

Everybody Eats

Evanston COVID-19 Food Insecurity Project
Summer 2020



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Everybody Eats ...

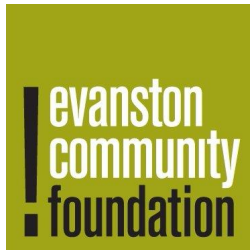
is the first step in a project aiming to build food security in Evanston. There is more to do.

is a collaboration between the City of Evanston Food Insecurity Task Force, Evanston Cradle to Career & Northwestern University's McCormick School of Engineering.

This 10 week project sprint combined data analytics and design skills with the collective impact approach to develop insights and recommendations for how, in Evanston,

Everybody Eats.

Food Insecurity Task Force
includes these organizations and more!



What Does the Data Show Us?

Food assistance data in Evanston is disconnected and inconsistent.

Each provider does his/her best to serve the people they know are in need

When viewed together, providers reveal a system of food assistance

Food insecure neighbors are unaware of the range of services available

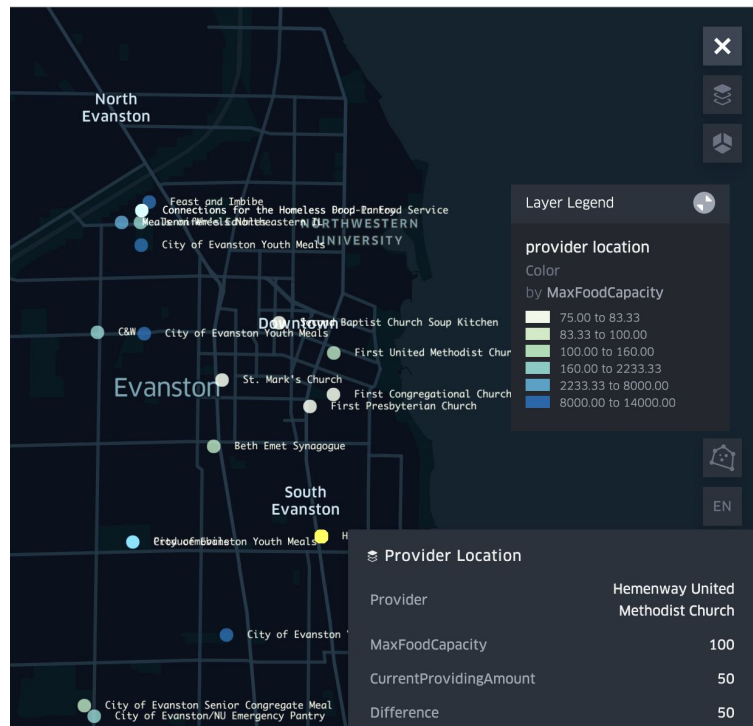
Make Food Assistance Information Visible

We developed a map of service providers showing location, capacity, food type, and more.

Neighbors in need and service providers can know:

- What food services are available and where
- What additional capacity a provider might have
- Where there are gaps in service compared to level of need and what additional investments might be needed.

Map can be expanded to include additional functionality.





MAP DEMO



Make Food Assistance Information Relevant

We developed a chatbot so that neighbors in need can receive recommendations based on their needs.

- Information about SNAP application
- Preference for grocery items or prepared meals
- Identification of need and priority for delivery
- Direct and recommend neighbor to closest relevant provider

Photo of chatbot



CHATBOT DEMO



Discussion about Map and Chatbot

Additional Features require more data

If the following data could be collected by each provider on a regular basis, organizations can better understand the need for delivery and people's food preferences.

Other suggestions?

- ***The distance that people travelled*** to distributions or the time it took them to go to a certain provider.
(could be helpful to estimate the service radius of each provider)
- ***Number of meals provided at each distribution.***
(With this information, we could easily do an animated mapping and look for patterns over time.)

Modeling & Hypothesis Testing



Objective & Methods

- **Objective:** To identify the influential geographical/demographic factors that may drive food insecurity
- **Methodology:**
 - Apply **predictive models** (multivariate linear regression model, random forest) on 2018 food insecurity population size for each geographic locations, with predictor variables selected/generated from the Policy Map (2014-2018) and the USDA Food Access Research Atlas (2015)
 - Look for the geographical/demographic factors that can explain the variations in the food insecurity population size
 - Run **independent hypothesis tests** (two-sample unpaired t-test) comparing the most food insecure zones and the least food insecure zones of Evanston to identify risk factors
- **Model Evaluation metrics:** Adjusted r-squared scores, p-values



Variables in Our Data

- **Food insecurity indicator:** 2018 food insecure population size from Feeding America
- **Geographical and demographic factors:**
 - Policy Map (2014-2018)
 - Variables: *Average size of household, average travel time to work in minutes, percent of households with any type of computer, percent of people with a Bachelor's degree, percent of all people who were men, percent of all people who were Hispanic or Latino, etc.*
 - USDA Food Access Research Atlas (2015)
 - Variables: *Low income population count beyond 1/2 mile from supermarket, Black or African American population count beyond 1/2 mile from supermarket, seniors population count beyond 1 mile from supermarket, total count of housing units without a vehicle in tract, total count of housing units receiving SNAP benefits, etc.*

What factors are associated with the food insecure population size?

ZIP Code Level - Cook County

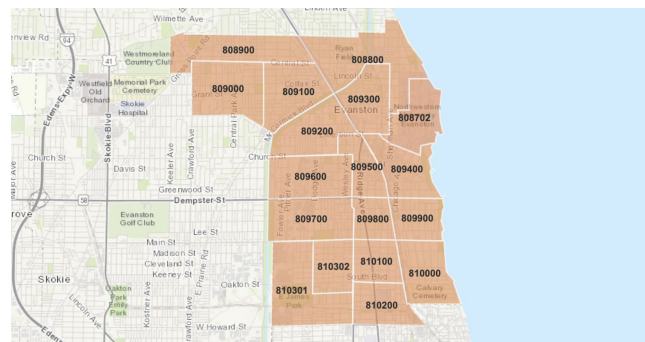
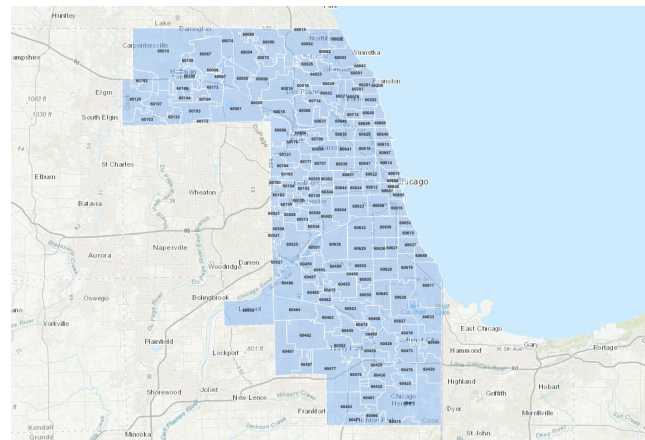
Key factors according to the random forest model:

- Median household income ↓
- % of families in poverty ↑
- # of households receiving SNAP benefits ↑
- Life expectancy (below 70)↑ (above 70)↓
- # of households without a vehicle ↑
- % of households with any type of computer ↓

Census Tract Level - Evanston Only

Key factors according to the multivariate linear regression model:

- Median age ↓
- Social Vulnerability Index ↑



What are the distinctions between the most and least food insecure tracts in Evanston?

Compared to **food secure tracts** in Evanston, **food insecure tracts** are ***different*** in terms of:

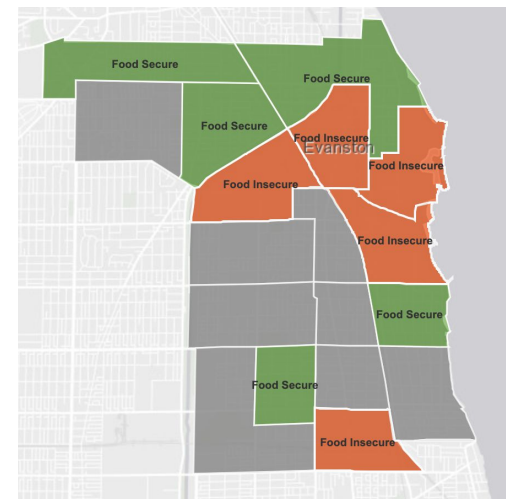
- A lower **median household income**
- More **socially vulnerable**
- Lower **median home value**
- A larger % of **non english speaking persons**
- Less **racial segregated**
- Lower **# of households with computer access**
- A lower **median age**
- Lower **median home loan amount**
- A larger % of **nonwhite persons**
- A larger % of **hispanic population**
- A smaller % **with bachelor's degree**
- Lower **average travel time to work**

Compared to **food secure tracts** in Evanston, **food insecure tracts** are ***similar*** in terms of:

- % of disabled (p-val: 0.761)
- Average household size (p-val: 0.5318)
- % of students in public school (p-val: 0.3729)
- # of housing units (p-val: 0.1631)
- # of jobs (p-val: 0.1327)
- % men (p-val: 0.7045)
- Median leverage ratios (p-val: 0.4619)
- % of families in poverty (p-val: 0.2086)
- Life expectancy (p-val: 1468)

Note:

- **Hypothesis testing:** a method for comparing two groups, and making conclusions in a statistically rigorous way.
- **p-value:** a measure of confidence: a higher p-value indicates higher confidence in our null hypothesis.





Next Steps & Potential Improvements

- **Next goal:**
 - To understand the impact of COVID-19 on food insecurity and identify potential indicators of changes in the food insecure community in Evanston
- **Methodology:**
 - Gather data that might tell the impact of COVID-19, and evaluate the reliability of using the collected variables to predict the food insecure population size in 2020. The data gathered should be updated frequently or can be easily collected on a regular basis, and the data should be on a geographical level as granular as census tracts or zip codes.
- **Current data sources:**
 - Monthly data about the # of households/individuals receiving SNAP benefits by zip code in the Cook county
 - # of participants at monthly Producemobile distributions
- **Potential data sources:**
 - Indicators of changes in the housing vacancies and homeownership, transportation, etc.
 - Any suggestions?

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Thank you!