Appendix B

Box B.1
Measures of Access Used in Food Desert and Related Studies

1) Algert, Susan J., Aditya Agrawal, and Douglas S. Lewis (2006). "Disparities in Access to Fresh Produce in Low-Income Neighborhoods in Los Angeles." *American Journal of Preventive Medicine* 30(5): 365-370.	
Area Studied	**Measure of Access**
Pomona, CA	Divided food stores in Pomona as having a "variety" of produce or "limited produce" based on onsite inspections, telephone interviews regarding produce content, or inference from store description. Stores selling four or fewer produce items were counted as "limited" while those serving more than four were counted as having a "variety" of produce. Access was measured by distance from a store offering a variety of produce. Addresses of food pantry clients were geocoded. Those living outside of a "walkable" distance to a store selling a variety of produce (0.8 km or about a 15 minute walk) were highlighted as not having access to a variety of produce.
2) Alwitt, Linda F., and Thomas D Donley (1997). "Retail Stores in Poor Urban Neighborhoods." *The Journal of Consumer Affairs* 31(1): 139-164.	
Area Studied	**Measure of Access**
Chicago, IL	Examined number of retail stores of different types and sizes in "poor" ZIP Codes. Poor ZIP Codes are defined as: 1) poverty rate in highest quartile of ZIP Codes in Chicago, 2) lowest quartile of high school graduation rate, 3) lowest quartile of labor force participation, and/or 4) highest quartile of unemployment rate. Store size was defined by the number of employees.
3) Apparicio, Philippe, Marie-Soleil Cloutier, and Richard Shearmur (2007). "The case of Montréal's missing food deserts: Evaluation of accessibility to food supermarkets." International Journal of Health Geographics 6(4).	
Area Studied	**Measure of Access**
Montreal, Canada	Measured access by proximity (nearest supermarket), diversity (number of supermarkets within 1,000 meters), and variety in terms of food and prices (mean distance to the three closest, different chain-name supermarkets). Supermarkets were defined as grocery stores associated with one of the seven major chains in Quebec.
4) Baker, Elizabeth A., et al. (2006). "The Role of Race and poverty in Access to Foods That Enable Individuals to Adhere to Dietary Guidelines." *Preventing Chronic Disease: Public Health Research, Practice, and Policy 3*(3).	
Area Studied	**Measure of Access**
St. Louis, MO	Supermarket audits were used to assess "healthy food" availability in stores, where healthy food was defined by USDA dietary intake guidelines. A checklist of 78 canned, fresh, or frozen fruits and vegetables were used by auditors. Availability of lean, low-fat and fat-free meat, poultry, and dairy products was also considered. Composite score for each supermarket was developed based on these audits. The composite scores were then divided into tertiles of high, medium, and low availability. Census tracts were divided by racial composition (greater than 75% African-American, greater than 75% White, and mixed) and poverty level (less than 10% poor, 10-20% poor, and greater than 20% poor).
5) Berg, Nathan, and James Murdoch (2008). "Access to grocery stores in Dallas." International Journal of Behavioural and Healthcare Research 1(1): 22-37.	

Area Studied	Measure of Access
Dallas County, TX	Mapped all of the mainline chain grocery stores in Dallas County and then counted how many stores were within a 1-mile radius of neighborhood Census block groups. The study linked this geospatial data with neighborhood income levels, poverty levels, and racial composition.
6) Blanchard, Troy C., and Thomas Lyson (2006). "Access to Low Cost Groceries in Nonmetropolitan Counties: Large Retailers and the Creation of Food Deserts." *Journal of Regional Studies*.	
Area Studied	**Measure of Access**
Mississippi	A food desert is classified as having no supermarkets or supercenters within a 10-mile radius of a ZIP Code centroid (with exceptions for highways). A supermarket classification was based on having 50 or more employees and a supercenter classification was based on NAICS category 452910.
7) Horowitz, Carol R., et. al. (2004). "Barriers to Buying Healthy Foods for People With Diabetes: Evidence of Environmental Disparities." *American Journal of Public Health* 94(9): 1549-1554.	
Area Studied	**Measure of Access**
East Harlem and Upper East Side, New York City	Classified stores as desirable if they had at least one item of the following five and undesirable if it had none of the items: (1) Diet soda (1-L or 2-L size) (2) 1% fat or fat-free milk (1-quart, half-gallon, or 1-gallon size) (3) High-fiber bread, low-carbohydrate bread, or both high-fiber and low-carbohydrate bread (defined as 2 g or more fiber, 10 g or less carbohydrate per slice, or both) (4) Fresh fruits (5) Fresh green vegetables or tomatoes.
8) Block, Daniel and Joanne Kouba (2005). "A comparison of the availability and affordability of a market basket in two communities in the Chicago area." *Public Health Nutrition* 9(7): 837-845.	
Area Studied	**Measure of Access**
Austin and Oak Park in Chicago, IL	The study compared item availability, price, and quality of food in 10 different types of foodstores in Austin (poor and African-American) and Oak Wood (upper-middle class and diverse races). Item availability was calculated by how many items a store stocked from a food list based on the USDA's Thrifty Food Plan. Price was calculated from the items in the food basket and the average price from all stores was assigned if an item was not sold at that store. Quality rating was subjective and only given two options, "satisfactory" or "poor." The 10 store types were national and regional chain markets, independent supermarkets, independent groceries, chain drug stores, gas stations, liquor stores with food, chain convenience stores, dollar stores, and specialty stores.
9) Block, JP, RA Scribner, KB DeSalvo (2004). "Fast food, race/ethnicity, and income: a geographic analysis." *American Journal on Preventive Medicine* 27(3): 211-7.	

Area Studied	Measure of Access
New Orleans, LA	The study geocoded all fast food restaurants and used a 1 mile and 0.5-mile radius as buffers around Census tracts to determine "shopping areas" in each tract. Fast food restaurant density was calculated by the number of fast food restaurants per square mile. Fast food restaurants have two or more of the following characteristics: expedited food service, takeout business, limited or no wait staff, and payment tendered prior to receiving food. These data were then compared with neighborhood characteristics, such as percentage Black population and low income.
10) Bodor, J Nicholas, Donald Rose, Thomas A Farley, Christopher Swalm, and Susanne K Scott. "Neighborhood fruit and vegetable availability and consumption: the role of small food stores in an urban environment." *Public Health Nutrition* 11(4): 413-420.	
Area Studied	**Measure of Access**
Four Census tracts in central-city New Orleans	Adequate access was calculated by two components; distance from the household to a foodstore and the instore availability of healthy items. The study included all stores selling food within the four Census tracts and all supermarkets within 5 km of the tract borders. Trained observers determined instore availability by calculating the linear shelf space devoted to fruits and vegetables and the number of fresh produce varieties available. Neighborhood availability was then determined by summing all of the shelf space devoted to fresh fruits and vegetables in all small food stores within 100 m of the household residence.
11) California Center for Public Health Advocacy, PolicyLink, and UCLA Center for Health Policy Research (2008). Designed for *Disease: The Link Between Local Food Environments and Obesity and Diabetes*.	
Area Studied	**Measure of Access**
California	Retail Food Environment Index (per adult): Total number of fast food restaurants and convenience stores divided by the total number of grocery stores and produce vendors within a given radius of the person's home. The radius used was 0.5 miles for urban areas and 5 miles for rural areas.
12) Clarke, Graham (2002). "Deriving Indicators of Access to Food Retail Provision in British Cities: Studies of Cardiff, Leeds, and Bradford." *Urban Studies* 39(11): 2041-2060.	
Area Studied	**Measure of Access**
Cardiff, Leeds/ Bradford (UK)	The study used GIS to map store locations. A circle with a 500-meter radius was drawn around each multiple/co-op store, which represents the maximum walking distance. Potential food deserts were only the areas that met the Carstairs indices of multiple deprivation and only had a few, small independent stores. The Hansen accessibility and spatial interaction model take into account the location and size (30,000, 60,000, and 90,000 square feet) of store in relation to its customers and social class structures.
13) *Examining the Impact of Food Deserts on Public Health in Chicago.* Mari Gallagher Research & Consulting Group (2006).	

Area Studied	Measure of Access
Chicago, IL	Food Balance Score: average distance (blocks) to any mainstream food venue divided by the average distance to a fringe food venue (includes fast-food). A mainstream food venue is a grocery store and a fringe food venue is everything else, such as convenience stores and fast food restaurants. The study compared food ratio scores and their impact on Years of Potential Life Lost (YPLL) and BMI outcomes, holding education, income, and race constant.
14) *Examining the Impact of Food Deserts on Public Health in Detroit*. Mari Gallagher Research & Consulting Group (2007).	
Area Studied	**Measure of Access**
Detroit, MI	Food Balance Score: average distance (blocks) to any mainstream food venue divided by the average distance to a fringe food venue. A mainstream food venue is a grocery store and a fringe food venue is everything else, such as convenience stores and fast food restaurants. Researchers manually classified store types based on appearance and items they sold. Diet-related death data are used to calculate Years of Potential Life Lost, a statistic that measures the total number of life years lost due to premature death per 100 people in a population from a certain cause. The Food Balance Score was then compared with the YPLL statistic in each neighborhood.
15) Guy, Cliff, Graham Clarke, and Heather Eyre (2004). "Food retail change and the growth of food deserts: as case study of Cardiff." International Journal of Retail and Distribution Management 32(2): 72-88.	
Area Studied	**Measure of Access**
Cardiff, UK	The study measured the spatial distribution of multiple and co-op grocery stores (healthy food stores) using electoral divisions as the geographical unit. Areas with a high deprivation are considered food deserts, and this was calculated by the Welsh Index of Multiple Deprivation (IMD). IMD includes income, employment, health, education, housing, and geographic components.
16) Hendrickson, Deja, Chery Smith, and Nicole Eikenberry (2006). "Fruit and vegetable access in four low-income food deserts communities in Minnesota." *Agriculture and Human Values* 23: 371-383.	
Area Studied	**Measure of Access**
Four urban and rural communities in Minnesota	The study used a survey based on the Thrifty Food Plan to measure the average price per pound of a food item, how much of the food item was offered, and the quality of the food item. Quality was determined by expiration dates on packaged food and by the opinion of surveyors for produce items. Consumer focus groups also revealed what residents thought of the availability, quality, and price of food.
17) Hosler, Akiko, et. al. (2008). "Assessing Retail Fruit and Vegetable Availability in Urban and Rural Underserved Communities." *Preventing Chronic Disease* 5(4). http://www.cdc.gov/pcd/issues/2008/oct/07_0169.htm. Accessed December 4, 2008.	

Area Studied	Measure of Access
Urban and rural areas in New York State	Instead of categorizing stores based on business type (such as a gas station or supermarket), businesses were labeled as a fruit and vegetable stores if they stocked at least two types of fresh fruit and at least three types of fresh vegetables. There were three types of fruit and vegetable stores: super produce stores, year-round produce stores, and seasonal produce stores. Fruit-for-snack stores were stores that carried at least one type of ready-to-eat fresh fruit but didn't meet the fruit and vegetable measure.

18) Sharkey, Joseph R. and Scott Horel (2008). "Neighborhood Socioeconomic Deprivation and Minority Composition Are Associated with Better Potential Spatial Access to the Ground-Truthed Food Environment in a Large Rural Area." The Journal of Nutrition 138(3): 620-627.

Area Studied	Measure of Access
6-county rural region in Texas	The study calculated the distance to the nearest foodstore from the population-weighted center of each CBG and then examined associations among deprivation, minority composition, population density, and distance to foodstore.

19) Kaufman, Phil R. (1999). "Rural Poor Have Less Access to Supermarkets, Large Grocery Stores." *Rural Development Perspectives* 13(3): 19-25.

Area Studied	Measure of Access
Lower Mississippi Delta (36 rural, high-poverty counties)	Net accessibility is the ratio of available large grocery store sales to potential food spending by households in a ZIP Code-based area (region broken up into quartiles). The stores in the study all have annual sales of $500,000 or more.

20) Morton, Lois Wright and Troy C. Blanchard (2007). "Starved for Access: Life in Rural America's Food Deserts." *Rural Realities* 1(4): 1-10.

Area Studied	Measure of Access
Rural Iowa	Low access: 50% of population lives more than 10 miles from large foodstore (supermarkets or supercenters). Food Desert: All residents live more than 10 miles from large foodstore Large foodstores are large supermarkets and supercenter.

21) Short, Anne, Julie Guthman, and Samuel Raskin (2007). "Food Deserts, Oases, or Mirages? Small Markets and Community Food Security in the San Francisco Bay Area." *Journal of Planning Education and Research* 26: 352-364.

Area Studied	Measure of Access
San Francisco, CA (Bayview, Mission, Central East Oakland)	The study measured accessibility by distance (mapping), affordability and nutritional adequacy (market basket analysis), cultural acceptability (types, variety and quality of goods carried and characteristics that may affect the shopping experience), and quality (produce observation) for small (less than 3,000 sq ft) full-service foodstores. Instead of measuring overall community access, the study measured whether small full-service stores can enhance access to food compared with chain and large supermarket availability.

22) Smoyer-Tomic, Karen E., John C. Spence, and Carl Amrhein (2006). "Food Deserts in the Prairies? Supermarket Accessibility and Neighborhood need in Edmonton, Canada." *The Professional Geographer* 58(3): 307-326.

Locations of Food Access Studies

Local/ State:

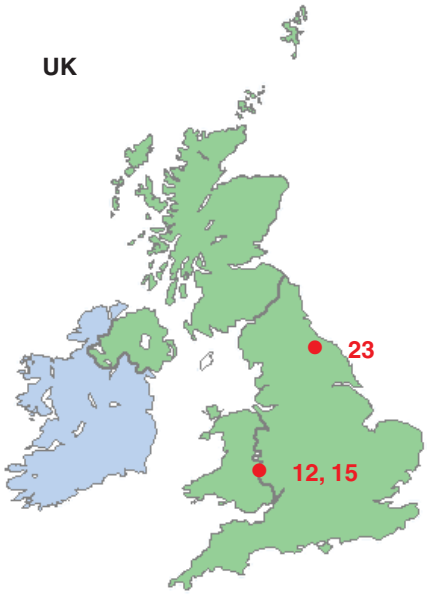
1-Pomona, CA
2-Chicago, IL
3-Montreal, Canada
4-St. Louis, MO
5-Dallas County, TX
6-Mississippi
7-New York, NY
8-Chicago, IL
9-New Orleans, LA
10-New Orleans, LA
11-California
12-Cardiff, UK
13-Chicago, IL
14-Detroit, MI
15-Cardiff, UK
16-Minnesota
17-New York
18-Texas
19-Lower MS Delta
20-Iowa
21-San Francisco, CA
22-Edmonton, Canada
23-Leeds, UK
24-Detroit, MI
25-Detroit, MI

Regional/ Nation:

26-South USA
27-USA
28-USA
29-USA
30-USA
31-UK

* 26-31 not shown on maps

UK



Canada

USA