

# Public Transit Time and Food Shopping Store Choice Within a Food Desert

Gerald Hunter

July 15, 2014

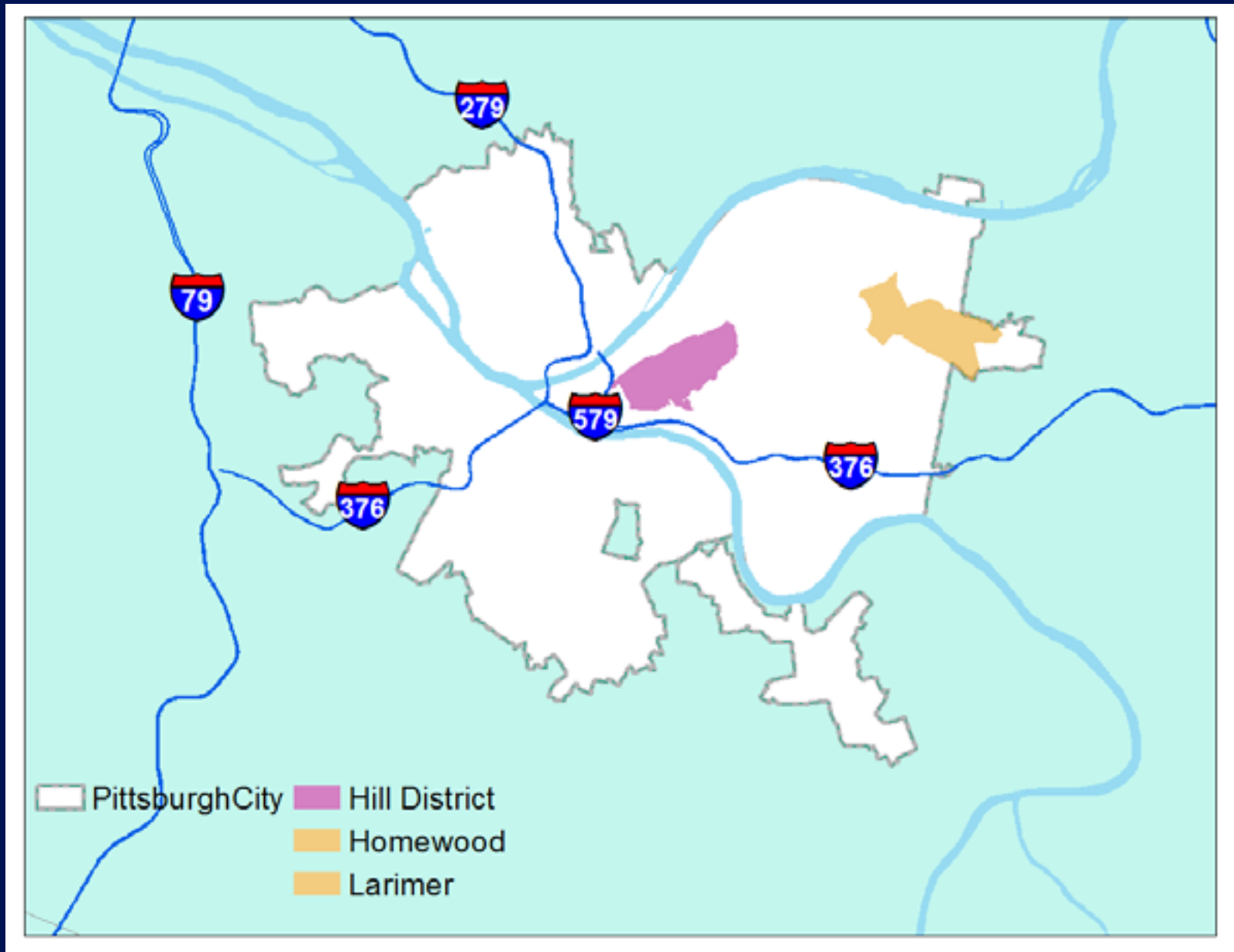
# PHRESH: Pittsburgh Hill/Homewood Research on Eating, Shopping, and Health

- PHRESH explores food choices, food availability, health and well-being in two neighborhoods in Pittsburgh, PA.
- Research Design
  - Extensive household surveys (one pre- and one post-intervention)
    - Hill District (Intervention); Homewood (Control)
  - Food Environment Audits
  - Two rounds of data collection, Fall 2011 & Fall 2014 (before and after the construction of a full-service grocery store in one of the neighborhoods)

# PHRESH: Transit Time and Store Choice

1. PHRESH Study Population Description
2. Food Store Characteristics
3. Transit Time Data
4. Store Choice Modeling
5. Findings

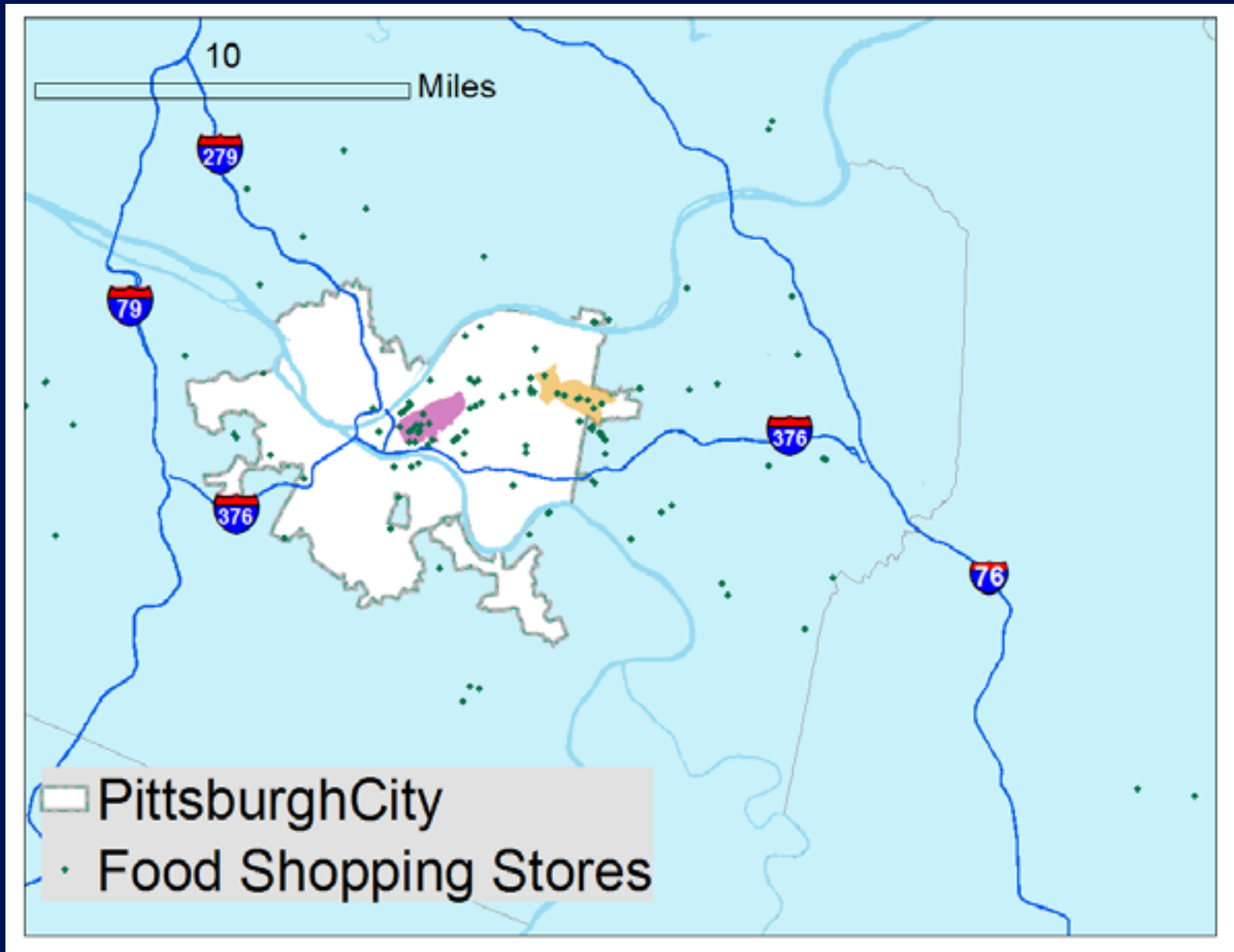
# PHRESH Neighborhoods



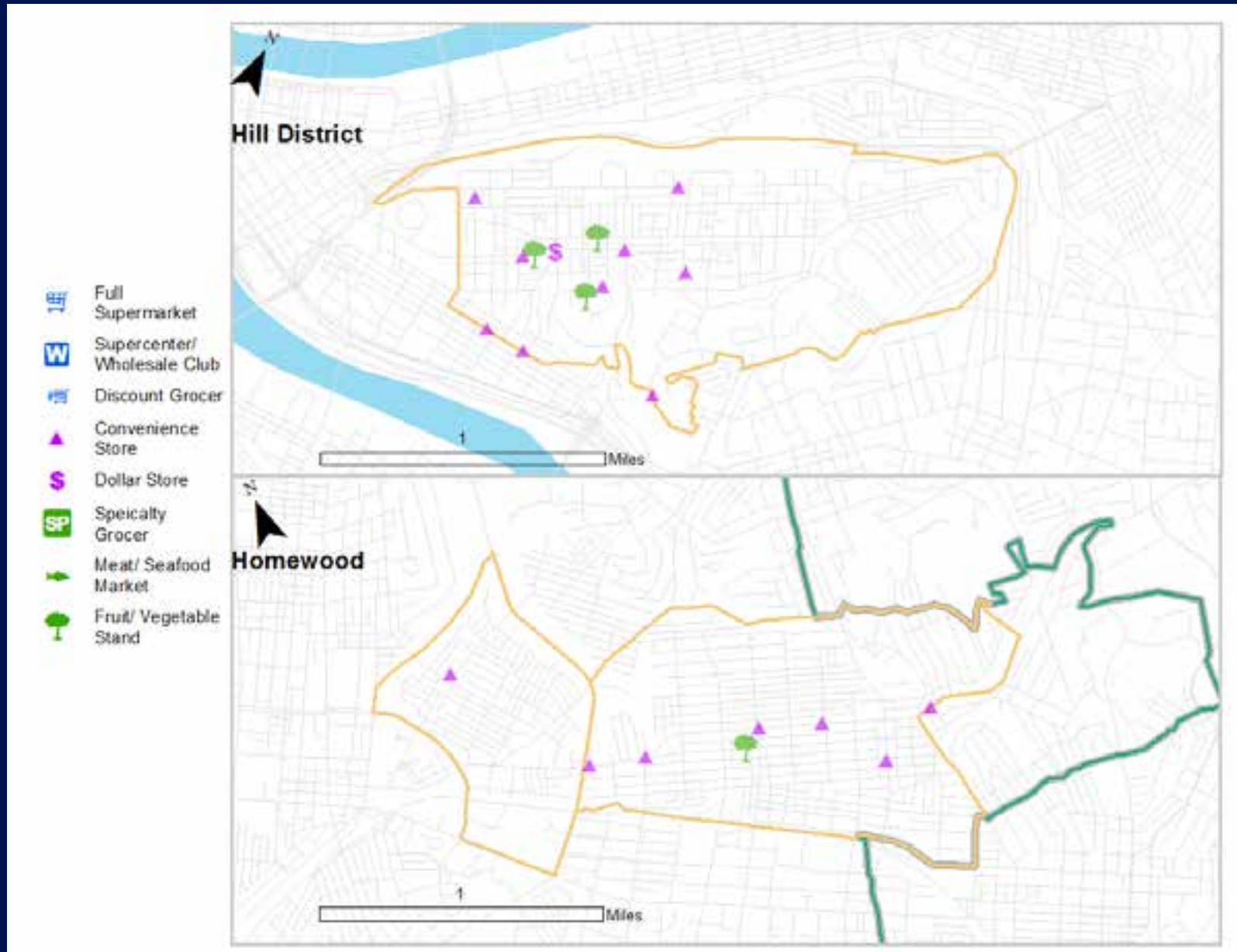
# Sample Characteristics

Transportation Mode for Major Food Shopping	<ul style="list-style-type: none"><li>• 41% Drive a private vehicle</li><li>• 32% Use Public Transportation</li><li>• 19% Use Paid Private Transportation (Taxi, Jitney)</li></ul>
Age	<ul style="list-style-type: none"><li>• 18 - 34 (17%)</li><li>• 35 - 49 (22%)</li><li>• 50 - 64 (32%)</li><li>• 65 + (28%)</li></ul>
Education	<ul style="list-style-type: none"><li>• No HS Diploma (16%)</li><li>• HS Diploma (37%)</li><li>• Some College (33%)</li><li>• Bachelors or more (15%)</li></ul>
Employment	<ul style="list-style-type: none"><li>• Employed (31%)</li><li>• Not Employed (69%)</li></ul>
Gender	<ul style="list-style-type: none"><li>• Female (73%)</li><li>• Male (27%)</li></ul>
SNAP Participation	<ul style="list-style-type: none"><li>• Receive Food Stamps (51%)</li></ul>
Race	<ul style="list-style-type: none"><li>• Black/African American (93.5%)</li></ul>
Auto Ownership	<ul style="list-style-type: none"><li>• Own a vehicle (34%)</li></ul>
Home Ownership	<ul style="list-style-type: none"><li>• Homeowners (29%)</li></ul>
Sample Size	<ul style="list-style-type: none"><li>• Homewood (495)</li><li>• Hill District (875)</li></ul>

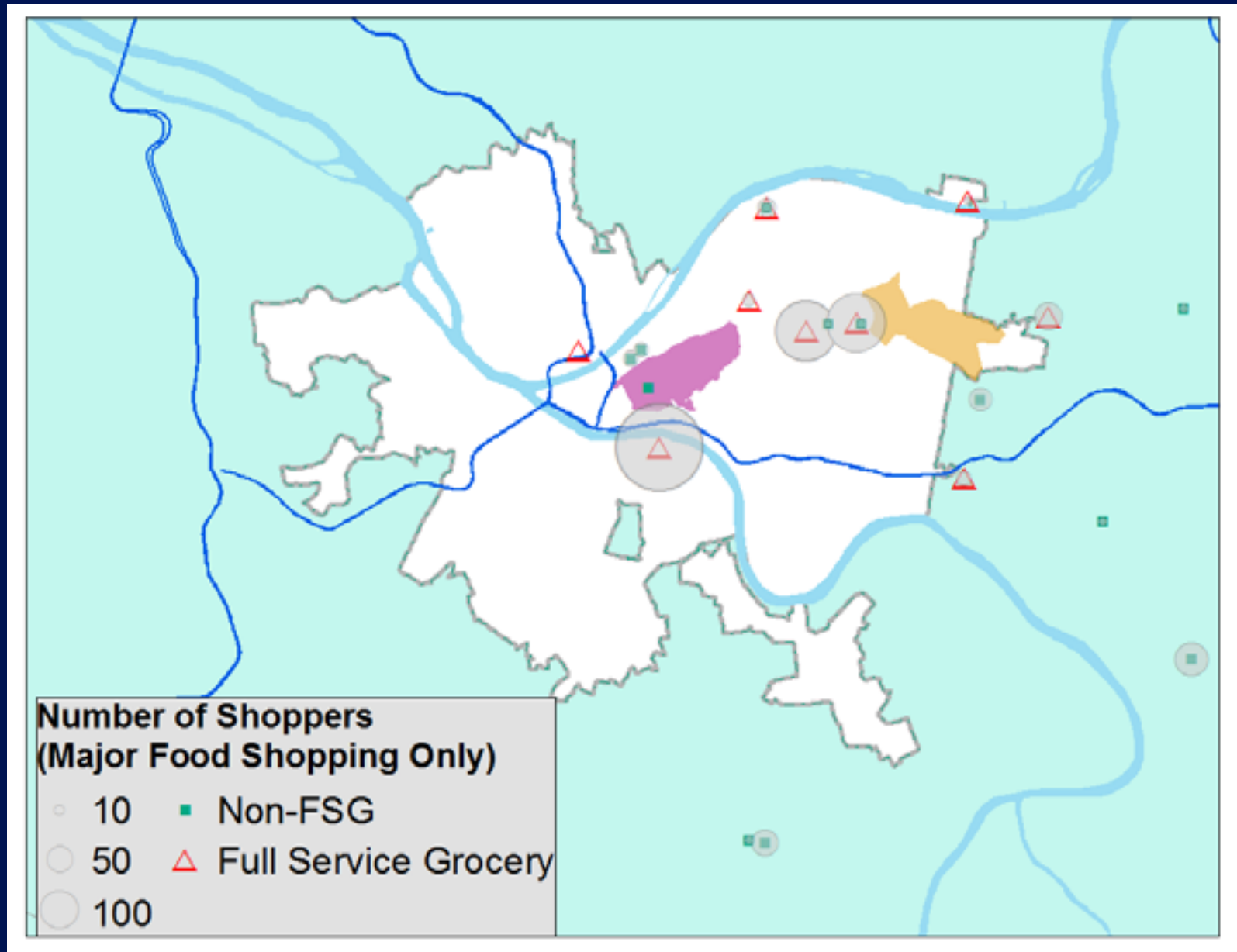
# Food Shopping Locations



# Food Stores Located in the Neighborhoods



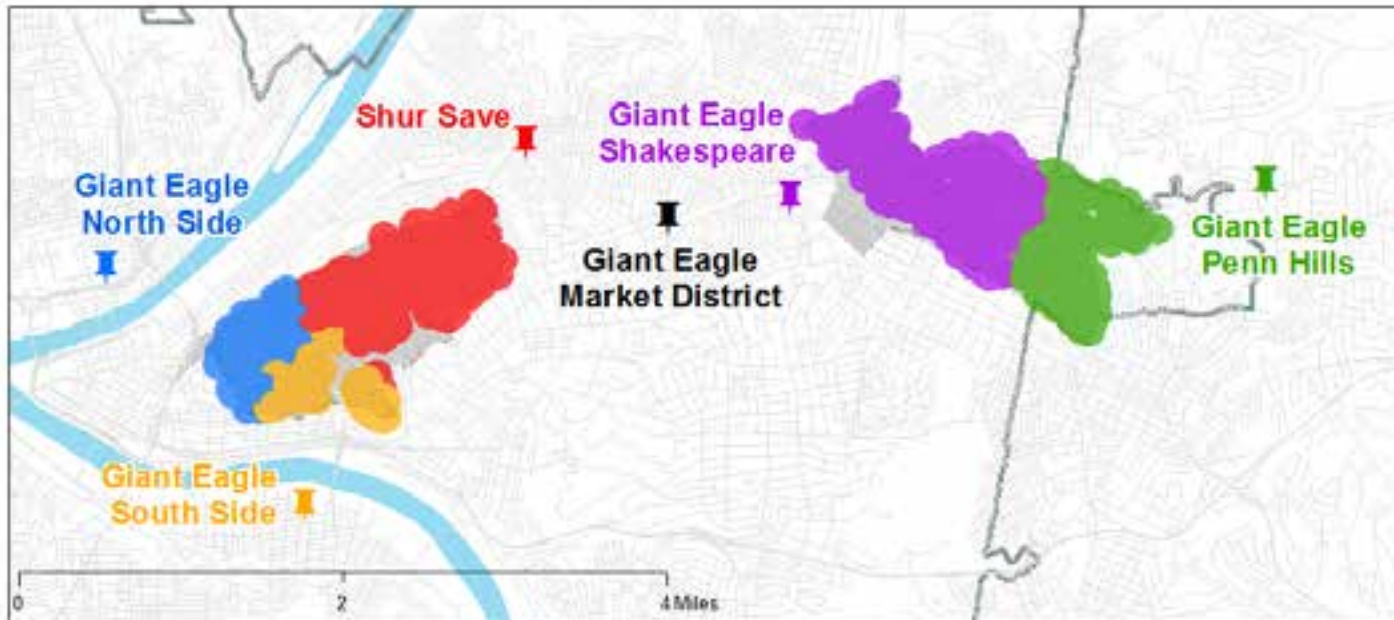
# Where Residents go for Major Food Shopping





# Where are Full Service Groceries and Where do Residents Shop?

Full Service Grocery (FSG) Store	Neighborhood	Households for whom FSG is Closest	Households shopping at this FSG
Shur Save	Hill District	387	16
Giant Eagle, South Side		194	436
Giant Eagle, North Side		314	1
Giant Eagle, Shakespeare	Homewood	334	196
Giant Eagle, Penn Hills		141	56



*How will a new Full Service Grocery store in a food desert affect eating or shopping habits, if relatively few people (~25%) shop at their nearest grocery store?*

*-OR-*

*Which groups people are most likely to be affected by policy initiatives that open grocery stores in food deserts?*

# What determines store choice for shoppers in food deserts?

## Quality and Aesthetics

- Number of Available Fruit & Vegetable Options
- Store Cleanliness
- Outside Appearance (Presence of Graffiti, Garbage, etc.)

## Convenience

- Operating Hours
- Other Amenities within the Store (Bank, Pharmacy, etc.)
- Number of Cash Registers

## Cost

- Prices of commonly sold items (Milk, Bread, etc.)

## Accessibility

- Public Transit Travel Time
- Private Auto Travel Time
- Distance

## Individual Characteristics

- Demographics of shoppers (Age, Gender, etc.)
- Size of Household
- Automobile Ownership
- SNAP Participation

# Accessibility: Transit Time and Store Choice

- Transit Travel Time is a suitable complement to Driving Times, given a sizeable proportion lacks access to an automobile.
- General Transit Feed Specification (GTFS)
  - <http://www.transit.melindamorang.com>
  - Step-by-step instructions for creating Network Dataset using GTFS Data
  - Open source data (published by the transit agencies) and free tools
- Data Sources
  - Local Transit agencies
    - [www.portauthority.org/GoogleTransitFeed](http://www.portauthority.org/GoogleTransitFeed)
  - <http://www.gtfs.-data-exchange.com/agencies>

# Transit Time Analysis

- Creates a time-enabled Network Dataset that is compatible with the Network Analyst
- Calculates travel times by public transit at a given departure time on a given day of the week for a set of origins and destinations (i.e. Households to food stores)
- Enables choice analysis to include transit time, in addition to drive time and driving distance

# McFadden's (1974) Conditional Logit

- More general form of logistic regression
- The modeled choice depends on the characteristics of the household/primary shopper AND the attributes of the food store.
- Each household is matched with each possible store choice

# McFadden's (1974) Conditional Logit

- Identifies the characteristics of stores that are associated with greater chances of being chosen:
  - Stores with longer operating hours are more likely to be chosen for major food shopping.
- Identifies characteristics of households associated with choosing a particular store, compared to the base alternative:
  - Having a vehicle was associated with a higher probability of shopping at suburban locations for major food shopping.

# Results

Observations	18765
Cases	1251
	Wald chi2(147) = 1701.22
Log likelihood = -1838.0469	Prob > chi2 = 0.0000

Parameter	Estimate	Standard Error	z-value	P>  z
Weekly Operating Hours	0.048	0.012	3.950	0.000
Driving Distance	-0.429	0.062	-6.890	0.000
Number of Transit Connections	-0.267	0.068	-3.940	0.000
Number of Available Fruits & Vegetables	-0.108	0.095	-1.140	0.254
Number of Store Amenities	-1.460	0.417	-3.500	0.000
Garbage	-4.434	1.899	-2.330	0.020
\$/Dozen Eggs	0.856	0.934	0.920	0.360



# Findings

- Driving distance and transit travel time were highly correlated and performed equally in the models.
- Shoppers tend to choose Food Stores with lower driving distances and/or fewer transit connections.
- While households may not shop at their closest FSG, lack of automobile ownership was associated with shopping at stores in close proximity to the neighborhoods.