

# **In Search of Free Food Resources: An Analysis of Food Insecurity and Safety Challenges for Residents of the City of Trenton**

**In Partnership with the Trenton Health Team and the Trenton Food  
Stakeholders Consortium**

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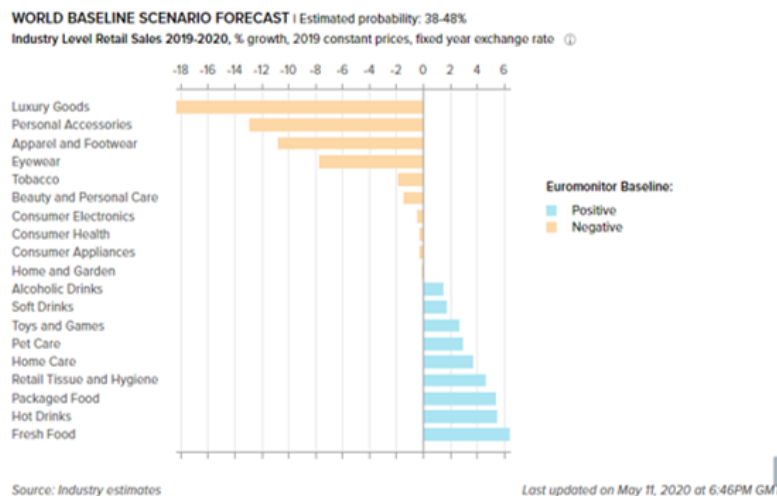
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# 1. Background Literature and Context on Food Insecurity, Crime, and Access to Free Food Resources, Introduction of Free Food Community and Resources in the City of Trenton

## **Background Literature and Context on Food Insecurity, Crime, and Access to Free Food Resources**

Food insecurity is an increasingly prevalent socioeconomic issue plaguing many communities in the United States. It is “defined by having insufficient amounts of food, but also a diet lacking in quality, variety, or desirability” (O’Neill Hayes). A household can be classified as food insecure due to a variety of factors, but mainly financial, physical, and logistical challenges contribute to the lack of accessing or preparing quality food. For the millions of people who are struggling financially amidst this pandemic and are facing food insecurity, food quantity is more important than quality. Food insecurity is rising at alarming rates globally, with similar rates in the U.S. This ties back into the importance of understanding what this pandemic means for many people’s health as they are further reliant upon processed and fast food.



When a consumer's life changes drastically, as many people have during this pandemic, their priorities and food consumption habits may change or be exacerbated. As you can see in the graph, there has been a worldwide further reliance on packaged goods, with close to a 6% increase in consumption, especially among lower income households.

Processed food offers a longer shelf life, which can be especially helpful since there is uncertainty of when people will be going to the store again. There has been a subsequent increase in demand for freezers and their capabilities, which represents the increase in demand for packaged/frozen food. Unfortunately, the increased sodium fat, cholesterol, and sugar content present in a heavily packaged/frozen diet can introduce a whole host of problems into someone's life versus a more whole-foods-based approach. However, many people do not have that choice. Low-income households are forced to consume food by any means necessary - *quantity* matters more now than quality for millions of Americans. This lifestyle, not by choice, is further increasing the divide between the rich and the poor. For those with access to food banks, they have been heavily responsive to the demand for food that the pandemic has caused. Food bank supply chain networks rely on both distribution centers as well as grocery store retailers, ultimately causing more pressure on the stores.

Feeding America, a national network of food banks, has been surveying households about their access to and consumption of food and using correlated factors, and publishing the data on food insecurity by county for the past decade. "Their major factors included poverty, unemployment, homeownership, and disability prevalence at the state level," many of which are similar to those in the built environment for this analysis (O'Neill Hayes).

While food insecurity is an issue that certainly can be detrimental to one's physical health, mental and emotional health can also decline due to a lack of consumption of nutritious food. According to Maslow's Hierarchy of Needs, when physiological needs such as food are not being met, one cannot possibly advance to or focus on the next level of needs until the current needs are met. For example, those who suffer from food insecurity are not meeting physiological needs, so safety, love and belonging, esteem, or self-actualization needs cannot be attended to. This phenomenon can stunt an individual's personal and professional growth and development in numerous ways, as unfortunately progress can often be disrupted by a failure to meet the lower level needs (McLeod). In turn, unmet physiological needs such as limited food access and poor diet quality can affect the quality of life and decrease life satisfaction.

In 2019, approximately 10.5% of Americans (35.2 million) were food insecure, including 4.1% (9 million) who were considered to have very low food security and 3.7% (8.1 million) who were estimated to be food insufficient. While the overall number of food-insecure Americans decreased by a statistically significant degree from 11.1 percent in 2018, the share of very low food security households remained virtually unchanged (from 4.3% in 2018), suggesting that whatever factors benefitted those with less severe food insecurity did not reach those struggling the most (O'Neill Hayes). This reinstates the importance of ensuring equitable access to free food resources for all residents, especially those with circumstances that predispose them to need free food resources.

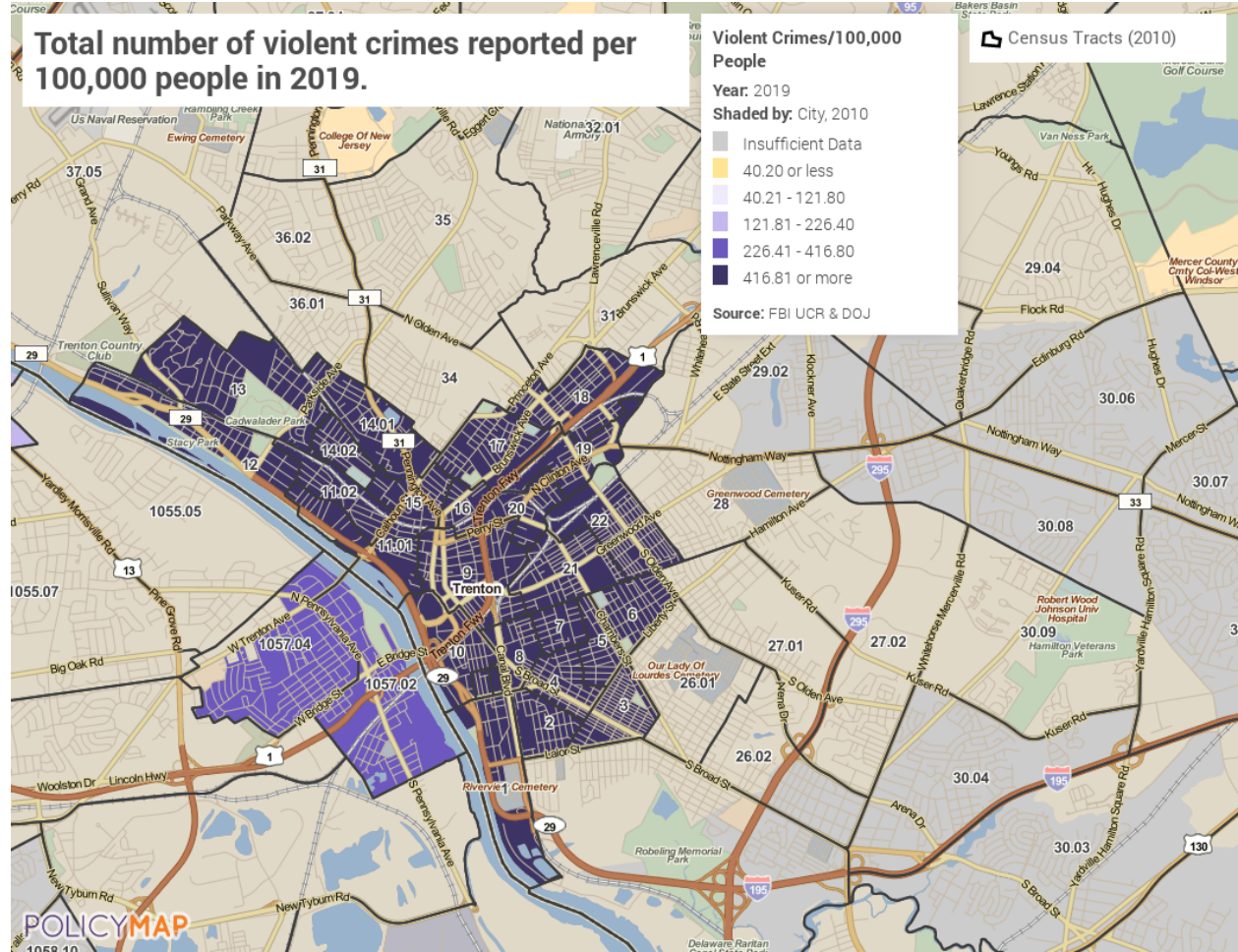
The city of Trenton, NJ has a large and complex network of non-profit organizations dedicated to addressing food resources for residents of Trenton with a particular focus on the most vulnerable communities. These organizations include food pantries, mobile pantries, soup kitchens, food delivery services, small supermarkets, and farmers markets to serve the

community's needs. Despite this, there are still significant gaps and shortages of fresh and healthy free food resources in the serving areas, as the demand is higher than the supply.

Community-based organizations that provide free food resources and the Trenton Health Team have been focused on food insecurity, affordability of, and access to high-quality food for residents for several years since food scarcity is a large issue in Trenton. However, this need for free food increased tremendously when the COVID-19 pandemic hit - thus showing the urgent need to address the issue of food scarcity. During the fall of 2020, researchers from the Trenton Health Team and Rider University collaborated to create a community Free Food Survey to evaluate the free/emergency food resources including food pantries and faith-based organizations, grab-and-go meals, and free farmer/mobile farmer markets, in the city of Trenton. This survey was developed to understand the free food needs of vulnerable populations within the city of Trenton to attempt to determine whether or not there are missing pockets of residents in need of free food to address the organizations' concerns about the high demand due to the pandemic. There are 6 zip codes within the boundaries of the city of Trenton and 24 Census tracts (based on the 2010 Census data) that constitute the city of Trenton, and each has a diverse and distinct population.

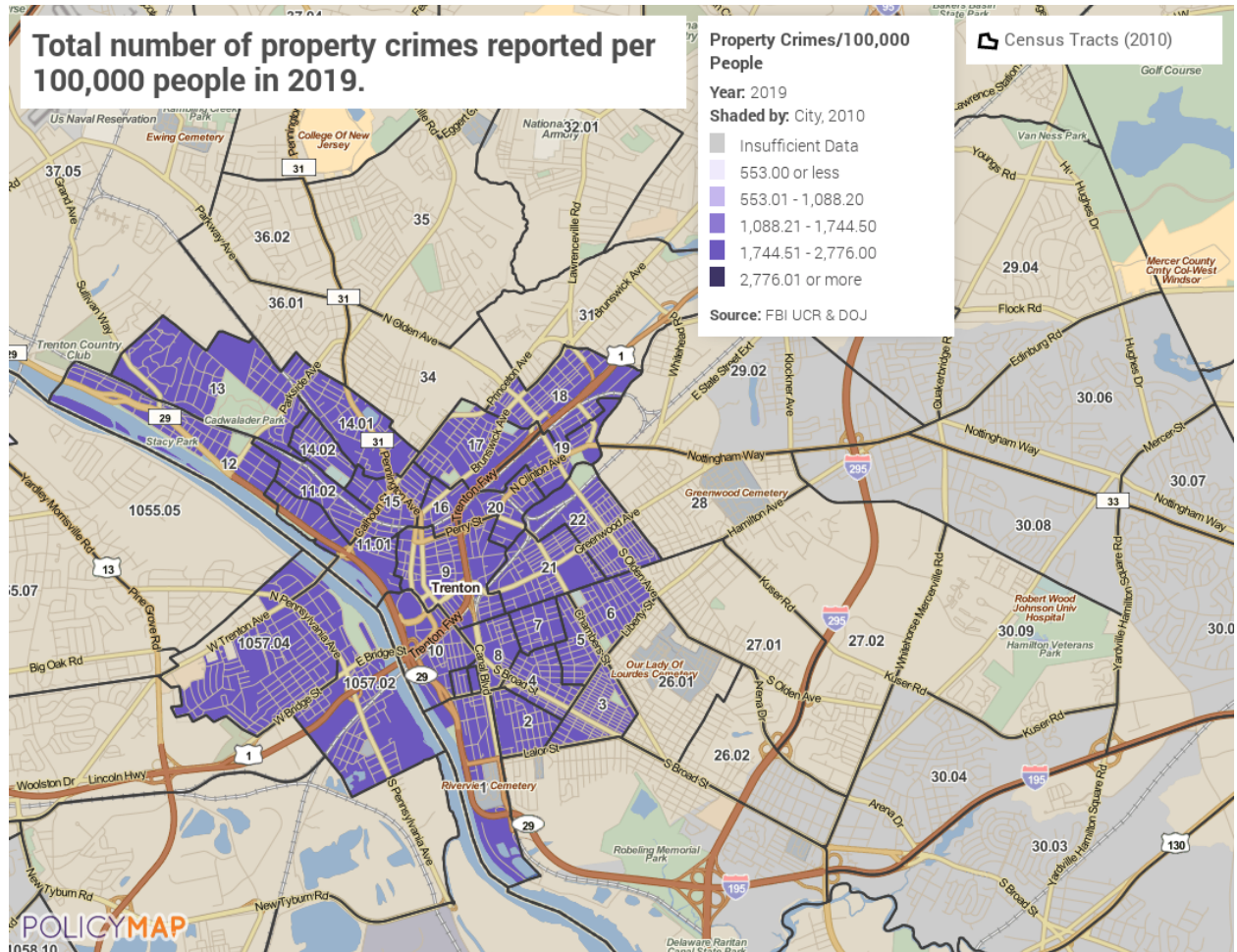
The projected food insecurity rate increased from 8.2% (actual rate in 2019) to 11.2% in 2020 and 2021 in Mercer County, NJ, due to the COVID-19 pandemic, which can only be expected to be exacerbated in the near future if no actions are taken to restore the city, potentially with increasing access to the free food resources or otherwise the viability of the city ("State-By-State Resource").

# Introduction of Free Food Community and Resources in the City of Trenton





According to PolicyMap, violent crimes encompass aggravated assault, murder, rape, and robbery. The city of Trenton has a significantly higher violent crime rate as compared to the countywide, statewide, nationwide, and some other nearby city rates. Mercer County, NJ has an average countywide rate of 346.6 violent crimes per 100,000 people. New Jersey has an average statewide rate of 206.9 violent crimes per 100,000 people. The United States has an average national rate of 369.9 violent crimes per 100,000 people. Unfortunately, higher rates of violent crime is a common occurrence within cities. However, Trenton's rate of violent crime of 1,133.5 occurrences per 100,000 people is notably higher than that of nearby cities, such as Philadelphia, Newark, and New York. Philadelphia, Newark, and New York, respectively, have rates of 717.2, 632.8, and 571.4 violent crimes per 100,000 people ("Total number of violent crimes").



According to PolicyMap, property crimes encompass burglary and motor vehicle theft. Mercer County, NJ has an average countywide rate of 1,512.2 property crimes per 100,000 people. New Jersey has an average statewide rate of 1,335.6 property crimes per 100,000 people. The United States has an average national rate of 2,046.9 property crimes per 100,000 people. However, Trenton’s rate of property crimes is only slightly above the national average at 2,190.3 occurrences per 100,000 people. Trenton’s rate is more markedly higher than that of nearby cities such as Newark and New York, with respective rates of 1,841.3 and 1,464.6 property crimes per 100,000 people (“Total number of property crimes”).

According to PolicyMap, hate crimes encompass crimes motivated in whole or in part by an offender's bias against the victim's perceived race/ethnicity/ancestry, religion, sexual orientation, gender/gender identity, or mental/physical disability. The state of New Jersey has a hate crime rate of 6.41 occurrences per 100,000 people. Compared to nearby states, New Jersey's statewide rate is disturbingly high, as Pennsylvania, New York, Delaware, and Connecticut have respective statewide rates of 0.52, 2.68, 1.65, and 2.27 hate crimes per 100,000 people.

New Jersey's high level of diversity could be a potential factor in this increased rating of hate crimes. However, for reference, other diverse states such as California and Hawaii only have respective statewide rates of 2.69 and 3.1 hate crimes per 100,000 people. New Jersey's statewide hate crime rate is only superseded by Washington and Vermont, with respective statewide rates of 6.73 and 7.19.

## **2. Objectives, Hypotheses, Research Questions (Including that of Qualitative Follow-Up Interviews)**

### **Objectives**

#### Focused Research

The Free Food Survey currently conducted by the Trenton Health Team allows for exploratory data analysis to know if there is a need for free food resources, what kinds of needs exist, and if the current free food resources, programs, and services are fulfilling the need. For those that do not need any more free services, the survey also hopes to answer where those areas are, the reasons for such a response, and the current services there. I joined this effort to analyze free food accessibility in urban areas in Trenton, NJ with neighborhood context, safety, and accessibility in mind. I will be working directly with Stuart Altschuler and Rupa Sandhu, respectively the director and graduate intern of Analytics and Insights at the Trenton Health Team, and my advisors, Dr. Surti and Dr. Kristin McCarthy, to manage the incoming, missing, and incomplete data from the survey. Through exploratory data analysis, I will identify and propose key performance indicators and variables that contribute to the outcomes of interest (i.e., lack of access to free food resources) and variations in the data.

By creating a focus/interest group focusing on the impact of lack of safety, my goal is to create clarity regarding the link between different aspects of quality of life, its real effect on the communities, and develop safety-related solutions/recommendations for the Trenton Food Stakeholders Group, including all of the non-profit organizations and agencies that provide free food resources to the Trenton community.

### Further Analysis by the Trenton Health Team

Through analyzing the survey in various ways, and thereby understanding the nature of the food disparity, insecurity, and access, the goal also is to improve the health and wellbeing of the residents of Trenton by increasing the accessibility and availability of fresh and healthy free food resources. On average, 28.4% of the Trenton community falls on or below the Federal Poverty Level (FPL), so this project could potentially help a significant portion of the ~ 85,000 residents. Ultimately, with the finalized analyses, the Trenton Health Team hopes to dive deeper into the reasons for the lack of access to food resources and increase free food operations within the areas of most need.

The Census tracts that are adequately serviced by free food resources will be identified. Also, what services are offered there, other unmet food needs faced, and potential apparent or confounding variables or factors contributing to the match between supply and demand so we may learn from the data and suggesting solutions for the remaining Census tracts. For the first couple questions, there was a control factor and screening for those who answered yes, so survey segmentation occurred when respondents would fall into non-targeted groups such as those that did not live in Trenton.

Results will also help guide future planning for non-government organizations (NGOs) that work within the Trenton ecosystem to provide free food services efficiently with minimal overlap with other agencies. Eventually, the goal is to reduce the information silos between these NGOs to achieve progress together.

## Hypotheses

### Focused Research

- There are confounding variables and factors, such as unemployment and dollar stores locations, that can significantly contribute to my interest group and others' perceived lack of safety and ultimately limits their access in obtaining free food resources.
- On top of food insecurity, violence and lack of safety are sure to add undue stress to the residents of certain Census tracts in Trenton and further predispose them to health issues surrounding lack of access to nutrition.

### Further Analysis by the Trenton Health Team

- Stage 1 - Exploratory Data Analysis
  - The data will be analyzed to investigate the variation in access to free food resources by populations and subgroups, geographic location, and other related demographic information such as race, ethnicity, household size, income, preferred language, dietary preferences, and medical history.
- Stage 2 - Hypothesis Development (Survey and primary data collection)
  - If there are areas with both met and unmet free food resources needs, then it is expected that there will be a mismatch of supply and demand within areas with surpluses and others with shortages.
  - Areas with shortages will be more likely to have high crime rates, poverty, and predominantly minority (African-American, Black, and Hispanic) communities, and regions with surpluses will be more likely to have lower rates of crime, poverty, and minority communities.

- If household size impacts access to free food resources, then it is expected that households with children generally have more access.
- If an individual lives in an area with an unmet need for free food resources, then the individual's quantified quality of life may reflect a lower score.

### **Research Questions (Including that of Qualitative Follow-Up Interviews)**

The free food survey has three research questions that have guided its development:

1. Are existing free/emergency food resources meeting the needs of Trenton residents?
2. What issues/conditions pose barriers to using existing resources by those who currently access free food resources?
3. What issues/conditions pose barriers to using existing resources by residents who currently do not access/use free food resources even though they need to use them?

Three research constructs were developed to address these questions – sufficiency, knowledge of free food resources, and accessibility. An important goal of the survey was to identify any gaps or oversaturation of existing free food resources and services by neighborhood location to assist the Trenton Food Stakeholder Task Force in addressing urgent food needs.

My exploratory analysis focused on two specific questions from the free food survey:

- Q10.2 Do any of the following challenges or barriers make it difficult for you to access the free food resources you need? Select all that apply.
  1. Resources Aren't Offered In My Language (1)
  2. Resources Aren't Open At Times When I Can Get To Them (2)
  3. I Don't Have Transportation To Get To The Resources (3)
  4. I Have To Walk Too Far To The Resources (4)
  5. I Have a Disability That Makes It Hard For Me To Get To The Resources (5)
  6. I Don't Feel Safe Traveling To The Resources (6)



7. I Don't Feel Safe Once I Arrive At The Resources (7)
  8. I Have Medical/Allergy Food Needs That The Resources Don't Meet (8)
  9. I Have Cultural/Religious Food Needs That The Resources Don't Meet (9)
  10. I Don't Want To Be Seen Taking A Handout (10)
  11. Not Applicable/we don't face any challenges or barriers (11)
  12. Other Barrier (please specify; be as specific as possible) (12)
- Q10.3 Which of the following is the biggest challenge or barrier for you? Select one.

The above selections for Q10.2 were all the possible answer choices in which respondents could choose all that applied, but I am focusing on the respondents that answered “I Don't Feel Safe Traveling to The Resources (Option 6)” or “I Don't Feel Safe Once I Arrive at The Resources (Option 7)” as either their biggest or among their top challenges or barriers to accessing free food resources because these are the questions that relate to safety and accessibility the most (The Trenton Health Team and the Trenton Food Stakeholders Consortium).

Other research questions that I desired to explore through my focused analysis are as follows:

- Do safety concerns contribute to a lack of access to free food resources?
- How is the safety group different than people who answered differently?
- What is the dynamic between safety and free food resources?
- What influences people's perception of going outside in unsafe neighborhoods? What drives people's inability to go out of the house?

- How does the built environment, as measured by crime, vacant lots, etc., drive feelings of unsafety and related neighborhood impacts?
  - a . How does this impact their day-to-day life?
- What are the largest indicators for why people do not use services in unsafe neighborhoods where there is the most need?

For questions that I do not directly answer with this research, I anticipate that I will partake in further research in collaboration with the Trenton Health Team.

### **3. Focused Survey Description and Questions, Sampling Methodology/Primary Data Collection, Limitations**

#### **Focused Survey Description and Questions**

As an important part of my primary research, I completed follow-up interviews with survey respondents who indicated that safety was a challenge or barrier within answers of “I Don’t Feel Safe Traveling To The Resources” or “I Don’t Feel Safe Once I Arrive At The Resources,” and who wanted to be contacted via phone/email for more information on free food resources. I only contacted respondents indicating interest in having a researcher call them regarding their challenges, barriers, and personal experiences surrounding safety as a concern for access to free food resources. Through my conversations, I hoped to gain a better understanding of respondents’ situations to aid in coming up with community solutions so this interest group and more could gain better access to free food resources. Throughout this project, I will also be using several types of analytics to aid in my decision-making - descriptive, predictive, and prescriptive. The survey will establish descriptive analytics by allowing me to understand what is happening. The survey will develop predictive analytics by predicting what is most likely to occur in the future given the historical data. The survey will develop prescriptive analytics by recommending actions we may take to affect the outcomes.

Since this was an exploratory data analysis project, I expected that new (and important) questions emerged due to the data analysis. I am looking forward to investigating these questions further as the research progresses.

My follow-up interviews focused on contextualizing questions regarding safety-related answers in the two specific questions from the free food survey:

- Q10.2 Do any of the following challenges or barriers make it difficult for you to access the free food resources you need? Select all that apply.
- Q10.3 Which of the following is the biggest challenge or barrier for you? Select one.
- Can you tell me more about the reasoning you chose your biggest barrier? (“I Don’t Feel Safe Traveling To The Resources” or “I Don’t Feel Safe Once I Arrive At The Resources”)
- On a scale of 1-5 (1 for never, 2 for rarely, 3 for sometimes, 4 for most of the time, and 5 for always), how worried are you on your way to your free food resource destination that you may become a crime victim?
- Are your concerns about safety and getting to the free food resources causing significant stress in your life?
- Regarding any personal, family member, or close friend’s experiences with crime in the recent past, do you think this has impacted your concern about feeling unsafe when trying to access food resources?
- Are there any specific efforts that you would like to see carried out by the police or organizations like community groups or food pantries to make you feel safer in accessing the free food resources?
- Do you have any other comments?

### **Sampling Methodology/Primary Data Collection**

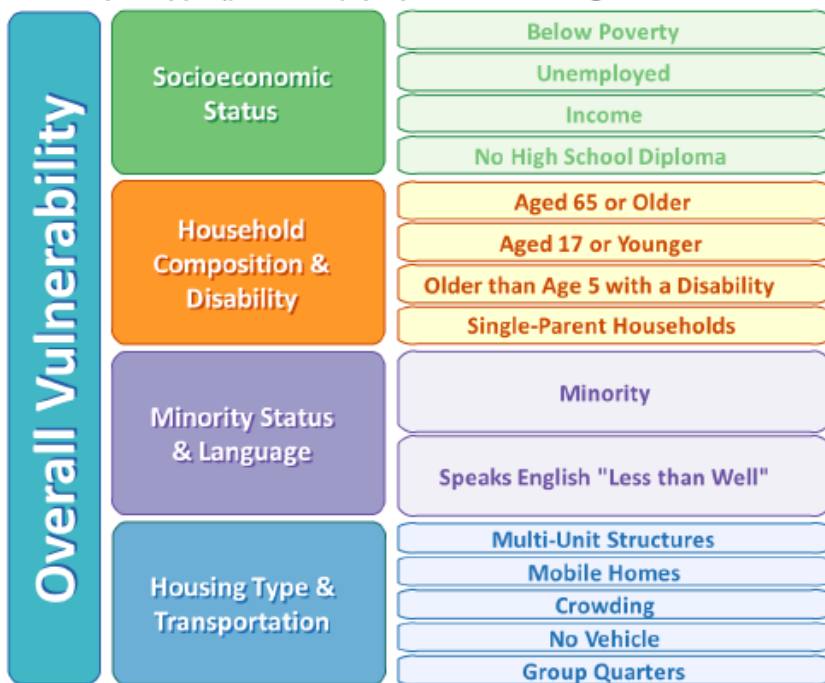
The Free Food Survey has been created through Rider University's subscription to Qualtrics. This powerful online survey tool assisted in building, distributing, and analyzing the surveys. Digital and physical copies were distributed to as many Trenton residents as possible to receive enough responses for conducting statistically sound research. The target sample size was approximately 200 responses delineated by 30 responses per sample stratum (cluster). The actual respondent total was 316. The sample methodology was designed to focus response rates by specific neighborhoods yet not diminishing the goal of having a representative sample of the city of Trenton. Thus, a snowball technique with Census tract stratification was being utilized, where the Trenton Health Team reconnected with key informants/contacts who were initial respondents to start the survey or interviews, and rely on each of them to distribute the survey to at least five other people until the desired amount of responses are reached, with each referral being another "snowball" layer. Without a substantial budget to recruit survey respondents, this is a reasonable way to increase the responses.

Because of the heightened interest in capturing the needs of certain neighborhoods, the neighborhoods in Trenton have been grouped into 7 buckets called strata. Each stratum is a group of Census tracts clustered to be more homogenous or consistent, as it would be impossible to obtain a representative response from all 24 Census tracts. In stratifying the 24 Census tracts in Trenton, the Trenton Health Team identified several variables that potentially differentiate the different tracts. Many of these variables are believed to be highly correlated. In order to reduce the number of dimensions needed to define each tract, the Trenton Health Team followed the following analytical approach:

1. Select a candidate set of variables that are readily available and have a reasonable hypothetical relationship to food need; 2) reduce the number of variables through: Box plot visualization; Selection of a minimum range; Exclusion of highly correlated variables; and Use Principal Component Analysis (PCA) to further reduce the remaining variables into a few (3-5) dimensions.
2. Based on the results of the variable reduction, and PCA analysis, the following variables were retained:
  - a. % of single-parent households with children < 18
  - b. % persons (age 5+) who speak English “less than well”
  - c. % households with no vehicle available
  - d. % households with Food Stamp / SNAP benefits
  - e. And others listed below: (“CDC SVI 2018 Documentation”)

*Variables Used*

American Community Survey (ACS), 2014-2018 (5-year) data for the following estimates:



3. The next stage of the sampling technique was to perform a cluster analysis of the 24 Census tracts around these four selected variables to reduce the 24 Census tracts to 3 - 6 strata for sampling purposes. We subsequently decided on 7 strata (or clusters) for the sample in which the sample size per cluster is 30 respondents.

The Trenton Health Team will conduct descriptive statistics on demographics for the entire sample per tract. Each Census tract's socio-economic and demographic information will provide a critical lens to further understanding the needs for and uses of free food resources for specific geographic location and unique populations that reside there.

The survey specifically addressed and looked to define the food needs and security levels in vulnerable populations in the Trenton area. During the pre-data analysis phase when we were waiting for incoming responses, the Trenton Health Team experienced an unfortunate consequence and vulnerability of presenting a survey and offering a gift card/raffle incentive once completed - robots. We received a total of 747 bot responses, causing our total to increase from less than 200 responses to over 900 within days. In recent times, especially with the pandemic, bots are fairly common, but the reason for so many was mostly due to the inclusion of the following statement in the survey description: "Participants who complete the survey will be entered into a lottery to receive one of ten \$20 gift cards as a thank you for your time. The randomly selected winners of the lottery will have the gift cards mailed to their preferred address." While unfortunate, this occurrence did not come as a particular surprise due to the economic and social landscape of Trenton. For a chance to win \$20, there are people willing to make a fake email account and fill out a 10-12 minute survey, especially in the impoverished parts of Trenton.

The Trenton Health Team's Analytics and Insights Department and I worked together to identify and conduct several approaches for bot detection within the survey responses. Upon a thorough cleaning, the Trenton Health Team and I identified a list of suspicious factors and variables, and developed a rubric to measure the likelihood of any individual response coming from a bot. For example, Qualtrics has advanced bot detection software that looked for highly suspicious variables to reduce the total amount of responses and make bot detection on our part easier, such as spam-coding IP addresses and displaying honey pot questions that are hidden to respondents and only picked up by bots. For the progress tab (survey completion rate), the filter allowed only responses with "100" to be included, indicating the survey was 100% complete. For the distribution channel tab, the filter allowed only responses with "anonymous" to be included. For question 2.1, "Do you live in Trenton?," the filter only included responses with "1" (1 = yes) indicating that the respondent lived in Trenton, as we did not want survey respondents who did not live in Trenton.

We determined that other highly suspicious variables were an out-of-area zip code (anything not starting with "086xx" was flagged) and an address that does not geocode in Trenton from using ArcGIS Software.

We determined that suspicious (but not highly suspicious) variables were date, duration, and time of day taking the survey were weak indicators of bot responses because bots are able to lag and take more time completing the survey when they read that it will take between 10-12 minutes, so an appropriate time length of the survey may not necessarily be a human.

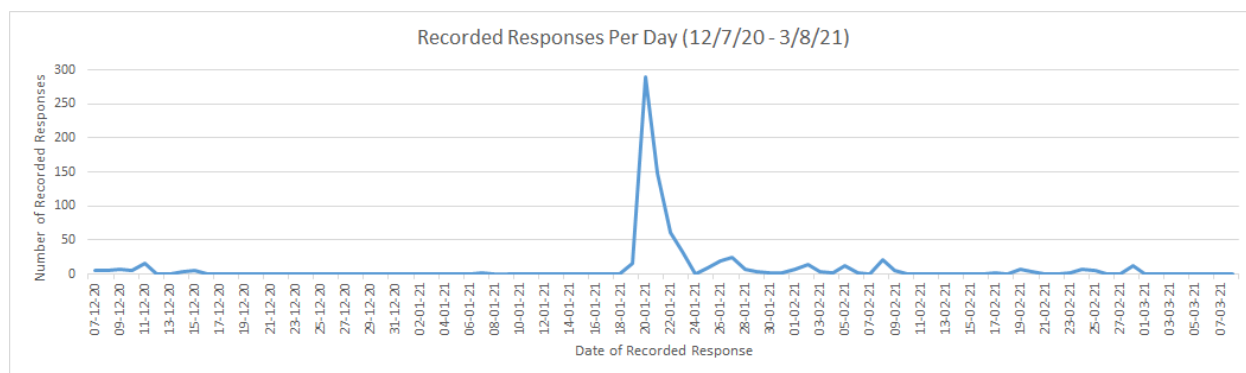
Additionally, people in Trenton may work multiple or different shifts than the standard 9-5, and 2AM may be the only time they have between shifts to fill out the survey. Additionally, idiosyncratic names and email addresses were suspicious because there were unusual letters or



numbers at the end of an open-ended response, but also could be the same first and last name twice, but a random email address for the second one.

When checking the data for bots, another suspicious factor became clear to us - for questions 7.1 and 7.2 on the online survey, the biggest selected barrier of accessing food should remain consistent with one of the selected barriers that apply in the previous question. What was checked off in question 7.2 must also be checked off in 7.1. Furthermore, if questions 8.1, 8.3, and 8.5 on the online survey were inconsistent regarding WIC/SNAP use and income level, that was also a suspicious factor (Sandhu). If a respondent stated that they use WIC/SNAP in their household, and reported a higher income level than was qualifying based on the amount of people in the household, they were most likely a bot because WIC/SNAP would then not be possible.

Lastly, one of the most obvious signs that a response was most likely a bot was the recorded response day. As previously mentioned, our total response rate increased from less than 200 responses to over 900 within days, especially from January 21st - 23rd. Please see below for a graph containing the number of recorded responses per day from 12/7/2020 to 3/8/2021 after a preliminary filter. The preliminary filtering process included responses that were not labeled as SPAM, had a progress of 100, a distribution channel coded as "anonymous," and only included responses that stated that the participant lived in Trenton. Any other responses were filtered out and not included in the survey. The total number of responses in the graph above is 793 (Sandhu).



I conducted an exploratory data analysis of the dataset focusing on the impact of the lack of safety and accessibility, using secondary data sources of census-tract crime rates and measures of the built environment. I wanted to examine the dynamic between safety and free food resources, how living in an unsafe environment is a barrier, and what the concerns are about it based on the survey, as a way to give context to quantitative findings.

Primarily, I was utilizing SPSS and Excel to load data and generate descriptive statistics for the whole dataset, and only relevant frequency distributions, crosstabs (responses to each of the questions by groups of respondents), and factor analysis cross referenced with PolicyMap for the purpose of differentiating between my interest group versus the rest of the respondents to get a sense of how the populations differentiate as well as to identify any associations with lack of access to free food resources and safety, which could make my analysis easier. As one of my primary objectives was to understand some of the factors that distinguish the lack of safety respondents versus the other groups, it was important to analyze how they answered other key questions compared to the rest of the group that did not indicate concerns of safety.

To ease the analysis garnered from frequencies, to understand the numbered answers better when in PivotTables without switching back and forth between sheets, and to maximize the context given, I changed the question number to include their respective names in the survey. For instance, instead of a column simply reading “Q8\_1\_4,” the column then read “Q8\_1\_4 -

How many people in your household are in each age range? - 65 years or older.” To add onto this for clear analyses, I also created many PivotTables of frequencies by response.

For those in my interest group, I created a separate column in order to create an easier process for filtering in the PivotTables that specified whether an individual record was either an “INTEREST” or a “Non-Interest.”

One of the crosstabs I conducted was based on question 2.1, “In the last six months, have you or anyone in your household used any of the free food resources listed below? 1 for yes, 2 for no.” I stratified based on the answer to this question for whether or not to include all respondents or just those who had used the free food resources in the last six months. I chose to focus on the group that indicated they or someone in their household had used free food resources in the last six months because those respondents would most likely include households with the most need. Based on the respondent’s answer to this question, I created PivotTables to see other potential differences between the group of respondents who had used the free food resources in the last six months and the group that indicated they had not.

Based on the results of the screening questions, the data will be segregated at a later date to prepare for conducting future t-tests to look at differences on several significant factors between subgroups and within subgroups. In further research, the predictive regression model can indicate the built environment as the independent variable (violent crimes, vacant lots, etc.) and the feeling of unsafety (quantified) as the dependent variable. Additionally in further research, I plan to combine all questions that have the same answer scales (1 - 6 Never to Always, N/A) in a PivotTable to efficiently measure differences between the strata. Once differences are fully established, then I will conduct simple & multiple linear regressions in R, for the interest group only, to see any specific factors that correlate well with safety based on

data/analyses. For an effective way of measuring a more accurate analysis, I would translate the responses with sixes (for meaning “N/A,” etc. in potential responses to questions) into zeroes with conditional formatting or blanks for more accurate analysis. This way, “N/A” can actually mean zero and not be 6, or more than 5, which means always, for a more accurate correlation measure.

## Limitations

Naturally, with any analysis, there are many decisions that we end up making along the way - especially with what to include and what not to include - some we are not even conscious of. I understand how this can create limitations, a key limitation of which is the potential underrepresentation of the food need in Census tracts 0 and 1, as only 17 responses total were captured out of 291 that were identified to fall within those tracts. As a result, the survey cannot be considered a reliable source of information or suggestions about these specific regions of Trenton. It may also give a limited scope for how my interest group is different than people who answered differently because it may be harder to find trends due to the heterogeneity of responses.

The Trenton Health Team understands that there may be an additional/follow-up study needed to obtain proper data representation, in a more customized manner (Altschuler). In addition to that, this method of snowball sampling is drawing the sample in a biased way, as many survey respondents were referred to take it from someone they know. Due to the high likelihood of distributing the survey to people geographically close to the individual, this could be a reason that certain Census tracts like 0 and 1 were underrepresented in the responses. In order to geographically compensate for this, one must keep in mind the variation throughout the Census tracts in Trenton.

Much of the data available on food insecurity and related quality of life factors both on PolicyMap and elsewhere are defined by county, so exact numbers were plentiful for Mercer County, NJ but not so much for specifically the city of Trenton, NJ. This is a limitation of this research and may result in an incomplete analysis capturing the factors contributing to the lack of safety in Trenton and its relation to food insecurity.

Due to the unforeseen bot response infiltration as previously mentioned, there were even more time constraints on when I was able to conduct my research from the data. If allowed more time, I would like to further contribute to the discourse to potentially provide more solutions and recommendations to the residents of Trenton.

On account of the bot infiltration, and as with any other self-reporting survey, there is a higher possibility and ability of respondents to manipulate or skew their answers and evade entirely truthful answers. While the Trenton Health Team did amazing work at catching 747 bot responses, there could still be inaccurate or untruthful responses from humans due to the gift card incentive, as well.

In the survey, there was a question inquiring about the respondent's household yearly income. This question poses a limitation, as some respondents may write the gross yearly income, whereas others may write the net. There is the possibility of a significant difference between these numbers, so it would be difficult to determine which are doing a top line analysis versus a bottom line.

Many answer choices within the survey are on a scale of 1-5, with 1 being "never," 2 being "rarely," 3 being "sometimes," 4 being "most of the time," and 5 being "always." We need to be more consistent with these definitions to leave minimal ambiguity with what these really mean. For data integrity purposes and to minimize the limitation posed by such scales, a sample definition could be included in the beginning of each question for clarity, such as "rarely" = less than 1 day per week, "sometimes" = 1-3 days per week, "often" = 4-5 days per week, and "always" = 6-7 days per week.

Some other limitations were purely situational: the COVID-19 pandemic made it evident that there is a real food need, but this may skew the data based off of normal circumstances and

determine different demographics of the most vulnerable populations. However, it is unfortunate because these hardships may be here to stay for some of the most vulnerable populations.

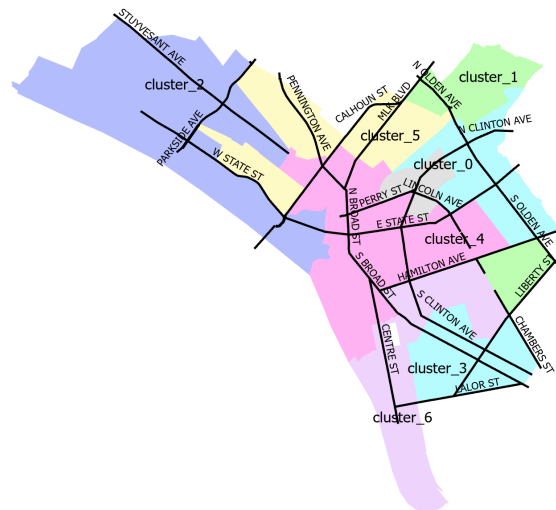
Additionally, in light of the bots, my time to conduct the analysis and write the bulk of the paper was further limited. If given the opportunity, I would want to collaborate further with the Trenton Health Team to bring more insights to life with more time and ability to truly be able to make more of a positive impact in the Trenton communities.

**4. Results, Analysis, Discussion (Qualitative Interviews), Solutions & Recommendations**

**Results**

Survey Respondents

Cluster	Count	Percentage of Total
Cluster 0 - Tract 20	6	2.1%
Cluster 1 - Tracts 18 and 6	11	3.8%
Cluster 2 - Tracts 11.01, 12, 13, 14.02	42	14.4%
Cluster 3 - Tracts 19, 2, 22, 3, 4	57	19.6%
Cluster 4 - Tracts 10, 15, 16, 21, 9	56	19.2%
Cluster 5 - Tracts 11.02, 14.01, 17	22	7.5%
Cluster 6 - Tracts 1, 5, 7, 8	29	10.0%
(blank)	68	23.4%
<b>Grand Total</b>	<b>291</b>	<b>100.0%</b>

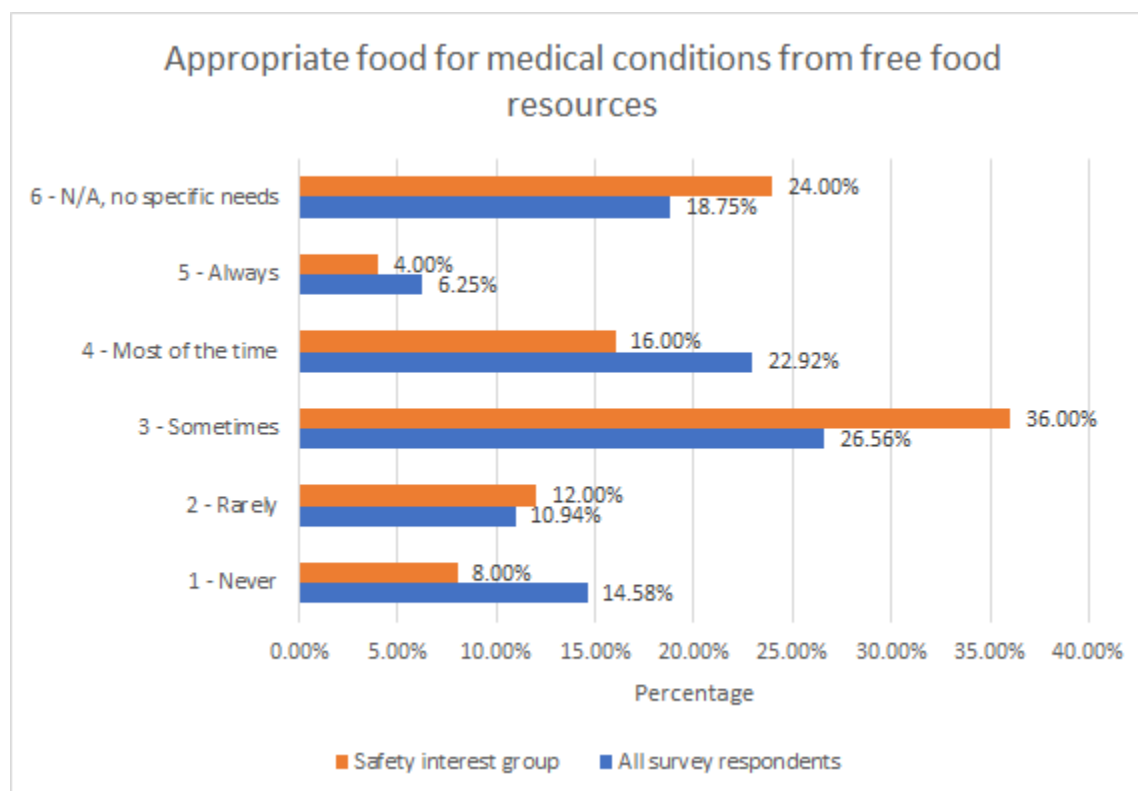




60.76% (192/316) of total survey respondents indicated that they or anyone in their household has used any of the following free food resources in the last six months: Food Pantries (such as Arm in Arm or Houses of Worship), Soup Kitchens (such as TASK or Houses of Worship), Meals for Kids and Teens (such as School Meals, Grab-n-Go Meals, or Summer Meals), Mobile Pantries or Food Delivery (such as Arm in Arm or Meals on Wheels), or Free Farmer's Markets (such as Rolling Harvest events at Cure Arena).

Concerning the interest group, 83.33% (25/30) of respondents indicated that they or anyone in their household have used any free food resources in the last six months.

83% of the interest group falls under clusters 2, 3, and 4, whereas 82% of the non-interest group falls under clusters 2, 3, 4, and 6.



52.08% (100/192) of total survey respondents who have utilized free food within the last six months either never, rarely, or sometimes receive food that is appropriate for those with medical conditions in their household from the free food resources they use. Some of the common diet-related medical conditions specified were diabetes, a heart condition, or high blood pressure. 56% (14/25) of the interest group respondents indicated the same; they either never, rarely, or sometimes receive food that is appropriate for those with medical conditions in their household from the free food resources they use.

65.63% (126/192) of total survey respondents who have utilized free food within the last six months either less than once a month or 1-3 times per month utilize free food resources, and 80% (20/25) of the interest group respondents indicated the same.

In order of prevalence, Wednesday is the most preferable the day of the week for accessing free food resources, with 18.33% (11/60) of my interest group indicating that Wednesday is either the top or within the top three most preferred days. Monday, Friday, and Saturday are the next most preferred days of the week for accessing free food sources, with 16.67% (10/60) of my interest group indicating that each day within Monday, Friday, and Saturday are either the top or within the top three most preferred days. Thursday, Tuesday, and Sunday are the least preferable days, with 6.67% (4/60), 11.67% (7/60), and 13.33% (8/60) of my interest group indicating that those days, respectively, are either the top or within the top three most preferred days.

In terms of the most preferable times of day for accessing free food resources within my interest group, 28.26% (13/46) of my interest group indicated that 9-11AM is either the top or within the top two preferred times of the day. As a close second, 26.09% (12/46) of my interest group indicated that 11AM-1PM is either the top or within the top two preferred times of the day. Together, most respondents (54.35%, 25/46) indicated that before 1PM was their preferred time to access free food resources. 1-3PM and 3-5PM time slots each account for 17.39% (8/46) of the responses as the top or within the top two preferred times of the day. Lastly, 10.87% (5/46) of my interest group indicated that 5PM or later is either the top or within the top two preferred times of the day to access free food resources.

## Analysis

A significantly higher percentage of respondents in my interest group indicated that they or anyone in their household has used any of the free food resources in the last six months. Safety issues may correlate with the residents being predisposed in those areas to other problems. The effects can worsen with the presence of other problems, such as the stress from lack of safety contributing, a basic physiological need. To take a deeper look, I first chose to focus on how often these residents received food that is appropriate for medical conditions in their household from the free food resources they use, with some common diet-related medical conditions specified as diabetes, a heart condition, or high blood pressure. Only slightly more respondents in my interest group than the total population indicated as such, but more also selected not applicable, or no specific needs, so this analysis can be inconclusive.

Although originally it was seen that a higher percentage of respondents indicated that they or anyone in their household has used any of the free food resources in the last six months, 60.76% (192/316) of total survey respondents indicated that they or anyone in their household has used any of the following free food resources in the last six months. There is a much lower percentage of respondents utilizing the free food resources more than 1-3 times per month. 65.63% (126/192) of total survey respondents who have utilized free food within the last six months either less than once a month or 1-3 times per month utilize free food resources, and 80% (20/25) of the interest group respondents indicated the same). This is another analysis and a prime example of why I am conducting this research and such that could potentially lead to more questions - what causes my interest group to utilize the resources less overall? How much is safety attributed?

According to the prevalence of preferences, my interest group largely prefers to access free food resources on Wednesdays before 1PM, whereas the respondents group as a whole prefers to access free food resources on Fridays before 1PM. For the Census tracts that my interest group was in, the unemployment rates are between 8.8% and 23.5%, with the lowest indicating the rate of Census tract 22 and the highest indicating the rate of Census tract 11.02. The countywide unemployment rate for Mercer County, NJ is 3.2%, and the statewide unemployment rate for New Jersey is 3.6% (“Unemployment rate in 2019”). As demonstrated, even one of Trenton’s lower unemployment rates in areas where safety and accessibility to free food resources is an issue is significantly higher than both the countywide and statewide rates of unemployment, most likely contributing to the increase of the countywide and statewide averages.

On a related note, the poverty rates for the Census tracts in which my interest group resides are between 14.25% and 47.04%, with the lowest indicating the rate of Census tract 22 and the highest indicating the Census tract 11.02. The citywide, countywide, statewide, and nationwide rates are respectively 28.72%, 11.64%, 9.98%, and 13.42% (“Estimated percent of all people that are living in poverty”). As demonstrated, even one of Trenton’s lower poverty rates in areas where safety and accessibility to free food resources is an issue is higher than the countywide, statewide, and nationwide rates of poverty, most likely contributing to the increase in the averages.

From this information, it can be concluded that unemployment and poverty may correlate with safety and lack of accessibility to free food resources. Where one is prevalent, so is the other.

Unfortunately, many people do not realize how expensive it actually is to obtain and start a job. The entire process costs money: from buying the apparel for the interview(s) or workplace, to the transportation/driving needed to get to the destination daily, to the technology needed if conducting remote interview(s) or work (smartphone or laptop), to the childcare or petcare expenses needed if the job is on site, to the printing/computer services needed, to the travel and networking events before the official hiring period. In a study based on the survey responses of 3,031 full-time employees over the age of 18, more than 25% (758/3,031) of the employees indicated that their last job search cost them upwards of \$200 on the various items and services (Brooks).

According to a survey conducted by Bankrate.com, only 37% of Americans would be able to cover the costs of a \$500-\$1,000 emergency. The other 63% would have to meet the cost of the unexpected event in other ways, such as reducing spending in certain areas (23%), charging a credit card (15%), or borrowing funds from friends and family. Furthermore, trusts report that 1 in 3 Americans (33%) have no savings at all (McGrath). These points illustrate just how much of a hardship coming up with \$200 to potentially obtain a job can be, especially for those in a good remote position who were not looking to change the way they work but who may have had some circumstances that warranted a job search.

For respondents whose address was able to be geocoded in the system, the most populous that face the lack of safety causing the deterrence of maximizing their use of free food resources are in Census tracts 11.01, 9, and 19, with the rest being 3, 14.01, 11.02, 14.02, 22, 15, 7, 10, 2, and 21. There are 0 grocery retail locations in tract 11.01, 4 in tract 9, and 0 in tract 19. There are 0 farmer's markets in tract 11.01, 2 in tract 9, and 0 in tract 19. There are 0 SNAP retail locations in tract 11.01, 9 in tract 9, and 3 in tract 19. This indicates that tracts 11.01 and 19 (but more so 11.01) are especially vulnerable because they are the tracts where my interest group is most likely to feel unsafe, coupled with also a more pronounced food desert. A food desert has relatively no locations or access to fresh/healthy food like meat and produce with nutritious calories that is naturally filling. This is an incredibly intricate discussion for a very simple concept: the human body needs to eat well to perform optimally, and everyone deserves to eat well.

I was unable to find data detailing the amount of dollar store retail locations by tract, but upon further research, that would be my next step in order to address my hypothesis that areas with higher levels of dollar store retail locations could be more likely to provide a lack of safety, as well.

## **Discussion (Qualitative Interviews)**

### **Interviewee #1 - Relevant Notes**

The nearest free food resource is a block and a half down to walk to as of the respondent's location since 2017. However, with their health problems such as a massive hernia, it is very painful to walk. The respondent used to only leave their apartment building once every two weeks to once every month, only to pick up mail and go to doctor's appointments, and every time they came back or leave they were scared because there is a very problematic element in the front of the building with alcoholics and drugatics congregating who beg for food or money, especially during the beginning and ending parts of the month. Every time the respondent used to leave or come back to their apartment, they would get scared at the potential of an interaction with these people. Out of 5, they said 5, always worrying that they may become a crime victim on their way to the free food resource destination. Although the problematic people live there in the building, management does nothing, and security is only there when management is there. There is a phone the security is supposed to use, but it always goes to voicemail, and the voicemail box is always full, so there is nothing tenants can do to reach the management or security. Most of the time, there are no security guards during the evening, and they are lucky to have one during the day. The security guards do not check the tapes; residents may report an incident, but no one will look at the tapes. The complex is hiring people who are not trained in law enforcement, just ones that are able to say they can work and show up, which is not conducive to an effective security guard. The problematic residents think that the pandemic is a joke, they do not wear masks, and the respondent feels as though "they are a prisoner in their own home."



Unfortunately, the respondent has no other place else to go; they applied to every low income housing place they could, but this was the only one that answered on social security disability. They do not look at background checks, as they are just trying to keep the apartments full, but clearly at the expense of some tenants, which is unethical.

A few months ago, Instacart started to accept food stamps (only) at Aldi, so that is what the respondent is doing now, and they have since stopped using free food resources. Once per month the respondent gets food, and does not have to even come down the stairs due to Instacart's setup with the convenience of how the shopper is willing to bring the food directly to their doorstep. ShopRite or WorldWide Market are the closest grocery locations to the apartment complex, which is called Trenton Center on Greenwood Avenue (East and West - with an even amount of disruption), but Instacart does not accept food stamps with them. The ShopRite has a bus now, but that is not convenient for the respondent. When they were using the free pantry nearby before Instacart, the concerns about safety and being able to get to the free food resources was a significant cause of stress in their life, especially since the complex does not care about the wellbeing of its residents.

The respondent considered writing her experiences to the Trentonian (local newspaper), but they would not want to be identified or evicted, as they were already threatened to be evicted when they called the investment company that now owns the apartments about a problem they were having. I assured them that the Trenton Health Team will take their experiences into full consideration.

## **Interviewee #2 - Relevant Notes**

This respondent has not had a car in about 10 years. This respondent is a 33 year old white female who has lived in Trenton their whole life, although she still feels like someone could mess with her because of how she looks. It is difficult for them to get around and do an entire week's worth of grocery shopping, especially since they cannot afford an Uber and the busses do not allow that many bags on the bus, especially since seating is more difficult now due to COVID-19. The respondent works part time and goes day by day to take care of food needs at the Family Dollar downtown, which does not contain any produce, to get dinner for the night and lunch for the next day, several times a week to make sure they are not hungry. I understand that quantity of food is more important than quality of food for now for the many people suffering from food insecurity. Colonial Super Market Farms on East State Street has good enough produce, but it is downtown and inconvenient to get to, especially with its limited hours.

This respondent mentioned safety concerns because they do go to the Trenton Soup Kitchen on Escher Street. It has great food and great service, but it is not in a safe neighborhood, and they wish it was in a better place and more convenient location. The building next to the soup kitchen is a boarding house with lots of criminals as residents, especially sexual predators. When it gets dark in the early evening in the wintertime, she does not like to go to the soup kitchen because of the location. The downtown busses run every hour or so, so from the other side of town, it would take more than two hours to get to the soup kitchen because it would require taking two busses. However, driving would take only 5 to 10 minutes from the other side of the town. The time difference is ridiculous between driving and public transport in this situation, and no one should have to go through a 4 hour round-trip just to get a hot meal.

Out of 5, they said 4, most of the time worrying that they may become a crime victim on their way to the free food resource destination.

The respondent is an ex-heroin addict. If they felt like they were walking with someone and that person did something, the respondent would be less willing to want to go over there to the soup kitchen with someone who has an active addiction, and they got in an altercation because of their addiction. She would be an innocent bystander at that point, and mentioned she would feel guilty by association.

The Trenton soup kitchen is right behind the Trenton police station headquarters (the only police station around, although there is usually one per subward of Trenton). They have an armed uniformed Trenton cop inside of the soup kitchen, but they do not do anything unless someone hurts another person.

This respondent mentioned that most people are concerned about safety regardless of the destination in Trenton, but depending on the neighborhood or how busy the streets are, it may be more or less safe. They mentioned that one little side street near the soup kitchen does not have much witness traffic, and there is a pound (animal shelter) in between the building and the soup kitchen, and people hang around the soup kitchen on the benches and tables outside, but it is overall relatively safe when right outside the property. The lunchtime hangers are okay, but the dinnertime hangers are a different crowd.

Overall, the soup kitchen is great, as they help the homeless, low income, and hungry populations. They do a lot of case management/social work and programs too; for example, they have an art program, music program, programs to help residents get their ID/birth certificates if they're homeless, lets residents have a mailbox there and receive mail.

## **Solutions & Recommendations**

As the Trenton Health Team and I have been working together throughout this process, I wanted to provide a thorough analysis but also give thoughtful solutions and recommendations, especially ones specific to the food partners that can use the answers to create change in the community.

According to the prevalence of preferences, my interest group largely prefers to access free food resources on Wednesdays before 1PM. Based on this and my interviews with interest group respondents, I recommend that operations increase to create enhanced access to free food resources on weekday mornings, such as creating more bus routes, relaxing some regulations about what residents can and cannot bring on the bus in terms of groceries, and recruiting more steady police officers at the free food locations to increase the sense of safety. In order to have the efforts taken advantage of by the residents, the township could partner with local grocery stores and send out exclusive paper coupons for retail stores like Walmart to incentivize going to the free food locations.

In relation to the incredibly high unemployment and poverty rates in the tracts in which safety was the biggest concern, we could hold job fairs for the city of Trenton - provide a stipend package to make it easier for someone to get a job, partnering with childcare and pet services, free bus pass for a month when someone is looking for a job, automatic approval at JCPenney at the Quaker Bridge mall for a credit card that allows an immediate 30-40% off the first time purchase for appropriate apparel, etc. If they must pay back this stipend type of deal, let them pay the package back within 12 months interest-free during their job, and whatever they can pay is sufficient based on their earnings.

Based on my conversation with my first interviewee, if a resident feels unsafe as a result of living somewhere, the city of Trenton should provide a bit of a relocation package, since the implementation of security guards and building management are only effective in theory, but in reality they are not helpful and do not create the feeling of safety within the residents' situations. Increasing security guards in all unsafe complexes instead of only select free food resource locations would be expensive, so some of that money can instead go towards funding these packages for residents looking for a job and cannot afford the costs of other complexes, or for those who are looking to shift/pivot careers.

Based on my conversation with my second interviewee, I think it would be a great idea if volunteers could come together to go around Trenton (especially tracts 11.01, 9, and 19) and drive those who need a ride to grocery stores, with designated pickup and dropoff spots around the city. This should occur at least once per week for the convenience of the residents, potentially on Saturdays if the weekdays do not end up working for the majority of residents who sign up.

My interviewee #2 mentioned that "it would be really cool if the Trenton soup kitchen had some satellite meals downtown every day," in a food truck capacity of some sorts, as downtown is still way more accessible than up where it is now for many of the residents who use their services. She suggested to put the satellite meals/grab-no-go meals near Broad and State, as some churches have weekend soup kitchens too.

As I would love to have an opportunity to further research this topic and continue to collaborate with the Trenton Health Team, I know more questions and solutions/recommendations will come to mind the longer it is researched and analyzed!

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