Accessibility to Emergency Food Services using Public Transportation, in Seattle Washington

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What are Emergency Food Services? And What are They Used For?

- Emergency Food Services within the context of this research is defined as food banks or food pantries.
- Food banks are a community-led way to help people facing food insecurity get nutritious food when they may not be able to.
- Food insecurity is the lack of a reliable source of healthy and nutritious food.
U.S. households with children by food security status of adults and children, 2022

- Food-secure households: 82.7%
- Food-insecure households: 17.3%
  - Food-insecure adults only: 8.5%
  - Food-insecure children and adults: 8.8%
    - Low food security among children: 7.8%
    - Very low food security among children: 1.0%

Note: In most instances, when children are food insecure, the adults in the household are also food insecure.

This is not new

• USDA tracks this information over time
• Grows with economic downturns
• Recent growth due to the Coronavirus pandemic
How we Quantified Food Insecurity For Our Research

- Supplemental Nutrition Assistance Program (Food Stamps)
- Income requirements based on household size
- Food Stamps can be used by people without a permanent residence (Houseless)
The Reasons Behind Studying Seattle

Size

Proximity

Availability of data
Research Objectives

1. Observe the spatial-temporal relationship between transportation and food bank accessibility.

2. Use General Transit Feed Specification (GTFS) data to estimate transit-based travel times at the census block group level.

3. Evaluate where possible socioeconomic disparities between different Seattle neighborhoods and food bank accessibility exist.
Total City-Wide Hours of Operation for Food Banks

- Primary dates open are Tuesday, Wednesday, and Thursday in the Afternoon, (between 12:00pm and 5pm)
- Few foodbanks open on the weekend and for restricted hours

![Graph showing weekly operational hours for food banks in Seattle with bars for Morning, Afternoon, and Evening hours.]

*Fig. 1 Total city-wide hours of operation for food banks in Seattle*
GIS Method used

GTFS to Public Transit Model to convert GTFS data into usable features

Connect Public Transit Data Model To Streets Tool

Create Network Dataset From Template Tool

Build Network tool and Closest Facility Tool
Fig. 2 Maps of (left) food insecurity, (middle) transit access to food banks, and (right) transit access vs. food insecurity.
Fig. 3 Travel time to the closest food pantry by (left) walking or (right) public transit
Conclusions and Policy Implications

Within 20 minutes of transit time using public transportation, more than 80% of the population of Seattle has access to food pantries, however, they may be restricted by operational hours (midweek, afternoon).

Hotspots of neighborhoods most likely to experience food insecurity and inadequate access to emergency food services via public transit exist in Southern Seattle.

Transportation agencies should consider providing on-demand services when large-size food banks are open or routing mobile food pantries to those vulnerable communities with low transit access to the network.
Other applications for GTFS

Using ArcGIS Pro there are a few other ways you could use GTFS data as it allows you to import facilities locations relatively indiscriminately and as long as they are within the network you created, they should be useable for your analysis.

An example that we encountered within this study was through imitating much of this study but for SNAP accessible stores.
Questions?