



Identifying High Density Areas of Poor Diabetes Control in NYC

Qun Jiang, MA
Winfred Y. Wu, MD, MPH
Steve Di Lonardo, MS

Primary Care Information Project

NYC Department of Health & Mental Hygiene

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Public Health Importance of Addressing Diabetes Control in NYC

- **High prevalence of diabetes in NYC¹**
 - About 1 in 10 adults have diagnosed diabetes
- **Control of A1C (a marker of blood sugar control) and other risk factors for complications inadequate²**
 - 10% of people with diagnosed diabetes have blood sugar, blood pressure, and cholesterol controlled
- **Significant morbidity and mortality annually³**
 - ~22,000 hospitalizations
 - ~2,600 hospitalizations for lower extremity amputations
 - ~1,700 deaths
 - ~1,400 new cases of end-stage renal disease leading to dialysis

¹ NYC Community Health Survey 2014.

² Thorpe et al. Diabetes Care 2009;32(1):57-62.

³ United States Renal Data System 2010, NYS DOH Statewide Planning and Research Cooperative System, Bureau of Vital Statistics, NYC

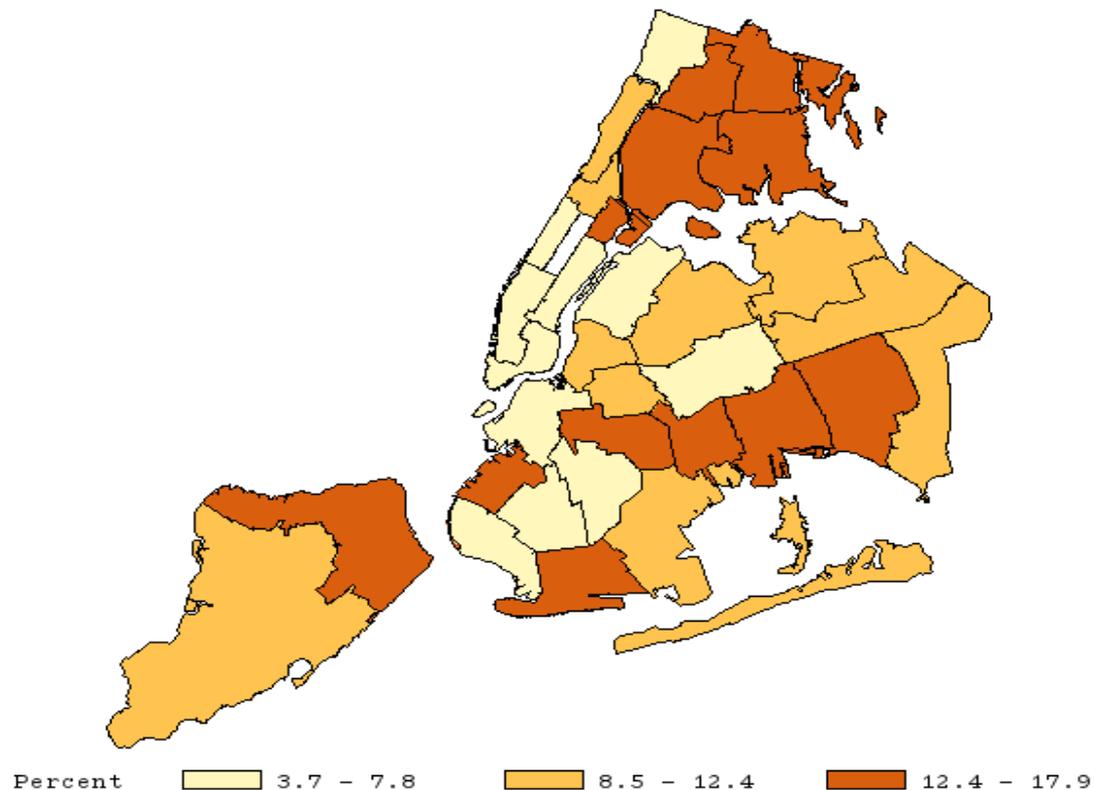
NYC DOHMH'S Response: Creation of an A1C Registry

- **Registries have been shown to facilitate quality improvement activities for diabetes¹**
- **Mandatory reporting of A1C from laboratories performing A1C tests on NYC residents since January 2006**
 - Changed the health code to require A1C test results to be reported to the health department
 - NYC A1C Registry has been implemented since January 2006
 - Received about 80,000 reports a week

¹ Bodenheimer T. et al. *JAMA* 2002;14:1775-9; Bodenheimer T. et al. *JAMA* 2002;15:1909-14; Kupersmith et al. *Health Affairs (Millwood)* 2007; 26:w156-68; Larsen et al. *Journal of Managed Care Pharmacy* 9(6):552-8.

Current State of Diabetes in NYC - Prevalence

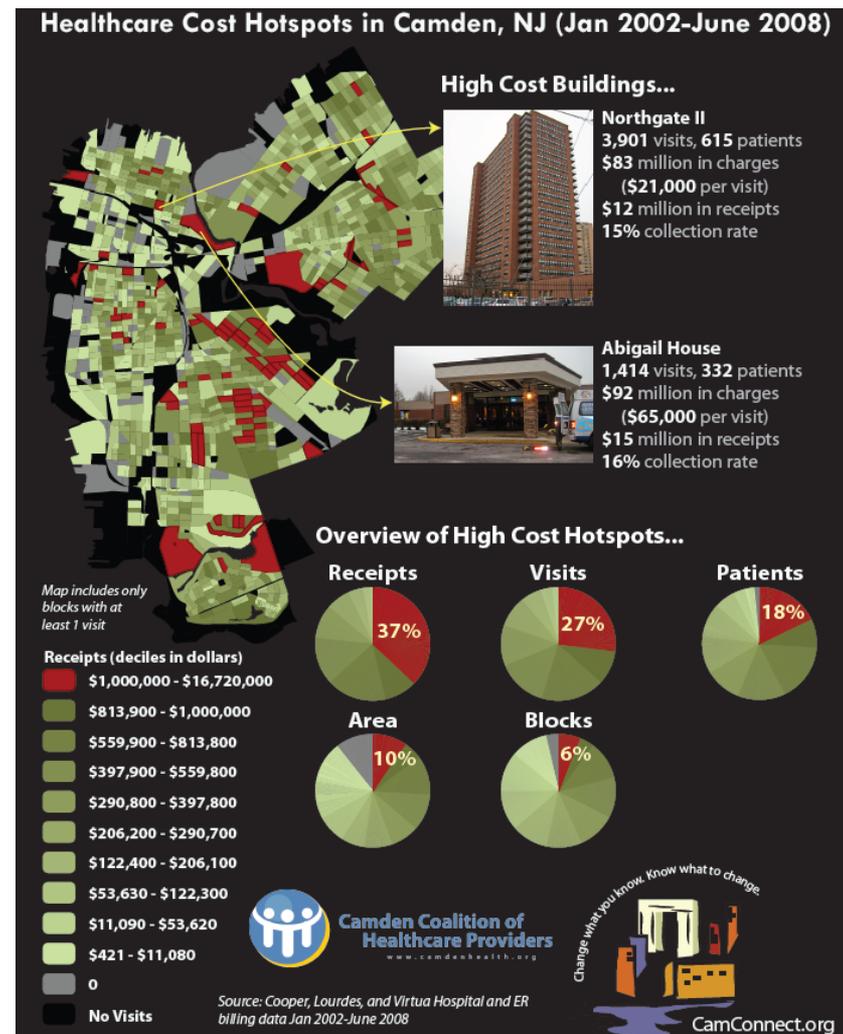
NYC Community Health Survey 2014
Percentage ever been told they had diabetes by neighborhood



Bureau of Epidemiology Services, NYC DOHMH

Purpose of the analysis

- Using the ArcGIS Point Density analysis tool to identify areas in New York City, where particularly high numbers of individuals with poor glycemic control resided to inform community awareness and potential programming focused on reducing the burden of poorly controlled diabetes.
- Our analysis “borrowed” the idea of “hotspotting” practice in Camden, New Jersey by Dr. Jeffrey Brenner in providing preventative care to high-risk patients in order to reduce healthcare costs.



Methods of the analysis (1)

- **Population**

- NYC residents 18 years of age and older with diabetes in poor glycemic control (A1C>9%) from 2011 to 2013.
- Based on an individual's latest A1C test result in a calendar year.

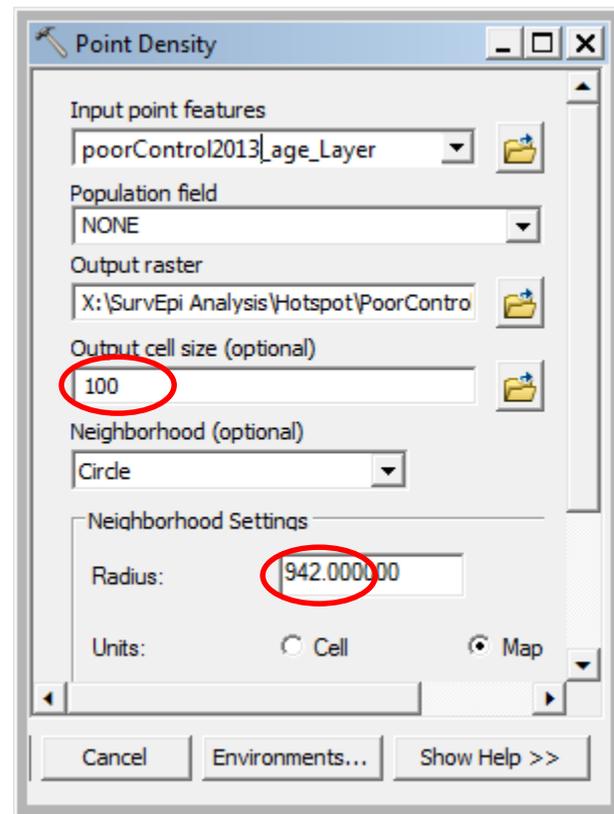
- **Geocoding address**

- Used SAS program to clean up the addresses and to exclude invalid tests, duplicate and non-NYC records, homeless, jails, hospital and nursing home addresses;
- Geocoding was performed using the NYC Department of City Planning's Geosupport Desktop Application and NYC DOHMH's Geoportal Application.
- Addresses which were not geocodable were checked against historical records to verify if a more complete address was available.

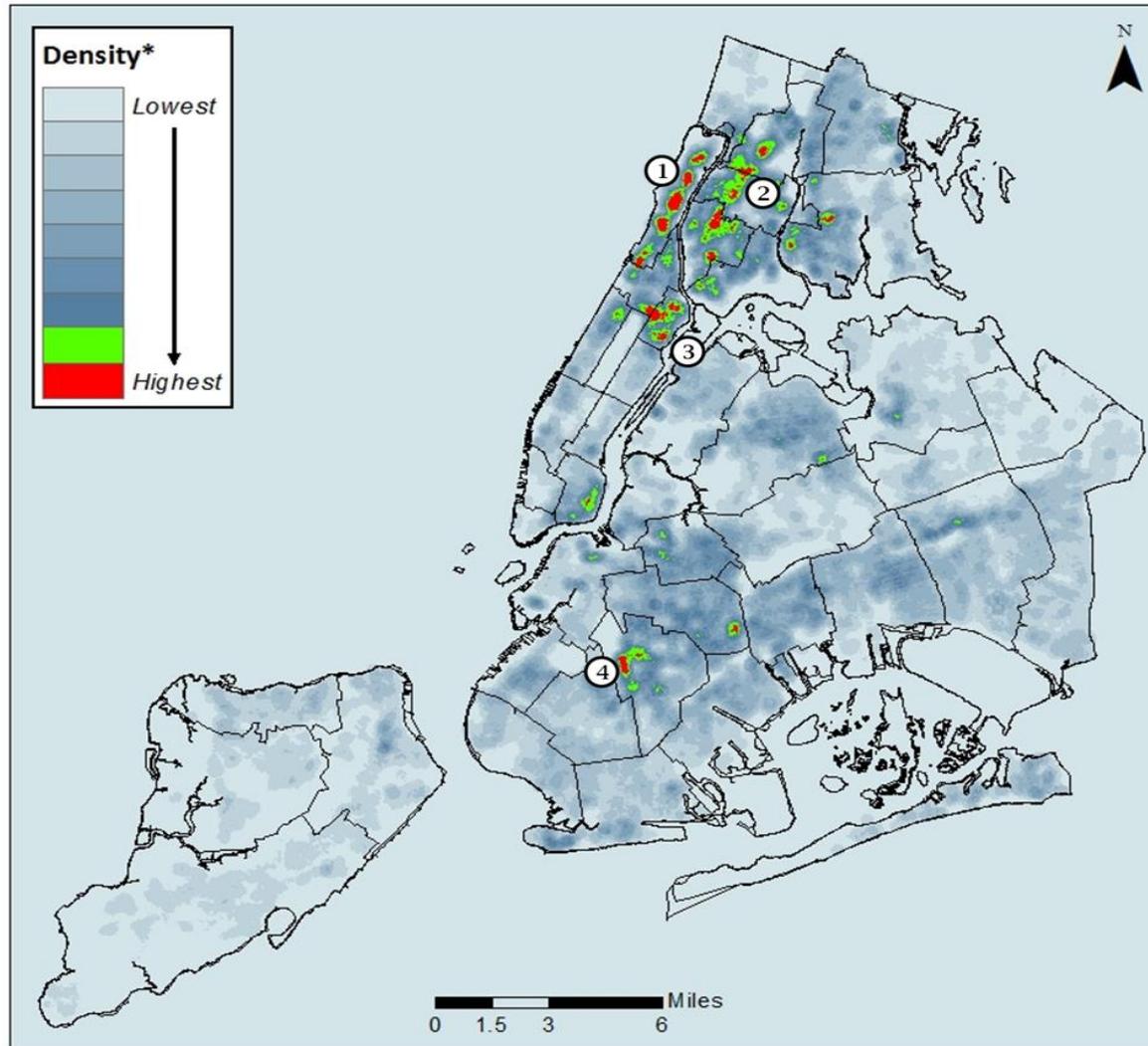
Methods of the analysis (2)

- **Point Density analysis**

- A dot map representing the locations of persons with poorly controlled diabetes in a given year was created.
- A 942-ft radius (equivalent of 0.1 square mile neighborhood area) and 100 square foot searching cell were used as the parameters for the point density raster map.
- The classification was set at the default value of 9 and the natural breaks method was applied. The two highest density classifications were identified as the high density areas.
- Point density raster map was converted into a vector map and the points layer was spatially joined to density polygons.

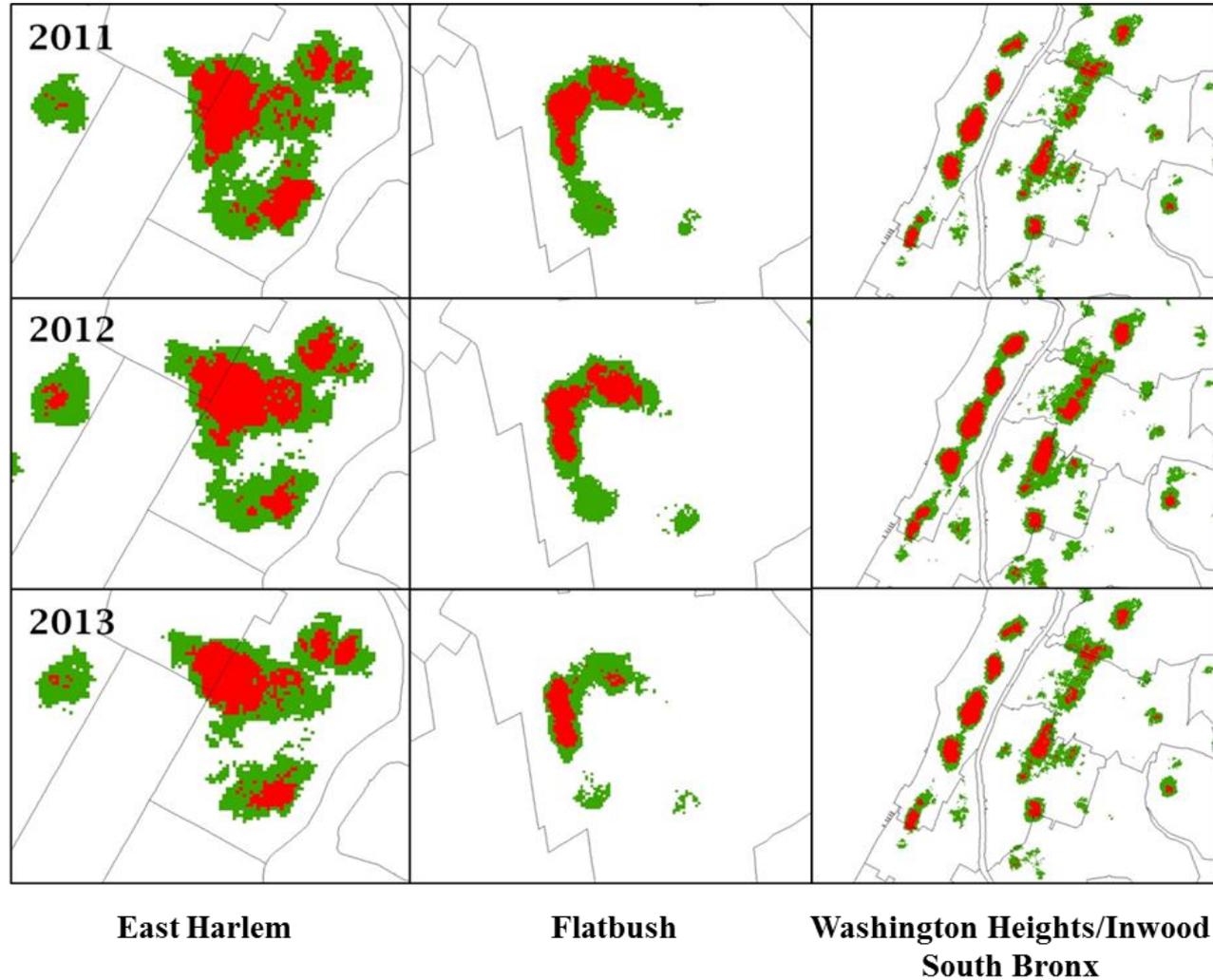


Point density map of poorly controlled diabetes in 2013, NYC



Data source: NYC A1C Registry, 2006-2013

Yearly point density map of poor controlled diabetes in NYC (2 highest density areas)



Data source: NYC A1C Registry, 2006-2013

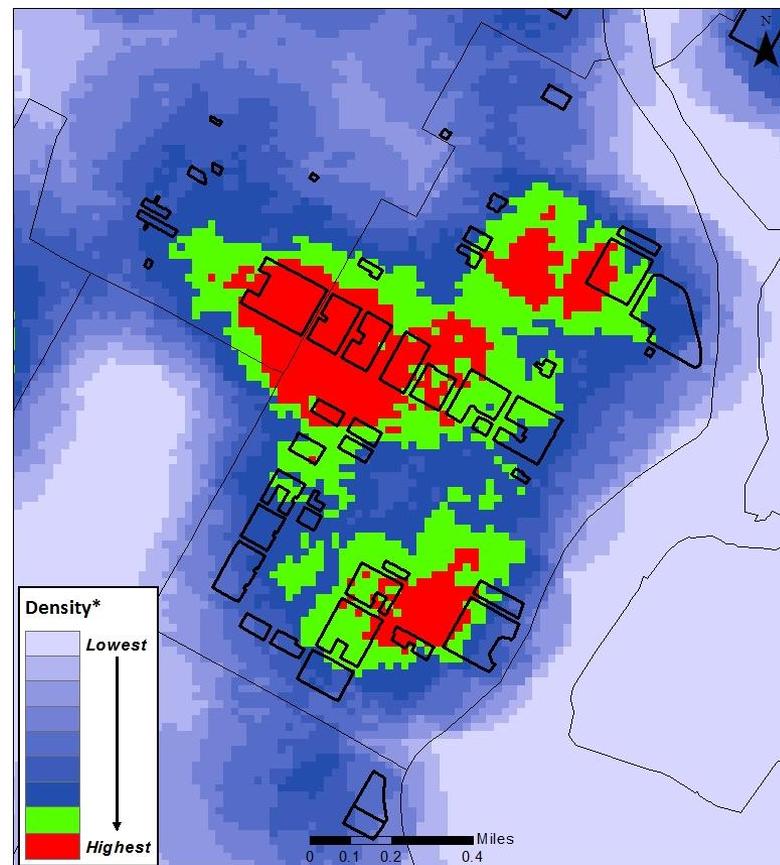
Persistence of poorly controlled diabetes, 2011-2013, NYC

| | Poor A1C control | A1C testing | Poor A1C control | Poor A1C control | Not in poor A1C control |
|----------------------------------|------------------|--------------|------------------|------------------|-------------------------|
| | 2013 | 2011 to 2013 | 2011 and 2012 | 2011 or 2012 | 2011 and 2012 |
| | n | n (%) | % | % | % |
| Citywide | 78,694 | 50,087 (64) | 39 | 30 | 31 |
| East Harlem | 1,005 | 693 (69) | 43 | 32 | 25 |
| Washington Heights/Inwood | 1,891 | 1,199 (63) | 42 | 30 | 28 |
| South Bronx | 3,120 | 2,069 (66) | 40 | 31 | 29 |
| Flatbush | 724 | 482 (67) | 42 | 33 | 25 |

Data source: NYC A1C Registry, 2006-2013

Discussion

- Point density analysis can supplement traditional public health analyses in greater geographic details.
- Enable limited resources to be targeted to high density areas that will reach the greatest numbers of the at-risk population.
- Two examples of using the results of this point density analysis
 - Community health worker program in five community housing developments in East Harlem
 - Placement of a community health worker program by NYU Medical Center in the Lower East Side of Manhattan



*Density of persons with poorly controlled diabetes per 0.1 square mile



Data source: NYC A1C Registry, 2006-2013

Limitations

- Doesn't include the persons with poorly controlled diabetes who do not undergo A1C tests.
- The results of the analysis are subject to the accuracy of the address for each record, which depend on health care workers correctly entering person addresses at the point-of-care.
- The current analysis focuses solely on the concentration of the poorly controlled diabetes and doesn't take into consideration underlying population density.
- The replication of this analysis in other jurisdictions would require a similar type of registry infrastructure.

Thank You!

Contact information:

Qun Jiang, MA
Primary Care Information Project
347-396-4292
qjiang@health.nyc.gov