Food Access Program Pilot Deployment Proposal

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Where should we deploy the food access program?

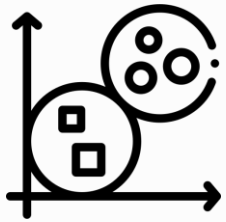
1. Segmentation Analysis
2. Segmentation Results
3. Deployment Strategy: Pilot Program
4. Who might benefit from the Pilot Program?

Segmentation Analysis

Objective:
Identify counties that share similar characteristics regarding low store access and prevalence of chronic diseases.

Segmentation features:

- **4 Low Access Metrics:** Population, Low Income, SNAP, Carless Households.
- **7 Health metrics** linked to chronic diseases associated with limited food access.



Segmentation Technique:
PCA and *k*-means techniques were used to find our number of segments.

Data Cleaning:

- **1 county** with no food access metrics was excluded.
- **4 counties** with the highest store access were excluded from the analysis.

Datasets:

- Food Access Research Atlas (USDA, 2021)
- 500 cities: Census Tract-Level (CDC, 2019)

Final Population:
321 Counties
across **51** states in U.S.

Segmentation Results

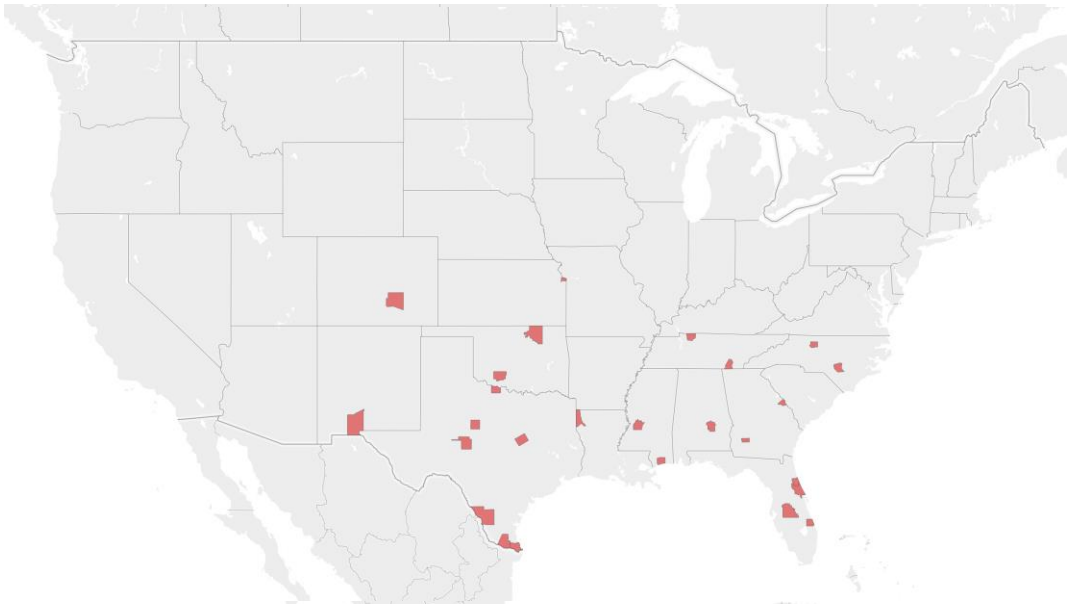
Segments	Low Access Metrics	Health Metrics	# Counties / # States / # Pop.	Interpretation
High access, **Low** disease risk **(29 %)**	**17 %** Low access **4 %** Low-income **1 %** Houses without car **1 %** Houses SNAP benefits	**29 %** High Cholesterol **26 %** Obesity **26 %** High Blood Pressure **12 %** Mental Health **12 %** Insurance access **8 %** Diabetes **2 %** Stroke prevalence	**93** Counties/ **40** States / **10,038,586**	This segment represents areas with relatively high food access levels, and lower prevalence of chronic diseases compared to other clusters.
Lowest access, **High** disease risk **(25 %)**	**28 %** Low access **11 %** Low-income **2 %** Houses without car **4 %** Houses SNAP benefits	**38 %** Obesity **37 %** High Blood Pressure **34 %** High Cholesterol **20 %** Insurance access **16 %** Mental Health **13 %** Diabetes **4 %** Stroke prevalence	**79** Counties / **24** States / **8,214,525**	This segment includes counties with significant food access challenges, which correlate with higher rates of chronic diseases. This suggests a potential need for targeted health interventions and food access improvements.
Moderate access, **Moderate** disease risk **(46 %)**	**22 %** Low access **7 %** Low-income **1.5 %** Houses without car **2 %** Houses SNAP benefits	**33 %** Obesity **31 %** High Blood Pressure **32 %** High Cholesterol **15 %** Insurance access **14 %** Mental Health **10 %** Diabetes **3 %** Stroke prevalence	**149** counties / **39** States / **13,968,819**	This segment shows moderate levels of food access issues and chronic disease prevalence, indicating counties that might benefit from improved food accessibility and health resources.

Deployment Strategy: Pilot Program

Categorized counties in the **Low Access, High Risk segment** into **High**, **Medium**, and **Low priority** using quantiles based on the percentage of **low-income population with low store access**.

High Priority : 26 counties
Medium Priority: 27 counties
Low: Priority: 26 counties

State with the highest ratio of counties with **High priority** in our selected segment is the target state of the deployment



TX : 27 % (7 counties)
FL : 15 % (4 counties)
GA, MS, NC, OK, TN : 8 % (2 counties ea.)
AL, CO, KS, LA, NM : 4 % (3 counties ea.)

1. Hidalgo
2. McLennan
3. Tom Green
4. Cameron
5. Wichita
6. Webb
7. Taylor

Who might benefit from the Pilot Program?

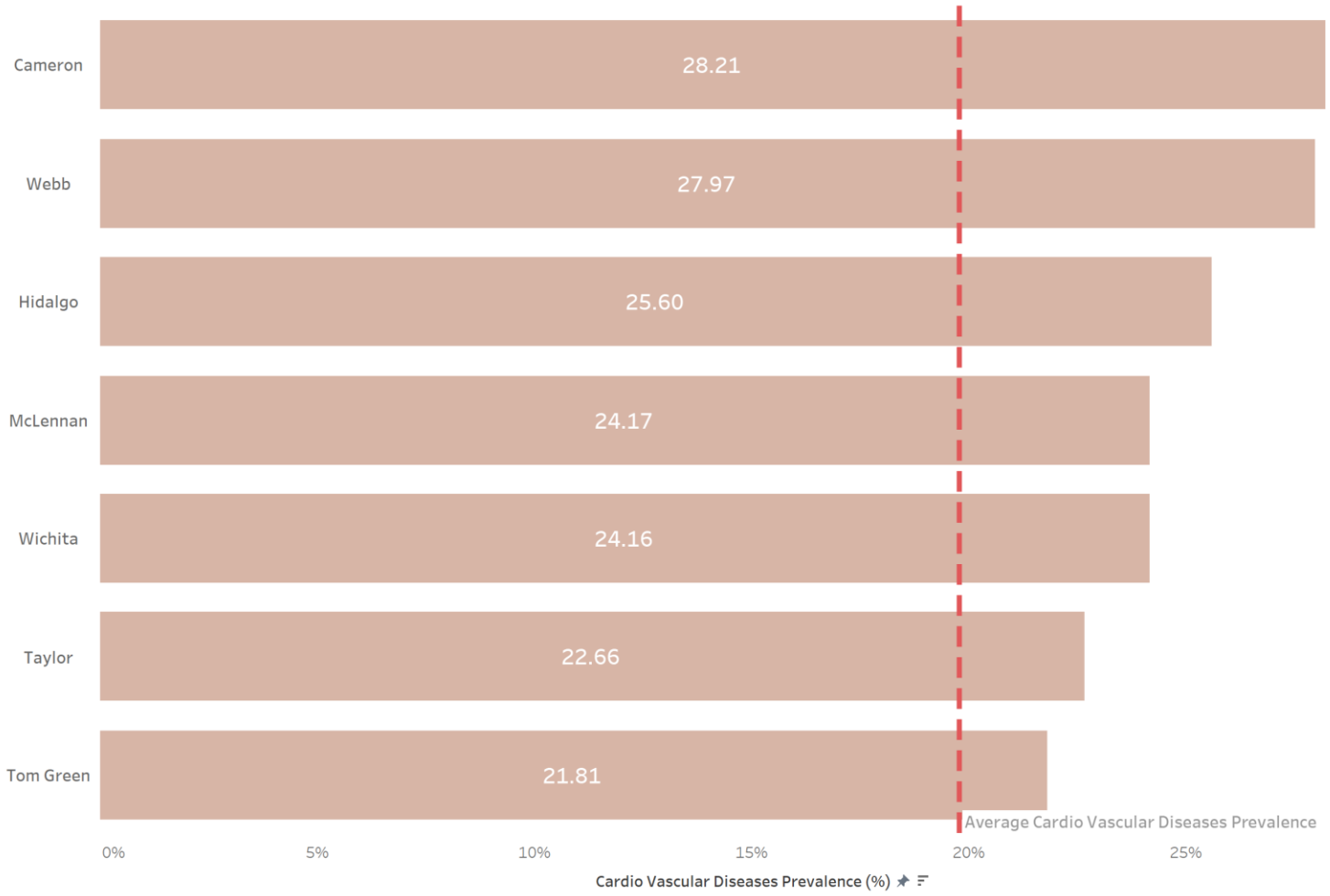
Target Population
Low-Income with Low Access population*
352,889 (16 %)
Successfully Engage People
SNAP benefited population with Low Access*
48,627 (2 %)

Benefited Age Groups
Low-income, Low Access Child, under 18*
39,844 (17 %)
Low-income, Low Access Senior, over 64*
12,093 (5 %)

Benefited Communities
Low-Income, Low Access Race Groups*
White: **104,938** (20 %)
American Indian and Alaska Native: **574** (14 %)
Black or African American: **6,196** (9 %)
Native Hawaiian and Other Pacific Islander: **46** (9 %)
Asian: **1,262 (**6 %)
Hispanic or Latino: **88,435** (6 %)

All groups have been compared with the estimated population numbers of the selected counties from the year 2015. (Source: Food Environment Atlas, 2020)

What is the potential impact of the program?



Impact Indicator

A **decline in chronic disease indicators** linked to low food access suggests that the nutritional status of our target population is improving.

How can we measure the impact?

- Conduct an **initial checkup** to analyze the parameters related to diseases linked to limited access to healthy food before implementing the program.
- **Re-test and analyze the same parameters 6 months** after the program has been applied.

Thank you!

Appendix

Data Assumptions

1. Populations with low access to stores do not necessarily indicate a need for assistance. Living one to ten miles from the nearest grocery store is not always a sign of low income.
2. Mental health issues and limited access to insurance are factors that may arise as consequences of food insecurity. A poor diet over the long term can lead to chronic diseases, which can hinder an individual's ability to obtain insurance. Moreover, limited access to nutritious food can result in deficiencies of essential vitamins and minerals that are critical for brain health, contributing to mood disorders.
3. Low-income populations may be more receptive to the food program plan, as they are often more familiar with assistance programs. Additionally, individuals receiving SNAP benefits represent a promising target for engagement due to their prior experience with such programs.

Segmentation Process

Features Selection

Food Access Metrics:

- % of people with **low access** to stores
- % of **low-income** people **with low access** to stores
- % of **housing units without a car and low access to stores**.
- % of **housing units** receiving **SNAP benefits with low access** to stores.

Health Indicators:

- % of **uninsured** adults (18-64)
- % of adults with **high blood pressure**
- % of adults who have had a **stroke**
- % of adults with **diabetes**
- % of adults with **high cholesterol** (screened in last 5 years)
- % of adults with **obesity**

*** Demographics indicators were excluded of the segmentation process to avoid subgroups biases.**

Standardization & Scaling

Addressing Skewness:

- The method Yeo-Johnson was used to adjust skewed data, which helps make the data more normal (bell-shaped) while standardizing it.

Scaling Data:

- For the normally distributed data, Z-Score standardization to transforms the data to have a mean of 0 and a standard deviation of 1.

Principal Component Analysis (PCA)

Five principal component were found:

PC1: Access and Chronic Disease Connection

- Low-income and low access to stores is linked to higher rates of chronic diseases like diabetes and obesity.

PC2: Access Improvement Potential

- Counties with limited access to stores tend to have worse health.

PC3: Health Risk Factors

- Counties with low access to stores may see increased health risks, particularly concerning with cholesterol levels.

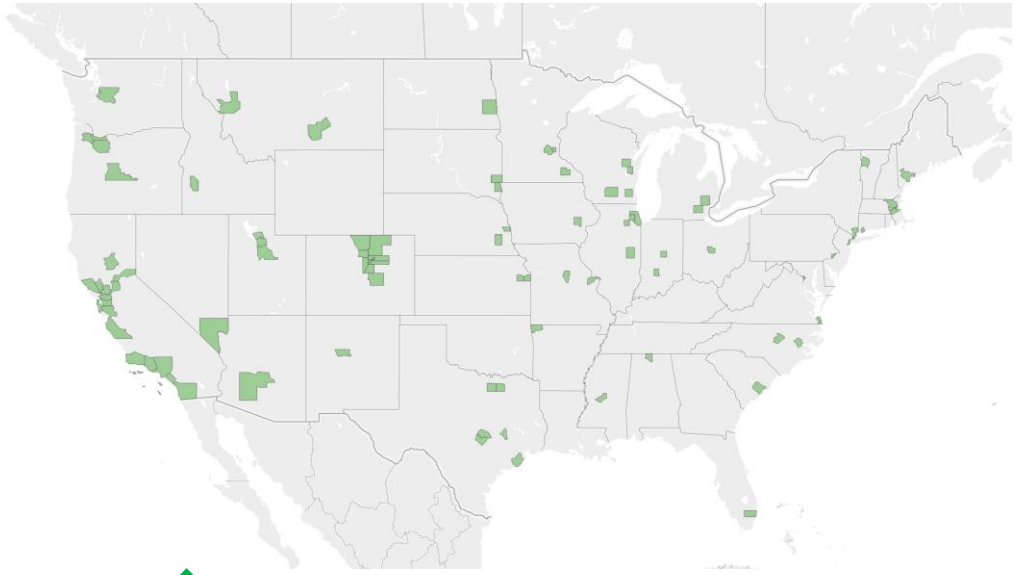
PC4: Mental Health and Low Access Dynamics

- Low access to stores may also influence mental well-being.

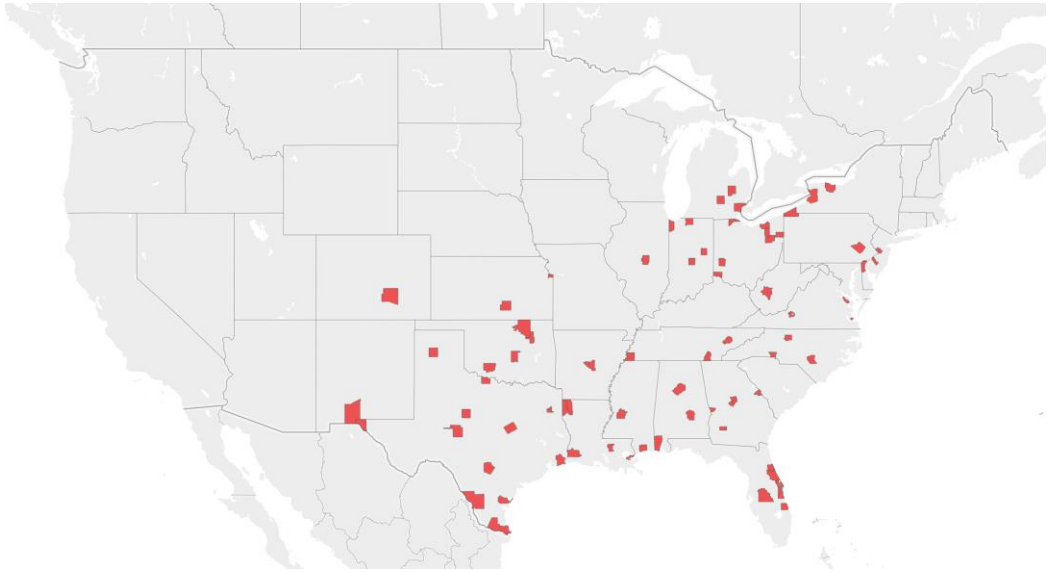
PC5: Specific Access Impact

- Certain low access categories are related but have less direct correlation with health outcomes.

Clusters Country Distribution



High access,
Low disease risk
10,038,586 pop.



Lowest access,
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Moderate access,
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13,968,819 pop.