State of New Yorkers – A Well-Being Index

"New York is a city of things unnoticed. It is a city with cats sleeping under parked cars, two stone armadillos crawling up St. Patrick's Cathedral, and thousands of ants creeping on top of the Empire State Building. New York is a city for eccentrics and a center for odd bits of information."

- *Gay Talese, author and reporter for* The New York Times

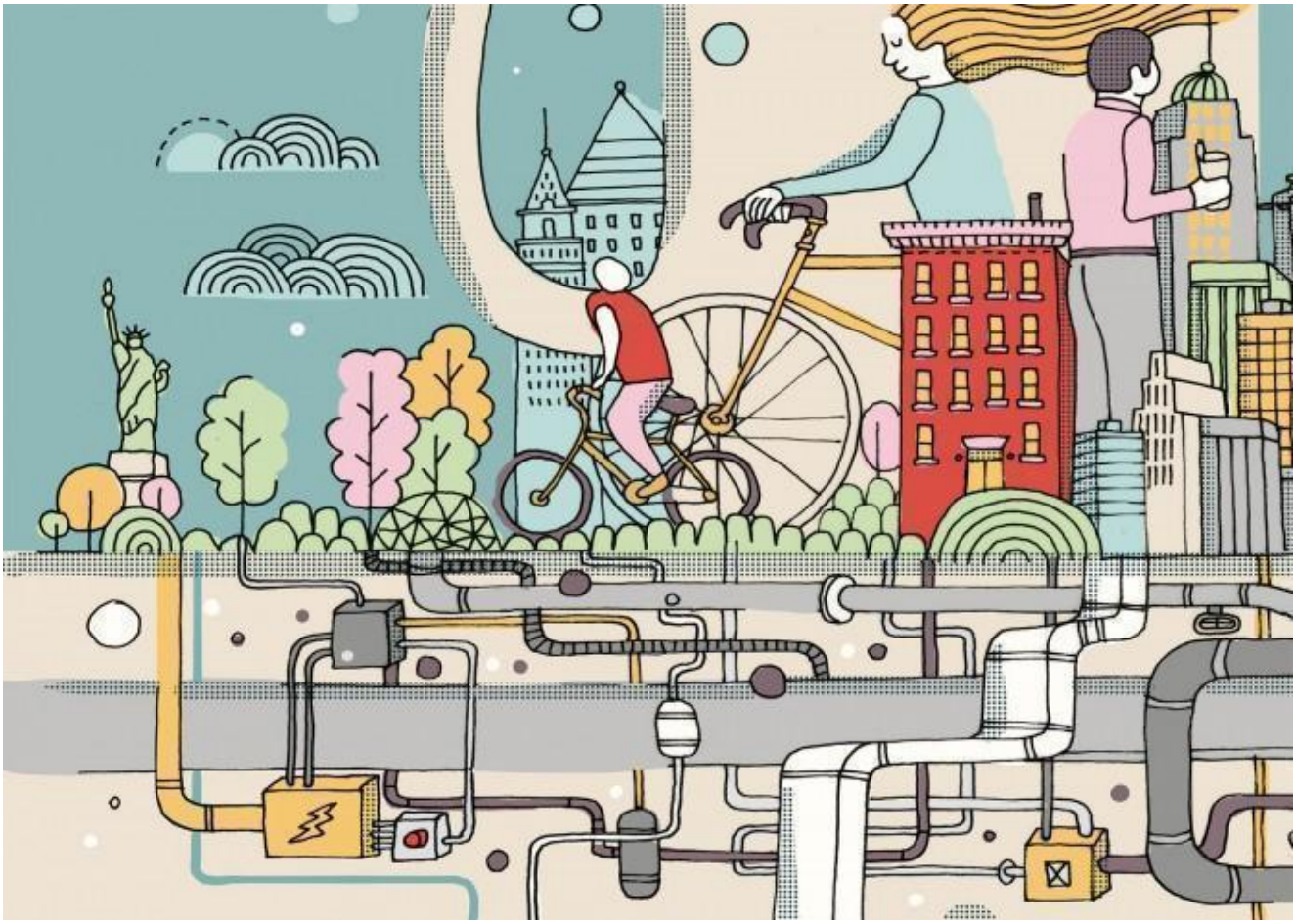

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Table of Contents

Table of Figures

Table of Tables

Executive Summary

In recent decades researchers and policy makers around the world have begun to seek measures of human well-being that go beyond mere reporting of Gross Domestic Product and other economic indicators. This results from the widespread recognition that per capita income alone cannot fully represent the quality of life and subjective well-being of individuals or communities. Such recognition has led to the development of more nuanced approaches designed to capture the range of factors that contribute to well-being. The use of an index, a composite measure with weighted domains and indicators, facilitates the synthesis of vast amounts of data from disparate disciplines in order to paint a more holistic picture of quality of life and track differences between and among populations over time.

Background

From January to May, 2015 the New York City Center for Innovation through Data Intelligence (CIDI) commissioned a Capstone team from Columbia University's School of International and Public Affairs (SIPA) to create a place-based index of socio-economic well-being in NYC communities. Well-being, by definition, is a subjective perception of one's quality of life. In a city such as New York, with its wealth of diversity and preferences, community well-being can be difficult to capture; nonetheless, certain indicators do indeed correlate with a community's state of well-being. This research attempts to integrate data on a range of indicators that adequately approximate the well-being of New Yorkers within the City's neighborhoods.

Methodology: Measuring Well-Being

The SIPA team conducted an extensive literature review on well-being indices, developed a sound methodology based on the evidence, collected data, and produced an index of neighborhood-level well-being for New York City. The indicators chosen, based on literature reviews of similar indices were grouped into six major domains: Education, Health & Well-Being, Housing, Economic Security & Mobility, Core Infrastructure & Services, and Personal & Community Safety. Datasets were gathered from variety of sources, e.g. the Census Bureau's American Community Survey, the New York City Community Health Survey, and New York City agencies. Statistical techniques were employed to modify the spatial units used in the various datasets in order to reach the desired common geographic level: the Neighborhood Tabulation Area (NTA). Correlation analysis conducted in STATA ensured data validity and contributed to the elimination of weak variables. Chosen indicators within each domain received equal weight in order to create a composite domain score for every NTA; each of the six domains then received equal weight within the overall composite well-being score. NTA scores were mapped using ArcGIS and outcome analyses were conducted at the city and borough levels.

Index Results and Conclusions

The NYC Well-Being Index has a normal distribution with a mean of 56 and a standard deviation of 13. There were 14 NTAs with significantly higher well-being than the mean (more than 1.5 standard deviations above the mean) and 16 NTAs with significantly lower well-being (more than 1.5 standard deviation below the mean). The index incorporates data from various sources, with 45% of indicators coming from the American Community Survey, which averages data from the last five years; therefore the index approximates the well-being of New Yorkers between 2009 and 2013. The availability of more annual data would improve the specificity of the measurement and enable more precise conclusions with regard to changes over time.

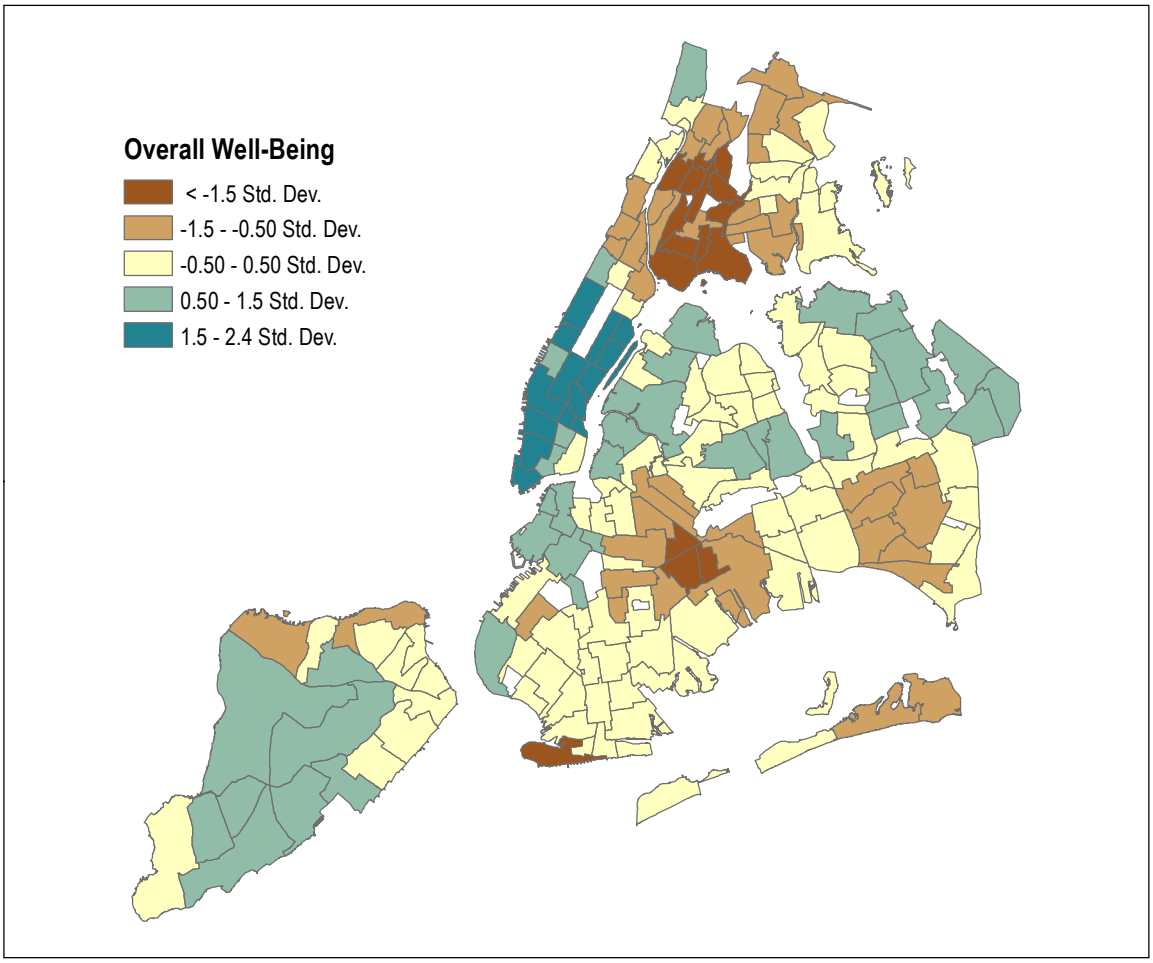


Figure 1: Map of Overall Well-Being in New York at the Neighborhood Level

I. Introduction

New York City is one of the wealthiest cities in the world; however, the standard of living for individuals is highly associated with their respective area of residence. As the chart below demonstrates, New Yorkers that live in the Bronx earn significantly less than their counterparts in other boroughs. But what does this imply about the well-being of Bronx residents as compared to Manhattan residents? Is well-being simply synonymous with income? Our analysis attempts to understand these issues and others as they relate to communities across New York City.

Borough	Population	Median Household Income	Mean Household Income
Bronx	1,385,108	$34,264	$47,325
Brooklyn	2,504,700	$43,567	$62,656
Manhattan	1,585,873	$64,971	$122,620
Queens	2,230,722	$55,297	$70,208
Staten Island	468,730	$71,084	$86,604
Source: 2006-2010 American Community Survey 5-Year Estimates; Population data from Census 2010			

Table 1: Household Income Across Boroughs

What is well-being?

Researchers around the world have undertaken the study of well-being, but there is no single definition, measure, or set of indicators that is universally agreed upon. A number of organizations, countries, and cities have sought to create indices in an attempt to tell a story about well-being and its variability over time and place. In countries as seemingly disparate as Bhutan and Canada, researchers have developed indices to track the well-being of their citizens. Some indices focus on subjective perceptions of well-being, which is measured by sampling surveys that ask individuals about the degree of well-being they experience (Warner & Kern, 2013). Others emphasize objective quality of life domains necessary for people to live and thrive in a community. Well-being indices around the world often combine survey data with objective data, in an attempt to balance the two approaches. For example, the Jacksonville Quality of Life progress report, which has been collecting well-being data for twenty-nine years, measured the health of its communities in 2014 using three measures: people under 18 without health insurance, packs of cigarettes sold per person, and percentage of residents that rate the quality of their health care as “Good” or “Excellent” (Jacksonville Community Council, 2000).

The Jacksonville Quality of Life Progress Report provides a good example of the ability of data indicators to reflect community behavior and preferences. Although “packs of cigarettes sold per person” is an objectively defined criteria, it still involves a subjective set of values and judgments. Therefore, researchers have been able to agree on several indicators and domains that allow measurement of well-being without direct survey collection. A report by the Santa Monica Office of Well-Being makes it clear that domains - larger themes of well-being - are quite similar across the different indices. For example, most indices try to utilize indicators that measure education, as well as the health and safety of residents. Once indicators for these and other well-defined domains are chosen, researchers collect data over time to track changes in that particular measure of well-being.

Why study well-being?

Happiness and well-being have increasingly become important topics of study for researchers, including economists and social scientists. Historically, researchers have relied on gross domestic product (GDP) indicators to determine a society's well-being. Although GDP can gauge how an economy is performing, the University of Waterloo, Faculty of Applied Health Sciences (2012) argues that GDP alone, "sheds no light on the health of our population, on the vibrancy of our democracy and our communities, on the growing inequality within our country, on the sustainability of our environment, or on other aspects of the quality of life. Figure 1 (below) illustrates how increases in GDP do not necessarily lead to better outcomes for the environment, leisure and culture, or health of residents. Therefore, GDP emerges as a very limited indicator, which must be supplemented with other types of data in order to accurately, capture well-being. Similarly, at the local level, income per capita (or per household) must be supplemented with other indicators in order to understand the quality of life of residents in a more holistic manner.

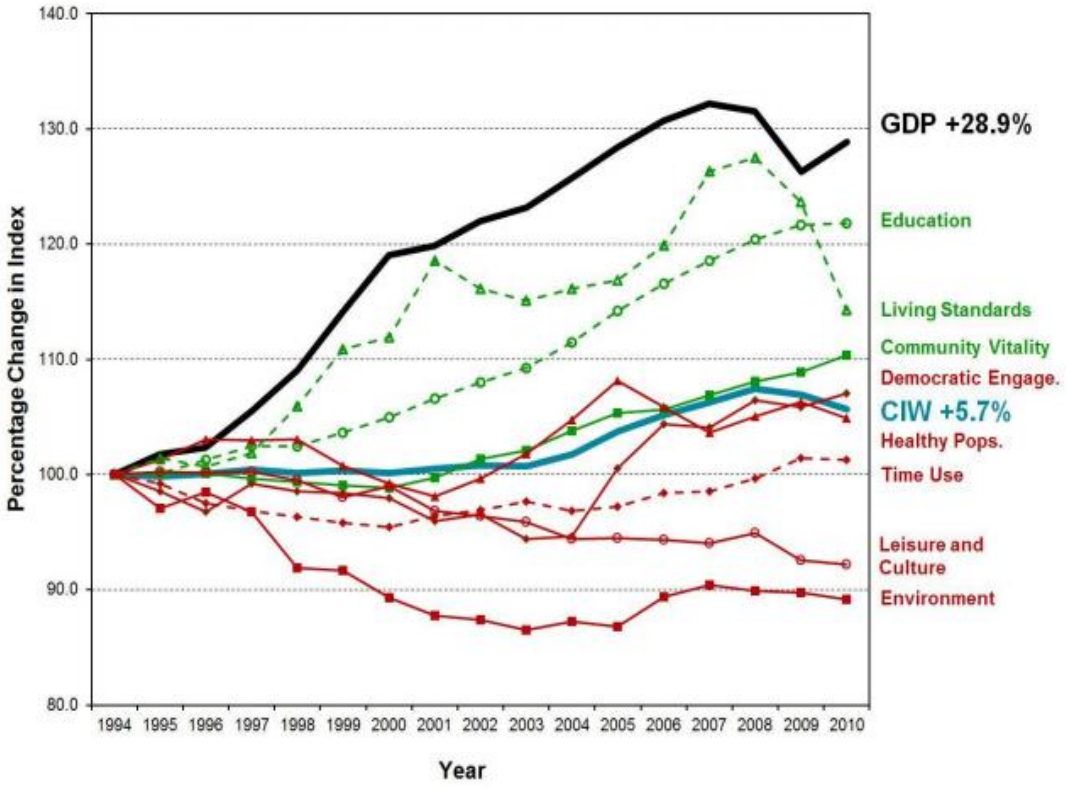


Figure 2: Trends in the Canadian Index of Well-Being with Eight Domains Compared with GDP, 1994-2010.

Source: University of Waterloo Faculty of Applied Health Sciences (2012)

Domains and Indicators

The team researched several well-being indices to understand the best indicators of community quality of life. After careful comparison of ideal indicators and available data, we aligned our research with CIDI's policy priorities. Below are the selected indicators aligned with New York City's "Policy Domains".

NYC Policy Domain[1]	Well-Being Index Indicators
 **Education** Increase early learning opportunities; academic achievement; graduation rates; parent access, and promotes holistic education approaches.	1. Percent enrolled in pre-school 2. Percent of population with Bachelor's degree or higher 3. Percent of students proficient in ELA and Math
 **Health and wellbeing** Ensure that all New Yorkers have healthy lives, with access to high-quality medical care and reduce disparities health outcomes.	1. Asthma-Composite 2. Poor Health- Composite 3. Self-Reported Health Status 4. Healthy Eating Habits 5. Teen Pregnancy 6. Low Birth Weight 7. Insurance Coverage 8. Medical Care Receipt
 **Economic security and mobility** Improve conditions for low-wage workers; help people prepare and find jobs; raise the floor on wages; build a diversified economy that creates jobs for all New Yorkers, and connect families to the stabilizing benefits for which they are eligible.	1. Median Income level 2. Employment and Unemployment Rate
 **Housing** Reduce homelessness and improve the conditions and availability of public and affordable housing.	1. Housing Cost Burden (Renters) 2. Housing Cost Burden (Owners) 3. Housing Maintenance Code Violation Rate 4. Homeless Shelter Entry Rate
 **Personal and community safety** Ensure that all New Yorkers feel safe and secure on their street and in their homes, schools, neighborhoods, institutional settings and places of work and have confidence in the fairness of the justice system.	1. Index Crime Rate 2. Victimization rate (Abuse/neglect investigations)
 **Core infrastructure and services** Ensure that all New Yorkers, regardless of where they live, enjoy a clean, healthy and safe environment and that the City's viability and growth are supported by core infrastructure and basic services.	1. Commute Time

Figure 3: List of Index Domains and Corresponding Indicators

[1] List and images courtesy of CIDI

II. Well-Being Overall Results

The following section presents the results of the overall well-being index. The NYC Well-Being Index has a normal distribution with a mean of 56 and a standard deviation of 13 (see figure 3 below). There were 14 NTAs with significantly higher well-being than the mean (more than 1.5 standard deviations from the mean) and 16 NTAs with significantly lower well-being (more than 1.5 standard deviation from the mean). Those neighborhoods are listed below and are depicted visually in the map on the next page (figure 4).

NTAs significantly above the mean:

1. Turtle Bay-East Midtown, MN
2. Upper East Side-Carnegie Hill, MN
3. West Village, MN
4. SoHo-TriBeCa-Civic Center-Little Italy, MN
5. Battery Park City-Lower Manhattan, MN
6. Hudson Yards-Chelsea-Flat Iron-Union Square, MN
7. Lincoln Square, MN
8. Midtown-Midtown South, MN
9. Murray Hill-Kips Bay, MN
10. Gramercy, MN
11. Lenox Hill-Roosevelt Island, MN
12. Yorkville, MN
13. Stuyvesant Town-Cooper Village, MN
14. Upper West Side, MN

NTAs significantly below the mean:

1. East Tremont, BX
2. Hunts Point, BX
3. Claremont-Bathgate, BX
4. Fordham South, BX
5. Crotona Park East, BX
6. Mott Haven-Port Morris, BX
7. Mount Hope, BX
8. University Heights-Morris Heights, BX
9. Longwood, BX
10. Melrose South-Mott Haven North, BX
11. East Concourse-Concourse Village, BX
12. Belmont, BX
13. East New York (Pennsylvania Ave), BK
14. Brownsville, BK
15. Ocean Hill, BK
16. Seagate-Coney Island, BK

What's an NTA?

The definition of a neighborhood used in this report is the NTA, which stands for Neighborhood Tabulation Area. NTAs are "created by the New York City Department of City Planning, using whole census tracts from the 2010 Census as building blocks. These aggregations of census tracts are subsets of New York City's 55 Public Use Microdata Areas (PUMAs). Primarily due to these constraints, NTA boundaries and their associated names may not definitively represent neighborhoods."

Source: NYC Department of City Planning.

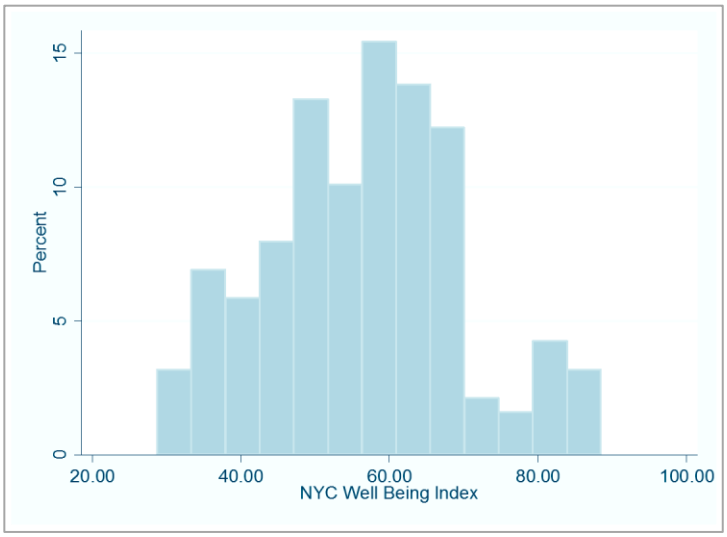


Figure 4: Distribution of Well-Being Index Results

The overall well-being index is composed of six domains, each composed of a series of indicators. The sections below describe the results from each domain, followed by details on each indicator within the domain.

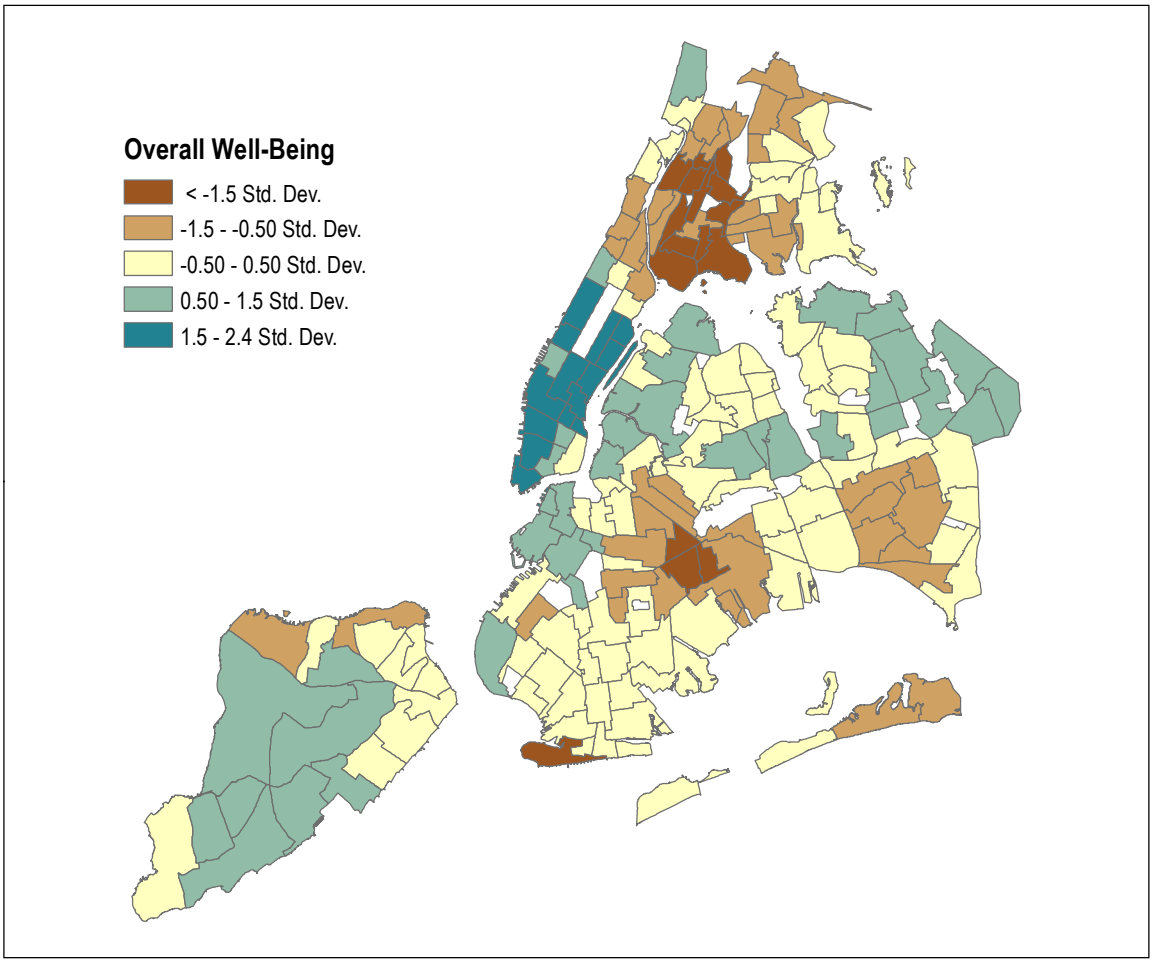


Figure 5: Map of Overall Well-Being by Neighborhood

Note about map display:

This report uses two different methods to display data on maps using ArcGIS. For all indicators, the methodology used in ArcGIS is called "natural breaks," which uses a built-in algorithm to categorize data into five distinct categories. The colors and categories are automatically assigned by ArcGIS. For all other maps (domains, overall), the methodology used is standard deviation. NTAs significantly higher than the mean are colored dark blue and those significantly lower than the mean are colored dark brown.

Education

Summary:

Access to quality education and academic achievement are both fundamental to personal and professional development (D'Andrea, 2012). With its network of 1,800 schools, educating over one million students, the NYC Department of Education (DOE) attempts to "improve student achievement and ensure that every child graduates from high school prepared for college, a career, and a future as a productive, critically thinking adult" (New York City Department of Education, n.d.). As middle and high school students in New York City do not necessarily attend an institution within their respective neighborhood, our research focused on pre-school programs, elementary schools, and levels of higher education in a community. We have analyzed three indicators that, according to an extensive literature review, adequately capture education as a predictor of well-being.[2]

The largest challenge confronted in the education domain was reconciling data that had been reported or gathered at differing geographic levels or political units. For example, school zones needed to be matched with corresponding Census tracts and aggregated into NTAs (see the methodology section for more information on this process). New York City is divided into school districts, and districts are divided into zones; each school falls within a particular zone. Every child residing in a particular zone is guaranteed a seat in a public school. Thus, despite the fact that zones did not aggregate neatly into NTAs, a good school in a particular NTA acts as an asset by making the area attractive for families, driving up real estate rates, and bringing other additional benefits (Tiebout, 1956).

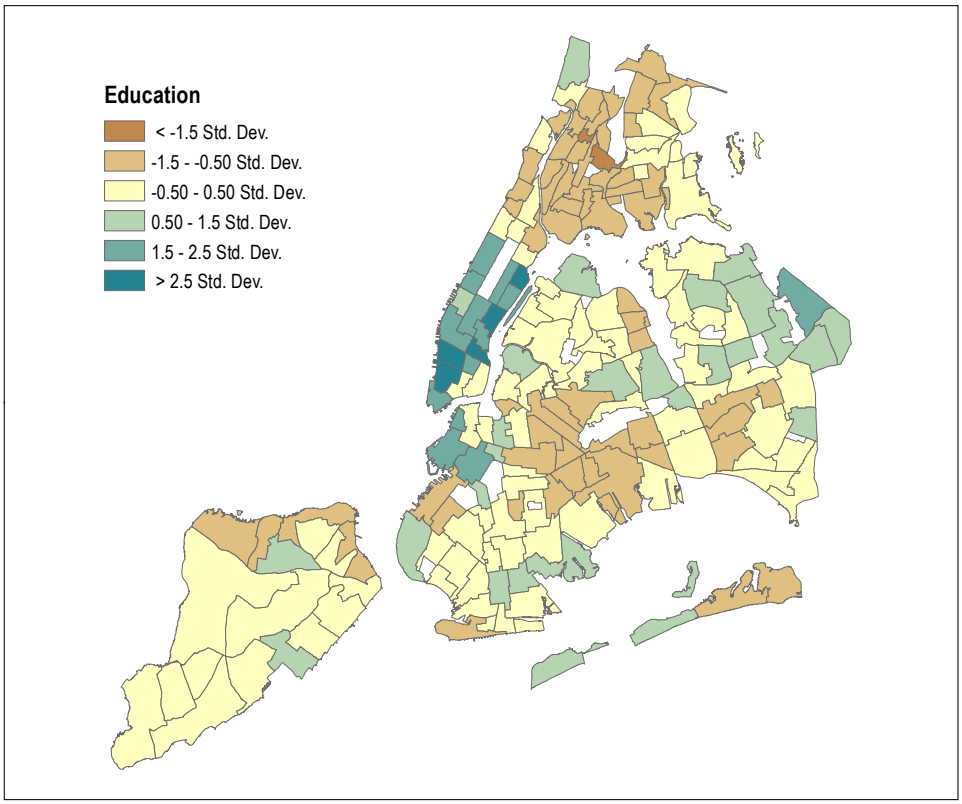


Figure 6: Map of Education Ranking by Neighborhood

[2] The Measure of America. (2010 "Methodological Notes," http://www.measureofamerica.org/wp-content/up- loads/2010/11/The-Measure-of-America-2010-2011-Methodological-Notes.pdf and OECD - Better Life Index 2014 - Education

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
1. Brooklyn Heights-Cobble Hill 2. Carroll Gardens-Columbia Street-Red Hook 3. Park Slope-Gowanus 4. Prospect Heights 5. Greenpoint 6. North Riverdale-Fieldston-Riverdale 7. Upper West Side 8. Hudson Yards-Chelsea-Flat Iron-Union Square 9. Lincoln Square 10. Clinton 11. Midtown-Midtown South 12. Turtle Bay-East Midtown 13. Murray Hill-Kips Bay 14. Gramercy 15. East Village 16. West Village 17. SoHo-TriBeCa-Civic Center-Little Italy 18. Battery Park City-3er Manhattan 19. Lenox Hill-Roosevelt Island 20. Yorkville 21. Upper East Side-Carnegie Hill 22. Stuyvesant Town-Cooper Village 23. Forest Hills 24. Fresh Meadows-Utopia 25. Oakland Gardens 26. Glen Oaks-Floral Park-New Hyde Park 27. Douglas Manor-Douglaston-Little Neck 28. Bayside-Bayside Hills 29. Ft. Totten-Bay Terrace-Clearview	1. Seagate-Coney Island 2. Williamsburg 3. Brownsville 4. East New York 5. East New York (Pennsylvania Ave) 6. Claremont-Bathgate 7. Bedford Park-Fordham North 8. Belmont 9. West Farms-Bronx River 10. Soundview-Castle Hill-Clason Point-Harding Park 11. East Concourse-Concourse Village 12. East Tremont 13. Highbridge 14. Hunts Point 15. Longwood 16. Melrose South-Mott Haven North 17. Mott Haven-Port Morris 18. Fordham South 19. Mount Hope 20. Soundview-Bruckner 21. West Concourse 22. Crotona Park East 23. South Jamaica 24. Hammels-Arverne-Edgemere 25. North Corona 26. Mariner's Harbor-Arlington-Port Ivory-Graniteville 27. Port Richmond

Table 2: Neighborhoods with the highest and lowest Education Rankings

Education Indicators:

1. Percent enrolled in preschool

- **Definition**: The percentage of children aged three and four enrolled in public or private nursery school, preschool, or kindergarten
- **Reasoning:** Early childhood education and care represent the years before more formal schooling (K-12) begins. Its inclusion acknowledges the vast research showing the developmental importance of these early years, with respect not only to education, but also to health (Daniel & Clyde, 1999). The inclusion of early childhood education is intended to promote a lifespan developmental perspective on education (Richard & Douglas, 2001), rather than reinforcing the political-institutional separation of developmental and educational matters pertaining to the early years (0-5 years of age) and educational matters pertaining to the K-12 system (5-17 years) (Martin, Gadermann, & Zumbo, 2010). Expanding pre-kindergarten (pre-K) to all children in NYC has been a major focus for Mayor Bill de Blasio (Office of the Mayor, 2014). The initiative began last September with enrollment of more than 53,604 four-year-olds in full-day pre-K programs and aims to reach all 73,250 children who would need it in 2015-16.[3] Given the lag time in our data, policy changes will not be immediately reflected in the analysis.

[3] Figures are based on the number of children enrolled in district and charter school kindergarten (81,748), minus the estimated number of children who will require full-day pre-K in a non-public setting (8,498), as documented on his/her individualized education program (IEP). The DOE will adjust these figures and programming as necessary over time to ensure that all children receive appropriate services.

- **Data Format & Source**: American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract level
- **Methodology**: ACS data was used to estimate the percentage of children enrolled in pre-K, due to unavailability of NYC DOE data. Currently, the DOE only has the number of students enrolled in public school nursery programs, which excludes those enrolled in private schools or not-for-profit nursery school programs. The figure from ACS includes all types of nursery school programs. It is also difficult to obtain the denominator, the number of children in any particular area that are eligible for pre-K, since it could include children as young as three-years-old and as old as five-years-old. To make sure that the numbers adequately approximated the actual percentage, the chosen denominator was the age group of three- and four-year-olds obtained from the ACS data and the numerator was the total enrolled in preschools or nursery schools.
- **Reasoning**

  Preschool enrollment rates across neighborhoods have a normal distribution. The mean rate of enrollment is 62%.

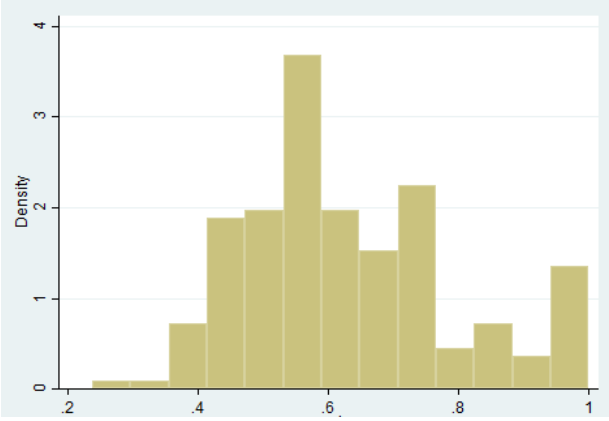


Figure 7: Histogram - Percent Enrolled in Pre-K

The NTAs with the lowest preschool enrollment rates are

1. Fordham South, BX, 24%
2. Ridgewood Heights, QN, 34%
3. Annadale-Huguenot-Prince's Bay- Eltingville, SI, 36%
4. Brighton Beach, BK,38%
5. Sheepshead-Bay-Gerritsen Beach- MN, 39%

The NTAs with the highest enrollment rates are:

1. Springfield Gardens North, QN, 100%
2. Stuyvesant Town-Cooper Village, MN, 100%
3. Upper East Side-Carnegie Hall, MN, 100%
4. Yorkville, MN, 100%
5. SoHo-TriBeCa-Civic-Centre-Little Italy, MN, 100%

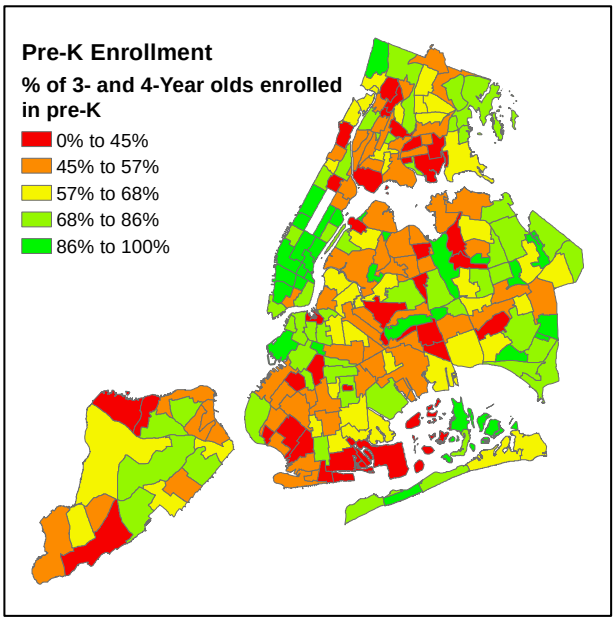


Figure 8: Percent Enrolled in Pre-K by Neighborhood

2. Percent of population with a Bachelor's degree or higher

- **Definition:** The percentage of population with a bachelor degree or higher.
- **Reasoning:** The average years of schooling is a useful indicator for understanding the educational status of a community/area and gives an idea of the average level of skills possessed by people in the area. Highly educated individuals are less affected by unemployment, typically because educational attainment makes an individual more attractive in the workforce (OECD, 2011). Since the average "years of education" is not a readily available statistic at the community level, the percent of population with a Bachelor's degree is used as a proxy.
- **Data Format & Source:** American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract Level

- **Methodology:** ACS survey estimate for people above age 25 with a Bachelor's Degree or higher aggregated to NTA level from Census tracts over the total population aged 25 and above.
- **Results:**
  The median percent of residents with Bachelor's degrees by NTA is 17%. Three quarters of NTAs have bachelor degree percentages of less than 25%.

The NTAs with the lowest percentage of college graduates are:

1. Williamsburg, BK, 4%
2. Longwood, BX, 5%
3. Belmont, BX, 6%
4. North Corona, QN, 6%
5. Claremont-Bathgate, BX, 6%

The NTAs with the highest percentage of college graduates are:

1. West Village, MN, 45%
2. Gramercy, MN, 44%
3. Murray Hill-Kips Bay, MN, 43%
4. Turtle Bay-East Midtown, MN, 43%
5. Battery Park City-Lower Manhattan, 43%

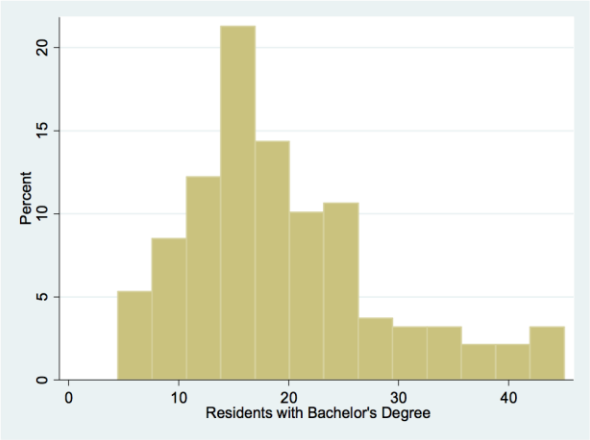


Figure 9: Histogram - Percentage of Population with Bachelor's Degree

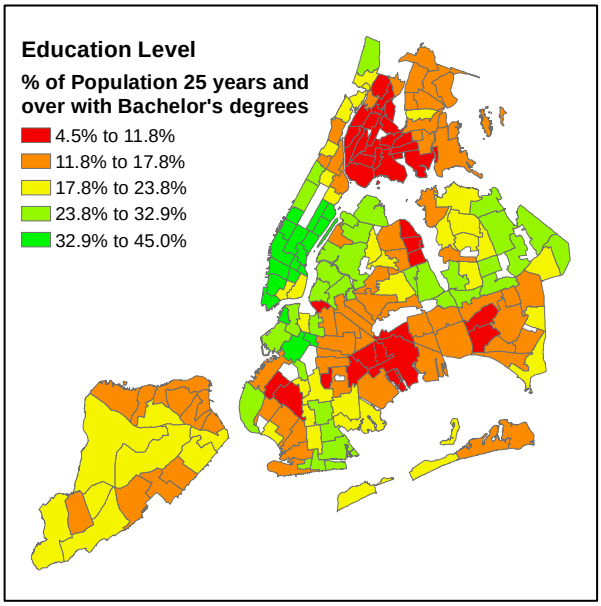


Figure 10: Percentage of Population with Bachelor's Degree by Neighborhood

3. Percent of students proficient in English and Math

- **Definition:** In New York, every public school student enrolled in grades three to eight must take an annual standardized exam offered by the New York State Education Department (The State Department of Education, 2015). Student scores are grouped according to their performance levels: Level One to Level Five. Students that score a level three or above have skills that at least "partially meet Common Core expectations (required for current Regents Diploma purposes)".[4] This proficiency standard was used to calculate the quality of schools in different communities. Specifically, the percent of students in third, fourth and fifth grades that meet proficiency standards for ELA and Math were deemed proficient. The denominator for the calculation was the number of third, fourth and fifth grade students that took the test. The grade range was not extended above the fifth grade in this analysis, because middle school and high school admissions are competitive in New York City, which means students do not necessarily attend the school in their neighborhood.

[4]EngageNY.org is developed and maintained by the New York State Education Department (NYSED) to support the implementation of key aspects of the New York State Board of Regents Reform Agenda.https://www.engageny.org/resource/english-language-arts-performance-level-descriptions

- **Reasoning:** Percentage of students performing at certain level is commonly used as a good indicator for determining quality of education. The report cards issued by the DOE also use this indicator. Furthermore, other well-being indices also use similar indicators.[5]
- **Data Format & Source:** Department of Education (DOE), 2013-2014 - Collected at School level
- **Methodology:** For each school, the number of general education students in grades three to five that took the state test were identified, using data from the DOE. Thereafter, the number of students that are proficient in math and English (Levels Three and Four) were isolated. Since the number of students that are proficient in Math and English will be different, the two values were combined and divided by total number of students that took the test. Data from DOE are available at the school level, school district, or borough level. School district boundaries do not match the community district or NTA boundaries. We assume that each NTA has a neighborhood school that students from that NTA attend. However, this assumption is problematic. As the data shows, there are no schools located in three NTAs. Midtown South and Stuyvesant Town are part of the large midtown Manhattan school district so students can attend any school in that area. The third NTA without data is Auburndale, which only has one elementary school and it is reserved for gifted students. As a result, these three NTAs have a score in the education domain that depends only on pre-school enrollment rates and percentage of BA graduates.

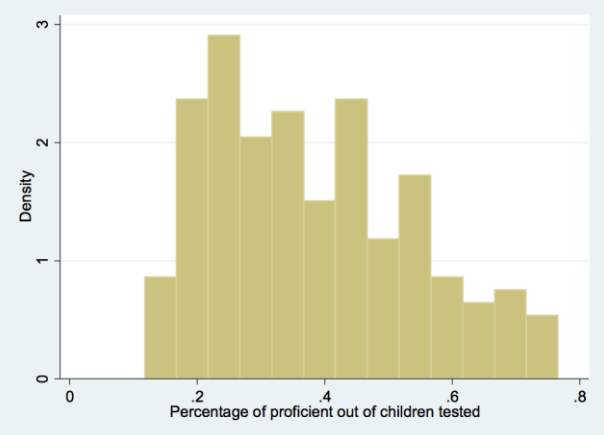


Figure 11: Histogram - English and Math Proficiency

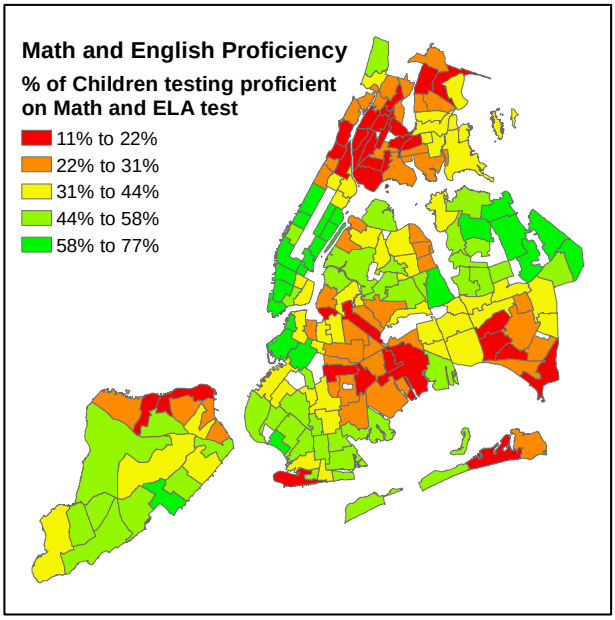


Figure 12: English and Math Proficiency by neighborhood

- **Results:**

  The results show a skewed distribution with a mean of 38% and a median of 34%.

  The NTAs with the lowest percentage of proficient students are:

  1. East Tremont, BX
  2. Hammels-Arverne-Edgemere, QN
  3. Fordham South, BX
  4. Mount Hope, BX
  5. Springfield Gardens North, QN

  The NTAs with the highest percentage of proficient students are:

  1. Turtle Bay-East Midtown, MN
  2. Oakland Gardens, QN
  3. Bayside-Bayside Hills, QN
  4. Gramercy, MN
  5. West Village, MN

[5] DataHaven is a non-profit 501(c)3 organization with a 22-year history of public service to Greater New Haven and Connecticut. Our mission is to improve quality of life by collecting, sharing, and interpreting public data for effective decision making. http://www.ctdatahaven.org/dbt/indicators.php?topic=4

Health & Well-Being

Summary:

Health—both physical and mental—is fundamental to the concept of well-being; good health correlates closely with higher levels of life satisfaction (Peasgood & White, 2008). The World Health Organization definition of health, rather than being limited to the absence of disease or infirmity, considers physical, mental and social well-being as the main components of a state of health (World Health Organization, 1946). Furthermore, a measurement of health can serve as a proxy for other contributors to well-being—such as air quality, nutrition, and others—as these factors have a direct impact on the physical and mental health of individuals and communities.

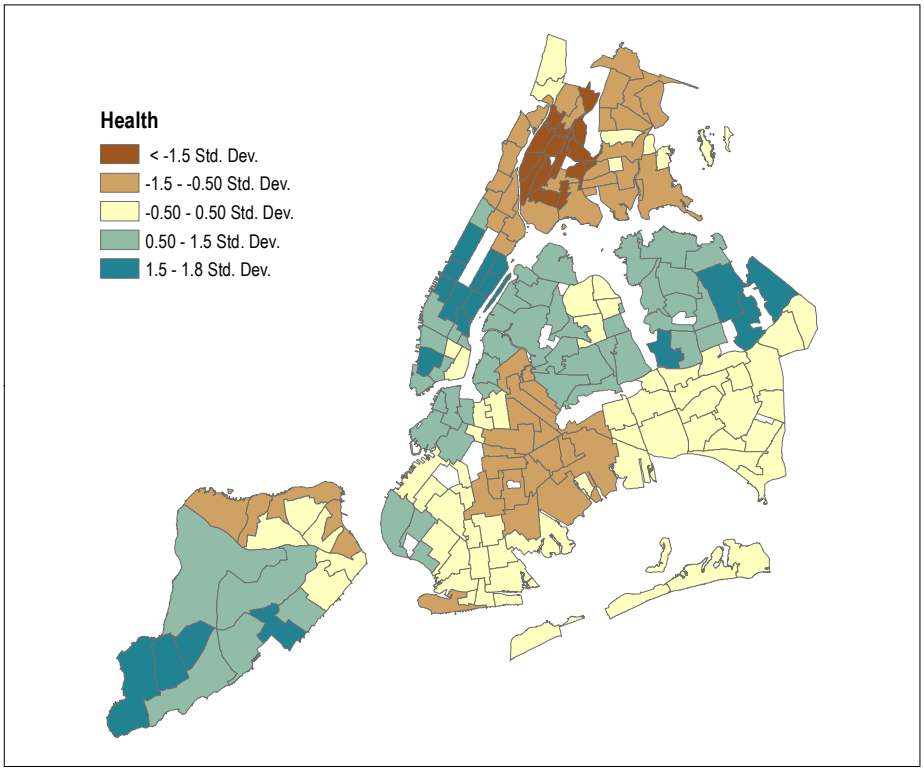


Figure 13: Map of Health and Well-Being by Neighborhood

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
1. Upper West Side 2. Charleston-Richmond Valley-Tottenville 3. Oakwood-Oakwood Beach 4. Arden Heights 5. Rossville-Woodrow 6. Yorkville 7. Kew Gardens Hills 8. Turtle Bay-East Midtown 9. Murray Hill-Kips Bay 10. SoHo-TriBeCa-Civic Center-Little Italy 11. Midtown-Midtown South 12. Clinton 13. Bayside-Bayside Hills 14. Lincoln Square 15. Lenox Hill-Roosevelt Island 16. Upper East Side-Carnegie Hill 17. Douglas Manor-Douglaston-Little Neck 18. Gardens	1. Highbridge 2. University Heights-Morris Heights 3. Crotona Park East 4. Norwood 5. East Tremont 6. Kingsbridge Heights 7. East Concourse-Concourse Village 8. Fordham South 9. Melrose South-Mott Haven North 10. West Concourse 11. Mount Hope 12. Belmont 13. Longwood

Table 3: Neighborhoods with the highest and lowest Health rankings

Health & Well-Being Indicators:

1. Asthma - Composite

- **Definition:** This composite indicator measures self-reported asthma (percentage of population that reports having ever been told they have asthma by a doctor, nurse or other health professional), as well as asthma-related emergency department visits attributable to poor outdoor air quality for children and for adults (rate of PM2.5-Attributable Asthma Emergency Department Visits for children and rate of PM2.5-Attributable Asthma Emergency Department Visits for adults).
- **Reasoning:** We used a composite measure in order to capture both asthma rates and the effect of neighborhood air quality on health. Among children, asthma is the most common chronic disease and a leading cause of school absenteeism and hospitalization (American Lung Association, 2014). The main causes of asthma—namely tobacco smoke, outdoor air quality, dust mites, cockroaches, mold, and stress—not only trigger potentially life-threatening symptoms, but they are indicative of overall quality of life (Centers for Disease Control and Prevention, 2012 & Chen and Miller, 2007). In our factor analysis, presence of cockroaches and mice is correlated with asthma rates, but not to a significant enough degree. Therefore we decided to eliminate these indicators of indoor air quality. It had also been suggested that we include measures of average particulate matter (air quality) within the health domain, as well as neighborhood walkability. However, these indicators weakened our overall factor analysis—the high degree of correlation between the variables skews the directionality of their relationship, because the walkability rating does not control for pollution. Furthermore, pollution is highly associated with density (higher density equals higher pollution, and density is highly associated with walkability). This confounding led us to eliminate the average particulate matter variable from our analysis (see Health Survey Factor Analysis in annex). According to the U.S. Environmental Protection Agency, the health effects of outdoor air quality are most notable in asthma rates, causing higher rates of onset and aggravation of the condition (Office of Transportation and Air Quality , n.d). The composite asthma indicator serves as a proxy for outdoor air quality by taking into account the health effects of neighborhood air pollution.

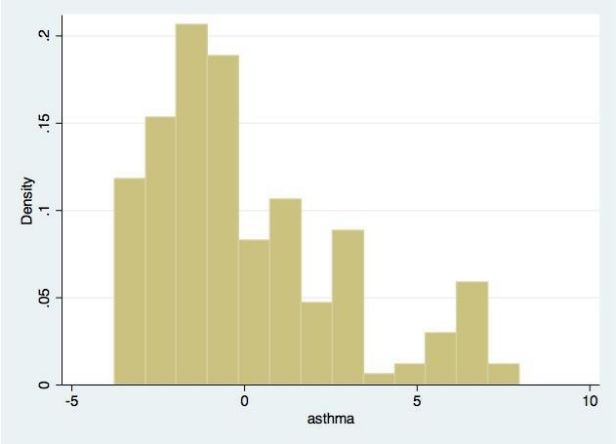


Figure 14:Histogram - Asthma Composite Indicator

- **Data Format & Source:** New York City Community Health Survey (NYC CHS), 2013 – Collected at United Hospital Fund (UHF) level
- **Methodology:** Data on self-reported “asthma ever” is based on the asthma questions included in the New York City Community Health Survey. The survey asks participants, “Have you ever been told by a doctor, nurse or other health professional that you had asthma?” In order to reflect the importance of air quality as a predictor of asthma hospitalizations, we have created a composite asthma indicator that includes the report of “asthma ever”, as well as asthma hospitalization rates attributable to outdoor air quality (average content of particulate matter in the air) for children and adults, as reported on the NYC Environment and Health Data Portal. Each of

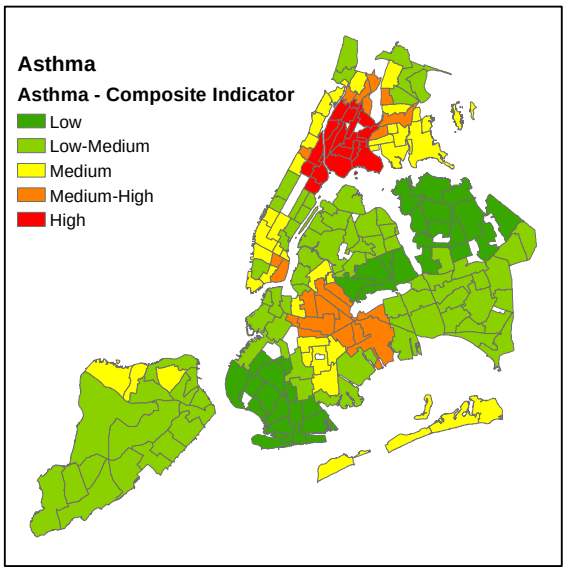


Figure 15: Asthma by Neighborhood

these three variables (asthma ever, child ED visits, and adult ED visits) was weighted equally to provide a single score for asthma using a z-score conversion of the aggregated data.

- **Results:** The results, as indicated by the distribution of the z-scores show a skewed distribution of asthma related indicators with a mean of 0. This scaling is necessary due to the composite nature of the indicator.

The NTAs with the lowest rates of asthma ever and PM2.5-Attributable Asthma Emergency Department Visits according to the composite indicator are:

1. Bath Beach, BK
2. Bay Ridge, BK
3. Flushing, QN
4. College Point, QN
5. Ft. Totten-Bay Terrace-Clearview, QN

The NTAs with the highest rates of asthma ever and PM2.5-Attributable Asthma Emergency Department Visits according to the composite indicator are:

1. East Harlem South, MN
2. East Harlem North, MN
3. Central Harlem North-Polo Grounds, MN
4. Central Harlem South, MN
5. Hunts Point, BX

2. Poor Health - Composite

- **Definition**: A composite indicator of the percentage of population that reports having ever been diagnosed with diabetes, percentage of population that reports having ever been diagnosed with hypertension, and the percentage of the population that is obese (based on self-reported height and weight).
- **Reasoning:** We decided to use a composite indicator to reflect the distribution of chronic disease burden across the population of New York City. Hypertension, diabetes, and obesity are highly correlated variables within our analysis. By combining obesity rates, diabetes rates, and high blood pressure rates, we have designed an indicator that describes the quality of physical health of neighborhood residents, Hypertension is the leading cause of chronic disease and premature death among adults in the United States and correlated with lower socio-economic status (Fan, Strasser, Zhang, Fang, & Crawford, 2015). Diabetes is a chronic condition that disproportionately affects poor and minority populations in the United States and requires constant and costly maintenance (Hipp & Chalise, 2015 & Seuring Archangelidi, Suhrcke, 2015). Obesity is a growing public health issue, a risk factor for a multitude of other health conditions – including coronary heart disease, stroke, type 2 diabetes, metabolic syndrome, cancer and others – (National Heart, Lung, Blood Association, n.d.) and has been correlated with lower social wellbeing in other studies (Riffken, n.d.).

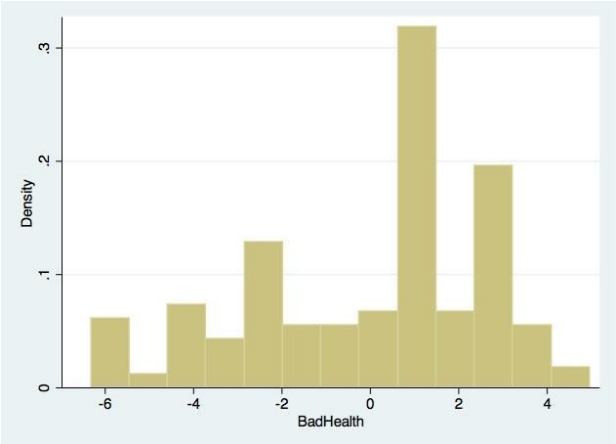


Figure 16: Histogram - Population Diagnosed with Hypertension, Diabetes, and Obesity

- **Data Format & Source:** New York City Community Health Survey (NYC CHS), 2013 – Collected at United Hospital Fund (UHF) level
- **Methodology:** Data is based on the questions included in the New York City Community Health Survey. The survey asks participants, "Have you ever been told by a doctor, nurse or other health professional that you have diabetes?", "Have you ever been told by a doctor, nurse or other health professional that you have hypertension, also called high blood pressure?," and calculates the percentage of the population with a BMI of 30 or more, based on self-

reported weight and height. The percentages of each of these three conditions were weighted equally to determine the composite "poor health" score, which is the z-score of the aggregated data.

- **Results:**
  The results show a normal distribution with a mean of 0. NTAs that scored below other NTAs receive a negative z-score and NTAs scoring above the mean receive a positive z-score.

  The NTAs with the worst health ratings according to the composite indicator are:
  1. Starrett City, BK
  2. Georgetown-Marine Park-Bergen Beach-Mill Basin, BK
  3. Canarsie, BK
  4. Westchester-Unionport, BX
  5. Soundview-Bruckner, BX

  The NTAs with the best health ratings according to the composite indicator are:
  1. Turtle Bay-East Midtown, MN
  2. Murray Hill-Kips Bay, MN
  3. Lenox Hill-Roosevelt Island, MN
  4. Yorkville, MN
  5. Upper East Side-Carnegie Hill, MN

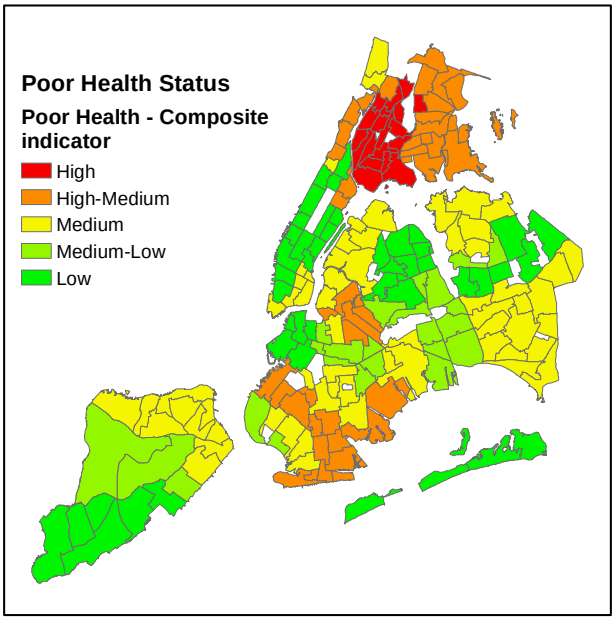


Figure 17: Diagnoses of Hypertension, Diabetes, and Obesity by Neighborhood

3. Self-Reported Health Status

- **Definition**: A composite indicator reflecting self-reported health status.
- **Reasoning:** This indicator provides a useful reflection of subjective well-being with regard to general health status and community context (Banjeree et. Al, 2010). Though this measure may not provide an accurate measure of "true" health status, it demonstrates perceived health status. Some studies have shown that self-reported health status serves as an independent predictor of subsequent mortality (Dowd & Zajacova, 2007).
- **Data Format & Source:** New York City Community Health Survey (NYC CHS), 2013 – Collected at United Hospital Fund (UHF) level
- **Methodology:** Data is based on the questions included in the New York City Community Health Survey. The survey asks participants, "Would you say in general that your health is excellent, very good, good, fair or poor?" Answers to this question were grouped into four categories in the survey results: "excellent," "very good," "good," and "fair / poor." The composite score was determined by weighting each of the general health status categories—so that a higher score correlates to better self-reported health—and averaging the percentages reporting their health in each of the categories: health status = ((poor for fair health * 1) + (good health * 2) + (very good health * 3) + (excellent health * 4) / 4).
- **Results:**
  The results show a normal distribution of the aggregated score for health status based on responses from the survey.

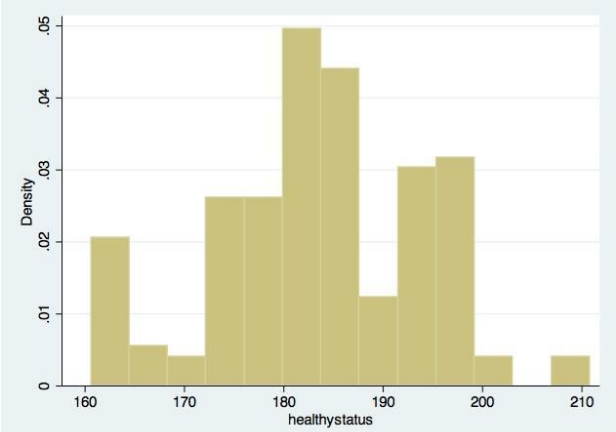


Figure 18: Histogram - Self-reported Health Status

The NTAs with the lowest self-reported health according to the composite indicator are:

1. Claremont-Bathgate, BX
2. East Concourse-Concourse Village, BX
3. East Tremont, BX
4. Highbridge, BX
5. Hunts Point, BX

The NTAs with the highest self-reported health according to the composite indicator are:

1. Clinton, MN
2. Midtown-Midtown South, MN
3. Hudson Yards-Chelsea-Flat Iron-Union Square, MN
4. SoHo-TriBeCa-Civic Center-Little Italy, MN
5. West Village, MN

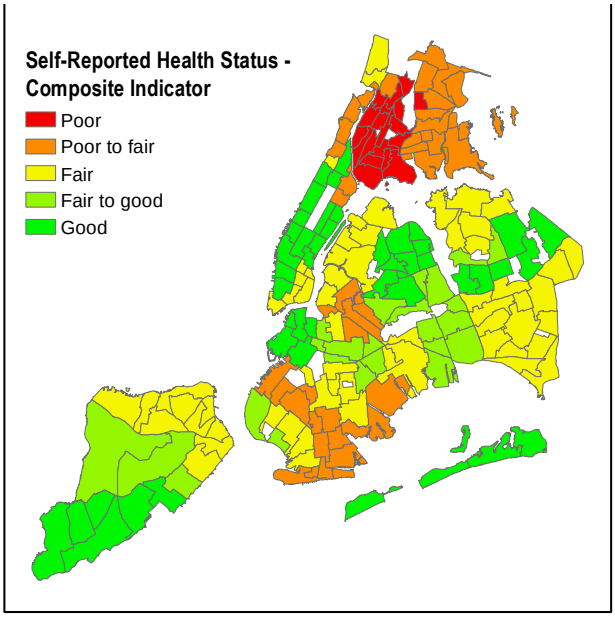


Figure 19: Map of Self-reported Health Status

4. Healthy Eating Habits

- **Definition**: A composite indicator reflecting the number of fruits or vegetables consumed on average.
- **Reasoning:** The U.S. dietary guidelines recommend intake of at least two and a half cups of fruits and/or vegetables each day. The 2010 Dietary Guidelines for Americans explains that a diet that includes this level of fruit and vegetable intake "is associated with a reduced risk of cardiovascular disease, including heart attack and stroke."[6] Nonetheless, consumption of fruits and vegetables varies greatly by race/ethnicity and income level, with subsequent effects on health status in the form of cardiovascular disease, obesity, diabetes, and other health conditions. This reflects variance in health knowledge, beliefs, and behaviors, as well as healthy food access and other aspects of the built environment and cultural context (Dubowitz et. al., 2008).
- **Data Format & Source:** New York City Community Health Survey (NYC CHS), 2013 – Collected at United Hospital Fund (UHF) level
- **Methodology:** Data is based on the questions included in the New York City Community Health Survey. The survey asks participants, "How many total servings of fruits and/or vegetables did you eat yesterday? A serving would equal one medium apple, a handful of broccoli, or a cup of carrots." Answers to this question were grouped into three categories in the survey results: "none" (which we have called "no fruit"), "1-4" (which we have called "some fruit"), and "5 or more" (which we have called "five fruit"). The composite score was determined by weighting each of the categories of self-reported number of servings of fruits and/or vegetables eaten on the previous day—so that a higher score correlates to higher intake of healthy foods—and averaging the percentages reporting their fruit and vegetable intake in each of the categories: healthy eating habits = ((no fruit * 1) + (some fruit * 2) + (five fruit * 3) / 3). The distribution of the results of this calculation is shown above.
- **Results:**

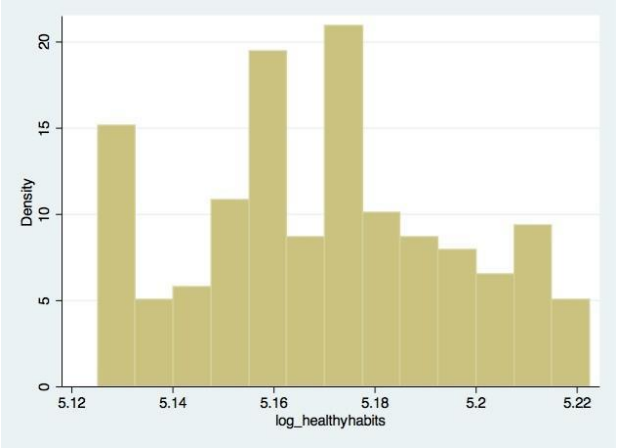


Figure 20: Histogram - Average Fruit & Vegetable Consumption

[6] U.S. Department of Agriculture and U.S. Department of Health and Human Services. Dietary Guidelines for Americans, 2010. 7th Edition, Washington, DC: U.S. Government Printing Office, December 2010.

The data for healthy habits shows a similar trend to those of other health indicators: Areas in the South Bronx experience lower rates of healthy food intake.
Note that areas in red (Far Rockaway) are missing data.
NTAs with the lowest rates of healthy food intake according to the composite indicator are:

1. Claremont-Bathgate, BX
2. East Concourse-Concourse Village, BX
3. East Tremont, BX
4. Highbridge, BX
5. Hunts Point, BX

The NTAs with the highest rates of healthy food intake (with 1 being the greatest intake of fruits/veg) according to the composite indicator are:

1. Laurelton, QN
2. Rosedale, QN
3. Bellerose, QN
4. Glen Oaks-Floral Park-New Hyde Park, QN
5. Cambria Heights, QN

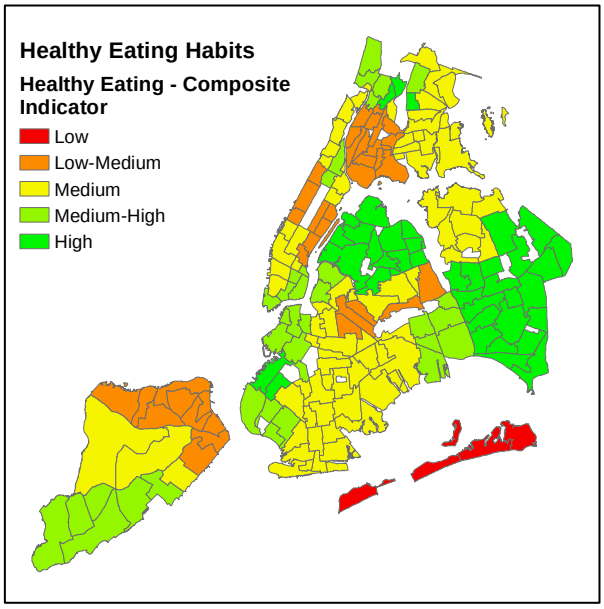


Figure 21: Average Fruit & Vegetable Consumption by Neighborhood

5. Teen Pregnancy Rate

- **Definition:** Number of births per 1,000 women aged 15-19
- **Reasoning:** Data on teen pregnancy in the United States reflects racial and ethnic and income disparities. Teen pregnancy is more likely where neighborhood disadvantage (poverty, unemployment, single parent households, etc.) is concentrated (Carlson et. al, 2014). Furthermore, negative socioeconomic consequences of early motherhood have been shown to persist for mothers and children, reducing educational and employment opportunities and resulting in lifetime disadvantage (Assini-Melvin & Green, 2015).
- **Data Format & Source:** American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** The teen birth rate was obtained by dividing the number of births to women aged 15 to 19 by the number of women aged 15 to 19 multiplied by 1,000 in each of the census tracts.
- **Results:** Most NTAs had a rate of close to zero teen pregnancies per 1000 live births.

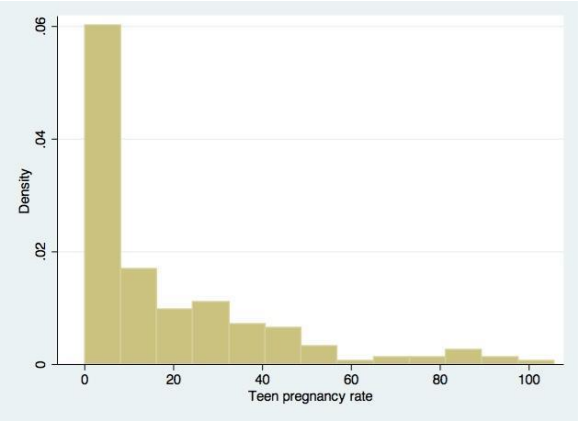


Figure 22: Histogram - Teen Pregnancy Rate

The NTAs with the highest rates of teen pregnancy are:

1. Stapleton-Rosebank, SI
2. Erasmus, BK
3. Seagate-Coney Island, BK
4. East Williamsburg, BK
5. Kingsbridge Heights, BX

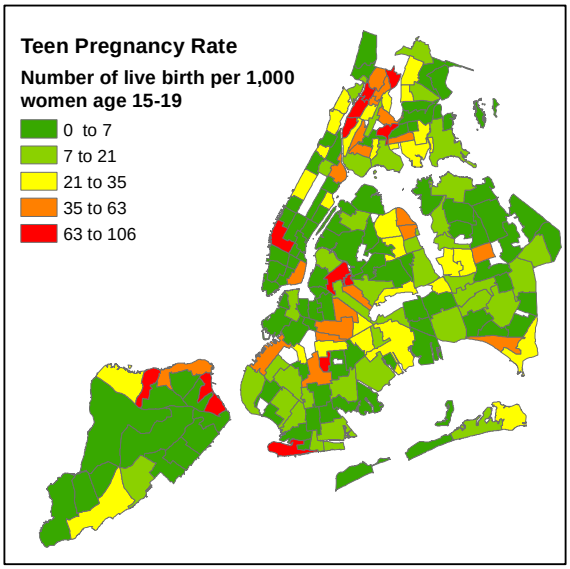


Figure 23: Teen Pregnancy Rate by Neighborhood

The NTAs with the lowest rates of teen pregnancy are:

1. New Springville-Bloomfield-Travis, SI
2. Williamsburg, BK
3. East Harlem South, MN
4. Park Slope-Gowanus, BK
5. Baisley Park, QN

6. Low birth weight

- **Definition**: Percent of live births that weigh less than 2,500 grams (5.5 pounds)
- **Reasoning**: Babies born with a low birth weight have a high probability of experiencing developmental problems and short- and long-term disabilities and are at greater risk of dying within the first year of life. Smoking, poor nutrition, poverty, stress, infections, and violence can increase the risk of a baby being born with a low birth weight. This indicator, therefore, captures information about reproductive health, antenatal care, and life course wellbeing issues for both mother and child.
- **Data Format & Source**: New York City Community Health Survey (NYC CHS), 2013 – Collected at United Hospital Fund (UHF) level
- **Methodology**: The percent of low birthweight births is calculated by dividing the number of low birthweight births (under 5.5lbs) by the total number of live births.
- **Results:**
  The NTAs with the lowest rates of low birth weight are:
  1. Greenpoint, BK
  2. North Side-South Side, BK
  3. Flushing, QN
  4. College Point, QN
  5. Ft. Totten-Bay Terrace-Clearview, QN

The NTAs with the highest rates of low birth weight (with 1 being the highest rate) are:

1. Port Richmond, SI
2. Mariner's Harbor-Arlington-Port Ivory-Graniteville, SI
3. Woodlawn-Wakefield, BX
4. Allerton-Pelham Gardens, BX
5. Co-op City, BX

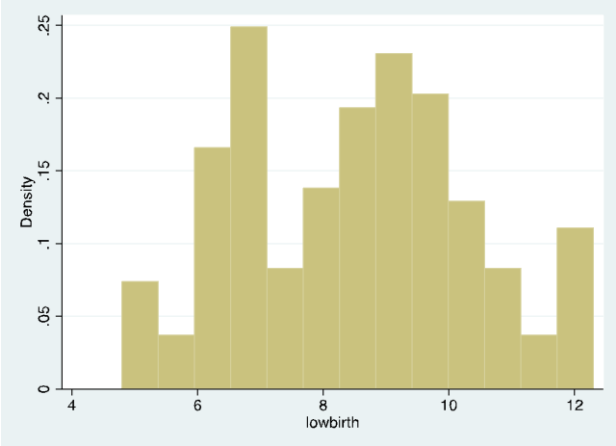


Figure 24: Histogram – Percentage of Children born with Low Birthweight

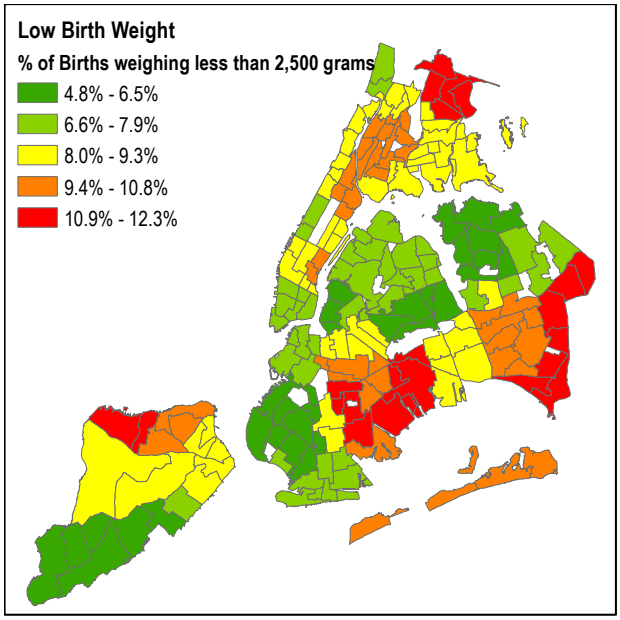


Figure 25: Map of Percentage of Children Born with Low Birthweight

7. Insurance Coverage

- **Definition**: Percentage of the population that reports having health insurance, defined by the ACS as[7]:
    - Private health insurance (a plan provided through an employer or union, a plan purchased by an individual from an insurance company, or TRICARE / other military health coverage).
        - Employer-based health insurance (coverage offered through one's own or a relative's current, or former, employer or union).
        - Direct-purchase health coverage (purchased directly from an insurance company by an individual or an individual's relative).
        - TRICARE or other military health coverage (offered through health care programs for active-duty military personnel and retired members of the uniformed services, and their families and survivors).
    - Public coverage includes the federal programs Medicare, Medicaid and other medical assistance programs, VA Health Care, the Children's Health Insurance Program (CHIP), and individual state health plans.
        - Medicare is a Federal program which helps pay health care costs for people age 65 older, and for certain people under age 65 with long-term disabilities.
        - Means-tested health care:
            - Medicaid or Medical Assistance is any kind of government-assistance plan for those with low incomes or a disability.
            - Children's Health Insurance Program (CHIP) is a state-level program providing health care to low-income children whose parents do not qualify for Medicaid.*
            - State-specific plans: Some states have their own health insurance programs for low-income, or for high-risk, uninsured individuals. These health plans may be known by different names in different states.*
        - VA Health Care is a Department of Veterans Affairs program that provides medical assistance to eligible veterans. Those who have ever used or enrolled in VA Health Care are considered covered to have VA coverage.

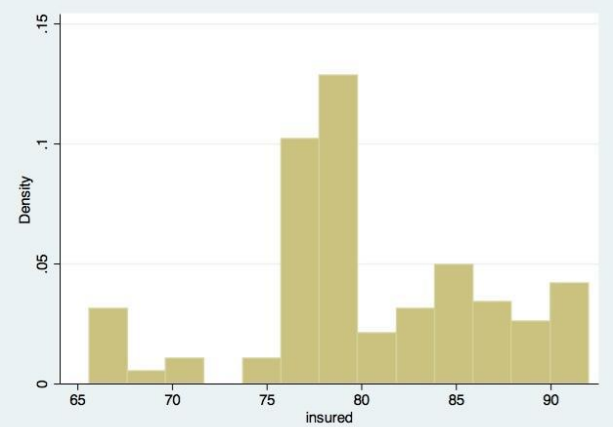


Figure 26: Histogram - Percentage of the Population with Health Insurance

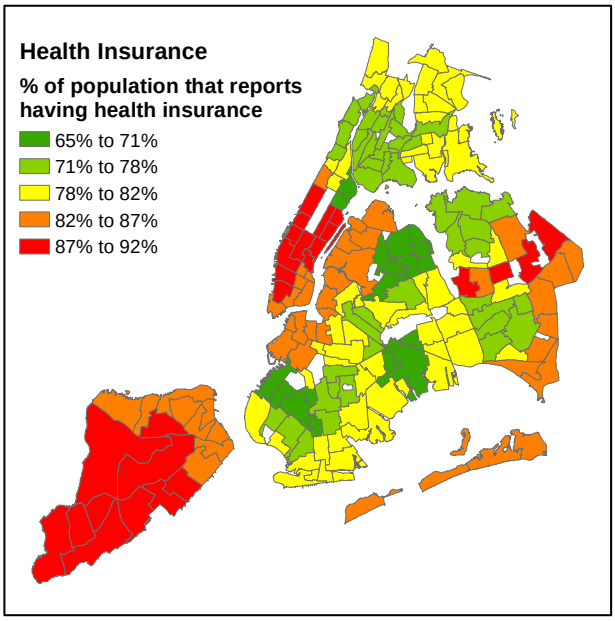


Figure 27: Percentage of Population with Health Insurance by Neighborhood

- **Reasoning:** To assess access to care for the New

[7] * The ACS questionnaire does not specifically ask about these types of coverage, but respondents who indicate these types of coverage are counted as having public coverage.
http://www.census.gov/hhes/www/hlthins/methodology/definitions/acs.html

York City population and track changes in access to care over time. Historically, access to health care has been largely determined by whether or not an individual possesses health insurance coverage and has varied based on race, ethnicity, socioeconomic status, age, sex, disability status, sexual orientation, and residence location.

- **Data Format & Source:** American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** Data is based on insurance questions included in the American Community Survey. The ACS collects and produces population and housing information every year instead of every ten years. Collecting data every year provides more up-to-date information throughout the decade about the U.S. population at the local community level. About 3.5 million housing unit addresses are selected annually, across every county in the nation.
- **Results:**

  The NTAs with the lowest rates of health insurance coverage (all five have equally low rates of 66%) are:

  1. Corona, QN
  2. North Corona, QN
  3. East Elmhurst, QN
  4. Jackson Heights, QN

  The NTAs with the highest rates of health insurance coverage (all five have equally high rates of 92%) are:

  1. Great Kills, SI
  2. Arden Heights, SI
  3. Rossville-Woodrow, SI
  4. Oakwood-Oakwood Beach, SI
  5. Charleston-Richmond Valley-Tottenville, SI

8. Did Not Receive Medical Care

- **Definition:** Percentage of the population that reports not having received medical care when it was needed in the past twelve months**.**
- **Reasoning:** To assess the degree to which New Yorkers can access medical care when needed. Historically, access to care has varied on race, ethnicity, socioeconomic status, age, sex, disability status, sexual orientation, and residential location. If care is not received in times of need, health conditions can be exacerbated and lead to increased emergency room usage, hospitalization, and pre-mature death.
- **Data Format & Source:** New York City Community Health Survey (NYC CHS), 2013 – Collected at United Hospital Fund (UHF) level
- **Methodology:** Data based on a question included in the New York City Community Health Survey. The survey asks participants, "Was there a time in the past 12 months when you needed medical care but did not get it"? Answers to this question were grouped into four categories in the survey results: "yes," "no," "don't' know/not sure," and "refused to answer".
- **Results:**

  The NTAs with the lowest rates of people reportedly <u>not</u> receiving needed medical care are:

  1. Kew Gardens Hill, QN

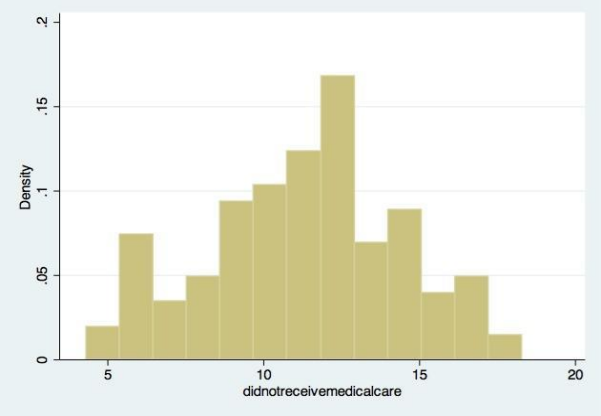


Figure 28: Histogram - Percentage of Population that did not receive Medical Care

2. Fresh Meadows-Utopia, QN
3. Oakland Gardens, QN
4. Douglas manor-Douglaston-Little Neck, QN
5. Upper West Side, MN

The NTAs with the highest rates of reportedly not receiving needed medical care are:

1. Norwood, BX
2. Bedford Park-Fordham North, BX
3. Bronxdale, BX
4. Kingsbridge Heights, BX
5. Van Cortlandt Village, BX

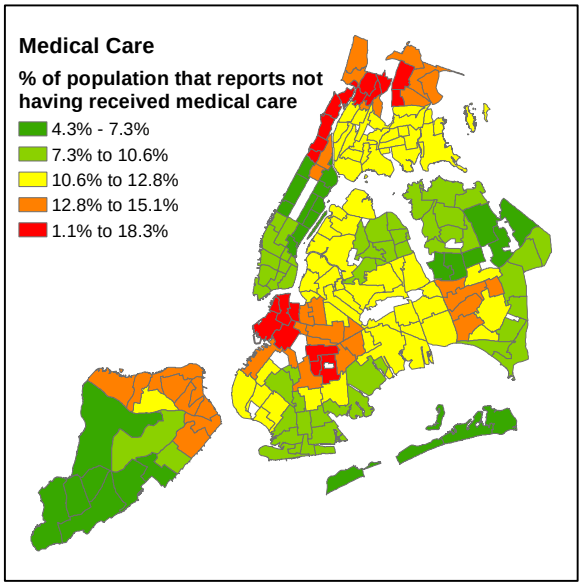


Figure 29: Percentage of Population that did not receive Medical Care

Economic Security & Mobility

Summary:

Although the idea of well-being emerges to complement the indicators based only on income, such as GDP, economic variables still play an important role in an individual's life satisfaction. All of the indices reviewed (including Canadian Index of Well-Being[8], The OECD Regional Well-Being[9], The Gallup-Healthways Index of Well-being[10], and The Greater New Haven Community Index[11]) consider economic indicators such as income, poverty, and employment as fundamental for the measurement of well-being. The OECD Better Life Index, one of the most comprehensive surveys on life satisfaction with more than 80,000 responses, considers income and employment as important dimensions.[12] In the case of United States, the more than 14,700 respondents of the Better Life Index consider income the main determinant of their well-being.

From the indices mentioned above, we identified two categories that are common across the methodologies: income level (or poverty) and employment. Other common categories among the indices are wealth and inequality. Unfortunately, in the case of wealth there is no available data at the local level. In the case of inequality, although there is information available, we considered that such a comparison within neighborhoods would not contribute to an appropriate analysis of well-being. It is also not clear whether more equality increases well-being, since an entire community could be equally poor.

[8] University of Waterloo (2011). *Living Standard: A report of the Canadian Index of Well-Being,* Ontario: University of Waterloo
[9] OECD. (2011). United States. Retrieved from OECD Regional Well-Being http://www.oecdregionalwellbeing.org/index.html
[10] Gallup-Healthways (2014). *State of Global Well-Being.* Franlyn, TN: Gallup-Healthways.
[11] DataHeaven (2013). *Greater New Heaven Community Index.* New Heaven, CT: Data Heaven.
[12] OECD. (2011). United States. Retrieved from The Better Life Index http://www.oecdbetterlifeindex.org/countries/united-states/..

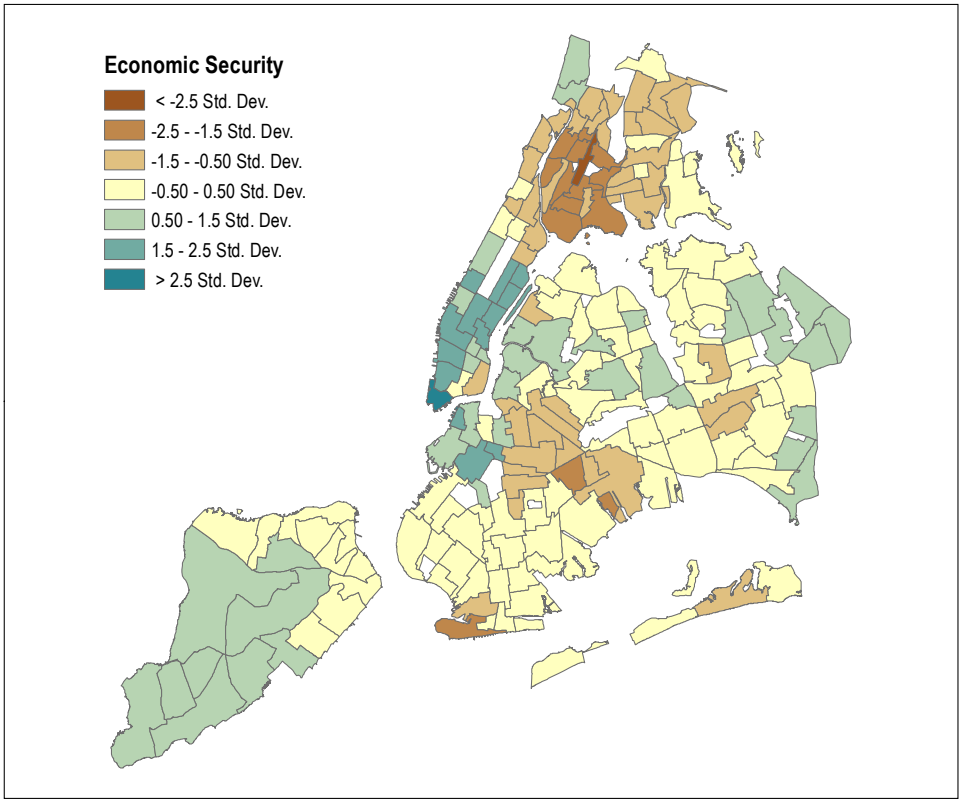


Figure 30: Map of Economic Security by Neighborhood

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
1. Battery Park City-Lower, MN 2. Upper East Side-Carnegie Hill, MN 3. Turtle Bay-East Midtown, MN 4. SoHo-TriBeCa-Civic Center-Little Italy, MN 5. West Village, MN 6. Park Slope-Gowanus, BK 7. Midtown-Midtown South, MN 8. Lincoln Square, MN 9. Murray Hill-Kips Bay, MN 10. Hudson Yards-Chelsea-Flat Iron-Union Square, MN 11. Lenox Hill-Roosevelt Island, MN 12. Prospect Heights, BK 13. Yorkville, MN 14. Brooklyn Heights-Cobble Hill, BK	1. Claremont-Bathgate, BX 2. Seagate-Coney Island, BX 3. Hunts Point, BX 4. East Tremont, BX 5. University Heights-Morris Heights, BX 6. Fordham South, BX 7. Melrose South-Mott Haven North, BX 8. Starrett City, BK 9. Highbridge, BX 10. Mott Haven-Port Morris, BX 11. Crotona Park East, BX 12. East Concourse-Concourse Village, BX 13. Morrisania-Melrose, BX 14. Brownsville, BK 15. Mount Hope, BX

Table 4: Neighborhoods with the highest and lowest Economic Safety Rankings

Economic Security & Mobility Indicators:

1. Median Household Income level

- **Definition**: Median household income, which considers the exact middle value of income (that which divides the distribution of households by income in two equal parts).
- **Reasoning:** Household surveys were specifically designed to monitor economic shifts experienced by individuals and families and to provide a comprehensive set of national data on the fluctuations in income of a typical family or individual over time. While average income is a convenient way to control for population

growth when tracking aggregate income, it has certain drawbacks. First, it is sensitive to extreme values. Unusually high or low income will have a large impact on the average income, which may not give accurate information about the change in income for a majority of families. The second disadvantage follows from this: average income does not give any information about the distribution of income. This is why median income becomes a useful measure. The median corresponds to the midpoint of the distribution. Hence, it is not affected by extreme values. Also, it can shed light on the distribution of income. If median income is lower than average income, the distribution is skewed to the left and vice-versa. In general, income distributions are skewed to the left, which means they are more concentrated at the low end. Thus, median income is generally lower than average income (University of Waterloo, 2011).

- **Data Format & Source:** American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** The ACS collects and produces population and housing information every year instead of every ten years. Collecting data every year provides more up-to-date information throughout the decade about the U.S. population at the local community level. About 3.5 million housing unit addresses are selected annually, across every county in the nation.
- **Results:**

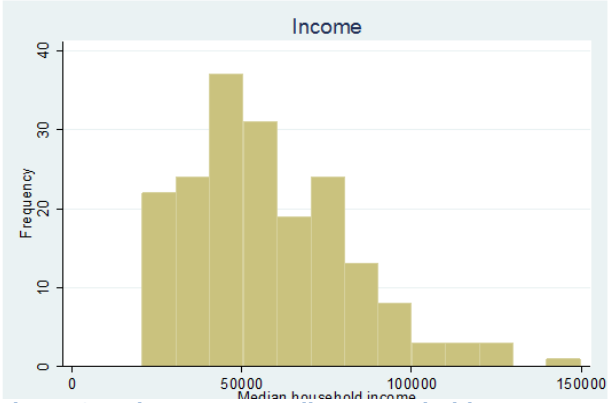


Figure 31: Histogram - Median Household Income

As we would expect with any variable that represents income, this indicator is skewed to the left for NYC. The data ranges from a minimum value of $20,702 per household, adjusted to prices of 2013, to a maximum of $149,776 per household. The mean and median values of income for NYC at the NTA level are $58,269 and $55,701, respectively. The standard deviation is $23,3829. The interquartile range (IQR) is $31,528. Utilizing the calculation 1.5IQR, there are three statistical outliers, all occurring at the highest income level.

The NTAs with the highest income are:

1. Upper East Side - Carnegie Hill, MN: $149,775
2. Battery Park City -Lower Manhattan, MN: $128,919
3. Midtown-Midtown South, MN: $121,058
4. SoHo-Tribeca, MN: $120,297
5. Lincoln Square, MN: $114,746

The NTAs with the lowest income are:

1. Williamsburg, BK: $20,702
2. East Tremont, BX: $21,266.97
3. Mott Haven-Port Morris, BX: $21,665
4. Belmont, BX: $21989
5. Melrose South-Mott Haven North, BX: USD $22,485

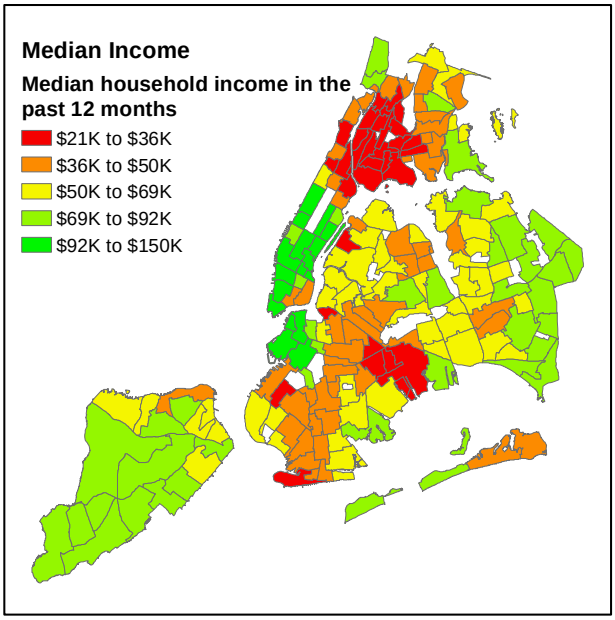


Figure 32: Median Household Income by Neighborhood

2. Employment and Unemployment Rate

- **Definition**: Percentage of employed population and percentage of unemployed population. Both address the working age population, that is, the population between 16 to 64 years old. While the percentage of the population employed refers to the individuals employed in the most recent week, the percentage of the population unemployed measures unemployed individuals in the most recent week that were actively looking for a job.
- **Reasoning:** These variables indicate whether New Yorkers have the opportunity to participate in the economic life of the city. Employment also addresses the issue of labor security. According to the OECD's Better Life Index (2015), work has obvious economic benefits, but having a job also helps individuals stay connected with society, build self-esteem, and develop skills and competencies. Societies with high levels of employment are also richer overall, more politically stable, and healthier.
- **Data Format & Source:** American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** The ACS collects and produces population and housing information every year instead of every ten years. Collecting data every year provides more up-to-date information throughout the decade about the U.S. population at the local community level. About 3.5 million housing unit addresses are selected annually, across every county in the nation.
- **Limitations:** Unemployment is generally considered a lagging indicator, as opposed to a leading indicator, because it is generally the result (rather than the cause) of a slowdown in the economy.
- **Results:** Employment follows a normal distribution with mean of 56% and a median of 55%. The standard deviation is 6.84 and the data ranges from a minimum value of 37% to a maximum of 77%. The interquartile range (IQR) is 6.98%. Utilizing the calculation 1.5IQR, there are ten statistical outliers, three at the lowest side of the distribution and 7 in the largest percentages.

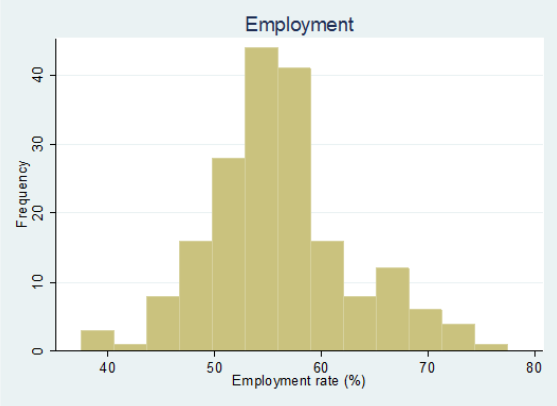


Figure 33: Histogram – Employment Rates

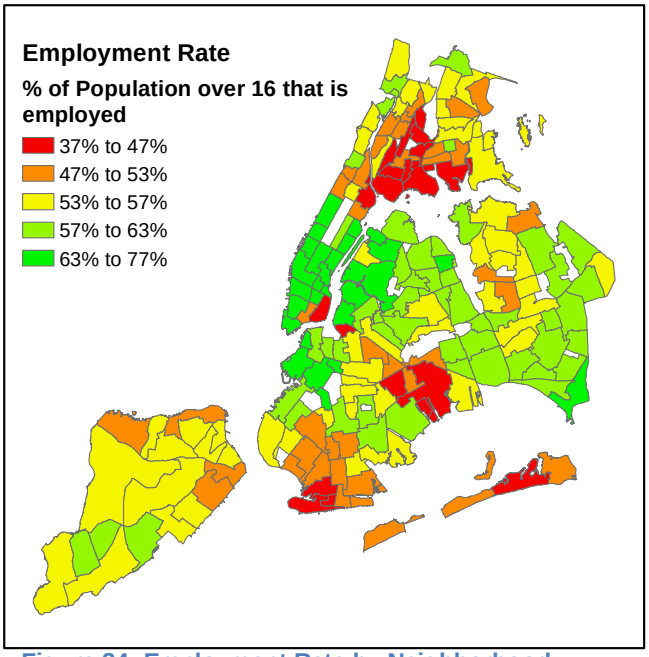


Figure 34: Employment Rate by Neighborhood

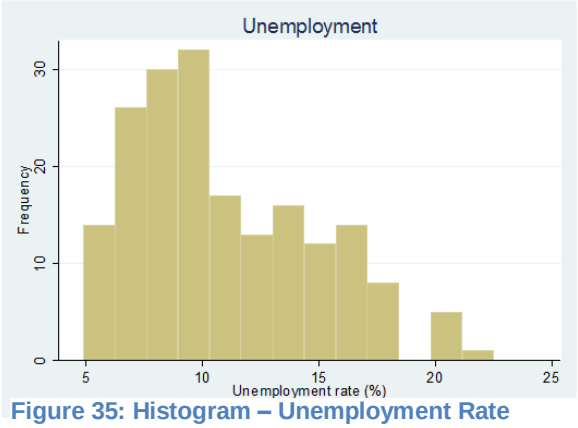


Figure 35: Histogram – Unemployment Rate

The NTAs with the highest employment rate are:

1. Battery Park City –Lower MN: 78%
2. Prospect Heights, BK: 74%
3. Park Slope – Gowanus, NK: 74%
4. Turtle Bay-East Midtown, MN: 72%
5. Hudson yards-Chelsea, MN: 71%

The NTAs with the lowest employment rate are:

1. Seagate-Coney Island, BK: 38%
2. Starrett City, BK: 39%
3. Claremont Bathgate, BX: 39%
4. Hunts Point, BX: 42%
5. East Tremont: 44%

Unemployment follows a skewed distribution to the right with a mean of 10.9% and a median of 9.9%. The standard deviation of unemployment is 3.86 and the range goes from a minimum of 4.87% to a maximum of 22.5%.The interquartile range (IQR) is 5.84%. Utilizing the calculation 1.5IQR, there are no statistical outliers.

The NTAs with the lowest unemployment rates are:

1. Battery Park City -Lower MN: 4.9%
2. Todt Hill-Emerson, SI: 4.92%
3. Upper East Side-Carnegie,MN: 5%
4. East Village, MN: 5.1%
5. Turtle Bay-East Midtown,MN: 5.2%

The NTAs with the highest unemployment rates are:

1. Claremont Bathgate, BX: 22.5%
2. Seagate-Coney Island, BK: 20.9%
3. U. Heights-Morris Heights,BX: 20.7%
4. Fordham South: 20.3%
5. East Tremont: 19.9%

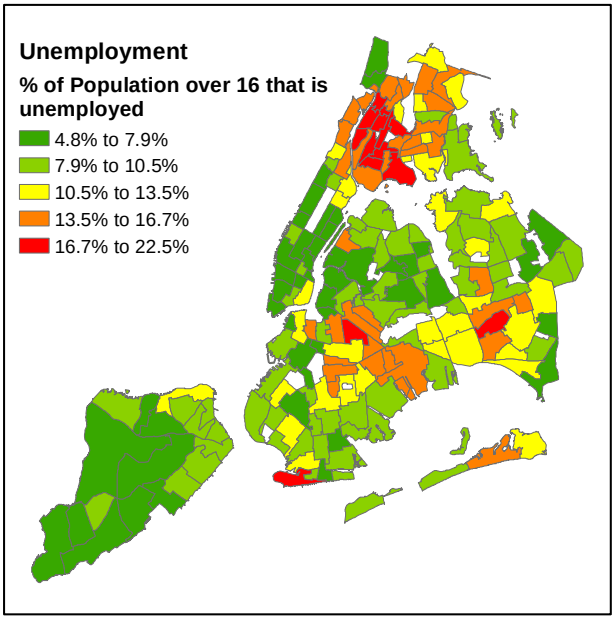


Figure 36: Unemployment Rate by Neighborhood

Housing

Summary:

Housing continues to be a major point of contention in New York City. Initial findings from the 2014 New York City Housing and Vacancy Survey (HVS) indicate that, although the City's total housing stock rose to its highest level since 1965 (3.4 million units), it has not kept pace with population growth. More than half of renters experience some level of rent-burden and vacancy rates are lowest for units with the lowest rent levels. The citywide net estimated rental vacancy is now 3.45 percent, which is below the five percent legal benchmark for a "housing emergency." The NYC HVS found that median income for households that rent is $41,500 ($3,460 monthly), and median monthly rent including utilities was $1,325, exceeding traditionally acceptable levels of rent burden (NYC Housing Prevention & Development, 2015). In addition to housing vacancy, this domain captures quality of housing and neighborhood trends among homeless shelter entries.

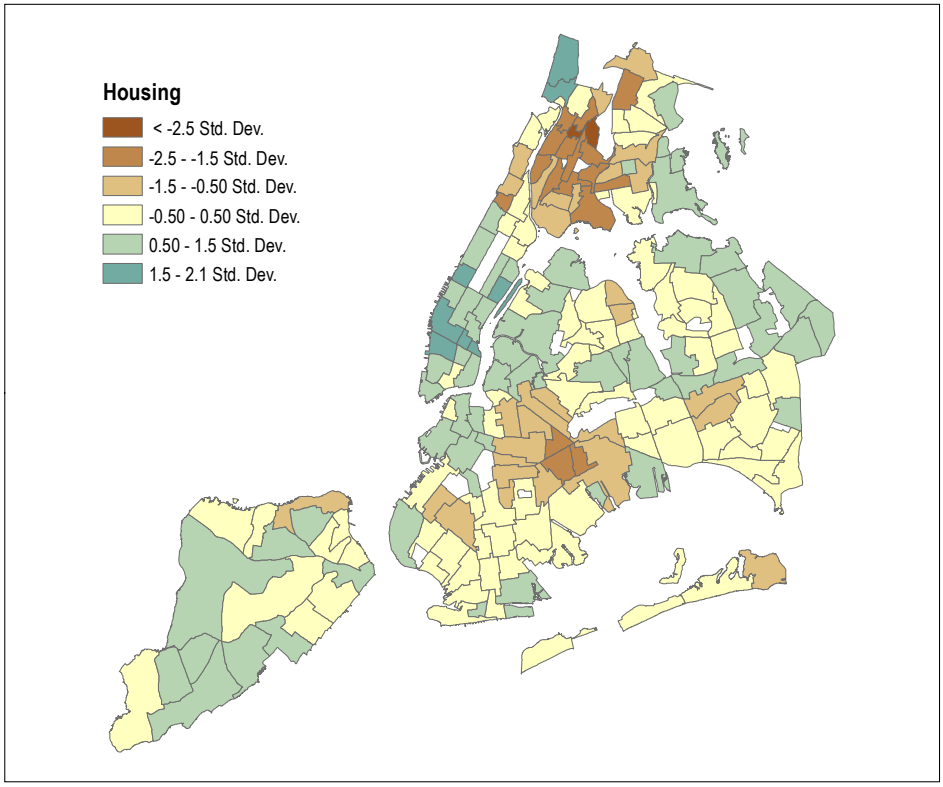


Figure 37: Map of Housing Index by Neighborhood

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
1. Stuyvesant Town-Cooper Village, MN 2. Gramercy, MN 3. Lincoln Square, MN 4. West Village, MN 5. North Riverdale-Fieldston-Riverdale, BX 6. Spuyten Duyvil-Kingsbridge, BX 7. Hudson Yards-Chelsea-Flatiron-Union Square, MN 8. Lenox Hill-Roosevelt Island, MN	1. Belmont, BX 2. Fordham South, BX 3. East Tremont, BX 4. Ocean Hill, BK 5. Hunts Point, BX 6. East New York (Pennsylvania Ave), BK 7. Crotona Park East, BX 8. Manhattanville, MN 9. Mount Hope, BX 10. Morrisania-Melrose, BX 11. Williamsbridge-Olinville, BX 12. Highbridge, BX 13. University Heights-Morris Heights, BX 14. Claremont-Bathgate, BX 15. East Concourse-Concourse Village, BX 16. Kingsbridge Heights, BX 17. Bedford Park-Fordham North, BX 18. Soundview-Bruckner, BX 19. Brownsville, BK

Table 5: Neighborhoods with the highest and lowest Housing Index Rankings

Housing Indicators:

1. Housing Cost Burden (Renters-GRAPI[13])

- **Definition**: The percentage of renter households spending 30% or more of their household income on rent and utilities. We have utilized 30% or more for ease of use of data reported by the ACS and NYC Department of City Planning. We define “rent burdened” as those households experiencing moderate to severe rent burdens (30% or higher), as per the U.S. Department of Housing and Urban Development’s definitions (Furman Center for Real Estate and Urban Policy, n.d.).

[13] GRAPI refers to Gross Rent as a Percentage of Income

- **Reasoning:** Families or individuals who pay 30% or more of their annual income for housing are considered cost-burdened under federal and state housing policy, based on research on household income and preferences. At housing costs over this threshold, households may have difficulty affording necessities such as food, clothing, transportation, and medical care. The continued increase in affordable housing demand coupled with the diminishing supply of affordable units is increasing the challenge of finding affordable housing (Data Haven, n.d.). Additionally, this is a widely used indicator throughout many well-being indices, such as those from Measure of America, Sustainable Communities Index, Furman Center Research, and the U.S. Department of Housing and Urban Development.
- **Data Format & Source:** American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** Monthly gross rent costs come from the following questions:
    - Contract rent
    - Utilities – Electricity, Gas, Water and Sewer, and Other Utilities

  These two items are divided by monthly household income to calculate gross rent as a percentage of income (Schwartz & Wilson, n.d.). This variable is the modified to calculate percent of households in each NTA with a GRAPI of 30% or more.
- **Results:**

  In almost three-quarters of the City's NTAs, more than 50% of households demonstrate a rent burden. The average percentage of rent-burdened households across all NTAs is 54% with a median of 55%.

  The NTAs with the lowest percentage of rent-burdened households are:
    1. Brooklyn Heights-Cobble Hill, BK 36%
    2. Lincoln Square, MN 38%
    3. West Village, MN 39%
    4. Park Slope-Gowanus, BK 39%
    5. DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill, BK 40%

  The NTAs with the highest percentage of rent-burdened households are:
    1. Borough Park, BK 70%
    2. Belmont, BX 69%
    3. Fordham South, BX 69%
    4. Kingsbridge Heights, BX 67%
    5. East Tremont, BX 67%

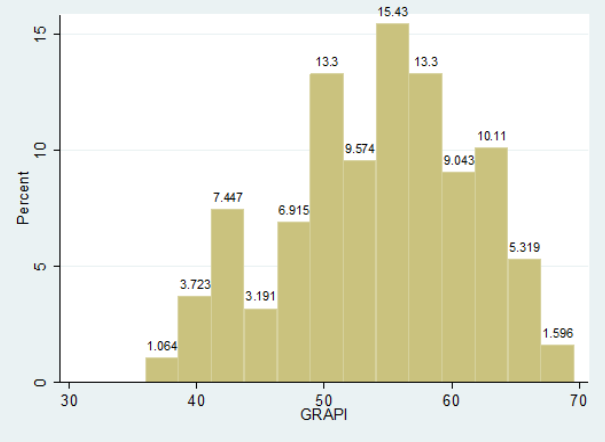


Figure 38: Histogram - Percentage of Renters Spending More Than 30% of Income on Rent & Utilities

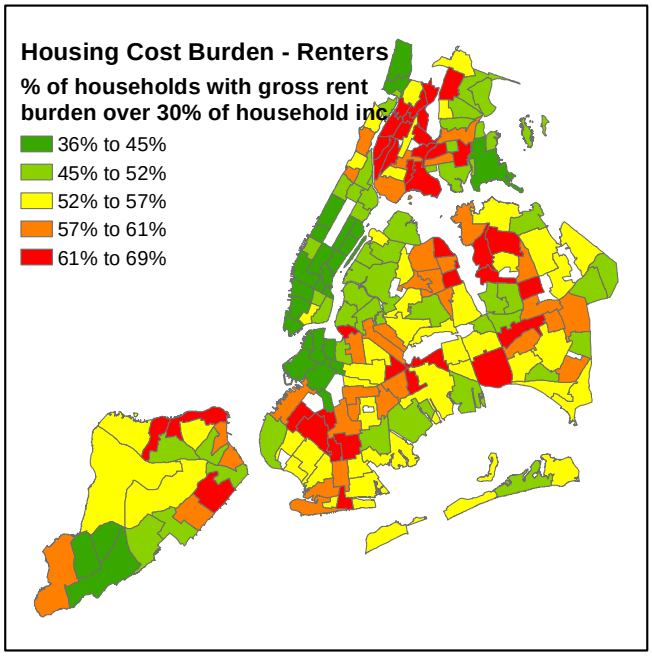


Figure 39: Percentage of Renters Spending More Than 30% of Income on Rent & Utilities by Neighborhood

2. Housing Cost Burden (Owners-SMOCAPI[14])

- **Definition**: The percentage of households spending 30% or more of their household income on mortgage payments and other housing costs for those who own their homes. We have utilized 30% or more for ease of use of data reported by the ACS and NYC Department of City Planning. This variable only accounts for homes that currently have a mortgage.
- **Reasoning:** Please see reasoning for indicator 1 above.
- **Data Format & Source:** American Community Survey (ACS) 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** Monthly owner costs come from questions on the following:
    - Mortgage
    - Second mortgage and/or home equity loans
    - Real estate taxes
    - Homeowners insurance
    - Condo fee (if applicable)
    - Mobile home cost (if applicable)
    - Utilities – Electricity, Gas, Water and Sewer, and Other Utilities.
- **Results:**

  Similar to GRAPI, the SMOCAPI distribution is left skewed, but to a greater degree. The middle 50% of NTAs indicate anywhere from 43% to 62% of households with an owner cost burden. The average and median percentage of households with owner cost burden across all NTAs is approximately 51%, demonstrating that more than half of all NTAs have an owner cost burden of greater than 50%. The outlier with a value of zero is Stuyvesant Town-Cooper Village, which is not owner occupied.

  The NTAs with the lowest percentage of owner cost burdened households are:

  1. Spuyten-Duyvil-Kingsbridge, BX 16%
  2. Gramercy, MN 20%
  3. North Riverdale- Fieldston- Riverdale, BX 21%
  4. Morningside Heights, MN 22%
  5. Marble Hill-Inwood, MN 24%

  The NTAs with the highest percentage of owner cost burdened households are:

  1. University Heights-Morris Heights, BX 84%
  2. North Corona, QN 80%
  3. Fordham South, BX 80%
  4. Belmont, BX 79%
  5. Crotona Park East, BX 76%
  6.

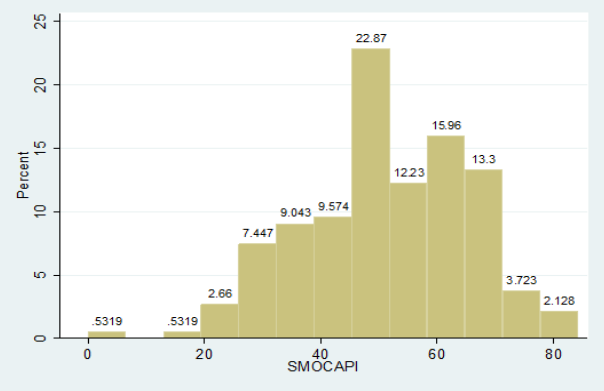


Figure 40: Histogram - Percentage of Households Spending Over 30% of Income on Mortgage Payments and other Housing Costs

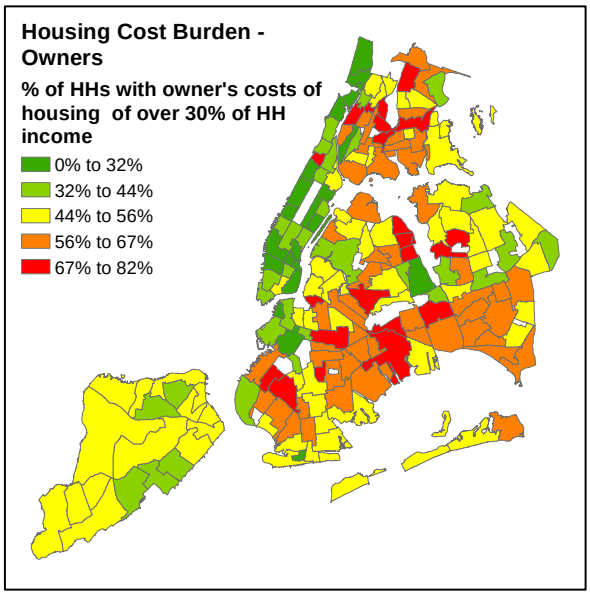


Figure 41: Map of Percentage of Households Spending Over 30% of Income on Mortgage Payments and other Housing Costs

[14] SMOCAPI refers to Selected Monthly Owner Costs as a Percentage of Income

3. Housing Maintenance Code Violations

- **Definition**: Pursuant to New York City's Housing Maintenance Code, the Department of Housing Preservation and Development (HPD) issues violations against conditions in rental dwelling units that have been verified as violating the New York City Housing Maintenance Code (HMC) or the New York State Multiple Dwelling Law (MDL). Violations are issued when an inspection verifies that a violation of the HMC or MDL exists. It is closed when the violation is corrected, as observed/verified by HPD or as certified by the landlord. This variable accounts for Code C violations only, which accounts for immediately hazardous violations, such as:
    - Inadequate supply of heat and hot water
    - Rodents
    - Peeling lead paint in dwellings where a child under 7 resides
    - Broken or defective plumbing fixtures
    - Defective plaster
    - Defective faucets
- **Reasoning:** The amount and degree of violations found within a given neighborhood indicates resident satisfaction with housing and quality of housing.
- **Data Format & Source:**
    - Housing Maintenance Code C Violations, NYC Housing Preservation and Development (HPD) accessed through NYC Open Data, 2014 - Collected at Address Level
    - Residential Units per building, PLUTO - NYC Department of City Planning (NYC DCP), 2014 – Collected at Building Level
- **Methodology:** Scores for each neighborhood will be calculated based on total code C violations per 1,000 residential units
- **Results:**
  Housing Code violations per 1,000 residential units are skewed to the right, with an average of 13 and a median of 6 violations per 1,000 units across NTAs. Fifty percent of NTAs have less than 6 violations per 1,000 units. Yet, there are many outliers, with the 10th percentile of NTAs having violations in the range from 40 to 71 per 1000 residential units.

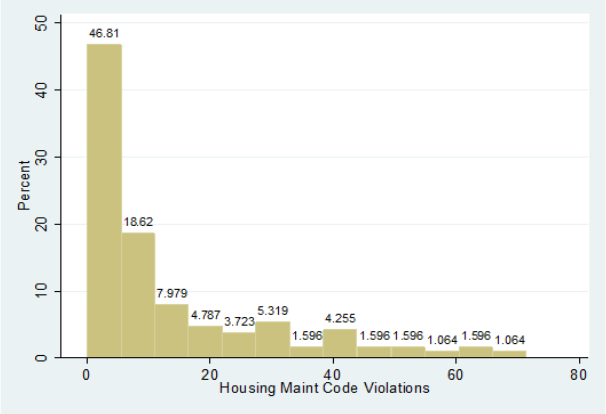


Figure 42: Histogram – Number of Housing Code Violations

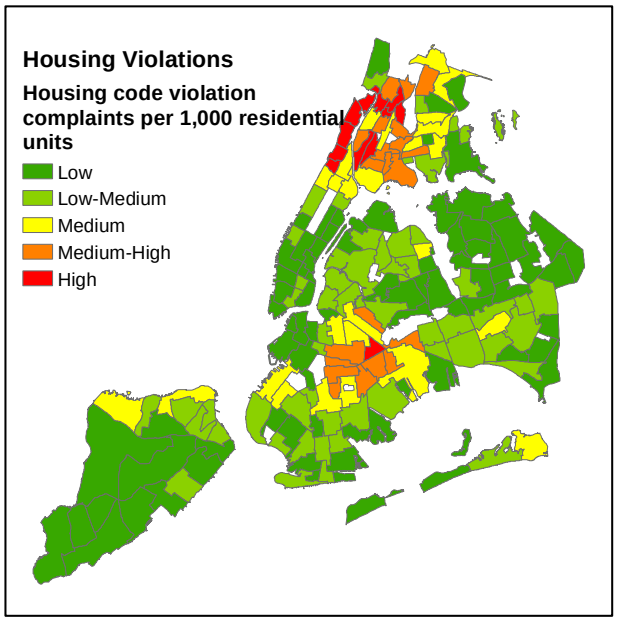


Figure 43: Number of Housing Code Violations by Neighborhood

The NTAs with the lowest rate of violations are:

1. Glen Oaks-Floral Park-New Hyde Park, QN, 0
2. Ft. Totten-Bay Terrace-Clearview, QN, 0
3. Stuyvesant Town-Cooper Village, MN, 0
4. Douglas Manor-Douglaston-Little Neck, QN, 0.2
5. Bellerose, QN, 0.23

The NTAs with the greatest rates of violations are:

1. Hamilton Heights, MN 71.4

2. Manhattanville, MN 65.9
3. Kingsbridge Heights, BX 64.1
4. Washington Heights South, MN 62.3
5. Fordham South, BX 61.1

4. Homeless Shelter Entry Rate

- **Definition**: Homeless Shelter Entries by Families per 1,000 NTA residents
- **Reasoning:** Given the growing emphasis on the homeless population by the current administration, having a better understanding of where homeless populations are coming from can help inform need. This indicator reveals which neighborhoods have residents who struggle to maintain housing, indicating housing affordability problems or lack of income.
- **Data Format & Source:**
  - Homeless Shelter Entries by Families, Department of Homeless Services (DHS), 2013 – Collected at Address Level (Last Known Addresses of Shelter Entrants)
  - Total Population, American Community Survey (ACS), 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** Homeless Shelter Entries per 1000 NTA residents.
- **Results:** The majority of NTAs show none or very low levels of homeless shelter entry rate. There are some neighborhoods, however, where shelter entry can reach markedly higher rates

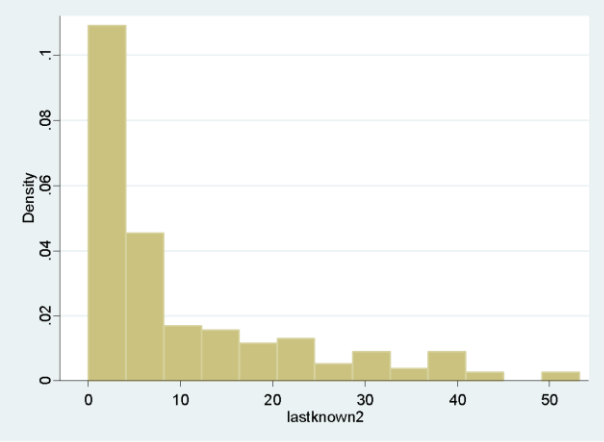


Figure 44: Histogram - Homeless Shelter Entry Rate

NTAs with the lowest rate of residents entering the homeless shelter system:

1. Auburndale, QN
2. Fresh Meadows-Utopia, QN
3. Bellerose, QN
4. Glen Oaks-Floral Park-New Hyde Park, QN
5. Brooklyn Heights-Cobble Hill, BK

NTAs with the highest rate of residents entering the homeless shelter system:

1. Claremont-Bathgate, BX
2. East New York (Pennsylvania Ave), BK
3. Hunts Point, BX
4. Melrose South-Mott Haven North, BK
5. Belmont, BK

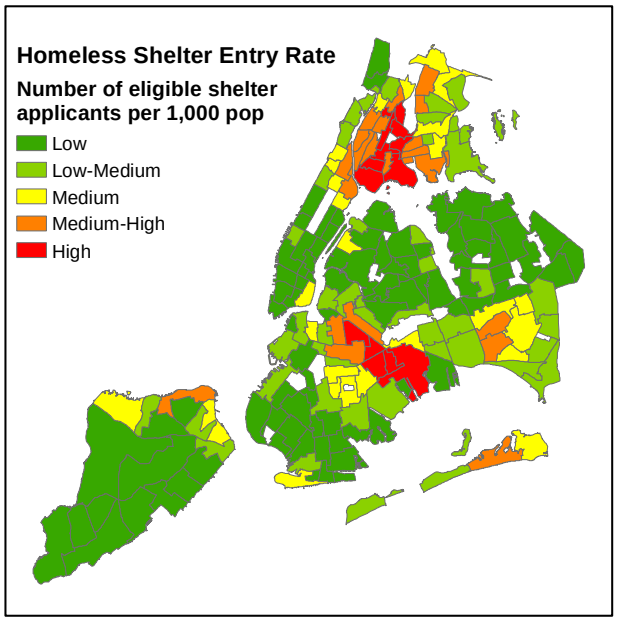


Figure 45: Homeless Shelter Rate by Neighborhood

Personal & Community Safety

Summary:

Public safety, as defined by low crime and victimization rates, is an essential component of well-being within a community. Many of the reports examined as part of our literature review focused on the psychosocial impact of crime and early life trauma on community well-being. The Department of Justice recently published a special report on the impact of violent crime, which found that 67% of victims report experiencing socio-emotional problems as a result of their victimization. These socio-emotional problems include: distress, problems with work or school, and problems with family members or friends.

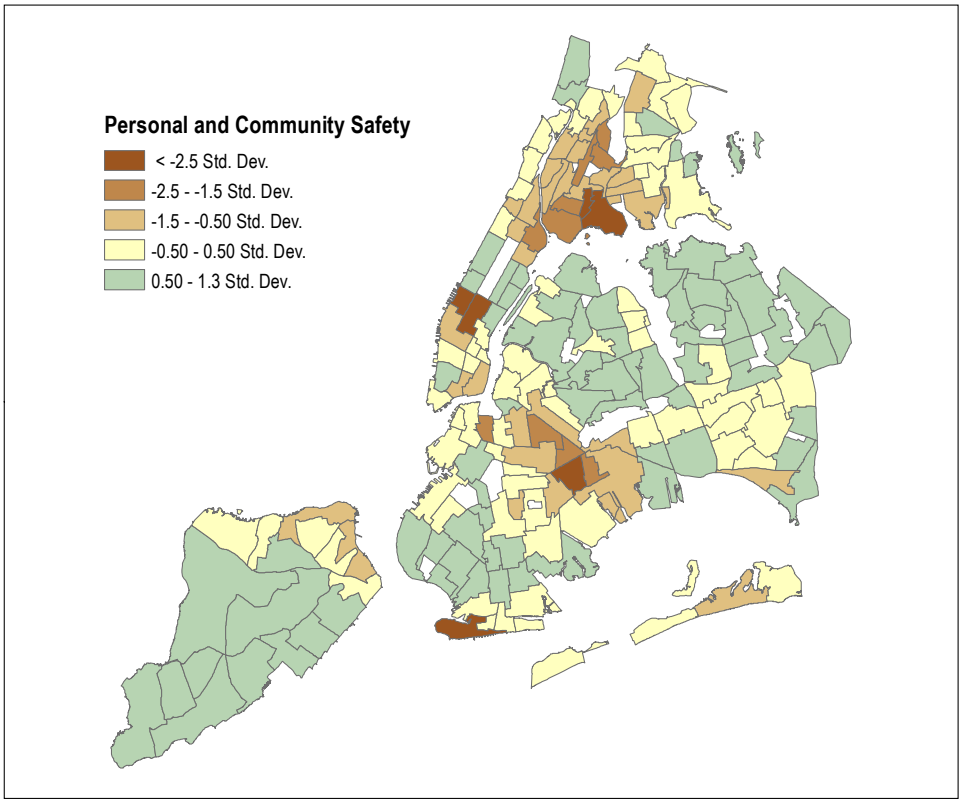


Figure 46: Map of Personal & Community Safety by Neighborhood

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
None	1. Seagate-Coney Island 2. Stuyvesant Heights 3. Fort Greene 4. Ocean Hill 5. Brownsville 6. East New York (Pennsylvania Ave) 7. Claremont-Bathgate 8. Belmont 9. East Tremont 10. Hunts Point 11. Longwood 12. Melrose South-Mott Haven North 13. Mott Haven-Port Morris 14. Clinton 15. Midtown-Midtown South 16. East Harlem North

Table 6: Neighborhoods with the highest and lowest Personal and Community Safety Rankings

Personal & Community Safety Indicators:

1. Index Crime Rate

- **Definition**: The number of offenses (murder, rape, robbery, felonious assault, burglary, grand larceny, grand larceny auto) on a weekly basis, reported by precinct, per 1000 residents in 2014.
- **Reasoning:** A variant of this statistic, violent crime, is an indicator used throughout many well-being indices, such as those from Measure of America, OECD, and the Opportunity Index.
- **Data Format & Source:**
  - Index Crime, New York Police Department (NYCPD), 2014 – Collected at Precinct Level
  - Total Population, American Community Survey (ACS), 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** Police precincts were matched with NTAs and census data. Seven categories of crime were aggregated to get the index crime rate, which was then modified to obtain crime rates per 1000 inhabitants to obtain the crime rates for all of 2014
- **Results:**

  The majority of NTAs have crime rates less than 20. Yet, there are significant outliers in the Bronx and Manhattan.

  The NTAs with the lowest crime rates are:
  1. Great Kills, SI, 3.5
  2. Old Town-Dongan Hills-South Beach, SI, 3.6
  3. Todt Hill-Emerson Hill-Heartland Village-Lighthouse Hill, SI, 3.6
  4. New Springville-Bloomfield-Travis, 3.6
  5. Charleston-Richmond Valley-Tottenville, 3.7

  The NTAs with the highest crime rates are:
  1. Midtown-Midtown South, MN, 70.6
  2. Clinton, MN, 51.9
  3. Hunts Point, BX, 30.3
  4. Longwood, BX, 29.3
  5. Hudson Yards-Chelsea-Flat Iron-Union Square, MN, 27.1

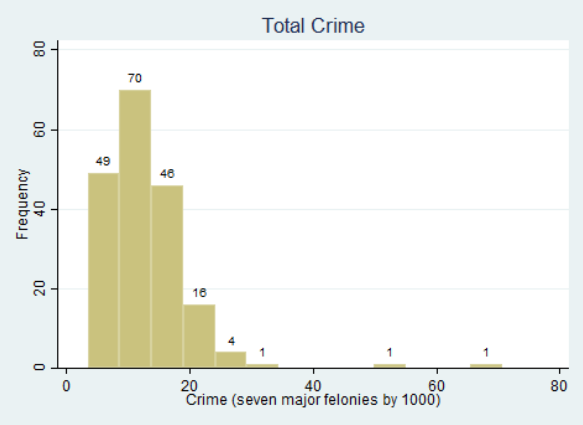


Figure 47: Histogram - Index Crime Rate

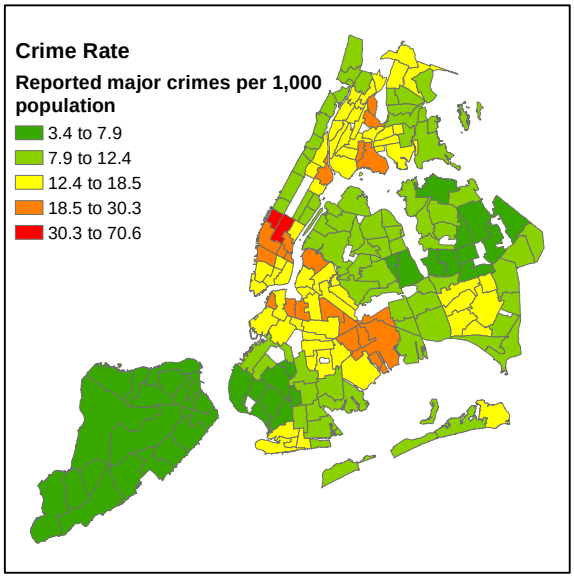


Figure 48: Index Crime Rate by Neighborhood

2. Victimization Rate (Abuse/Neglect Investigations)

- **Definition**: Total number of distinct children 17 and under with indicated reports divided by the number of children 17 and under in the population (NTA) multiplied by 1,000. An abuse/neglect report is indicated when the investigation finds credible evidence of abuse or neglec
- **Reasoning:** Child welfare is an important component of well-being. Studies show that adverse childhood events have lifelong effects on health and well-being. Similar proxies for child welfare have been used in other indices such as the Child Well-being Index (CWI).
- **Data Format & Source:**
  - Abuse/Neglect Investigations (Indicated Reports), Administration of Children Services (ACS), 2013 – Collected at Address Level

- Population (Ages 17 and Under), American Community Survey (ACS), 2009-2013 5 year estimates – Collected at Census Tract Level

- **Methodology:** Indicated Reports for Abuse and Neglect Investigations for each NTA are aggregated and modified to account for NTA population for children 17 and under.
- **Results:**

The NTAs with the lowest victimization rates are:

1. Upper East Side-Carnegie Hill, MN
2. Fresh Meadows-Utopia, QN
3. Turtle Bay-East Midtown, MN
4. Forest Hills, QN,
5. SoHo-TriBeCa-Civic Center-Little Italy, MN

The NTAs with the highest victimization rates are:

1. Brownsville, BK
2. Seagate-Coney Island, BK
3. Hunts Point, BX
4. Longwood, BX
5. Stuyvesant Heights, BK

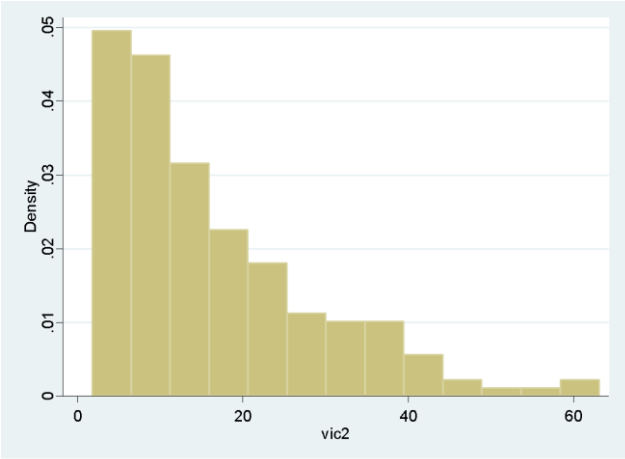


Figure 49: Histogram Victimization Rates

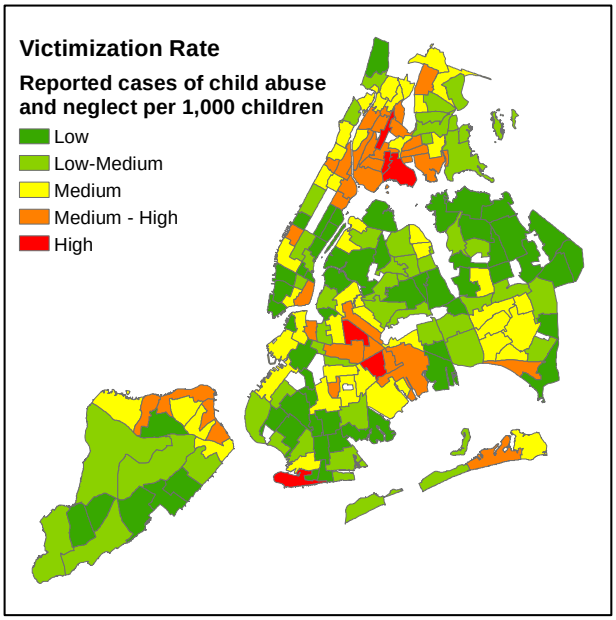


Figure 50: Victimization Rates by Neighborhood

Core Infrastructure & Services

Summary:

As is the case in cities and urban centers across the United States, the mobility of residents and access to both private and public forms of transportation is a reflection of social and economic stability. However, New York City is unique in its low rates of car ownership, with the city reporting “a third as many cars per capita as the average U.S. urban resident (about 23 per 100 residents compared to about 77 per 100 in most urban areas)” (Cortight, 2010). The Metropolitan Transportation Authority (MTA) recently implemented its second increase in subway and bus fares in two years by raising the base from $2.50 per ride to $2.75 (Rivoli, 2015). The move arrived shortly after the office of New York City Comptroller, Scott Stringer, released a report indicating that New York residents boast the longest workweeks of any major city in the country as a result of time spent in transit to and from their places of employment (Associated Press, 2015). We have selected a related indicator in order to effectively analyze how New Yorkers travel from their residences to work and the impact that it has on their well-being.

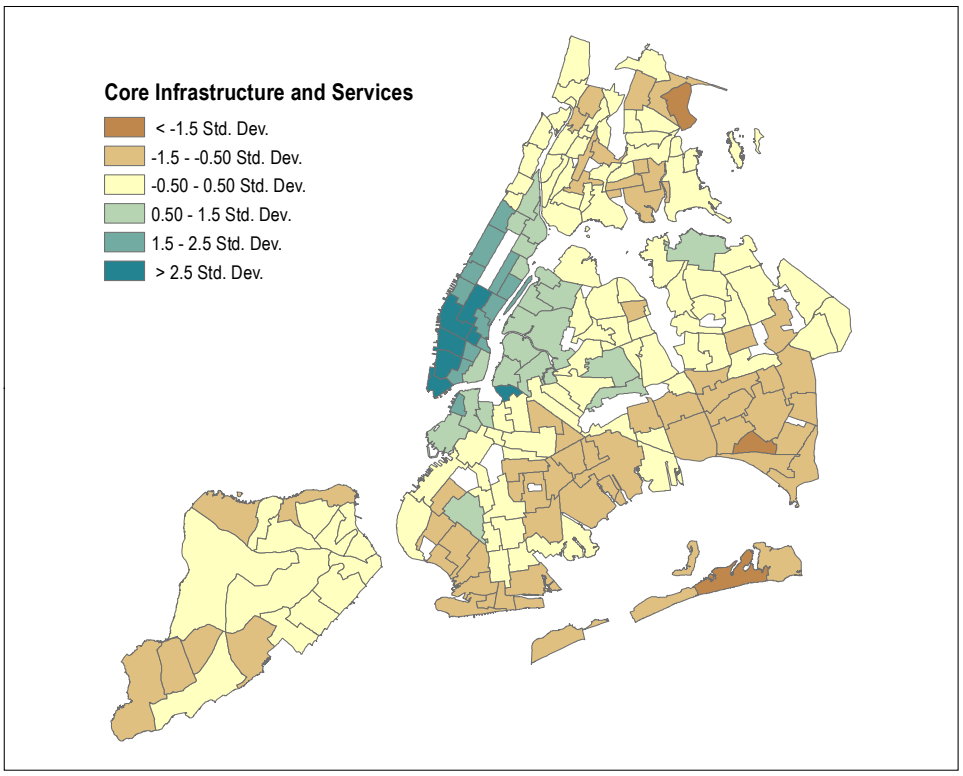


Figure 51: Map of Core Infrastructure & Services

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
1. Midtown-Midtown South, MN 2. Williamsburg, BK 3. West Village, MN 4. Gramercy, MN 5. Battery Park City-Lower Manhattan, MN 6. SoHo-TriBeCa-Civic Center-Little Italy, MN 7. Hudson Yards-Chelsea-Flat Iron-Union Square, MN 8. Turtle Bay-East Midtown, MN 9. Upper East Side-Carnegie Hill, MN 10. Murray Hill-Kips Bay, MN 11. Clinton, MN 12. Lincoln Square, MN 13. East Village, MN 14. Stuyvesant Town-Cooper Village, MN 15. Lenox Hill-Roosevelt Island, MN 16. Morningside Heights, MN 17. Chinatown, MN 18. Brooklyn Heights-Cobble Hill, BK	1. Hammels-Arverne-Edgemere, QN 2. Springfield Gardens North, QN 3. Co-op City, BX

Table 7: Neighborhoods with the highest and lowest Infrastructure Rankings

Core Infrastructure Indicator:

1. Average Length of Commute

- **Definition**: Average length of commute is defined as the mean time spent, in minutes, per individual aged 16 and over (who did not work at home) traveling to or from their place of employment.
- **Reasoning:** The length of an individual's commute is linked to both economic and health factors. A particularly time-consuming commute may "[carry] such a cost to well-being that economists have found you have to earn 20 percent more to make the trip worth it" and can cause commuters to "[experience] an increased amount of stress, get worse sleep, and experience decreased social interaction" (Jaffe, 2011). Some research has also indicated that there is lowered civic participation amongst individuals with long commutes (Newman, Johnson, & Lown, 2013). Notably, indicators measuring the mobility of residents and access to reliable means of transportation were utilized in the indices of the Jacksonville Quality of Life Progress Report, Spirit of South Tyneside, and Hertfordshire Forward (Warner & Kern, 2013).
- **Data Format & Source:** American Community Survey (ACS), 2009-2013 5 year estimates – Collected at Census Tract Level
- **Methodology:** Data is based on transportation questions included in the American Community Survey. The results that are tabulated "focus solely on commuting to work and do not ask about leisure travel or other non-work trips" and include "commuting characteristics for workers 16 years and over who were employed during the week prior to the ACS reference week" (McKenzie & Rapino, 2011). The survey questions where workers are employed, "what time they leave home for work, the means of transportation used to get there, the number of workers riding in a car, truck, or van, and how long it takes to travel to work" (McKenzie & Rapino, 2011). The results are cross-referenced with the demographic, social, and economic characteristics of the respondents.

  The average length of commute in minutes statistic was found by generating the estimated total number of minutes spent commuting per Census tract and the number of workers aged 16 and over who did not work from home. The figures for each Census tract were matched with their respective NTA and then aggregated into two categories: the estimated raw total number of minutes spent commuting and the number of workers aged 16 and over who did not work from home. Once these figures were fully compiled at the NTA level, the

number commuting minutes was divided by the number of workers to estimate of the average length of commute in minutes by NTA.

There were a limited number of instances, however, where the ACS did not report a figure for the aggregate number of minutes spent commuting per Census tract. This was a result of the sample size being too small to draw any meaningful statistical extrapolations. For example, Kings County Census Tract 808 reported 25 workers over the age of 16 who did not work at home, but did not report a corresponding figure for the aggregate number of minutes these individuals spent commuting. For the purposes of the indicator, these sets of figures are assumed to be zero.

- **Results:** 188 observations were utilized in generating the histogram and summary statistics for the average length of commute in minutes. Though there are a total of 195 NTAs across New York City, those for Riker's Island (the Bronx), Airport (Queens), and the park-cemetery-etc. units for each borough were not included in the analysis. Additionally, there were zero residents reported by the ACS for Riker's Island, Airport, and park-cemetery-etc.-Staten Island. Collectively, these NTAs represent 3.5% of the total utilized by the NYC Department of City Planning.

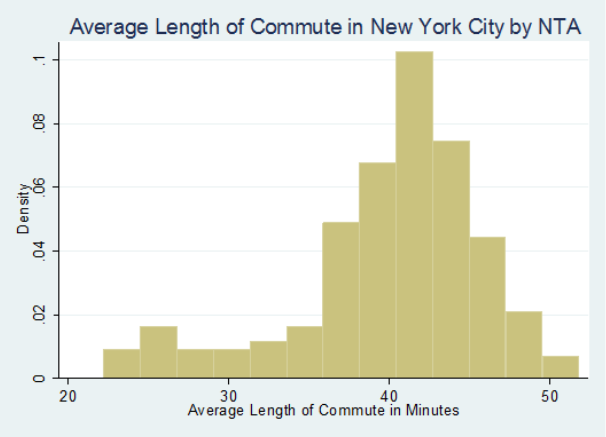


Figure 52: Histogram - Average Length of Commute

The distribution for the variable has a left, negative skew. The data ranges from a minimum value of 22.21 minutes to a maximum of 51.83 minutes. The mean is 40.03 and the median is 41.04. The standard deviation is 5.85. The interquartile range (IQR) is 6.22. Utilizing the calculation 1.5IQR, there are thirteen statistical outliers in this variable, all at the lower end of the range. This represents 6.9% of the total NTAs analyzed.

The NTAs with the shortest commutes are:

1. Midtown-Midtown South, MN: 22.2 minutes
2. Williamsburg, BK: 23.2 minutes
3. West Village, MN: 24.0 minutes
4. Gramercy, MN: 24.1 minutes
5. Battery Park City-Lower Manhattan, MN: 24.6 minutes

The NTAs with the longest commutes are:

1. Starrett City, BK: 48.6 minutes
2. St. Albans, QN: 48.8 minutes
3. Co-op City, BX: 50.0 minutes
4. Springfield Gardens North, QN: 50.2 minutes
5. Hammels-Arverne-Edgemere, Queens: 51.8 minutes

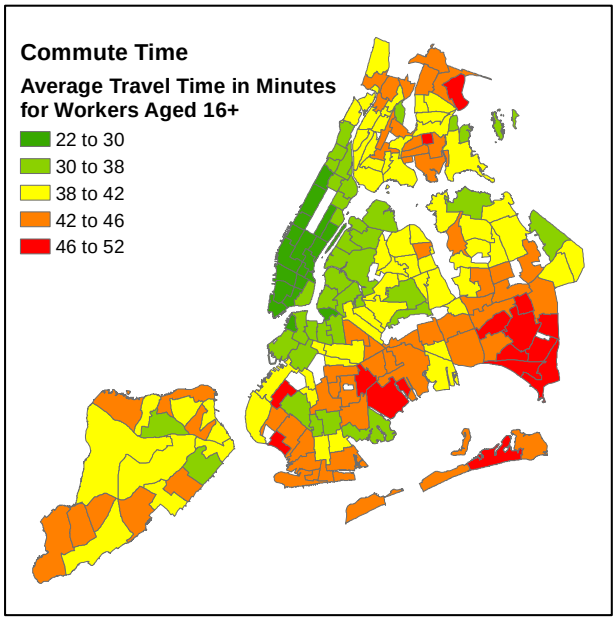


Figure 53: Average Length of Commute by Neighborhood

III. Borough Level Analysis

The analysis in the first two sections of this report utilized mean and standard deviation data for the entire city. In this section, the team analyzed the distribution of well-being at the borough level. For each borough, the overall distribution of well-being is analyzed, followed by the domain analysis for each borough.

Bronx

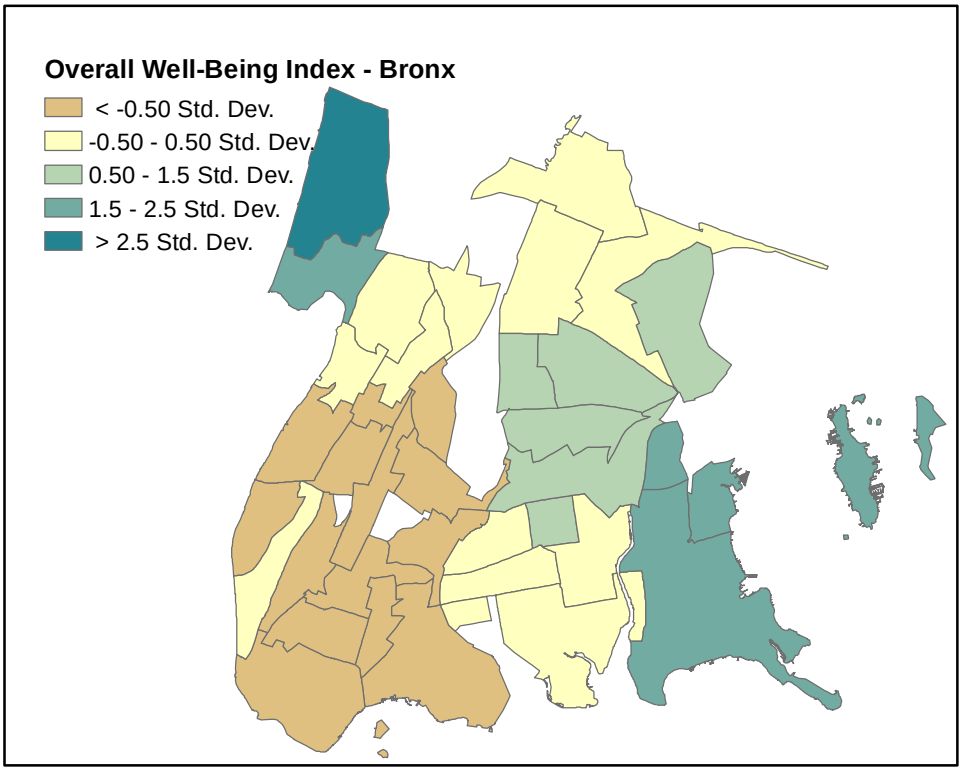


Figure 54: Map of Overall Well-Being in the Bronx

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
Overall	
1. North Riverdale-Fieldston-Riverdale 2. Spuyten Duyvil-Kingsbridge 3. Pelham Bay-Country Club-City Island 4. Schuylerville-Throgs Neck-Edgewater Park 5. Pelham Parkway 6. Allerton-Pelham Gardens	1. East Tremont 2. Hunts Point 3. Claremont-Bathgate 4. Fordham South
Education	
1. North Riverdale-Fieldston-Riverdale 2. Spuyten Duyvil-Kingsbridge 3. Co-op City 4. Pelham Bay-Country Club-City Island 5. Pelham Parkway 6. Schuylerville-Throgs Neck-Edgewater Park	1. Fordham South 2. East Tremont
Health	
1. North Riverdale-Fieldston-Riverdale 2. Spuyten Duyvil-Kingsbridge 3. Pelham Bay-Country Club-City Island 4. Parkchester	1. Highbridge 2. University Heights-Morris Heights 3. Crotona Park East 4. Norwood

5. Pelham Parkway 6. Schuylerville-Throgs Neck-Edgewater Park	5. East Tremont 6. Kingsbridge Heights
Economic Security	
1. Spuyten Duyvil-Kingsbridge 2. North Riverdale-Fieldston-Riverdale 3. Schuylerville-Throgs Neck-Edgewater Park 4. Pelham Bay-Country Club-City Island 5. Pelham Parkway 6. Woodlawn-Wakefield 7. Parkchester	1. Claremont-Bathgate 2. Hunts Point 3. East Tremont 4. University Heights-Morris Heights Fordham South
Core Infrastructure	
1. Pelham Bay-Country Club-City Island 2. Belmont 3. Schuylerville-Throgs Neck-Edgewater Park 4. Allerton-Pelham Gardens 5. Pelham Parkway	1. Co-op City 2. Parkchester 3. Claremont-Bathgate 4. Williamsbridge-Olinville 5. Westchester-Unionport 6. Soundview-Castle Hill-Clason Point-Harding Park
Housing	
1. North Riverdale-Fieldston-Riverdale 2. Spuyten Duyvil-Kingsbridge 3. Co-op City 4. Schuylerville-Throgs Neck-Edgewater Park 5. Pelham Bay-Country Club-City Island 6. Parkchester 7. Allerton-Pelham Gardens	1. Belmont 2. Fordham South 3. East Tremont 4. Hunts Point
Security	
1. North Riverdale-Fieldston-Riverdale 2. Allerton-Pelham Gardens 3. Pelham Bay-Country Club-City Island 4. Spuyten Duyvil-Kingsbridge 5. Pelham Parkway 6. Schuylerville-Throgs Neck-Edgewater Park	1. Hunts Point 2. Longwood 3. Claremont-Bathgate 4. East Tremont 5. Belmont 6. Melrose South-Mott Haven North

Brooklyn

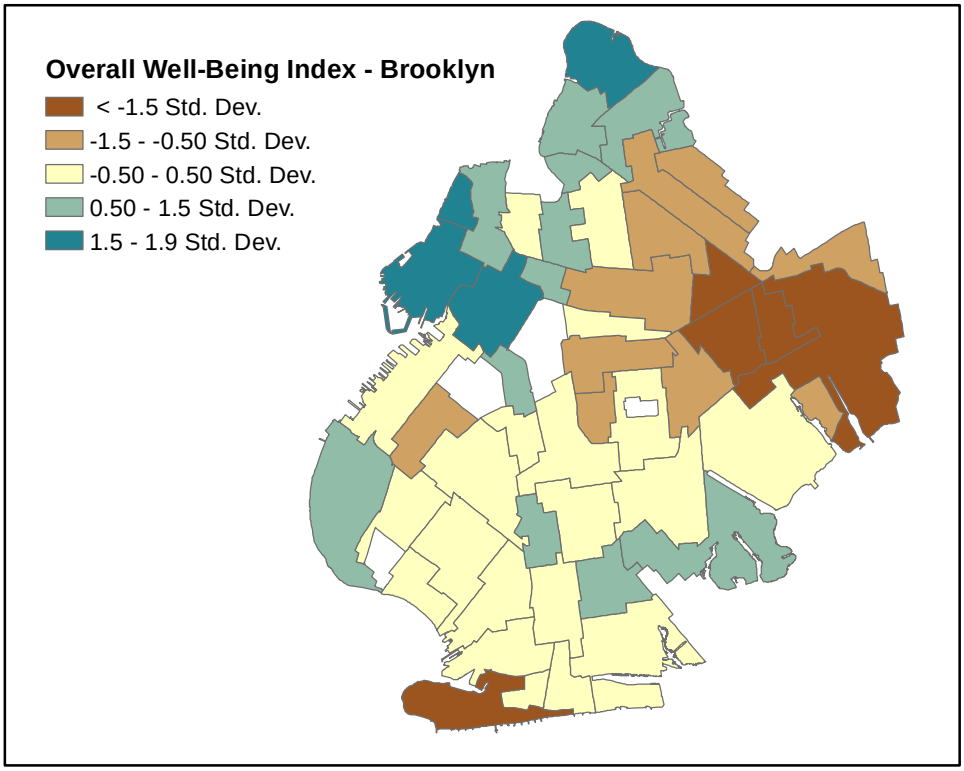


Figure 55: Map of Overall Well-Being in Brooklyn

NTAs more than 1.5SD ABOVE the mean	NTAs more than 1.5SD BELOW the mean
Overall	
1. Brooklyn Heights-Cobble Hill 2. Carroll Gardens-Columbia Street-Red Hook 3. Park Slope-Gowanus 4. DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill 5. Windsor Terrace 6. Prospect Heights 7. North Side-South Side 8. Greenpoint	1. Seagate-Coney Island 2. Stuyvesant Heights 3. Crown Heights North 4. Ocean Hill 5. Brownsville 6. East New York 7. Cypress Hills-City Line 8. East New York (Pennsylvania Ave) 9. Starrett City Erasmus
Education	
1. Brooklyn Heights-Cobble Hill 2. Bay Ridge 3. Carroll Gardens-Columbia Street-Red Hook 4. Park Slope-Gowanus	1. Seagate-Coney Island 2. Williamsburg 3. Ocean Hill 4. Brownsville 5. East New York 6. Cypress Hills-City Line 7. East New York (Pennsylvania Ave) 8. Rugby-Remsen Village
Health	
1. Brooklyn Heights-Cobble Hill 2. Bath Beach 3. Bay Ridge 4. Carroll Gardens-Columbia Street-Red Hook 5. Park Slope-Gowanus	1. Stuyvesant Heights 2. Prospect Lefferts Gardens-Wingate 3. Crown Heights North 4. Crown Heights South 5. Bushwick North

6. DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill 7. Fort Greene 8. Williamsburg 9. North Side-South Side 10. Greenpoint	6. Ocean Hill 7. East New York 8. Cypress Hills-City Line 9. East New York (Pennsylvania Ave) 10. Erasmus
Economic Security	
1. Brooklyn Heights-Cobble Hill 2. Carroll Gardens-Columbia Street-Red Hook 3. Park Slope-Gowanus 4. DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill 5. Windsor Terrace 6. Prospect Heights 7. North Side-South Side 8. Greenpoint	1. Seagate-Coney Island 2. Stuyvesant Heights 3. Brownsville
Core Infrastructure	
1. Brooklyn Heights-Cobble Hill 2. DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill 3. Fort Greene 4. Williamsburg 5. North Side-South Side 6. Greenpoint 7. Borough Park 8. East Williamsburg	1. Bath Beach 2. Sunset Park East 3. Canarsie 4. East New York (Pennsylvania Ave) 5. Starrett City 6. Rugby-Remsen Village
Housing	
1. West Brighton 2. Carroll Gardens-Columbia Street-Red Hook 3. Park Slope-Gowanus 4. DUMBO-Vinegar Hill-Downtown Brooklyn-Boerum Hill 5. Windsor Terrace 6. Prospect Heights 7. Fort Greene 8. Greenpoint	1. Stuyvesant Heights 2. Crown Heights North 3. Bushwick North 4. Ocean Hill 5. Brownsville 6. East New York 7. Cypress Hills-City Line 8. East New York (Pennsylvania Ave) 9. Erasmus 10. Rugby-Remsen Village
Security	
1. Windsor Terrace 2. Kensington-Ocean Parkway 3. Ocean Parkway South 4. Borough Park	1. Seagate-Coney Island 2. Stuyvesant Heights 3. Crown Heights North 4. Fort Greene 5. Ocean Hill 6. Brownsville 7. East New York 8. East New York (Pennsylvania Ave)

Manhattan

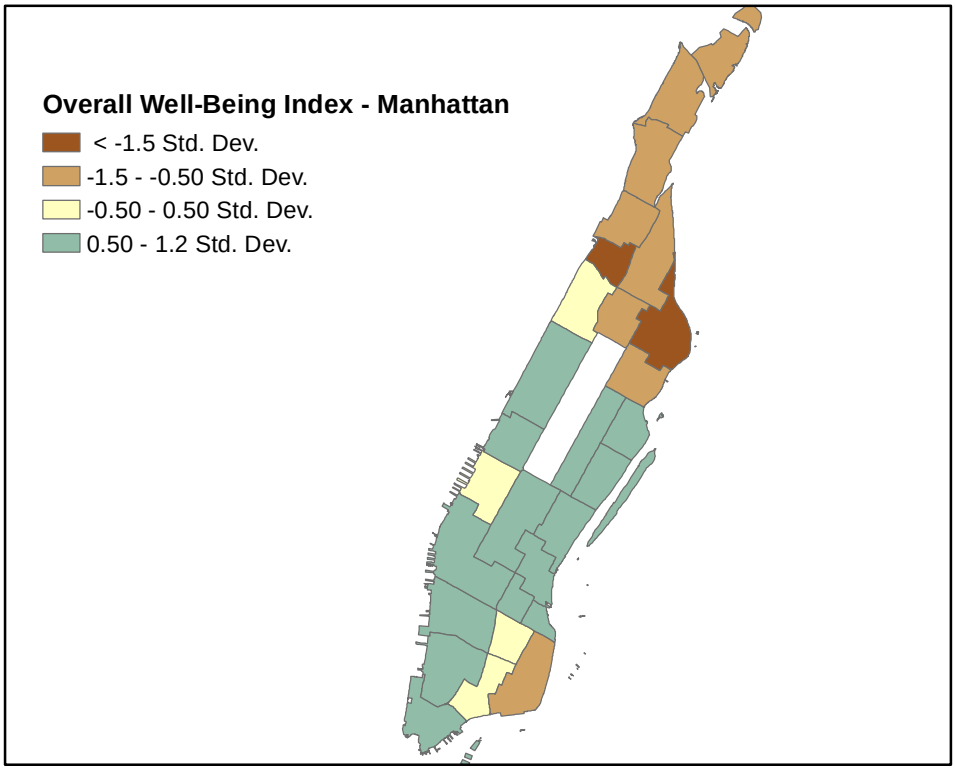


Figure 56: Map of Overall Well-Being in Manhattan

NTAs more than 1.5SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
Overall	
1. SoHo-TriBeCa-Civic Center-Little Italy 2. West Village 3. Upper East Side-Carnegie Hill 4. Turtle Bay-East Midtown	1. Manhattanville 2. East Harlem North 3. Washington Heights South 4. Hamilton Heights 5. Central Harlem North-Polo Grounds 6. Marble Hill-Inwood 7. Washington Heights North
Education	
1. SoHo-TriBeCa-Civic Center-Little Italy 2. Yorkville 3. Stuyvesant Town-Cooper Village 4. Gramercy 5. West Village 6. Turtle Bay-East Midtown	1. Washington Heights South 2. Hamilton Heights 3. Manhattanville 4. East Harlem North 5. Marble Hill-Inwood 6. Washington Heights North 7. Central Harlem North-Polo Grounds
Health	
1. Clinton 2. Lincoln Square 3. Lenox Hill-Roosevelt Island 4. Upper East Side-Carnegie Hill	1. East Harlem North 2. East Harlem South 3. Washington Heights North 4. Washington Heights South 5. Manhattanville 6. Central Harlem South 7. Hamilton Heights 8. Central Harlem North-Polo Grounds 9. Marble Hill-Inwood

Economic Security	
1. SoHo-TriBeCa-Civic Center-Little Italy 2. Turtle Bay-East Midtown 3. Upper East Side-Carnegie Hill 4. Battery Park City-3er Manhattan	1. East Harlem North 2. Central Harlem North-Polo Grounds 3. Washington Heights South 4. 3er East Side 5. Marble Hill-Inwood 6. East Harlem South 7. Washington Heights North
Core Infrastructure	
1. SoHo-TriBeCa-Civic Center-Little Italy 2. Battery Park City-3er Manhattan 3. Gramercy 4. West Village 5. Midtown-Midtown South	1. Marble Hill-Inwood 2. Washington Heights North 3. Hamilton Heights 4. Manhattanville 5. Washington Heights South 6. Central Harlem North-Polo Grounds
Economic Security	
5. SoHo-TriBeCa-Civic Center-Little Italy 6. Turtle Bay-East Midtown 7. Upper East Side-Carnegie Hill 8. Battery Park City-3er Manhattan	8. East Harlem North 9. Central Harlem North-Polo Grounds 10. Washington Heights South 11. 3er East Side 12. Marble Hill-Inwood 13. East Harlem South 14. Washington Heights North
Housing	
1. Stuyvesant Town-Cooper Village	1. Manhattanville 2. Hamilton Heights 3. Washington Heights South 4. East Harlem North
Security	
1. Yorkville 2. Lincoln Square 3. Turtle Bay-East Midtown 4. Lenox Hill-Roosevelt Island 5. Upper East Side-Carnegie Hill	1. Clinton 2. Midtown-Midtown South 3. East Harlem North 4. East Harlem South 5. Central Harlem North-Polo Grounds

Queens

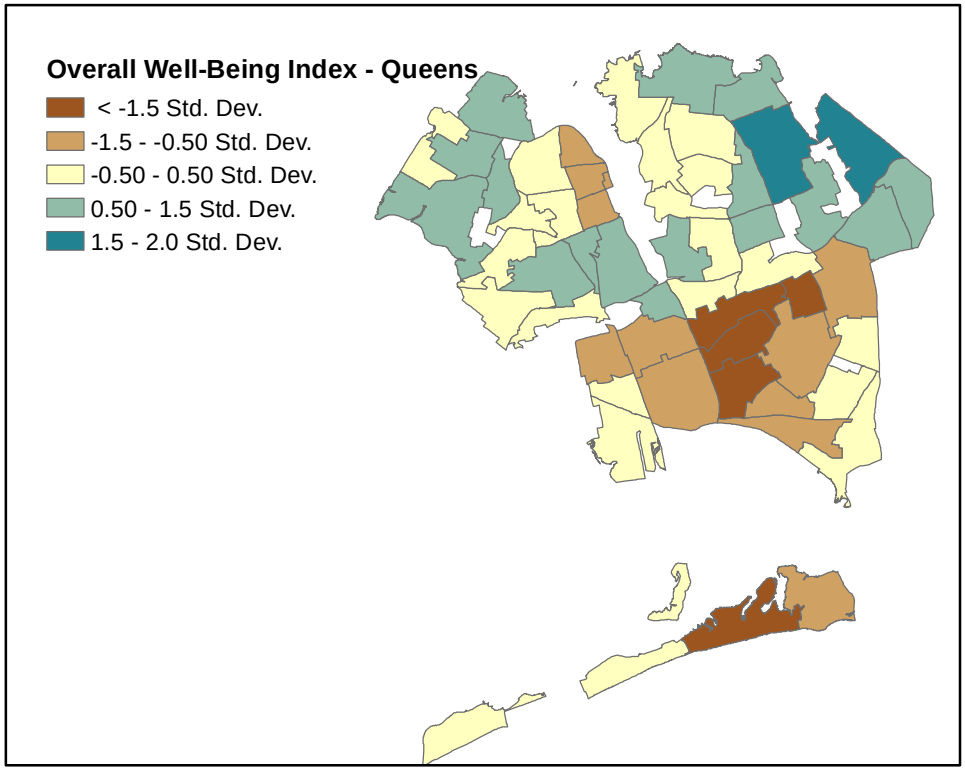


Figure 57: Map of Overall Well-Being in Queens

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
Overall	
1. Douglas Manor-Douglaston-Little Neck 2. Bayside-Bayside Hills 3. Oakland Gardens 4. Forest Hills 5. Hunters Point-Sunnyside-West Maspeth 6. Ft. Totten-Bay Terrace-Clearview 7. Middle Village 8. Whitestone 9. Glen Oaks-Floral Park-New Hyde Park	1. South Jamaica 2. Hammels-Arverne-Edgemere 3. Jamaica 4. Hollis 5. Baisley Park 6. Far Rockaway-Bayswater 7. Springfield Gardens South-Brookville 8. Springfield Gardens North 9. St. Albans
Education	
1. Douglas Manor-Douglaston-Little Neck 2. Forest Hills 3. Bayside-Bayside Hills 4. Oakland Gardens 5. Glen Oaks-Floral Park-New Hyde Park 6. Ft. Totten-Bay Terrace-Clearview 7. Fresh Meadows-Utopia	1. North Corona 2. South Jamaica 3. Hammels-Arverne-Edgemere 4. Ridgewood 5. Baisley Park 6. East Elmhurst 7. Corona 8. Ozone Park
Health	
1. Douglas Manor-Douglaston-Little Neck 2. Oakland Gardens 3. Bayside-Bayside Hills 4. Kew Gardens Hills	1. Jamaica 2. Briarwood-Jamaica Hills 3. South Jamaica 4. Far Rockaway-Bayswater

5. Fresh Meadows-Utopia 6. Auburndale 7. Queensboro Hill 8. Murray Hill 9. East Flushing 10. College Point 11. Ft. Totten-Bay Terrace-Clearview 12. Pomonok-Flushing Heights-Hillcrest 13. Flushing	5. St. Albans 6. Baisley Park 7. Hollis 8. Springfield Gardens South-Brookville 9. Hammels-Arverne-Edgemere 10. Springfield Gardens North
Economic Security	
1. Rosedale 2. Hunters Point-Sunnyside-West Maspeth 3. Douglas Manor-Douglaston-Little Neck 4. Cambria Heights 5. Oakland Gardens 6. North Corona 7. Elmhurst-Maspeth 8. Bellerose	1. Hammels-Arverne-Edgemere 2. South Jamaica 3. Queensbridge-Ravenswood-Long Island City 4. Pomonok-Flushing Heights-Hillcrest 5. Jamaica 6. Hollis 7. Far Rockaway-Bayswater
Core Infrastructure	
1. Hunters Point-Sunnyside-West Maspeth 2. Queensbridge-Ravenswood-Long Island City 3. Glendale 4. Whitestone 5. Old Astoria 6. Astoria 7. Middle Village 8. Steinway 9. Douglas Manor-Douglaston-Little Neck	1. Hammels-Arverne-Edgemere 2. Springfield Gardens North 3. St. Albans 4. Cambria Heights 5. Springfield Gardens South-Brookville 6. Hollis 7. Laurelton 8. Rosedale 9. South Jamaica
Housing	
1. Ft. Totten-Bay Terrace-Clearview 2. Kew Gardens 3. Forest Hills 4. Bellerose 5. Hunters Point-Sunnyside-West Maspeth 6. Glen Oaks-Floral Park-New Hyde Park 7. Lindenwood-Howard Beach 8. Oakland Gardens 9. Middle Village	1. South Jamaica 2. Jamaica 3. North Corona 4. Far Rockaway-Bayswater 5. East Elmhurst 6. Baisley Park 7. South Ozone Park 8. Corona 9. Hollis
Security	
1. Forest Hills 2. Fresh Meadows-Utopia 3. Douglas Manor-Douglaston-Little Neck 4. Oakland Gardens 5. Rego Park 6. Ft. Totten-Bay Terrace-Clearview 7. Whitestone 8. Kew Gardens Hills 9. Auburndale	1. Hammels-Arverne-Edgemere 2. Springfield Gardens South-Brookville 3. South Jamaica 4. Springfield Gardens North 5. Queensbridge-Ravenswood-Long Island City 6. Jamaica 7. Hollis 8. Far Rockaway-Bayswater 9. Baisley Park 10. St. Albans

Staten Island

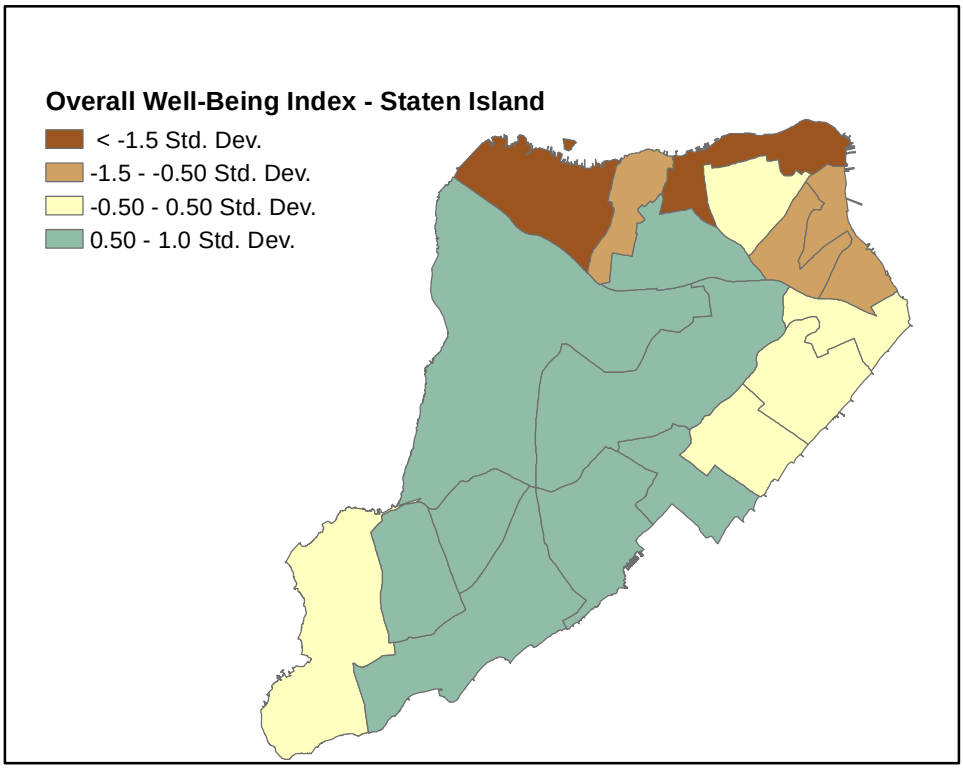


Figure 58: Map of Overall Well-Being in Staten Island

NTAs more than 1.5 SD ABOVE the mean	NTAs more than 1.5 SD BELOW the mean
Overall	
None	1. West New Brighton-New Brighton-St. George 2. Mariner's Harbor-Arlington-Port Ivory-Graniteville 3. Stapleton-Rosebank
Education	
1. Westerleigh 2. Oakwood-Oakwood Beach 3. Todt Hill-Emerson Hill-Heartland Village-Lighthouse Hill	1. Port Richmond 2. Mariner's Harbor-Arlington-Port Ivory-Graniteville 3. West New Brighton-New Brighton-St. George
Health	
1. Rossville-Woodrow 2. Arden Heights 3. Oakwood-Oakwood Beach 4. Charleston-Richmond Valley-Tottenville	1. Port Richmond 2. Stapleton-Rosebank 3. Mariner's Harbor-Arlington-Port Ivory-Graniteville 4. West New Brighton-New Brighton-St. George
Economic Security	
1. Todt Hill-Emerson Hill-Heartland Village-Lighthouse Hill 2. Charleston-Richmond Valley-Tottenville 3. Rossville-Woodrow 4. Great Kills	1. West New Brighton-New Brighton-St. George 2. Grymes Hill-Clifton-Fox Hills 3. Mariner's Harbor-Arlington-Port Ivory-Graniteville
Core Infrastructure	
1. Old Town-Dongan Hills-South Beach 2. Westerleigh 3. New Brighton-Silver Lake	1. Mariner's Harbor-Arlington-Port Ivory-Graniteville 2. Charleston-Richmond Valley-Tottenville 3. Great Kills 4. Rossville-Woodrow 5. Arden Heights

Housing	
1. Rossville-Woodrow 2. Arden Heights 3. Annadale-Huguenot-Prince's Bay-Eltingville 4. Great Kills	1. West New Brighton-New Brighton-St. George 2. Stapleton-Rosebank 3. Port Richmond 4. Mariner's Harbor-Arlington-Port Ivory-Graniteville
Security	
1. Great Kills	1. West New Brighton-New Brighton-St. George 2. Stapleton-Rosebank 3. Port Richmond

IV. Index Methodology

Data Limitations and Time Range

The measurement specificity of indicators included in the index was significantly limited by the availability of data. For example, many data points derived from the American Community Survey can only be obtained at the neighborhood level by combining the samples from the past five years (2009 to 2013). Therefore, such data provides only an indication of the average over the past five years, rather than the specific measure for a particular year. At the same time, some indicators—for example those that utilize data from New York City agencies—can be updated annually. However, because this index incorporates data from various sources, including those that average data from the last five years, the well-being index cannot be considered an accurate measure of the target year. This well-being index must instead be thought of as approximating the current state of welfare as derived from data during the past five years; in other words, the well-being of New Yorkers during the time period 2009-2013.

Geographic Tabulation Unit

Many different local geographical units exist and are employed by researchers in different fields. Federal government organizations, like the Census Bureau, and local government organizations, like the Department of City Planning, use different geographic areas when tabulating data for statistical purposes.[15] The Census Bureau organizes data by census tracts and census blocks as their most basic units of measurement. New York City agencies aggregate these into nearly two hundred Neighborhood Tabulation Areas (NTAs), which can further be combined to form fifty-five Public Use Microdata Areas (PUMAs). These fifty-five areas are a close approximation of, but not coterminous with, the fifty-nine community boards that are defined by the New York City Department of City Planning. For more details, please see the maps presented in the appendix.

Differences in spatial units between disciplines are evident when examining the geographic measurements referenced across domains of this index. Data available for education indicators are usually presented by school, information on health is generally presented in by United Hospital Funds (UHFs), and information on crime is aggregated at the precinct level. Some variation exists even within domains, depending on the best source of data for the measure; for some indicators on education (proficiency rate), housing (last known residence of shelter applicants), and crime (the victimization rate) information was extracted from New York City agency reports.

Statistical techniques were employed to modify the data units in order to reach the desired geographic unit, which is the NTA level. All data sourced from the census or American Community Survey (ACS) was simply aggregated from census tract to NTA using the relationship files available from many city agencies.[16] In the case of the data and reports available by address, after being geocoded they were again simply aggregated to the NTA level. The most challenging transformation was for indicators using precincts and UHFs, because these spatial units do not match the Census Bureau units. For both, the process was to transform the variables to the smaller units that match with census tracts. In the case of UHFs, the information was transformed to ZCTAs, using well-known relationships between these units.[17] Then, the information on ZCTAs was disaggregated to the block level, using relationship files from the Census Bureau.[18] We used the lowest geographical level possible in an attempt to utilize the most representative data possible when aggregating and weighting back up

[15] For Census Tract to NTA we used the relationship files from the Department of City Planning.
New York City Department of City Planning, (2010). *Population New York City Geographies* Accessed March 2015 http://www.nyc.gov/html/dcp/html/census/demo_tables_2010.shtml

[16] For Census Tract to NTA we used the relationship files from the Department of City Planning. Accessed March 2015 http://www.nyc.gov/html/dcp/html/census/demo_tables_2010.shtml

[17] In several documents, the Department of Health provides the relationship between these two units.
New York City Department of Health (date unknown) *UHF Codes: United Hospital Fund Codes.*
Accessed March 2015. http://www.nyc.gov/html/doh/downloads/pdf/ah/zipcodetable.pdf

[18] United States Census Bureau (2010). *Census Block Relationship*. Files Accessed March 2015. Retrieved from https://www.census.gov/geo/maps-data/data/rel_blk_download.html

to the NTA level. To bring data from UHFs to ZCTAs and from ZCTAs to Blocks the critical assumption necessary was to assume the value of the indicator for a larger unit to be representative of the value of the smallest unit. Once we had the data by Blocks, we simply had to aggregate to Census Tract and NTAs. Finally, for precincts we found a relationship between this unit and census blocks (Keefe, 2011). Then, the process to aggregate was similar to the one followed for UHFs.

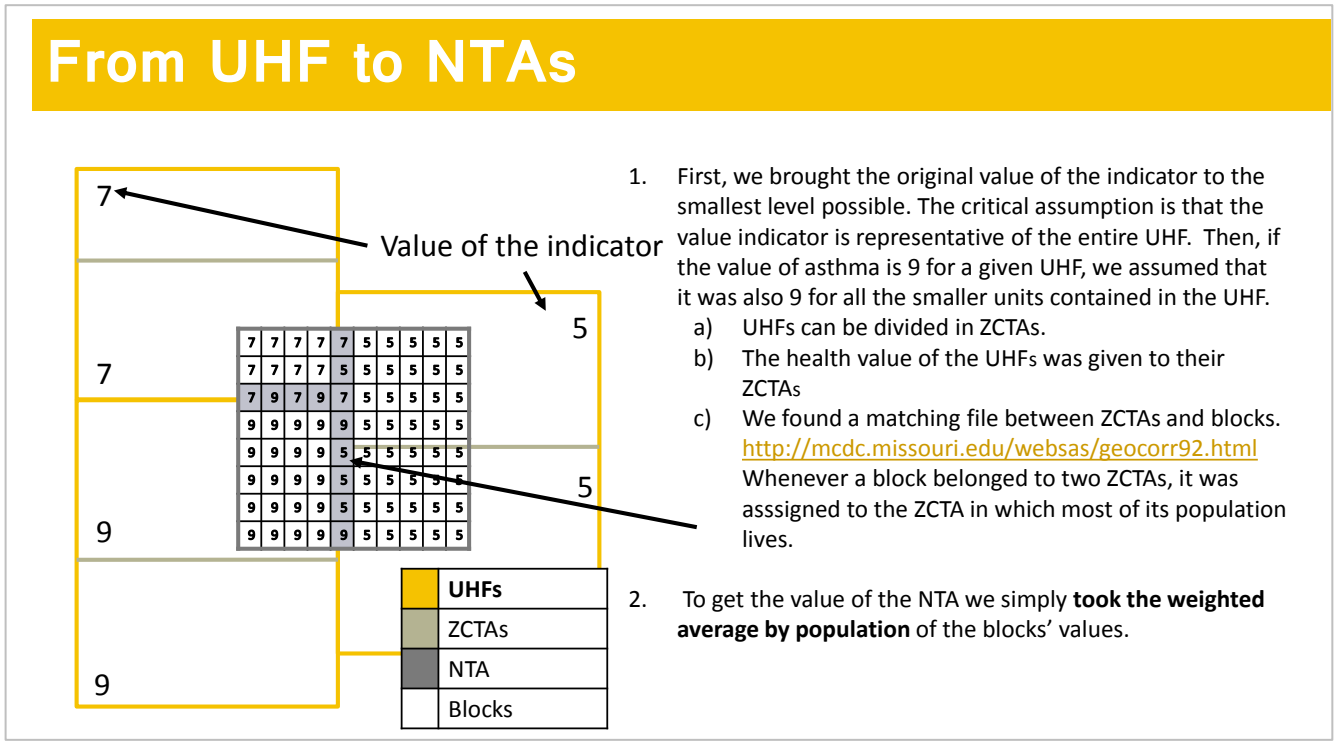


Figure 59: Conversion of United Hospital Fund Areas to Neighborhood Tabulation Areas (2015)

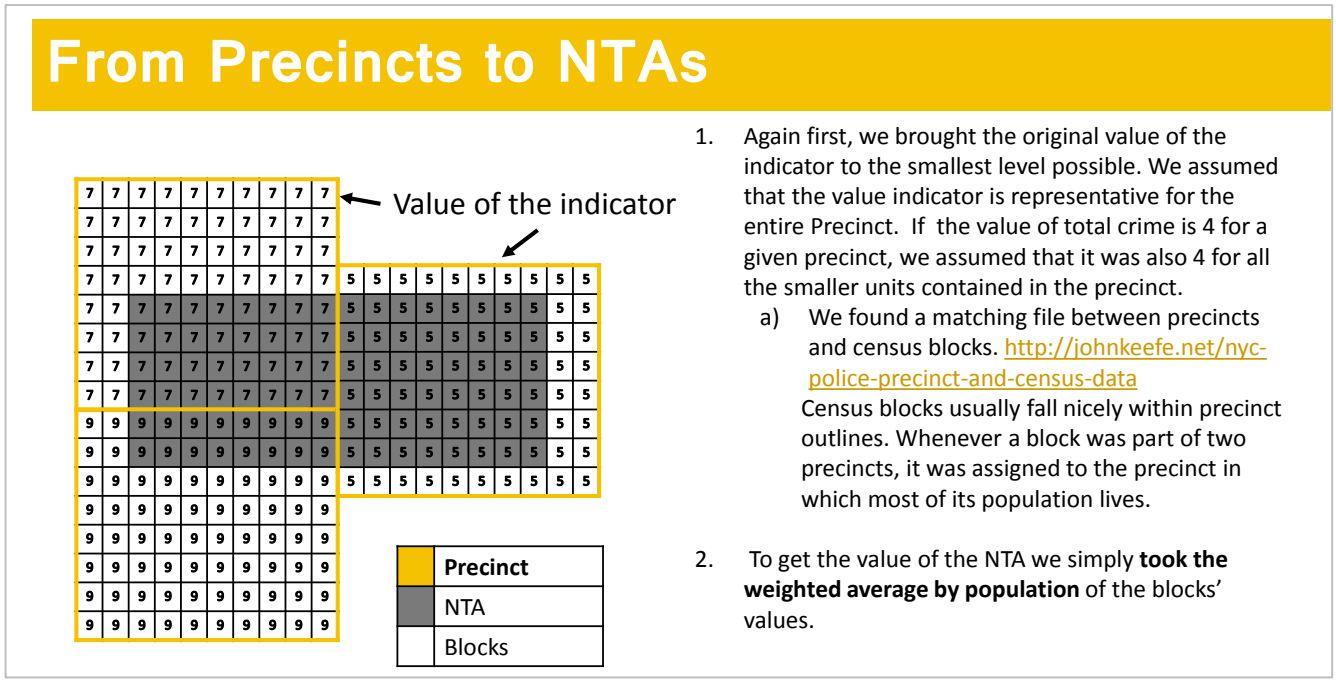


Figure 60: Conversion of Police Precincts to Neighborhood Tabulation Areas (2015)

One variable in the education domain, the results of the English and math tests, also posed a challenge in terms of aggregation. The results for this indicator are at the school district level, which again does not correspond with the Census Bureau geographic units. Here, to overcome that problem, we collected the results by school, we geocoded the addresses of the schools and then we assigned the NTAs the averages of the schools within them.

In order to aggregate the variables from Blocks to Census Tracts and from Census Tracts to NTAs, we weighted the indicators to take into account the fact that the smaller units have different relative sizes in terms of population within their NTAs. We weighted using different variables depending on the indicator (See Table 1 in the Appendix B).

Further details on the creation and transformation of the variables can be found in the Appendix A.

Index Creation Process

Index creation has gained importance in different research areas and in many international organizations, because it provides an intuitive way to compare and identify common trends across separate indicators. Indexing also provide us with new information when no single indicator can measures the entire dimension of interest. This is the case of well-being in New York City. For the creation of NYC Well Being Index we followed other reports and manuals closely regarding how best to build composite indicators, especially Measure of America's Opportunity Index and the OECD Handbook on Constructing Composite Indicators.

Pros and Cons of Composite Indicators[19]	
Pros	**Cons**
• Can summarize complex, multi-dimensional realities with a view to supporting decision makers. • Are easier to interpret than a battery of many separate indicators. • Can assess progress of countries over time. • Reduce the visible size of a set of indicators without dropping the underlying information base. Thus make it possible to include more information within the existing size limit. • Facilitate communication with general public (*i.e.* citizens, media, *etc.*) and promote accountability. • Help to construct/underpin narratives for lay and literate audiences. • Enable users to compare complex dimensions effectively.	• May send misleading policy messages if poorly constructed or misinterpreted. • May invite simplistic policy conclusions. • May be misused, *e.g.* to support a desired policy, if the construction process is not transparent and/or lacks sound statistical or conceptual principles. • The selection of indicators and weights could be the subject of political dispute. • May disguise serious failings in some dimensions and increase the difficulty of identifying proper remedial action, if the construction process is not transparent. • May lead to inappropriate policies if dimensions of performance that are difficult to measure are ignored.

Table 8: Pros and Cons of Composite Indicators

The first step towards the construction of a sound composite index is its theoretical framework. Without such grounding, the index can lead to disputable policy messages, in spite using a correct methodology in its construction. For the NYC Well-Being Index, we have reviewed existing literature on well-being, as well as other indices used for the main international organizations and NGOs that research well-being. The domains selected also match the current NYC Mayor's Office policy domains and priorities, which guide efforts to foster improved well-being for New Yorkers. The indicator selection process was a collaboration between the SIPA Capstone team, the CIDI team, and policy makers from NYC agencies relevant to the chosen domains. The indicators were selected based on the availability of the data, the quality and explanatory power of the variables, and the

[19] Table from OECD. Handbook on Constructing Composite Indicators (Paris: OECD, 2008).

most up to date information. The expected longevity of the variable (if we expected that the indicator would continue to exist in the future) was also considered.

Correlation Analysis

We performed a correlation analysis in STATA to ensure data validity. The table on the next page shows correlation between variables. Darker shades of blue indicate the most significant and meaningful correlations. For example, Median income has a strong positive correlation with employment (0.73).

	Commute Time	Income	Employment	Unemployment	Housing Burden	Rent Burden	Housing Violations	Homeless rate	Low Birth	No medical care	Insured	Healthy Status	Healthy Habits	Teen pregnancy rate	Asthma	Bad Health	BA Grads	Proficient Childrn	PreK Enrollment	Victimization Rate
Commute Time																				
Income	0.46																			
Employment	0.47	0.73																		
Unemployment	0.42	0.71	0.61																	
Housing Burden	0.48	0.56	0.41	0.42																
Rent Burden	0.46	0.72	0.56	0.46	0.66															
Housing Violations	0.17	0.60	0.35	0.63	0.25	0.48														
Homeless rate	0.21	0.56	0.49	0.73	0.34	0.34	0.63													
Low Birth	0.30	0.15	0.19	0.41	0.16	0.13	0.33	0.44												
No medical care	0.15	0.39	0.13	0.44	0.12	0.20	0.52	0.39	0.25											
Insured	0.33	0.61	0.30	0.39	0.46	0.53	0.35	0.29	0.02	0.34										
Healthy Status	0.27	0.65	0.54	0.63	0.29	0.50	0.56	0.53	0.26	0.44	0.38									
Healthy Habits	0.11	0.03	0.16	0.07	0.02	0.00	0.03	0.11	0.08	-0.17	-0.16	-0.11								
Teen pregnancy rate	0.14	0.37	0.23	0.40	0.23	0.34	0.44	0.35	0.16	0.23	0.18	0.29	0.02							
Asthma	-0.08	0.46	0.34	0.59	0.09	0.18	0.67	0.75	0.47	0.34	0.18	0.54	0.12	0.32						
Bad Health	0.63	0.58	0.62	0.51	0.42	0.46	0.35	0.41	0.49	0.28	0.35	0.62	0.05	0.17	0.40					
BA Grads	0.65	0.78	0.75	0.65	0.70	0.70	0.49	0.54	0.30	0.31	0.52	0.54	0.07	0.34	0.35	0.67				
Proficient Children	0.44	0.70	0.51	0.68	0.46	0.52	0.60	0.62	0.48	0.51	0.39	0.55	0.11	0.40	0.54	0.58	0.74			
PreK Enrollment	0.47	0.65	0.50	0.38	0.49	0.58	0.34	0.26	-0.04	0.20	0.45	0.39	-0.03	0.22	0.10	0.47	0.64	0.44		
Victimization Rate	0.21	0.61	0.55	0.71	0.30	0.33	0.59	0.81	0.39	0.33	0.25	0.45	0.10	0.45	0.70	0.40	0.54	0.66	0.32	
Crime	-0.35	0.04	-0.06	0.21	-0.06	-0.10	0.23	0.37	0.18	0.13	0.03	0.01	0.02	0.08	0.43	-0.12	-0.13	0.19	-0.17	0.39

Table 9: Indicator Correlation Analysis (2015)

Excluded Data

Before proceeding with the construction of the index, we completed a careful analysis of the data at hand that was deemed inapplicable. Seven NTAs, due to their population characteristics of null or considerable small population, either had no data or presented outliers (e.g. unemployment of 0%). We decided to exclude these NTAs from the index construction process. Their final value would not show a realistic well-being state. Additionally, these outliers would create bias in the normalization process for the other NTAs.

NTA Code	NTA Name
BK99	park-cemetery-etc.-Brooklyn
BX98	Rikers Island
BX99	park-cemetery-etc.-Bronx
MN99	park-cemetery-etc.-Manhattan
QN98	Airport
QN99	park-cemetery-etc.-Queens
SI99	park-cemetery-etc.-Staten Island

Table 10: NTAs with no Data (2015)

Normalization Process

Because data is presented in different units of measurement (percentages, rates, absolute values, etc.), it is not possible to aggregate them directly. Data needs to be normalized first. The selected method for normalization is the minimum-maximum technique, employed by the Human Development Index of the United Nations Development Program (UNDP, 2015).

The Minimum-Maximum normalizes indicators to have an identical range [0, 1] by subtracting the minimum value and dividing by the range of the indicator values. Although outliers could distort the transformed indicator, this type of normalization could widen the range of indicators lying within a small interval, increasing the effect on the composite indicator more than the z-score transformation (standardization). Finally, another advantage, especially over the standardization technique, is that the range [0,1] provides an easy interpretation of each variable and the final index (OECD, European Union, JRC, 2008).

$$I = \frac{X - Minimum}{Maximum - Minimum}$$

Weights

After normalization, the variables are ready for weighting and aggregation to a full index. There are a number of different weighting techniques. All of them have significant effect on the overall indicator and “regardless of which method is used, weights are essentially value judgments” (OECD, European Union, JRC, 2008). The method selected for the NYC Well-Being Index was equal weighting.

Equal weighting is present in most composite indicators. This means that all domains are worth the same in the final index. It is important to make clear that equal weighting does not mean the absence of weight;

the weight is decided to be equal. That means that all six domains present in the index have the same weight in the final index. We consider education as important as economic security, and personal and community safety as important as health, and core infrastructure and services as important as housing, and so on. The aggregation simply follows a linear equation to weight the domains in the same proportion. This process is also used in the construction of other indices such as the Opportunity Index of Measure for America (2014). We first take the average of all the variables for a given domain to have the domain score and then we take the average of the domains to get the value of the index.

For a given NTA,

$$NYC\ Well-Being\ Index = \frac{\sum \mu d}{n}$$

Where $\sum \mu d$ is the sum of the score of each domain and *n* is the number of domains.

Data Validation

In order to validate the final categories, the team conducted a correlation analysis of all domains, as well as the final index. As the table shows, all domains that are correlated with each other show the correct signs. Since all indices are constructed to be positive (i.e. variables that were negative in construct – for example homeless shelter entry indicator – were subtracted, and positive were added), all domains are positively correlated with each other.

	NYC Well Being Index	*Core Infra-structure and services*	*Economic Security*	*Housing*	*Health*	*Education*
Core Infrastructure and services	0.65					
Economic Security	0.92	0.51				
Housing	0.89	0.41	0.80			
Health	0.85	0.40	0.76	0.78		
Education	0.92	0.61	0.82	0.80	0.74	
Personal and Community Safety	0.61	0.02	0.58	0.59	0.58	0.44

Table 11: Domain Correlation Analysis (2015)

V. Appendix

A. Step-by-Step Data Processing

Education

Indicator: BA graduation rate Data:

1. Navigate to American Fact Finder > Download Center
2. Get the information from the American Community Survey / 5 year estimates / Census Tract level / New York State/ table S1501 “Education attainment”.

- Open the CSV file:

1. Save the file as .xlsx
2. Filter the data only to include counties: 005, 047, 061, 081 and 085, which represent New York City. There should be 2167 observations in total (number of census tract in all 5 boroughs).
3. The variable of interest is “Population 25 years and over with Bachelor’s degree”.
4. In a new column, we divided the number of students with Bachelor degree income by the sum of population 25 years or over in the NTA where that census tract belongs. We did this dividing the income by the command =SUMIF to find the other values of the NTA. This is the weighted percentage of the population 25 years or over that has a BA degree of that census tract.
5. To aggregate the information by NTA, we simply added up this weighted values of the census tracts that belong to a given NTA.

Indicator: Preschool enrollment:

1. Navigate to American Fact Finder > Download Center
2. Get the information from the American Community Survey / 5 year estimates / Census Tract level / New York State/ table S1401 “School enrollment”.

- Open the CSV file:

1. Save the file as .xlsx
2. Filter the data only to include counties: 005, 047, 061, 081 and 085, which represent New York City. There should be 2167 observations in total (number of census tract in all 5 boroughs).
3. The variable of interest is “Population 25 years and over with Bachelor’s degree”.
4. We added a new column with information of the population between 3-4 years old. We obtained the variable also from the American Fact Finder (Table B09001).
5. In a new column, we divided the number of children enrolled in preschool and nursery schools by the sum of population between 3 and 4 years old in the NTA where that census tract belongs. We did this dividing the income by the command =SUMIF to find the other values of the NTA. This is the weighted preschool enrollment percentage of that census tract.
6. To aggregate the information by NTA, we simply added up this weighted values of the census tracts that belong to a given NTA.

Indicator: Preschool enrollment:

1. Navigate to the Department of Education webpage http://schools.nyc.gov/default.htm
2. Go to performance and accountability> school quality reports> citywide results and download “2013-14 School Quality reports results for all schools”.

- Open the CSV file:

1. Save the file as .xlsx
2. Filter the data only to include 3,4 and 5^{th} grades.
3. Identify and separate in two different columns the number of students that presented the English and Math test and the number of students that obtained “proficient” in the exam.
4. Geocode the schools.

5. Aggregate the information of both columns by NTA using the command =SUMIF using the NTA codes.
6. Finally divide the number of students that got "proficient" by the total number of students that presented the exam to have a percentage rate.

Health Domain

After the following transformations, all variables except teen pregnancy rate and insurance coverage, were modified to change the geographical unit from UHF to NTA. Please refer to the methodology section of the report for a description of this process. Teen pregnancy rates and insurance coverage were obtained from ACS at the Census Tract level. They only required a weighed aggregation to group the values into NTAs. See the description below.

Indicator: Asthma (composite)

- Self-Reported Asthma
    1. Enter NYC Epiquery: https://a816-healthpsi.nyc.gov/epiquery/
    2. Choose Community Health Survey year of interest under "Survey Modules."
    3. Click "Asthma ever" and then "Submit."
    4. On the "Refine these results" menu on the right hand side of the screen choose "Show results with neighborhood map (34 United Hospital Fund Neighborhoods)" and then "Submit."
    5. At the bottom of the page click "Download Results (CSV)"
- PM2.5-Attributable Asthma Emergency Department Visits for children and adults:
    1. Enter the NYC Environment and Health Data Portal: http://a816-dohbesp.nyc.gov/IndicatorPublic/publictracking.aspx
    2. Choose "Explore Environmental Data"
    3. Under the category "Outdoor Air and Weather" choose "Health Impacts of Air Pollution."
    4. Click the link for "PM2.5-Attributable Asthma Emergency Department Visits"
    5. In the upper right-hand corner click "Export;" the downloaded Excel spreadsheet will contain the data for children in one column and adults in the next.
- Creating the composite:
    1. Copy the three datasets into one spreadsheet, matching their UHFs.
    2. Obtain a single score for each UHF (row) by multiplying each of the columns by (1/3).

Indicator: Poor Health - Composite

- Self-Reported Diabetes
    1. Enter NYC Epiquery: https://a816-healthpsi.nyc.gov/epiquery/
    2. Choose Community Health Survey year of interest under "Survey Modules."
    3. Click "Diabetes ever" and then "Submit."
    4. On the "Refine these results" menu on the right hand side of the screen choose "Show results with neighborhood map (34 United Hospital Fund Neighborhoods)" and then "Submit."
    5. At the bottom of the page click "Download Results (CSV)"
- Self-Reported High Blood Pressure
    1. Enter NYC Epiquery: https://a816-healthpsi.nyc.gov/epiquery/
    2. Choose Community Health Survey year of interest under "Survey Modules."
    3. Click "High Blood Pressure ever" and then "Submit."
    4. On the "Refine these results" menu on the right hand side of the screen choose "Show results with neighborhood map (34 United Hospital Fund Neighborhoods)" and then "Submit."
    5. At the bottom of the page click "Download Results (CSV)"
- Obesity
    1. Enter NYC Epiquery: https://a816-healthpsi.nyc.gov/epiquery/
    2. Choose Community Health Survey year of interest under "Survey Modules."
    3. Click "Overweight and Obesity" and then "Submit."

4. On the “Refine these results” menu on the right hand side of the screen choose “Show results with neighborhood map (34 United Hospital Fund Neighborhoods)” and then “Submit.”
5. At the bottom of the page click “Download Results (CSV)”
6. Sort the data in the spreadsheet by “bmicat3” and extract only the data for “Obese.”

- Creating the composite:
  1. Copy the three datasets into one spreadsheet, matching their UHFs.
  2. Obtain a single score for each UHF (row) by multiplying each of the columns by (1/3).

Indicator: Self-Reported Health Status

1. Enter NYC Epiquery: https://a816-healthpsi.nyc.gov/epiquery/
2. Choose Community Health Survey year of interest under “Survey Modules.”
3. Click “Self-reported health status” and then “Submit.”
4. On the “Refine these results” menu on the right hand side of the screen choose “Show results with neighborhood map (34 United Hospital Fund Neighborhoods)” and then “Submit.”
5. At the bottom of the page click “Download Results (CSV)”

- Creating the composite:
  1. Sort the dataset by “genhlt4” and extract the “percent” columns for each of the four categories (poor for fair health, good health, very good health, and excellent health).
  2. Set the four percentage columns side-by-side matching their UHFs.
  3. Obtain a single score for each UHF (row) using this formula: self-reported health status = ((poor for fair health * 1) + (good health * 2) + (very good health * 3) + (excellent health * 4) / 4).

Indicator: Healthy Eating Habits

1. Enter NYC Epiquery: https://a816-healthpsi.nyc.gov/epiquery/
2. Choose Community Health Survey year of interest under “Survey Modules.”
3. Click “Fruit/vegetable consumption” and then “Submit.”
4. On the “Refine these results” menu on the right hand side of the screen choose “Show results with neighborhood map (34 United Hospital Fund Neighborhoods)” and then “Submit.”
5. At the bottom of the page click “Download Results (CSV)”

- Creating the composite:
  1. Sort the dataset by “fruitv3” and extract the “percent” columns for each of the three categories (none, 1-4, and 5 or more).
  2. Set the three percentage columns side-by-side matching their UHFs.
  3. Obtain a single score for each UHF (row) using this formula: healthy eating habits = ((no fruit * 1) + (some fruit * 2)+ (five fruit * 3) / 3).

Indicator: Low Birth Weight

1. Enter NYC Vital Statistics: http://www.nyc.gov/html/doh/html/data/vs-summary.shtml
2. Under the menu forEpiquery for Vital Statistics Data choose “Birth Module”
3. Select the year of interest from the drop down menu and then click “Submit.”
4. On the “show results by” menu on the right hand side of the screen choose “Mother's Neighborhood of Residence (United Hospital Fund neighborhoods) ” and then “Submit.”
5. Click “Download Results (CSV)”
6. Extract the column for “LowBirthWeight%.”

Indicator: Did Not Receive Medical Care

- Self-Reported: To not having received medical care in the past 12 months, when it was needed**.**

1. Enter NYC Epiquery: https://a816-healthpsi.nyc.gov/epiquery/
2. Choose Community Health Survey year of interest under "Survey Modules."
3. Click "Did not get needed medical care" under the category "Access to Health Care" and then "Submit."
4. On the "Refine these results" menu on the right hand side of the screen choose "Show results with neighborhood map (34 United Hospital Fund Neighborhoods)" and then "Submit."
5. At the bottom of the page click "Download Results (CSV)"

Indicator: Insurance Coverage

1. Navigate to American Fact Finder > Download Center
2. Get the information from the American Community Survey / 5 year estimates / Census Tract level / New York State/ table S2701 "Health Insurance coverage status".
3. Open the CSV file and save as an .xlsx file.
4. Filter the data only to include counties: 005, 047, 061, 081 and 085, which represent New York City. There should be 2167 observations in total (number of census tract in all 5 boroughs).
5. The variable of interest is "Health Insurance Coverage".
6. We added a new column with information of the total population for each census tract. We obtained the variable also from the American Fact Finder.
7. In a new column, we divided the value of the insurance coverage by sum of the total population in the NTA where that census tract belongs. We did this dividing the health coverage by the command =SUMIF to find the other values of the NTA. This is the weighted health coverage of that census tract.
8. To aggregate the information by NTA, we simply added up the weighted health coverage values of the census tracts that belong to a given NTA.

Indicator: Teen Pregnancy

1. Navigate to American Fact Finder > Download Center
2. Get the information from the American Community Survey / 5 year estimates / Census Tract level / New York State/ table S1301 "Fertility".
3. Open the CSV file and save as an .xlsx file.
4. Filter the data only to include counties: 005, 047, 061, 081 and 085, which represent New York City. There should be 2167 observations in total (number of census tract in all 5 boroughs).
5. The variable of interest is "Women 15-19 years with births in the past 12 months, rate per 1000 women".
6. Divide the value of variable of interest by the sum total women 15-19 years in the NTA where that census tract belongs. The variable is available in the same table S1301. Divide the variable by the command =SUMIF to find the other values of the NTA. This is the weighted teen pregnancy rate of that census tract.
7. To aggregate the information by NTA, add up the weighted teen pregnancy rate values of the census tracts that belong to a given NTA.

Economic Security Domain

Indicator: Income Data:

1. Navigate to American Fact Finder > Download Center
2. Get the information from the American Community Survey / 5 year estimates / Census Tract level / New York State/ table B19013 "Median household income in the past 12 months (in 2013 inflation-adjusted dollars)".

- Open the CSV file:

1. Save the file as .xlsx
2. Filter the data only to include counties: 005, 047, 061, 081 and 085, which represent New York City. There should be 2167 observations in total (number of census tract in all 5 boroughs).

3. The variable of interest is “Estimate; Median household income in the past 12 months (in 2013 inflation-adjusted dollars)”.
4. We added a new column with information of the number of employed persons for each census tract. We obtained the variable also from the American Fact Finder.
5. In a new column, we divided the value of median household income by the sum of employed persons in the NTA where that census tract belongs. We did this dividing the income by the command =SUMIF to find the other values of the NTA. This is the weighted median household income of that census tract.
6. To aggregate the information by NTA, we simply added up the weighted median household income values of the census tracts that belong to a given NTA.

Indicator: Employment and Unemployment Data:

1. Navigate to American Fact Finder > Download Center
2. Get the information from the American Community Survey / 5 year estimates / Census Tract level / New York State/ table S2301 “Employment status”.

- Open the CSV file:

1. Save the file as .xlsx
2. Filter the data only to include counties: 005, 047, 061, 081 and 085, which represent New York City. There should be 2167 observations in total (number of census tract in all 5 boroughs).
3. The variables of interest are “Employed; Estimate; Population 16 years and over” and “Unemployment rate; Estimate; Population 16 years and over”.
4. We added a new column with information of size of the labor force (population 16 or more years old) the number of employed persons for each census tract. This variable is in the same table S2301.
5. In a new column, we divided the values of employment and unemployment by the sum of employed persons in the NTA where that census tract belongs. We did this dividing the income by the command =SUMIF to find the other values of the NTA. These are the weighted employment and unemployment rates.
6. To aggregate the information by NTA, we simply added up the weighted variables of the census tracts that belong to a given NTA.

Housing Domain

Indicator: Housing Violations

- Open Violations Data:

1. Navigate to NYC Open Data> Housing & Development
2. In the search box, type “Housing Maintenance Code Violations”
3. Filter the data to limit to:
    a. Code C violations only
    b. Filter NOV Issue date for year of interest
    c. Export to CSV

   In order to obtain residential units and census tract, you must match to Pluto Data

- Open Pluto Data:

1. Access Pluto Download at NYC Planning Website
2. Download the zip file. Each borough is a separate file, so work with one at a time.
3. In each of these files, you can delete all columns except:
    a. Address
    b. Box
    c. Lot
    d. CT2010
    e. Unitsres

- Matching Data:

There is a lot of formatting and editing needed to match these two datasets. This may be done more easily in a platform like sql or spss in future iterations where joins allow for quick matching.

1. Prepare Violations Data:
    a. House Number and Street are separated by columns. Create a new column titled “Full Address”.
    b. In first row, use a concatenate formula to join the two columns with a space in between. Ex: =CONCATENATE(A2,” “,B2). This is necessary in order to match to the address column in PLUTO data.
    c. For those addresses that don’t match on PLUTO, you will need to match on Box & Lot instead, which is a less accurate match. However, given the small discrepancies, this will have minimal impact on the overall NTA level data. Use a concatenate formula to join Box & Lot. Ex: =CONCATENATE(C2,”,”,D2).
    d. We transformed the new information on Box & Lot into values.
    e. Hide all unnecessary columns. You only need Full Address and BoxLot. Add the following columns to the spreadsheet:
        i. PLUTO Address
        ii. Census Tract
        iii. CT_6Digit
        iv. GEO ID

Prepare PLUTO Data

1. Create a concatenated column for BoxLot, as you did above.

Matching on Address

a) You will first search for all matching addresses. In column “PLUTO Address”, perform an exact match VLOOKUP. Search for “Full Address” in the PLUTO file, and pull back the corresponding PLUTO Address. Remember, the PLUTO Address must be the first column in your lookup array.
b) Drag the formula down (for all properties in that borough)
c) Using the same methodology, pull in *CT2010* for Census Tract.

Matching on Box & Lot

a) Many rows will return an N/A, meaning that there was no exact match in the PLUTO file. For those properties, you should match on your BoxLot concatenated columns. Start by filtering down to only N/A entries.
b) Using the same VLOOKUP methodology, match on BoxLot in both files. Remember, now BoxLot has to be the first column in the lookup array from your PLUTO file.
c) Drag the formula down for the N/A rows.
d) Using the same methodology, pull in *CT2010* for Census Tract.
e) Clear your filters and copy and paste all new rows as values.

Prepare CT2010 for Geocoding.

a) The census tracts need to be put into 6 digit format in order to be easily converted to NTA level. In the Violations Data, under your newly created column CT_6Digit, use the formula TEXT(AJ2,"0000.00") to get the Census Tract into the correct format. In this example, AJ is the Census Tract column.
    i. This should convert values like 217 ot **0217.00** and 129.01 to **01209.01**
b) In Column GEO ID, use another concatenate formula to get the value into an 11 digit geocode. The first two digits represent the state (36= NYS) followed by 3 digits representing the county:
    i. BX=005
    ii. BK=047
    iii. QN=081
    iv. MN=061
    v. SI=085

    The final 6 digit come from the *CT_6Digit* column. A formula for the BX, for example, would look like: =CONCATENATE("36005",AK2), where AK is the 6 digit column.
c) Finally, copy and paste the column as values and delete the decimal point. This will prepare it for conversion to NTA.

Now we need to get total residential units in each NTA, since we are counting housing violations by 1000 units. In order to do this, you simply need to work with the PLUTO file to aggregate residential units per NTA. You use the same methodology above to create the proper format for the GEO ID. Then you match the GEO ID for each PLUTO observation to the NTA matching table (described below).

In order to assign to each observation its NTA code and name, we used a table that has the relationship between NTAs and Census Tract.

a. We used the function =VLOOKUP to bring the NTA code and name to every observation.
b. Then, in a different sheet, we just grouped the observations by NTAs using the function =COUNTIF, for total violations, and =SUMIF, to sum the residential units.
c. We created a new variable "complaints by 1000 res units" simply multiplying the total violations by 1000 and dividing by the total number of residential units

Indicator: Housing Cost Burden (Owners & Renters):

- This option will take you to tables that give you median Gross Rent as a Percentage of Income (GRAPI) and Selected Monthly Owner Costs as a Percentage of Income (SMOCAPI).

1. Navigate to The American FactFinder website.
2. Click on Advanced Search.
3. Under Topic or Table Name, type DP04. This will provided Selected Housing Characteristics.
4. Use the options on the left to limit your geography to Census Tract for the 5 NYC counties.
5. Download the table affiliated with the latest 5 year estimates.
6. Once open, you only want to focus on GRAPI and SMOCAPI levels of 30% or above. The table already buckets these percentages. You can delete all columns *except*:
    a) SMOCAPI- Housing Units **with a mortgage** (excluding units where SMOCAPI cannot be computed).
    b) Estimate and Percent for SMOCAPI 30.0 to 34.9 percent
    c) Estimate and Percent for SMOCAPI 35.0 percent or more
    d) SMOCAPI Not computed
    e) GRAPI- Occupied Units paying rent (excluding units where GRAPI cannot be computed)
    f) Estimate and Percent for GRAPI 30.0 to 34.9 percent
    g) Estimate and Percent for GRAPI 35.0 percent or more
    h) GRAPI Not computed
8. The first step is to match each census tract to its corresponding NTA. In order to assign each observation its NTA code and name, we used a table that has has the relationship between NTAs and Census Tract. We used the function =VLOOKUP to bring the NTA code and name to every observation.
9. Create a new column, titled SMOCAPI>30. The formula for this column is *Percent SMOCAPI 30.0 to 34.9 percent + Percent SMOCAPI 35.0 percent or more.* This provides us with the total percentage of owned households in each census tract spending 30% or more of annual income on housing costs.
10. In a new column (Weight SMOCAPI), we then weighted each census tract within the NTA to account for different amounts of households in each tract. Using the formula =number of SMOCAPI units in that census tract/ total number of units units in the NTA where that census tract belongs (for the denominator we used the command SUMIF).
11. Create a new column which provides the new **weighted** SMOCAPI=>30%. In order to obtain the weighted number, you multiply SMOCAPI>30 column with Weight SMOCAPI.
12. Finally, you must add these values up for each NTA to get the total percent. This leaves you with an accurate total SMOCAPI=>30% for each NTA. This was done using the command =SUMIF(values in NTA code column, desired NTA, values in weigthed SMOCAPI=>30%)
13. Complete steps 8-11 for GRAPI as well.

Indicator: Homeless Shelter Entry Rate

1. Last Known Addresses for Homeless Shelter Entrants (Shelter Entries by Families, 2013) dataset is Department of Homeless Services (DHS) data and provided by CIDI. This address-level data is stored in an encrypted environment by CIDI employees. The analysis was

completed within this encrypted environment using CIDI office computers. The addresses are geocoded and assigned Census Tract IDs.

2. Using the same methodology as other variables, convert all census tract IDs to corresponding NTAs. Using total population estimates from American Community Survey (ACS) for each NTA, create the variable for homeless shelter entries per 1000 residents.

Personal & Community Safety Indicators

Indicator: Index Crime Data:

1. Navigate to NYPD official web page to get the historical NYC Crime Data http://www.nyc.gov/html/nypd/html/analysis_and_planning/historical_nyc_crime_data.shtml
2. Download the data base "Citywide Seven Major Felony Offenses 2000-2014".
3. Filter and arrange the information to get the total seven major felonies by precinct.
4. Refer to the methodology section for more information on how to transform the information from precincts to NTA.
5. Once we obtained the weighted total number of crimes per census tract, we simply added them up by NTA.
6. To obtain the crime rate, we divided the values at the NTA level by the total population by NTA and multiplied by 1000.

Indicator: Victimization Rate:

1. Abuse and neglect investigations (Indicated Reports, 2013) dataset is Administration for Children Services (ACS) data and provided by CIDI. An abuse/neglect report is indicated when the investigation finds credible evidence of abuse or neglect. This address-level data is stored in an encrypted environment by CIDI employees. The analysis was completed within this encrypted environment using CIDI office computers. The addresses are geocoded and assigned Census Tract IDs.
2. With the assigned census tract IDs and the NTA code for each report, the number of reports could be aggregated simply using the command = SUMIF.
3. We added a new column with information about the population who are 17 years old and younger. This data is from American Community Survey (ACS).
4. The total number of indicated reports was divided by the population who are 17 years old and younger and then multiplied by 1000.

Core Services and Infrastructure Domain

Indicator: Average Commute Length

Find NTA and Census tract equivalency

1. Navigate to http://www.nyc.gov/html/dcp/html/bytes/dwn_nynta.shtml
2. Download Excel file "2010 Census Tract to 2010 Neighborhood Tabulation Area Equivalency"
3. Enter formula "=D6/100" (labeled 2010 Census Tract) and drag down the length of column
4. Add filter to top row of information
5. Filter by Borough, and then by Census tract in ascending order

Find transportation data I

1. Navigate to http://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t
2. Select topic "B08013 AGGREGATE TRAVEL TIME TO WORK (IN MINUTES) OF WORKERS BY SEX"
3. Select "Geographies", then "Census Tract", then "State", then "County"
4. Add all Census tracts in county to selection
5. Select "Modify Table"

6. Select “Transpose Rows/Columns”
7. Download data

Combining first part of data

1. Add filter to ACS data
2. Filter so that margin of error, male aggregate travel, and female aggregate travel are excluded
3. Filter data in ascending order
4. Copy data
5. Paste into original Excel spreadsheet, and title column “aggregate travel minutes”
6. Ensure that Census tracts align

Find transportation data II

1. Select topic “S0802 MEANS OF TRANSPORTATION TO WORK BY SELECTED CHARACTERISTICS”
2. Select “Geographies”, then “Census Tract”, then “State”, then “County”
3. Add all Census tracts in county to selection
4. Select “Modify Table”
5. Select “Transpose Rows/Columns”
6. Download data

Combining second part of data

1. Add filter to ACS data
2. Filter so that all but “Workers 16 years and over” are excluded
3. Filter data in ascending order
4. Copy data
5. Paste into original Excel spreadsheet, and title column “Workers 16 and over”
6. Ensure that Census tracts align

Determining average commute by NTA

1. Delete extraneous columns – only NTA name, single revised Census tract (BE SURE THAT THESE MATCH UP CORRECTLY), aggregate travel minutes, and workers 16 and over needed.
2. Generate pivot table
3. Add “NTA Name” to rows
4. Add “aggregate travel minutes” and “workers 16 and over” to values
5. Ensure that the values of these are sums, not counts
6. Return to pivot table
7. Enter formula next t to rightmost column that divides “aggregate travel minutes” by “workers 16 and over”
8. Drag down for all NTAs

B. Summary of the Indicators Used in the Well-Being Index

Dom.	Variable	Geo Level	Description	Source	Type of indicator	Year	Change required	Next update	Link
Economic Security	Income	Census Tract	Median household income in the past 12 months (in 2013 inflation-adjusted dollars)	American Community Survey (ACS)	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
	Employment rate	Census Tract	Percentage of labor force (Ages 16-64) employed	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
	Unemployment rate	Census Tract	Percentage of labor force (Ages 16-64) unemployed and looking for a job.	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
Housing	Rental Housing Cost Burden	Census Tract	Percentage of households spending 30% or more of household income on rent and utilities	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
	Owner Housing Cost Burden	Census Tract	Percentage of households spending 30% or more of household income on mortgage payments and other housing costs for those who own their homes	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
	Housing Maintenance Code Violations	Address	Violations issued pursuant to NYC's Housing Maintenance Code divided by total number of residential units in NTA	NYC Housing Preservation and Development (NYC HPD) accessed through NYC Open Data	Reports	2014	Geocoding, creation of rate by units and weighting to aggregate by NTA	2015	Link
	Homeless Shelter Entries	Address	Last known addresses for Shelter Entries	Department of Homeless Services (DHS)	Agency Data	2013	Geocoding, creation of rate by population and aggregation by NTA		Provided by CIDI

Dom.	Variable	Geo Level	Description	Source	Type of indicator	Year	Change required	Next update	Link
Core infrastructure and services	Commute Time	Census Tract	Average Travel Time in Minutes for Workers Aged 16 and Over Who Did Not Work At Home	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
Health	Asthma	UHF	Self-reported asthma diagnosis ever	New York City Community Health Survey (NYC CHS)	Estimate	2013	Change UHF to NTA, weighting and aggregation by NTA	Every year	Link1 Link2
	Poor health	UHF	By combining obesity rate, diabetes rate, and high blood pressure rates, we have designed an indicator that describes the quality of physical health of neighborhood residents.	NYC CHS	Combination of estimates	2013	Change UHF to NTA, weighting and aggregation by NTA	Every year	Link1 Link2 Link3
	Insurance Coverage	UHF	Percentage of population that have health insurance, private and public	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	Every year	Link
	Low Birth Weight	UHF	Low birth weight (LBW) is defined as a birth weight of a live born infant of less than 2,500 g (5 pounds 8 ounces)	NYC Vital Statistics	Actual	2013	Change UHF to NTA, weighting and aggregation by NTA	Every year	Link
	Did Not Receive Care	UHF	Percentage of population that required medical attention in the last year but did not receive it	NYC CHS	Estimate	2013	Change UHF to NTA, weighting and aggregation by NTA	Every year	Link
	No Psychological Distress	UHF	Percent of population reporting no psychological distress	NYC CHS	Estimate	2013	Change UHF to NTA, weighting and aggregation by NTA	Every year	Link

Dom.	Variable	Geo Level	Description	Source	Type of indicator	Year	Change required	Next update	Link
	Self-Reported Health Status	UHF	Self-reported health status	NYC CHS	Combination of estimates	2013	Change UHF to NTA, weighting and aggregation by NTA	Every year	Link
	Healthy Eating Habits	UHF	Percentage of population reporting eating regularly eating fruits or vegetables.	NYC CHS	Combination of estimates	2013	Change UHF to NTA, weighting and aggregation by NTA	Every year	Link
	Teen pregnancy rate	Census Tract		ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
Education	PreK Enrollment	Census Tract	Percentage of children under 3-4 years that attend preschool and nursery schools	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
	Proficiency Rate	School	Percentage of students in grades 3,4,5 that tested proficient in reading and math	Department of Education (DOE)	Actual	2013 -2014	Geocoding, creation of rate by students in 3,4,5 grade and aggregation by NTA	Every year	Link
	College Graduation Rate	Census Tract	Percentage of population 25 years and older with Bachelor's degree or more	ACS	Survey Estimate	2009-13	Weighting to aggregate by NTA	End of 2015 Estimates for 2010-2014	Link
Personal and Community Safety	Index Crime rate	Precinct	Total number of 7 major crimes per 1,000 population	New York Police Department (NYPD)	Reports	2014	Change precinct to NTA, creation of the rate with total population and aggregation by NTA	Every year	Link
	Victimization rate by 1000 children	Address	Number of indicated reports of Abuse/Neglect Investigations per 1,000 children 17 and under	Administration for Children Services	Agency Data	2013	Geocoding, creation of rate and aggregation by NTA		Provided by CIDI

Table 12: Table of Indicators Used in the Construction of the Well-Being Index (2015)

C. Weighting Variables

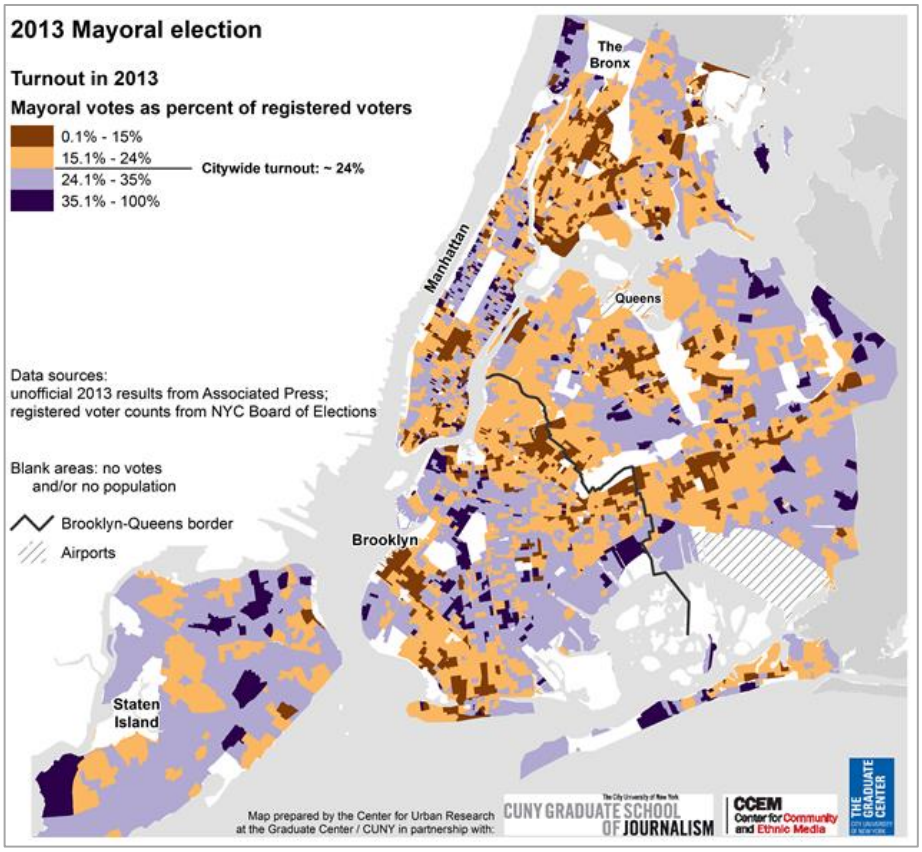
Indicators used to weight the variables in their aggregation to larger geographic units.

Indicator	Weighting Variable
Average Travel Time in Minutes for Workers Aged 16 and Over Who Did Not Work At Home	Labor force
Median household income in the past 12 months (in 2013 inflation-adjusted dollars)	Employed Population
Employment rate; Population 16 years and over	Labor force
Unemployment rate; Population 16 years and over	Labor force
Percentage of the population with selected monthly owner costs of housing =>30% of household income	Total mortgage units for which cost was known
Percentage of the population with gross rent burden =>30% of household income	Total units for which rent was known
Housing maintenance code violation complaints by 1000 Res Units	Total residential units
Last known residence of homeless shelter applicants	N/A- data is at address level
Low birth weight	Total Population
Did not receive medical care	Total Population
Insured population	Total Population
Healthy status	Total Population
Healthy habits	Total Population
Teen pregnancy rate	Female Population 15-19 years
Asthma	Total Population
Bad Health	Total Population
Percent of population with BA	Population older than 25
Percent enrolled in nursery school/ preschool	Population between 3-4 years old
School proficiency	N/A-Data is at address level
Victimization rate by 1000 children	N/A-Data is at the address level
Crime (seven major felonies by 1000)	Total population

Table 13: Weighting Factors Used in the Aggregation of Indicators

D. Rejected Domains

One domain that we considered but rejected is the civic engagement domain, which strives to measure the degree to which citizens engage with their democratic duty of voting in elections. National indices like OECD and the Canadian Well-Being Index include variables like national level turnout for important elections, i.e. Presidential or Parliamentary. However, at the local level the clarity this variable provides for well-being is more ambiguous. NYC Election Atlas, a program at CUNY, aggregates data at the city level for local elections. As the map to the right indicates, most jurisdictions have low turnout (less than 35%).[20] More importantly, this turnout only accounts for registered voters. The actual turnout is even lower. In addition, it is not clear which election turnout results should be used for a well-being index: mayoral, city council, gubernatorial, congressional, presidential, etc. Due to these concerns, the team decided to not include democratic engagement as a domain in the NYC Well-Being Index.



[20] NYC Election Atlas. Center for Urban Research at the Graduate Center of the City University of New York, in partnership and with support from the CUNY Graduate School of Journalism and the Center for Community and Ethnic Media. Accessed April 2015. http://www.nycelectionatlas.com/maps.html#!2013general

E. Rejected Indicators

The team also rejected certain indicators from other domains. Those indicators, as well as the reasoning for rejection, are included in the tables below.

Education

Indicator	Reasoning
Percent of students proficient in English and Math for grades 6 to 8	Since middle school and high school placement is dependent not on where one resides unlike elementary schools, this indicator was rejected as a way of evaluating an NTA.
School Quality Reports – Middle schools and High Schools	Same as above.
Percent of population with a high-school diploma	High school completion, or its inverse, high school dropout, has also been traditionally used as an indicator of education. ACS survey estimates for high school graduates in an area include high-school diplomas or equivalent. These are given for every census tract and shown in both numbers and percentage for every census tract over and above the total population in the age group of 18-24. The idea behind using the age-group of 18-24 was to look at the most vulnerable population who should have finished high school at 18 but clearly dropped out or might drop out. However, after conducting a correlation with other indicators, it was noticed that the data from this indicator didn't match other indicators. For example, areas with a higher number of high school grads had lower median income. As a result, it was decided to only keep college graduates and disregard high school graduation.
School Quality Report Rating – Elementary Schools	• The quality reports consist of different ratings like the school environment, achievement, progress, environment and closing the achievement gap rating. Out of that, only the English and Math scores from grades 3, 4, and 5 were considered since the data for the total of 653 schools did not see drastic variation among the quality ratings and the 5 sub-indicators it consisted of. Almost 220 or so schools were approaching target in the 4 sub-indicators (except the quality indicator which saw only a slight variation from the trend). 130 were exceeding target, 250 or so were meeting target and 30 were not meeting target. • Moreover, three out of the five categories are related to the ELA and Math results administered annually. The progress, achievement and closing the achievement gap rating are based on total achievement in terms of ELA and Math scores, differences from previous year and performance of weaker students and improvement therein. • The two remaining categories - Environment and Quality were based on subjective data from parental and student ratings and the survey administered from an educator. • Finally, the school quality ratings have been changed from 2013-14 when the last review came out. Prior to that, from 2007-12, the ratings based on performance, progress, environment and a peer-index were numerical or grade-based. This year's report had percentages of parental response which feed into school environment category. This is also expected to undergo iterations for 2014-15. It would thus be a difficult indicator to be used on a yearly basis if it undergoes iterations.

Overcrowding	The raw data from the Department of Education website could not be matched with actual schools as it gave only building numbers without addresses. It was also difficult to interpret owing to different definitions of overcrowding for each level of schooling (primary, middle and higher) would have meant correlating that with number of students per classroom/grade in every school, a figure which is not available in public domain.
Student Teacher Ratio	The raw data obtained for the same didn't have the exact number of teachers in a school, it had average student-teacher ratio but without knowing the total population of a school, it made comparison of average ratios across schools difficult to compare.
Suspension Rates	Data for the same could be located only at School District level and not by school level from the New York State Education Department website.

Health

Indicator	Reasoning
Disability Adjusted Life Years (or Quality Adjusted Life Years)	Life expectancy (LE) is a widely used measure of the overall health of a population. It attempts to estimate the average number of years an individual of a particular age can expect to live given current mortality rates. LE has an overwhelming presence in other well-being indices; however, this may not hold the same significance for NYC. We could potentially consider Health adjusted life expectancy (Canadian Well-Being Index). The data available for NYC is in the form of Disability-adjusted life years (DALYs), which measures years of healthy life lost. They combine in a single measure years lost to premature death and years lived with a disability. Mortality is expressed as years of life lost (YLL), and disability as years lived with disability (YLD). People who die before an expected age can be thought of as dying early, or prematurely. Years of life lost to premature death were computed based on the difference between a standard life expectancy and age at death. Each condition is assigned a disability weight. Years lived with disability are based on the disability weight and average duration specific to each condition. The number of DALYs for any given condition is the sum of years of life lost and years lived with a disability for that condition (DALYs = YLL + YLD). The health conditions can then be ranked by the number of DALYs – showing the relative burden to New Yorkers associated with specific diseases and injuries.[21]
Inter-Partner Violence	While this intimate-partner violence can significantly impact well-being, the effects are likely represented in other included indicators, such as mental/emotional health (victims of domestic abuse are at risk for mental health problems, such as depression).[22]
HIV / STI Status	The degree of inter-neighborhood variation and prevalence was not considered significant enough for inclusion in this index.
Indoor Air Quality	For indoor air quality we examined data on homes with cockroaches and mice/rats (the indoor air quality data available have not been updated since 2011, making it inconvenient for an annual analysis of wellbeing). These variables correlated closely with self-reported asthma as measured by the NYC Community Health Survey, but were not on their own significant variables within the confirmatory factor analysis (see annex: Health Survey Confirmatory Factor Analysis). It was therefore determined that the composite asthma indicator can serve as a proxy for overall air quality and the inclusion of indoor air quality would cause

[21] DOHMH (2011) Epi Data Brief. Nov, No. 11 http://www.nyc.gov/html/doh/downloads/pdf/epi/databrief11.pdf

[22] Wong, J. and D. Mellor (2014). "Intimate partner violence and women's health and wellbeing: impacts, risk factors and responses." Contemp Nurse 46(2): 170-179.

	redundancy.
Neighborhood Walkability	Neighborhood walkability, while it does provide information on place-based quality of life, the indicators does not vary much from year to year and the data are not frequently updated (last in 2011). Furthermore, neighborhood walkability reduced the reliability of our factor scale and skewed the results, so it was removed from the model (see annex: Health Survey Confirmatory Factor Analysis).
Heavy Drinking	Heavy drinking is defined as an average of more than 2 drinks per day for men and more than 1 drink per day for women, according to the NYC Community Health Survey. At this threshold, heavy drinking does not appear to predict health or wellbeing. For example, according to the confirmatory factor analysis, as walkability improves, the outcomes for obesity, diabetes, and blood pressure improve but heavy drinking seems to go up. From this analysis, we concluded that self-reported heavy drinking is not a useful metric for our purposes so we eliminated this from our next analysis (see annex: Health Survey Confirmatory Factor Analysis).
Smoking Status	Smoking habits was not strongly predictive of other measures of health in our analysis and did not meet the reliability benchmark (see annex: Health Survey Confirmatory Factor Analysis).
Serious Psychological Distress	This indicator, the presence or absence of "serious psychological distress," was originally included to serve as a proxy for the prevalence of serious mental illness (SMI) in the community, including depression, anxiety, and other mental health issues. There is often a close relation between depression and life dissatisfaction; reports of serious psychological distress are often correlated with a lack of social/emotional support, unhealthy behaviors, poor overall health status and financial distress. This indicator reflects an overall sense of mental and emotional wellbeing in the population. Data is based on the questions included in the New York City Community Health Survey. The survey measures serious psychological distress through a composite measure of 6 questions regarding symptoms of anxiety, depression and other emotional problems. The CHS adopted the Kessler K6 for the survey, a measure increasingly used in epidemiological studies is the K6 nonspecific distress scale, a 6-item, psychological screening instrument, developed by Kessler et al. (2002), which takes < 2 minutes to complete and screens at the population level for individuals with possible severe mental illness. The K6 items assess the frequency of nonspecific psychological distress within a particular reference period. The responses range from "none of the time" coded 0 to "all of the time" coded 4. The six items are summed to yield a number between 0 and 24. The K6 cut-point of 13 was developed to operationalize the definition of serious mental illness, defined as meeting diagnostic criteria for a DSM-IV disorder in the past 12-months and experiencing significant impairment. Based on the accepted cut-point of K6 ≥ 13 for serious mental illness. Measured at the neighborhood level. However, the indicator was eventually discarded due to a lack of statistical significance in relation to the other variables included in the analysis. It showed very little significance in the health domain confirmatory factor analysis, but was not immediately discarded. Yet, when we ran the correlation with the indicators from the other domains this indicator was not correlated with any of the other indicators in the index. so the decision was made to remove this indicator.

Economics

Indicator	Reasoning
Ratio of top to bottom quintile of economic families after tax	This would be a measure of inequality and it is relative. A larger ratio is not necessary worse than an small ratio. The indicator by individual is preferred to families. Other indexes used families due to the lack of data
After tax median income of economic families	After tax income gives a better picture of the disposable incomes that families have. Unfortunately there is no information of after tax income.
Percentage of persons in low income	The drawback is that it is purely relative. For example, if the real income of all households doubled, there would be no change in the percentage of persons under the LIM. Also, there is no adjustment for community and family size, and it is not based on a basket of goods income.
Scaled value of center of living standards	The Centre for the Study of Living Standards (CSLS) has developed the Index of Economic Well-being (IEWB) to capture trends in economic well-being through four dimensions – consumption flows, stocks of wealth, income equality, and economic security. This indicator is not available for NYC.
Economic security Index	Economic security is a broad concept. It covers subjects such as employment security and opportunities, access to food and housing, and the existence of a social safety net. It is assumed that, in general, people are risk averse. This indicator comes mainly from surveys, which are not the scope of this index. Additionally, this indicator has not been found for NYC.
Percentage of labor force with long term unemployment	No data was available --- Long-term unemployment is very different than short-term unemployment, both in term of its causes and its consequences for individuals and society. Long-term unemployment can result in social exclusion for the most vulnerable and tends to increase inequalities in income. Moreover, it increases significantly the burden on the social assistance system.
Index of employment quality.	No data found for NYC. - Job quality indicators include the flexibility of schedules, work-life balance, pay and benefits, the amount of training available and the quality of the work environment. However, many of those indicators are hard to track and data are not easily gathered.
Housing affordability Index	Will be transferred to the housing domain.
Mean Household Income	The median is preferred to the mean for the reasons explained in the reasoning of the median household income selected for the index and explained above.
Per capita income	This measure is followed closely by the media, politicians and economists. However, if we want to analyze the living standards of individuals, we tend to downplay GDP per capita, because it includes retained corporate profits and depreciation, which are not received by individuals, and does not include transfer payments, which are received by individuals
Individuals below poverty level	Since poverty level is defined to the national level, it will not offer much variation within the city.
Labor force	Employment and unemployment rates offer more information on the opportunity to participate in the economic life of the city. Additionally, it is not clear how a larger labor force would contribute to individual well-being.
Persons working at home	This variable is available at the local level; however, it is not considered in other

	indexes since it is not clear that working at home affects positively or negatively living standards.
Salary workers	These statistics thus shed light on the dilemma of the working poor, who can work long hours without ending the cycle of low income and poverty.
Government workers	Workers by industry is not usually considered by other indexes as a determinant of well-being. It will require to rank or define sectors that lead to greater well-being.
Self-employed in own not incorporated business	
10 different income for households by levels from "less than 10,000" to "200,000 or more"	This could be used as measure of inequality; however, as explained at the beginning, we consider that a comparison within neighborhoods does not contribute an appropriate analysis of its well-being. It is also not clear whether more equality increases well-being, since an entire community could be equally poor.
Persons with Social Security	People under government programs, pensions and retirement income are strongly correlated with income; a variable that we are already considering in our index.
Mean Social Security Income	
Persons with retirement income	
Mean Retirement Income	
Persons with cash public assistance income	
Mean cash public assistance income	
Persons with food stamp/SNAP benefits in last 12 months	
Percentage of families and people whose income in the last 12 months is below the poverty level	First, at the Individual level we have a better picture of the magnitude of the need. Secondly, again, indicators based on poverty levels will not offer a significant variation for the city.
Personal disposable Income	The indicator is not available at the required level. Personal disposable income is defined as personal income less current transfers (basically direct taxes, like personal income taxes) to governments. May be considered a better indicator than real personal income per capita since it represents the average after-tax spending power of individual Canadians. If we assume governments are efficient and reflect the preferences of the population, one might conclude that personal income is a better indicator of wellbeing because every penny paid in taxes would be gained in government services. Nonetheless, there is no agreement on whether higher taxes and the resulting lower after-tax income improve, worsen, or have no effect on wellbeing, so difficulties in deciding on the most appropriate indicator of living standards remain.
Wages	Since wages in many cases do not represent the total income perceived by individuals, indicators based on income should be preferred, since they represent better the possibilities and constraints of individuals.

Perceptions of citizens about economy	We are mainly interested in objective indicators. Additionally, there is no data for the city.
Wealth [survey on financial security]	We have not been able to find indicators on wealth. Economic wellbeing cannot be captured only with income data. Not only can we enjoy today's income in the present, but we can also transform wealth accumulated in the past into present consumption. As well, wealth can provide economic security and a personal safety net in cases of economic adversity, such as a death or disability of a family member in the workforce. Therefore, to measure economic wellbeing at any point in time, one needs to take into account both income and wealth. However, wealth surveys are conducted infrequently
Gini	We consider that a comparison within neighborhoods does not contribute an appropriate analysis of its well-being. It is also not clear whether more equality increases well-being, since an entire community could be equally poor. To track broad trends in income inequality, the Gini coefficient is a well accepted indicator. It reflects the dispersion of the income distribution, and its value ranges from 0 to 1. While a value of zero would indicate that income is equally divided among individuals, a value of 1 would mean that only one household receives all the income in the economy. Therefore, when income inequality increases, the Gini coefficient goes up and vice-versa. Since government transfers and taxes are aimed at reducing income disparities, we should expect a higher Gini coefficient for market income than for total income and an even lower one for after-tax income.
Incidence of Unemployment	No data was found for this indicator. The incidence of unemployment is the average number of persons experiencing unemployment in a given year over the number in the labor force.
Alternative measures of Unemployment	No data was found for this indicator. Alternative measures of unemployment provide insights into the overall underutilization of labor. The official measure of unemployment is restricted to people who are actively looking for a job. However, this measure can be misleading, because in some areas, employment opportunities are so scarce that numerous individuals decide to stop searching for work. They are called discouraged workers, and despite their desire to work, they are not included in the unemployment rate statistics. Another form of underutilization of labor is part-time workers who want full-time employment. Those workers, called involuntary part-time workers, are not included in the official measure of unemployment.

Housing

Indicator	Reasoning
Occupants per room	OPR is the most common measure of overcrowding. We selected the standard of greater than one person per room because it helps identify whether rooms are used as sleeping quarters which may provide privacy (like a living room), but are likely considered less than ideal. This measure also indicates whether multiple families are living in one residence. Overcrowding is shown to be associated with negative health and education outcomes. It can also indicate unaffordability and scarcity of housing. However, NYC crowding levels are so high across income levels, that it may not indicate enough about well-being. For instance, college students often use living rooms as makeshift rooms. They may be doing this out of convenience of location and price, without it being an indicator of their general quality of life.
Vacancy Rate	High vacancy rates are often associated with increased crime rates and decreased rates of neighborhood cohesion and residential stability, which influence individual well-being and community-level economic and social changes.[23] The OECD contends that vacancy rates can be indicators of high cost of transport and poor housing quality, which would be worthwhile indicators of well-being. However, given the extreme strain on the NYC housing market, vacancy rates may not be good indicators of crime, and instead reflect housing prices. This measure is captured to some extent by the Housing Cost Burden indicator. In addition, it is unlikely that vacancy rates across the city will show enough variation to draw adequate conclusions for the population.
Heating Equipment Breakdown	Can be captured by other indicators. Microdata currently unavailable.
Neighborhood Rating	The data presented are based on the respondent's overall opinion of the physical condition of the residential structures in his/her neighborhood. We do not want to include subjective measures.
Reason Householder Moved From Previous Residence	This could indicator housing stress such as eviction. However, it does not say anything about the current neighborhood of residence. Microdata currently unavailable.
Rent Subsidy	Better captured by housing cost burden indicator. Microdata currently unavailable.
Lacking complete plumbing and/or kitchen facilities	When this is the case, can be very indicative of poor living conditions. However, this is extremely rare given housing codes. Issues can be captured by data on violations.

[23] Owens, A., & Sampson, R. J. (2013). *Community Well-Being and the Great Recession.* Retrieved from https://web.stanford.edu/group/scspi/_media/pdf/pathways/spring_2013/Pathways_Spring_2013_Owens_Sampson

Crime

Indicator	Reasoning
Recidivism	Recidivism is a major focus of criminal justice policy according to the NYC Criminal Justice Indicator Report.[24] However, no clear link to well-being in the literature.
Juvenile Arrests	Juvenile crimes calculates the number of kids arrested for major crimes as reported using the Data Analytics Recidivism Tool (DART).[25] No clear link to well-being in the literature.
Homicide Rate	The homicide rate documents accidental or deliberate murders. Included as part of total crime indicator.
Youth not in school & not working	This is a measure of juvenile delinquency rates (% of population ages 16 to 24 who are not enrolled in school and who are not working). Used in the Opportunity Index. Data source: Measure of America analysis of data from the U.S. Census Bureau, American Community Survey PUMS Microdata (http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml) and custom tabulations for county and county equivalents provided by special arrangement with the U.S. Census Bureau.
Public Safety Complaints to 311	Complaints to 311 based on neighborhood level data. No clear link to well-being in the literature. Results may be over-stated in communities with high level of civic engagement.
Child Safety	Used in UNICEF Child Poverty Report. Data only available at the country-level data from WHO.
Property crime	Used in Ontario wellness report. Included in total crime count.
Assignment of Officers Against Whom Allegations Were Substantiated	This indicator can be used as a proxy for police-community relations. However, time frame for data does not match up with the time frame we're using for this report.

The team also looked at other indicators that did not fit into any of the domains but ultimately rejected these indicators for the reasons noted in the description column.

Indicator	Description
Percent reporting participation in organized activity. Percent who provide unpaid help to others on their own. Percent with six or more close friends. Percent who feel that most or many people can be trusted. Percent reporting very or somewhat strong sense or belonging to community Percent who feel safe walking alone after dark.	There are no community-wide surveys that measure indicators of personal well-being such as these in New York City.
Number of businesses that are arts related or number of people employed in the arts.	These are from the Baltimore well-being index but similar indicators for New York City are not available.

[24] John Feinblat. (12/13). *Criminal Justice Indicator Report*. Office of the Mayor. http://www.nyc.gov/html/cjc/downloads/pdf/Criminal-Justice-Indicator-Report-Winter-2013.pdf

[25] http://recidivism.cityofnewyork.us/index.php?m=search

Library statistics (for NYPL only) ADULT Program ADULT Attendance YOUNG ADULT Program YOUNG ADULT Attendance JUVENILE Program JUVENILE Attendance OUTREACH SERVICES Program OUTREACH SERVICES Attendance TOTAL Program TOTAL Attendance REFERENCE TRANSACTIONS Adult REFERENCE TRANSACTIONS Young Adult REFERENCE TRANSACTIONS Juvenile REFERENCE TRANSACTIONS CIRCULATION Adult CIRCULATION Young Adult CIRCULATION Juvenile CIRCULATION Weekly Hours of Public Service	Very interesting statistics are available for NYPL only from 2010 to 2011. But the same data is not available for queens or Brooklyn so we must reject these indicators. New York Public Library (NYPL) branch services from July 2010 to June 2011(Manhattan, Bronx, Staten Island) NYC Open data: https://nycopendata.socrata.com/data?browseSearch=nypl&type=&agency=&cat=&scope=
Percent of population that votes or has registered to vote.	This data, while interesting, does not fit into our "well-being" criteria. However, it is used in national well-being indices like The Canadian Well-Being Index. If CIDI would like us to use this data, it is available for New York City data at the census tract level.
Family type (couple families, single headed households) Divorce rate (Marital Status) Grandparents (two indicators) Number of grandparents living with own grandchildren under 18 years (7 million total) Number of grandparents responsible for own grandchildren under 18 years (2 million total)	These indicators are available via Census at the NTA level; however, we ultimately decided against using these indicators because of the value judgment involved.

Core Services and Infrastructure

Food Security

We consider food security an important indicator that could be included in Core services and infrastructure; unfortunately, we could not find an indicator to serve as a proxy of this variable.

City Harvest, a New York City nonprofit organization, defines "food insecurity" using the "USDA's measure of lack of access, at times, to enough food for an active, healthy life for all household members; limited or uncertain availability of nutritionally adequate foods."[26] Due to recent cuts in food stamp benefits,[27] the ability of many New York City residents to obtain quality, healthy food has been placed in increased jeopardy. Additionally, the city's extensive network of food pantries and soup kitchens have been affected many of these institutions have difficultly providing adequate amounts of food to meet the true level of need in the populations

[26] Hunger in NYC: Food Insecurity. http://www.cityharvest.org/hunger-in-nyc/food-insecurity

[27] Resnikoff, Ned. (2014, February 11). This is how families go hungry. *MSNBC*. Retrieved from http://www.msnbc.com/msnbc/anatomy-hunger-crisis

they serve.[28] An indicator assessing the ease with which New York City residents are able to access healthy sources of food is vital for determining overall well-being.

We created and considered the indicator: Grocery stores per 1,000 residents, to capture food security. Below we provide the results for this variable and the reason why we decided not to include it in the final index.

Grocery Stores per 1,000 Residents

- **Definition:** The number of retail food stores equal to or greater than six thousand square feet per one thousand residents.
- **Reasoning:** Both access to and consumption of healthy foods have a direct impact on the well-being of individuals. According to figures published by the New York City Coalition Against Hunger, some 1.5 million New York City residents "experience food insecurity."29 One in four are children.30 This condition manifests itself physically through "malnutrition, as indicated by wasting (low weight-for-height), underweight (low weight-forage) or stunting (low height-for-age), to micronutrient deficiencies leading to lowered immunocompetence, anemia, developmental and cognitive defects, etc." and economically through "reduced productivity, both from lowered energy availability for work and from lowered physical fitness resulting from malnutrition, as well as changes in risk-taking and coping strategies."
- **Data Format & Source:** Listing of all retail food stores, which are licensed by the Department of Agriculture and Markets. Source: NYC Open Data, 2014
- **Methodology:** The New York State Department of Agriculture and Markets hosts a list of licensed retail food stores on its public Open Data portal. The data is categorized by county, license number, operation type, establishment type, entity name, DBA name, square footage, address, and location. As per industry convention, markets that reported square footage of less than six thousand square feet were excluded from the variable. Producers of pastries, meat, and beer were also excluded, in addition to K-MART and COSTCO stores. Afterward, the data was geocoded and calculated per NTA in order to determine each respective value. We used population estimates from the ACS 2009-2013 survey to calculate the population rate.
- **Results:**
  NTAs with the lowest grocery store footage per resident:

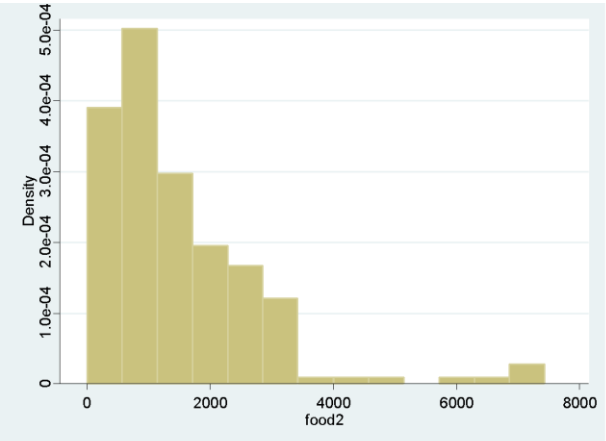


Figure 61: Number of Large Grocery Stores Per Thousand Residents

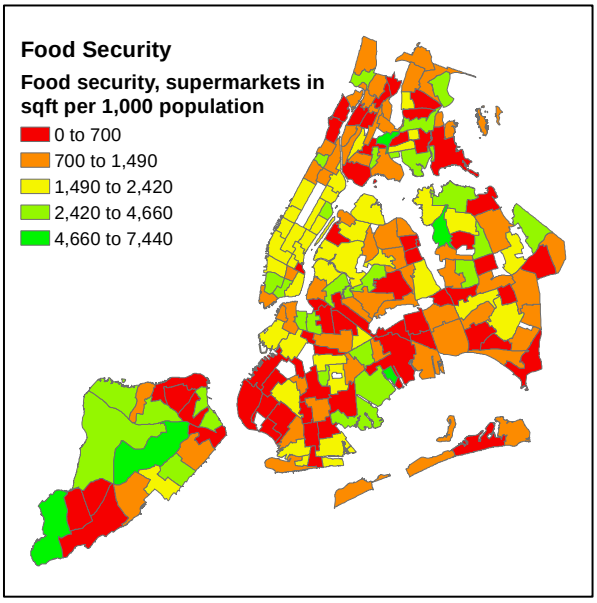


Figure 62: Sqft. of Grocery Stores per Resident by Neighborhood

[28] *Ibid*.
[29] Williams, Tanique. (2013, September 16). USDA report shows 'food insecurity' on the rise in NY. *Legislative Gazette*. Retrieved from http://www.legislativegazette.com/Articles-c-2013-09-16-85108.113122-USDA-report-shows-food-insecurity-on-the-rise-in-NY.html
[30] *Ibid*.

1. Ocean Parkway South, BK
2. Allerton-Pelham Gardens, BX
3. Crown Heights South, BK
4. Grasmere-Arrochar-Ft. Wadsworth, SI
5. Ft. Totten-Bay Terrace-Clearview, QN

NTAs with the highest grocery store footage per resident:

1. Todt Hill-Emerson Hill-Heartland Village-Lighthouse Hill, SI
2. Crotona Park East, BX
3. Charleston-Richmond Valley-Tottenville, SI
4. Starrett City, BK
5. Flushing, QN

Reasoning for not including the variable

Given the mobility in the city, the fact that citizens are not constrained to a specific grocery store as they are for pre-school and that there are many alternatives in which they can access food, the indicator presented theoretical problems for its inclusion. Additionally, as it is possible to see in the correlation matrix below, food security has weak and in some cases counterintuitive relationships with the rest of the indicators. This provided us with some evidence to conclude that this indicator, as created, did not serve as a good proxy for food security.

Finally, due to the last point, this indicator affected the score of Core services and infrastructure, obscuring some of the true effect of transportation. After removing the indicator, the relation of Core infrastructure with other domains improved.

Correlation Matrix of Food Security

Variables of the index	Food Security
Average Travel Time	0.129
Median household income	0.105
Employment rate	**-0.007**
Unemployment rate	0.147
SMOCAPI =>30% of household income	0.066
GRAPI =>30% of household income	0.072
Housing code violation complaints by 1000 Res Units	0.096
Last known residence of homeless shelter applicants	0.064
Low birth weight	0.073
Did not receive medical care	0.171
Insured	0.198
Healthy status	0.105
Healthy habits	0.044
Teen pregnancy rate	0.007
Asthma	**-0.002**
BadHealth	**0.120**
Population with Bachelor's degree	0.098
Percentage of proficients out of children tested	0.166
Enrollment in pre-school	0.091
Victimization rate by 1000 childs	-0.017
Crime (seven major felonies by 1000)	-0.062

F. Health Survey Confirmatory Factor Analysis

Summary

Health well-being of a community is a particularly difficult topic to narrow down to specific indicators. The problem is not a lack of data, but too much data that can be used to define this domain. In addition, there are underlying issues that impact more than one health outcome. For example, poor individuals smoke more and are less likely to have medical insurance. In order to ensure that our indicators have the least amount of overlap as possible, we conducted a factor analysis to learn more about the 28 health indicators we collected.

Data Source

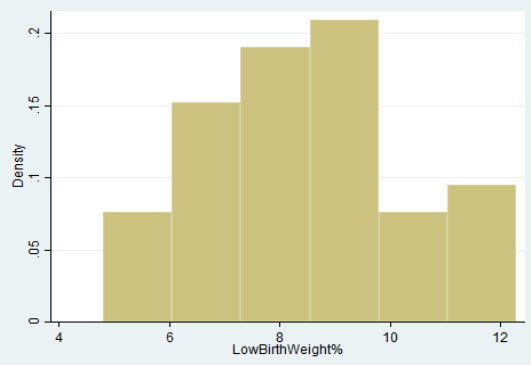
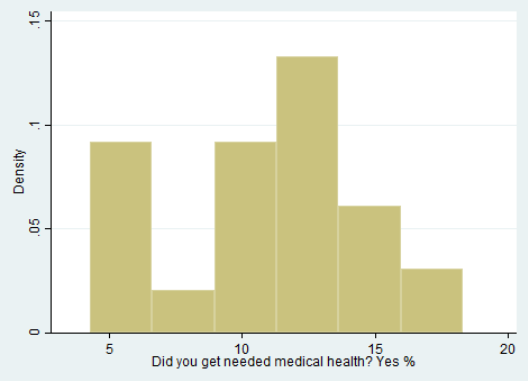
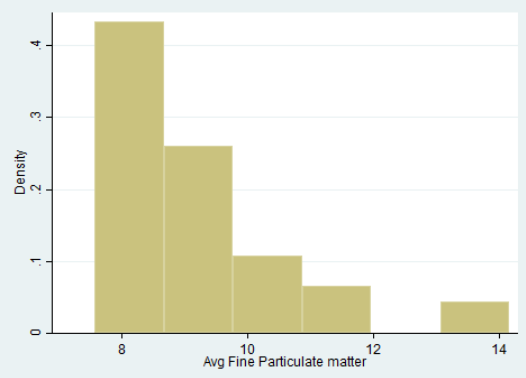
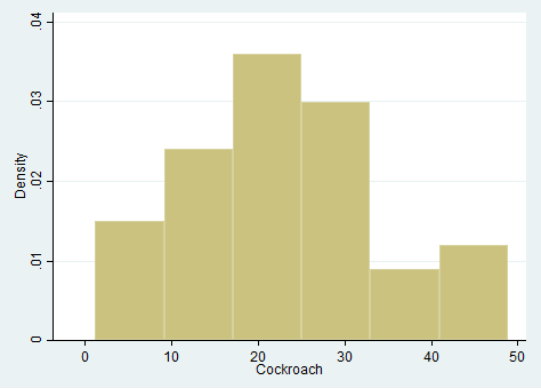
All of the datasets included in this analysis were obtained through publicly available sources from New York City or the Federal government. The majority of the health indicators included in this analysis utilize data generated by the NYC Community Health Survey (CHS), an annual telephone survey conducted by the Division of Epidemiology within the NYC Department of Health and Mental Hygiene to estimate chronic disease rates and health behaviors at various aerial units within New York City.[31] The remaining data was obtained from NYC Environment & Health Data Portal[32], the Bureau of Vital Records (Office of Vital Statistics)[33], and the American Community Survey of the U.S. Census Bureau.[34]

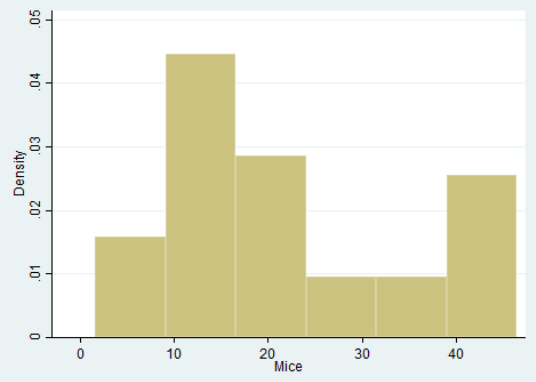
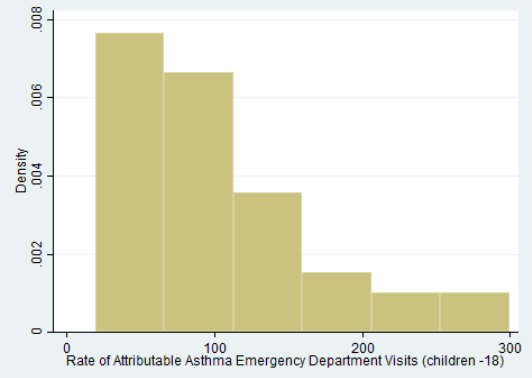
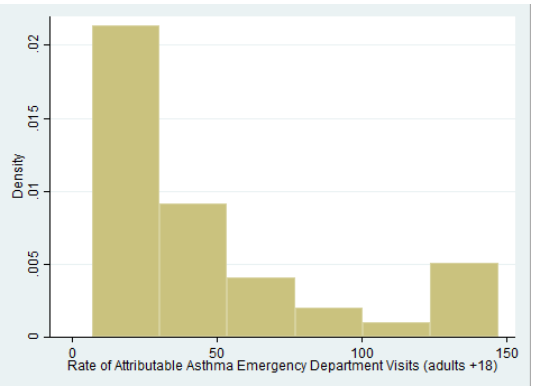
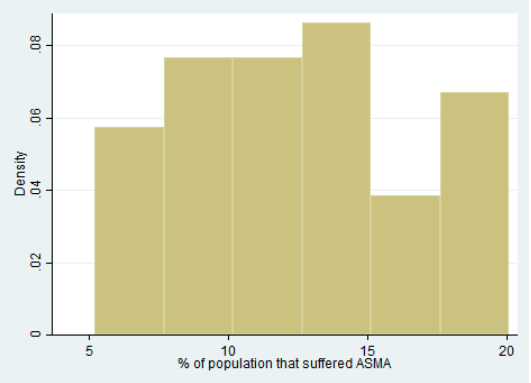
Methodology

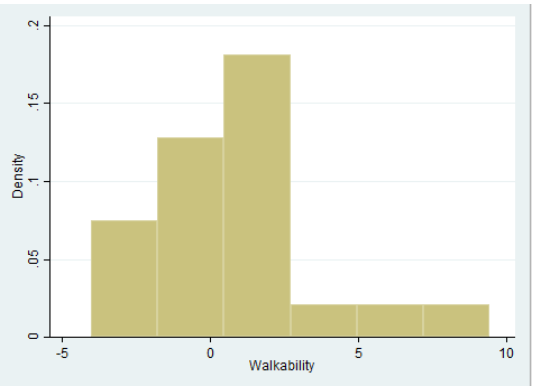
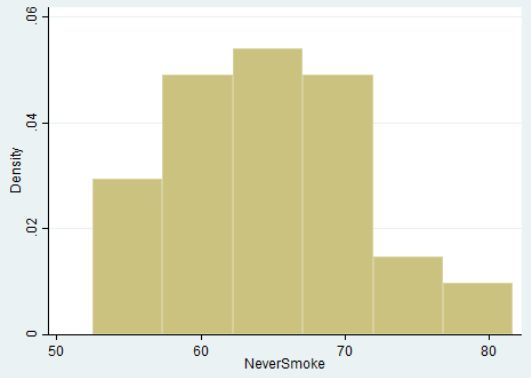
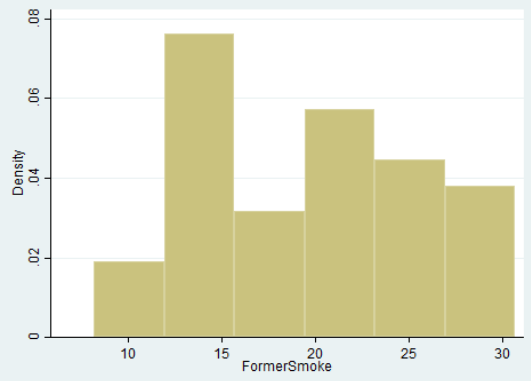
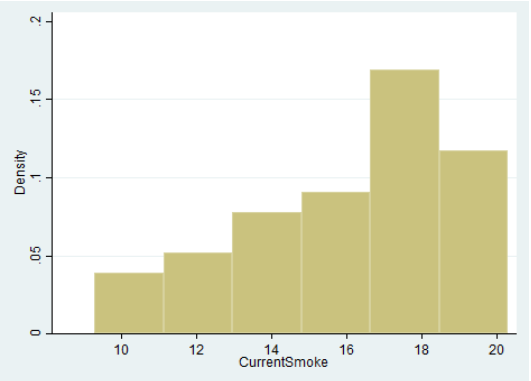
Factor analysis helps to reduce large numbers of variables to a smaller number by identifying the relationships and dimensions underlying the data. We conducted a confirmatory factor analysis using the statistical analysis program STATA to verify our hypotheses regarding the structure of the data and the directionality of the relationships between the various proposed indicators. This tool also reveals patterns in the data that might not otherwise be obvious. Running the confirmatory factor analysis through STATA analyses the correlation coefficient between each variable and the emergent factors (the main underlying relationships that exist within the data). The results display the amount of variance explained by each of the factors and the factor "loadings" (which provide information about the weight and degree of correlation between each variable and the given factor). Variables (indicators) with a high factor load (0.7 or above) were considered to be explained by the particular factor.[35]

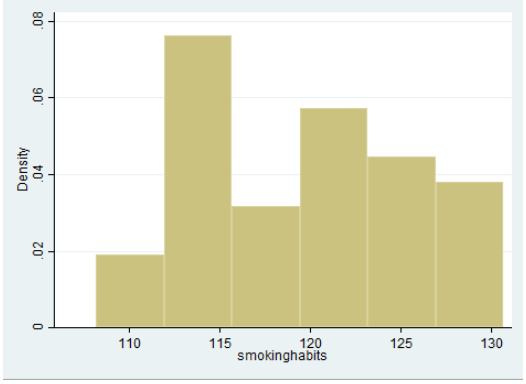
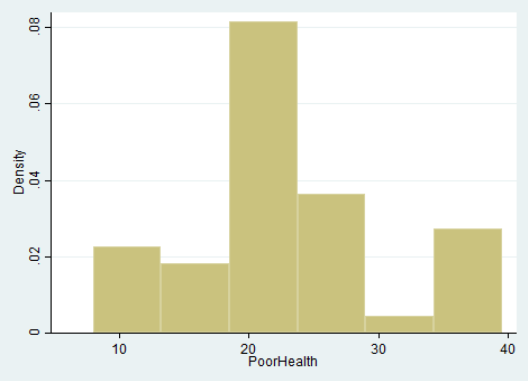
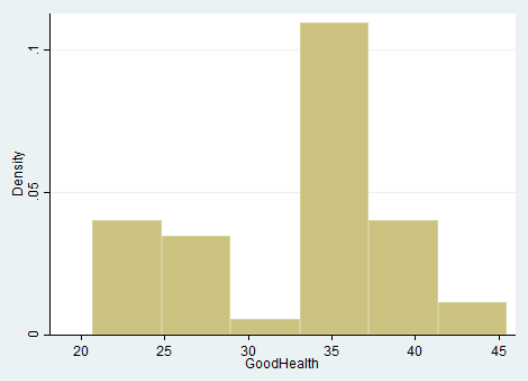
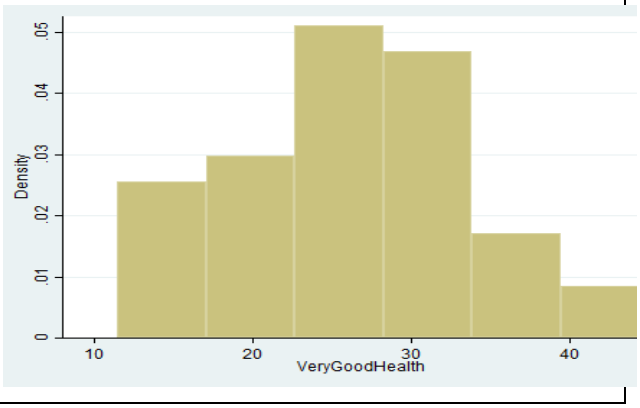
Before running the factor analysis, we analyzed each variable. The results of that are on the next page:

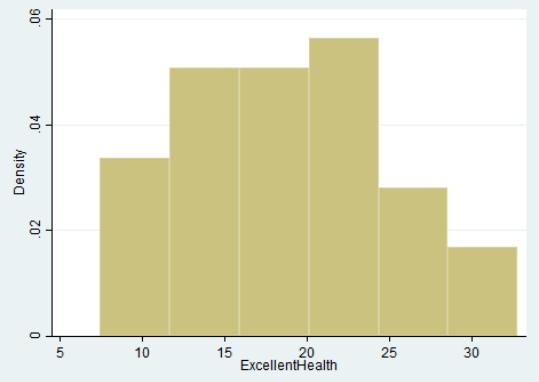
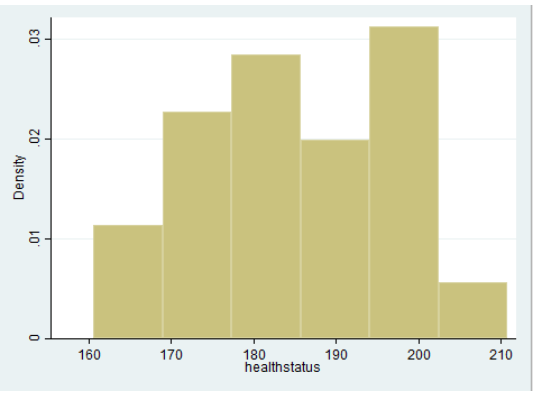
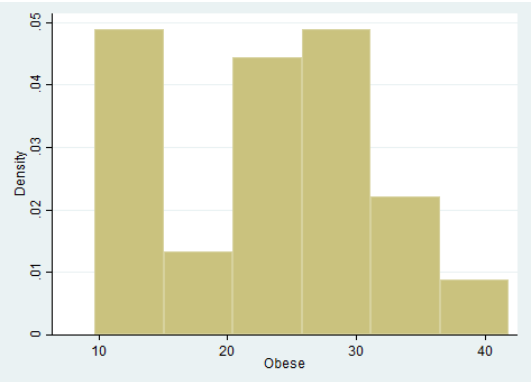
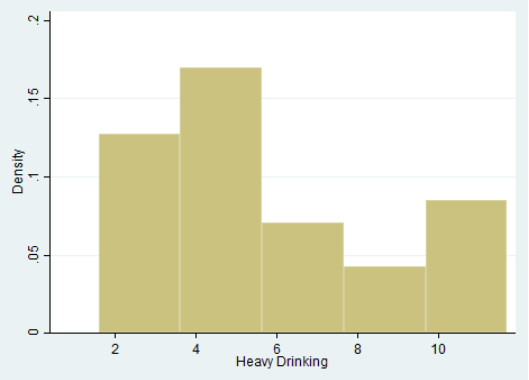
[31] http://www.nyc.gov/html/doh/html/data/survey.shtml
[32] http://a816-dohbesp.nyc.gov/IndicatorPublic/publictracking.aspx
[33] http://www.nyc.gov/html/doh/html/data/vs-epiquery.shtml
[34] http://www.census.gov/acs/www/data_documentation/data_main/
[35] Torres-Reyna, Oscar. Getting Started in Factor Analysis. Princeton University, Data and Statistical Serivces. Accessed on 3/25/3015 at: http://dss.princeton.edu/training/Factor.pdf; Grau, Eric. Using Factor Analysis and Using Factor Analysis and Cronbach's Alpha To Ascertain Relationships Between Questions of a Dietary Between Questions of a Dietary Behavior Questionnaire. Mathematic Policy Research, Inc. Accessed on 3/25/3015 at: http://www.mathematica-mpr.com/~/media/publications/PDFs/factoranalysis.pdf; Rockefeller College of Public Affairs and Policy. Factor Analysis. Rockefeller College, University at Albany. Accessed on 3/25/3015 at: http://www.albany.edu/faculty/kretheme/PAD705/SupportMat/FactorAnalysisTheory.pdf

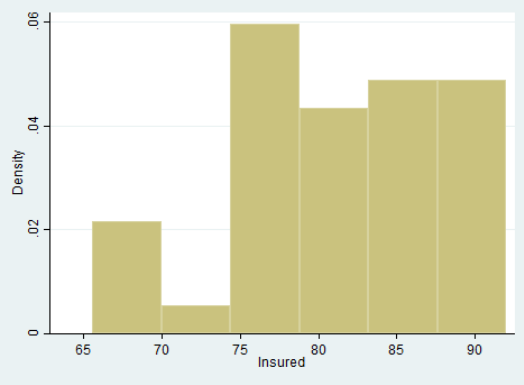
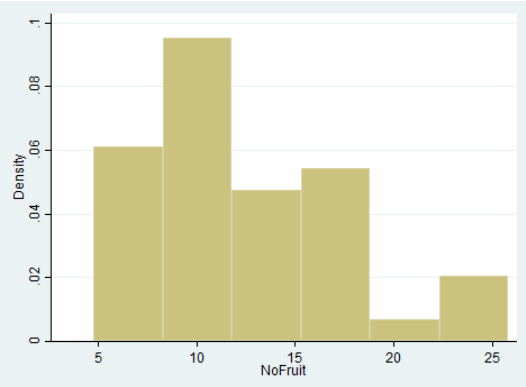
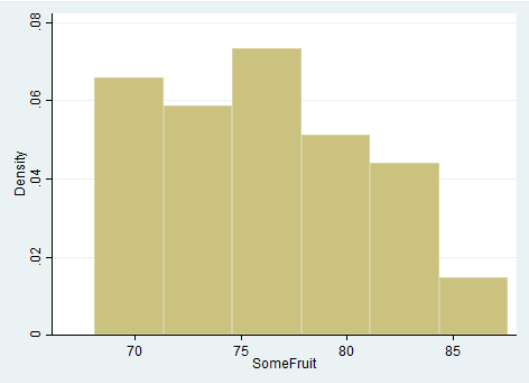
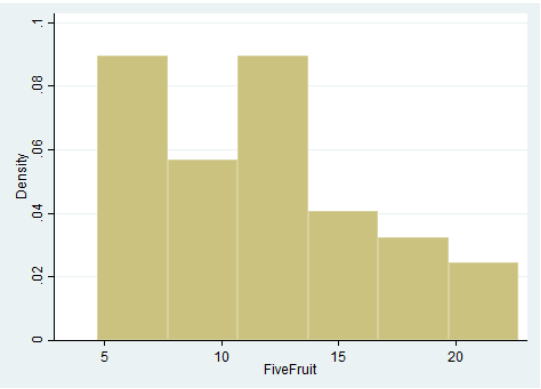
Variable	Histogram
Low Birth Weight Percentage of live births weighing under 5.5 lbs. Label: lowbirthwe~t From NYC vital statistics data. Higher values equal lower well-being	
Percentage of population that reported not receiving needed medical care in the past year Label: didyougetn~s Q: Was there a time in the past 12 months when you needed medical care, but did not get it? Higher values equal lower well-being.	
Annual Average Fine Particulate Matter (PM2.5) https://www.health.ny.gov/environmental/indoors/air/pmq_a.htm Higher values equal lower well-being.	
% of homes with cockroaches Higher values equal lower well-being.	

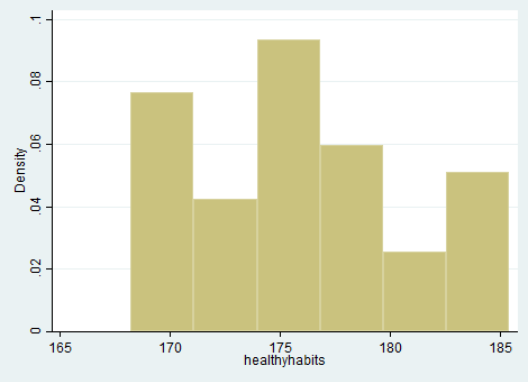
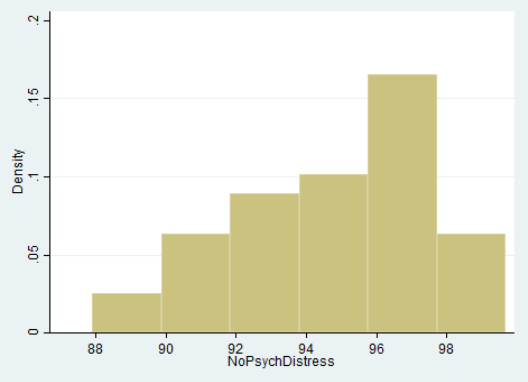
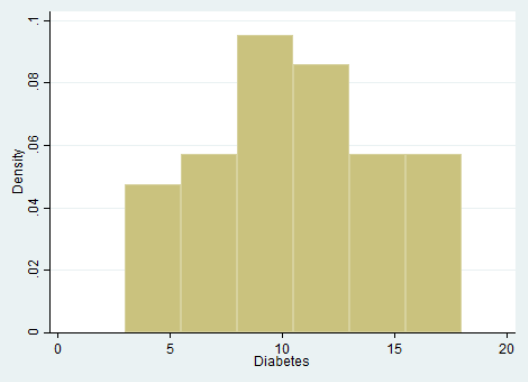
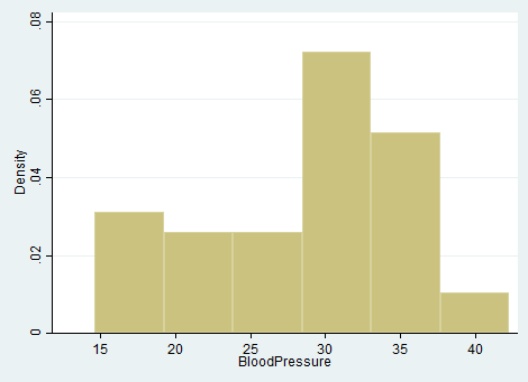
% of homes with mice-rats Higher values equal lower well-being.	
Rate of ppm Attributable Asthma Emergency Department Visits (children under 18) Rate of child asthma-related ED visits that are attributable to poor outdoor air quality. Higher values equal lower well-being.	
Rate of ppm Attributable Asthma Emergency Department Visits (adults over age 18) Rate of adult asthma-related ED visits that are attributable to poor outdoor air quality. Higher values equal lower well-being.	
Asthma Percentage of population that reports ever being diagnosed with asthma Question: Have you ever been told by a doctor, nurse or other health professional that you had asthma? Higher values equal lower well-being.	

Neighborhood Walkability The extent to which neighborhood design supports walking in terms of density, diversity, design, destination accessibility and distance to transit. Higher values equal higher well-being.	
Never Smoked Self reported smoking status (never smoked cigarettes - having smoked fewer than 100 cigarettes ever) Higher values equal higher well-being.	
Former Smoker Self reported smoking status (formerly smoked cigarettes) Higher values equal (ambiguous) well-being.	
Current Smoker Self reported smoking status (currently smoke cigarettes) Higher values equal lower well-being.	

Smoking Habits Using the data above we created a composite indicator of smoking habits by using the following formula: smokinghabits = ((currentSmoke *1)+ (formerSmoke*2) + (NeverSmoke*3))/3 Higher values equal higher well-being.	
Poor Health Percentage reporting poor or fair general health. Higher values equal lower well-being.	
Good Health Percentage reporting good general health Higher values equal higher well-being.	
Very Good Health Percentage reporting very good general health Higher values equal higher well-being.	

Excellent Health Percentage reporting excellent general health Higher values equal higher well-being.	
Health Status Using the above mentioned indicators of health we create a composite indicator for self reported health status using the following formula: healthstatus = ((poorhealth*1)+(goodhealth*2)+ (verygoodhealth*3)+(excellenthealth*4)/4) Higher values equal higher well-being	
Obese Percentage of population with BMI of 30 or over. Body Mass Index (BMI) is calculated based on respondents' self-reported weight and height. Higher values equal lower well-being.	
Heavy Drinking Percentage of population reporting heavy drinking. Heavy drinking is defined as an average of more than 2 drinks per day for men and more than 1 drink per day for women. Higher values equal lower well-being.	

Insured Percentage of population reporting having a health insurance policy. Question: Do you have a health insurance policy? Higher values equal higher well-being.	
No Fruit/veg Percentage of population reporting eating zero servings of fruits or vegetables yesterday. Question: How many total servings of fruit and/or vegetables did you eat yesterday? A serving would equal one medium apple, a handful of broccoli, or a cup of carrots. Higher values equal lower well-being.	
Some Fruit / veg Percentage of population reporting eating one to four servings of fruits or vegetables yesterday. Question: How many total servings of fruit and/or vegetables did you eat yesterday? A serving would equal one medium apple, a handful of broccoli, or a cup of carrots. Higher values equal (ambiguous) well-being.	
Five Fruit / veg Percentage of population reporting eating five or more servings of fruits or vegetables yesterday. Question: How many total servings of fruit and/or vegetables did you eat yesterday? A serving would equal one medium apple, a handful of broccoli, or a cup of carrots. Higher values equal higher well-being.	

Healthy Habits Using the fruit/vegetable indicators above we made a composite indicator called healthy habits using the following formula: gen healthyhabits = ((nofruit*1)+(somefruit*2)+ (fivefruit*3) /3) Higher values equal higher well-being.	
No serious psychological distress Percentage of population reporting no serious psychological distress. Serious psychological distress is a composite measure of 6 questions regarding symptoms of anxiety, depression and other emotional problems. Higher values equal higher well-being.	
Diabetes Percentage of population reporting ever having been diagnosed with diabetes. Question: Have you ever been told by a doctor, nurse or other health professional that you have diabetes? Higher values equal lower well-being.	
High Blood Pressure Percentage of population reporting having ever been told they have hypertentsion. Question: Have you ever been told by a doctor, nurse or other health professional that you have hypertension, also called high blood pressure? Higher values equal lower well-being.	

Factor Analysis

Rotated factor loadings (pattern matrix) and unique variances

Variable	Factor1	Factor2	Factor3	Factor4	Uniqueness
childrenem~a	-0.0000	0.5448	0.7222	-0.1514	0.1586
adultemerg~t	-0.0999	0.5144	0.7524	-0.2219	0.1101
asthmaever	0.3483	0.1397	0.8004	-0.1945	0.1807
lowbirth	-0.3583	0.0231	0.7250	0.3210	0.2424
didnotrece~e	-0.1375	0.4477	0.1688	0.3338	0.6407
avgparticu~r	0.8961	-0.0849	0.2037	-0.1051	0.1373
cockroach	-0.0358	0.8562	0.3884	-0.2604	0.0470
mice	0.0091	0.8054	0.5224	-0.0800	0.0720
walkability	0.8725	0.1434	0.1607	0.0381	0.1908
obese	-0.7565	0.2299	0.4113	-0.2567	0.1398
heavydrink~g	0.7684	-0.4109	0.1857	0.0582	0.2028
insured	0.2975	-0.8399	0.0603	0.0585	0.1989
nopsychdis~s	0.4076	-0.4094	-0.0263	0.6981	0.1783
diabetes	-0.6871	0.3678	0.3269	-0.0370	0.2844
bloodpress~e	-0.8606	0.1627	0.2070	-0.0636	0.1861
healthstatus	0.4388	-0.5417	-0.2614	0.4273	0.2631
healthyhab~s	-0.1234	0.0158	-0.3979	0.6732	0.3730
smokinghab~s	0.3267	-0.7256	-0.1120	-0.2514	0.2911

Conclusions from the first principal component analysis:

1. 'Did not receive medical care when needed' is not associated with any of the four factors analyzed by this model. However, the variable is very unique so we decided to keep this data for another analysis later.
2. Factor 1 is associated with the following variables: average particular matter, walkability, obesity, heavy drinking, diabetes, and blood pressure. Two of the variables in this category do not make theoretical sense.
    a. The factor impacts walkability and average particular matter to both become positive because these two variables are highly correlated (r = 0.8245). This is due to a lack of control for pollution in the walkability rating. Furthermore, pollution is highly associated with density (higher density equals higher pollution, and density is highly associated with walkability (higher density equals higher walkability rating). Due to this confounding variable, we decided to eliminate the average particular matter variable from our analysis. http://beh.columbia.edu/neighborhood-walkability/
    b. The second factor that does not make sense is the self-reported heavy drinking variable. As walkability improves, the outcomes for obesity, diabetes, and blood pressure improve but heavy drinking seems to go up! From this analysis, we assume that self-reported heavy drinking is not a useful metric so we eliminated this from our next analysis.
3. Self-reported health status, self-reported mental stress, and self-reported healthy food eating habits are not strongly impacted by any of the four factors.

We decided to re-do the factor analysis after making the above mentioned changes. The resulting analysis explains 81.68% of the variance in the data, which is quite strong.

Factor analysis/correlation — Number of obs = 42
Method: principal-component factors — Retained factors = 3
Rotation: orthogonal varimax (Kaiser off) — Number of params = 30

Factor	Variance	Difference	Proportion	Cumulative
Factor1	3.64917	0.88909	0.3317	0.3317
Factor2	2.76007	0.18421	0.2509	0.5827
Factor3	2.57586	.	0.2342	0.8168

```
   ------------------------------------------------------------------------------
   LR test: independent vs. saturated:  chi2(55) =  429.56 Prob>chi2 = 0.0000

Rotated factor loadings (pattern matrix) and unique variances
   -------------------------------------------------------------
       Variable |  Factor1   Factor2   Factor3 |   Uniqueness
   -------------+-----------------------------+--------------
   childrenem~a |   0.8716    0.1531    0.2931 |      0.1310
   adultemerg~t |   0.8617    0.2495    0.3068 |      0.1011
     asthmaever |   0.9018   -0.0777   -0.1195 |      0.1665
      cockroach |   0.6419    0.1234    0.6773 |      0.1141
           mice |   0.6890    0.0732    0.6658 |      0.0766
        insured |  -0.1266   -0.2120   -0.8701 |      0.1820
   smokinghab~s |  -0.0497   -0.2554   -0.7483 |      0.3724
    walkability |   0.4085   -0.7725    0.0179 |      0.2360
          obese |   0.3754    0.8303    0.2103 |      0.1255
       diabetes |   0.3394    0.7204    0.2839 |      0.2853
   bloodpress~e |   0.0751    0.8558    0.1936 |      0.2244
   -------------------------------------------------------------
```

Conclusions from the second factor analysis above:

1. Presence of cockroaches and mice is correlated with asthma rates as well as insurance/smoking habits but not to a significant enough degree (.7). Therefore we decided to eliminate these variables.

Next we used an alpha test to determine reliability of a scale for each of the categories as determined by the second factor analysis.

```
. alpha walkability diabetes bloodpressure obese
        Test scale = mean(unstandardized items)
        Reversed item:  walkability
        Average interitem covariance:     18.89762
        Number of items in the scale:            4
        Scale reliability coefficient:      0.8087

. alpha bloodpressure diabetes obese
        Test scale = mean(unstandardized items)
        Average interitem covariance:     29.49673
        Number of items in the scale:            3
        Scale reliability coefficient:      0.8411
. alpha childrenemergencyvisitsattributa adultemergencyvisitsattributatet asthmaever
        Test scale = mean(unstandardized items)
        Average interitem covariance:     1049.044
        Number of items in the scale:            3
        Scale reliability coefficient:      0.7099

. alpha insured smokinghabits
        Test scale = mean(unstandardized items)
        Average interitem covariance:     21.15382
        Number of items in the scale:            2
        Scale reliability coefficient:      0.6650
```

For the first scale, we compared the scale reliability with and without including the walkability indicator. As illustrated above, the scale without walkability variable is more reliable than the scale that includes walkability. Therefore, we decided to eliminate the walkability variable from our scale. The second scale for asthma is reliable. For the third scale, we decided to only use the percent insured as an indicator and disregard the smoking habits indicator because the scale reliability coefficient doesn't meet the 0.7 benchmark.

As a result of this analysis, we've come up with the following five health indicators.

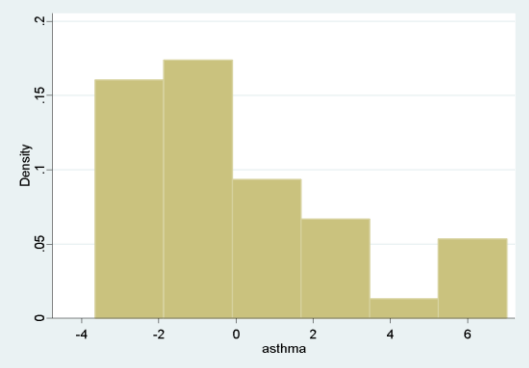
1. Asthma rate per neighborhood are derived from three different indicators.
2. Physical Health – By combining obesity rate, diabetes rate, and high blood pressure rates, we've designed an indicator that describes the quality of physical health of neighborhood residents.

3. Insurance coverage – Percent of people with insurance in a particular neighborhood.
4. Low Birth Weight – Percent of births in a particular neighborhood that had a low birth weight.
5. Did not receive healthcare when needed – Self-reported indicator of healthcare quality and access in the neighborhood.

Asthma

In order to create the asthma rating per neighborhood, we had to combine the three indicators using STATA. We did this by converting the three indicators to Z-Scores and then adding up the Z-Scores.

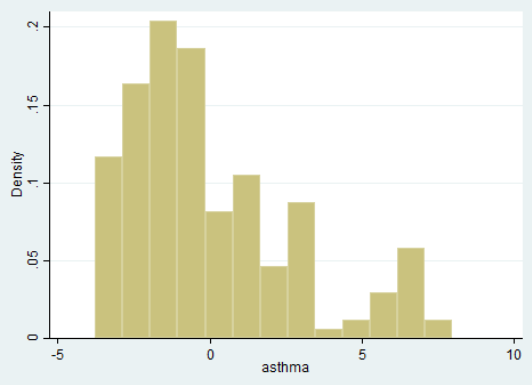
```
. sum childrenemergencyvisitsattributa adultemergencyvisitsattributatet asthmaever
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
childrenem~a |        42    100.3024    73.13248       19.5      299.4
adultemerg~t |        42    47.29524    40.49865        6.7      147.1
 asthmaever |        42    12.36429    4.158261        5.2       20.1

. egen z1asthma = std( childrenemergencyvisitsattributa)
. egen z2asthma = std ( adultemergencyvisitsattributatet)
. egen z3asthma = std ( asthmaever)

. sum z1asthma z2asthma z3asthma
    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
    z1asthma |        42    3.73e-09           1  -1.104877   2.722424
    z2asthma |        42   -5.17e-09           1  -1.002385   2.464397
    z3asthma |        42   -1.29e-09           1  -1.722904   1.860325
. gen asthma = z1asthma+ z2asthma+ z3asthma
. sum asthma

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
      asthma |        42   -9.40e-09    2.735838  -3.652076   7.023098
. hist asthma (bin=6, start=-3.6520765, width=1.7791957)
```



Repeating the above process with data at the NTA level gave the following output:

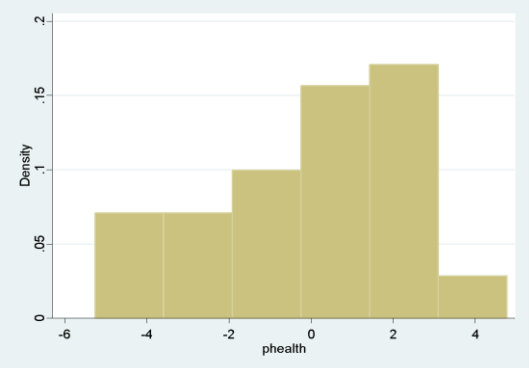
```
. . sum childrenemergencyvisitsattributa adultemergencyvisitsattributatet asthmaever

        Variable |     Obs     Mean    Std. Dev.       Min     Max
-------------+--------------------------------------------------------
childrenem~a |         190     99.09347       63.57722       19.5    299.4
adultemerg~t |         190     46.14811       36.4297        6.7     147.1
  asthmaever |         190     11.75295       4.03487        5.2     20.1

. . egen z1asthma = std( childrenemergencyvisitsattributa)
(5 missing values generated)
```

```
. . egen z2asthma = std ( adultemergencyvisitsattributatet)
(5 missing values generated)

. . egen z3asthma = std ( asthmaever)
(5 missing values generated)

. . sum z1asthma z2asthma z3asthma

    Variable |     Obs     Mean    Std. Dev.       Min     Max
-------------+--------------------------------------------------------
    z1asthma |     190   -9.31e-10        1  -1.251918   3.150602
    z2asthma |     190    1.90e-09        1  -1.082856   2.771143
    z3asthma |     190    2.28e-09        1  -1.624079   2.068729
. . gen asthma = z1asthma+ z2asthma+ z3asthma
(5 missing values generated)

. . sum asthma
    Variable |     Obs     Mean    Std. Dev.       Min     Max
-------------+--------------------------------------------------------
      asthma |     190    7.61e-09    2.785705  -3.764139    7.96569
```



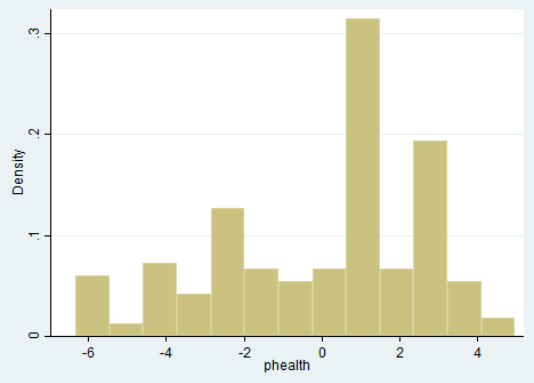
Physical Health

```
. egen z1phealth = std ( walkability)
. egen z2phealth = std ( obese)
. egen z3phealth = std ( diabetes)
. egen z4phealth = std ( bloodpressure)
. sum walkability obese diabetes bloodpressure
   Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
walkability |        42    .9245238    2.904957        -4       9.43
      obese |        42    23.40476    8.720286       9.7       41.9
   diabetes |        42    10.42857    4.243462         3         18
bloodpress~e |        42    28.73333    6.678786      14.6       42.3

. sum z1phealth z2phealth z3phealth z4phealth

   Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
  z1phealth |        42   -9.65e-10           1  -1.695214   2.927918
  z2phealth |        42   -1.62e-09           1  -1.571595   2.120944
  z3phealth |        42    4.97e-09           1  -1.750592   1.784258
  z4phealth |        42    7.67e-09           1  -2.116153   2.031307

. gen phealth = z2phealth+ z3phealth+ z4phealth
. hist phealth (bin=6, start=-5.2586675, width=1.6712166)
```



Repeating the process at the NTA level gave the following results:

```
. . egen z2phealth = std ( obese)
(5 missing values generated)

. . egen z3phealth = std ( diabetes)
(5 missing values generated)

. . egen z4phealth = std ( bloodpressure)
(5 missing values generated)

. . sum obese diabetes bloodpressure

        Variable |     Obs     Mean    Std. Dev.       Min     Max
-------------+--------------------------------------------------------
        obese |         190     24.24158       7.912856       9.7     41.9
        diabetes |      190     11.04153       3.618533       3       18
bloodpress~e |          190     29.55374       6.08591        14.6    42.3

. . sum z2phealth z3phealth z4phealth

        Variable |     Obs     Mean    Std. Dev.       Min     Max
-------------+--------------------------------------------------------
   z2phealth |          190   -2.20e-09        1   -1.837716   2.231612
   z3phealth |          190   -1.00e-08        1   -2.222317   1.923009
   z4phealth |          190     1.00e-09              1   -2.457108   2.094389
. gen phealth = z2phealth+ z3phealth+ z4phealth
 (5 missing values generated)
```

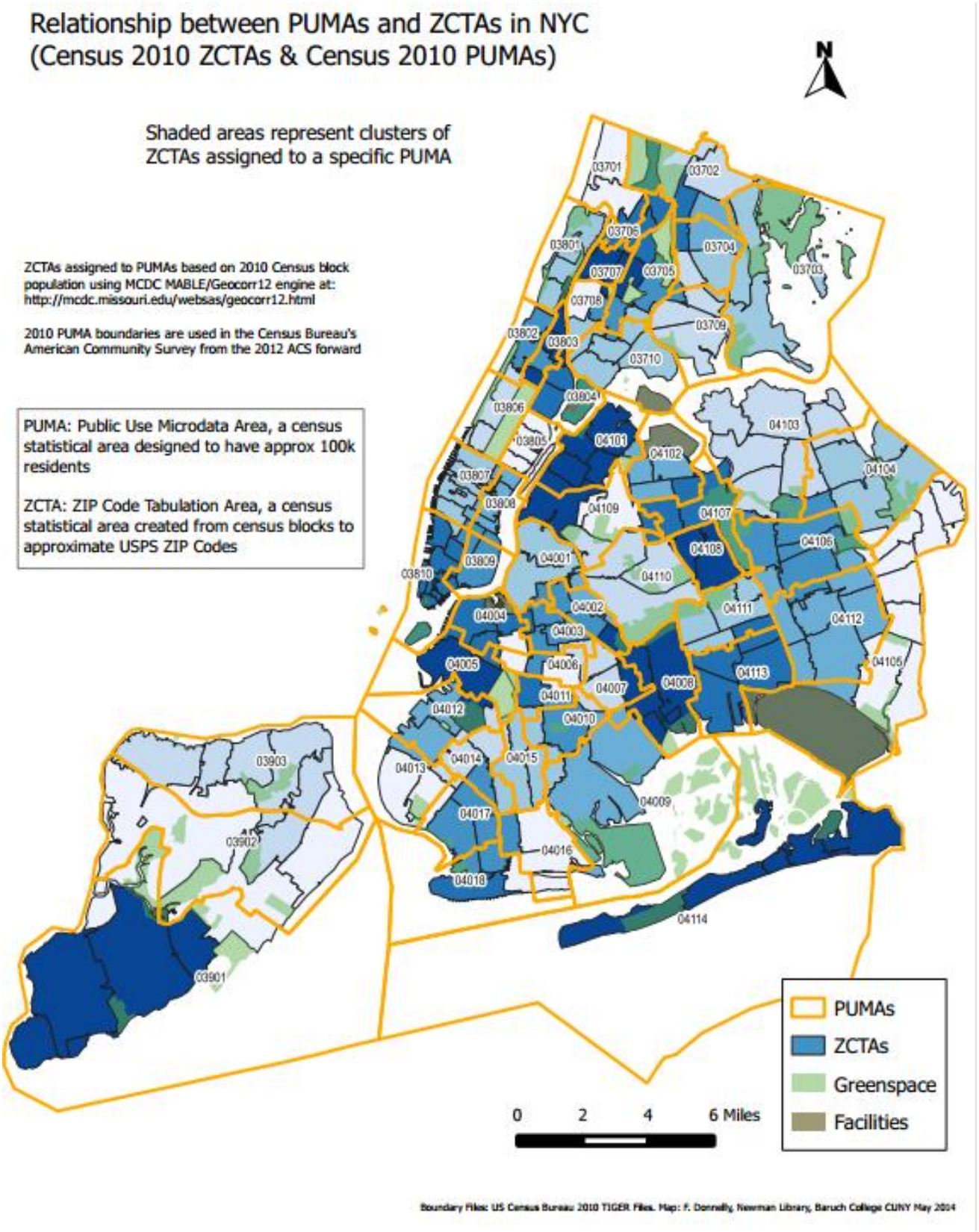


The following describes the variables chosen:

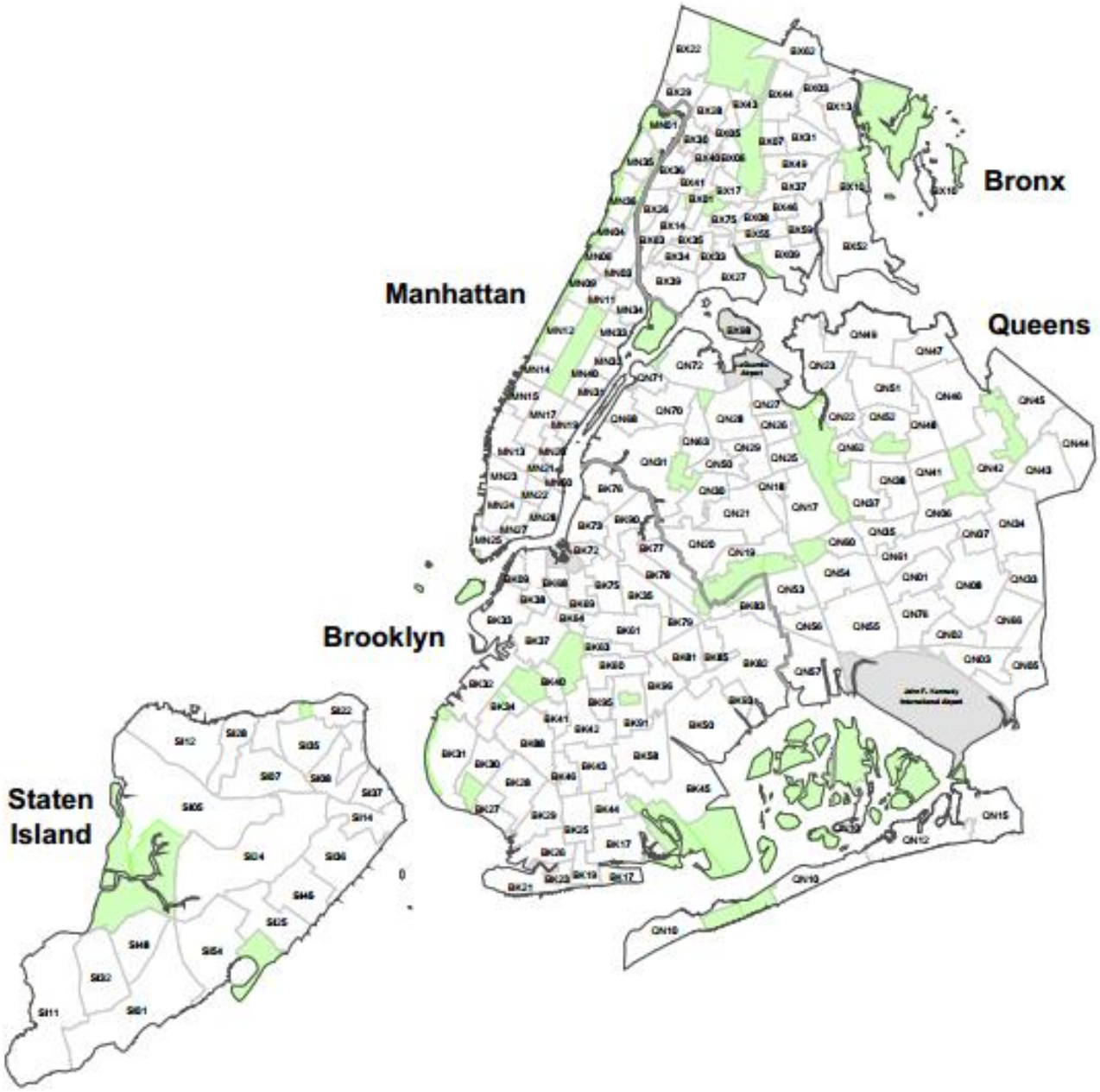
```
. cor asthma phealth lowbirth didnotreceivemedicalcare insured nopsychdistress healthstatus
healthyhabits womenwithbirthsinthepast12months
(obs=190)
```

	asthma	phealth	lowbirth	didnot~e	insured	nopsyc~s	healt~us	healt~ts	womenw~s
asthma	1.0000								
phealth	0.3979	1.0000							
lowbirth	0.4766	0.4877	1.0000						
didnotrece~e	0.3455	0.2855	0.2499	1.0000					
insured	-0.1721	-0.3396	-0.0098	-0.3281	1.0000				
nopsychdis~s	-0.0348	0.0645	0.0655	-0.0146	-0.0499	1.0000			
healthstatus	-0.5396	-0.6258	-0.2645	-0.4467	0.3603	0.0096	1.0000		
healthyhab~s	-0.1175	-0.0496	-0.0851	0.1722	-0.1610	0.0114	-0.1047	1.0000	
womenwithb~s	0.3217	0.1763	0.1665	0.2374	-0.1737	0.0416	-0.2948	-0.0200	1.0000

G. Reference Maps



New York City 2010 Neighborhood Tabulation Areas*



*Neighborhood Tabulation Areas (NTAs) are aggregations of census tracts that are subsets of New York City's 55 Public Use Microdata Areas (PUMAs). Primarily due to these constraints, NTA boundaries and their associated names may not definitively represent neighborhoods.

Population Division - New York City Department of City Planning
(March 2011)

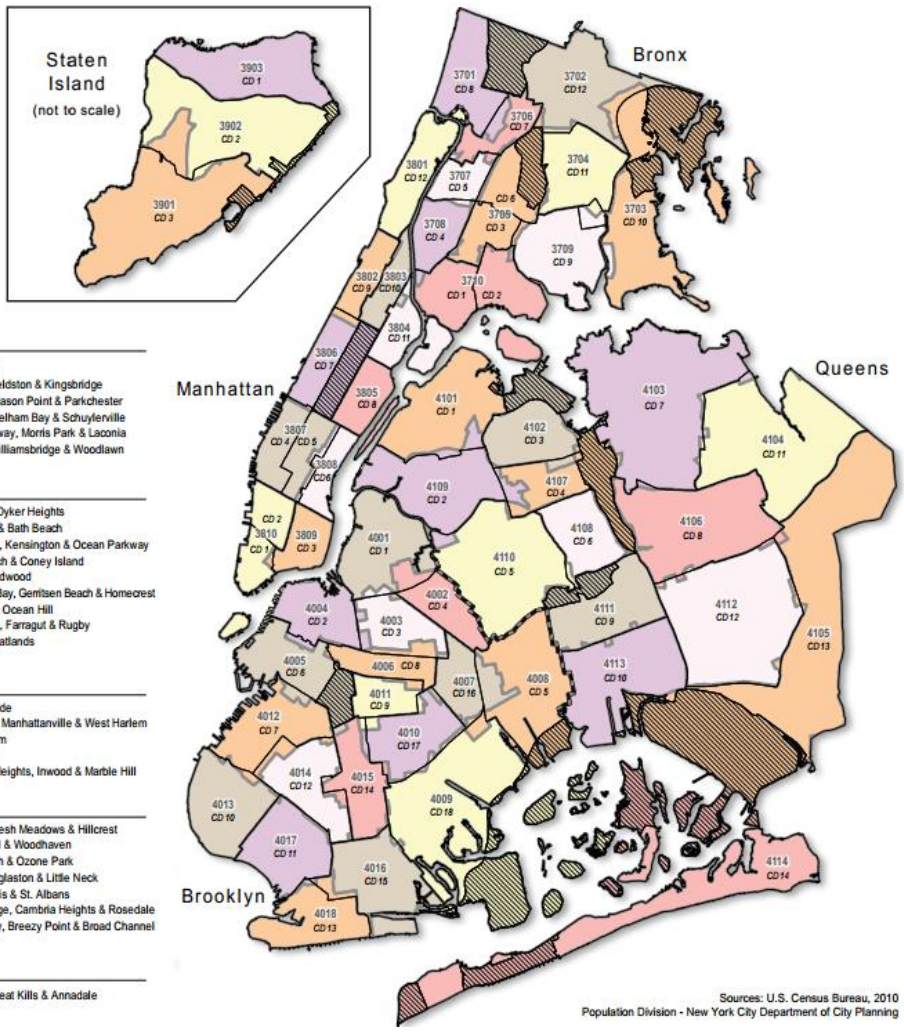
New York City PUMAs and Community Districts

Public Use Microdata Areas (PUMAs) approximate NYC Community Districts (CDs).

3702 PUMAs

CD 12 Community District boundaries

Joint Interest Areas (JIAs) *e.g. parks and airports*



Bronx

CD	PUMA	PUMA Name	CD	PUMA	PUMA Name
1 & 2	3710	Hunts Point, Longwood & Melrose	8	3701	Riverdale, Fieldston & Kingsbridge
3 & 6	3705	Belmont, Crotona Park East & East Tremont	9	3709	Castle Hill, Clason Point & Parkchester
4	3708	Concourse, Highbridge & Mount Eden	10	3703	Co-op City, Pelham Bay & Schuylerville
5	3707	Morris Heights, Fordham South & Mount Hope	11	3704	Pelham Parkway, Morris Park & Laconia
7	3706	Bedford Park, Fordham North & Norwood	12	3702	Wakefield, Williamsbridge & Woodlawn

Brooklyn

1	4001	Greenpoint & Williamsburg	10	4013	Bay Ridge & Dyker Heights
2	4004	Brooklyn Heights & Fort Greene	11	4017	Bensonhurst & Bath Beach
3	4003	Bedford-Stuyvesant	12	4014	Borough Park, Kensington & Ocean Parkway
4	4002	Bushwick	13	4018	Brighton Beach & Coney Island
5	4008	East New York & Starrett City	14	4015	Flatbush & Midwood
6	4005	Park Slope, Carroll Gardens & Red Hook	15	4016	Sheepshead Bay, Gerritsen Beach & Homecrest
7	4012	Sunset Park & Windsor Terrace	16	4007	Brownsville & Ocean Hill
8	4006	Crown Heights North & Prospect Heights	17	4010	East Flatbush, Farragut & Rugby
9	4011	Crown Heights So., Prospect Lefferts & Wingate	18	4009	Canarsie & Flatlands

Manhattan

1 & 2	3810	Battery Park City, Greenwich Village & Soho	8	3805	Upper East Side
3	3809	Chinatown & Lower East Side	9	3802	Hamilton Hts, Manhattanville & West Harlem
4 & 5	3807	Chelsea, Clinton & Midtown Business District	10	3803	Central Harlem
6	3808	Murray Hill, Gramercy & Stuyvesant Town	11	3804	East Harlem
7	3806	Upper West Side & West Side	12	3801	Washington Heights, Inwood & Marble Hill

Queens

1	4101	Astoria & Long Island City	8	4106	Briarwood, Fresh Meadows & Hillcrest
2	4109	Sunnyside & Woodside	9	4111	Richmond Hill & Woodhaven
3	4102	Jackson Heights & North Corona	10	4113	Howard Beach & Ozone Park
4	4107	Elmhurst & South Corona	11	4104	Bayside, Douglaston & Little Neck
5	4110	Ridgewood, Glendale & Middle Village	12	4112	Jamaica, Hollis & St. Albans
6	4108	Forest Hills & Rego Park	13	4105	Queens Village, Cambria Heights & Rosedale
7	4103	Flushing, Murray Hill & Whitestone	14	4114	Far Rockaway, Breezy Point & Broad Channel

Staten Island

1	3903	Port Richmond, Stapleton & Mariner's Harbor	3	3901	Tottenville, Great Kills & Annadale
2	3902	New Springville & South Beach			

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