Food Accessibility in the US

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Purpose

- **Food deserts** - unstable access to health and fresh foods
  - **Goal**: learn more about the populations affected by these food deserts

```
food_access <- read_csv("data/food_access.csv")
```

```
Rows: 3142 Columns: 25
── Column specification ────────────────────────────────────────────────────────
Delimiter: ","
chr  (2): County, State
dbl (23): Population, Housing Data.Residing in Group Quarters, Housing Data....
```

The Data

- US only
- Data collected in 2014-2018 from American Community Survey
- Variables we focused on
  - State
  - County
  - Population size
  - Low access individuals (proportion)
  - Population 10+ miles away from grocery store (proportion)

Research Question

What is the correlation between population density & food insecurity within US states, primarily within NC?

FIGURE 1: Food Access Levels vs. Population (US)

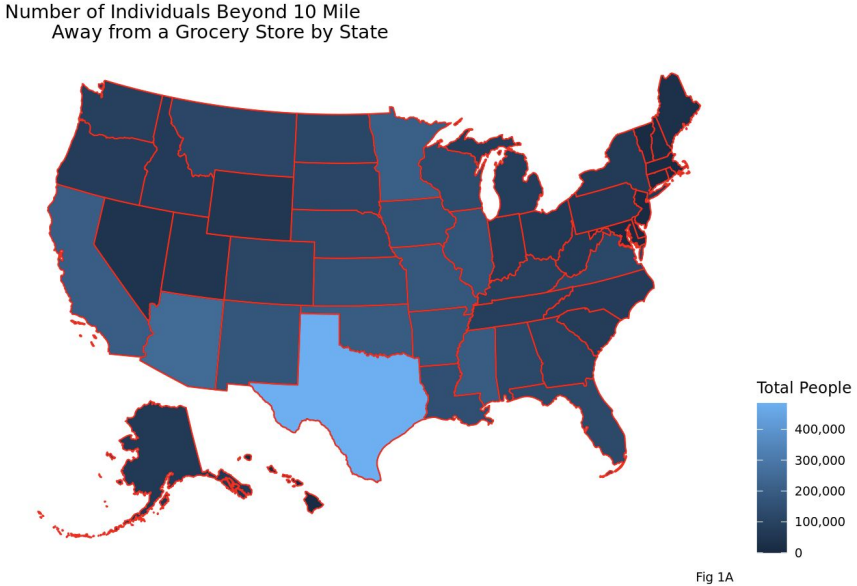

Fig 1A

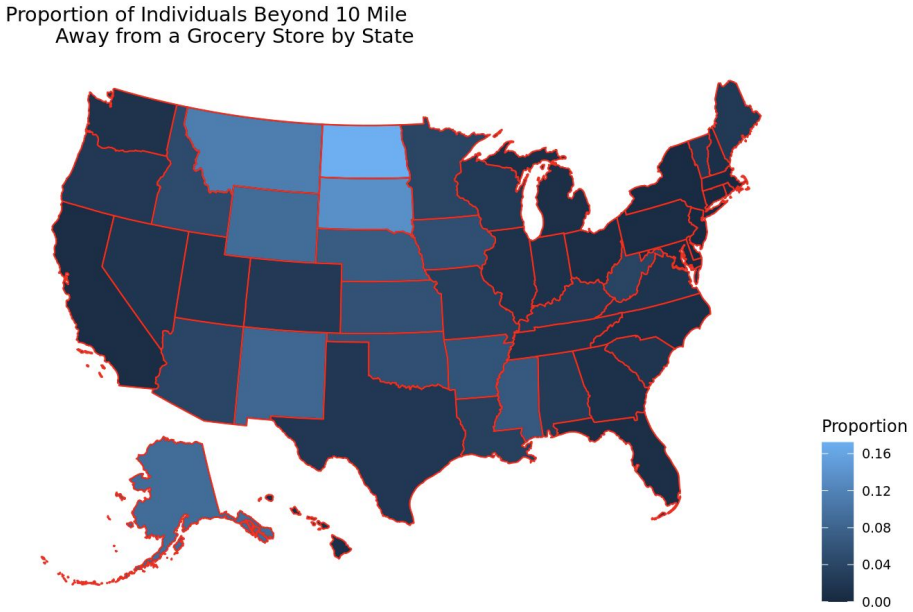

Fig 1C

- **Texas** is the most food-insecure by population while **North Dakota** is the most food-insecure by proportion
- States with high proportions of food insecurity tend to be more **rural, midwestern states**

FIGURE 2: Comparing Food Levels Across States

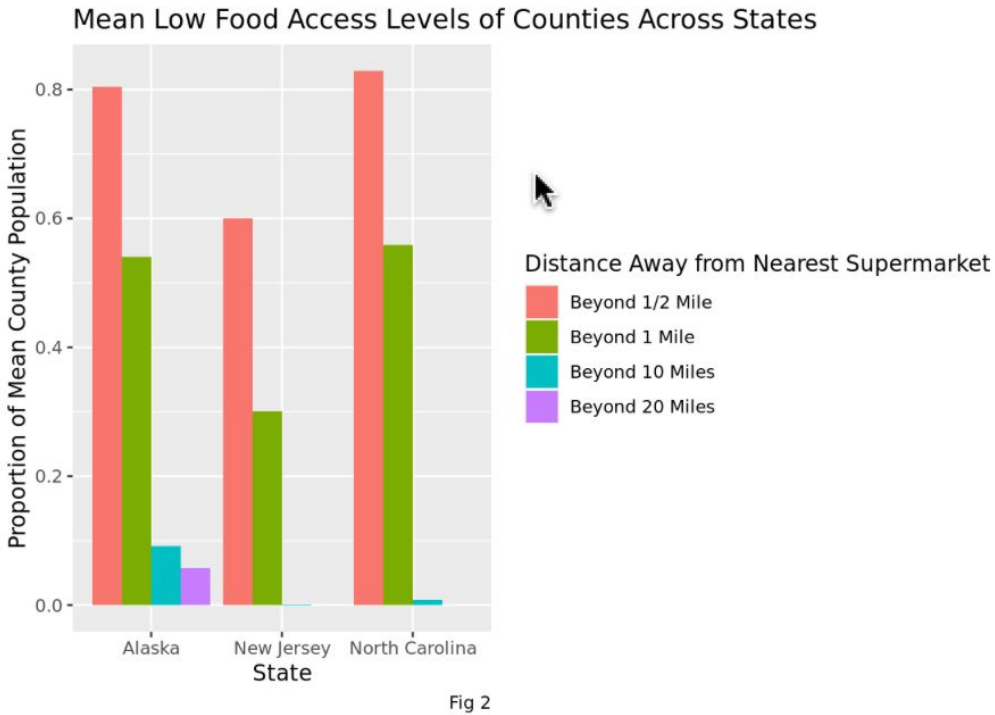

Fig 2

- Higher population density → average smaller proportions of county populations residing farther away from supermarkets
- Suggests that as population density increases → distance to the nearest supermarket decreases, ensuring residents have easier access to food resources

FIGURE 3: Proportions of Low Access by Population (NC vs. Florida)

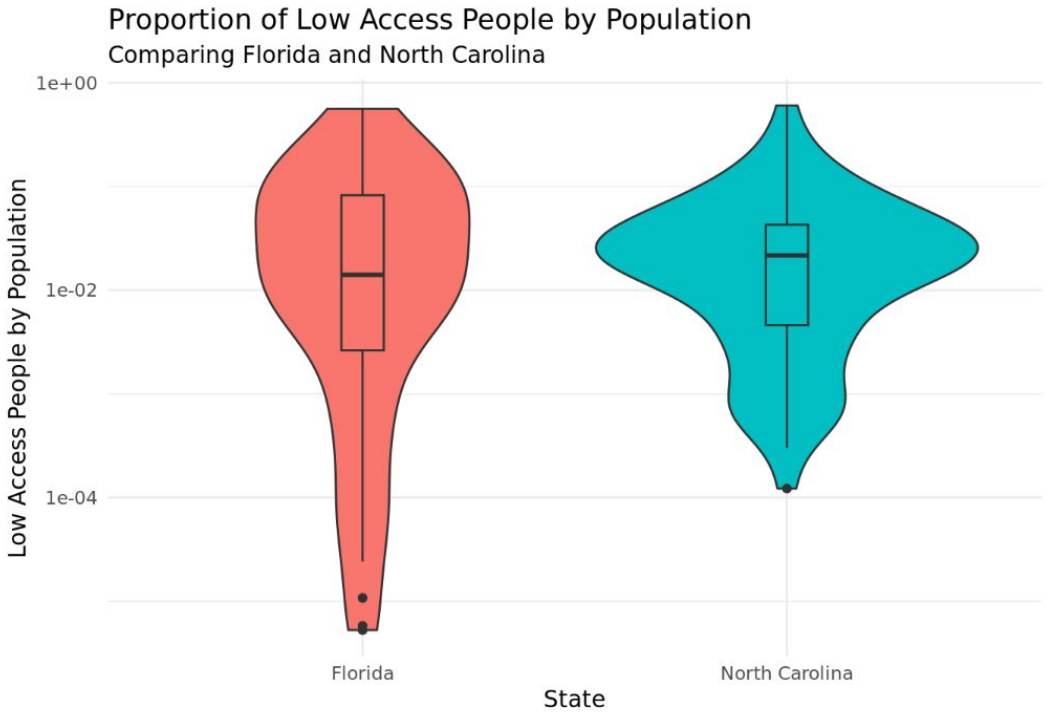

Fig 3

- Aids in understanding the proportion of low access people within 10 miles of a supermarket by population
- Florida → narrower spread (more concentrated proportion of low-access individuals)

FIGURE 4: Food Access vs. Population of State

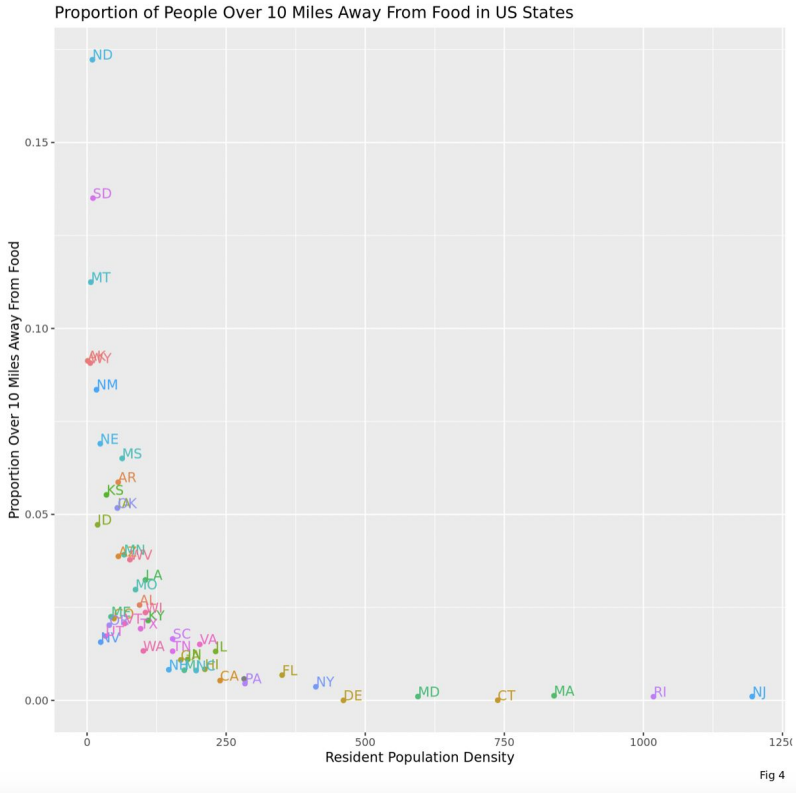

Fig 4

term	estimate	std.error	statistic	p.value
<chr>	<dbl>	<dbl>	<dbl>	<dbl>
1 (Intercept)	0.0461	0.00575	8.00	2.18e-10
2 rpdens	-0.0000694	0.0000178	-3.90	2.95e- 4

$$\widehat{Proportion} = 0.04606 - 6.938649 * 10^{-5} * PopulationDensity$$

Scatterplot:

- Negative, nonlinear trend
- States with higher resident population densities tend to have a lower proportion of residents that live > 10 miles away from food sources

Linear model (weak-fitting):

- Adjusted R-squared: **0.2251475**
- AIC: **-196.8401**

Conclusion + Limitations

Based on our evidence, we ***accept*** our hypothesis:

- Individuals in areas of low population density → more likely to be in "low access" pool
- States with more people of lower-income and higher population densities → larger portion of their population beyond a 1 mile from nearest grocery store

Solutions:

- Consider population demographics when addressing food accessibility
- Policies should develop strategies that target individual needs of communities

Limitations:

- Lack of data from underrepresented groups
- Definition of “food insecure” not applicable to everyone (i.e. wealthy individuals)