HOMELESSNESS IN NEW YORK

By Cathy Chang, Kyle Lee, and Judy Zhu

THE HOMELESSNESS EPIDEMIC EXPLAINED

Homelessness in New York is a sad and growing problem. One in every 135 people is homeless in New York. Homelessness continues to increase despite the measures the city has taken to reduce it.

Without enough money to pay for the ever-increasing rent, many of the homeless are unable to earn enough money to keep a roof over their heads. Over the last 15 years, the median rent in New York has increased by 20%, while household income fell about 6.5%. Homelessness will continue to increase if we do not implement a sustainable, long-term solution.
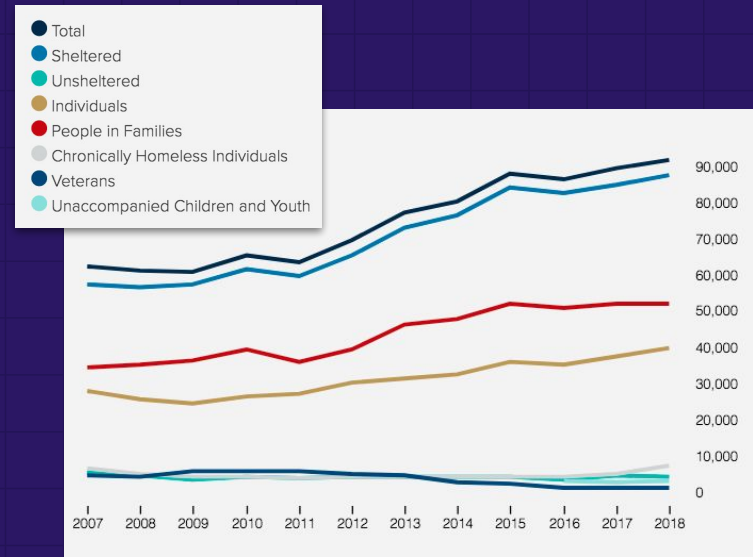
As the figure above shows, the rates of homeless for most categories such as sheltered, individual, and families are increasing from 2007 to 2018. However, the unaccompanied homeless youth population is staying stagnant, and the veteran homeless population is declining as time goes on. The sheltered homeless population also increases, while the number of unsheltered homeless stays the same.

(From the National Alliance to End Homelessness)
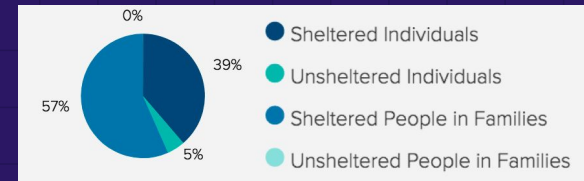
HOMELESSNESS RATE IN 2018

Homelessness Rate

Percent of Population
- 0.2%
- 0.4%
- 0.6%
- 0.8%
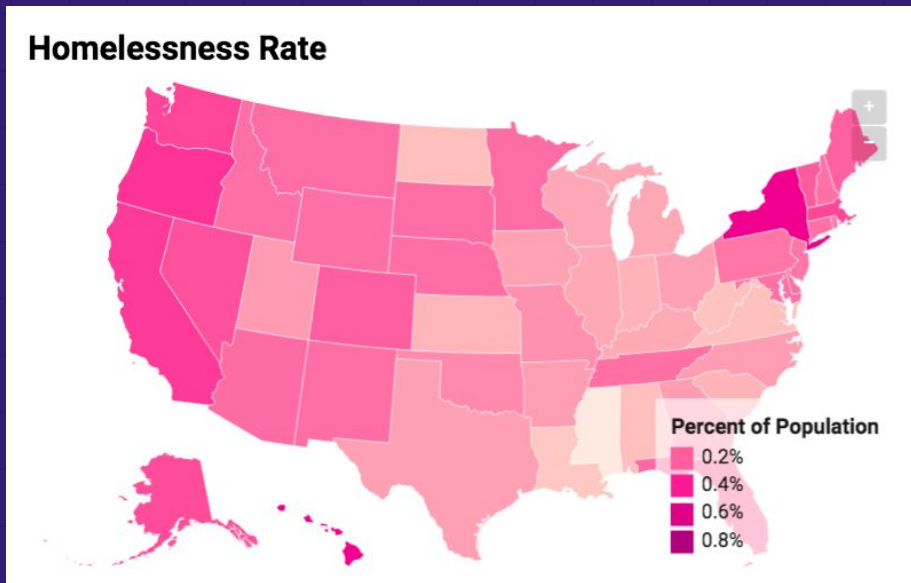
We created this map by dividing the total number of homeless people in the state by the total population of the state. Then, we used darker colors to represent higher rates of homelessness and a lighter color for a lower rates of homelessness.
(Made with DataWrapper)

New York has one of the densest homelessness across the country. Most of homelessness in New York is concentrated around New York City.

The main factor influencing homelessness is rent and housing prices. Some other factors influencing homelessness in New York include:

- Shutdown of numerous mental institutions
- Loss of jobs and declining wages
- Proliferation of highly addictive drugs and very cheap street drugs
- Released prisoners and people discharged from foster care

Predicted 2019 Homeless Population in NYC

Homeless Population vs. Year
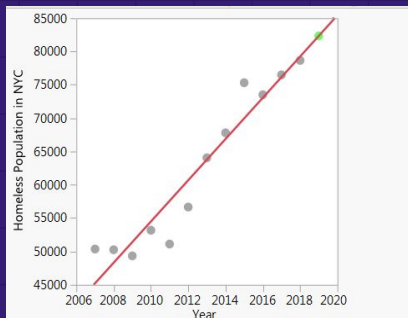
As the figure to the left shows, the line of best fit suggests that the homeless population in NYC is mostly increasing as time goes on. The green dot represents the prediction of the total number of homeless in 2019, while the gray dots represent the actual data values from 2007 to 2018.

Homeless Pop = -6164501 + 3094.0315 * Year

R^2 = 0.916569

There is a **strong, positive linear relationship** between the homeless population and the year.

The predicted total number of homeless during 2019 in NYC using the line of best fit is 82,349 people.

(Made with JMP)

95% Confidence Interval for the Slope

Let β = the true average change in homeless population in NYC associated with an increase of 1 year.

Assumptions:
1. A simple random sample was used.
2. The distribution of residuals at any given x value is approximately normal.
3. The variability of residuals is not changing with x.

We use the formula $b \pm t_{crit} * s_b$ to calculate a 95% confidence interval for the slope:

$$b \pm t_{crit} * s_b$$

$$= -3094.0315 \pm (2.228)(295.1930)$$

$$= (2436.3415, 3751.7215)$$

Therefore, we are 95% confident that the true average change in homeless population in NYC is between 2,436 and 3,752 people per year.

Housing and Homelessness

There are 4 main sets of housing policies that have an association with making housing scarcer, more expensive, and less quality in NYC:

1. Rent regulation: linked with apartment deterioration and discouraging construction of new rental housing
2. Overlapping development regulations: linked with large costs for big developers to build inexpensive housing
3. Property taxes: unjust system that minimally taxes family houses and excessively taxes multifamily rental units
4. Housing subsidies: promotes construction of expensive apartments instead of low income housing

The mayor of New York, Bill de Blasio, has also proposed 3 approaches to combating homelessness: make housing more affordable and stop illegal evictions, better serve people in shelters and neighborhoods, and cut shelter facilities and help homeless people get back on track.
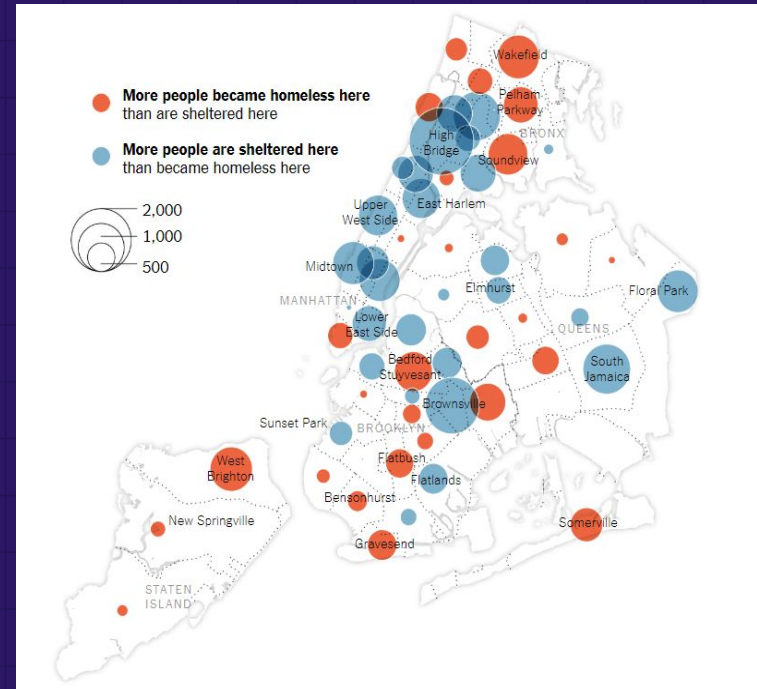
The map above shows the areas where more people become homeless vs. where more homeless are sheltered. This shows where we should focus on prevention of homelessness and where we should focus on providing aid to the homeless.
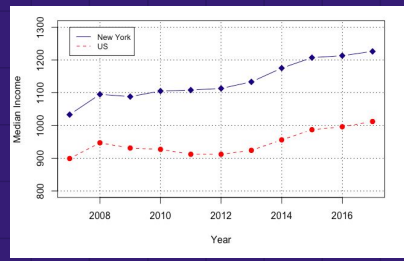(From The New York Times)

As shown in the graphs below, New York's median rent is higher than the national average by over $100. This allows more affluent people to afford luxury housing and shows that the New York housing market largely caters to the more affluent people of the city. This is detrimental to New York's low income residents because of the lack of affordable housing.

The low vacancy rate reflects the trend of expensive housing: as the supply of housing decreases, the price must increase. This pushes low income residents out of the city, while richer people move in, resulting in the rent increasing even more. This cycle of increasing housing prices forces families, individuals, and even veterans onto the street.
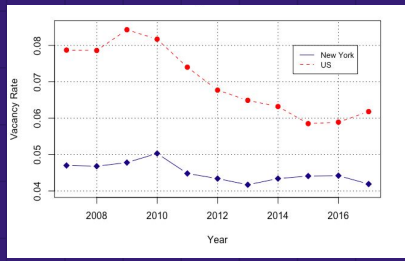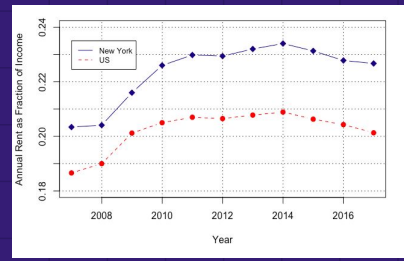
(Made with RStudio)

Median Rent vs. Homeless Population

Homeless Pop = –131.65 + 0.1694 (Median Rent)

Linear Regression

The median rent vs. homeless population plot (on the left) shows a **strong, positive linear relationship** between median rent and homeless population **(R=0.9468)**.

89.65% of the variation in homeless population can be attributed to the approximate linear relationship with median rent in New York.

This high correlation between rent and homeless population shows the strong association between rent prices have on homelessness. From our results and research, we have decided to focus on a solution to housing as well as techniques to prevent people from becoming or returning to homelessness.

New York
US

Median Rent by Year

Vacancy Rate by Year

Annual Rent as a Fraction of Income by Year

OUR SOLUTION: Phase 1

Prevention

Prevention would stop someone from falling into the cycle of homelessness.

We would help families or individuals who are at imminent risk of becoming homeless due to loss of jobs, drug addiction, or a criminal record.

In the future, we plan to study more and collect data on illegal evictions, issues with healthcare costs, and reasons why people may encounter unexpected financial troubles.

We performed multivariate regression (as shown on the right) on crime rate, minimum wage, unemployment rate, and vacancy rate to analyze what factors play into the increasing homelessness rate and find out what factors to focus on to prevent homelessness.

Some of the results were the opposite of what we expected. The crime rate had a negative correlation with homeless population, indicating that crime may not be a factor of homelessness. The unemployment rate also had a negative correlation with homeless population, which suggests that many homeless actually have jobs. However, as minimum wage increased, the homeless population also increased, showing that the minimum wage may not be enough to support someone living in New York.

The graph of vacancy rate does not show a linear trend, but it does show a nonlinear pattern. The negative trend between homeless population and vacancy rate and the strong positive correlation between rent and homelessness (in the previous slide) suggests that housing may be the main factor affecting homelessness rates.

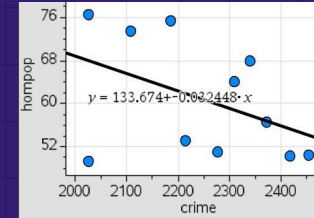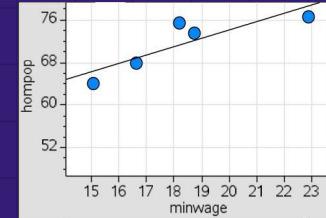## Multivariate Regression
(Made with TI Nspire CX CAS)

Homeless Pop = 129.828
- 0.008759 * (Crime Rate) – 0.868452 * (Unemployment Rate)
– 1664.16 * (Rental Vacancy Rate) + 1.93514 * (Minimum Wage)

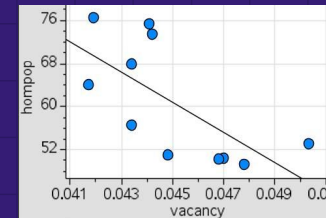**R^2 = 0.791243**

Homeless Pop vs. Crime Rate

Homeless Pop vs. Annual Minimum Wage in Thousands

Homeless Pop vs. Unemployment Rate

Homeless Pop vs. Rental Vacancy Rate

OUR SOLUTION: Phase 2

Housing Assistance

Comparison of outcomes between shelter stays, transitional housing, and rapid re-housing in 14 communities (performed by the National Alliance to End Homelessness)

Cost per exit to permanent housing

Percentage exiting to permanent housing

Recidivism rate

As the figures above shows, switching from rapid rehousing to permanent housing costs much less than changing from homeless shelter and transitional housing. Rapid Rehousing also shows a higher success rate of 85% in helping people exit to permanent housing. Not only is is more affordable and more effective, rapid rehousing also has the lowest recidivism rate, reducing the rate of chronic homelessness.
(From Solid Ground)

Rapid Rehousing

Housing assistance would help homeless trying to get back on their feet. Our housing assistance plan would implement the rapid rehousing technique.

Rapid Rehousing
RRH is an intervention designed to quickly move families and individuals out of homelessness and into permanent housing. This plan would have multiple levels of assistance based on a person's barriers to obtaining and sustaining housing.

3 Key Components
1. Housing Identification - Find housing quickly; since New York is a high-cost, low vacancy city, we should actively recruit landlords and establish connections. We can incorporate this with NYC's housing subsidy program.
2. Rent and Move in Assistance - Help with costs associated with housing
3. Case Management - Stabilize people once housed; this ties into the next phase of our solution: stability.

(From the National Alliance to End Homelessness)

OUR SOLUTION: Phase 3

Stability

Stability programs would help people who were once homeless, stay in their homes.

We would provide skill training for homeless people who are currently unemployed and lack skills; we would also provide skill certificates and credentials for skilled homeless to help them obtain and keep long-term jobs.
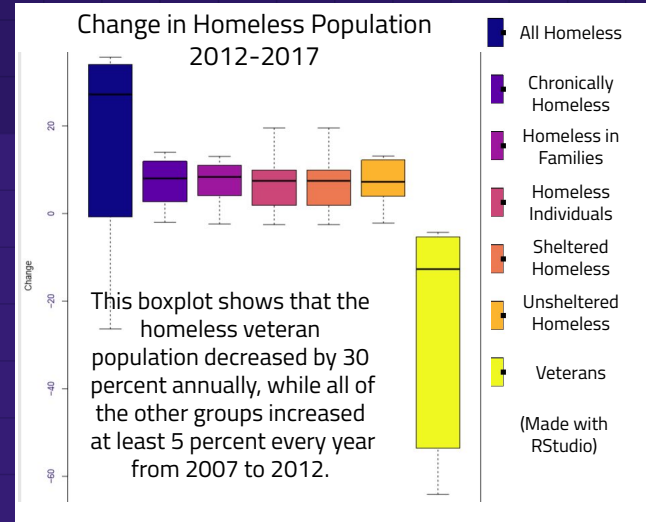
We performed an ANOVA Test (as shown below), and we found that change in population of homeless veterans is significantly lower than those of the other homeless groups.

```
          Df Sum Sq Mean Sq F value  Pr(>F)
Group      6   6386  1064.3    4.82 0.00111
Residuals 35   7729   220.8
```

We also performed a two-sample t-test between Veteran Homeless and All Homeless in New York City. It shows that homeless veterans had a statistically significant decrease in population.

T = -2.924, df = 5.467, p = 0.0148

From these results, we investigated policies targeting homeless veterans. We found that the state of New York prioritizes all veterans and their spouses in career counselling and job training services. One of the veteran-focused programs the city has been practiced is TEAP (as shown on the right).

Change in Homeless Population 2012-2017

Legend: All Homeless, Chronically Homeless, Homeless in Families, Homeless Individuals, Sheltered Homeless, Unsheltered Homeless, Veterans

(Made with RStudio)

This boxplot shows that the homeless veteran population decreased by 30 percent annually, while all of the other groups increased at least 5 percent every year from 2007 to 2012.

We propose to use the **Transitional Employment Assistance Program** to help once homeless people gain the skills they need to sustain a long-term job. TEAP is a form of on-the-job training created in an effort to offset the cost of hiring and training new employees. Qualified employers may be reimbursed up to half of the new hire's wages for up three months. These transitional jobs help ensure that all applicants are well trained and qualified for the job in question.

This program is currently focused on helping veterans, but given that the homeless population has decreased the most, we believe that we can expand similar programs to reach all previously homeless people.

THANK YOU FOR YOUR TIME!

Bibliography

▫ http://www.coalitionforthehomeless.org/wp-content/uploads/2014/04/NYCHomelessnessFactSheet_7-2017_citations.pdf
▫ https://www.coalitionforthehomeless.org/wp-content/uploads/2019/04/StateOfThe-Homeless2019.pdf
▫ https://www.bowery.org/homelessness/
▫ https://data.cityofnewyork.us/browse?tags=homeless
▫ https://www1.nyc.gov/site/dhs/about/stats-and-reports.page
▫ https://www.nydailynews.com/opinion/smarter-battle-plan-homelessness-article-1.3008528
▫ https://www1.nyc.gov/office-of-the-mayor/news/118-17/de-blasio-administration-plan-turn-tide-homelessness-borough-based#/0
▫ https://www1.nyc.gov/assets/dhs/downloads/pdf/turning-the-tide-on-homelessness.pdf
▫ https://www.kaggle.com/adamschroeder/homelessness
▫ https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_1YR_S0201&prodType=table
▫ https://www.deptofnumbers.com/rent/new-york/
▫ https://b.3cdn.net/naeh/f9c3098ee52f369b12_tjm6bnkh2.pdf
▫ https://www.hsncfl.org/grantees/rapid-rehousing-programs/
▫ http://hsh.sfgov.org/services/outreach-and-homelessness-prevention/
▫ https://www.deptofnumbers.com/rent/new-york/
▫ https://endhomelessness.org/rapid-re-housing-works/

▫ https://www.whitehouse.gov/wp-content/uploads/2019/09/The-State-of-Homelessness-in-America.pdf
▫ https://www.nytimes.com/interactive/2017/07/22/nyregion/nyc-homeless-shelter-maps.html
▫ https://citylimits.org/2019/09/10/data-drop-which-nyc-neighborhoods-host-the-most-homeless-shelter-beds/
▫ https://www.cssny.org/advocacy-and-research/entry/housing-policy
▫ https://www.city-journal.org/html/scarcity-design-new-york%E2%80%99s-failed-housing-policies-12463.html
▫ https://www.washingtonpost.com/blogs/local/wp/2014/07/02/six-possible-solutions-to-the-affordable-housing-crisis/
▫ https://ny.curbed.com/2019/8/21/20813581/nyc-homelessness-crisis-housing-plan-affordable-units-report
▫ https://www.coalitionforthehomeless.org/ending-homelessness/proven-solutions/
▫ https://www.homelesshub.ca/solutions/prevention
▫ http://www.city-data.com/crime/crime-New-York-New-York.html
▫ https://www.solid-ground.org/rapid-re-housing-the-transition-to-permanent-housing-got-a-lot-faster/
▫ https://www.myflfamilies.com/PublicNotices/20160601_Council_handouts.pdf
▫ https://compstat.nypdonline.org/2e5c3f4b-85c1-4635-83c6-22b27fe7c75c/view/89