Analyzing the Food Security in NYC

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Project Goals

The global food security index, measured by **food access, quality and affordability**, shows that the food access and equality issues remain an ever present problem in countries across the world. As the United States is a first world country and leading member of the world economy, it is contradictory to assume that food security issues in the U.S. exist as a prevalent problem.
Through the analysis of three main data sets:

- USDA Food Atlas
- DOHMH NYC Restaurant Inspections
- Liquor License Data

And the supporting ACS 2014 and PLUTO data,
This study seeks to explore the **plight of food security** within the U.S. with **an emphasis on New York City**.

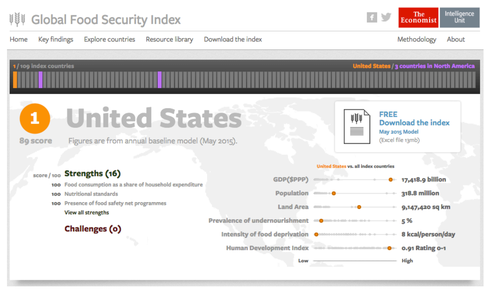
By exploring the boroughs with the greatest inequality of food access this study hopes to see where each borough ranks among its access to the least accessible populations.
NYC Restaurant inspections are a recent implementation that can have major impacts on a businesses turn out, trends in food type, location, and year will be examined.
Liquor License data (as a replacement for Grocery Store Data) across the city will also be examined, observing frequencies and utilizing demographic data from the Census and PLUTO to compare the densities in each borough.

The identification of these lower access to food areas can support policy making decisions to plan to enhance the food access. The analyses can help urban planners and economic developers to allocate resources for efforts to eliminate these food desert islands.
There are a number of users that would benefit from my project conclusions; they are, most obviously, food desert advocates and elected officials fighting for food equality to everyday Americans looking to move to an area where quality food is nearby and available.

Global Food Security Index

"The Global Food Security Index considers the core issues of **affordability, availability, and quality across** a set of 109 countries. The index is a dynamic quantitative and qualitative benchmarking model, constructed from 28 unique indicators, that measures these drivers of food security across both developing and developed countries.

This index is the first to examine food security comprehensively across three internationally established dimensions. Moreover, the **study looks beyond hunger to** the underlying factors **affecting food insecurity**. To increase the ongoing relevance of the study, the index will employ a quarterly adjustment factor for food price fluctuations to examine the risk countries face throughout the course of the year."



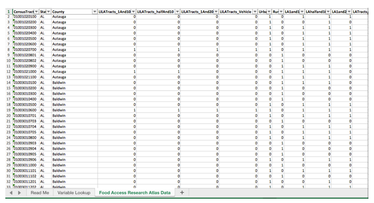
Food Atlas

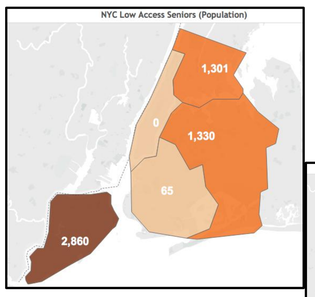
The Data

Origin: United States Department of Agriculture
The left image depicts the Raw Data set from the Examining the United States at the county level and in turn the NYC Borough level

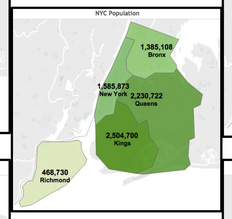
The Food Atlas data includes 2010 Census Tract data in its own analysis.

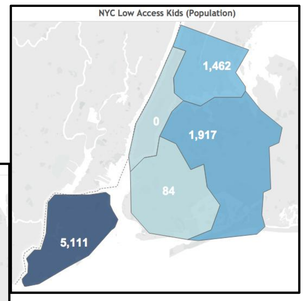
Food access
"**Limited access** to **supermarkets, supercenters, grocery stores**, or other **sources of healthy and affordable food** retailers may make it harder for some Americans to eat a healthy diet. There are many ways to measure food store access for individuals and for neighborhoods, and many ways to define which areas are food *deserts—neighborhoods that lack healthy food sources.*"

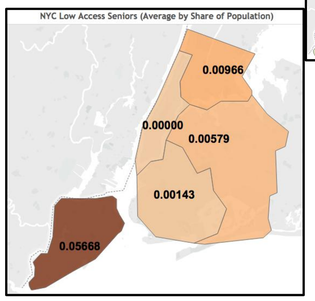




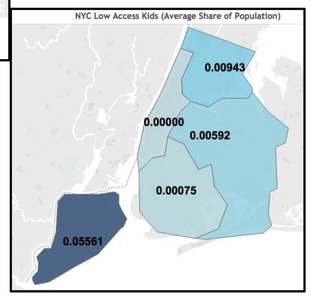
This particular data was examined by two sets of population, the "Vulnerable Populations" i.e. the populations with the lowest self access to food.







With Staten Islands smaller in relative size population, lower numbers for both the raw number comparison and average share were hypothesized. This however is not the case with Staten Island pulling in the highest numbers in all 4 categories. For example Staten Island has on average 5% of each census tract with low access to food.

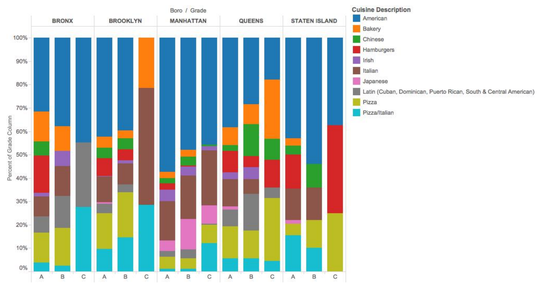


The "Seniors" in this data set refer to individuals aged 65+.

The "Kids" in this data set refer to individuals aged 0-17.

Restaurant Inspection Data

2015 Restaurant Inspection Grade Dispersion By Borough and Grade



- Data is from the Department of Health and Mental Hygiene.
- Year 2015 was used to ensure that a full year of data could be accessed.
- Data is filtered across by the top 10 highest frequencies of cuisine type.
- A's across all boroughs are given to restaurants that serve "American" Cuisine.

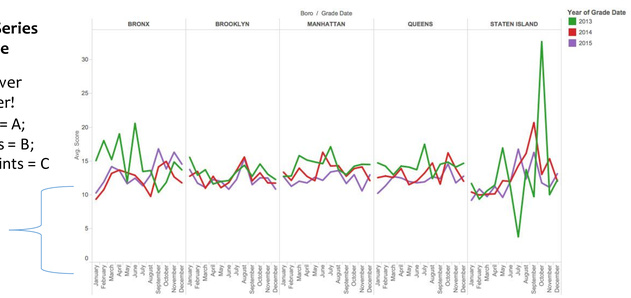
2015 Restaurant Inspection Grade Dispersion By Borough and Grade

Cuisine Des..	BRONX A	BRONX B	BRONX C	BROOKLYN A	BROOKLYN B	BROOKLYN C	MANHATTAN A	MANHATTAN B	MANHATTAN C	QUEENS A	QUEENS B	QUEENS C	STATEN ISLAND A	STATEN ISLAND B	STATEN ISLAND C
American	31.59%	37.90%	44.83%	42.29%	39.62%		57.44%	48.01%	45.78%	38.41%	28.51%	17.91%	42.92%	54.00%	37.50%
Bakery	12.83%	10.48%		4.69%	3.30%	21.43%	2.65%	2.76%		7.45%	8.51%	25.37%	3.33%		
Chinese	5.94%			4.57%	4.72%		2.22%	3.80%	0.60%	2.62%	13.62%	8.96%	3.75%	10.00%	
Hamburgers	15.91%			7.54%	4.72%		2.73%	0.32%		9.02%	4.68%	11.94%	14.58%		37.50%
Irish	1.66%	6.45%		0.11%	1.42%		4.83%	3.80%	1.81%	3.04%	5.11%				
Italian	8.55%	12.90%		11.09%	8.96%	50.00%	16.97%	18.65%	23.49%	11.65%	6.38%		13.33%	14.00%	
Japanese				0.69%			4.51%	12.95%	7.83%	1.26%			1.67%		
Latin (Cuban, Dominican, Puerto Rican..	6.69%	13.71%	27.59%	4.23%	3.30%		2.45%	3.80%	0.60%	7.35%	15.74%	4.48%			
Pizza	12.83%	16.13%		15.20%	19.34%		5.14%	4.66%	7.83%	13.64%	11.91%	26.87%	5.00%	12.00%	25.00%
Pizza/Italian	3.80%	2.42%	27.59%	9.60%	14.62%	28.57%	1.07%	1.04%	12.05%	5.56%	5.53%	4.48%	15.42%	10.00%	

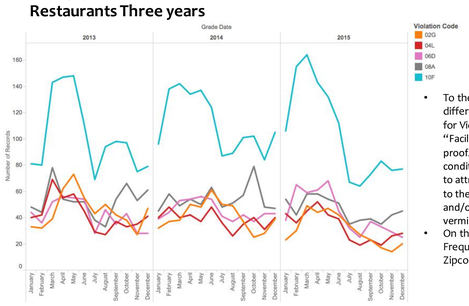
Manhattan Sample: Italian and Japanese Restaurant Percentage Across Grades by Zipcode

Three Year Time Series Analysis: Score

- In this graph the lower your score the better!
  Score 0 to 13 points = A;
  Score 14 to 27 points = B;
  Score 28 or more points = C



Top 5 Violations by Restaurants Three years

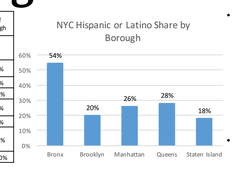


- To the left we see differences in peaks for Violation 08A: "Facility not vermin proof. Harborage or conditions conducive to attracting vermin to the premises and/or allowing vermin to exist."
- On the right is a Frequency by Zipcode Map

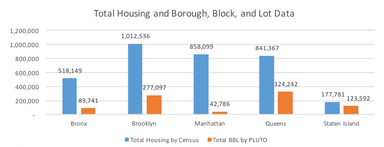
Violation 08A: 2015 Frequency

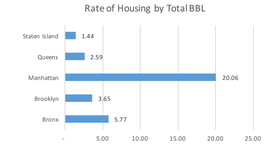
NYC Borough Data

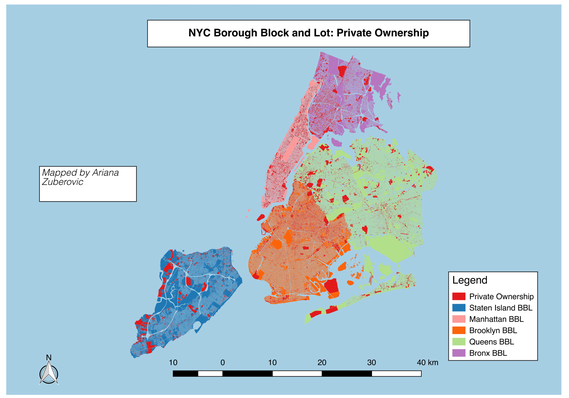
2014 ACS	Bronx	% of Borough	Brooklyn	% of Borough	Manhattan	% of Borough	Queens	% of Borough	Staten Island	% of Borough
ONE RACE	1,362,017		2,513,542		1,552,947		2,199,770		461,617	
American Indian and Alaska Native	7,936	0.58%	9,135	0.36%	5,988	0.39%	8,771	0.40%	1,057	0.23%
Asian	50,800	3.73%	286,727	11.41%	184,945	11.91%	544,900	24.86%	37,617	8.15%
Black or African American	477,844	35.08%	871,044	34.65%	245,256	15.79%	424,129	19.28%	49,435	10.71%
Native Hawaiian and Other Pacific Islander	660	0.05%	621	0.02%	1,052	0.07%	1,191	0.05%	48	0.01%
Some other race	520,667	38.23%	224,112	8.92%	197,648	12.73%	272,214	12.37%	17,335	3.76%
White	304,110	22.33%	1,121,903	44.63%	918,058	59.12%	946,565	43.03%	356,125	77.15%
		100.00%		100.00%		100.00%		100.00%		100.00%



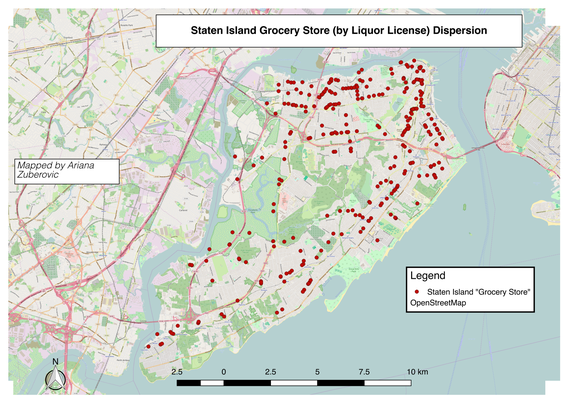
- The chart to the left depicts the breakdown of races among the city, with a mean race allocation of 16.675 when looking at the borough with the most "diversity" (in our case we consider the mean as a benchmark) we examine the Variance and Standard Deviation of the percentages. Staten Island is the least "diverse" with 0.30 standard deviations form the mean, followed by Manhattan, 0.22, Brooklyn, 0.19, Bronx, 0.18 and the most "diverse", Queens with 0.16.
- In the context of Hispanic or Latino decent, we can see that the Bronx has the highest, perhaps and ode to the largest share of "some other race" category in the race comparison chart.







- The map to the left an the charts above give a quick overview on the housing distribution among the boroughs. This was done to examine the density of these areas as to target the type of living that those with low food access are accustomed to.
- We can see that the bar chart (which compares Census (2014) "housing" and PLUTO (2016) data's "BBL" or parcel count, that the higher density areas are the one's with the greatest variability among the two numbers.
- The horizontal bar graph shows that for every parcel of land be it a building, house, parking lot, etc. there are 20.6 housing units (by Census standards). This suggests that the lowest density of housing areas are on Staten Island which has the lowest rate of 1.44 housing units per parcels of land.
- The map to the left depicts these parcels by land and singles out the BBL's that are owned by private entities, that is not by the city, state or Federal government.



- In the quest to find data on the grocery stores in the city it is not a fairly transparent data set, instead a comparable data set was utilized, Liquor License data (suggested by fellow peer Austin Krauza). The data was parsed to only include the five boroughs and was specified to only those with the word "Grocery" in their license type.
- The map to the left offers a visual of the breakup of these licenses.

	"Grocery"	% of Grocery Stores	All
Bronx	1,345	18.60%	2,280
Brooklyn	2,506	34.66%	5,656
Manhattan	1,219	16.86%	7,860
Queens	1,850	25.59%	4,752
Staten Island	310	4.29%	826
	7,230		

Summary of Findings

From this research project we can see that in the context of food access to vulnerable populations, Staten Island is one to worry about, with nearly 5% of each census tract examined with low access to food, while Manhattan is striving with numbers at 0%.
Across cuisine types at restaurants there are serious cases for control needed, among them Brooklyn has one of the largest shares of C's with 50% identifying as Italian. Violations across the years remain steady, with peak changes noted, such as the change of months peak of violation 08A.
When comparing borough characteristics it is to be noted that Staten Island possesses a high percentage of low access, lowest diversity by race and ethnicity it still remains at low density when it comes to housing and grocery store share is close to 5% which is the borough's approximate population share. This indicates that throughout the island though there is a problem of food access, it seems that quantity is not the issue, but instead physical access to this food.

Future Research

This study rises some interesting issues about food security across the five boroughs. With all five boroughs possessing their own unique mix of population and resource allocation it is clear to see that there a number of factors that may lead to the results shown on this poster.

Future analysis can include the correlation between the Grocery Store data and the high frequency of low access on Staten Island in particular for the vulnerable populations. One hypothesis could be that since Staten Islands non-vulnerable population is so vehicle driven, the need for walking access for these populations is much lower.

Another area of research this project could inspire is the analysis of health based data across NYC specifically in relation to malnutrition for example, analysis into the rates of obesity and/or diabetes.

This research can help spark thought about food security in NYC, for example, while on the surface it may seem that there are a plethora of restaurants to choose from in NYC clearly there is disparity among the quality of those restaurants for the city's inhabitants.