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# Measuring Access to Healthful, Affordable Food in American Indian and Alaska Native Tribal Areas

Phillip Kaufman, Chris Dicken, and Ryan Williams





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**Errata**

**On April 9, 2015,** the estimate for average distance from a grocery for all tribal areas in Table 2 on page 13 was corrected to fix a calculation error. References to the number in the text on pages 13-16 were updated to reference the revised number. The references to the estimate for population share and population percentiles for all ANVSA individuals in Table 3 on page 17 was also corrected.

# Measuring Access to Healthful, Affordable Food in American Indian and Alaska Native Tribal Areas

Phillip Kaufman, Chris Dicken, and Ryan Williams\*

## Abstract

American Indian and Alaska Native (AIAN) populations have about twice the rate of nutrition-related health conditions, including cardiovascular disease, diabetes, and obesity, as non-Hispanic White Americans. The authors found likely sources of healthful, affordable food to be limited in many tribal areas, a factor that may influence diet and food choices. Access to large grocery stores and supermarkets—which sell food needed for a healthy diet—varied by tribal area. AIAN tribal area populations are mostly rural, unlike the national population. Spatial analysis revealed that 25.6 percent of individuals living in tribal areas were within 1 mile of a supermarket—defined as walking distance—compared with 58.8 percent of all Americans. The largest share of AIAN tribal area populations are between 1 and 10 miles from a supermarket, defined as driving distance. Among the 6 percent of tribal area households without vehicles, more than two-thirds lived more than 1 mile from the nearest supermarket. Measures of access are also reported for supermarkets authorized for the Supplemental Nutrition Assistance Program and outlets used by the Food Distribution Program on Indian Reservations.

**Keywords:** healthful, affordable food; access measures; American Indian and Alaska Natives; AIAN; Oklahoma Tribal Statistical Area; OTSA; supermarkets; Supplemental Nutrition Assistance Program, SNAP; Food Distribution Program on Indian Reservations; FDPIR.

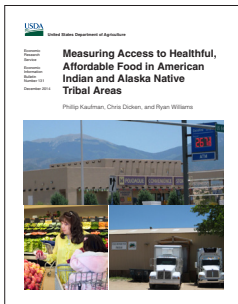
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\*Phillip Kaufman is a Senior Economist (retired) in the USDA-ERS Food Economics Division. Chris Dicken and Ryan Williams are Analysts in the USDA-ERS Research Support Division.

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# Measuring Access to Healthful, Affordable Food in American Indian and Alaska Native Tribal Areas

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## What Is the Issue?

American Indian and Alaska Native (AIAN) tribal populations experience about twice the rate of nutrition-related health problems—including cardiovascular disease, diabetes, and obesity—than most Americans. Prior studies cite limited access to supermarkets and other sources of affordable and nutritious foods as contributing to less healthful food choices by consumers. In many AIAN tribal areas, relatively low population density and limited incomes create disincentives for the entry of large grocery stores and supermarkets. Smaller grocery stores, convenience stores, and other retail outlets—though more prevalent in AIAN tribal areas and more accessible—are less likely to offer comparable foods. Healthy eating can be especially challenging for the poorest tribal area households. Although many are eligible for assistance through the Supplemental Nutrition Assistance Program (SNAP), limited access is also reported for supermarkets authorized for the program. Access measures are also reported for outlets used by the Food Distribution Program on Indian Reservations (FDPIR), an alternative program that provides healthful foods where SNAP-authorized food stores are limited. This study's findings contribute to a better understanding of differences in access to healthful, affordable food by researchers and policymakers charged with improving the nutrition and health status of tribal area populations.

## What Did the Study Find?

Both American Indian and Alaska Native tribal area populations are mostly rural; as a result, only 25.6 percent of all tribal area populations were 1 mile or less from a supermarket (defined as walking distance), compared with 58.8 percent of the U.S. population. Measured by population percentiles, the median distance to the nearest supermarket was 0.8 mile for all Americans, compared with 3.3 miles for all tribal area individuals. Although the 20th percentile of the population among tribal area and all U.S. individuals were both within walking distance, at the 80th percentile tribal area individuals were 13.2 miles from a supermarket, compared with 2.2 miles for all Americans. Almost one-half of all tribal area individuals had incomes at or below 200 percent of the Federal Poverty Level (FPL). Of those, 27.8 percent lived in walking distance from a supermarket, compared with 63.6 percent of low-income individuals nationwide.

ERS is a primary source of economic research and analysis from the U.S. Department of Agriculture, providing timely information on economic and policy issues related to agriculture, food, the environment, and rural America.

The shares and population percentiles corresponding to SNAP-authorized supermarkets and FDPIR outlets were separately measured to better account for access by low-income individuals, children, the elderly, and households without a vehicle—those more likely to rely on food assistance benefits. Among the three tribal area types studied—American Indian Tribal Areas, Oklahoma Tribal Statistical Areas, and Alaska Native Village Statistical Areas—the fewer numbers of supermarkets that are authorized for SNAP resulted in an often smaller share of low-income individuals within walking distance and a greater share more than 10 miles distant compared with the shares for all supermarkets.

Because FDPIR outlets provide an alternative to SNAP participation in areas where access to SNAP-authorized food stores is often limited, they are typically located within the tribal areas they serve. The share of low-income individuals within walking distance varied by tribal area type, ranging from 7.1 percent in Oklahoma Tribal Statistical Areas to 39.4 percent in Alaska Native Village Statistical Areas.

In tribal areas where both FDPIR and SNAP are available, the selection of the nearest of either outlet—a hypothetical outlet type—resulted in a greater share of low-income individuals within walking distance and a greater share between 1 and 10 miles driving distance relative to those same shares for SNAP-authorized supermarkets or FDPIR outlets alone. When the shares of walking distance and driving distance between 1 to 10 miles are combined, their shares ranged from 83.9 percent in American Indian Tribal Areas to 97.4 percent in Alaska Native Village Statistical Areas.

## **How Was the Study Conducted?**

This study uses spatial analysis of the locations of tribal area populations, large grocery stores, supermarkets and supercenters, SNAP-authorized supermarkets, and FDPIR outlets to measure differences in access to healthful, affordable foods. Population and population subgroup characteristics for American Indian and Alaska Native tribal areas were obtained from the 2010 Census of Population and the 2006-2010 American Community Survey (ACS) 5-year summary. The 2006-2010 ACS summary file was chosen to allow comparisons with national results reported in Ver Ploeg et al. (2012). The locations of large grocery stores, supermarkets, and supercenters (herein referred to as supermarkets) are from a 2010 ERS directory developed by the same authors. The locations of SNAP-authorized supermarkets and FDPIR outlets were obtained from USDA, Food and Nutrition Service, and are based on 2010 data.

Geographic Information System (GIS) methods were used to compute the number and percentage of populations and population subgroups in 545 American Indian and Alaska Native tribal areas by nearest distance to each of four outlet types. Each individual tribal area was divided into 1/2-kilometer square grids, and distances to the nearest outlet type were computed for each grid-cell population and population subgroup. These results were then aggregated to obtain access measures for American Indian Tribal Areas (AITAs), Oklahoma Tribal Statistical Areas, and Alaska Native Village Statistical Areas. Two methods were used to measure tribal access. The first reports the number and share of tribal area populations by walking (1 mile or less) and driving (more than 1 mile) distance. The second method reports distance to outlet type for the 20th, 50th (median), and 80th percentile of population. A Statistical Supplement, available along with the report on the ERS website, provides tables with access measures for each of the 545 individual tribal areas.

# Measuring Access to Healthful, Affordable Food in American Indian and Alaska Native Tribal Areas

## Introduction

Native Americans experience high rates of obesity, diabetes, and heart disease that may be due in part to poor diets. Prior studies cite limited access to supermarkets and other sources of affordable and nutritious foods as contributing to less healthful food choices by U.S. consumers. In American Indian and Alaska Native (AIAN) tribal areas, the relatively low population density and often limited household incomes create disincentives for the entry of large grocery stores and supermarkets. Smaller, locally accessible grocery stores, convenience stores, and other retail outlets are less likely to offer affordable, healthful food choices.<sup>1</sup>

In this report, we characterize differences in tribal population access to sources of healthful, affordable food, based on the nearest distance to a large grocery store or supermarket. The role of access and availability to support healthful food choices is an important topic for policymakers and Federal, State, and local agencies tasked with improving the Nation's health.

Literature on the prevalence of childhood and adult obesity among AIAN populations cite related nutritional and health problems. A report by the National Center for Health Statistics (NCHS) used the National Health Interview surveys to compile statistics on AIAN populations (NCHS, 2010). Compared with other U.S. racial and ethnic groups, AIAN populations reported higher rates of many adverse health conditions. Among the total AIAN population, only 29 percent of adults were of a healthy weight. Among women, 39.7 percent were obese. Of the total population, 14 percent were diagnosed with heart disease, another 34.5 percent were diagnosed with hypertension, and 17.5 percent had diabetes.

Changes in the prevalence of nutrition- and health-related deficiencies among the AIAN population have also been examined using the Behavioral Risk Factor Surveillance System (BRFSS). Jernigan et al. (2010) found that between 1996 and 2006, rates of diabetes among AIAN populations increased by 26.9 percent, obesity increased by 25.3 percent, and hypertension increased by 5 percent. Concurrently, the data found no change in rates of smoking, sedentary behavior, or the intake of fruits or vegetables.

Poverty, genetics, consuming nontraditional diets, and lack of physical activity have been cited as contributing to the prevalence of obesity among AIAN populations. In a review of studies, Broussard et al. (2012) conclude that for many Native American communities the high rates of obesity are a relatively recent phenomenon. They cite environmental factors that may encourage the consumption of high-fat and high-sugar foods, including limited access to a healthy food supply and a recent proliferation of fast-food restaurants and convenience-food markets on and near reservations.

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<sup>1</sup>For a detailed discussion of differences in affordability and food choices, see Ver Ploeg, et al., Chapter 5 (2009).

In reviewing the literature on the prevalence of obesity in tribal populations, Halpern (2007) concluded that Native American obesity rates had increased dramatically over the prior 30 years. Although Native Americans are not a homogeneous demographic group, they share adverse health effects from relatively high rates of obesity. Overall, studies demonstrate that obesity begins early for AIAN children and is also a significant problem for the adult population (IHS, 2001). Many chronic health problems such as type II diabetes, heart disease, stroke, arthritis, and shortness of breath are associated with the increasing prevalence of obesity in American Indians and Alaska Natives. Story et al. (1998) note that in recent years, obesity has replaced malnutrition as a major health issue, in part due to limited access to grocery stores that offer a healthy variety of foods.

A more recent study of both AIAN and White adults examined the association of food insecurity with sociodemographics, exercise, and obesity in low-income California communities (Jernigan et al., 2013). While the prevalence of food insecurity was the same between the two groups, logistic regression found that obesity was not associated with the level of food insecurity in either group, adjusting for socioeconomic and exercise differences. The authors cite the need for increased access to healthy food in poorer communities.

Finegold et al. (2005) reviewed existing data sources and prior research on six USDA food assistance programs available to American Indians living in tribal areas. They found that access to healthy food may be more difficult due to the limited number of grocery stores on reservations and the limited selection available in those stores. In a survey of the Gila River Reservation, it was reported that tribal members must travel 15-20 miles to reach a food source other than a small local grocery or convenience store. They cited the need for greater availability of traditional foods and the Food Distribution Program on Indian Reservations (FDPIR) outlets, as well as foods that meet the needs of restricted-diet participants.

A study of grocery stores on Federal reservations in Washington State evaluated the availability of healthful foods based on the availability and cost of 68 healthy foods from USDA's Thrifty Food Plan (O'Connell et al., 2011). Fifty stores were identified on 22 American Indian reservations, including 25 convenience stores, 16 grocery stores, and 9 supermarkets. Across all stores, about 38 percent of checklist items were available, with supermarkets having the most and convenience stores the fewest. Foods from the dairy and sugar/sweets groups were the most prevalent, while fresh fruits and vegetables were the least. Cost of the most commonly available items was lowest in supermarkets. Seventeen reservations did not have a supermarket, and their nearest off-reservation supermarket was about 10 miles from the tribe's headquarters, which was used as the standard starting point for distance calculations. O'Connell concluded that tribal area populations in Washington State often have limited access to foods that make up a nutritious diet at minimal cost.

In separate studies of ethnic minority communities, Gittelsohn and Sharma (2009) conclude that obesity and diet-related diseases are directly related to the types of food stores in the community and the availability of healthful food. Because food environments vary by area, intervention strategies must take into account characteristics such as proximity to food stores and supermarkets, availability of healthful foods, the variety of food sources, and store openness (the ease with which customers can select food items). Household factors include adequacy of the food supply, seasonal factors, and the extent of interhousehold food sharing. The authors cite the need for special attention to such ethnic communities because they typically comprise vulnerable populations.

A national study of access to healthful, affordable food by Ver Ploeg et al. (2012) measured access to large grocery stores and supermarkets as a proxy for healthful, affordable retail food sources.



The study reported on access by total population and population subgroups, including aggregate measures for American Indian tribal area populations. Of those tribal populations, 62 percent lived more than 1 mile from a supermarket.<sup>2</sup> The report found that in urban tribal areas—locations with a population of 2,500 or more—47 percent live more than 1 mile from the nearest supermarket, while 32 percent of rural tribal households—those in areas with a population of less than 2,500—live more than 10 miles from a supermarket, large grocery store, or supercenter.

The present report extends the tribal area access analysis in Ver Ploeg's 2012 study to include detailed information for American Indian tribal areas, as well as similar measures for Oklahoma Tribal Statistical Areas (OTSAs) and Alaska Native Village Statistical Areas (ANVSAs). In addition to measures of access to all supermarkets, we report distances to the nearest SNAP-authorized supermarket, FDPIR outlet, and— where both SNAP and FDPIR are available—to the nearest location of either.

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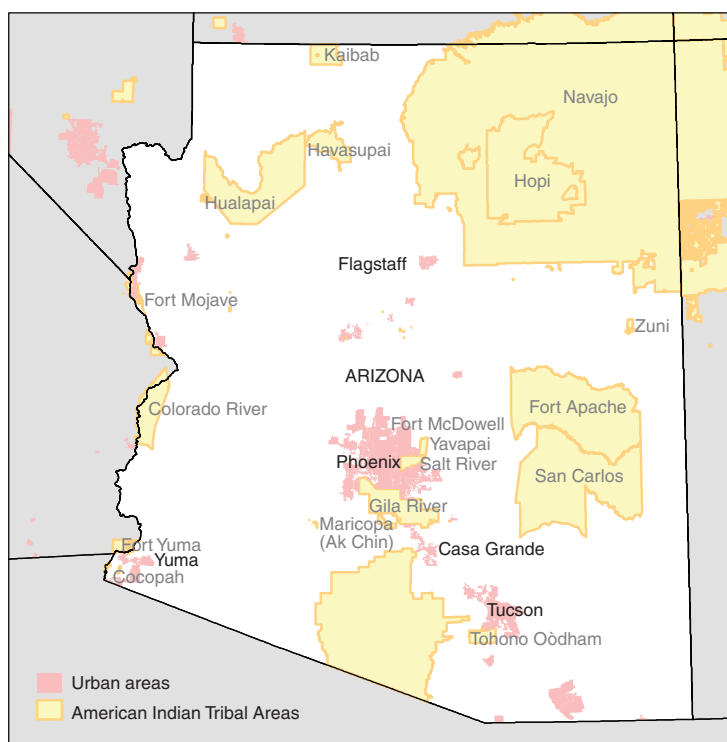
<sup>2</sup>Populations within Oklahoma Tribal Statistical Areas were excluded from Ver Ploeg's analysis.

## Background

American Indian and Alaska Native tribal areas are highly varied in rurality, size, composition, and location. Among American Indian populations, 70 percent live in rural areas with less than 2,500 people. Some tribal areas are near large population centers, such as the Gila River, Ft. McDowell, and Salt River tribal areas of Arizona that are all adjacent to the urbanized areas of Phoenix. Others are in remote locations, such as the Duck Valley tribal area in Nevada and Idaho. Tribal areas vary in size, ranging from some like the Taos Pueblo in New Mexico (15.6 square miles) to large reservations such as the Navajo Nation (27,425 square miles). Figure 1 illustrates how area size and proximity vary within Arizona.

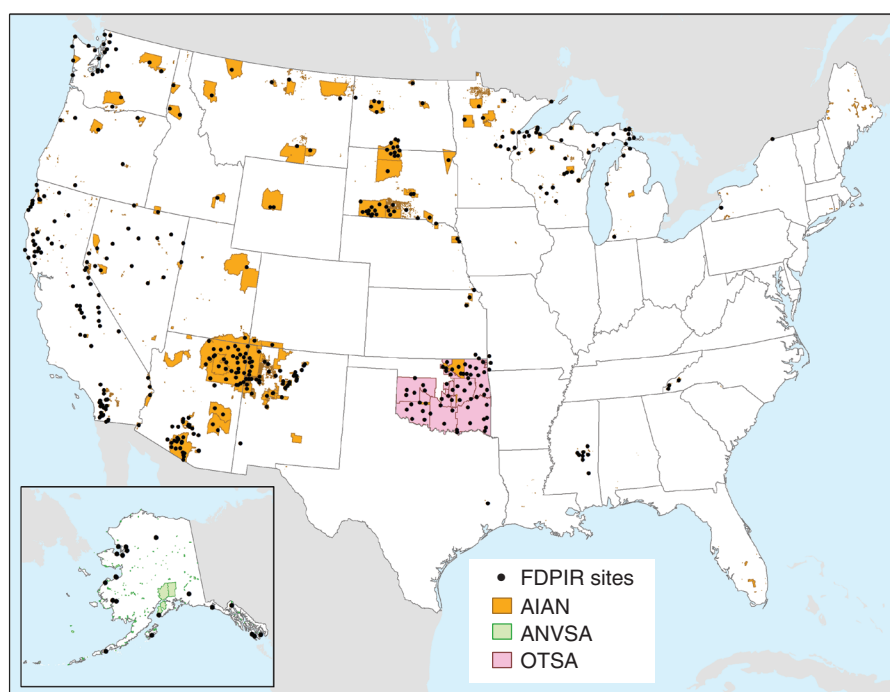
Tribal areas included in this study consist of either American Indian Tribal Areas (AITAs), Census-defined Oklahoma Tribal Statistical Areas (OTSA), or Alaska Native Village Statistical Areas (figure 2). The Census OTSAs are areas delineated by concentrations of American Indian tribes in Oklahoma.<sup>3</sup> Since the reallocation of tribal lands in the State, the populations have become less homogeneous. In addition, OTSAs have become more developed than many reservation lands and are often in proximity to urban areas. These factors may contribute to the greater availability of supermarkets and other healthful, affordable food sources in OTSAs than in other tribal areas.

Figure 1  
**American Indian reservations in Arizona**



<sup>3</sup>The General Allotment Act of 1887 (Dawes Act), the 1893 Commission to the Five Civilized Tribes (Dawes Commission), and the Curtis Act of 1889 divided Indian lands in Oklahoma and Indian territories for allotment to individual families.

Figure 2  
**U.S. tribal areas and FDPIR sites**



FDPIR = Food Distribution Program on Indian Reservations; AIAN = American Indian and Alaska Native; ANVSA = Alaska Native Village Statistical Areas; and OTSA = Oklahoma Tribal Statistical Areas.

In Alaska, small towns and the surrounding areas that have concentrations of Alaska Natives are defined by Census as Alaska Native Village Statistical Areas (ANVSAs). There are 208 villages, ranging in size from a few residents to several thousand. In 2010, the five largest village areas accounted for 63 percent of the total ANVSA population of 236,369.

The challenges of obtaining healthful, affordable food in tribal areas are many. Supermarkets are less likely to be located within these areas due to a variety of factors, including a lack of urban centers to sustain profitable sales volume; the relatively lower income of tribal area households; and tribal government policies and land tenure requirements that may limit nontribal ownership by retail firms. Access to healthful, affordable food is often difficult; among the larger tribal areas, populations are often widely dispersed, with few areas of population concentration. As a result, a large share of tribal area individuals and households must travel considerable distances to reach larger retail food outlets.

Because a relatively high proportion of tribal populations meet low-income criteria, in addition to all supermarkets in the tribal areas, we include nearest distance measures to SNAP-authorized supermarkets, FDPIR outlets, and the nearest of either a SNAP-authorized supermarket or FDPIR outlet. Eligible tribal area households may choose between the store-based SNAP and the tribal-based FDPIR. Tribal households that participate in SNAP may find authorized supermarkets less accessible than smaller SNAP grocery stores and convenience stores, giving them less variety in food choices. As an alternative to SNAP, FDPIR provides a variety of healthful foods at outlets almost

all located within tribal lands and operated by the tribal government.<sup>4</sup> Tribal areas served by FDPIR use warehouses, tribal stores, and local sites to distribute USDA foods.<sup>5,6</sup> The FDPIR food assistance program consists of a monthly food allotment designed to maintain a nutritionally balanced diet comparable in food quantity to SNAP benefits. Eligibility criteria are similar, although not identical, to SNAP requirements.<sup>7</sup> Participants may select from over 70 products that include fresh fruits and vegetables and frozen foods.<sup>8</sup> The availability of FDPIR is more limited among tribal areas than SNAP, primarily due to FDPIR rules that limit urban areas served to populations of less than 10,000.<sup>9</sup> In Alaska, FDPIR is currently available in 19 of the 208 ANVSAs.

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<sup>4</sup>FDPIR is administered by Indian Tribal Organizations (ITOs) or State agencies. Indian Tribal Organizations and State agencies may provide FDPIR services through multiple tribes. Currently, 100 ITOs and 5 State agencies administer the program for about 276 tribes.

<sup>5</sup>To the extent possible, most State agencies and tribal governments offer home delivery services to seniors, disabled, and homebound individuals.

<sup>6</sup>Some tribal areas in Oklahoma, such as the Cherokee Nation, operate FDPIR stores.

<sup>7</sup>A Final Rule, published August 27, 2014, changed FDPIR eligibility criteria to promote conformity with SNAP requirements.

<sup>8</sup>Fresh fruits and vegetables, although not mandatory, are offered in lieu of canned products by more than 90 percent of all FDPIR tribal outlets.

<sup>9</sup>Tribal governments can request a waiver from the restriction against serving such areas.

## Data Sources and Methods

Data used in this study consist primarily of tribal population-based and individual outlet-based sources. Measures of nearest distance to outlet type are reported for both total population and by population subgroups, including individuals grouped by low- and non-low-income status, age group, and by households with and without a vehicle<sup>10</sup>.

We report measures of access to food outlets in two ways: by the number and share of the tribal population in terms of walking and driving distances and by distance measures for the 20th, 50th (median), and 80th percentile population distribution. Summary statistics based on 545 tribal areas are reported for individuals and households living in American Indian tribal lands, Oklahoma Tribal Statistical Areas, and Alaska Native Village Statistical Areas.

Geographical Information System (GIS) methods were used to compute distances within individual tribal areas for each of the four outlet types: all supermarkets, SNAP-authorized supermarkets, FDPIR outlets, and a hypothetical SNAP/FDPIR outlet type in which eligible individuals always choose to participate in the nearest of either outlet. The GIS analysis also takes into account areas not served by FDPIR as well as those that are served.<sup>11</sup>

### Outlet Data Sources and Criteria

Source data for identifying large grocery stores, supermarkets, and supercenters are from a directory developed for an ERS national study of food access using 2010 data (Ver Ploeg et al., 2012). The directory consists of the Nielsen Company TDLinx® store directory (2010) and a directory of SNAP-authorized stores (2010). All large grocery stores, supermarkets, and supercenters (herein referred to as supermarkets) with sales of \$2 million or more annually were included. To identify SNAP-authorized supermarkets, we applied industry supermarket criteria to the directory of SNAP-authorized stores. A special tabulation was performed by USDA, Food and Nutrition Service to identify all SNAP-authorized stores that had annual food and nonfood sales of \$2 million or more and offered all major food departments.<sup>12</sup> Similar criteria were used to identify all supermarkets in the TDLinx® store directory.

The TDLinx® and SNAP supermarket lists were then combined to obtain a single comprehensive directory, matching store names and addresses, and, where required, matching by geographic coordinates.<sup>13</sup> Although most supermarkets are SNAP-authorized, some large grocery stores that otherwise meet supermarket sales and food variety criteria may not accept SNAP benefits. To account for potential differences in access by tribal individuals and households eligible to participate in SNAP, we separately identified and measured access to SNAP-authorized supermarkets.

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<sup>10</sup>Vehicle access is defined by Census as by passenger cars, vans, and pickup or panel trucks of one-ton capacity or less kept at home and available for the use of household members.

<sup>11</sup>Access measures for the hypothetical SNAP/FDPIR outlet type apply to those tribal areas served by FDPIR.

<sup>12</sup>The Economic Census does not identify supermarkets as a retail store class. The North American Industry Classification System (NAICS) code 4451 includes both full-line grocery stores and supermarkets without regard to annual sales.

<sup>13</sup>Nonmatching stores from both sources are included in the final directory.

To measure access to FDPIR outlets, the addresses of outlets were obtained from the USDA, Food and Nutrition Service FDPIR Policy Branch. The addresses were converted to geographic coordinates for use in the spatial analysis.

## Defining Tribal Areas and Population Groupings

Boundary data obtained from the 2010 Census TIGER/Line® Shapefiles, American Indian and Alaska Native Geography, were used to define tribal area geographies. Population data were obtained from the 2010 Census of Population and the American Community Survey, 2006-2010 Summary file. These data allow for analysis of access by total tribal population and population subgroups, including low-income individuals (defined here by income equal to 200 percent of the Federal poverty level or less); by age (children, working age, and elderly), and by households with and without vehicles.

## Spatial Analysis Methods

The ArcGIS spatial analysis system was used to measure access distances. A uniform grid overlay of tribal areas was created to obtain location and population data at the 1/2-km-square area. The grid cells are typically smaller than Census blocks, resulting in a greater resolution of population distributions within a tribal area. The measurement of distance to access location based on a uniform grid also reduces ArcGIS computation requirements relative to nonuniform boundary data. To further reduce the computation, the location of supermarkets and FDPIR outlets were measured to the physical center (centroid) of each tribal area grid cell.<sup>14</sup>

To convert block-level Census data to grid-cell data, we followed methods used by Ver Ploeg et al. (2010). The grid cells are first overlaid by Census block-level geographies. For a given grid cell, the block's population is multiplied by the proportion of the block's area contained within the cell. The resulting values for all blocks are summed to obtain the grid-cell population. This process is repeated to obtain grid-cell values for each population and population subgroup.

## Walking and Driving Distance Criteria

In prior ERS analyses of access to healthful, affordable food, different distance criteria were used for determining levels of access, depending on whether the population was classified as urban or rural according to Census definitions (Ver Ploeg et al., 2009 and 2012).<sup>15</sup> Accordingly, walking-distance criteria were applied to urban populations and driving-distance criteria to rural populations. The current analysis does not distinguish between urban and rural populations within individual tribal areas, however. In application to tribal areas where urban areas tend to be small compared with urban areas nationwide, urban and rural classifications may introduce a boundary problem.

For a given urban tract, if one or more adjacent tracts have populations of less than 2,500, those tracts are classified by Census as rural. As a result, driving-distance measures of access would apply, even if some of the population was within walking distance of a supermarket in the urban tract.

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<sup>14</sup>All distance measures are Euclidian (straight line point-to-point measures) and were converted to miles from kilometers.

<sup>15</sup>Census tracts with a population of 2,500 or more were classified as 'urban,' while all other census tracts were classified as 'rural.'

Because tribal areas are likely to contain a mix of high- and low-density populations, there is a greater potential for the misapplication of access-distance criteria. We instead use grid-cell distance and population data to determine the number and share of a tribal area population that is within walking and driving distance of a supermarket, SNAP supermarket, or FDPIR outlet, regardless of urban or rural classification.

## Tribal Area Access Measurement

For each American Indian Tribal Area (AITA), Oklahoma Tribal Statistical Area (OTSA), and Alaska Native Village Statistical Area (ANVSA), tribal area access is measured in two ways. The first method measures the share of tribal area population within walking distance (1 mile or less), and driving distance (more than 1 mile). Driving distance is further subdivided into (a) between 1 and 10 miles, (b) between 10 and 20 miles, and (c) greater than 20 miles. Within a tribal area, the nearest distances to each outlet type are measured for the overall population and five population subgroups by individual grid cell. The grid-cell populations meeting defined walking or driving distance criteria are then summed to obtain the number and share of the total tribal area population living at those distances from each outlet type, and the same calculations are made for each population subgroup.

The second method measures grid-cell distances to nearest outlet type within a tribal area by population percentiles. For each outlet type, grid-cell distances are ranked from shortest to farthest. The corresponding grid-cell populations are accumulated, and distance measures at the 20th, median, and 80th population percentile are reported. Separate distances by population percentile are calculated for each of the population groups and by outlet type.

A more straightforward approach would have been to measure distance to the nearest supermarket or FDPIR outlet from the centroid (geographic center) of each tribal area. Due to the potential for large differences in size and the distribution of population across tribal areas, the use of a single centroid was deemed unrepresentative of actual distances traveled. By segmenting tribal areas into grids, we are able to account for differences in the distribution of populations and population subgroups within each tribal area, resulting in more representative measures of access distances.

Measures of access to FDPIR outlets are limited to those tribal areas within FDPIR service areas. The FDPIR service areas are determined by both tribal boundaries and areas served and not served by FDPIR according to regulations governing the program. Where available, FDPIR service areas in Alaska include native populations within 10 miles of an Alaska Native Village Statistical Area that contains an FDPIR outlet.<sup>16</sup> Service areas were created for those ANVSAs that contained an FDPIR outlet.

## Study Exclusions

Additional tribal populations and defined areas were considered for inclusion in the analysis. Tribes that are recognized by the Federal Government but do not have designated lands were excluded due to the spatial nature of this study. State-designated tribal areas and populations were also excluded, due to differences between their designation criteria and Federal requirements.

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<sup>16</sup>Where the 10-mile extended area overlaps with another ANVSA's extended area, a boundary was created to define separate FDPIR service areas in order to avoid double counting of ANVSA populations.

Native Hawaiian Homelands (NHHL) were also excluded from the analysis. These areas consist of trust lands created in 1920 for use by Native Hawaiians.<sup>17</sup> Of the 290,000 Native Hawaiians living in the State, 11 percent live in NHHL trust lands. Of these, 44 percent meet Native Hawaiian blood quantum criteria.<sup>18</sup> As a result of the special characteristics of the Hawaiian trust areas, they were deemed not sufficiently comparable to the American Indian and Alaska Native tribal areas in the analysis.

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<sup>17</sup>Hawaiian trust lands are areas set aside for homesteading, including residential, agricultural, and pastoral uses. Industrial and commercial uses are prohibited. Residential areas are governed by declarations, covenants, conditions, and restrictions.

<sup>18</sup>Lessees of Native Hawaiian Trust Lands are required to have a Native Hawaiian blood quantum of at least 50 percent. Successors are limited to other family members and must have a blood quantum of at least 25 percent.



# Assessing Tribal Area Access to Healthful, Affordable Food

To understand differences in tribal area access to healthful, affordable food, a comparison of socioeconomic subgroups is needed, both among tribal areas and with those of the U.S. population.<sup>19</sup> Because the analysis is based on data for 545 individual tribal areas, we report summary access measures for each of the three tribal area types. Access measures are reported both for the total population and population subgroups based on socioeconomic characteristics. Similar access measures for individual tribal areas are available in Excel tables that are accessible from the index page of the report via the following link: <http://cms.usda.net/publications/eib-economic-information-bulletin/eib-131.aspx>

## Tribal Area Population Characteristics

Among almost 3 million individuals living in U.S. tribal areas, 42 percent had incomes at or below 200 percent of the Federal Poverty Level (FPL), compared with 32 percent among all U.S. individuals (table 1). Poverty rates varied by tribal area type, however.

Of the 1 million individuals in American Indian tribal areas, 49 percent had incomes at or below 200 percent of the FPL. The share of low-income individuals was lower (40.2 percent) in Oklahoma

Table 1  
**Population and household characteristics by tribal area type**

Population/household characteristic	U.S. individuals/ households		AITAs <sup>1</sup>		OTSAs <sup>2</sup>		ANVSAs <sup>3</sup>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
<b>All individuals</b>	308,700,000	100.0	1,051,594	100.0	1,572,763	100.0	236,831	100.0
<b>Individuals by income:</b>								
Low-income individuals <sup>4</sup>	98,400,000	31.9	515,469	49.0	632,803	40.2	74,358	31.4
Non-Low-income individuals	210,300,000	68.1	536,126	51.0	939,960	59.8	162,473	68.6
<b>Individuals by age:</b>								
Children, age 17 or less	73,700,000	23.9	309,899	29.5	388,282	24.7	67,130	28.3
Adults, age 18-64	193,000,000	62.5	613,061	58.3	940,944	59.8	149,400	63.1
Elderly, age 65 or more	42,000,000	13.6	128,633	12.2	243,536	15.5	20,301	8.6
<b>Households by vehicle access:</b>								
Total households	116,716,000	100.0	437,962	100.0	700,946	100.0	104,929	100.0
Households without vehicle	10,200,000	8.7	30,173	6.9	30,200	4.3	13,780	11.4
Households with vehicle	106,516,000	91.3	407,789	93.1	670,746	95.7	91,149	88.6

<sup>1</sup>American Indian Tribal Areas; <sup>2</sup>Oklahoma Tribal Statistical Areas; <sup>3</sup>Alaska Native Village Statistical Areas. <sup>4</sup>Defined as individuals with a household income of 200 percent or less of the Federal Poverty Level (FPL) in 2010.

Sources: ERS estimates based on Census of Population, 2010; American Community Survey, 2006-2010 Summary File; Table 9 and Appendix table B3, Ver Ploeg, et al. (2012); Households and Families: 2010, U.S. Census (April, 2012).

<sup>19</sup>The U.S. population statistics and access measures include tribal area populations.

tribal areas. The tribal population in Alaska Native Village Statistical Areas had the lowest share of low-income individuals at 31.4 percent—slightly less than the rate for all U.S. individuals.

The shares of population by age group in tribal areas were comparable to those for the national population. Working-age adults (18-64 years) made up the largest share of both the U.S. and tribal area populations, followed by children (age 17 or younger) and the elderly (age 65 and up). Alaska Native Village populations had a smaller share of elderly and a larger share of children than American Indian and Oklahoma tribal populations.

The share of households without a vehicle varied by tribal area. Among all U.S. households, 8.7 percent had no vehicle, compared with 11.4 percent of Alaska Native Village households. Both American Indian (6.9 percent) and Oklahoma tribal area households (4.3 percent) had a smaller share of nonvehicle households than the share for all U.S. households.

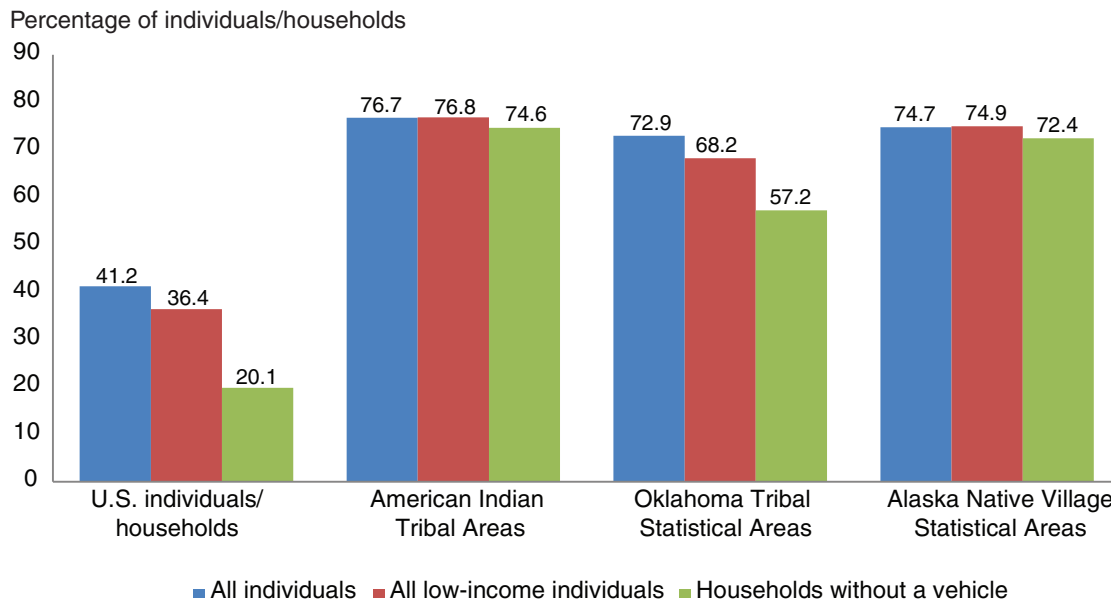
### Tribal Access Comparisons with National Access Measures

We compared tribal area access measures to the U.S. national measures reported in the ERS study of access (Ver Ploeg et al., 2012). Comparisons were limited to population and household measures of access for all supermarkets (without breaking out those authorized for SNAP). Access measures include the share of population by walking and driving distances and access distances by percentiles of population.

#### *Access Measures by Walking and Driving Distances*

Among all U.S. individuals, 41.2 percent lived more than 1 mile from a supermarket, while the share among tribal area individuals ranged from 72.9 percent in Oklahoma tribal areas to 76.7 percent in American Indian tribal areas (fig. 3 and table 2).

Figure 3  
**Share of individuals and households more than 1 mile from a supermarket**



Source: USDA, Economic Research Service.

Table 2

**U.S. and Tribal area access measures: selected comparisons for all supermarkets**

Access measure	U.S.	AITAs <sup>1</sup>	OTSAs <sup>2</sup>	ANVSAs <sup>3</sup>	All tribal areas <sup>4</sup>
<b>All individuals:</b>			<i>Percent share</i>		
Access more than 1 mile	41.2	76.7	72.9	74.7	74.4
Access by percentiles of all individuals			<i>Miles</i>		
20th percentile	0.3	0.9	0.7	0.7	0.8
50th percentile	0.8	3.5	3.2	2.8	3.3
80th percentile	2.2	12.8	7.9	10.3	9.9
<b>Low-income individuals:</b>			<i>Percent share</i>		
Access more than 1 mile	36.4	76.8	68.2	74.9	72.2
Access by percentiles of low-income individuals			<i>Miles</i>		
20th percentile	0.3	0.9	0.7	0.7	0.8
50th percentile	0.8	4.1	2.8	3.5	3.4
80th percentile	2.0	15.5	8.1	37.7	13.0
<b>Households without a vehicle:</b>			<i>Percent share</i>		
Access more than 1 mile	20.1	74.6	57.2	72.4	67.1
Access by percentiles of households without a vehicle			<i>Miles</i>		
20th percentile	*	0.9	0.6	0.6	0.7
50th percentile	0.4	4.2	1.4	10.0	4.1
80th percentile	1.0	16.7	6.9	76.7	23.9

<sup>1</sup>American Indian Tribal Areas; <sup>2</sup>Oklahoma Tribal Statistical Areas; <sup>3</sup>Alaska Native Village Statistical Areas; <sup>4</sup>Average of tribal areas, weighted by corresponding population.

\*Value less than 0.5 percent.

Sources: Ver Ploeg, et al. (2012); ERS tabulations.

Similarly, among low-income individuals, a greater share of tribal area populations lived more than 1 mile from a supermarket than the national percentage. Compared with the share of all low-income U.S. individuals (36.4 percent), shares were more than twice as much in American Indian tribal areas (76.8 percent) and Alaska Native Village areas (74.9 percent), while slightly less than double in Oklahoma tribal areas (68.2 percent).

Of all U.S. households without a vehicle, 20.1 percent were more than 1 mile from a supermarket. In contrast, the share among nonvehicle tribal households more than 1 mile from a supermarket ranged from 57.2 percent in OTSAs to 74.6 percent in AITAs. For all tribal areas, the median distance among these households was 4.1 miles. These differences suggest that tribal area households without a vehicle are concentrated in rural settings, while the majority of similar U.S. households are concentrated in urban settings.

### *Access Measures by Population Percentiles*

We also compared access distances by population percentiles between all U.S. individuals and tribal area individuals (table 2). Compared with tribal areas, U.S. individuals had much lower distances to the nearest supermarket at the 20th, 50th (median), and 80th population percentile (fig. 4). At the 20th percentile of population, nearest distances to a supermarket were less than 1 mile for both all U.S. and tribal area individuals (walking distances). Even so, distances ranged from more than triple the distance (AITAs) to two times the distance (OTSAs and ANVSAs) as that for all U.S.

individuals. The greatest disparity was at the 80th population percentile, where, compared with U.S. individuals, distances ranged from 3.6 times as much in OTSAs to 5.8 times as much in AITAs.

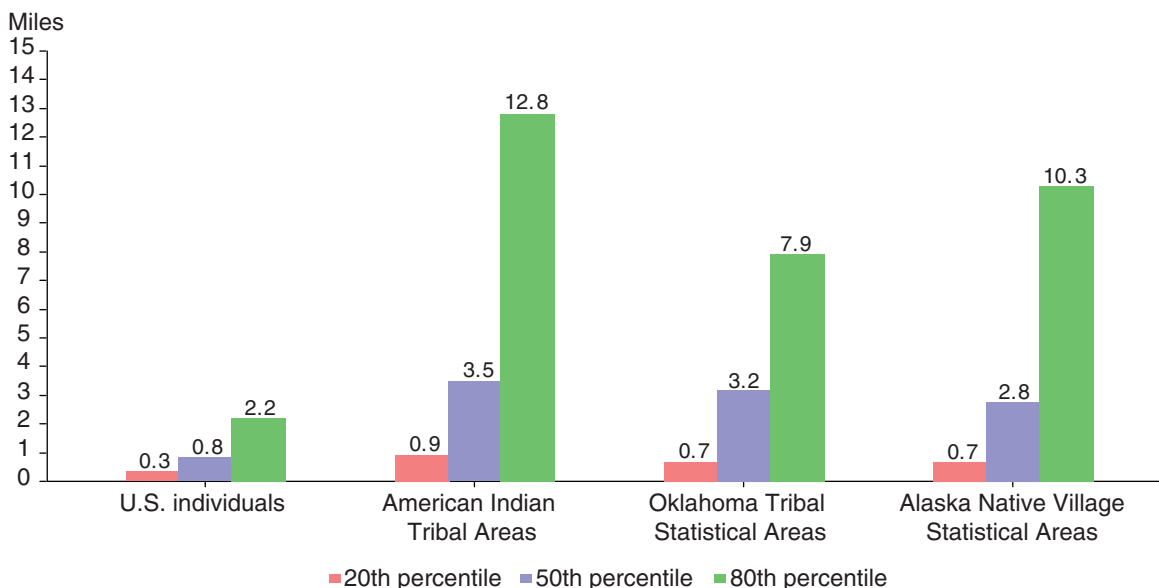
Low-income tribal area individuals were also within walking distance of a supermarket at the 20th population percentile, although at the 80th percentile distances ranged from 8.1 miles in OTSAs to 37.7 miles in ANVSAs, compared with 2.0 miles for all U.S. low-income individuals. The greater distances experienced by low-income tribal area individuals imply higher costs of transportation to reach a supermarket relative to higher income individuals.

In tribal areas, access to supermarkets by households without a vehicle differed considerably from all U.S. households without a vehicle. While at the 20th percentile, tribal areas without a vehicle were within 1 mile or less (walking distance), distances at the median population percentile differed greatly. Nearest supermarket distances at the median varied from 1.4 miles in OTSAs to 10.0 miles in ANVSAs, compared with 0.4 miles for all U.S. households without a vehicle. At the 80th percentile, tribal area households without a vehicle lived at considerably greater distances to supermarkets than their U.S. household counterparts. U.S. households without a vehicle were within walking distance of a supermarket at the 80th percentile, while in tribal areas, distances ranged from 6.9 miles in OTSAs to 76.7 miles in ANVSAs. Clearly, these tribal area householders must depend on help from other people to reach a supermarket or rely more on smaller grocery stores and other food sources.

These comparisons of access measures between U.S. and tribal area individuals and households, while limited to all supermarkets (without regard to those authorized for SNAP), nevertheless underscore important differences in access to healthful, affordable food. Contributing factors in tribal areas may include the greater share of rural individuals and households and the lack of proximity to urban and nontribal populations—areas more likely to contain supermarkets.<sup>20</sup>

Figure 4

**Access distance to all super markets by population percentiles:  
U.S. and tribal area individuals**



Source: USDA, Economic Research Service.

<sup>20</sup>Although the national comparisons do not take into account FDPIR outlets, their inclusion would have a negligible contribution to access measures due to the small number of participants relative to the total tribal area population.

## Summary Tables of Access by Outlet Type

Tables 3 through 6 provide summary measures of access by tribal area type for: (1) all supermarkets, (2) SNAP-authorized supermarkets, (3) FDPIR outlets, and (4) the nearest of either a SNAP-authorized supermarket or an FDPIR source, a hypothetical outlet type. The latter three outlet measures are primarily relevant to population subgroups more likely to be eligible for SNAP and FDPIR food assistance benefits and include all low-income individuals, children, the elderly, and households without vehicles.<sup>21</sup>

For each outlet type, we first examine tribal area measures of access by walking and driving distances and by population and population subgroup. The percent share of distances by walking (1 mile or less) and driving (between 1 and 10 miles, between 10 and 20 miles, and greater than 20 miles) are reported separately for all American Indian tribal areas, Oklahoma tribal areas, and Alaska Native Village areas. These measures can be used to compare differences in the distribution of population by access distance.

We also report access measures by population percentiles. For each of the four outlet types, a corresponding nearest distance was calculated at the 20th, 50th (median), and 80th population percentile. Within a tribal area, populations tightly clustered around a supermarket, for example, will result in relatively small differences in nearest distance at the 20th, 50th, and 80th percentile of the population. More widely distributed populations are likely to have larger differences in the distances for those same population percentile values. The use of population percentiles provides an alternative measure of access that results from the differences in the distribution of tribal area populations relative to the locations of an outlet type. The distance corresponding to each population percentile can also be compared against walking and driving criteria as a measure of access.

### All Supermarkets Access

The share of populations and households by walking and driving distances to all supermarkets (including SNAP-authorized supermarkets) varied by tribal area type. Among American Indian tribal areas, 23.3 percent of all individuals were within 1 mile of a supermarket, while another 51.4 percent were between 1 and 10 miles (driving distance) of a supermarket (table 3a). The remaining 25.3 percent of individuals living in American Indian tribal areas were more than 10 miles from a supermarket. Compared with all individuals, a greater share (30.6 percent) of the low-income population was more than 10 miles distant. Among households, only 25.4 percent of those without a vehicle were within walking distance of a supermarket.

By population percentiles, the top 20 percent of individuals and households were all within 1.0 mile or less of a supermarket. The median (50th percentile) distance to a supermarket among all individuals was 3.5 miles. Low-income individuals had a slightly higher median distance (4.1 miles), and households without a vehicle had the greatest median distance (4.2 miles).

Compared with American Indian tribal areas, Oklahoma tribal areas had larger shares of individuals and households within walking distance of a supermarket. Among all OTSA individuals, 27.1 percent were within 1 mile, compared with 31.8 percent of low-income individuals and 42.8 percent of households without a vehicle (table 3b). In addition, a greater share of the OTSA population

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<sup>21</sup>Census data do not identify low-income individuals or households by demographic subgroups.

Table 3a

**Supermarket access by share of population and population percentiles: American Indian Tribal Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Miles</i>		
<b>All individuals</b>	1,051,594	23.3	51.4	15.0	10.3	0.9	3.5	12.8
<b>Individuals by income:</b>								
Low-income individuals	515,469	23.2	46.3	17.0	13.6	0.9	4.1	15.4
Non-low-income individuals	536,126	23.5	56.3	13.1	7.1	0.9	3.1	10.1
<b>Individuals by age:</b>								
Children, age 17 or less	309,899	22.2	50.3	16.1	11.4	1.0	3.8	13.7
Adults, age 18-64	613,061	23.3	52.0	14.7	10.0	0.9	3.4	12.5
Elderly, age 65 or more	128,633	26.4	50.9	14.0	8.7	0.7	3.1	11.6
<b>Households by vehicle access:</b>								
Total households	437,962	24.3	51.6	14.7	9.4	0.9	3.5	12.6
Households without vehicle	30,173	25.4	41.7	17.3	15.5	0.9	4.2	16.7
Households with vehicle	407,789	24.2	52.3	14.5	8.9	0.9	3.5	12.3

Source: USDA, Economic Research Service.

Table 3b

**Supermarket access by share of population and population percentiles: Oklahoma Tribal Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Miles</i>		
<b>All individuals</b>	1,572,763	27.1	61.6	10.7	0.6	0.7	3.2	7.9
<b>Individuals by income:</b>								
Low-income individuals	632,803	31.8	56.4	11.2	0.6	0.7	2.8	8.1
Non-low-income individuals	939,960	23.9	65.1	10.4	0.6	0.9	3.4	7.8
<b>Individuals by age:</b>								
Children, age 17 or less	388,282	27.9	61.0	10.5	0.6	0.7	3.1	7.8
Adults, age 18-64	940,944	26.7	62.1	10.7	0.6	0.7	3.2	7.9
Elderly, age 65 or more	243,536	27.2	60.6	11.5	0.7	0.7	3.2	8.1
<b>Households by vehicle access:</b>								
Total households	700,946	27.6	60.3	11.4	0.7	0.7	3.4	8.1
Households without vehicle	30,200	42.8	47.2	9.4	0.6	0.6	1.4	6.9
Households with vehicle	670,746	27.0	60.9	11.5	0.7	0.7	3.5	8.2

Source: USDA, Economic Research Service.

(61.6 percent) was between 1 and 10 miles (driving distance) from a supermarket compared with American Indian tribal areas. These differences resulted in a much smaller share of OTSA individuals and households that were more than 10 miles from a supermarket. Tribal areas in Oklahoma tend to be closer to urbanized areas and areas of nontribal populations, potentially benefiting from greater availability of both SNAP-authorized and non-SNAP supermarkets.

Measured by population percentiles, Oklahoma tribal areas again showed lower corresponding distances from a supermarket than American Indian tribal areas. The median distance for all individuals was 3.2 miles, while the median among low-income individuals was slightly lower (2.8 miles). OTSA households without vehicles had the lowest median distance of all population subgroups (1.4 miles). At the 20th percentile, all OTSA population subgroups were within walking distance of a supermarket, while at the 80th percentile all subgroups were within 10 miles.

The share of Alaska Native Village Statistical Area residents within walking distance of a supermarket was comparable to the share of American Indian and Oklahoma tribal area residents, ranging from 25.1 percent of low-income individuals to 27.6 percent of households without vehicles. In contrast to the other tribal areas, however, a much larger share of ANVSA individuals and households were more than 10 miles from a supermarket. Among population subgroups, 32.7 percent of low-income individuals and 50.0 percent of households without a vehicle lived more than 10 miles from a supermarket.

By population percentiles, the median distance of ANVSA households without a vehicle was 10 miles—far greater than for all ANVSA households (2.8 miles) and low-income individuals (3.5 miles). At the 20th percentile, all ANVSA population subgroups were within walking distance of a supermarket. In contrast, at the 80th percentile, low-income individuals (37.7 miles from a super-

Table 3c

**Supermarket access by share of population and population percentiles: Alaska Native Village Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	Number	Percent	Percent	Percent	Percent	Miles		
<b>All individuals</b>	236,831	25.3	54.3	6.9	13.5	0.7	2.8	10.3
<b>Individuals by income:</b>								
Low-income individuals	74,358	25.1	42.1	8.4	24.3	0.7	3.5	37.7
Non-low-income individuals	162,473	25.3	59.8	6.3	8.6	0.7	2.5	7.1
<b>Individuals by age:</b>								
Children, age 17 or less	67,130	23.8	53.2	6.5	16.5	0.9	2.9	13.1
Adults, age 18-64	149,400	25.4	55.3	6.9	12.5	0.7	2.7	9.5
Elderly, age 65 or more	20,301	29.2	50.3	8.8	11.8	0.7	2.6	10.2
<b>Households by vehicle access:</b>								
Total households	104,929	24.5	52.7	10.2	12.6	0.9	3.1	12.0
Households without vehicle	13,780	27.6	22.4	7.2	42.8	0.6	10.0	76.7
Households with vehicle	91,149	24.0	57.3	10.6	8.1	0.9	2.9	9.9

Source: USDA, Economic Research Service.

market) and households without a vehicle (76.7 miles) were much more distant in comparison with all U.S. individuals (10.3 miles).

## SNAP-Authorized Supermarkets Access

Tribal area populations participating in SNAP are likely to find fewer authorized supermarkets, resulting in reduced access relative to that for all supermarkets. Within American Indian Tribal Areas (AITAs), among population groups more likely to depend on food assistance programs, a smaller share of all low-income individuals (17.1 percent), children (16.6 percent), and elderly (23.0 percent) were within walking distance of SNAP-authorized supermarkets (table 4a) compared with the corresponding shares for all supermarkets (23.2, 22.2, and 26.4 percent, respectively) (table 3a). Driving distances to SNAP supermarkets were generally greater compared with all supermarkets. A greater share of low-income and elderly AITA populations was more than 10 miles from a SNAP-authorized supermarket compared with their distance from all supermarkets. Similarly, a greater share of households without a vehicle was more than 10 miles from a SNAP-authorized supermarket than the share of these households located 10 miles from all supermarkets.

In AITAs, the median distance to SNAP-authorized supermarkets for low-income individuals, children, and households without a vehicle was greater than that for all supermarkets. The largest differences in distance between SNAP-authorized supermarkets and all supermarkets occurred at the 80th percentile of population.

Among Oklahoma tribal area individuals, however, the population shares within walking distance of a SNAP-authorized supermarket were comparable to the shares for all supermarkets and larger than the shares in American Indian and Alaska Native tribal areas (tables 3b and 4b). Due to the

Table 4a

### SNAP supermarket access by share of population and population percentiles: American Indian Tribal Areas

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	Number	Percent	Percent	Percent	Percent	Miles		
<b>All individuals</b>	1,051,594	18.5	47.2	15.3	19.0	1.1	4.9	19.2
<b>Individuals by income:</b>								
Low-income individuals	515,469	17.1	41.3	16.6	25.0	1.3	6.4	23.7
Non-low-income individuals	536,126	19.8	52.9	14.0	13.3	1.1	3.8	14.0
<b>Individuals by age:</b>								
Children, age 17 or less	309,899	16.6	45.5	16.0	21.9	1.3	5.7	21.3
Adults, age 18-64	613,061	18.5	47.9	15.1	18.5	1.1	4.7	18.9
Elderly, age 65 or more	128,633	23.0	47.7	14.7	14.6	0.9	3.8	15.4
<b>Households by vehicle access:</b>								
Total households	437,962	20.3	47.9	15.4	16.3	1.1	4.7	17.6
Households without vehicle	30,173	19.8	36.3	15.7	28.2	1.1	6.9	28.3
Households with vehicle	407,789	20.4	48.8	15.4	15.5	1.1	4.6	16.8

Source: USDA, Economic Research Service.



Table 4b

**SNAP supermarket access by share of population and population percentiles: Oklahoma Tribal Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	Number	Percent	Percent	Percent	Percent	Miles		
<b>All individuals</b>	1,572,763	24.5	61.4	13.4	0.7	0.9	3.5	8.6
<b>Individuals by income:</b>								
Low-income individuals	632,803	28.9	56.7	13.7	0.7	0.7	3.1	8.7
Non-low-income individuals	939,960	21.5	64.5	13.2	0.7	1.0	3.8	8.6
<b>Individuals by age:</b>								
Children, age 17 or less	388,282	25.2	60.8	13.3	0.7	0.9	3.5	8.6
Adults, age 18-64	940,944	24.2	61.8	13.4	0.7	0.9	3.5	8.6
Elderly, age 65 or more	243,536	24.6	60.7	13.8	0.9	0.9	3.5	8.7
<b>Households by vehicle access:</b>								
Total households	700,946	25.1	60.2	13.9	0.8	0.9	3.7	8.8
Households without vehicle	30,200	38.2	50.0	11.1	0.7	0.6	1.6	7.5
Households with vehicle	670,746	24.5	60.7	14.1	0.8	0.9	3.8	8.8

Source: USDA, Economic Research Service.

Table 4c

**SNAP supermarket access by share of population and population percentiles: Alaska Native Village Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	Number	Percent	Percent	Percent	Percent	Miles		
<b>All individuals</b>	236,831	21.0	51.8	9.9	17.3	1.0	3.7	15.2
<b>Individuals by income:</b>								
Low-income individuals	74,358	21.0	39.1	11.6	28.2	1.0	5.8	43.3
Non-low-income individuals	162,473	20.9	57.6	9.1	12.3	1.0	3.2	10.8
<b>Individuals by age:</b>								
Children, age 17 or less	67,130	20.3	51.4	9.1	19.2	1.0	3.8	18.8
Adults, age 18-64	149,400	20.9	52.6	10.0	16.4	1.0	3.6	14.1
Elderly, age 65 or more	20,301	23.4	47.1	12.0	17.4	0.9	3.7	15.5
<b>Households by vehicle access:</b>								
Total households	104,929	19.8	48.3	13.9	18.0	1.1	4.5	18.2
Households without vehicle	13,780	24.3	22.6	7.6	45.5	0.7	13.9	77.7
Households with vehicle	91,149	19.1	52.2	14.8	13.9	1.1	4.3	14.4

Source: USDA, Economic Research Service.

generally fewer supermarkets that are SNAP-authorized, tribal areas in Oklahoma had a smaller share of low-income individuals (28.9 percent), children (25.2 percent), elderly (24.6 percent), and households without a vehicle (38.2 percent) that were within walking distance of a SNAP-authorized supermarket relative to walking distance for all supermarkets. A larger share of those same OTSA population groups were more than 10 miles from the nearest SNAP-authorized supermarket than the share living that far from all supermarkets.

Median distances in OTSAs were consistent with the shares for walking and driving distances. Low-income individuals had a median distance of 3.1 miles from a SNAP-authorized supermarket, the lowest of the tribal areas. Similarly, OTSA households without a vehicle had the lowest median distance (1.6 miles) among the tribal areas. Children and the elderly had median distances equal to those for all OTSA individuals (3.5 miles). At the 20th percentile, all OTSA population groups were within walking distance, while at the 80th percentile, all the groups were within 10 miles of a SNAP-authorized supermarket.

The shares of individuals and households in Alaska Native Village Statistical Areas living within walking distance of a SNAP-authorized supermarket were also lower than their comparable shares for all supermarkets (tables 3c and 4c). A smaller share of low-income ANVSA individuals (21.0 percent), children (20.3 percent), elderly (23.4 percent), and households without a vehicle (24.3 percent) were within walking distance of a SNAP supermarket relative to those for all supermarkets. Of the three tribal area types, ANVSAs had the greatest difference in the share of individuals and households within 1 mile compared with their shares for all supermarkets. They also had the greatest disparity between SNAP-authorized supermarkets and all supermarkets in shares of individuals and households more than 10 miles distant.

In ANVSAs, median distances to a SNAP supermarket were also greater than for all supermarkets among individuals and households more likely to be eligible for SNAP benefits. Households without a vehicle had a much greater median distance (13.9 miles) than low-income individuals (5.8 miles) to SNAP-authorized supermarkets. At the 20th percentile, most ANVSA population groups were within walking distance of a SNAP supermarket, while at the 80th percentile, all individuals and households were more than 10 miles distant.

## FDPIR Outlets Access

Measures of access to FDPIR outlets are limited to those tribal areas that meet program criteria. In total, 73.1 percent of individuals in American Indian tribal areas, 89 percent of individuals in Oklahoma tribal areas, and 27 percent of individuals in Alaska Native Village areas were located in areas served by FDPIR.

The share of individuals and households within walking and driving distances of an FDPIR outlet varied by tribal area type (tables 5a, b, and c). Within American Indian Tribal Areas, 19.5 percent of low-income individuals, 19 percent of children, 13.9 percent of elderly, and 19.7 percent of households without a vehicle were within walking distance of an FDPIR outlet. Among these same AITA groups, the share within 1 to 10 miles ranged from 49 percent (elderly) to 52 percent (households without a vehicle). Corresponding shares of those groups who were more than 10 miles distant from an FDPIR outlet varied from 28.3 miles for households without a vehicle to 37.1 percent among the elderly.

Table 5a

**FDPIR access by share of population and population percentiles: American Indian Tribal Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Miles</i>		
<b>All individuals</b>	768,195	17.4	51.1	22.2	9.3	1.3	5.3	13.7
<b>Individuals by income:</b>								
Low-income individuals	411,869	19.5	51.6	21.0	7.9	1.1	4.7	13.1
Non-low-income individuals	356,327	15.0	50.5	23.6	10.9	1.6	5.8	14.3
<b>Individuals by age:</b>								
Children, age 17 or less	238,816	19.0	51.7	21.2	8.0	1.1	4.9	13.1
Adults, age 18-64	443,415	17.2	51.2	22.3	9.3	1.3	5.3	13.8
Elderly, age 65 or more	85,965	13.9	49.0	24.4	12.7	1.7	6.4	15.0
<b>Households by vehicle access:</b>								
Total households	303,435	14.9	49.5	23.0	12.5	1.6	6.2	15.2
Households without vehicle	23,259	19.7	52.0	21.0	7.3	1.1	4.7	12.8
Households with vehicle	280,176	14.5	49.3	23.2	13.0	1.6	6.3	15.5

Note: Number of individuals and households are for areas served by FDPIR only.

Source: USDA, Economic Research Service.

Table 5b

**FDPIR access by share of population and population percentiles: Oklahoma Tribal Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	<i>Number</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Percent</i>	<i>Miles</i>		
<b>All individuals</b>	1,400,643	6.0	41.8	37.9	14.2	3.5	10.6	18.2
<b>Individuals by income:</b>								
Low-income individuals	566,125	7.1	40.6	38.5	13.8	3.1	10.6	18.0
Non-low-income individuals	834,518	5.3	0.0	37.5	14.5	3.8	10.6	18.4
<b>Individuals by age:</b>								
Children, age 17 or less	346,014	6.4	41.9	37.4	14.3	3.4	10.4	18.3
Adults, age 18-64	836,270	5.9	42.1	38.0	14.0	3.6	10.6	18.2
Elderly, age 65 or more	218,359	6.0	40.9	38.5	14.6	3.6	10.8	18.4
<b>Households by vehicle access:</b>								
Total households	627,970	6.2	41.0	38.6	14.3	3.7	10.7	18.3
Households without vehicle	27,100	9.2	42.4	35.5	12.9	2.2	9.6	17.4
Households with vehicle	600,869	6.0	40.9	38.7	14.3	3.8	10.8	18.3

Note: Number of individuals and households are for areas served by FDPIR, only.

Source: USDA, Economic Research Service.

Table 5c

**FDPIR access by share of population and population percentiles: Alaska Native Village Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	Number	Percent	Percent	Percent	Percent	Miles		
<b>All individuals</b>	63,979	33.8	26.8	39.0	0.5	0.6	6.2	15.6
<b>Individuals by income:</b>								
Low-income individuals	25,485	39.4	34.5	25.9	0.1	0.4	2.8	14.2
Non-low-income individuals	38,494	30.1	21.6	47.6	0.7	0.6	8.5	15.9
<b>Individuals by age:</b>								
Children, age 17 or less	18,537	37.3	29.4	32.9	0.4	0.4	4.0	15.3
Adults, age 18-64	39,797	32.5	25.9	41.1	0.5	0.6	6.5	15.6
Elderly, age 65 or more	5,645	31.2	24.4	43.8	0.7	0.6	6.8	16.1
<b>Households by vehicle access:</b>								
Total households	26,648	30.8	25.8	42.7	0.6	0.6	6.7	15.7
Households without vehicle	6,725	43.0	32.1	24.7	0.2	0.4	2.2	11.2
Households with vehicle	19,923	26.7	23.7	48.8	0.8	0.7	9.0	15.9

Note: Number of individuals and households are for areas served by FDPIR, only.

Source: USDA, Economic Research Service.

Compared with American Indian Tribal Areas, the share of low-income Oklahoma Tribal Statistical Area individuals within walking distance of an FDPIR outlet was much smaller—7.1 percent versus 19.5 percent (tables 5a and 5b). For other OTSA population groups, the share within walking distance was 6.4 percent among children, 6.0 percent among elderly, and 9.2 percent among households without a vehicle. The lower shares within walking distance to FDPIR outlets in OTSAs are in contrast to the corresponding higher shares of SNAP-authorized supermarkets within walking distance.

Another 40.6 percent of OTSA low-income individuals were within 1 to 10 miles of an FDPIR outlet—also fewer in comparison with these same subgroups in AITAs. A correspondingly greater share of individuals and households were more than 10 miles distant in OTSAs than in AITAs, including low-income individuals (53.3 percent), children (51.7), elderly (53.1 percent), and households without vehicle (48.4 percent).

By population percentiles, the median distance to an FDPIR outlet was more than double that for OTSAs compared with AITAs among low-income individuals (10.6 versus 4.7 miles). Similarly, at the 20th percentile, the OTSA population groups were typically twice the distance from an FDPIR compared with the corresponding AITA groups. Of the three tribal area types, OTSA population groups had the greatest distances from an FDPIR outlet at the 80th population percentile.

Alaska Native Villagers had the highest share of all individuals within walking distance of an FDPIR outlet, or 33.8 percent. The share of low-income ANVSAs within walking distance was somewhat greater (39.4 percent) than that for all individuals, followed by children (37.3 percent) and the elderly (31.2 percent). ANVSA households without a vehicle experienced the largest share of all population groups (including other ANVSA groups as well as AITAs and OTSAs) within walking

distance to a FDPIR outlet (43.0 percent). The share of ANVSA populations more than 10 miles distant from one of the outlets were all less than their corresponding walking-distance shares, except among the elderly (44.5 percent). These results are consistent with areas of more concentrated populations, allowing FDPIR outlets to serve a larger share of individuals and households within walking distance and driving distances of 10 miles or less.

In Alaska Native Village areas, median distance to an FDPIR outlet varied, depending on the population group. Among those groups more likely to be eligible for FDPIR, median distances varied from 2.2 miles (households without a vehicle) to 6.8 miles (for the elderly). At the 20th percentile, those same ANVSA populations were all within walking distance of an FDPIR outlet, while distances at the 80th percentile ranged from 11.2 miles (for households without a vehicle) to 15.3 miles (among children).

## Distance to the Nearest of Either SNAP-Authorized Supermarket or FDPIR Outlet

In tribal areas where both SNAP and FDPIR are available, eligible individuals may choose to participate in either program. A hypothetical outlet type, SNAP supermarket or FDPIR outlet, was created in which eligible individuals participate in the nearest of either outlet type. Applying these criteria, access to the nearest of either outlet type resulted in a greater share of individuals and households within walking distance, and a greater share between 1 and 10 miles' driving distance, compared with those same shares for SNAP-authorized supermarkets and FDPIR outlets alone.

In American Indian tribal areas, 29.7 percent of low-income individuals were within walking distance of either a SNAP-authorized supermarket or FDPIR outlet compared with a SNAP-authorized supermarket alone (17.1 percent) or an FDPIR outlet alone (19.5 percent) (table 6a, 4a, 5a). Another 54.2 percent of low-income AITA individuals were within 1 to 10 miles of the nearest of either outlet, compared with 41.3 percent who were that close to a SNAP-authorized supermarket alone (table 4a) and 51.6 percent near an FDPIR outlet alone (table 5a). Among populations more likely to be eligible for SNAP or FDPIR, the share of AITA population groups within walking distance of either outlet type ranged from 27.7 percent of elderly to 30.5 percent of households without a vehicle. Similarly, the shares of those same population groups living more than 10 miles from the nearest of either outlet type varied from 15.6 percent of households without a vehicle to 17.8 percent of the elderly. For the low-income AITA population percentile, the median distance to the nearest of either outlet type was 2.6 miles, compared with the distance to a SNAP-authorized supermarket alone (6.4 miles) or an FDPIR outlet alone (4.7 miles).

A greater share of Oklahoma tribal area low-income individuals were also within walking distance of either outlet type (32.1 percent) compared with a SNAP-authorized supermarket (28.9 percent) or an FDPIR outlet (7.1 percent) (tables 6b, 4b, 5b). Another 55.3 percent of OTSA low-income individuals were between 1 to 10 miles of the nearest of either outlet type—slightly lower than the distance from a SNAP-authorized supermarket alone (56.7 percent) but greater than to an FDPIR outlet alone (40.6 percent). Among populations more likely to be eligible for SNAP or FDPIR, the share of individuals within walking distance of either outlet type ranged from 27.5 percent of OTSA elderly individuals to 41.4 percent of households without a vehicle. The shares of the same population groups and households more than 10 miles from either outlet type varied from 10.1 percent of households without a vehicle to 12.9 percent of the elderly. By low-income population percentiles, the median distance to the nearest of either outlet type was 2.7 miles, compared with the median distance from a SNAP-authorized supermarket alone (3.1 miles) or an FDPIR outlet alone (10.6 miles).

Table 6a

**SNAP supermarket or FDPIR outlet access by share of population and population percentiles:  
American Indian Tribal Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
	Number	Percent	Percent	Percent	Percent	Miles		
<b>All individuals</b>	768,195	28.9	55.2	13.9	2.0	0.7	2.6	8.4
<b>Individuals by income:</b>								
Low-income individuals	411,869	29.7	54.2	14.1	2.0	0.7	2.6	8.4
Non-low-income individuals	356,327	28.0	56.3	13.7	2.0	0.7	2.7	8.3
<b>Individuals by age:</b>								
Children, age 17 or less	238,816	29.6	54.7	13.9	1.9	0.7	2.5	8.2
Adults, age 18-64	443,415	28.8	55.6	13.7	2.0	0.7	2.6	8.2
Elderly, age 65 or more	85,965	27.7	54.5	15.4	2.4	0.7	2.9	9.1
<b>Households by vehicle access:</b>								
Total households	303,435	27.1	54.8	15.4	2.7	0.7	3.1	9.6
Households without vehicle	23,259	30.5	53.9	14.3	1.3	0.7	2.6	8.4
Households with vehicle	280,176	26.8	54.9	15.5	2.8	0.7	3.1	9.7

Note: Number of individuals and households are for areas served by FDPIR only.

Source: USDA, Economic Research Service.

Among the 19 Alaska Native Village areas served by FDPIR, the share of low-income individuals within walking distance of either a SNAP or an FDPIR outlet was much greater (64.2 percent) compared with a SNAP-authorized supermarket, alone (21 percent) or an FDPIR outlet, alone (39.4 percent) (table 6c, 4c, 5c). Comparing access to these same outlet types by driving distance, 33.1 percent of low-income ANVSA individuals were between 1 and 10 miles of either a SNAP-authorized supermarket or an FDPIR outlet. A slightly larger share lived a similar distance from a SNAP-authorized supermarket alone (39.1 percent), while 34.5 percent were within the same distance from an FDPIR outlet. ANVSAs also had the smallest share of populations likely to be eligible for SNAP and FDPIR who were living more than 10 miles driving distance from either outlet type, ranging from 1.5 percent of the elderly to 2.8 percent of households without a vehicle. The median distance for ANVSA low-income individuals by the nearest outlet of either type was 0.6 miles, compared with the median distance to a SNAP-authorized supermarket alone (5.8 miles) or an FDPIR outlet alone (2.8 miles).

Table 6b

**SNAP supermarket or FDPIR outlet access by share of population and population percentiles:  
Oklahoma Tribal Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
		Number	Percent	Percent	Percent	Percent	Miles	
<b>All individuals</b>	1,400,643	27.4	60.3	12.0	0.3	0.7	3.2	8.1
<b>Individuals by income:</b>								
Low-income individuals	566,125	32.1	55.3	12.3	0.3	0.7	2.7	8.1
Non-low-income individuals	834,518	24.2	63.6	11.9	0.3	0.9	3.5	8.1
<b>Individuals by age:</b>								
Children, age 17 or less	346,014	28.3	59.6	11.9	0.3	0.7	3.1	8.1
Adults, age 18-64	836,270	27.0	60.7	12.0	0.3	0.7	3.2	8.1
Elderly, age 65 or more	218,359	27.5	59.6	12.5	0.4	0.7	3.2	8.3
<b>Households by vehicle access:</b>								
Total households	627,970	27.8	59.5	12.4	0.4	0.7	3.4	8.4
Households without vehicle	27,100	41.4	48.4	9.8	0.3	0.6	1.6	6.9
Households with vehicle	600,869	27.1	60.0	12.5	0.4	0.7	3.5	8.4

Note: Number of individuals and households are for areas served by FDPIR only.

Source: USDA, Economic Research Service.

Table 6c

**SNAP supermarket or FDPIR outlet access by share of population and population percentiles:  
Alaska Native Village Statistical Areas**

Population/household characteristic	Individuals/ Households	Walking distance	Driving distance			Population percentiles		
		1 mile or less	Between 1 and 10 miles	Between 10 and 20 miles	Greater than 20 miles	20th percentile	50th percentile (median)	80th percentile
		Number	Percent	Percent	Percent	Percent	Miles	
<b>All individuals</b>	63,979	63.0	35.2	1.8	0.0	0.3	0.6	2.8
<b>Individuals by income:</b>								
Low-income individuals	25,485	64.2	33.1	2.6	0.0	0.3	0.6	3.1
Non-low-income individuals	38,494	62.1	36.6	1.3	0.0	0.3	0.6	2.6
<b>Individuals by age:</b>								
Children, age 17 or less	18,537	62.9	34.9	2.2	0.0	0.3	0.7	2.9
Adults, age 18-64	39,797	62.6	35.7	1.7	0.0	0.3	0.6	2.8
Elderly, age 65 or more	5,645	65.7	32.8	1.5	0.0	0.3	0.6	2.4
<b>Households by vehicle access:</b>								
Total households	26,648	62.3	35.3	2.3	0.0	0.3	0.6	3.1
Households without vehicle	6,725	64.1	33.2	2.8	0.0	0.3	0.6	2.8
Households with vehicle	19,923	61.7	36.0	2.2	0.1	0.3	0.6	3.1

Note: Number of individuals and households are for areas served by FDPIR only.

Source: USDA, Economic Research Service.

## Individual Tribal Area Access Measures

Individual tribal access measures are available on the Economic Research Website (see first page of this report for a link). The tables provide measures by share of population within walking and driving distance and by population percentiles for the nearest supermarket, nearest SNAP-authorized supermarket and FDPIR outlet, and the nearest of either a SNAP-authorized supermarket or an FDPIR outlet.<sup>22</sup> In total, we report individual access measures for 545 tribal areas, which include American Indian Tribal Areas, Oklahoma Tribal Statistical Areas, and Alaska Native Village Statistical Areas.

Individual tribal measures are critically important for the identification of extremely low access areas. In contrast, summary tables of access mask the variation in distance measures observed in the individual tribal measures due to the use of population weighting. For example, among Alaska Native Village tribal areas, 140 were found to be more than 20 miles from the nearest supermarket measured at the 50th population percentile. Yet when taken together, distance to the nearest supermarket at the median population percentile for all ANVSAs was 2.8 miles. Individual tribal access measures help to identify underserved populations where policymakers and nutrition and health advocates may focus initiatives to improve access to healthful, affordable food sources.

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<sup>22</sup>Access measures for FDPIR sites and the closest SNAP supermarket or FDPIR site are limited to those tribal areas authorized for FDPIR.



## Conclusions

Tribal area individuals and households are more likely to experience much lower levels of access to healthful, affordable food than most Americans. Comparing tribal access measures with national access measures, we found large disparities in the share of populations that are greater than 1 mile from the nearest supermarket. For example, only 36.4 percent of all U.S. low-income individuals were more than 1 mile from a supermarket, compared with 76.8 percent of low-income individuals in American Indian tribal areas and 68.2 percent of Oklahoma tribal areas. The greatest disparity between national and tribal areas was among households without a vehicle, where the majority in tribal areas was farther than 1 mile from a supermarket. As a result, many tribal individuals and households may rely more on small grocery stores, convenience stores, general stores, and even fast-food outlets as primary food sources. While local agriculture and farmers and growers markets may provide healthful food choices, including traditional Native American foods, the extent to which tribal populations have access to these alternative sources is not well documented.

Because of the higher prevalence of poverty among tribal area individuals relative to all Americans, the analysis also focused on the access of low-income and other vulnerable populations to SNAP-authorized supermarkets and FDPIR outlets. Compared with all supermarkets, the shares of low-income tribal individuals within walking distance of a SNAP-authorized supermarket were often found to be lower and driving distance shares higher—a finding that adversely affects those who depend on SNAP benefits.

The results are mixed when comparing low-income individuals' access to SNAP-authorized supermarkets and FDPIR outlets. Combining walking distance shares with driving distance shares between 1 and 10 miles, the share of low-income individuals' access to FDPIR outlets in American Indian tribal areas (71.1 percent) and Alaska Native Village tribal areas (73.9 percent) were greater than the same shares corresponding to SNAP-authorized supermarkets. In contrast, tribal areas in Oklahoma had lower combined shares for FDPIR outlets and higher shares for SNAP-authorized supermarkets. Within a tribal area, differences in access to each outlet type may play a role in determining whether to participate in SNAP or FDPIR.

To better understand the potential for SNAP and FDPIR to enhance access to healthful food, we took advantage of the provision that allows eligible individuals to select participation in either program where both are available. The selection of SNAP or FDPIR participation according to the nearest outlet distance of either resulted in much higher shares of individuals and households within walking distance compared with the shares for SNAP-authorized supermarkets and FDPIR outlets alone.

Overall, the findings of limited access to healthful, affordable food support the need for more comprehensive information and research to document the specific food and outlet choices of tribal area individuals and households. Such data would allow researchers and policymakers to better understand the importance of food access to the nutritional and health outcomes of American Indian and Alaska Native tribal area populations.

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