Navigating Food Deserts: An Analysis of Social Characteristics and Transportation Options on Chicago's Far South Side

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Abstract

Beginning with a list of retail outlets on Chicago’s Far South Side that accept SNAP benefits, this study groups stores into three classifications: all stores selling food, grocery stores and supermarkets, and chain supermarkets. By conducting site visits as well as calling stores, a method was developed to classify a store as either a “grocery store or supermarket” or “other” based on whether the store sells fresh meat and produce.

After plotting the location of the chain supermarkets on a map of census tracts using ArcMap, supermarket accessibility by public transportation was modeled to show which destinations could feasibly be reached given different trip times. Overall, having a census tract with a high percentage of food stamp recipients was the best predictor of poor supermarket access. This finding has implications for federal policy, as public benefits are made less effective when consumers are forced to pay higher prices because they cannot access stores that offer the lowest prices, or when recipients cannot access healthy food.

This study analyzes the presence of supermarkets, grocery stores, and other types of retail food outlets on Chicago’s Far South Side. It takes into account existing studies of food deserts and seeks to assess the ability of public transportation to ameliorate food deserts. This paper demonstrates that transportation should enter the definition of a food desert and analyzes how food deserts should be assessed as a range of inequality in food access, rather than on a binary scale.
Introduction
There is national concern that “some poor or rural areas do not have access to supermarkets, grocery stores, or other food retailers that offer the large variety of foods needed for a healthy diet,” (USDA 1). This leaves households more reliant on fast food outlets with few nutritional choices, or corner stores which often charge higher prices and are less likely to stock nutritious foods (Ver Ploeg 21).

A ‘food desert’ is defined as “an area in the United States with limited access to affordable and nutritious food, particularly such an area composed of predominantly lower income neighborhoods and communities,” (USDA 1). Transportation is an essential link in ameliorating the impact of food deserts, although “transportation planners have largely ignored the special needs of transit-dependent persons to access food,” (Gottlieb & Fisher 18). Transportation and access to food are linked, especially for low-income citizens. Without adequate transportation, “people cannot enjoy… the simple convenience of shopping at a supermarket,” (Gottlieb & Fisher 18). While urban supermarkets used to be plentiful, the migration of businesses, including supermarkets, out of the central city has compromised access.

Literature Review

Food Deserts Nationally

In 2008, the United States Department of Agriculture (USDA) conducted a national study on the existence and extent of food deserts. The USDA compiled a database of the locations of supermarkets and larger grocery stores within the United States. This data then was used to estimate food access by analyzing the distance of households to the nearest supermarket or large grocery store.
Table 1: National statistics on distance from supermarket, access, and income

<table>
<thead>
<tr>
<th></th>
<th>Do not have access to a vehicle</th>
<th>Low-income people, living in a low-income area$^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live .5 mile to 1 mile from a supermarket</td>
<td>3.4 million households, 3.2% of all households</td>
<td>No statistics presented</td>
</tr>
<tr>
<td>Live more than 1 mile from a supermarket</td>
<td>2.3 million households, 2.2% of all households</td>
<td>11.5 million people, 4.1% of population</td>
</tr>
</tbody>
</table>

Nearly all (99%) households shop for food at least once a week, and households in the United States made a median of 2.1 round trips to the grocery store per week in 2005 (Jiao et al. 1-25). Those living in low-income areas spend 19.5 minutes getting to a grocery store, whereas the national average is 15 minutes, an increase of 30 percent. This difference may be due to distance from grocery stores or reliance on public transportation (USDA iii). If the value for those in low-income areas was removed from the national average, the disparity would be even greater. For families that are pressed for time, the additional time spent travelling has a demonstrable impact. If the process of obtaining the food and preparing a meal is too time consuming, then a household is likely to make a faster, less nutritious choice.

Though 93% of those in low-income areas travelled to a grocery store in a personal vehicle that they or another household member drove, residents did not necessarily own the vehicle or have access to it at all times. According to a survey, nearly 6% of all U.S. households do not always have the food they want or need because of access-related problems (USDA iv). For those without a car, “reliance on public transportation, rides from friends, and walking are often cited as methods to reach food venues, so small differences in distance could make for large differences in dietary

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$^1$A low-income area is defined as an area where more than 40 percent of the population has income at or below 200 percent of the federal poverty line.
choices available, and potentially large differences in health outcomes,” (Mari Gallagher Research & Consulting Group 2006: 5). According to the study, both the consumer’s individual characteristics (vehicle ownership, proximity to a grocery store) as well as the characteristics of the neighborhood (low-income, poor transit) determine ease of access to food. Overall, large supermarkets are preferable to smaller corner stores because of their ability to offer competitive prices as well as a broader selection. According to the USDA study, “when consumers shop at convenience stores, prices paid for similar goods are, on average, higher than at supermarkets,” (USDA iv). When a family is living near the poverty line, this difference has a larger effect on the household budget and restricts the amount of healthy food that can be purchased. In a study of food stamp recipients in Dayton, Ohio the majority of shopping trips were made to either supermarkets (67%) or grocery stores (18%), demonstrating a preference for shopping at these types of stores (Feather 162-172).

By analyzing SNAP data, researchers were able to better understand the spending patterns of low-income Americans. In 2008, 86% of SNAP benefits were used at supermarkets\(^2\) or large grocery stores (USDA iv). On average, SNAP recipients are located 1.8 miles from a supermarket, yet the store visited most often was located 4.9 miles away\(^3\) (USDA iv). A supermarket farther away could potentially offer a better selection, lower prices, be located along a convenient transit route, etc. It is often assumed that all supermarkets provide similar goods and prices, and that they are preferable to small grocery stores and convenience stores, though findings from the

\(^2\)“The industry-standardized definition requires that to be considered a supermarket, a retailer must have annual sales of at least $2 million and contain all the major food departments found in a traditional supermarket, including fresh meat and poultry, produce, dairy, dry and packaged foods, and frozen foods,” (USDA 15)

\(^3\) The USDA does not provide an explanation for this finding
Seattle Obesity Study indicate that this is not always the case. When a market basket of 100 foods was collected from seven different supermarket chains the prices varied from $225 to $420, but the selection remained relatively consistent, as 95% of the food basket was found at every supermarket. Though it is unclear if the data are generalizable beyond Seattle, the study found that less than 15% of shoppers shopped within their census tract, either to obtain lower prices or higher quality food elsewhere (Drewnowski et al. 3).

City of Chicago Studies

Two studies portray different aspects of food access in the city of Chicago. Beginning in 2006, the Mari Gallagher Research & Consulting Group began to study the existence of ‘food deserts’ in the City of Chicago. The report defines a food desert as a “large, geographic area with no, few, or distant grocery stores,” (Mari Gallagher Research & Consulting Group 2006: 1-39). Statistics indicate that the amount of land area and people in food deserts has declined between 2006 and 2009, yet a sizeable population still lives in a food desert. The study measures the distance between the geographic center of each of the 18,888 census blocks in the city of Chicago and locations of each food venue in the vicinity. Food outlets were divided into three types: chain grocer (Jewel, Dominick’s, etc.), small or independent grocer, and fast food, meaning take-out or venues in which customers bring food to their own tables. Chain grocers and independent grocers were then grouped under the bigger category of “all grocers.” Convenience stores and corner grocery stores were not included in any of the types.

Data were then examined at the census tract level, and a “food balance score” was calculated according to the distance to a store that fell under “all grocers” versus distance
to a fast food venue. They then mapped the tertile with the “worst” access (average distance to mainstream food venue divided by average distance to fast-food venue)\(^4\). Due to the clustering of individual tracts with low access to grocery stores on the West side and South side, food deserts were said to exist in those areas. According to the study, as of May 2010, 550,382 Chicago residents still lived in a food desert. The vast majority of this population had incomes under $50,000 per year, and 57,758 of the households did not have an automobile (Mari Gallagher Research & Consulting Group 2010: 1-4).

In order to develop a method to allocate funding to improve access to healthy food, the USDA created a quantitative definition of a food desert. To qualify for subsidies, census tracts must meet low-income as well as low-access requirements. In this assessment, the USDA defines “low-income communities” as communities that have either a poverty rate of 20% or greater, or a median family income at or below 80% of the area median family income. The USDA defines “low-access communities” as those which have at least 500 persons and/or at least 33% of the population living more than one mile from a supermarket or large grocery store (“Food Desert Locator” Web). The census tracts within the City of Chicago that meet the USDA definition\(^5\) are shown in Figure 1.

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\(^4\) The example given of the worst outcome is a grocery store 1 mile away and a fast food restaurant .5 miles away, yielding a score of 2. The example given for the best outcome is a grocery store .5 miles away, and a fast food restaurant 1 mile away, yielding a score of .5

\(^5\) The USDA identifies two census tracts, the O’Hare Airport tract, which is estimated to have no residents, and the Lake Calumet industrial area tract, which is estimated to have 29 households, as food deserts (American Community Survey, Web).
Figure 1: Census Tracts that Meet the USDA’s Food Desert Criteria

Study Comparison

The Mari Gallagher study does not take into account the absolute number of or distance to food stores in an area, but provides a comparison of distance to food stores versus fast food venues. If a supermarket and a fast food restaurant are both within reasonable walking distances, but the supermarket is one-tenth of a mile further, the choice would be based on consumer preferences, not a lack of access, so access-related problems may be overestimated. The study maps the tertile with “worst” access, which necessitates that one-third of tracts must fall under that category, instead of creating a quantitative standard.

One strength of the USDA study is its reliance on numerical thresholds, yet the access criterion may not be reasonable. The one-mile distance used by the USDA to
determine a “low-access” tract does not take into account that residents may not have a personal vehicle. According to a study carried out in Cambridge, Massachusetts, supermarket accessibility can be more accurately measured if a radius of half of a mile, a suitable distance for walking, is used (Community Development Department 2). Neither of the studies differentiate between supermarkets and grocery stores, though there may by differences between the two in price and selection.

Transportation

Transportation is often left out of the discourse on food deserts, yet it can play an important role in improving food access. The discrepancy between the location of jobs and that of affordable housing is a well-documented phenomenon that can be applied to supermarket and grocery stores. In many instances, public transportation does not provide convenient service from a person’s residence to the location that he or she needs to access. Even in urban areas, “federal transportation policy is still biased toward highways over mass transit,” (Swanstrom & Barrett 82) meaning that those households without access to an automobile are at an extreme disadvantage.

One solution to this inequity is providing bus services that connect residents to employment centers, especially with the cooperation of the employment center (Miller 1-65). This idea could be applied to grocery stores, with the cooperation of a food retailer. Residents of a food desert would be ensured access to a grocery store with a wide range of healthful options, and stores would benefit from an increased customer base. According to Gottlieb & Fisher, “some food suppliers…recognize that providing transportation services for customers may further their own interests,” (19) like increasing business. The program could be implemented in neighborhoods on the basis of
income or access, using quantitative food desert guidelines to target the most needy populations.

A commuting pattern study in Los Angeles recommended improving and expanding the bus network. Improvements in frequency of service, safe bus shelters, improved passenger information, and targeted marketing and information were all suggested (Singa et al. 8-14). Buses that stop directly at supermarkets, or express service from a central neighborhood location that residents would likely be at, such as a school could be added.

As part of the Jobs Access Reverse Commuting (JARC) legislation, the Metropolitan Transportation Commission (MTC) suggested methods to improve the opportunities to reach employment destinations for the lower income segment of the population. In the San Francisco Bay area, the MTC financed a program which showed welfare recipients how to use public transportation more effectively, so that accessing their job, childcare, a grocery store, and other destinations would be more feasible and less time consuming using the existing infrastructure. Though the MTC wanted to promote increased use of public transportation, it saw that not all of the low-income residents’ needs could be met that way, so it funded two car programs as well as one vanpool program, recognizing that “the structural barriers could not be overcome by fixed transit service,” (Sandoval et al. 2009: 110).

Though it is often assumed that funding should be used for public transportation, rather than to help a family on welfare purchase a car, increasing amounts of research demonstrate the importance of car ownership for lower-income households. A representative from the Center for Neighborhood Technology commented that “there was
considerable pent-up demand for non-traditional transit service specifically targeted at welfare recipients and other low-income individuals,” (Sandoval et al. 2009: 103).

An ethnographic study has demonstrated that “access to a car or car ownership was the only transit option that has the ability to reduce hardships for welfare mothers,” (Sandoval et al. 2011: 352-362). Without access to a car, informal measures allow the person the access he or she needs. A “working-poor” woman explains, “I have to pay someone to take [my children] to school. My brother lives right up the street and I pay him to take me somewhere, like to the grocery stores, to the dollar store,” (Rogalsky 1018-1038). Even in instances where bus routes are available, they are not always viable options for riders. One interviewee explains that she “feels constrained by the bus for activities like grocery shopping because she can ‘only get a little bit, and always end up getting more than I can carry. When I do a big shopping, I pay somebody to take me,’” (Rogalsky 1018-1038). These two examples show that the best way of alleviating access issues for some members of the working poor may be subsidizing rides in vehicles. Subsidizing car ownership would allow low-income families to access multiple destinations such as work, school, daycare, supermarkets, other shopping destinations, etc. more easily and directly than public transportation. Yet, there are environmental and congestion concerns when a new car is added to the road, especially in an urban environment. Subsidizing rides in vehicles, such as legal taxi services, would provide an easier but potentially less impactful solution.

**Research Method**

The following study was designed to explore the impact that a narrowed definition of a food store as well as multiple transportation options may have on the
existence of food deserts. The study area was limited to the Far South Side of Chicago, including zip codes 60617, 60619, 60620, 60627, 60638, 60642, 60643, 60649, 60652, 60655, and 60658. In order to accurately account for shopping trips that may occur beyond the border of Chicago, parts of the surrounding suburbs were included in the analysis.

This study began with a USDA listing of all stores that accept SNAP benefits; stores were then grouped into three store types based on product offerings, and estimated store space and prices (SNAP Retailer Locator, Website). Data on stores that accept SNAP benefits was readily available, and accepting SNAP benefits is an essential requirement in order to meet the needs of the population that has the most difficulty with food access. The USDA defines a ‘healthy diet’ as one that emphasizes fruits, vegetables, whole grains, and fat-free or low-fat milk as well as lean meats, poultry, beans, eggs, and nuts (USDA’s MyPyramid, Website). A grocery outlet should provide all of those in order to be deemed adequate. Many of the stores on the list may sell a few food items, but do not offer the variety of products necessary for a healthy diet. In this study, stores that provide adequate amounts of fresh produce (at least six types) and fresh meat are considered grocery stores or supermarkets, depending on size. An ideal retail food outlet would be large enough to offer competitive prices allowing low-income shoppers to purchase the most food for their budget. As in Weinberg (1996: 16) chain supermarkets are defined as those that have 11 or more stores. The three categories of classification for stores that emerge are all stores, grocery stores and supermarkets, and chain supermarkets only.
Since visiting all of the stores in the study area was not feasible, calls were placed to gain information about products. Employees were asked if the store sold fresh meat that could be “taken home and prepared,” as opposed to frozen meat or already prepared meals. If they did not sell fresh meat that response was recorded. If they did sell fresh meat then the employee was asked if the store sold fresh produce meaning “fresh fruits and vegetables.” If the answer was “a little or not right now” then the response was noted and the store was not counted as a grocery store. If the employee asked which specific item was needed examples were given including “apples or lettuce and other items to make a salad with.” If one store in a chain of stores did not have fresh meat and produce the same conditions were assumed to exist for other stores of the same type. For example, all 7 – Eleven stores or stores attached to a Western gas station were considered not to be grocery stores since the original store called was not classified as a grocery store.

Though some store employees were helpful over the phone, some suggested to “come in and see the selection,” and other stores failed to answer the phone after multiple attempts. In order to figure out the classification for these non-responding stores, one Chicago zip code, 60620, was sampled. The zip code contains 78 retailers that accept SNAP benefits. Of those, eight are chain grocery stores and were not visited. Thirty-eight stores were not visited because they had been either confirmed as grocery stores or not grocery stores prior to the visit. The remaining 32 stores in the zip code were visited.

Additionally, North American Industry Classification System (NAICS) codes were used in order to better understand the data (Manta, Website). Stores classified as 445120 (Convenience Stores) or 447190 (Other Gasoline Stations) were eliminated.
The locations of all stores, grocery stores and supermarkets, and chain supermarkets only were plotted on a map of City of Chicago census tracts using ArcMap. Though the sample area visited was defined by a zip code, census tracts were used to provide a more fine-grained unit of analysis. Only the census tracts fully contained in the zip code boundaries are considered. Buffers were drawn to show a distance of 0.25 and 0.50 miles away from the supermarket. Assuming a walk speed of 3 miles per hour, the distance of .25 miles represents a 5-minute walk, and .5 miles represents a 10-minute walk. (Phillips 209).

To understand the role that existing transportation plays in ameliorating food deserts, SHAPE files for Chicago Transit Authority (CTA) bus and El lines were overlaid onto a map of Chicago census tracts in ArcMap. The CTA guarantees that a bus stop is within a half mile of almost all residents in Chicago (Chicago Transit Authority 2001: 36). Table 2 shows calculations for trip times and distances assuming approximately a 5-minute walk to the bus stop, a 5-minute wait for the bus, and a 5-minute walk to the supermarket. CTA bus speed is reported to be 9.6 miles per hour on average (“Chicago Transit Authority” 2011).

<table>
<thead>
<tr>
<th>Walk Time</th>
<th>Walk Speed</th>
<th>Walk Distance</th>
<th>Wait Time</th>
<th>Bus Time</th>
<th>Bus Speed</th>
<th>Bus Distance</th>
<th>Journey Distance</th>
<th>Journey Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 min</td>
<td>3 mph</td>
<td>.5 mi</td>
<td>5 min</td>
<td>5 min</td>
<td>9.6 mph</td>
<td>.8 mi</td>
<td>1.3 mi</td>
<td>20 min</td>
</tr>
<tr>
<td>10 min</td>
<td>3 mph</td>
<td>.5 mi</td>
<td>5 min</td>
<td>10 min</td>
<td>9.6 mph</td>
<td>1.6 mi</td>
<td>2.1 mi</td>
<td>25 min</td>
</tr>
<tr>
<td>10 min</td>
<td>3 mph</td>
<td>.5 mi</td>
<td>5 min</td>
<td>15 min</td>
<td>9.6 mph</td>
<td>2.4 mi</td>
<td>2.9 mi</td>
<td>30 min</td>
</tr>
</tbody>
</table>

The most vulnerable population is composed of households that are “low-income” and “low-access” who also live far away from a supermarket. In this study, “low-income” census tracts are those in which 20% or more of families have had incomes below the poverty line in the last 12 months, corresponding with the definition used by the USDA.
“Low-access” census tracts are those in which 30% or more of households do not have a vehicle available. As seen above, one half-mile is considered to be a reasonable walking distance. Demographic characteristics of the study area were derived from the 2005–2009 American Community Survey provided by the Census Bureau (American Community Survey, Web).

**Findings**

In the beginning of the study, stores were eliminated with the data obtained by a phone call. In order to contact stores by phone, listings were searched for 50 of the stores in the study area. Of those, 24 said that they did not sell fresh meat and produce, including chains like Family Dollar. Four of the stores did not answer the phone after multiple call attempts. For seven of them it was not possible to find a phone number to contact the business. Fifteen reported that they had fresh produce and meats. From visiting 60620 as well as calling stores in other zip codes, generalizations were made about which stores did not have adequate food. Any store that calls itself a bakery or health food store is unlikely to contain enough variety to meet the criteria. Any store attached to a gas station or that mentions speed such as “quick” or “quik” or convenience is unlikely to meet the criteria. Any store that is a mart rather than a market or refers to itself as “corner” or “neighborhood” is likely too small to stock all the food items that are desirable.

After sampling the 60620 zip code, observations were used to create a methodology for eliminating stores without having to visit or call them. The zip code contained a total of 78 stores from the USDA’s list of retail food outlets that accept food stamps. Eight are chain supermarkets: three are Aldi, two are Jewel food stores, two are
Save-A-Lot, and one is Food-4-Less. Of the 70 remaining stores, 14 are gas stations, 13 are chain convenience stores such as CVS and Walgreen’s. Eleven were contacted and of those only one, Moo and Oink, was found to meet grocery store criteria. The remaining 32 stores were visited.

Of the 32 stores visited, three were not found at the location identified by the USDA. Seven were identified as grocery stores or non-chain supermarkets. The remaining 22 either lacked fresh produce, fresh meat, or both. Seven out of eight of the stores which had “food and liquor” in their names had little food. Stores that had food in their name coupled with something else like “food and dollar plus,” or businesses that do not mention food at all such as “dollar and drapery,” or “82nd discount stores” were found to be unlikely to contain a necessary range of food options for supporting a healthy diet. From their names, two of the food retailers in the area seemed like they would only stock meat, but no produce. Surprisingly, this assumption was false, leading to the conclusion that retailers that seem to specialize in just meat or just produce should not automatically be excluded.

**Table 3: Criteria Used to Eliminate Stores**

<table>
<thead>
<tr>
<th>From zip code visit</th>
<th>From phone calls</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Food and liquor&quot;</td>
<td>Bakery or health food store</td>
</tr>
<tr>
<td>No mention of food in name</td>
<td>Attached to a gas station</td>
</tr>
<tr>
<td>Food and another item</td>
<td>&quot;Quick&quot; or &quot;quik&quot;</td>
</tr>
<tr>
<td></td>
<td>&quot;Corner&quot; or &quot;neighborhood&quot;</td>
</tr>
<tr>
<td></td>
<td>“Mart” rather than market</td>
</tr>
</tbody>
</table>

Figures 2-7 display the locations of the different store types. Figure 2 displays all stores, and Figure 3 displays all stores with a ten-minute walk buffer. Figure 4 displays grocery stores and supermarkets; Figure 5 displays grocery stores and supermarkets with
a ten-minute walk buffer. Figure 6 displays chain supermarkets only, and Figure 7 displays chain supermarkets only with a ten-minute walk buffer.

Figure 2: Map of All Stores

Figure 3: Map of All Stores with ½ mile (10-minute walk) Buffer
Figure 4: Map of Grocery Stores and Supermarkets

Figure 5: Map of Grocery Stores and Supermarkets with ½ mile (10-minute walk) Buffer
Figure 6: Map of Chain Supermarkets Only

Figure 7: Map of Chain Supermarkets Only with ½ mile (10-minute walk) Buffer
Figures 8 – 10 show the impact that bus and El lines may have on improving access to supermarkets. The small circles represent a .25 mile or five minute walk distance. The red line represents the CTA Red Line, which is the only El line that operates within the bounds of the study area. Green lines represent bus lines. The five supermarkets that do not have a CTA bus line that drops off grocery shoppers within a five-minute walk of the supermarket are highlighted in magenta.

Figure 8: Map of Chain Supermarkets Only with 10-minute Walk and 5-minute Bus ride Buffer (1.3 miles, 20-minute travel time)
Figure 9: Map of Chain Supermarkets Only with 10-minute Walk and 10-minute Bus Ride Buffer

(2.1 miles, 25-minute travel time)
Figures 10 shows the effect of removing bus routes that provide limited service. Table 4 displays the bus routes that have been removed and explains the reasoning. When bus lines with limited service are removed, an additional four supermarkets cannot be accessed within a five-minute walk of a CTA bus stop; these are highlighted in bright green.
Table 4: Bus Routes with Limited Service

<table>
<thead>
<tr>
<th>Route Number</th>
<th>Route Name</th>
<th>Reason excluded</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>Wentworth</td>
<td>No weekend service.</td>
</tr>
<tr>
<td>26</td>
<td>South Shore Express</td>
<td>No weekend service. Runs in one direction.</td>
</tr>
<tr>
<td>X28</td>
<td>Stony Island Express</td>
<td>No weekend service.</td>
</tr>
<tr>
<td>48</td>
<td>South Damen</td>
<td>No weekend service. No midday service.</td>
</tr>
<tr>
<td>49A</td>
<td>South Western</td>
<td>No weekend service. No midday service.</td>
</tr>
<tr>
<td>100</td>
<td>Jeffrey Manor Express</td>
<td>No weekend service. No midday service.</td>
</tr>
<tr>
<td>108</td>
<td>Halsted/95th</td>
<td>No weekend service. No midday service.</td>
</tr>
<tr>
<td>169</td>
<td>69th/UPS Express</td>
<td>Only five buses per day.</td>
</tr>
</tbody>
</table>

Figure 11: Map of Bus Lines, Limited Service Bus Lines Removed

There are 116 census tracts fully contained within the zip codes examined in this study. Of those, one has no residents, and one has 29 households or less, so both were excluded from the study. Figures 12 – 18 are maps made with ArcMap displaying
socioeconomic characteristics at the census tract level. Chain supermarkets only are plotted and a half-mile buffer is drawn around them. Tables 5 – 9 make quantitative data comparisons.

![Map of census tracts with supermarkets proximity](image)

**Figure 12: Percentage of Families Whose Income in the Past 12 Months was Below Poverty Level, by Census Tract**

<table>
<thead>
<tr>
<th>Poverty rate</th>
<th>Number of tracts more than .5 miles from a supermarket</th>
<th>Number of tracts</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10%</td>
<td>11</td>
<td>27</td>
<td>41%</td>
</tr>
<tr>
<td>30% or more</td>
<td>9</td>
<td>23</td>
<td>39%</td>
</tr>
</tbody>
</table>

**Table 5: Poverty and Supermarket Proximity**
Figure 13: Percentage of Households That Do Not Have a Vehicle Available, by Census Tract

<table>
<thead>
<tr>
<th>Households that do not have a vehicle available</th>
<th>Number of tracts more than .5 miles from a supermarket</th>
<th>Number of tracts</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 10%</td>
<td>6</td>
<td>23</td>
<td>26%</td>
</tr>
<tr>
<td>30% or more</td>
<td>12</td>
<td>30</td>
<td>40%</td>
</tr>
</tbody>
</table>
Figure 14: Percentage African American

Figure 15: Percentage Hispanic
Table 7: Racial Composition and Supermarket Proximity

<table>
<thead>
<tr>
<th>Racial composition</th>
<th>Number of tracts more than .5 miles from a supermarket</th>
<th>Number of tracts</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% or more African American</td>
<td>22</td>
<td>75</td>
<td>29%</td>
</tr>
<tr>
<td>80% or more Hispanic</td>
<td>1</td>
<td>3</td>
<td>33%</td>
</tr>
<tr>
<td>80% or more White</td>
<td>2</td>
<td>6</td>
<td>33%</td>
</tr>
</tbody>
</table>
Figure 17: Households Receiving SNAP Benefits in the Past 12 Months

Table 8: SNAP Benefit Recipients and Supermarket Access

<table>
<thead>
<tr>
<th>SNAP recipient Rate</th>
<th>Number of tracts more than .5 miles from a supermarket</th>
<th>Number of tracts</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.9% or less</td>
<td>7</td>
<td>26</td>
<td>24%</td>
</tr>
<tr>
<td>36.2% or more</td>
<td>9</td>
<td>12</td>
<td>75%</td>
</tr>
</tbody>
</table>
Criteria

Table 9: Percentage of tracts meeting low-income and low-access criteria

<table>
<thead>
<tr>
<th>“Food desert”</th>
<th>Number of tracts more than .5 miles from a supermarket</th>
<th>Total tracts</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poverty (&gt;20% of tract) and households without vehicle (&gt;30% of tract)</td>
<td>10</td>
<td>26</td>
<td>38%</td>
</tr>
</tbody>
</table>

Discussion

When all stores that accept SNAP benefits are considered, almost everyone is within walking distance of a food outlet. When grocery stores and supermarkets are considered, the majority of the study area is still within walking distance of a store, but there is less overlap in the buffer zone areas, meaning that a household might be in walking distance of only one grocery store or supermarket rather than having the choice between several. When “chain supermarkets only” are mapped, it becomes difficult in
many areas to access a supermarket, and some form of transportation must be used to fill in the gap.

When a 5-minute bus ride is mapped, most of the study area residents have access to a supermarket, yet the residents that do not are some of the most needy, those with incomes below poverty level and lacking vehicle access. The map analysis may not be a completely accurate predictor, since it shows if residents can or cannot reach a bus route – but that bus route may not take them directly to a supermarket, and their ride may require transfers, putting them above the 20-minute trip time estimation. Since the “El” has stops that are much farther apart than buses, it is less convenient for many residents to use rail transit to access a supermarket, yet for some it is feasible. Longer trip times enable more people to travel to the grocery store and allow some shoppers to choose between multiple destinations, but the time spent travelling must be weighed against the gains from shopping at a supermarket.

Existing bus transportation does not allow shoppers to access five of the nearby supermarkets in the study area, and when bus routes with limited service are removed, four more supermarkets become inaccessible by public transit. In order to further understand the implications of this, more research needs to be done on shopping patterns. For example, if most residents shop in the morning or night during the week then a lack of midday or weekend service should not pose a problem. Additionally, the use of PACE buses by Chicago residents and their intersection with supermarket access should be examined since six of supermarkets in the study area are in the suburbs, which are served by PACE.
In general, supermarkets are most prevalent where there is the least amount of poverty. The single tract with the most families with incomes below the poverty line has no supermarket within walking distance. But the percentage of tracts that are .5 miles from a supermarket are very similar for those tracts which have under 10% poverty and above 30%, with values of 41% and 39%, respectively. Proportionally there are more census tracts in which people cannot walk to the supermarket in the group with less than 10% poverty, but the map shows that the cluster of supermarkets generally tends to be in the less impoverished area.

The single tract with the highest percentage of households without a vehicle does not have a supermarket within walking distance. The households in census tracts where vehicle ownership is high are more likely to be able to walk to a supermarket, leaving households in other census tracts farther away and transit-dependent. There were not very notable differences in access when race was looked at: African Americans, Hispanics, and Whites had relatively equal access to supermarkets when evaluated in terms of walking distance.

When census tracts with a lower number of SNAP recipients (7.9% or less) are compared to tracts with a high number of SNAP recipients (greater than 36.2%) there was a large difference in supermarket accessibility. While only 24% of tracts with low numbers of SNAP recipients were not within walking distance of a supermarket, 75% of those tracts with high numbers of SNAP recipients were not within walking distance. This means that purchasing power may be lost if residents must spend their money at higher priced retail outlets, weakening the effectiveness of the program. Of all the demographic information studied, a census tract with a high amount of households
receiving SNAP benefits seems to be the best predictor of inadequate grocery store access.

The 26 census tracts colored in red in Figure 18 represent the census tracts classified as “low-income” and “low-access.” Though many tracts and parts of tracts are within walking distance of grocery stores, some food desert areas do emerge, most notably the cluster of six census tracts on the Far South Side that also have fewer transportation options and farther to travel to a supermarket.

Limitations

An important limitation of the study is the potential for inaccurate classification of stores, since not all stores could be visited. For example, an outlet like “Vincennes Food” would be counted as a grocery store in the study although it does not actually meet the criteria, and Four Brothers Food and Liquor, the one liquor store that was also a grocery store, would not be counted. This does indicate that an on-site visit – or direct contact with a store manager – is necessary to create an accurate classification system for the purpose of assessing access to wholesome food. The results may over-estimate or under-estimate the number of grocery stores and supermarkets. Additionally, comparison of prices for a basket of goods across all of the grocery stores and supermarkets would provide more in-depth knowledge of price variations.

More research is needed to examine the street system in the study area to assess whether the routes are feasible for walking or if there are barriers. There is the important matter of personal safety for walking in some of these neighborhoods, an issue not addressed here. Additionally, a circular buffer provides data about a straight distance from one point to another, but does not provide information about the street network and
actual distance that must be travelled, meaning that it underestimates the distance that
would actually need to be walked.

**Recommendations and Conclusion**

Since the region of six census tracts in Figure 18 with high poverty and low
vehicle ownership are clustered and poorly served by existing transportation, the area
should be the primary focus for expanded transportation options. A shuttle service could
be established to take residents from a fairly central point in each of the census tract to a
supermarket a couple of times per week. The supermarket provided shuttle could be
timed so that it coincided with a time when many parents would be at a central location,
like a school, in order to pick up or drop off their children.

Public transportation, specifically CTA buses, improves access to supermarkets
for many, yet there is still a population not well served by fixed route modes.
Ethnographic studies from the literature review show that paying someone for a trip to
the grocery is sometimes a necessary option in order to have freedom to choose a specific
time, or to buy more goods than what could be carried. Subsidized taxi rides to and from
the grocery store may prove to be a cost-effective access option, which could be allocated
to those who receive SNAP benefits or have incomes below the poverty line.
Additionally, a car-sharing program could be brought to the area and subsidized for low-
income users, since fixed route transportation does not meet all needs, and providing
every household with an automobile is not feasible. In those areas that are served well by
fixed route transportation, the CTA could provide outreach to parents at schools to help
them understand how to most efficiently achieve all of their day-to-day needs including
work commute, food shopping, dropping off children at school, etc.
Considering walking distance and public transportation brings up an important question – does someone need to be able to walk to the grocery store? If the answer is yes, then many suburban residents would live in a food desert. Since most suburban residents have cars, though, being able to walk is not considered necessary. Since SNAP recipients do not necessarily shop at the closest supermarket, does eliminating a “food desert” mean being able to access a range of stores via public transportation? In previous studies, different measures have been used to assess which census tracts are located in a food desert, and different conceptions of food access have been conveyed. Rather than rely on a binary classification, food access must be looked at as a range of advantages and limitations. Though one household may not be in walking distance of a supermarket, their income may enable them to own a vehicle so that distance is not a constraint. A household in a different census tract may not be able to afford a private vehicle, but may benefit from a dense network of buses. For those that experience more limitations than advantages, though, it is essential that transportation be modified or expanded to meet needs.
Bibliography


