CHAPTER 2

The Extent of Limited Food Access in the United States

This chapter describes the extent of limitations in access to affordable and nutritious food in the United States in three separate sections. The first section provides estimates of individual measures of access, based on survey data on the number of U.S. households that indicate food access limitations. The second section uses a geographical, area-based approach to measure access to supermarkets. A national level directory of supermarkets is developed and geocoded. Distance-based measures of supermarket access are produced for the entire continental U.S. population and by selected economic and demographic characteristics of the population. Median distances to supermarkets are computed and a three-category distinction of low, medium, and high access is used to describe supermarket access for the entire U.S. and separately for low-income neighborhoods and for people outside of those areas. Information on vehicle ownership, which is an important individual-level characteristic related to the ease at which a variety of nutritious foods can be accessed, is also provided for those that live far from supermarkets. The third section of this chapter uses data from the American Time Use Survey (ATUS) to estimate the amount of time households spend traveling to the grocery store. The mode of transportation used is also considered.

Most of the previous studies on food access have focused on specific geographic areas such as cities or counties or even States. The analysis in this chapter is unique because it uses multiple methods to provide a broad overview of access to affordable and nutritious food on a national level.

Individual-Level Measures of Food Access From National Household Surveys

The vast majority of the literature on food deserts and much of the rest of this report focus on area-based measures of food access—that is, measures of access to stores or food outlets for a geographically designated area, often areas with high concentrations of low-income individuals. These measures inherently assume that everyone within a geographic area has the same level of access as everyone else in that area. But some people who live in areas with concentrated poverty may not be poor, may own their own vehicle, and may be able to access affordable and nutritious food. Other poor individuals may live outside of areas with concentrated poverty but may have limited access to food. An alternative measure of food access is the one presented in this section—access for individuals directly, regardless of where they live.

Since 1995, USDA has collected information annually on food spending, food access and adequacy, and sources of food and nutrition assistance for the U.S. population. The information is collected in an annual food security survey, conducted as a supplement to the nationally representative Current Population Survey (CPS). Data from the Food Security Supplement of the CPS (CPS-FSS) is used to provide estimates of the prevalence and severity of food insecurity in U.S. households (see, for example, Nord et al., 2008).

In addition to asking food security questions, the CPS-FSS, until 2001, asked a general question about whether the household had enough of the kinds of foods it wanted and needed. Those households who responded that they did not have enough of the kinds of foods they wanted were asked followup questions about why they did not have enough food. Respondents could answer by choosing from among several options, including options directly related to store access (see box, "CPS-FSS Questions on Food Access"). Table 2.1 provides the population weighted responses to these questions and provides a direct measure of the percent of households that do not always have enough of the foods they want because of access limitations. Eighty-one percent of households always had the kinds of foods they wanted to eat. Sixteen percent always had enough food to eat but did not always

Box CPS-FSS Questions on Food Access

SS1 Which of these statements best describes the food eaten in your household--enough of the kinds of food we want to eat, enough but not always the kinds of food we want to eat, sometimes not enough to eat, or often not enough to eat?

1. Enough of the kinds of food we want to eat (SKIP TO SX1CK)
2. Enough but not always the kinds of food we want to eat (SKIP TO SS1B)
3. Sometimes not enough to eat (SKIP TO SS1C)
4. Often not enough to eat (SKIP TO SS1C)

Those who gave response #2, "enough but not always the kinds of foods we want to eat" were asked SS1B:

SS1B Here are some reasons why people don't always have the kinds of food they want. For each one, please tell me if that is a reason why YOU don't always have the kinds of food you want to eat.

READ LIST. MARK ALL THAT APPLY.

	YES	NO
Not enough money for food	[ ]	[ ]
Kinds of food we want not available	[ ]	[ ]
Not enough time for shopping or cooking	[ ]	[ ]
Too hard to get to the store	[ ]	[ ]
On a special diet	[ ]	[ ]

Those who responded to question SS1 with response #3 or #4, "sometimes" or "often not enough to eat" were asked SS1C:

SS1C Here are some reasons why people don't always have enough to eat. For each one, please tell me if that is a reason why YOU might not always have enough to eat.

READ LIST. MARK ALL THAT APPLY.

	YES	NO
Not enough money for food	[ ]	[ ]
Not enough time for shopping or cooking	[ ]	[ ]
Too hard to get to the store	[ ]	[ ]
On a diet	[ ]	[ ]
No working stove available	[ ]	[ ]]
Not able to cook or eat because of health problems	[ ]	[ ]

Notes: Question SS1 is still asked in the CPS-FSS. Up until 2001, questions SS1B and SS1C were also asked as follow up questions. For questions SS1B and SS1C, multiple responses were accepted.

Table 2.1
National estimates of the percent of households who do not have enough of the kinds of foods they want because of food access limitations

	Percent of all households
Households that always had the kinds of foods they wanted to eat	81.0
Households that had enough to eat but did not always have the kinds of foods they wanted to eat	16.0
Households that sometimes or often did not have enough to eat	3.1
Reported reasons for not always having the kinds of foods or enough food:	
Households that always had enough to eat, but did not always have the kinds of foods they wanted to eat because it was too hard to get to the store or the kinds of foods they wanted were not available	5.1
Households that sometimes or often did not have enough to eat because it was too hard to get to the store	0.6
Total with food access limitations	5.7

Notes: Some of those who reported it was "too hard to get to the store" may be elderly or disabled. Of the 5.7 percent who reported access limitations, more than half (3.0 percent of all households) also cited that they did not have enough money for food.
Source: USDA, ERS calculations based on 2001 CPS-FSS survey data.

have the kinds of foods they wanted to eat. Another 3 percent sometimes or often did not have enough food to eat.

Respondents who reported they had enough to eat but did not always have the kinds of foods they wanted were asked why they did not have the kinds of foods they wanted. Among all households, 5.1 percent reported that they did not have the kinds of foods they wanted because it was either too hard to get to the store or the foods they wanted were not available. Respondents who reported that they sometimes or often did not have enough food to eat were also asked why. A total of 0.6 percent of all households said they did not always have enough to eat and that it was because it was too hard to get to the store. Thus, based on these questions, 5.7 percent of all households reported they did not always have the food they want or need because of access limitations.

Not all of these access limitations reflect a lack of a nearby store with adequate food. Some who report that it is too hard to get to the store may be disabled or elderly and frail. This group may very well have food access problems, but it is not necessarily because they do not have nutritious food options nearby. Further, of the 5.7 percent who cited access problems, more than half, or 3.0 percent, also cited that they did not have enough money for food. Another reason these responses may not indicate access problems related to nearby availability of food is that the condition "enough but not always the kinds of foods we want to eat" does not necessarily indicate whether the food available was nutritionally adequate or not. Despite these caveats, these estimates from the CPS-FSS could be considered an estimate of the number of households that face food access limitations.

Area-Based Measures of Access to Affordable and Nutritious Food

Individual measures of access provide one estimate of the number of people affected by limited access. The primary intent of the congressional mandate was to focus on area-based measures of access. Area-based measures are important because characteristics of the areas where people live, work, or travel may affect access to healthy and affordable food, which may affect diet and health.

This section examines the extent of areas in the U.S. that have low access to supermarkets, a reliable source of nutritious and affordable foods. A national supermarket directory is first developed and geocoded. Data on population, income, and other household characteristics from the 2000 Census are aggregated to square kilometer grids that cover the continental United States. The distances are measured from the center of these 1-kilometer grids to the nearest supermarket for the entire U.S. population, for low-income areas and higher income areas, and by characteristics of individuals or households. Access to supermarkets is described using these distance measures first for the entire U.S. population, then separately for Census Urbanized Area designations. The descriptions use simple population-weighted median distance to stores overall and across Urbanized Area and population characteristics. Each area is assigned to one of three categories of access based on whether the distance to the nearest supermarket is within a range of "walkable" distances. For rural areas, a "drivable" distance measure is considered.

Data and Methods

Definition of food retail outlets that offer affordable and nutritious food

Food is sold in a wide range of retail outlets, including traditional foodstores (e.g., supermarkets, grocery stores and convenience stores), and nontraditional retail stores that carry food products with other merchandise. Among the various forms of food retailers, supermarkets, supercenters, and warehouse club stores combined account for the largest share of food sales, 75.2 percent of the total in 2008 (Economic Research Service, 2009). These larger retail outlets typically offer all major food departments, including fresh produce, meat, poultry and seafood, as well as more economical package sizes and lower cost store brands and generic brands of packaged foods. Many studies have shown large retail outlets are more affordable relative to other retail food outlets (Andrews et al., 2001; Chung and Myers, 1999; Nayga and Weinberg, 1999; Kaufman et al., 1997).

An ERS review of studies of food prices found that supermarket prices are 10 percent lower, on average, than those of smaller foodstores, in part, due to lower per unit costs resulting in lower margins over cost of goods sold (Kaufman et al., 1997). Neckerman, et al. (2009) cite a number of audit surveys of food prices, finding that store type is highly associated with price and that supermarkets, larger chain stores, or discount stores such as supercenters, tend to offer lower prices.

Montovani et al. (1997) examined characteristics and services of a nationally representative sample of 2,400 stores authorized to receive benefits from the Supplemental Nutrition Assistance Program (SNAP). Price, quality, and variety of store foods were assessed in terms of the market basket of goods that reflect the Thrifty and Low Cost Food Plans.[13] This analysis focused on product availability and cost in areas with different concentrations of poverty. In urban areas, market basket costs in supermarkets and large grocers were nearly equivalent across levels of poverty. Prices were less at "other" stores located in high-poverty areas versus those in lower poverty areas. Availability of market basket items did not vary by poverty level among supermarkets in urban areas. Variety did vary by poverty level for large grocers. Fresh produce and fresh seafood were less available in large grocers located in high-poverty areas. Fresh meat was more available, however, at large grocers in these locations. In rural areas, market basket costs were consistently similar in higher and lower poverty areas. With the exception of fresh seafood, a similar proportion of market basket items was available in supermarkets and large grocery stores, regardless of the area's poverty level. Food quality was similar across different store types and poverty levels in rural areas. Results from this analysis confirm that, on average, supermarkets and large grocery stores offer lower prices and more variety than other store types. Large grocers were more similar to supermarkets than other store types, especially in rural zip codes.

[13]Market basket quality was measured in terms of availability of acceptable items as guided by a USDA publication on buying quality food (1975).

The analysis uses supermarkets and large grocery stores (hereafter defined simply as "supermarkets") as proxies for food retailers that offer a variety of nutritious, affordable retail foods. 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.[14, 15]

Two separate national-level directories of foodstores from the year 2006 were used to develop a comprehensive list of supermarkets in the U.S. The first directory is a list of authorized stores that accept SNAP benefits. More than 166,000 outlets were authorized in 2006, but only approximately 34,000 met the supermarket definition criteria. In addition to the store name and address, SNAP data include a store type classification, the most recent authorization year's total sales and total food sales, and total SNAP redemptions. The SNAP data were augmented with additional supermarket data from Trade Dimensions TDLinx (a Nielsen company), a proprietary source of individual supermarket store listings also for the year 2006.[16] This data set includes the name and address of supermarkets, the type of supermarket, annual sales volume range, and other supermarket characteristics. Details on how these data were merged and cleaned can be found in Appendix C. The combined list of supermarkets was converted into a GIS-useable format by geocoding the street addresses into store point locations. The final combined data set included locations for 40,108 supermarkets and supercenters nationwide.

[14]The $2 million annual sales requirement has been used by the retail food industry since at least 1980. If adjusted for annual inflation, the equivalent in 2008 dollars is approximately $4.5 million. By using the unadjusted annual sales, we potentially include medium-sized grocery stores in both the industry and SNAP store directories.

[15]Supercenters are included in our definition of supermarkets. However, warehouse club stores, also known as wholesale club stores, were not included in this study for two reasons. First, warehouse/wholesale club stores are not considered to be supermarkets by the industry, and second, few of these stores have applied to accept SNAP benefits.

[16]TDLinx data only include information on stores that meet the industry standard definition of a supermarket.

By combining the two store listings and using outside sources for verification, a more comprehensive national list of supermarkets and supercenters was obtained. By comparison, a study of Salt Lake County, Utah, revealed that there can be considerable disagreement across sources of data on the presence of foodstores when conducting access studies (Fan

et al., 2009). In a study of access to foodstores in Detroit, Gallagher (2007) also describes discrepancies in supermarket classification when using SNAP-authorized store data.

Using supermarkets and supercenters may underestimate the availability of affordable and nutritious food. Smaller grocery stores, neighborhood markets, or "dollar stores," for example, sometimes include a range of healthful, affordable foods.[17] Rose et al. (2009) and Sharkey and Horel (2009) both conducted in-store audits of food availability in these store types in New Orleans and in the Brazos Valley, Texas. The problem with including these stores in the analysis is that the range of foods sold in these stores was highly varied (Franco et al., forthcoming; Neckerman et al., 2009; Rose et al. 2009; and Sharkey and Horel, 2009). It would be impossible to do a complete national level audit of the contents of these stores. Reliable data on the relative pricing of foods sold in these stores is not available either, which means it cannot be asserted with confidence that these stores are a source for a wide range of affordable and nutritious food.

[17]Specialized foodstores, such as produce markets, meat and seafood markets, and retail bakeries, can serve as a source for affordable and nutritious food; however, they typically do not provide the full range of foods that supermarkets and supercenters do.

Food is also sold in restaurants, fast food outlets, and related foodservice establishments. In fact, nearly half of all food spending is on food away from home (Martinez and Kaufman, 2008). In considering the effect of food access on diet and health, access to restaurants and other foodservice establishments is important because food from these sources accounts for a significant part of the total diet. However, this national-level analysis does not consider access to restaurants and other food service outlets. Compared with foodstores and other retail food outlets, the monetary costs of an equal quantity of food purchased in a restaurant are higher than the costs at supermarkets or grocery stores. The cost of food sold in restaurants represents about one-third of the price at which it is sold, so that two-thirds of the cost of restaurant food is the premium of having someone prepare and serve it to the customer. In a grocery store, the cost of food accounts for about three-fourths of the retail price, on average. Thus, while eating at a restaurant may diminish the time costs of buying and preparing food for a consumer, those costs are eventually paid for by the consumer. For these reasons, food eaten at restaurants is less affordable due to its higher per unit cost relative to foodstores and other retail food outlets.

Defining and measuring the geographical unit of interest

This study uses the Socioeconomic Data and Applications Center (SEDAC) grids data, which is based on information from the 2000 Census of Population (SEDAC, 2006). These population data (including some socioeconomic and demographic data), which are released at the block group level, are first allocated to blocks and then allocated aerially down to roughly 1-square-kilometer grids across the continental United States. These data provide two important benefits for the analysis. First, they give better estimates of where people and households are located than data on larger geographic areas, such as census tracts. Second, the process of allocating census data to 1-square-kilometer grid cells transforms the irregular shapes and sizes of census geographies into regularized grid cells, providing for faster spatial computation needed for national-level analysis.

Measuring access from the geographical unit to the foodstore

This study uses distance to the nearest supermarket as a measure of access.[18] For each grid cell, the distance is calculated from its geographic center to the nearest supermarket. Median distances to the nearest supermarket are calculated for the Nation as a whole and across different subpopulations. Based on the grid measure of distance to the nearest supermarket, three categories of access (high, medium, and low) are created for two types of access—walking access and driving access. Walking access measures a range of distances for which it is feasible to walk to a supermarket, while drivable access measures a range of distances for which it is feasible to drive to a supermarket. A time-based distance measure equivalent for both walking and driving is developed. The walkability range is categorized as either 1) high, if a supermarket is within a half mile; 2) medium, if a supermarket is between ½ and 1 mile; and 3) low, if the nearest supermarket is more than a mile away. For rural areas, a drivability range is also measured. Drivability is categorized as either 1) high, if a supermarket is within 10 miles; 2) medium, if a supermarket is between 10 and 20 miles; and 3) low, if a supermarket is greater than 20 miles away.

[18]Chapter 4 also uses a variety measure of distance, which is the distance to three different supermarkets.

Defining vulnerable subpopulations of interest

This national-level assessment of access to affordable and nutritious food first characterizes access for the entire U.S. population. But the interest here is in subpopulations that may be particularly vulnerable to access barriers. The study considers supermarket access across the following four subpopulations:

- Low-income individuals, where anyone living in a household with income less than or equal to 200 percent of the Federal poverty thresholds for family size is considered low-income.[19]
- Household vehicle access, where households that do not have access to an automobile, van, or truck of 1-ton-load capacity or less are considered separately from those households who do have access.
- Race and ethnicity, where non-Whites include those individuals who identified their race as something other than "White" or their ethnicity as Hispanic (regardless of race).
- Elderly or nonelderly status, where individuals over age 65 are considered elderly.

[19]In 2008, the poverty threshold for a family of two adults and two children was $21,835, so 200 percent of this threshold would double the threshold to $43,670.

Specifying areas with high concentrations of low-income people

This study is interested not only in vulnerable individuals and households but also in vulnerable areas—neighborhoods that are highly deprived and for which, food access could be limited. Areas (the 1-kilometer-square grids) are identified as low-income areas if more than 40 percent of the people in the grid had income at or below 200 percent of the Federal poverty thresholds using kernel-density smoothing. Comparisons of distances to supermarkets across these low-income and higher income areas are made.

Finally, because it is difficult to use the same measures to characterize access in densely populated urban areas compared with less populated suburban and rural areas, a separate analysis is conducted using Census Urbanized Area definitions. The three definitions are as follows: Urban Areas, densely settled that contain 50,000 or more people, such as a core city and surrounding suburbs; Urban Clusters, densely settled local areas that have at least 2,500 people but fewer than 50,000 people, such as smaller cities and towns; and Rural Areas, low-density areas with populations of less than 2,500, including all areas not classified as either Urban Areas or Urban Clusters.

Results and Findings

This section presents a national overview of access to supermarkets. Separate analyses of access are also conducted for each of three Census-designated urbanicity types. Measures of access are presented for the overall population and then by each of the four vulnerable subpopulations. Differences in supermarket access are compared between low-income and higher income areas within each urbanicity type.

National access overview

Table 2.2 shows supermarket access for selected individual characteristics of vulnerable populations. Median distance to the nearest supermarket is given.[20] The number and percentage of individuals or households that have high, medium, and low access are also presented. The data in this table are for the Nation as a whole, not separately by areas or by urbanicity.

[20]The median distance is the point at which over the range of distances, half of the population is closer to that point, while half is farther away.

Overall, median distance to the nearest supermarket is 0.85 miles. Median distance for low-income individuals is about 0.1 of a mile less than for those with higher income, and a greater share of low-income individuals (61.8 percent) have high or medium access to supermarkets than those with higher income (56.1 percent).

Overall, ethnic and racial minorities have better access to supermarkets than Whites. Median distance to the nearest supermarket for non-White individuals is 0.63 miles, compared with 0.96 miles on average for Whites. Similarly, a smaller percentage of non-Whites (26.6 percent) have low access to supermarkets than do Whites (48.2 percent). These differences do not consider income, only race/ethnicity.

There are not great differences in access to supermarkets by elderly status. In terms of distance to the supermarket, the elderly compare very much with the nonelderly, overall. Despite their similar distances to supermarkets, the elderly could face additional barriers to access due to disability or inability to drive to the supermarket.

Vehicle access is perhaps the most important determinant of whether or not a family can access affordable and nutritious food. Table 2.3 focuses specifically on vehicle ownership for the entire Nation. It shows the total number of households in the U.S., the number without access to a vehicle and their distance to the nearest supermarket. The table reports these statistics for all households in the U.S. and for all households in low-income areas and then separately by the three urbanicity categories. The study focuses only on

Table 2.2

Supermarket access by household income, race/ethnicity, age, and vehicle access (walking distance)

				Distance to nearest supermarket miles					
				High access (0.5 miles or less)		Medium access (Between 0.5-1 mile)		Low access (More than 1 mile)	
	Number (millions)	Percent	Median[1] (miles)	Number (millions)	Percent	Number (millions)	Percent	Number (millions)	Percent
Income:[2]									
Low-income	79.3	28.8	0.76	22.6	28.5	26.4	33.3	30.2	38.1
Higher-income	196.1	71.2	0.87	43.8	22.3	66.3	33.8	86.1	43.9
All income levels	275.5	100.0	0.84	66.5	24.1	92.7	33.7	116.3	42.2
Race/ethnicity:									
Non-White	85.7	30.7	0.63	31.4	36.6	31.5	36.8	22.8	26.6
White	193.9	69.3	0.96	39.1	20.2	61.3	31.6	93.4	48.2
All races/ethnicities	279.6	100.0	0.86	70.5	25.2	92.8	33.2	116.3	41.6
Age:									
Age 65 or more	34.8	12.4	0.81	8.9	25.7	11.8	33.9	14.1	40.4
Less than age 65	244.8	87.6	0.82	61.6	25.2	81.0	33.1	102.2	41.8
All ages	279.6	100.0	0.82	70.6	25.2	92.7	33.2	116.3	41.6
Vehicle access:									
Households without vehicle	10.8	10.3	0.55	5.0	46.2	3.4	31.7	2.4	22.1
Households with vehicle	94.1	89.7	0.84	22.2	23.6	31.7	33.7	40.2	42.7
All households	104.9	100.0	0.81	27.2	25.9	35.1	33.5	42.5	40.6

[1]Medians are weighted by population of each square kilometer grid area.

[2]Low-income households are those with income less than or equal to 200 percent of the Federal poverty threshold for family size.
Sources: USDA, ERS analysis based on data from Census of Population, 2000 and the ERS-compiled supermarket directory for the contiguous U.S. in 2006.

Table 2-3

Household vehicle access and supermarket access

		Households without access to a vehicle			
		Between 1/2 to 1 mile from a supermarket		More than 1 mile from a supermarket	
Geographic area	Total households[1]	Number	Percent	Number	Percent
	Millions	*Millions*		*Millions*	
Total U.S.	104.9	3.4	3.2	2.4	2.3
Low-income areas	25.1	1.6	6.4	0.9	3.8
Urban areas	69.9	2.9	4.1	1.1	1.5
Low-income areas	15.6	1.3	8.3	0.4	2.5
Urban clusters	9.7	0.4	4.1	0.2	2.5
Low-income areas	3.6	0.2	5.6	0.1	3.3
Rural areas	25.3	0.2	0.8	1.1	4.4
Low-income areas	5.9	0.1	1.7	0.4	7.4

[1] This column shows the total number of households regardless of vehicle access.

Source: USDA, ERS analysis based on data from Census of Population, 2000 and the ERS-compiled supermarket directory for the contiguous U.S. in 2006.

households with medium or low access (those more than one-half mile from a supermarket) since those who have high access can walk to a supermarket that, at most, is one-half mile away.

Only 2.4 million households, or 2.3 percent of all 104.9 million households in the U.S., live more than a mile from a supermarket and do not have access to a vehicle. An additional 3.4 million households, or 3.2 percent of all households, do not have access to a vehicle and are between one-half to 1 mile from a supermarket. Thus, for the total U.S. population, between 2.3 and 5.5 percent of all households may be outside of a walking distance to a supermarket and lack access to a vehicle.

Not surprisingly, the percentage of households without access to vehicles is higher in low-income areas. Overall, 0.9 million households do not have access to a vehicle and live in low-income areas more than a mile from a supermarket. This represents 3.6 percent of all households in low-income areas. A much greater percentage of households without vehicles in low-income areas is between one-half to 1 mile from the nearest supermarket—1.6 million households, or 6.4 percent of all low-income households.

Table 2.3 also presents the number of households without access to vehicles and distance to supermarkets by urbanicity. These estimates show that 1.1 million households, or 4.3 percent of all rural households, lacks access to a vehicle and lives more than 1 mile from a supermarket. It is not surprising that people in rural areas live farther from the nearest supermarkets. But it is perhaps unexpected that a greater percentage lack access to a vehicle. Urban areas have the smallest percentages of households without access to a vehicle that are more than a mile from a supermarket. For urban areas, 4.1 percent of households are between one-half to 1 mile from the nearest supermarket and do not have access to a vehicle.

The analysis now turns specifically to supermarket access for areas with high concentrations of low-income people. Map 2.1 shows low-income areas in the U.S., which are 1-kilometer grid cells where more than 40 percent of the total population has income less than or equal to 200 percent of the Federal poverty level. The map shows the dispersion of low-income areas across the country, but the map also shows greater concentration of low-income areas in the South, Southwest, and Upper Plains States. Rural low-income areas are better reflected on the map than urban low-income areas, which are difficult to see on the national level view the map provides.

Table 2.4 focuses on these low-income areas. The right half of the table shows the number (and percent) of people in low-income areas by access level. It also shows the percent of the total U.S. population represented in these low-income areas. The left half of the table focuses only on those people with incomes below 200 percent of Federal poverty guidelines. It is worth noting here, and will be supported later in the chapter, that low-income people who live outside of low-income areas are, in general, farther from supermarkets than low-income people who live in low-income areas.

Table 2-4

Supermarket access for people in low-income and higher-income areas (walking distances)

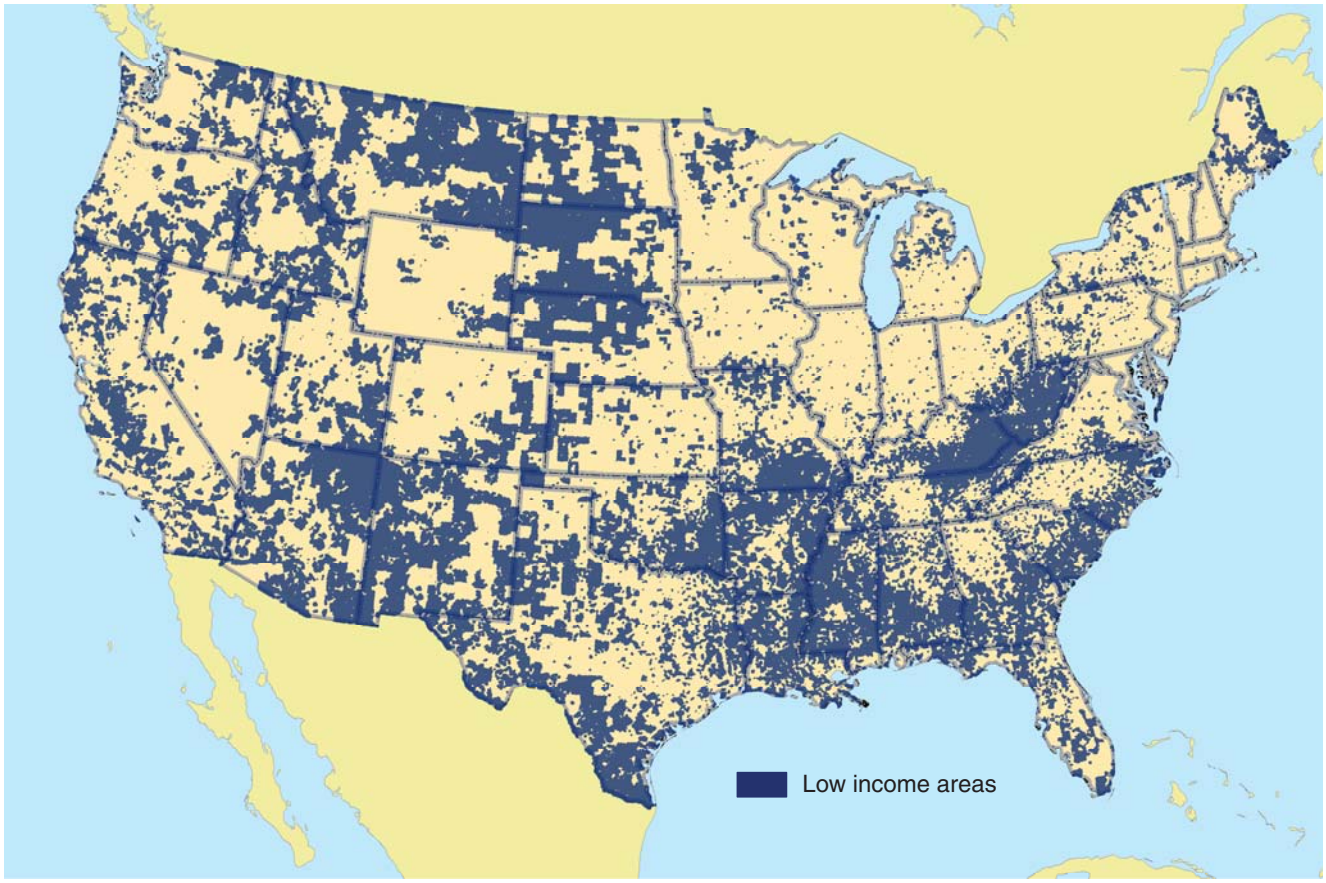
	Low-income areas[1]					
	All people in low-income areas			All low-income people in low-income areas		
Access level[2] (walking)	Total number (millions)	Percent of people in low-income areas	Percent of total U.S. population (millions)	Total number	Percent of low-income people	Percent of total U.S. population
High	22.9	32.1	8.2	12.1	33.5	4.3
Medium	24.9	34.9	8.9	12.5	34.7	4.5
Low	23.5	33.0	8.4	11.5	31.8	4.1
Subtotal in low-income areas	71.3	100.0	25.5	36.0	100.0	12.9
Total U.S. population	279.6			79.3		

[1]Low-income and non-low-income areas defined according to ERS criteria. See text for details.
[2]High access defined as less than or equal to 1/2 mile of a supermarket. Medium access defined as more than 1/2 mile but less than or equal to one mile from a supermarket. Low access defined as more than one mile from a supermarket.

Source: USDA, ERS analysis based on data from Census of Population, 2000 and the ERS-compiled supermarket directory for the contiguous U.S. in 2006.

Map 2.1

Low income areas of the contiguous 48 United States (1 km grids in which 40 percent of population have incomes below 200 percent of the Federal poverty level)



The first point to note in table 2.4 is that only 33 percent of people in low-income areas live in areas with low access. In contrast, 32 percent of people in low-income areas live in high-access areas and 35 percent live in medium-access areas. Thus, one estimate of the number of people who live in low-income areas with low access to supermarkets is 23.5 million, which is 8.4 percent of the total U.S. population (out of a total of 279.6 million people in 2000). If those with medium-access levels who live in low-income areas are included, then 48.4 million, or 17 percent of the total U.S. population, is more than half a mile from a supermarket.

Not all people in low-income areas, however, have low income. In fact, only about half have income less than 200 percent of the Federal poverty thresholds (36 million out of a total of 71 million). It is likely that those who are not low income but live in low-income areas have adequate resources to access supermarkets even if they are more than a mile away. If the analysis excludes those who live in low-income areas, but who are not themselves, low income, then only 11.5 million, or 4.1 percent of the total U.S. population, has low access to supermarkets. Including those low-income people in low-income areas with medium access yields a total of 24 million people, or 8.6 percent of the total population.

Supermarket access in urban areas

Thus far, the study has considered urban, rural, and all areas in between similarly. But distance does not mean the same thing in rural areas as in urban areas. The focus next turns to analysis of access by urbanicity. Each grid area is assigned to one of three Census Urbanized Areas: Urban Areas, Urban Clusters, and Rural Areas. Together, these three urban types characterize the range of urbanicity found in the U.S. population. A separate analysis of access is conducted for each urban type at the national level. Populations within an urban type are assumed to have similar levels of density, measured as population per unit of area, such as per square mile or square kilometer. Areas having similar population densities are more likely to have similar levels of the built environment—the infrastructure (e.g., networks of roads, transportation services, utilities, communication networks, and government services) and businesses, manufacturing plants, and retail stores. Analysis by urban type results in measurement of access within similar built environments, resulting in greater comparability across similar populations regardless of location.

Table 2.5 shows measures of access to supermarkets in urban areas only. Median distances to supermarkets are calculated for each of the four vulnerable populations as are the percentage of the populations with high, medium and low access to supermarkets. To better understand how access to supermarkets differs for vulnerable and disadvantaged groups, the study compares access measures by each of the four economic and demographic characteristics: income, race/ethnicity, vehicle access, and elderly status. For each of the vulnerable populations, access for those who live in areas with high concentrations of low-income individuals is compared with that of those who live outside of areas with high concentrations of low-income individuals.

Table 2.5

Urban area access to supermarkets--overall and for income and demographic subpopulations (walking distance)

					Distance to nearest supermarket						
						High access (0.5 miles or less)		Medium access (Between 0.5-1 mile)		Low access (More than 1 mile)	
Population	Income level of area	Number (millions)	Total percent	Sub-population percent	Median (miles)	Number (millions)	Percent	Number (millions)	Percent	Number (millions)	Percent
Total population of urban areas	Low income	45.3	100.0	24.4	0.57	19.2	42.5	19.0	42.1	7.0	15.4
	Higher income	140.6	100.0	75.6	0.71	42.1	30.0	57.9	41.2	40.6	28.9
	Total	185.9	100.0	100.0		61.4	33.0	76.9	41.4	47.6	25.6
Subpopulations											
Population with low income	Low income	23.5	51.9	46.4	0.56	10.2	43.3	9.8	41.5	3.6	15.1
	Higher income	27.1	19.3	53.6	0.65	9.0	33.1	11.5	42.3	6.7	24.6
	Total	50.6	27.2	100.0		19.1	37.8	21.2	41.9	10.2	20.2
Households without access to a vehicle	Low income	3.4	22.0	40.5	0.50	1.7	50.2	1.3	38.4	0.4	11.3
	Higher income	5.1	9.3	59.5	0.42	2.8	56.1	1.6	30.8	0.7	13.1
	Total	8.5	12.2	100.0		4.6	53.7	2.9	33.9	1.1	12.4
Non-White population	Low income	30.8	68.1	44.2	0.55	13.7	44.5	12.6	41.0	4.5	14.5
	Higher income	38.9	27.7	55.8	0.60	15.3	39.4	15.6	40.1	8.0	20.5
	Total	69.8	37.5	100.0		29.1	41.6	28.2	40.5	12.5	17.9
Elderly population	Low income	4.5	10.0	20.3	0.58	1.8	40.8	2.0	43.7	0.7	15.6
	Higher income	17.7	12.6	79.7	0.69	5.4	30.5	7.5	42.5	4.8	27.0
	Total	22.2	11.9	100.0		7.2	32.6	9.5	42.7	5.5	24.6

Source: Source: USDA, ERS analysis based on data from Census of Population, 2000 and the ERS-compiled supermarket directory for the contiguous U.S. in 2006.

Table 2.5 first presents data on supermarket access for urban areas. A greater share of low-income individuals lives outside of low-income areas (53.6 percent) than in low-income areas (46.4 percent). Further, low-income individuals who live in higher income areas live farther from supermarkets than those who live in low-income urban areas. About 15 percent of those in low-income urban areas are more than a mile from a supermarket, compared with 29 percent for those in higher income areas. Median distances to supermarkets reflect this as well.

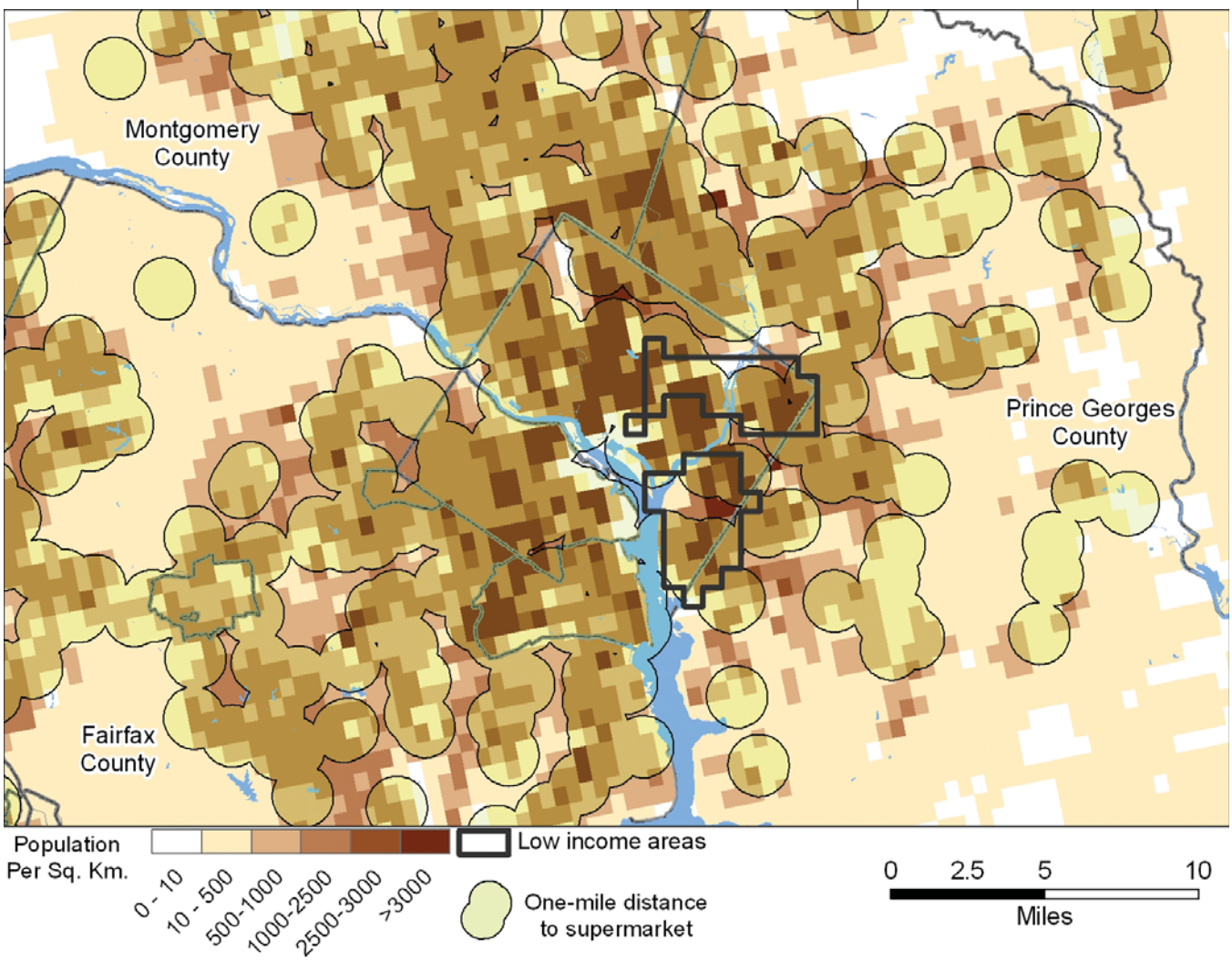
The next rows focus specifically on access for low-income individuals, which make up 27.2 percent of all urban dwellers. Results show that 43.3 percent of low-income individuals who live in low-income areas are within one-half mile of a supermarket and another 41.5 percent of are between half a mile to one mile from the nearest supermarket. The remaining 15.1 percent of the

low-income individuals who live in low-income areas resided more than a mile from the nearest supermarket.

Similar statistics were calculated for low-income urban individuals who live outside of low-income areas. Applying the access categories, 33.1 percent had high levels of access, 42.3 percent had medium access, and 24.6 percent had low access. This is greater than the 15.1 percent of low-income individuals living in low-income areas that had low access.

Maps 2.2 and 2.3 illustrate these measures of access for two urban areas, the Washington, DC, and St. Louis, Missouri, metro areas. For Washington, DC, there were two low-income areas, outlined in black, that are largely contained within the city's boundaries. The St. Louis area has a large low-income area that spans a good portion of the City of St. Louis in Missouri and across the Mississippi River into Illinois. In both maps, circles shaded light green indicate areas that are within a 1-mile radius of a supermarket. The color shadings of the areas indicate population density where the darker shading indicates grids with more people and the lighter shading indicates grids with fewer people. This study focuses particular attention on areas that are

Map 2.2
Washington, DC Urban Area

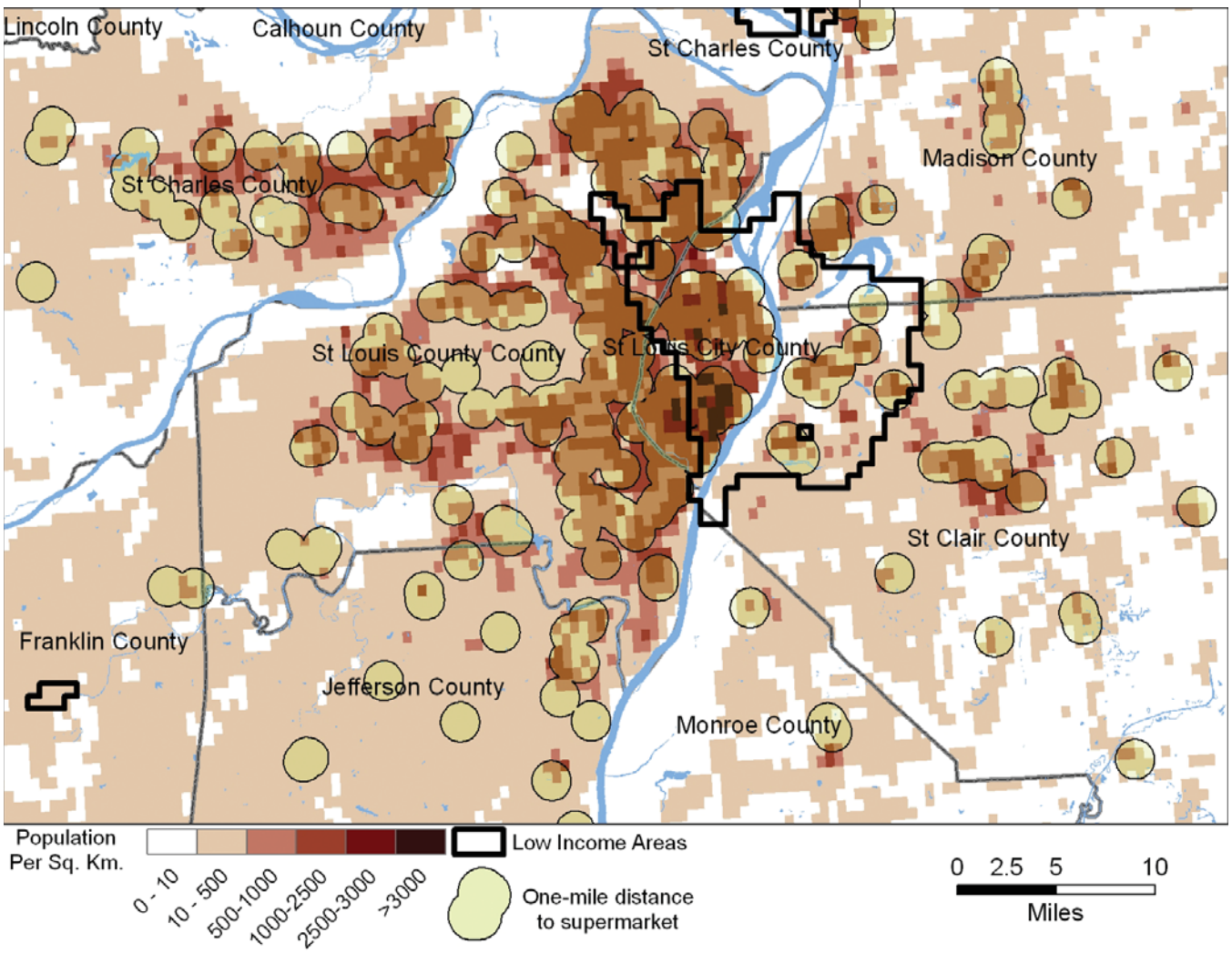


outside of the one-mile radius of a supermarket and in the neighborhoods with low income.

Map 2.2 shows that there are some low-income areas within DC and on the border with Prince Georges County, Maryland, which are outside of 1 mile from a supermarket. But for most of these areas, the population density is low to moderate. The situation looks more severe in the St. Louis area. While the most densely populated grids are within one mile of a supermarket, there are several low-income grids with moderate to high densities that are more than a mile from a supermarket, especially in the central and northern part of St. Louis, Missouri. The low-income area just east of the Mississippi River in Illinois has few supermarkets, but there are few grids outside of one mile that have moderate to high population densities. The Illinois side of the river has many grids with low population densities that are more than a mile from a supermarket.

Table 2.5 also shows supermarket access for households without access to vehicles, overall, and then separately by whether or not the households live in low-income or higher income areas. About 12.2 percent of urban households

Map 2.3
St. Louis, Missouri Urban Area



do not have access to a vehicle; however, this number is almost twice as large—22 percent—for households in low-income areas. Those who live in higher income areas are much more likely to have access to a vehicle—only 9.3 percent do not have access to a vehicle. Just over 50 percent of low-income-area households without access to a vehicle had a high level of access. Another 38.4 percent of this population had medium access. The remaining 11.3 percent of households living in low-income areas without access to vehicles were more than 1 mile from the nearest supermarket and had low access to supermarkets. Among households that lived outside of low-income areas and did not have access to a vehicle, a greater percentage had high access than similar households that lived in low-income areas, but fewer had medium access and more had low access.

About 15 percent of non-White individuals living in low-income areas have low access to supermarkets. An additional 41 percent have medium access. This compares with 21 percent of non-White individuals living outside of low-income areas with low access and 40 percent with medium access.

A greater share of the elderly population in low-income areas had high access (40.8 percent) than those living outside low-income areas (30.5 percent). While both groups have about the same percentage of the population of elderly with medium access, the greatest difference occurred among the low-access group. Almost 16 percent of the elderly who lived in low-income areas were outside of 1 mile from the nearest supermarket, but 27 percent of those living outside low-income areas were more than a mile from a supermarket.

Supermarket access in urban clusters

The population in urban clusters (areas with at least 2,500 people but fewer than 50,000 people) makes up 9.1 percent of the total U.S. population. Table 2.6 presents accessibility measures for vulnerable populations in low-income and higher income areas within urban clusters.

Individuals with income below 200 percent of Federal poverty thresholds represent 34.6 percent of the total urban cluster population. Of these individuals, 54.4 percent lived in low-income areas while 45.6 percent lived outside of low-income areas. Almost 29 percent of low-income individuals who live in low-income areas are within half a mile of a supermarket. Another 42.0 percent were between half a mile and 1 mile. The remaining 29.3 percent of low-income individuals in low-income areas were outside of a mile from the nearest supermarket. Thus, about 30 percent of low-income individuals in low-income urban clusters have low access to supermarkets.

The percentage of low-income individuals with low access to supermarkets is greater for those who live outside of low-income areas within urban clusters. Thirty-five percent lived more than a mile from a supermarket and an additional 39.5 percent were between a half mile and a mile. Only 26 percent were within a half mile of a supermarket.

Less than 10 percent of households in urban clusters lacked access to a vehicle. Among households without access to vehicles, those who lived in

Table 2.6

Urban cluster access to supermarkets--overall and for income and demographic subpopulations (walking distance)

					Distance to nearest supermarket						
						High access (0.5 miles or less)		Medium access (Between 0.5-1 mile)		Low access (More than 1 mile)	
Population	Income level of area	Number (millions)	Total percent	Sub-population percent	Median (miles)	Number (millions)	Percent	Number (millions)	Percent	Number (millions)	Percent
Total population of urban clusters	Low income	9.9	100.0	38.8	0.72	2.8	28.7	4.1	41.8	2.9	29.6
	Higher income	15.6	100.0	61.2	0.82	3.6	23.4	5.9	38.0	6.0	38.6
	Total	25.5	100.0	100.0		6.5	25.4	10.1	39.5	8.9	35.1
Subpopulations											
Population with low income	Low income	4.8	48.6	54.4	0.71	1.4	28.7	2.0	42.0	1.4	29.3
	Higher income	4.0	25.8	45.6	0.77	1.0	25.5	1.6	39.5	1.4	35.0
	Total	8.8	34.6	100.0		2.4	27.3	3.6	40.9	2.8	31.9
Households without access to a vehicle	Low income	0.5	13.5	52.3	0.66	0.2	32.4	0.2	43.1	0.1	24.5
	Higher income	0.4	7.3	47.6	0.69	0.1	30.5	0.2	41.5	0.1	28.0
	Total	0.9	9.6	99.9		0.3	31.5	0.4	42.3	0.2	26.1
Non-White population	Low income	4.0	40.8	66.7	0.75	1.1	26.4	1.7	41.5	1.3	32.1
	Higher income	2.0	12.9	33.3	0.85	0.4	22.3	0.7	36.3	0.8	41.5
	Total	6.0	23.7	100.0		1.5	25.0	2.4	39.7	2.1	35.3
Elderly population	Low income	1.4	13.8	35.2	0.68	1.5	30.7	0.6	42.9	0.4	26.4
	Higher income	2.5	16.1	64.8	0.78	1.5	25.0	1.0	39.5	0.9	35.6
	Total	3.9	15.2	100.0		3.0	27.0	1.6	40.7	1.3	32.3

Source: USDA, ERS analysis based on data from Census of Population, 2000 and the ERS-compiled supermarket directory for the contiguous U.S. in 2006.

low-income areas had slightly better access to supermarkets than those who lived outside of low-income areas, but the distributions are very similar.

Supermarket access in rural areas

Because the population in rural areas is dispersed, this analysis measures access to the nearest supermarket according to driving distances. Rural areas represent 36.9 percent of the total land area of the U.S., but only 24.4 percent of the U.S. population. Just over 29 percent of the rural population is low-income, which is lower than the percent in urban clusters but greater than the percent in urban areas (table 2.7).

Almost 39 percent of low-income individuals in rural areas lived in low-income areas, while the remaining 61 percent lived in higher income rural areas. Among low-income individuals, those living in higher income

Table 2.7

Rural areas access to supermarkets--overall and for income and demographic subpopulations (driving distance)

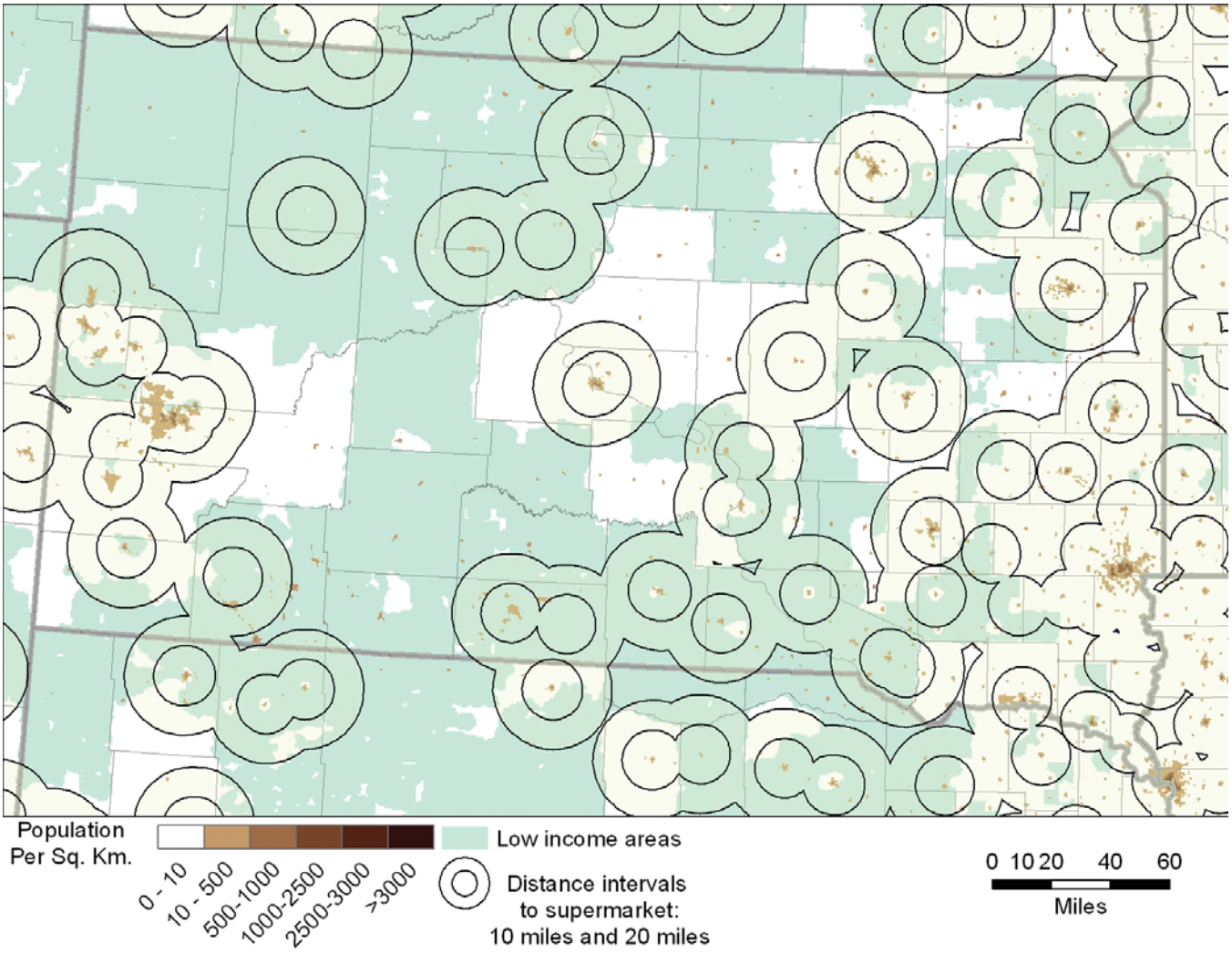
					Distance to nearest supermarket						
						High access (10 miles or less)		Medium access (Between 10-20 miles)		Low access (More than 20 miles)	
Population	Income level of area	Number (millions)	Total percent	Sub-population percent	Median (miles)	Number (millions)	Percent	Number (millions)	Percent	Number (millions)	Percent
Total population of rural areas	Low income	16.1	100.0	23.6	4.11	13.8	85.7	1.9	11.7	0.4	2.6
	Higher income	52.1	100.0	76.4	3.42	49.1	94.1	2.8	5.3	0.3	0.6
	Total	68.2	100.0	100.0		62.8	92.1	4.6	6.8	0.7	1.0
Subpopulations											
Population with low income	Low income	7.7	48.1	38.9	4.21	6.6	85.0	0.9	12.0	0.2	3.0
	Higher income	12.2	23.3	61.1	3.70	11.3	92.6	0.8	6.6	0.1	0.8
	Total	19.9	29.2	100.0		17.8	89.7	1.7	8.7	0.3	1.6
Households without access to a vehicle	Low income	0.6	9.4	40.2	3.37	0.5	87.3	0.1	10.4	0.0	2.3
	Higher income	0.8	4.2	59.8	3.08	0.8	93.7	0.0	5.7	0.0	0.7
	Total	1.4	5.4	100.0		1.2	91.1	0.1	7.6	0.0	1.3
Non-White population	Low income	4.8	29.9	48.4	3.65	4.1	84.5	0.6	12.0	0.2	3.5
	Higher income	5.1	9.8	51.6	2.98	4.8	94.6	0.2	4.8	0.0	0.6
	Total	9.9	14.6	100.0		8.9	89.8	0.8	8.3	0.2	2.0
Elderly population	Low income	2.1	13.3	24.4	4.04	1.8	84.4	0.3	12.7	0.1	2.9
	Higher income	6.6	12.7	75.6	3.32	6.1	92.6	0.4	6.6	0.1	0.8
	Total	8.7	12.8	100.0		7.9	90.6	0.7	8.1	0.1	1.3

Source: USDA, ERS analysis based on data from Census of Population, 2000 and the ERS-compiled supermarket directory for the contiguous U.S. in 2006.

areas (93 percent) had better access than those who lived in low-income areas (85 percent). This is in contrast to low-income populations in urban areas and urban clusters where low-income individuals who lived in low-income areas were closer to supermarkets than low-income individuals who lived in higher income areas. For rural populations, supermarket access typically involves driving to an urban area or urban cluster, where higher population densities are more likely to contain larger stores. Map 2.4 shows supermarket access of South Dakota, a largely rural state. This map uses light blue shading to indicate the location of low-income areas. Circles with the 10 and 20 mile radii around a supermarket indicate which areas are within each of these distances of a supermarket. Finally, the brown shading scheme (white to dark brown) indicates population density (low to high).

The map shows that there are several small towns in low-income portions of the State that are outside of a driving range from a supermarket (more

Map 2.4
Supermarket access in South Dakota



than 20 miles). Individuals in these areas, and in the surrounding sparsely populated areas, are likely to have considerable time and out-of-pocket costs to accessing food sources.

There are also several Indian reservations in South Dakota, as well as in other rural areas, primarily in the Midwest and West. These areas may be served by the Food Distribution Program on Indian Reservations (FDPIR), a commodity food assistance program for eligible Native Americans offered as an alternative to the SNAP.[21] The locations of these distribution centers are not yet incorporated in the analysis but will be in the future.

Obviously, those outside of walking distance to a store who do not have a vehicle in rural areas will face much higher transportation costs, both in terms of hiring transportation (taxi, shuttle, or public transportation if they exist at all) and in time costs in walking to the store or waiting for a friend or family member to take them to a store. These households make up only a small share (5.4 percent) of the rural population in total and 9.4 percent of low-income people, yet most of them live between 1 mile and 10 miles from a supermarket. Although this is a small portion of the overall population, the

[21]The FDPIR operates in 23 States and served 90,100 persons in FY2008, primarily individuals living on or near Indian reservations

population certainly has very limited access to supermarkets based on driving distances.

The non-White population represents 14.6 percent of the total rural population, or 9.9 million persons. Of the non-White population, 51.6 percent live in low-income areas. Almost 90 percent of the non-White population lives within 10 miles of a supermarket. Non-White individuals that live in low-income areas are more likely to reside more than 20 miles from a supermarket than non-White individuals who did not live in low-income areas (3.5 percent, compared with less than 1 percent).

Over 84 percent of elderly individuals in low-income rural areas were within 10 miles of a supermarket, while another 12.7 percent were between 10 and 20 miles. Only 2.9 percent were more than 20 miles from the nearest supermarket.

Time Costs of Access to Food

In addition to the effects of price, income, and the availability of different foods, consumers' food shopping and consumption behavior may also be affected by the time costs of food shopping and food preparation. Higher time costs of travel to grocery stores are likely associated with lower demand for those stores or for some foods. Likewise, greater time costs of preparing some foods may be associated with lower demand for those foods. ERS analysis of time diary data from the ATUS provides information about variations in time costs across areas with different levels of access to supermarkets and across different population groups.

The ATUS collects information on how Americans spend their time. Sponsored by the Bureau of Labor Statistics (BLS, http://stats.bls.gov/tus/home.htm) and conducted by the U.S. Census Bureau, the ATUS is a continuous, monthly survey that started in January 2003. The ATUS sample is nationally representative of civilian Americans age 15 and older, and the data include about 13,000 completed interviews annually. Estimates from the survey show the range of detailed activities performed daily, how much time is spent in each activity as well as where and with whom, and how time is allocated by demographic group, labor force status, and weekdays versus weekends.

Table 2.8 shows the average time spent in travel to grocery shopping on an average day by level of access to the nearest supermarket (as defined above). The table shows the average minutes spent traveling to grocery stores for shoppers who live in low-income areas with low, medium, and high access to supermarkets.[22] These averages are compared with the national average. Overall, the national average time spent traveling, one-way, to the grocery store was almost 15 minutes, and about 14 percent of the population traveled to the grocery store on an average day.

Time spent traveling to the grocery store was greater in low-income areas with low-access. The average time spent traveling to the grocery store for those who lived in these areas, 19.5 minutes, was significantly greater than the average time spent traveling to the grocery store for those in low-income areas with high access (15.5 minutes) and for those in low-income areas

[22]Survey respondents did not report which type of "grocery" store they visited, only that they reported the activity of grocery shopping.

Table 2.8

Average time spent in travel to grocery shopping on an average day by access to grocery stores

Average time is one-way, not total travel time (based on the shortest one-way time). Pooled 2003-2007 American Time Use Survey data

	Average minutes per day of travel related to grocery shopping, for those who grocery shopped	Average % engaged in travel related to grocery shopping (on an average day)	Average minutes, 90% CI min	Average minutes, 90% CI max	Average percent, 90 CI min	Average percent, 90% CI max
	Minutes	*Percent*				
Total population, age 15+, 2003-07	15.0	14.0	14.7	15.3	13.7	14.3
Low-income areas						
Low access	19.5	12.1	18.1	20.9	11.1	13.1
Medium access	14.1	13.5	13.0	15.1	12.5	14.5
High access	15.5	12.3	14.3	16.7	11.3	13.4
Not-low-income areas						
Low access	15.9	14.4	15.2	16.5	13.7	15.1
Medium access	12.5	14.7	12.1	12.9	14.1	15.3
High access	13.3	16.3	12.6	14.1	15.4	17.3
Metropolitan areas, 2005-07	14.2	13.9	13.8	14.6	13.4	14.3
Low-income areas						
Low access	20.4	12.9	17.5	23.3	10.7	15.0
Medium access	14.4	11.7	13.1	15.6	10.2	13.1
High access	15.5	11.5	13.7	17.3	10.0	13.1
Not-low-income areas						
Low access	15.5	14.3	14.8	16.3	13.4	15.2
Medium access	12.1	14.0	11.5	12.6	13.2	14.7
High access	12.9	15.9	11.9	13.7	14.6	17.2
Nonmetropolitan areas, 2005-07	16.9	12.2	15.8	18.0	11.5	13.0
Low-income areas						
Low access	18.8	11.0	16.9	20.6	9.6	12.4
Medium access	11.2	13.6	8.4	14.0	10.7	16.6
High access	--	11.8	--	--	6.3	17.4
Not-low-income areas						
Low access	--	16.0	--	--	8.3	23.6
Medium access	--	--	--	--	--	--
High access	--	--	--	--	--	--
Note: 2003 Met/nonmet classification used for 2005-07 data.						
Income, 2003-07						
Household Income <= 200% poverty threshold	15.8	13.6	15.3	16.4	13.0	14.2
Low-income areas						
Low access	19.3	13.7	17.3	21.3	12.2	15.1
Medium access	14.2	13.4	13.1	15.3	12.0	14.7
High access	16.4	12.5	14.5	18.2	11.0	14.0
Not-low-income areas						
Low access	16.3	14.7	15.0	17.6	13.2	16.3
Medium access	13.6	13.3	12.6	14.7	12.0	14.6
High access	2.3	16.7	11.1	13.6	14.6	18.8
Household Income > 200% poverty threshold	14.2	14.2	13.9	14.6	13.8	14.7
Low-income areas						
Low access	20.5	11.3	18.3	22.6	9.8	12.8
Medium access	12.1	14.1	10.9	13.4	12.3	15.8
High access	13.5	12.6	11.9	15.2	10.9	14.4
Not-low-income areas						
Low access	15.6	14.3	14.8	16.4	13.4	15.2
Medium access	11.8	15.0	11.4	12.3	14.2	15.9
High access	13.4	16.3	12.3	14.4	15.1	17.6

Table 2.8
Average time spent in travel to grocery shopping on an average day by access to grocery stores (continued)

Average time is one-way, not total travel time (based on the shortest one-way time). Pooled 2003-2007 American Time Use Survey data

	Average minutes per day of travel related to grocery shopping, for those who grocery shopped	Average % engaged in travel related to grocery shopping (on an average day)	Average minutes, 90% CI min	Average minutes, 90% CI max	Average percent, 90 CI min	Average percent, 90% CI max
	Minutes	*Percent*				
Household Income missing	16.3	13.9	15.4	17.2	13.1	14.7
Low-income areas						
Low access	17.7	9.7	14.4	21.1	7.5	12.0
Medium access	19.4	12.3	14.5	24.5	9.6	14.9
High access	17.0	11.2	12.8	21.1	8.8	13.5
Not-low-income areas						
Low access	16.5	14.4	14.9	18.0	12.5	16.3
Medium access	14.4	15.0	12.9	15.8	13.1	16.9
High access	14.4	15.9	12.4	16.4	13.5	18.3

-- indicates that estimate is suppressed due to small cell size.
Source: 2003-2007 American Time Use Survey data, Current Population Survey sampling frame from Census Bureau.
Store access levels are tract-level classifications based on categories of access used in Chapter 2.
Data with missing tract-level classification were included in Total population, age 15+ estimates.

with medium access (14.1 minutes). These differences are large and statistically significant. In addition, those in low-access areas shopped less frequently—on average once every 8 days versus a national average of once every 7 days.

The difference in average time spent traveling to the grocery store by access level may not be surprising given that this study's definition of access is based on distance, and that, all else equal, it is expected that those who live more than 1 mile from a supermarket would spend more time traveling to the grocery store than those who live less than half a mile or less than a mile from the supermarket. To put these averages into context, table 2.8 also reports average time spent traveling to grocery stores by households in higher income areas separately by their access levels. As expected, those with low access spend the most time traveling to the grocery store (15.8 minutes) compared with those who are closer. But the average of those in higher income areas that are more than a mile from a store is still almost 4 minutes shorter than the 19.5 minute average of those in low-income areas who are more than a mile from a grocery store.

Table 2.8 also considers average time spent traveling to get groceries for sample members living in metropolitan (metro) areas compared with those living in nonmetropolitan (nonmetro) areas.[23] Not surprisingly, those who live in nonmetro areas spent more time, on average (16.9 minutes), traveling to the grocery store than those living in metro areas (14.2 minutes), and a smaller percent of nonmetro residents shopped on an average day than metro residents. Surprisingly, those in nonmetro areas with low access spend about the same amount of time traveling to supermarkets as those in metro areas with low access.

The final set of averages shown in table 2.8 compares average time spent traveling to grocery stores for those with household income below 200 percent of Federal poverty guidelines and for those with income above 200 percent of poverty. Also included are national estimates for the 13 percent of the sample with missing income information. Those with low income who

[23]There are not enough households in urban clusters or rural areas in the sample to examine average minutes spent traveling to supermarkets across the same urbanicity categories used above, so here we focus on metro and nonmetro statistical areas.

live in low-income areas with low access spend about the same amount of time traveling to grocery stores (19.3 minutes) as those who do not have low income but who live in low-income areas with low access to grocery stores (20.5 minutes). In contrast, those with low income who live in low-income areas with medium or high access take more time to get to the grocery store (14.2 minutes and 16.4 minutes, respectively) than those who do not have low income but who live in low-income areas with medium (12.1 minutes) or high access (13.5 minutes). It is possible that these higher income individuals in low-income areas have access to their own vehicles for grocery shopping and choose to shop outside their neighborhoods.

These data show some expected patterns, but it is difficult to interpret without further information. For example, it is not known whether shoppers in the time use sample go to the nearest grocery store to do their shopping or if they are selectively shopping further from their neighborhood because of price or availability factors. If the latter is true, these time use estimates do not reflect true differences in access, just differences in choice. Of course, it is not clear whether these differences in choices are correlated with the area-level measures of access or not—for example, if those in low-access areas pass several stores that may not have the foods they want to get to stores with better selection or price.

Table 2.9 shows the mode of transportation used in getting to grocery stores.[24] These results show that the majority of people who shopped for groceries drove to the store as either the driver of a vehicle or as a passenger with another household member. Those with the lowest levels of access were the most likely to drive to the grocery store (93.3 percent, compared with 87.1 percent for medium-access shoppers and 65.3 percent for high-access shoppers). Those who lived closest to grocery stores were more likely to walk or bicycle to the store than those in low or medium access areas (23.1 percent, compared with 2.3 and 5.4 percent for those with low and medium access). Very few shoppers used public transportation to get to a grocery store. Only 4 percent of shoppers in low-access areas got rides to the grocery store with nonhousehold members or in taxis, while 10 percent of shoppers in high-access areas got rides to grocery stores with nonhousehold members or in taxis.

[24]Mode of transportation estimates are for all grocery shoppers, not just low-income grocery shoppers.

Grocery shoppers from low-access areas were more likely to have been accompanied by children on their trips to the grocery store than others—29.1 percent versus a national average of 22.8 percent. Having children along on the trip is likely to make the trip more cumbersome, making travel and grocery shopping more difficult for these low-access shoppers.

The last rows in table 2.9 show whether grocery shoppers shop from home or from work, or their trip chaining patterns.[25] For the majority of shoppers, the time distance from the grocery store to home is shorter than the time distance from the grocery store to work (about 92 percent). But for about 8 percent, the time distance from work to the grocery store was shorter than the time distance from home to the grocery store (5.9 percent directly from work to the grocery store and 2.1 percent clustered with other stops from work to the grocery store). Interestingly, those in low-income areas with low access were the most likely to access grocery stores directly, bunched with other activities, or from work (7.7 percent directly from work and 3.6 percent

[25]Appendix C contains information on how trip chaining was classified.

Table 2.9

Characteristics of grocery shopping by level of access to supermarkets

Characteristics are of one-way shortest travel time to grocery store.
Pooled 2003-2007 American Time Use Survey data

		Low-income areas			Not-low-income areas		
	Total	Low access	Medium access	High access	Low access	Medium access	High access
			Percent				
Mode of transportation							
1. Car, truck, motorcycle (driver or passenger w/hh member)	90.2	93.3	87.1	65.3	96.7	92.3	83.9
2. Walking or bicycle	4.8	2.3	5.4	23.1	0.3	3.1	10.0
3. Public transportation (bus, subway/train)	0.3	0.1	0.9	1.9	0.0	0.3	0.3
4. Other (passenger w/nonhh member, boat/ferry, taxi/limo, unspecified)	4.8	4.3	6.6	9.7	2.9	4.4	5.8
Total	100.0	100.0	100.00	100.0	100.0	100.0	100.00
With whom							
Alone	48.8	40.0	39.0	40.8	49.9	52.7	53.6
With household members	42.1	49.3	49.9	46.1	41.1	39.5	37.9
With others, not household members	9.1	10.8	11.1	13.1	9.1	7.8	8.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0
With children (persons under 18 years old)	22.8	29.1	28.2	32.8	20.3	22.6	19.4
Note that "with whom" is for travel to grocery store, and not grocery shopping. The person or persons with the respondent may only be present for part of the travel.							
Trip chaining							
Home to store, direct / Store to home direct	63.6	54.8	64.1	61.0	64.5	68.4	66.6
Home to store, clustered activities/ Store to home, clustered activities	28.4	33.9	31.1	34.9	26.5	25.8	26.3
Work to store, direct / Store to work direct	5.9	7.7	3.5	3.3	6.6	3.9	5.9
Work to store, clustered activities/ Store to work, clustered activities	2.1	3.6	1.4	0.8	2.5	1.9	1.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: 2003-2007 American Time Use Survey data, Current Population Survey sampling frame from Census Bureau. Store access levels are tract-level classifications based on categories of access used in Chapter 2. Data with missing tract-level classification were included in Total population estimates.

bunched with other activities from work). Those from low-income areas that had medium or high levels of access were less likely to access grocery stores from work. These data indicate that some of those who live in low income areas with low access choose grocery stores closer to work than to home.

Data presented here are for the entire U.S. population. One study specifically focused on a sample of low-income people. The National Food Stamp Program Survey of 1996/1997 (NFSPS) surveyed a sample of participants of the SNAP and eligible nonparticipants. Sample members were asked about the modes of transportation and out-of-pocket costs used to travel to stores where they shopped for food and about how much time it took to travel to foodstores (Ohls et al., 1999). Close to 76 percent of participants and 85 percent of eligible nonparticipants reported use of a car to shop. Food stamp participants either drove (45 percent) or got a ride with family or friends (31 percent). Among the 22 percent of participants who reported some transportation expenses, the average cost per shopping trip was $6.54. Average round trip travel time to the most frequently used store was 23-24 minutes for participants and eligible nonparticipants. The survey compared these patterns across participants who lived in urban, mixed, and rural areas.

Average distance, time, and out-of-pocket cost to the most often used store were greater for those living in rural settings. Rural participants were less likely than their urban area counterparts to report out-of-pocket expenses associated with food shopping—perhaps because 94 percent either drove or got a ride with others.

Time costs to travel to grocery stores are only part of the time costs involved in healthy eating—preparing nutritious food can be more costly in terms of time than prepared meals or restaurant meals. Previous ERS research examined time spent in food preparation for women across income levels and family composition. This study found that being a mother who worked full-time or a single mother were more important in explaining differences in time spent in food preparation than were either earnings or income (Mancino and Newman, 2007). Specifically, food preparation time falls as mothers spend more time working outside the home. Single women with children spend less time preparing food than married women.

Summary

The number of people who have low access to healthy food depends upon which measure is used. Direct questions from a nationally representative sample of U.S. households in 2001 show that up to 5.7 percent of all U.S. households did not always have the food they wanted or needed because of access-related problems. Households that live far from a supermarket and that do not have vehicles likely have limited access to nutritious food. Of all households in the U.S., 2.3 million, or 2.2 percent, live more than a mile from a supermarket and do not have access to a vehicle. An addition 3.4 million households, or 3.2 percent of all households, live between one-half to 1 mile and do not have access to a vehicle.

Area-based measures of access show that 23.5 million people live in low-income areas that are more than 1 mile from a supermarket, which represents 8.4 percent of the total U.S. population. However, not all of these 23.5 million are themselves, low income. If only the low-income people in low-income areas are considered, then 11.5 million, or 4.1 percent of the total U.S. population, lives in low-income areas more than 1 mile from a supermarket. Both of these estimates are national totals that do not consider differences in distance, travel modes and travel patterns, and retail markets for urban versus rural areas.

Within urban areas, 10.1 million low-income individuals (20.2 percent) were more than 1 mile from the nearest supermarket. Of the total, 3.6 million lived in low-income areas. Within urban clusters, 1.4 million persons, or 29.3 percent of the low-income population, were more than 1 mile from the nearest supermarket. Of the 16.1 million persons living in rural low-income areas, 85.7 percent (13.7 million persons) were within 10 miles of a supermarket. Another 11.7 percent (1.9 million persons) were between 10 and 20 miles distant, and only 2.6 percent were more than 20 miles from a supermarket. These differences underscore the importance of owning a vehicle or having access to affordable transportation in rural areas.

Data on time use and travel mode show that those who live in low-income areas that are more than a mile from a supermarket spend more time (19.5

minutes) traveling to grocery stores than the national average (15 minutes). However, 93 percent of those who live in low-income areas more than a mile from a supermarket traveled to the grocery store in a vehicle they or another household member drove.

While considerable efforts were made to develop these data, measures, and methods, different assumptions and measures are likely to produce differing outcomes and conclusions when applied to the same data. More detailed information which is not currently available would likely result in more precise findings. It is hoped that the methods and findings in this chapter will stimulate new research to provide additional insights about the nature and extent of low-income populations faced with low access to sources of nutritious and affordable foods.

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