Quantile Classification



## NCS Segment Area Scale Comparisons



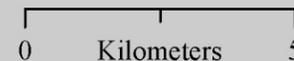
Manhattan

Queens

Brooklyn



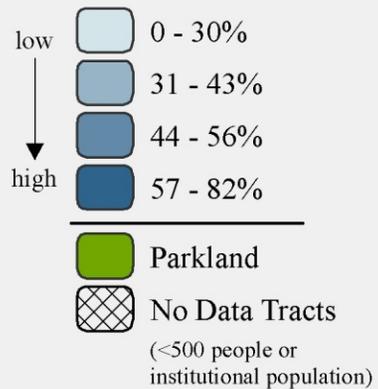
Map Scale: 1:135,000



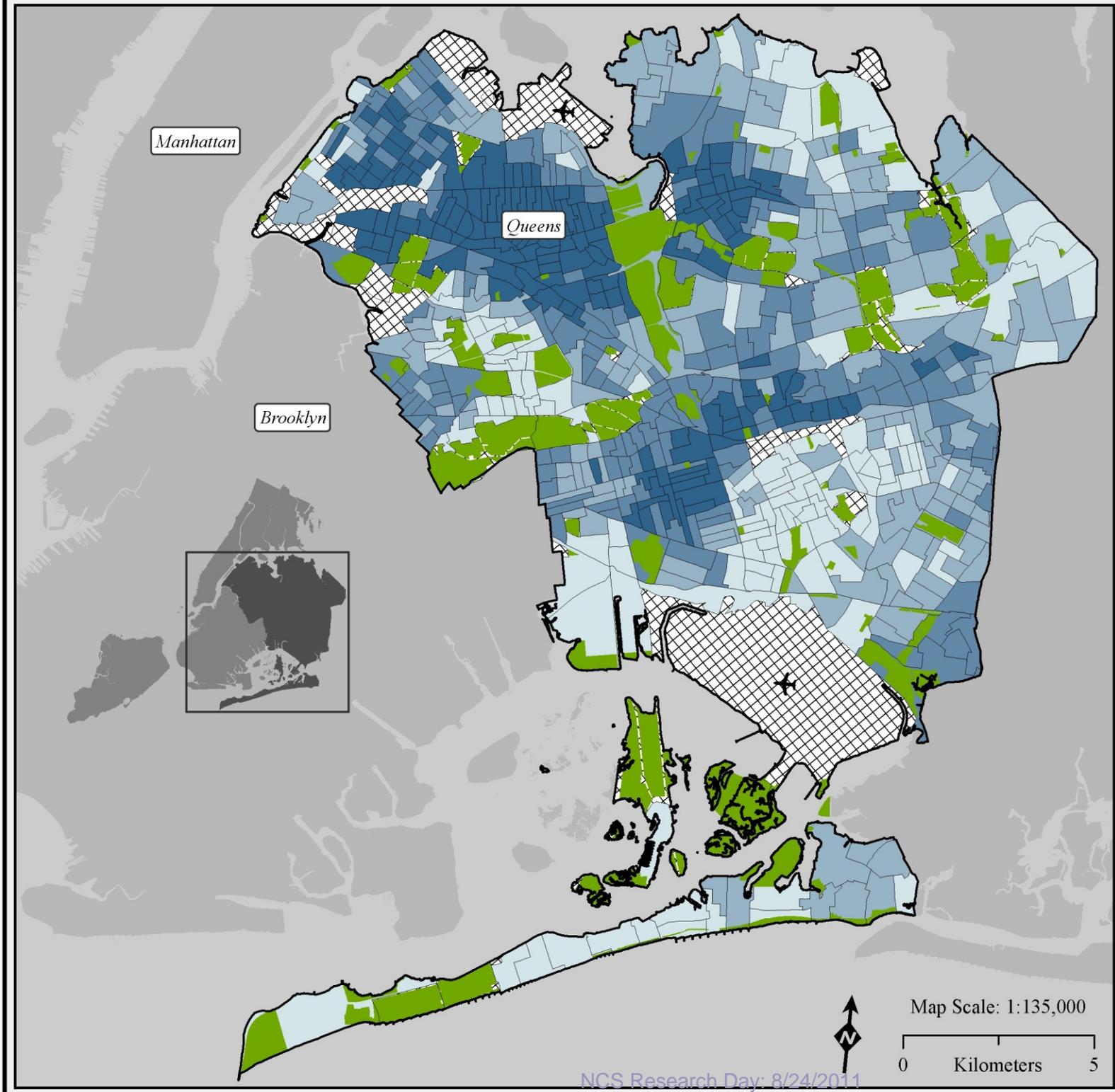
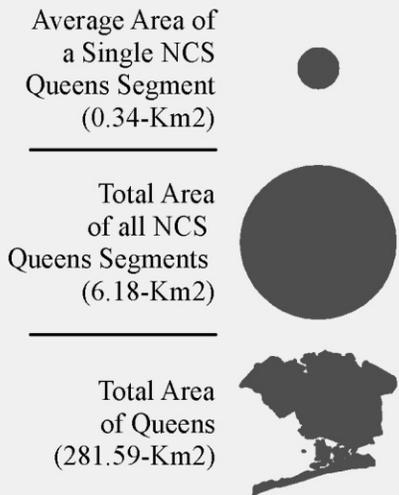
# Percent Foreign-Born Population: Queens, New York

## Legend

% Foreign-Born Population  
by 2000 Census Tracts and  
Quantile Classification



## NCS Segment Area Scale Comparisons



# Descriptive Characteristics and Predictors of Enumeration, Pregnancy Screening and Consent<sup>1</sup>

Sociodemographic Characteristic	Mean (SD)	Enumeration Completion (correlation coefficient)	Pregnancy Screening Completion (correlation coefficient)	Consent (correlation coefficient)
Percent of Births to Mothers with Some College	47.04 (12.89)	.210	-.160	-.320
Percent of Births to Primiparous mothers	34.51 (4.88)	.159	-.224	-.200
Percent of Mothers Receiving Late or No Prenatal Care	8.00 (3.84)	.251	.114	.433
Percent Foreign-born Population	48.57 (15.81)	.244	-.058	-.138
Median Household Income	41,400 (10,200)	.003	-.360	-.463
Percent Population Below Poverty level	15.340 (7.1943)	.275	.394	.158
Gun Arrests Per 10,000 Population, 2001-2004	1.67 (2.06)	.023	.011	.072
Felonies Per 1000 Population, 2001-2004	3.70 (1.20)	.025	.023	.142
Percent Medicaid	55.52 (15.02)	.421	.173	.275
<b>Percent Low Birth Weight</b>	<b>7.29 (1.84)</b>	<b>.648**</b>	<b>.508*</b>	<b>.571*</b>
Percent Preterm Birth	11.33 (3.03)	.325	.349	-.003

\*p<.05; \*\*p<.01

<sup>1</sup>Update of table originally published in Trasande L, Andrews HF, Goranson C, Li W, Barrow EC, Vanderbeek SB, McCrary B, Allen SB, Gallagher KD, Rundle A, Quinn J, Brenner B. Early experiences and predictors of recruitment success for the National Children's Study. Pediatrics 2011;127(2):261-8.

# Conclusions

- Communities in which NCS Queens Vanguard Center segments are located are representative of Queens communities as a whole, with respect to more than 50 indicators in 9 domains of interest.
- The NY/NNJ NCS Consortium has established a robust GIS/informational infrastructure for using community-level information in all phases of the NCS Study
- This infrastructure and associated statistical methods could provide a model for other NCS Sites, and could be leveraged to operate at the national level, at relatively low cost

# Next Steps: Community Buffers

- Implement *GIS buffering technology*. The brown areas are reachable in a walk of .5 miles or less from the home (red dot) along city streets (Rundle et al, 2009, *Envtl Health Perspectives*)



- Using *irregular buffer shapes* estimate community characteristics for each buffer, and therefore characterize the community experienced by each household