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Access to WIC-Authorized Vendors and High-speed Internet Services in Urban and Rural Areas

Leslie Hodges, John Pender, David Marquardt, Anna Shetler, and Joanne Guthrie

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Abstract

Low-income and nutritionally at-risk women, infants, and children up to age 5 are eligible for the USDA Special Supplemental Nutrition Program of Women, Infants, and Children (WIC). WIC supports a healthy diet by providing supplemental foods that are high in nutrients that are determined to be beneficial for these population groups. Most WIC participants obtain their prescribed foods at a WIC-authorized vendor (a retail food store that accepts WIC benefits); however, WIC State agencies have begun to pilot online shopping options for WIC participants to increase participants' access to prescribed foods. To better understand the ability of WIC participants to take advantage of online shopping options, this report describes the availability of fixed and mobile high-speed internet services across census tract—a proxy for neighborhoods. The report considers whether census tracts have adequate internet infrastructure to support the use of online options when there is limited physical access to WIC-authorized vendors. It also estimates the shares of WIC-eligible families without internet subscriptions across census tracts characterized by low or adequate physical access to WIC-authorized vendors and low or adequate availability of fixed and mobile high-speed internet services.

Keywords: Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); food access; broadband; online shopping; nutrition

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A report summary from the Economic Research Service

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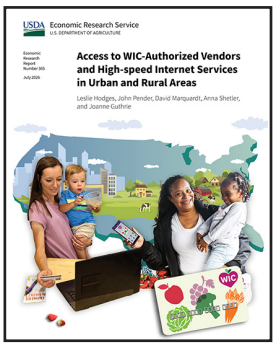


Key Points

- Half (49 percent) of census tracts, a geographic proxy for neighborhoods, in the United States had low access to a Special Supplemental Nutrition Program of Women, Infants, and Children (WIC)-authorized vendor in 2021. An estimated 2.5 million WIC-eligible families (49 percent of all WIC-eligible families) lived in these tracts.
- The national average distance to the nearest WIC-authorized vendor was 1.8 miles. Distances to the nearest WIC-authorized vendor were greater in rural areas and areas outside cities and towns (4–6 miles on average).
- Most census tracts (96.3 percent) had adequate access to fixed (93.5 percent) or mobile (85.5 percent) high-speed internet services, as of December 2020. Fixed high-speed internet services connect locations, like homes and businesses, to the internet at download/upload speeds of at least 25/3 Megabits per second. Mobile internet services use cellular networks to connect digital devices to the internet.
- An estimated 1.2 million WIC-eligible families (22.4 percent) did not have fixed or mobile high-speed internet subscriptions in 2019 across all census tracts. This included an estimated 888,494 families in urban census tracts and 273,092 families in rural census tracts. Internet subscriptions refer to paid arrangements that allow a household to access the internet (for example, a cellular data plan or cable, fiber optic, or DSL (Digital Subscriber Line) plan).
- In census tracts characterized by low access to a WIC-authorized vendor but adequate access to fixed or mobile high-speed internet services, one in five WIC-eligible families did not have high-speed internet subscriptions.

Why Does This Matter?

Many WIC State agencies have waivers in place to provide WIC services online, including some components of eligibility certification and nutrition education. In 2022, USDA increased the funding available to WIC State agencies for developing pilot projects to offer online grocery shopping as an option for participants to purchase WIC foods. In 2023, USDA proposed revisions to the Code of Federal Regulations to provide State agencies with permanent flexibilities needed to offer online shopping options to participants. This study provides information relevant to these objectives by identifying areas across the United States where WIC-eligible families may have limited access to a physical store that accepts WIC benefits but adequate access to fixed or mobile high-speed internet services that could facilitate online shopping, as well as use of other WIC services. We document differences between rural and urban locations, as geography may impact retail and internet infrastructure.

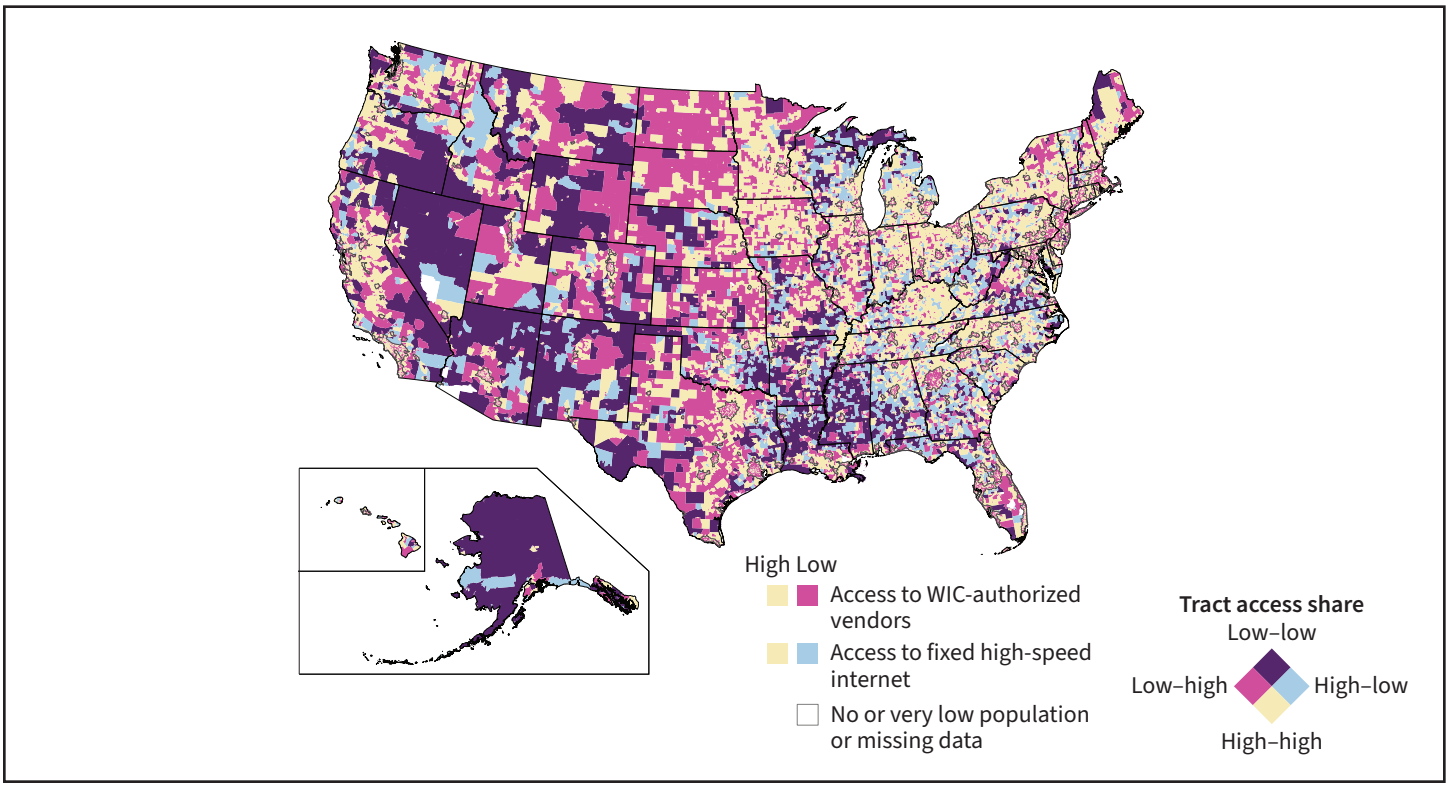
A Few More Details

Following the methodology of USDA, Economic Research Service's Food Access Research Atlas, low-access tracts had at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. Additionally, we considered the ability of WIC-eligible families to take advantage of food shopping online by measuring access to fixed and mobile high-speed internet services for U.S. census tracts.

In the figure below, tracts in purple had low access to both a WIC vendor and fixed high-speed internet services (3 percent of all tracts and an estimated 140,000 WIC-eligible families in 2015–19). Tracts in pink had low access to a WIC vendor but adequate access to fixed high-speed internet services (46 percent of all tracts and 2.4 million WIC-eligible families). Tracts in blue (4 percent) had adequate access to a WIC vendor but low access to fixed high-speed internet services. Tracts in yellow (47 percent) had adequate access to both.

Low access to a WIC vendor may require some WIC participants to travel further to a store that accepts WIC benefits, but it does not necessarily prevent them from redeeming their benefits. Likewise, low access to fixed high-speed internet does not necessarily limit use of online WIC services. Participants may have access to mobile internet provided through a cellular network or access to slower fixed internet connections. Additionally, on-premises internet access may be available at businesses and libraries via Wi-Fi.

Access to WIC-authorized vendors and fixed high-speed internet



Note: Number = 72,864 census tracts. Tracts with no or very low population = 333. Tracts with missing fixed high-speed internet data=15. Areas outlined within States are urban areas with more than 100,000 people. Low access to a Special Supplemental Nutrition Program of Women, Infants, and Children (WIC)-authorized vendor is defined as a census tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. Low access to fixed high-speed internet services is defined as a census tract where less than 90 percent of the population live in census blocks with at least one residential service provider that advertises download speeds of at least 25 Megabits per second (Mbps) and upload speeds of at least 3 Mbps. WIC vendor data are as of fiscal year 2021. High-speed internet data are as of December 2020.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service, Federal Communications Commission, and U.S. Department of Commerce, Bureau of the Census.

Access to WIC-Authorized Vendors and High-speed Internet Services in Urban and Rural Areas

Introduction

Low-income women, infants, and children who are nutritionally at-risk are eligible for participation in the USDA's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). In fiscal year 2024, WIC provided supplemental foods, nutrition education, breastfeeding support, and referrals to health care and other social services to nearly 7 million participants every month at a total cost of $7.2 billion (Jones et al. 2025). Existing research suggests that WIC improves the consumption of healthy foods and key nutrients (Caulfield et al., 2022), with investments in WIC resulting in savings in medical costs and generating revenue to local communities (Nianogo et al., 2019; Bauman & Thilman, 2021; Hanson & Oliveria, 2009). Yet, according to the most recent data (2022), little more than half of those who were eligible participated in WIC and food benefits are not fully used (Kessler et al., 2024; Zhang et al., 2021).[1]

Previous research has found that access to healthy foods can be limited for low-income families (Rhone et al., 2019). Challenges to healthy food access include fewer resources to purchase healthy foods, which the WIC program helps to address by providing supplemental foods, as well as proximity to physical stores that sell healthy foods. Most WIC participants obtain the food prescribed to them in person at a WIC-authorized vendor (a retail store that accepts WIC benefits). Having a vehicle may assist households with accessing WIC foods. Most WIC participants (86 percent) use their own vehicle to do grocery shopping (Ver Ploeg et al., 2015). However, some current and former WIC participants cite a lack of adequate transportation as a reason for not fully redeeming WIC foods and as a reason for discontinuing participation in the program (Panzera et al., 2017; Rosenberg et al., 2003).

Online grocery shopping is a potential way to increase both participant access to WIC-authorized vendors and use of WIC food benefits. Online grocery shopping has been a growing trend for U.S. consumers, and the Coronavirus (COVID-19) pandemic increased its adoption (Restrepo & Zeballos, 2024). In 2022, an estimated 20 percent of individuals who usually do any grocery shopping in their household purchased groceries online at least once in the past month (Restrepo & Zeballos, 2024). WIC participants have expressed a desire to be able to use their benefits for online grocery purchases. In a survey of more than 20,000 WIC participants across 12 WIC State agencies (conducted by the National WIC Association in the spring of 2021), more than two-thirds of participants said they would like to purchase WIC foods by ordering online and using curbside or in-store pickup (Ritchie et al., 2021). Additionally, more than half reported lack of access to online shopping as a reason for not redeeming all their WIC food benefits in the prior 6 months (Ritchie et al., 2021).

In 2021, WIC received Congressional funding to undertake program modernizations to increase participation among those who are eligible and support participants in full use of program benefits (American Rescue Plan Act of 2021, 2021). In 2022, USDA issued a memorandum to WIC State agencies to review their authorized vendors in terms of proximity to participants' homes and places of work

[1] Until recently (fiscal year 2022), total participation for all three groups of WIC participants (women, infants, and children) had been declining (Hodges et al., 2024). Although this may be partially due to declining birthrates, birthrates cannot explain low rates of participation among the eligible population and the underuse of WIC food package benefits. From 2016 to 2020, the number of eligible individuals participating in WIC declined from 54.8 percent to 50.2 percent; in 2022, 53.5 percent of eligible individuals participated in WIC (Kessler et al., 2024). On average, WIC households purchase half (52.4 percent) of the food items in the food packages they are issued (Zhang et al., 2021).

and to review State agency criteria for authorization in collaboration with existing vendors to determine ways to improve WIC participant access to physical stores accepting WIC benefits (USDA, Food and Nutrition Service (FNS), 2022). Additionally, USDA awarded grants to State agencies to modernize in-store shopping and to explore online shopping options. This was followed by a proposed rule to permanently provide State agencies with the flexibilities needed to offer online shopping options to participants (USDA, FNS, 2024).

This study provides information relevant to these objectives by characterizing census tracts across the United States in terms of physical access to WIC-authorized vendors and access to high-speed internet services that could facilitate online shopping. Census tracts are statistical areas defined by the U.S. Department of Commerce, Bureau of the Census that can proxy for neighborhoods (Ver Ploeg et al., 2009). To measure access to WIC-authorized vendors, we follow a similar methodology used in the 2019 edition of USDA, Economic Research Service's (ERS) Food Access Research Atlas (FARA), which presents an overview of food access indicators for low-income and other census tracts using different measures of supermarket accessibility and provides food access data for populations within census tracts (USDA, ERS, 2021). FARA offers data on food access by census tract that can be used for community planning or research purposes, but it does not distinguish stores authorized to accept WIC benefits and does not include information about availability of fixed or mobile high-speed internet services.

We defined low-access census tracts as having at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. We considered census tracts not designated as "low access" to have adequate access to a WIC-authorized vendor. Even with adequate access to a WIC-authorized vendor, access to high-speed internet services may improve access to WIC-prescribed foods and other healthy foods. We describe access to WIC-authorized vendors and availability of high-speed internet services across the rural-urban continuum, as rurality and urbanicity may impact distances to physical stores and availability of internet services.

Defining Key Terms

The following terms used through the report are defined as follows:

- **Internet access** refers to the ability to connect to the internet, a global system of interconnected computer networks (Bush et al., 2004).
- **Online** refers to an activity or service available on or performed using the internet (Oxford University Press, 2012).
- **Internet service providers** develop and maintain the infrastructure needed to facilitate internet access and offer connections to the internet to customers through paid subscriptions.
- **High speed** can be used interchangeably with broadband when referring to internet connection speeds (Federal Communications Commission (FCC), 2024a).

continued on next page ▶

Defining Key Terms (continued)

- **Fixed internet service providers** offer access to the internet at a fixed location, such as home or business, typically through installation of physical cables such as fiber optics, Digital Subscriber Line (DSL), or cable (FCC, 2024a). Following the Federal Communications Commission (FCC) definition set in 2015, fixed high-speed internet services refer to download/upload speeds of at least 25/3 Megabits per second (FCC, 2024b).[1]
- **Mobile internet service providers** offer access to the internet via cellular networks (FCC, 2024b).
- **Fifth Generation (5G) mobile broadband** is the latest generation of mobile broadband technology, which uses a higher frequency range of the radio spectrum to achieve higher speeds of transmission (up to 20 Gigabits per second in ideal conditions) than is possible with earlier technologies, such as Fourth Generation (4G) and Fourth Generation Long Term Evolution (4G-LTE) technologies, which are now nearly universally available in residential areas of the United States. 5G represents the current industry standard for mobile connectivity and is considered particularly important for people who rely solely on mobile devices for internet access (FCC, 2020a). However, many online activities, including online shopping, can be completed at slower connection speeds. Federally funded programs, such as WIC, can take slower connectivity into account when designing online services (Dockray et al., 2017).
- **Internet subscription** refers to a paid arrangement, such as a cellular data plan or cable, fiber optic, or Digital Subscriber Line (DSL) plan, that allows a household to access the internet (U.S. Department of Commerce, Bureau of the Census, 2025). We use this term to align with definitions used by the U.S. Census Bureau in its reporting on household internet use and with the FCC's technical definitions of telecommunications terms. However, terms like "having a data plan" or "paying for internet access" or "having internet access/service" may be more common in everyday use.

[1] In March of 2024, the Federal Communications Commission (FCC) updated its definition of high-speed fixed internet to download/upload speeds of 100/20 Megabits per second (FCC, 2024b).

Data and Methods

We use a descriptive approach to characterize census tracts in terms of proximity to WIC-authored vendors, availability of high-speed internet services, number and share of WIC-eligible families, and number and share of WIC-eligible families without high-speed internet subscriptions. We consider descriptive differences in these characteristics across levels of urbanicity and poverty.

Data on the locations of WIC-authorized vendors (physical stores that accept WIC benefits) came from fiscal years 2020, 2021, and 2022 WIC-authorized vendor lists (USDA, FNS, 2023). We primarily used the fiscal year 2021 vendor file; however, there were vendors missing for Indiana. To address these issues, we relied on store information from the fiscal year 2020 file and validated it against the fiscal year 2022 file. We excluded vendors that could be identified by name and geography, as farms/farmer's markets or pharmacies are only authorized to sell/distribute infant formula where WIC participants would only be able to redeem a narrow set of WIC benefits. Our final sample includes 38,279 WIC-authorized

vendors. We used data from fiscal year 2021 rather than more recent data to align with Federal Communications Commission (FCC) data on high-speed internet services from December 2020 and the 2019 version of the Food Access Research Atlas, which used Census data from 2014 to 2018 and 2010 census tract boundaries.

Table 1
Sample exclusion/inclusion criteria for WIC-authorized vendors in fiscal year 2021

Original number	40,108
Data cleaning (removing territories; Indiana; farms, farmers' markets, and formula-only vendors; incomplete addresses)	-1,088
Records geocoded, with duplicate locations removed	-1,351
Adding in Indiana 2020 records (geocoded, with duplicate locations removed)	+610
Final number	38,279

WIC=Special Supplemental Nutrition Program for Women, Infants, and Children.

Note: Vendor data from 2020 and 2022 were used to address missing vendors in Indiana vendor data for 2021. Because the data did not include information about the type of authorized vendor (i.e., farmers' market or formula-only vendor), exclusions were made when vendors could be identified by name and geography as fitting into this category.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service.

We used Census-block level data from the FCC to measure access to fixed and mobile high-speed internet services for December 2020 (FCC, 2021). Biannual census block data on fixed and mobile high-speed internet is publicly available from the FCC from 2014 through 2021. However, December 2020 was the last data release using 2010 census block definitions, which align with other measures in our study.[2]

We obtained information about income, poverty, and urbanicity from the 2019 Food Access Research Atlas (USDA, ERS, 2021), the 2010 Rural-Urban Commuting Area Codes (USDA, ERS, 2019), and the Poverty Area Measures for decennial years 1970 through 2000 and 5-year periods spanning 2007–11 and 2015–19 (USDA, ERS, 2023). We used data from the American Community Survey 2015–19 5-year estimates detailed tables to estimate the total number of WIC-eligible families and the number of WIC-eligible families without high-speed internet subscriptions in each tract (U.S. Department of Commerce, Bureau of the Census, n.d.). Construction of these measures is described in the section, "Additional Measures."

Measures

All measures were aggregated to 2010 census tract definitions for consistency across data sets. Census tracts are statistical subdivisions of a county that generally have a population size between 1,200 and 8,000 people (Census Bureau, 2022). Census tracts are a commonly used proxy for neighborhoods (Ver Ploeg et al., 2009). Our analysis includes 72,351 inhabited census tracts. Our use of 2010 census data create potential inaccuracies when representing more recent years like 2020, since Census Bureau geographies change over time to reflect changes in population. However, it allowed for use of and direct comparison to other data sources (e.g., Food Access Research Atlas) that use the 2010 census tract boundaries.

[2] In 2021, the FCC used 2020 census block definitions. In 2022, the FCC began reporting on availability of internet services using the National Broadband Map, which allows a user to enter an address and retrieve information about internet providers serving that address.

Access to WIC-authorized Vendors

To measure access to WIC-authorized vendors (physical stores that accept WIC benefits), we used a similar methodology as the Food Access Research Atlas (USDA, ERS, 2024). Block-level population data from the 2010 Census of Population and Housing were allocated down to half-kilometer-square grids across the United States. For each half-kilometer-square grid cell, the straight-line (Euclidean) distance was calculated from its geographic center to the nearest WIC-authorized vendor within the same State. These distances were then aggregated by census tract based on grid cell population weight. Because WIC benefits generally cannot be used across State lines, all measures stay within State boundaries.

In addition to constructing a continuous measure of distance to the nearest WIC-authorized vendor for each census tract, we constructed binary measures of WIC access that incorporate information about urbanicity, income, and poverty. In the Food Access Research Atlas, census tracts are designated as low income according to criteria from the U.S. Department of Treasury's New Markets Tax Credit program. A census tract is low income if the tract's poverty rate is 20 percent or greater; the tract's median family income is less than or equal to 80 percent of the State-wide median family income; or if the tract is in a metropolitan area and has a median family income less than or equal to 80 percent of the metropolitan area's median family income. In the Food Access Research Atlas, a census tract is designated as urban based on the Census Bureau's 2019 urban area definition, which classifies tracts as urban if the geographic centroid of the tract is in an area with more than 2,500 people.

For each census tract, the primary measures of access to a WIC-authorized vendor include:

- Distance to WIC-authorized vendor: The average miles to the nearest WIC-authorized vendor from the centroid of each half-kilometer-square grid cell within that census tract, weighted by each grid cell's population.
- Low access to a WIC-authorized vendor at 1 mile and 10 miles: A binary indicator equal to 1 if a significant number (at least 500 people) or share (at least 33 percent) of the population is greater than 1 mile from the nearest WIC-authorized vendor for an urban area or greater than 10 miles for a rural area. We consider census tracts not designated as "low access" to have adequate access to a WIC-authorized vendor.
- Low income and low access to a WIC-authorized vendor, measured at 1 mile and 10 miles: A binary indicator equal to 1 if a census tract is low income and at least 500 people or 33 percent of the population live more than 1 mile (urban areas) or more than 10 miles (rural areas) from the nearest WIC-authorized vendor. A census tract is low income if the tract's poverty rate is 20 percent or greater; the tract's median family income is less than or equal to 80 percent of the State-wide median family income; or if the tract is in a metropolitan area and has a median family income less than or equal to 80 percent of the metropolitan area's median family income.

Access to High-speed Internet Services

To measure access to high-speed internet services by census tract, we estimated the percentage of the population in each tract that resided in census blocks with high-speed service providers, considering various speeds and provider counts.

This approach is not without limitations. As noted, using 2010 census data on the population or number of households of census blocks creates potential inaccuracies when representing more recent years like 2020. Additionally, the share of people or households in census blocks with high-speed internet availability somewhere in the block is likely an overestimate of those with actual access at

their residence, due to uneven distribution of high-speed internet availability within blocks. This limitation of the FCC data is likely a greater problem in rural areas where census blocks can be geographically large, with residences further away from each other. Finally, the data were collected prior to Federal investments in high-speed internet infrastructure during the COVID-19 pandemic, such as the Infrastructure Investment and Jobs Act,[3] which may have increased access to (and quality of) fixed and mobile high-speed internet services (Goldstein & Pender, 2025).

For each census tract, measures of access to high-speed internet services include:

- **Share of population with access to fixed high-speed internet services:** The percentage of the population in the census tract that lives in a census block with at least one residential service provider that advertises fixed access to the internet at download speeds of at least 25 Megabits per second (Mbps) and upload speeds of at least 3 Mbps.
- **Low fixed high-speed internet access:** A binary indicator that equals 1 if less than 90 percent of the population in the census tract lives in a census block with at least one residential service provider that advertises fixed access to the internet at download speeds of at least 25 Megabits per second (Mbps) and upload speeds of at least 3 Mbps. We considered census tracts not designated as "low access" to have adequate access to fixed high-speed internet services.
- **Share of population with access to Fifth Generation (5G) mobile high-speed internet services:** The percentage of the population in the census tract that lives in a census block that is fully within a 5G mobile coverage area.
- **Low 5G mobile high-speed internet access:** A binary indicator that equals 1 if less than 90 percent of the population in the census tract lives in census blocks that are fully within a 5G mobile coverage area. We considered census tracts not designated as "low access" to have adequate access to 5G mobile high-speed internet services.

WIC families and other households may still be able to access the internet in areas considered low access to fixed or 5G mobile high-speed internet services. WIC families in census tracts that have low access to fixed high-speed internet services may have adequate access to mobile high-speed internet services (provided through cellular networks), or they may have access to fixed or mobile internet services at lower speeds.[4] A Fourth Generation Long Term Evolution (4G LTE), 4G, or even Third Generation (3G) connection is sufficient for someone to complete an online application or shop for groceries. Additionally, fixed internet services may be available at businesses and libraries that provide on-premises internet access via Wi-Fi.

[3] Public Law 117–58.

[4] We considered an alternative definition of mobile high-speed internet availability as 90 percent of the population within the tract living in a census block that is fully within a 4G, 4G LTE, or 5G coverage area. Nearly all (>99 percent) census tracts met this definition. However, this is likely an overestimate of the share of the population with actual access to 4G or higher mobile speeds at their residence. See box, "Fifth Generation (5G) Mobile Highspeed Internet" for more information.

Fifth Generation (5G) Mobile Highspeed Internet

Our analysis focuses on the availability of Fifth Generation (5G) mobile high-speed internet services by census tract. 5G is the latest generation of mobile high-speed internet technology. It uses a higher frequency range of the radio spectrum to achieve higher speeds of transmission (up to 20 Gigabits per second in ideal conditions) than is possible with earlier technologies, such as Fourth Generation Long Term Evolution (4G-LTE) technology. Although 5G is not required for tasks such as online shopping, it represents the current industry standard for mobile connectivity (FCC, 2020a). 5G significantly reduces latency, making it better for supporting services such as video conferencing and telehealth. 5G is considered particularly important for people who rely solely on mobile devices for internet access (FCC, 2020a).

5G is more prevalent in urban areas, while 4G-LTE is now nearly universally available in residential areas of the United States. In December 2019, estimates based on coverage maps submitted by internet service providers indicated that 99.9 percent of the U.S. population lived in census blocks with one or more service providers providing 4G-LTE service (FCC, 2020b). For this analysis, we considered a definition of mobile high-speed internet availability as 90 percent of the population within a tract living in a census block that is fully within a 4G, 4G LTE, or 5G coverage area in December 2020. Nearly all (>99 percent) census tracts met this definition.

However, the data on 4G coverage areas may overestimate the share of the population with actual access to mobile high-speed internet at their residence. An investigation led by the Rural Broadband Actions Taskforce found that minimum connectivity speeds corresponded with those predicted by the service provider maps in about two-thirds of 24,649 drive tests—tests of download and upload speeds conducted by field agents of more than 10,000 miles in 12 States along 6 routes. No 4G LTE signal was available for 16 percent to 38 percent of the tests, depending on the service provider (FCC, 2019).

This issue prompted the development of the current FCC National Broadband Map, which provides information about fixed and mobile internet service availability at each serviceable location (residential or business address). Although this newer data are now available at the Census block level, we used the FCC data from December 2020, the most recent data release using 2010 census block definitions, to align with our other data sources.

Additional Measures

We also include more detailed information about the rurality/urbanicity of census tracts using the 2010 Rural-Urban Commuting Area (RUCA) Codes (USDA, 2019). The RUCA codes incorporated information about where people travel for work (i.e., commuting flows) to group census tracts with respect to urbanization into 10 categories: metro core, metro high commuting, metro low commuting, micro core, micro high commuting, micro low commuting, small town core, small town high commuting, small town low commuting, and rural area. Metropolitan cores are urbanized areas and micropolitan and small-town cores are urban clusters. High commuting means that the largest share of the commuting flow was at least 30 percent to a metropolitan, micropolitan, or small-town core. Low commuting means the largest share of the commuting flow was less than 30 percent to a metropolitan, micropolitan, or small-town core. Rural areas are those where the primary commuting flow is local or to another rural tract.

We included more detailed information about poverty for each census tract using the Poverty Area Measures (USDA, 2023). The Poverty Area Measures use data from Decennial Censuses and American Community Survey (ACS) 5-year period estimates to report on levels of poverty and its persistence in given places over time. High poverty areas had a poverty rate of 20 percent or more in 2015–19. Extreme poverty areas had a poverty rate of 40 percent or more in 2015–19. Persistent poverty areas had a poverty rate of 20 percent or more for four consecutive time periods spanning approximately 30 years.

Finally, we use data from the American Community Survey (ACS) 2015–19 5-year estimates to estimate the total number of WIC-eligible families and the number of WIC-eligible families without internet subscriptions in each census tract.[5] Census table B17022 provides an estimate of the number of families at different income-to-poverty ratios by family type (married-couple families, female household, etc.) and by whether the family has children under 18 or not for each census tract. If families have children under 18, they are further categorized by whether there are children in the home under 5 years only, under 5 years and 5 to 17 years, and 5 to 17 years only. We use this information to identify families of any type with incomes less than 185 percent of the Federal poverty level and children under the age of 5 in each tract. We consider these families to be eligible for WIC. This is a conservative estimate of WIC-eligible families because this data does not contain information about the number of families with incomes less than 185 percent of the Federal poverty level that have a pregnant woman but do not have children under the age of 5.[6] Due to sample size constraints, we estimate the number of WIC-eligible families for 63,457 (87.5 percent) of the 72,531 census tracts in our analysis. Differences in the characteristics of all census tracts in our analysis and those where we can identify WIC-eligible households are reported in appendix table A.1.

Because publicly available ACS data do not provide estimates of the number of WIC-eligible families without a high-speed internet subscription, we estimated this quantity by multiplying the estimated number of WIC-eligible families by the estimated share of households without a high-speed internet subscription in each census tract.[7] In the ACS data, a high-speed internet (or broadband) subscription refers to a service that someone pays for to "broadband such as cable, fiber option, or Digital Subscriber Line (DSL); a cellular data plan; satellite; a fixed wireless subscription; or other non-dial up subscription types" (U.S. Department of Commerce, Bureau of the Census, n.d.). Households that do not pay for an internet subscription are categorized as "without an Internet subscription" in the ACS. Households that do not have an internet subscription may be able to access the internet at a business or public location (like a school or library) or at the home of a friend or relative. The estimates reflect internet subscription rates prior to policy changes during the COVID-19 pandemic, such as the Emergency Broadband Benefit and the Affordable Connectivity Program,[8] which may have increased the number of households with highspeed internet subscriptions (FCC, 2024c; FCC, 2025).[9]

[5] A family includes a householder and one or more people living in the same household who are related to the householder by birth, marriage, or adoption (U.S. Department of Commerce, Bureau of the Census, 2025). This may underestimate the number of WIC-eligible households by excluding single pregnant women living alone or with unrelated people.

[6] This estimate also excludes single pregnant women living alone or with unrelated people.

[7] Estimates of the share of households in each tract without a broadband subscription by household income ranges are available in ACS table B28004, a different ACS table from the table reporting the numbers of families with income less than 185 percent of the Federal poverty level and children under the age of 5 (ACS table B17022).

[8] The Affordable Connectivity Program (ACP) operated from January 1, 2022, to July 1, 2024, and replaced the Emergency Broadband Benefit (EBB), which operated from May 12, 2021, to December 31, 2022. Under ACP, eligible households received a discount of up to $30 per month towards internet service or up to $75 per month for households on qualifying tribal lands (FCC, 2024c). Under EBB, eligible households received a discount of up to $50 per month towards internet service or up to $75 per month for households on qualifying tribal lands (FCC, 2025).

[9] Based on the 2019 5-year estimates from ACS table B28004, 17 percent of households did not have a highspeed internet subscription. Based on the 2023 5-year estimates from ACS table B28004, 10.1 percent of households did not have a highspeed internet subscription.

Estimating the Number of WIC-eligible Families Without a Fixed or Mobile High-speed Internet Subscription

We estimated the number of WIC-eligible families without a fixed or mobile high-speed internet subscription in each census tract by multiplying the estimated number of WIC-eligible families in the tract by the estimated share of all households without a high-speed internet subscription in the tract. This likely results in a conservative estimate of the number of WIC-eligible families without an internet subscription.

We investigated how our estimates would vary if we multiplied the number of WIC-eligible families by the share of households with incomes below various thresholds that did not have a broadband/high-speed internet subscription in each census tract, considering income thresholds of $10,000, $20,000, $35,000, $50,000, and $75,000 reported in ACS table B28004 (U.S. Department of Commerce, Bureau of the Census, n.d.). Using these different thresholds, we found that for all thresholds considered, the estimated number of WIC-eligible families without a broadband subscription would be larger than our estimates based on the estimated share of all households without a broadband subscription, with the largest estimate found using the $20,000 income threshold. Using the $20,000 income threshold, our estimate of the total number of WIC-eligible families without a broadband subscription would be about twice as large as our conservative estimate based on the share of all households without broadband in each census tract (2.15 million families compared to 1.16 million families). The true value for the total number of WIC-eligible families without a high-speed internet subscription in 2015–19 likely lies within this range of 1.16 to 2.15 million families.

Results

Across all census tracts included in our study, the national average distance to the nearest WIC-authorized vendor was 1.8 miles (table 2). Half of the census tracts (49.2 percent) had low access to a store accepting WIC benefits (figure 1 and table 2). Fewer tracts (17.3 percent) were characterized as low income and low access (table 2).

The percentage of census tracts characterized as low access to a WIC-authorized vendor changed depending on how low access was defined (appendix table A.2). Defining low access as not having a WIC-authorized vendor within half a mile in urban areas and 10 miles in rural areas resulted in more tracts, nearly 70 percent, being characterized as low access. Defining low access to a WIC-authorized vendor as areas where 100 housing units do not have a vehicle and are more than half a mile from the nearest vendor, or a significant number or share of residents are more than 20 miles from the nearest vendor, resulted in fewer tracts (23.2 percent) being characterized low access. This pattern was similar when comparing the different measures of low income and low access (appendix table A.2).

Table 2

Measures of access to WIC-authorized vendors and high-speed internet services for U.S. census tracts

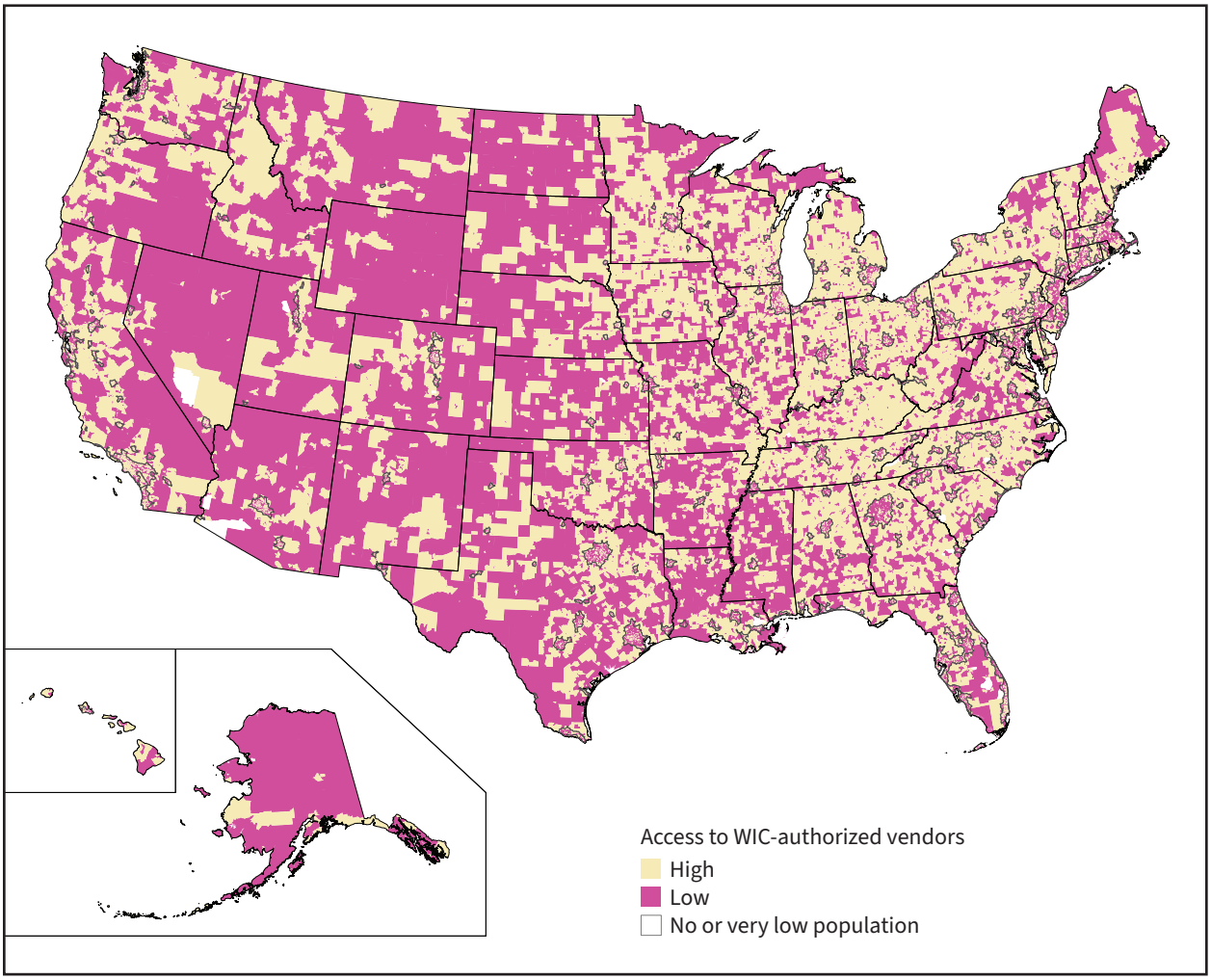
Continuous measures	**Mean (standard deviation)**	
Distance to nearest WIC-authorized vendor in miles	1.80	(2.31)
Share of population with access to fixed high-speed internet services	97.87	(8.22)
Share of population with access to 5G mobile internet services	93.99	(17.16)
Binary measures	**N (percent)**	
Tracts with low access to WIC-authorized vendor	35,678	(49.2)
Low-income tracts with low access to WIC-authorized vendor	12,530	(17.3)
Tracts with low access to fixed high-speed internet services	4,746	(6.5)
Tracts with low access to 5G mobile internet services	10,454	(14.5)
Total tracts	72,531	

WIC = Special Supplemental Nutrition Program of Women, Infants, and Children.

Note: Low access to a WIC-authorized vendor is defined as a census tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. Low access to fixed high-speed internet services is defined as a census tract where less than 90 percent of the population lives in a census block with at least one residential service provider that advertises download speeds of at least 25 Megabits per second (Mbps) and upload speeds of at least 3 Mbps (excludes 15 tracts with missing data). Low access to 5G mobile high-speed internet services is defined as a census tract where less than 90 percent of the population lives in census blocks with full 5G mobile high-speed internet service coverage (excludes 367 tracts with missing data). WIC vendor data are as of fiscal year 2021. High-speed internet data are as of December 2020. Continuous measures are national averages that account for differences in population across census tracts.

Source: USDA, Economic Research Service (ERS) using data from USDA, Food and Nutrition Service, Federal Communications Commission, and USDA, ERS.

Figure 1
U.S. census tracts by access to WIC-authorized vendors



WIC = Special Supplemental Nutrition Program of Women, Infants, and Children.

Note: Number = 72,864 census tracts. Tracts with no or very low population = 333. Areas outlined within States are urban areas with more than 100,000 people. Low access to a WIC-authorized vendor in fiscal year 2021 was defined as a census tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service and U.S. Department of Commerce, Bureau of the Census.

On average, within a census tract, 98 percent of people had access to fixed high-speed internet services and 94 percent of people had access to 5G mobile high-speed internet services (table 2). Only 6.5 percent of census tracts were characterized as low access to fixed high-speed internet, meaning less than 90 percent of people within the tracts had access to fixed high-speed internet services. Only 14.5 percent of census tracts were characterized as low access to 5G mobile high-speed internet, meaning less than 90 percent of people within the tracts lived in census blocks with full 5G mobile high-speed internet service coverage.

To the extent there is an overlap between low access to WIC-authorized vendors and low access to high-speed internet, figure 2 shows low access to both a WIC-authorized vendor and fixed high-speed internet service in purple. These tracts represented 3 percent of all census tracts in 2021 (table 3). Census tracts shaded in pink (46.2 percent of all tracts) had low access to a WIC-authorized vendor but adequate access to fixed high-speed internet service. The blue colored census tracts (3.6 percent of

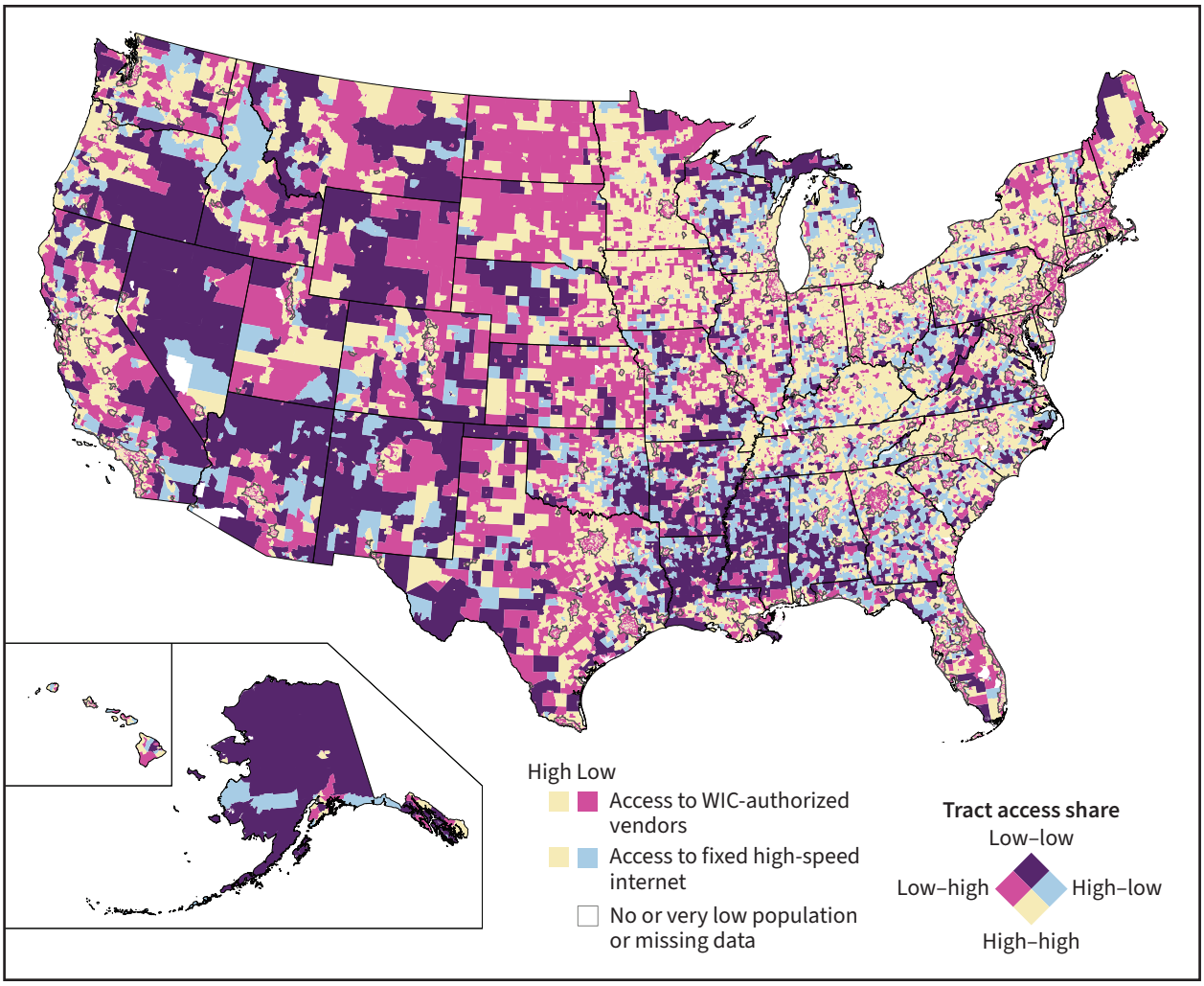
all tracts) had adequate access to a WIC-authorized vendor but low access to fixed high-speed internet services. Census tracts shown in yellow had adequate access to both (47.2 percent).

Of the census tracts with low access to both WIC and fixed high-speed internet, 75.2 percent were rural and 24.8 percent were urban (table 3). Of the census tracts that had low access to a WIC-authorized vendor but adequate access to fixed high-speed internet services, 5.7 percent were rural and 94.3 percent were urban. Of those that had adequate access to a WIC-authorized vendor but low access to fixed high-speed internet, 90.5 percent were rural and 9.5 percent were urban. Of those that had adequate access to both a WIC-authorized vendor and high-speed internet services, 33.5 percent were rural and 66.5 percent were urban.

To further illustrate the geographic variation in WIC store access and fixed high-speed internet availability, we focus in on three distinct areas in the United States. In figure B.1, we show the overlap between low access to WIC-authorized vendors and low access to fixed high-speed internet for Chicago, rural Michigan, and Tampa Bay. Chicago represents a major metropolitan area with high population density. Northern Michigan represents a mix of small town and rural areas with low population density. The Tampa Bay area represents a mix of medium population density suburban neighborhoods around two urban cores (Tampa and St. Petersburg). In both the urban areas of Chicago and Tampa Bay, many census tracts had low access to a WIC authorized vendor but very few had low access to high-speed internet services. In rural Michigan, more census tracts had low access to high-speed internet services, including those tracts with low access to a WIC vendor (figure B.1).

Figure 2

U.S. census tracts by access to WIC-authorized vendors and fixed high-speed internet



WIC = Special Supplemental Nutrition Program of Women, Infants, and Children.

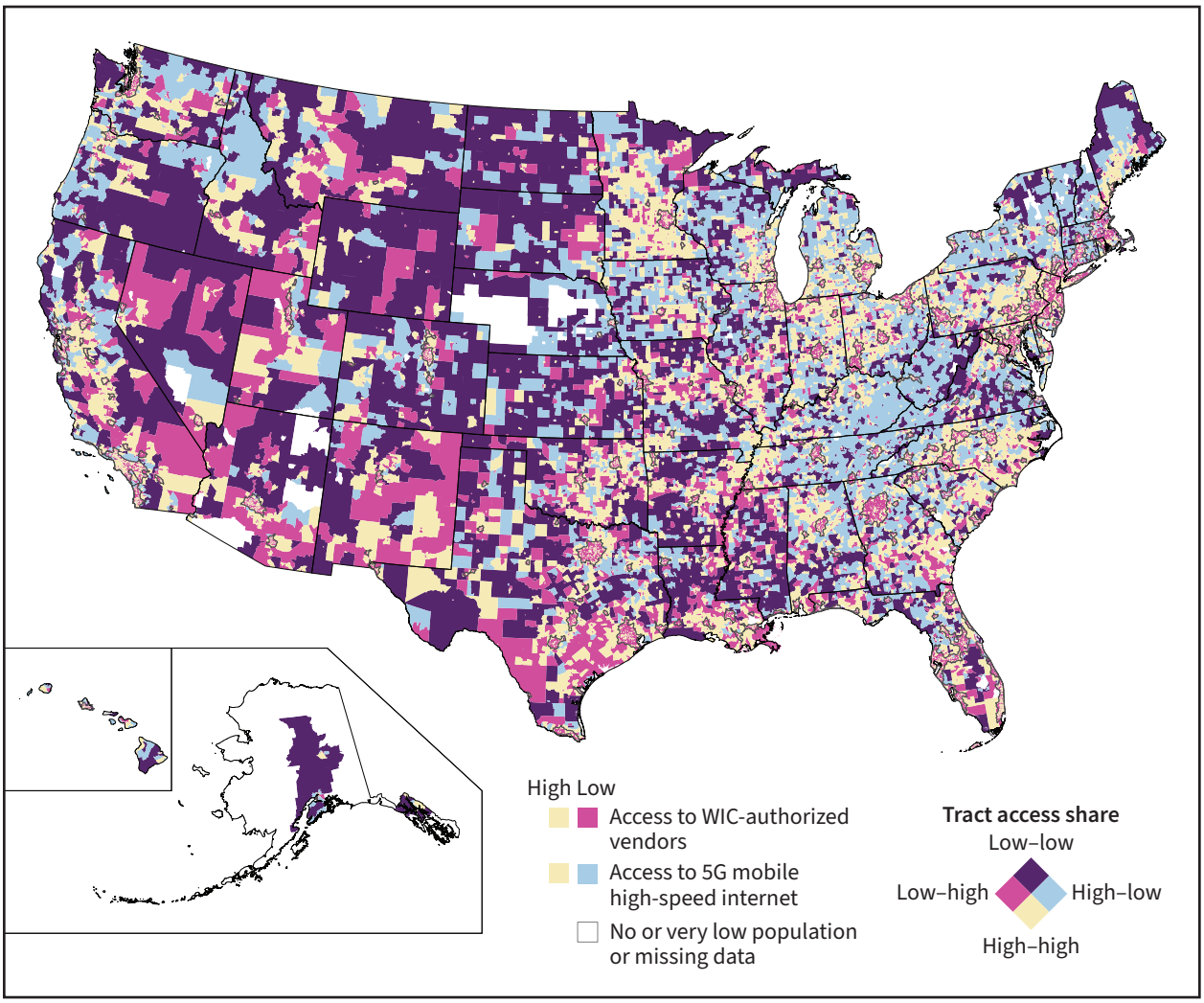
Note: Number = 72,864 census tracts. Tracts with no or very low population = 333. Tracts with missing fixed high-speed internet data = 15. Areas outlined within States are urban areas with more than 100,000 people. Low access to a WIC-authorized vendor is defined as a census tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. Low access to fixed high-speed internet services is defined as a census tract where less than 90 percent of the population live in census blocks with at least one residential service provider that advertises download speeds of at least 25 Megabits per second (Mbps) and upload speeds of at least 3 Mbps. WIC vendor data are as of fiscal year 2021. High-speed internet data are as of December 2020.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service, Federal Communications Commission, and U.S. Department of Commerce, Bureau of the Census.

Figure 3 shows census tracts that had low access to both a WIC-authorized vendor and 5G mobile high-speed internet services in purple, representing 6.4 percent of all tracts in 2021 (table 3). Pink tracts (42.7 percent of all tracts) denote tracts with low access to a WIC-authorized vendor but adequate access to 5G mobile high-speed internet services. The blue-colored census tracts (8.1 percent of all tracts) had adequate access to a WIC-authorized vendor but low access to 5G mobile high-speed internet services. The census tracts with adequate access to both (42.8 percent) are shown in yellow.

Figure 3

U.S. census tracts by access to WIC-authorized vendors and 5G mobile high-speed internet



WIC = Special Supplemental Nutrition Program of Women, Infants, and Children.

Note: Number = 72,864 census tracts. Tracts with no or very low population = 333. Tracts with missing 5G mobile data = 367. Areas outlined within States are urban areas with more than 100,000 people. Low access to a WIC-authorized vendor is defined as a census tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. Low access to Fifth Generation (5G) mobile high-speed internet service is defined as a census tract where less than 90 percent of the population lives in census blocks with full 5G mobile high-speed internet service coverage. WIC vendor data are as of fiscal year 2021. High-speed internet data are as of December 2020.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service, Federal Communications Commission, and U.S. Department of Commerce, Bureau of the Census.

Of the census tracts that had low access to both a WIC-authorized vendor and mobile high-speed internet, 51.6 percent were rural and 48.4 percent were urban (table 3). Of those that had low access to a WIC-authorized vendor and adequate access to mobile high-speed internet services, 3.4 percent were rural and 96.6 percent were urban. Of those that had adequate access to a WIC-authorized vendor and low access to fixed high-speed internet, 92.1 percent were rural and 7.9 percent were urban. Of those that had adequate access to both a WIC-authorized vendor and high-speed internet services, 27.1 percent were rural and 72.9 percent were urban.

Table 3

U.S. census tracts by access to WIC-authorized vendors, high-speed internet, and rurality and urbanicity

	All tracts		Rural		Urban	
	Number	(percent)	Number	(percent)	Number	(percent)
Access to fixed high-speed internet service	72,516		17,348	(23.9)	55,168	(76.1)
Low access to WIC-authorized vendor and fixed high-speed internet service	2,151	(3.0)	1,618	(75.2)	533	(24.8)
Low access to WIC-authorized vendor and adequate access to fixed high-speed internet service	33,520	(46.2)	1,895	(5.7)	31,625	(94.3)
Adequate access to WIC-authorized vendor and low access to fixed high-speed internet service	2,595	(3.6)	2,349	(90.5)	246	(9.5)
Adequate access to WIC-authorized vendor and fixed high-speed internet service	34,250	(47.2)	11,486	(33.5)	22,764	(66.5)
Access to mobile high-speed internet service	72,164		17,181	(23.8)	54,983	(76.2)
Low access to WIC-authorized vendor and 5G mobile high-speed internet service	4,627	(6.4)	2,389	(51.6)	2,238	(48.4)
Low access to WIC-authorized vendor and adequate access to 5G mobile high-speed internet service	30,844	(42.7)	1,056	(3.4)	29,788	(96.6)
Adequate access to WIC-authorized vendor and low access to 5G mobile high-speed internet service	5,827	(8.1)	5,368	(92.1)	459	(7.9)
Adequate access to WIC-authorized vendor and 5G mobile high-speed internet service	30,866	(42.8)	8,368	(27.1)	22,498	(72.9)

WIC = Special Supplemental Nutrition Program of Women, Infants, and Children.

Note: Number = 72,531 census tracts. Low access to a WIC-authorized vendor is defined as a census tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. Low access to fixed high-speed internet service is defined as a census tract where less than 90 percent of the population lives in census blocks with at least one residential service provider that advertises download speeds of at least 25 Megabits per second (Mbps) and upload speeds of at least 3 Mbps (excludes 15 tracts with missing data). Low access to 5G mobile high-speed internet access is defined as a census tract where less than 90 percent of the population lives in census blocks with full 5G mobile high-speed internet service coverage (excludes 367 tracts with missing data). WIC vendor data are as of fiscal year 2021. High-speed internet data are as of December 2020.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service, Federal Communications Commission, and USDA, Economic Research Service.

Access to WIC-authorized Vendors at Different Levels of Rurality and Poverty

In this section, we take a closer look at physical access to WIC foods and access to technologies that would support online options for obtaining WIC foods at different levels of rurality and poverty.[10] Specifically, we report the average distance to the nearest WIC-authorized vendor (in miles) and average population share with access to fixed and mobile high-speed internet by rural-urban community area and poverty area classifications (table 4).

Mean distances to the nearest WIC-authorized vendor in 2021 were greater in smaller cities/towns than larger ones, and much greater in noncore areas outside of cities and towns. Shares of people with access to high-speed internet services were greater in metropolitan areas and smaller cities/towns and were lower in noncore areas outside of cities and towns. Census tracts characterized as having

[10] High poverty areas had a poverty rate of 20 percent or more in 2015–19. Extreme poverty areas had a poverty rate of 40 percent or more in 2015–19. Persistent poverty areas had a poverty rate of 20 percent or more for four consecutive time periods spanning approximately 30 years.

high, extreme, and persistent poverty, had similar mean distances to the nearest WIC-authorized vendor as core areas. This may be because most tracts characterized by high, extreme, and persistent poverty are urban—84.1 percent, 94.4 percent, and 87.4 percent respectively. The shares of people with high-speed internet services available in high, extreme, and persistent poverty tracts were similar to core areas as well.

Table 4
Distance to nearest WIC-authorized vendor and shares of population with access to fixed and mobile high-speed internet of U.S. census tracts by rurality and poverty

		Distance to nearest WIC-authorized vendor	Percentage of population with access to fixed high-speed internet service	Percentage of population with access to 5G mobile high-speed internet service
	Number (percent)	Mean (standard deviation)		
Total census tracts	72,531	1.80 (2.31)	97.87 (8.22)	93.68 (17.16)
Rural-Urban Commuting Area Codes				
Metro core	51,903 (71.6)	1.01 (0.81)	99.44 (3.34)	97.92 (9.92)
Metro high commuting	6,833 (9.4)	4.28 (2.74)	94.41 (12.57)	86.15 (21.93)
Metro low commuting	653 (0.9)	5.21 (2.88)	88.70 (19.46)	77.05 (27.54)
Micro core	4,230 (5.8)	1.61 (1.69)	98.69 (4.56)	92.15 (20.48)
Micro high commuting	1,970 (2.7)	5.73 (3.02)	90.67 (14.92)	77.94 (26.23)
Micro low commuting	411 (0.6)	5.87 (2.73)	87.90 (17.77)	77.06 (25.14)
Small town core	2,159 (3.0)	1.90 (2.57)	96.14 (10.48)	84.85 (28.41)
Small town high commuting	827 (1.1)	6.24 (3.09)	82.90 (21.96)	70.81 (29.03)
Small town low commuting	343 (0.5)	6.13 (2.48)	84.60 (20.56)	73.13 (26.71)
Rural	3,202 (4.4)	6.13 (5.05)	88.15 (19.15)	67.86 (32.06)
Poverty Area Measures				
High poverty	17,577 (24.7)	1.42 (2.39)	97.11 (10.47)	94.89 (17.01)
Extreme poverty	2,838 (3.9)	1.02 (2.11)	97.59 (10.29)	97.47 (12.56)
Persistent poverty	8,299 (12.1)	1.27 (2.30)	96.90 (11.58)	95.36 (16.92)

WIC = Special Supplemental Nutrition Program of Women, Infants, and Children. Metro = metropolitan areas. Micro = micropolitan areas.

Note: Total number for percentage of population with access to fixed high-speed internet service excludes 15 census tracts. Total number for percentage of population with access to 5G mobile high-speed internet service excludes 367 census tracts. Total number for high poverty measure (share of households in poverty > = 20 percent) excludes 1,470 census tracts. Total number for extreme poverty measure (share of households in poverty > = 40 percent) excludes 547 census tracts. Total number for persistent poverty measure (share of households in poverty > = 20 percent in 1990, 2000, 2007–11, and 2015–19) excludes 3,906 census tracts. Continuous measures are weighted by tract population within each Rural-Urban Commuting Area (RUCA) and poverty area typology. Vendor data are as of fiscal year 2021; high-speed internet data are as of December 2020.

Source: USDA, Economic Research Service (ERS) using data from USDA, ERS; USDA, Food and Nutrition Service; and the Federal Communications Commission.

WIC-eligible Families

We estimated the number of WIC-eligible families within groups of census tracts based on urbanicity, income, WIC store access, and high-speed internet access (table 5). An estimated 5.2 million families were eligible for WIC in 2015–19, meaning that they had incomes of less than 185 percent of the Federal poverty level and children under the age of 5.[11] An estimated 4.1 million WIC-eligible families

[11] Our estimates do not include families with incomes less than 185 percent of the Federal poverty level that have a pregnant woman but do not have children under the age of 5.

lived in urban areas and 1.1 million lived in rural areas. An estimated 2.5 million WIC-eligible families lived in areas considered to have low access to a WIC-authorized vendor and 1.4 million lived-in low-income areas with low access to a WIC-authorized vendor.

In terms of high-speed internet availability, around 316,000 WIC-eligible families lived in areas with low access to fixed high-speed internet and about twice as many lived in areas with low access to 5G mobile high-speed internet. An estimated 2.4 million WIC-eligible families lived in areas with low access to a WIC-authorized vendor but adequate access to fixed high-speed internet services, while about 139,000 families lacked access to both. Similarly, an estimated 2.2 million WIC-eligible families lived in areas with low access to a WIC-authorized vendor but adequate access to 5G mobile high-speed internet, while about 262,000 families lacked access to both.

Table 5
WIC eligible families overall and without high-speed internet subscriptions by census tract characteristics

	WIC eligible families	WIC eligible families without high-speed internet subscriptions (using subscription estimates for all households)	
	Number	Number	Percent
All census tracts	5,195,741	1,161,585	22.4
Urbanicity			
Rural tracts	1,097,035	273,092	24.9
Urban tracts	4,098,706	888,494	21.7
Income level			
Medium- or high-income tracts	1,891,863	288,671	15.3
Low-income tracts	3,303,878	872,914	26.4
Access to WIC authorized vendor			
Adequate access tracts	2,670,733	637,884	23.9
Low-access tracts	2,525,008	523,701	20.7
WIC access and income			
Adequate access and medium/high income tracts	3,750,680	788,379	21.0
Low-access and low-income tracts	1,445,061	373,206	25.8
Access to fixed high-speed internet service			
Adequate access tracts	4,880,070	1,064,765	21.8
Low-access tracts	315,671	96,821	30.7
Access to 5G mobile high-speed internet service			
Adequate access tracts	4,565,721	1,000,570	21.9
Low-access tracts	606,826	153,797	25.3
Access to WIC vendor and fixed high-speed internet service, tracts with			
Adequate access to both	2,494,465	584,840	23.4
Low access to WIC vendor only	2,385,605	479,925	20.1
Low access to fixed high-speed internet only	176,268	53,045	30.1
Low access to both	139,403	43,776	31.4

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	WIC eligible families	WIC eligible families without high-speed internet subscriptions (using subscription estimates for all households)	
	Number	Number	Percent
Access to WIC vendor and 5G mobile high-speed internet service, tracts with			
Adequate access to both	2,316,568	547,125	23.6
Low access to WIC vendor only	2,249,153	453,446	20.2
Low access to 5G mobile high-speed internet only	344,889	88,148	25.6
Low access to both	261,937	65,649	25.1
RUCA			
Metro core tracts	3,728,953	782,756	21.0
Metro high commuting tracts	417,620	95,655	22.9
Metro low commuting tracts	43,374	12,733	29.4
Micro core tracts	406,886	100,429	24.7
Micro high commuting tracts	128,331	34,554	26.9
Micro low commuting tracts	26,745	7,826	29.3
Small town core tracts	197,939	54,005	27.3
Small town high commuting tracts	49,958	14,783	29.6
Small town low commuting tracts	20,842	6,363	30.5
Rural tracts	175,093	52,481	30.0
Poverty area measures			
High poverty tracts	2,169,463	641,567	29.6
Extreme poverty tracts	357,323	137,675	38.5
Persistent poverty tracts	1,010,651	348,274	34.5

WIC = Special Supplemental Nutrition Program of Women, Infants, and Children. Metro = metropolitan areas. Micro = micropolitan areas. RUCA = Rural-Urban Commuting Area.

Note: Numbers of WIC-eligible families by census tract based on estimates from the 2019 5-year American Community Survey data. Number =63,459 census tracts with WIC-eligible population. It is possible that there were WIC eligible families in the 9,072 excluded tracts, but they were not identified due to sampling errors. An additional 324 tracts were missing 5G mobile high-speed internet data. For WIC eligible families without high-speed internet subscriptions, categories may sum to more than 1,161,585 due to rounding. Internet subscription refers to a paid arrangement, such as a cellular data plan or cable, fiber optic, or a DSL (Digital Subscriber Line) plan, that allows a household to access the internet. We multiplied the estimated number of WIC-eligible families by the estimated share of households without a high-speed internet subscription in each tract to estimate the number of WIC-eligible families without high-speed internet subscriptions.

Source: USDA, Economic Research Service (ERS) using data from USDA, ERS; USDA, Food and Nutrition Service; U.S. Department of Commerce, Bureau of the Census; and the Federal Communications Commission.

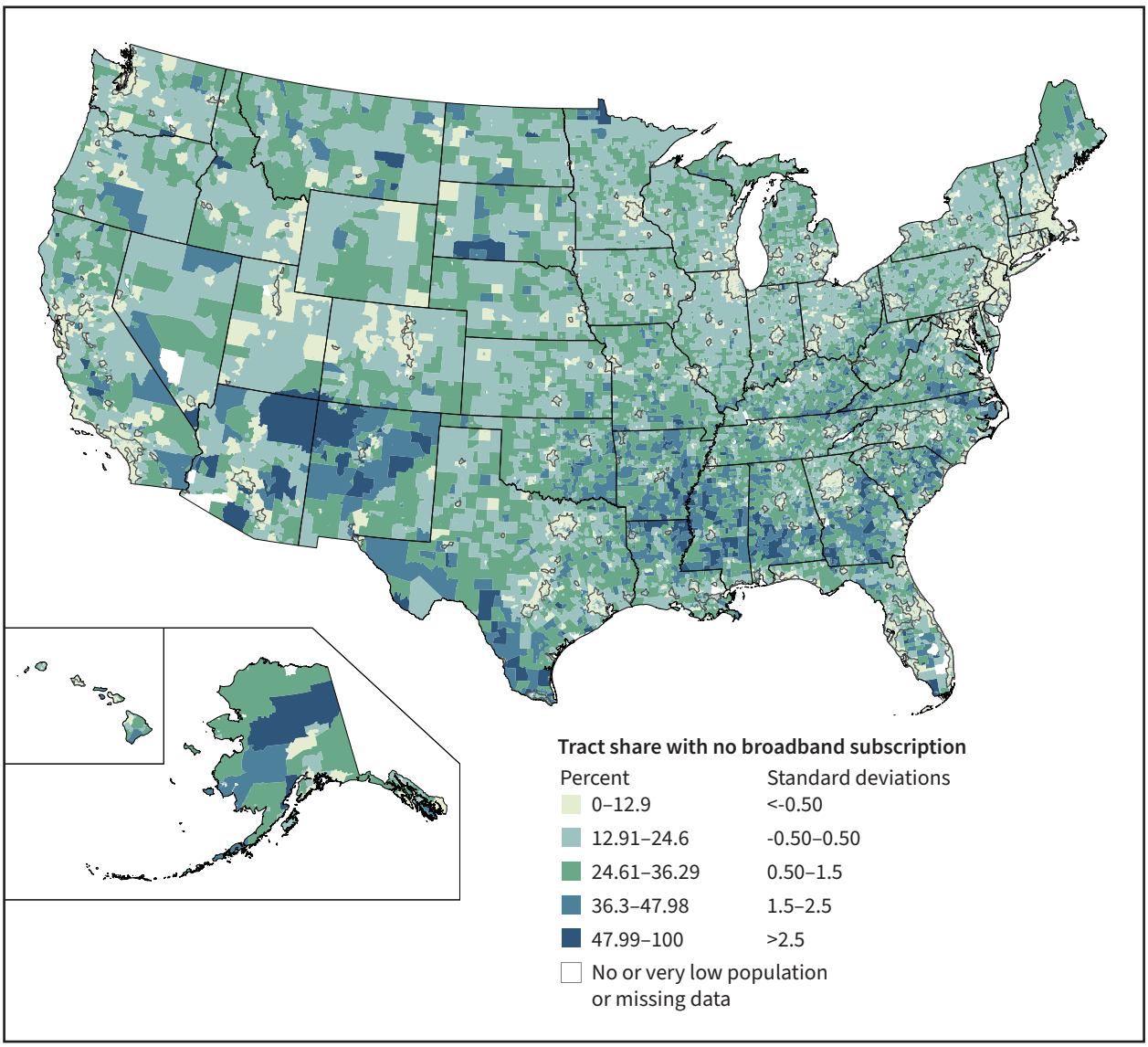
To better understand WIC-eligible families' abilities to take advantage of high-speed internet technologies, particularly in areas where they have access to fixed or mobile high-speed internet services, we estimated the share of WIC-eligible families that did not have high-speed internet subscriptions in 2015–19 (whether fixed, mobile, or both) (figure 4, table 5). Because the publicly available ACS data do not provide estimates of the number of WIC-eligible families without a high-speed internet subscription, we estimated this quantity by multiplying the estimated number of WIC-eligible families by the estimated share of households without a high-speed internet subscription in each census tract. As a result, some categories in table 5 may sum to more than the estimated total number of WIC eligible families without high-speed internet subscriptions.

Figure 4 shows the shares of households without a high-speed internet subscription by census tract in 2015–19, using standard deviations from the mean to differentiate tracts. Tracts where more households had high-speed internet subscriptions are shown in lighter shades and tracts where fewer

households had high-speed internet subscriptions are shown in darker shades. On average, 19 percent of households in a census tract did not have a high-speed internet subscription. The distribution was skewed right, with half of tracts having 17 percent or fewer households without a high-speed internet subscription. In more than a third (36 percent) of census tracts, 12.9 percent or fewer households did not have high-speed internet subscriptions. These tracts are shown in light green/yellow in figure 4. Another 37 percent of census tracts fell a standard deviation below the mean to half a standard deviation above the mean, meaning that 13 to 24.6 percent of households in these areas did not have high-speed internet subscriptions. On the other end of the distribution, 6 percent of tracts were between 1.5 and 2.5 standard deviations from the mean, meaning that the shares of households without high-speed internet subscriptions in these tracts ranged from 36.3 percent to 47.98 percent. In 2 percent of tracts, 48 percent or more of households lacked high-speed internet subscriptions.

Figure 4

Shares of households without a fixed or mobile high-speed internet subscription in 2019 by census tract



Note: Number = 72,864 census tracts. Estimates are based on data for 72,218 census tracts from the American Community Survey (ACS) 2015–19 5-year estimates (ACS table B28004). Tracts with no or very low population = 333. Tracts where estimates of household level internet subscriptions were not available = 313. Standard deviations from the average share of households without high-speed internet subscriptions (19 percent) used to differentiate census tracts. Internet subscription refers to a paid arrangement, such as a cellular data plan or cable, fiber optic, or DSL (Digital Subscriber Line) plan, that allows a household to access the internet. Areas outlined within States are urban areas with more than 100,000 people.

Source: USDA, Economic Research Service using data from U.S. Department of Commerce, Bureau of the Census.

We estimated that of the 5.2 million WIC-eligible families in 2015–19, 1.2 million (or 22.4 percent) did not have fixed or mobile high-speed internet subscriptions (table 5). This included an estimated 888,494 WIC-eligible families in urban census tracts and 273,092 in rural census tracts. Of the 1.1 million families in rural tracts, an estimated 24.9 percent did not have high-speed internet subscriptions. Shares of WIC-eligible families without high-speed internet subscriptions were lower for metro census tracts and higher for noncore tracts outside of cities and towns. In high poverty, extreme poverty, and persistent poverty census tracts, 29.6 percent, 38.5 percent, and 34.5 percent of WIC-eligible families did not have high-speed internet subscriptions, respectively.

In census tracts characterized as low access to a WIC-authorized vendor, 20.7 percent of WIC-eligible families did not have high-speed internet subscriptions compared to 23.9 percent in tracts characterized as having adequate access. In census tracts characterized as low income and low access, 25.8 percent of WIC-eligible families did not have high-speed internet subscriptions.

In census tracts that had low access to a WIC-authorized vendor and fixed high-speed internet, 31.4 percent of WIC-eligible families (about 44,000 families) did not have high-speed internet subscriptions. In tracts that had low access to a WIC-authorized vendor and 5G mobile high-speed internet, 25.1 percent of WIC-eligible families (about 66,000 families) did not have high-speed internet subscriptions. This does not mean that WIC families living in these census tracts cannot use WIC services that are provided on the internet. Families in census tracts that have low access to fixed high-speed internet service may have adequate access to mobile high-speed internet service (provided through cellular networks) or they may have access to fixed or mobile internet service at lower speeds. Additionally, fixed internet services may be available to businesses and libraries that provide on-premises internet access via Wi-Fi.

Discussion

This study found that about half (49.2 percent) of census tracts lacked adequate access to a WIC-authorized vendor in 2021. This estimate aligns with a recent study conducted by USDA, Food and Nutrition Service (FNS), that examined geographic coverage and density of WIC vendors across States in fiscal year 2022 and characterized 45 percent of census tracts as having low access to a WIC-authorized vendor (Bardin et al., 2025).[12] We estimated that 2.5 million WIC-eligible families lived in census tracts characterized as low access in 2021. Given that Bardin et al. (2025) characterized fewer census tracts as low access, it is not surprising that their estimated number of WIC-eligible families lacking access to a WIC-authorized vendor was slightly lower than ours, at 2.1 million as of 2022. We also found that 17.3 percent of census tracts in low-income areas had low access to a WIC-authorized vendor, with an estimated 1.4 million WIC-eligible families (27.8 percent) living in these tracts.

The analytical choice of a distance that defines low access can substantially impact the share of census tracts and number of WIC-eligible households estimated to have low access to a WIC-authorized vendor. The numbers of census tracts and numbers of WIC-eligible households with low access to a WIC-authorized vendor both increase if shorter distances are used to define low access

[12] The USDA, FNS report, which used WIC vendor data from fiscal year 2022, measured adequate access as the availability of a WIC vendor within 1-mile driving distance in urban areas and 10-mile driving distance in rural areas from the population-weighted centroid of a census tract. However, our report used census-block level population data from the 2010 Census of Population and Housing. Census blocks are smaller geographic units than census tracts. We allocated the block-level data down to half-kilometer-square grids across the United States. For each half-kilometer-square grid cell, the distance was calculated from its population-weighted geographic center to the nearest WIC-authorized vendor within the same State. These distances were then aggregated for each tract, weighting by population of each grid cell within the tract.

in urban areas. At greater than one-half mile from the nearest WIC-authorized vendor for an urban tract and greater than 10 miles for a rural tract, 70 percent of census tracts and an estimated 3.6 million WIC-eligible families had low access to a WIC-authorized vendor (appendix table A. 2).

The low access designation may mean that WIC participants living in these tracts need to travel further to shop at a WIC-authorized vendor, but it does not necessarily mean that they are unable to redeem their WIC food benefits. Consistent with this notion, in USDA's Food Acquisition and Purchase Survey (FoodAPS), WIC households reported conducting most of their grocery shopping at physical stores further away than the one closest to them (Ver Ploeg et al., 2015). They also reported having access to more than one food retailer and shopping at supermarkets or supercenters at the same rate as non-participating households (Ver Ploeg et al., 2015). Additionally, about 86 percent reported using their own vehicle to do their grocery shopping and 7 percent report using someone else's car. Comparatively, 98 percent of higher-income households not participating in WIC reported using their own vehicle for grocery shopping (Ver Ploeg et al., 2015).

The number of WIC-authorized vendors has declined by about 15 percent in recent years, from 47,420 in fiscal year 2015 to 40,377 in fiscal year 2022 (Bardin et al., 2025). Stores may face operational barriers to becoming WIC vendors, including the operating costs related to WIC electronic benefit transfer (EBT) equipment and processing (Landry et al., 2021; USDA, FNS, 2011). Additionally, geography may create logistical challenges for stores to obtain the food items necessary to meet State agency minimum stocking requirements (Wallace et al., 2020).

USDA, FNS is finalizing a rule to provide State agencies with permanent flexibilities needed to offer online shopping options to participants.[13] The option for WIC participants to purchase use food benefits online is a potential way to increase their access to healthy foods. In a recent study of digital food access, George and Tomer (2022) found that 93 percent of people in the United States have access to fresh grocery or prepared food delivery services—including 90 percent of people in low-income and low-access tracts. Online shopping may be particularly helpful to participants in rural areas that may lack sufficient grocery retail infrastructure (Rhone et al., 2019; Winkler et al., 2019). However, fewer rural areas (37 percent) had food delivery options (George & Tomer, 2022).

One limitation of the current analysis is that national-level data on WIC benefit redemptions (participant use of the benefits they are issued) are not available. Therefore, our study did not examine whether WIC participants living in tracts with low WIC vendor access use their benefits less than participants living in tracts with adequate vendor access. Nor did our study examine the extent to which online grocery shopping pilots improve use of WIC benefits in places where there is limited physical access to a WIC-authorized vendor.

In addition to beginning to offer online grocery shopping options, many WIC agencies offer smartphone apps for participants to use to keep track of appointments, check their benefits balance, coordinate with healthcare providers, provide and receive health information, and participate in nutrition education. Our study found that a substantial portion of WIC-eligible families live in areas that provide the infrastructure needed to take advantage of WIC services that use the internet. Most census tracts (96.3 percent) had adequate access to fixed (93.5 percent) or mobile (85.5 percent) high-speed internet services as of December 2020.

[13] Special Supplemental Nutrition Program for Women, Infants and Children (WIC): WIC Online Ordering and Transactions and Food Delivery Revisions to Meet the Needs of a Modern, Data-Driven Program, Proposed Rule, 88 *Federal Register,* Number 2023–02484, February 23, 2023, pp. 11516–11533.

Rural census tracts were characterized by greater distances to WIC-authorized vendors, as well as by lower shares of the population have high-speed internet availability. It is possible that high-speed internet availability could have been more limited for rural WIC participants without Federal and State investments. For example, the Broadband Initiatives Program (BIP), which was established by the American Recovery and Reinvestment Act of 2009 and was the largest USDA rural high-speed internet program at the time, increased households' high-speed internet subscriptions by an estimated 1–3 percentage points between 2013 and 2016, with larger impacts in micropolitan, small town, and rural areas than in metropolitan areas (Pender et al., 2022). The USDA ReConnect Program, established in 2018 and now the largest USDA rural broadband program, is even more targeted towards rural areas than BIP (Pender et al., 2023) and thus may be having an even larger impact on high-speed internet availability and subscriptions in more rural areas.

Although many WIC-eligible families live in census tracts where service providers offer high-speed internet technologies, it may not be the case that WIC-eligible families subscribe to these services.[14] In tracts characterized by low WIC vendor access but adequate fixed high-speed internet service, we estimated that a fifth of WIC-eligible families did not have high-speed internet subscriptions in 2015–19. In tracts characterized by low WIC vendor access and low fixed high-speed internet access, more families (31 percent) did not have high-speed internet subscriptions. In low-income and low WIC-store access areas, our lower bound estimate puts the number of WIC-eligible families that did not have high-speed internet subscriptions at about 373,000 families in 2015–19 (26 percent of all WIC-eligible families in low-income and low-access areas). An upper bound estimate suggests this number is closer to 626,000 families (about 43 percent of WIC-eligible families in low-income and low-access areas). These estimates do not represent current shares of WIC households with or without high-speed internet subscriptions or changes in subscription rates resulting from COVID-19 era policies and programs, such as the Infrastructure Investment and Jobs Act,[15] the Emergency Broadband Benefit, and the Affordable Connectivity Program.

In sum, this report identified areas across the United States where WIC-eligible families may have limited access to WIC foods at physical store locations. By using information about fixed and 5G mobile high-speed internet availability and subscriptions, we identify places where sufficient infrastructure may exist for WIC-eligible families to take advantage of new and existing technologies (such as online program applications and online food shopping) to facilitate engagement with WIC and mitigate limited physical access to WIC-authorized stores. On the other hand, households in low-income tracts that have low WIC vendor access and low high-speed internet access may uniquely be at risk of compounding limited access to resources. This information may be used to improve targeting or refinement of WIC program modernization efforts in those areas. Future research could investigate the extent to which limited WIC vendor access and internet availability overlap with other types of community infrastructure (such as access to libraries, schools, health care, and employment opportunities).

[14] Use of fixed and mobile high-speed internet infrastructure by WIC-eligible families may not mirror that of other families. Evidence from lower-income households suggests a significant reliance on smartphones and other mobile devices for internet access (Gelles-Watnick, 2024). Yet in a recent multi-State survey of WIC participants, 25 percent of survey participants who did not use their agency's WIC app said they did not own a smartphone (Lee et al., 2024).

[15] Public Law 117–58.

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Appendix A: Additional Tables

Table A.1

Comparison of tracts with people/households to tracts where share of WIC-eligible households can be estimated

	Tracts with people		Tracts with WIC-eligible households	
	Number (percent) or mean (standard deviation)		Number (percent) or mean (standard deviation)	
Tracts	72,531		63,459	
Urbanicity				
Rural	17,361	(23.9%)	16,167	(25.5%)
Urban	55,170	(76.1%)	47,292	(74.5%)
Income				
Medium or high income	42,244	(58.2%)	34,214	(53.9%)
Low income	30,287	(41.8%)	29,245	(46.1%)
Access to WIC authorized vendor				
Adequate access	36,853	(50.8%)	32,894	(51.8%)
Low access	35,678	(49.2%)	30,565	(48.2%)
Access to WIC authorized vendor and income				
Adequate access and medium/high income	60,001	(82.7%)	51,391	(81.0%)
Low access and low income	12,530	(17.3%)	12,068	(19.0%)
Access to fixed high-speed internet				
Adequate access	67,770	(93.5%)	59,046	(93.0%)
Low access	4,746	(6.5%)	4,413	(7.0%)
Access to 5G mobile high-speed internet				
Adequate access	61,710	(85.5%)	53,662	(85.0%)
Low access	10,454	(14.5%)	9,473	(15.0%)
Rural-Urban Commuting Area classification				
Metro core	51,903	(71.6%)	43,994	(69.3%)
Metro high commuting	6,833	(9.4%)	6,261	(9.9%)
Metro low commuting	653	(0.9%)	626	(1.0%)
Micro core	4,230	(5.8%)	4,029	(6.3%)
Micro high commuting	1,970	(2.7%)	1,919	(3.0%)
Micro low commuting	411	(0.6%)	401	(0.6%)
Small town core	2,159	(3.0%)	2,092	(3.3%)
Small town high commuting	827	(1.1%)	801	(1.3%)
Small town low commuting	343	(0.5%)	336	(0.5%)
Rural areas	3,202	(4.4%)	3,000	(4.7%)
Distance to nearest WIC store	1.80	(2.31)	1.85	(2.37)

WIC = Special Supplemental Nutrition Program for Women, Infants, and Children. Metro = metropolitan. Micro = micropolitan.

Note: Number of tracts with population (72,531) corresponds to number of tracts in USDA, Economic Research Service Food Access Research Atlas 2019 data download; 15 tracts were missing fixed high-speed internet data and 367 tracts were missing 5G mobile high-speed internet data. Number of tracts with WIC-eligible families (63,459) excludes 9,072 tracts where estimates were not available due to sampling error. An additional 324 tracts were missing 5G mobile high-speed internet data. Margins of error were calculated following U.S. Department of Commerce, Bureau of the Census guidelines.

Source: USDA, Economic Research Service (ERS) using data from USDA, ERS; USDA, Food and Nutrition Service; U.S. Department of Commerce, Bureau of the Census; and the Federal Communications Commission.

Table A.2

Census tracts and WIC-eligible families by WIC store access measures

	Number of tracts	Percent	Number of WIC-eligible families	Percent
	72,531		5,195,741	
Low access to WIC (urban/rural distance)				
1 and 10 miles	35,678	49.2	2,525,008	48.6
.5 and 10 miles	50,656	69.8	3,648,242	70.2
1 and 20 miles	32,467	44.8	2,333,051	44.9
Low vehicle access and 20 miles	16,805	23.2	1,678,371	32.3
Low-income and low-access tracts				
1 and 10 miles	12,530	17.3	1,445,061	27.8
.5 and 10 miles	20,322	28.0	2,305,791	44.4
1 and 20 miles	11,233	15.5	1,350,744	26.0
Low vehicle access and 20 miles	10,442	14.4	1,282,076	24.7

WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

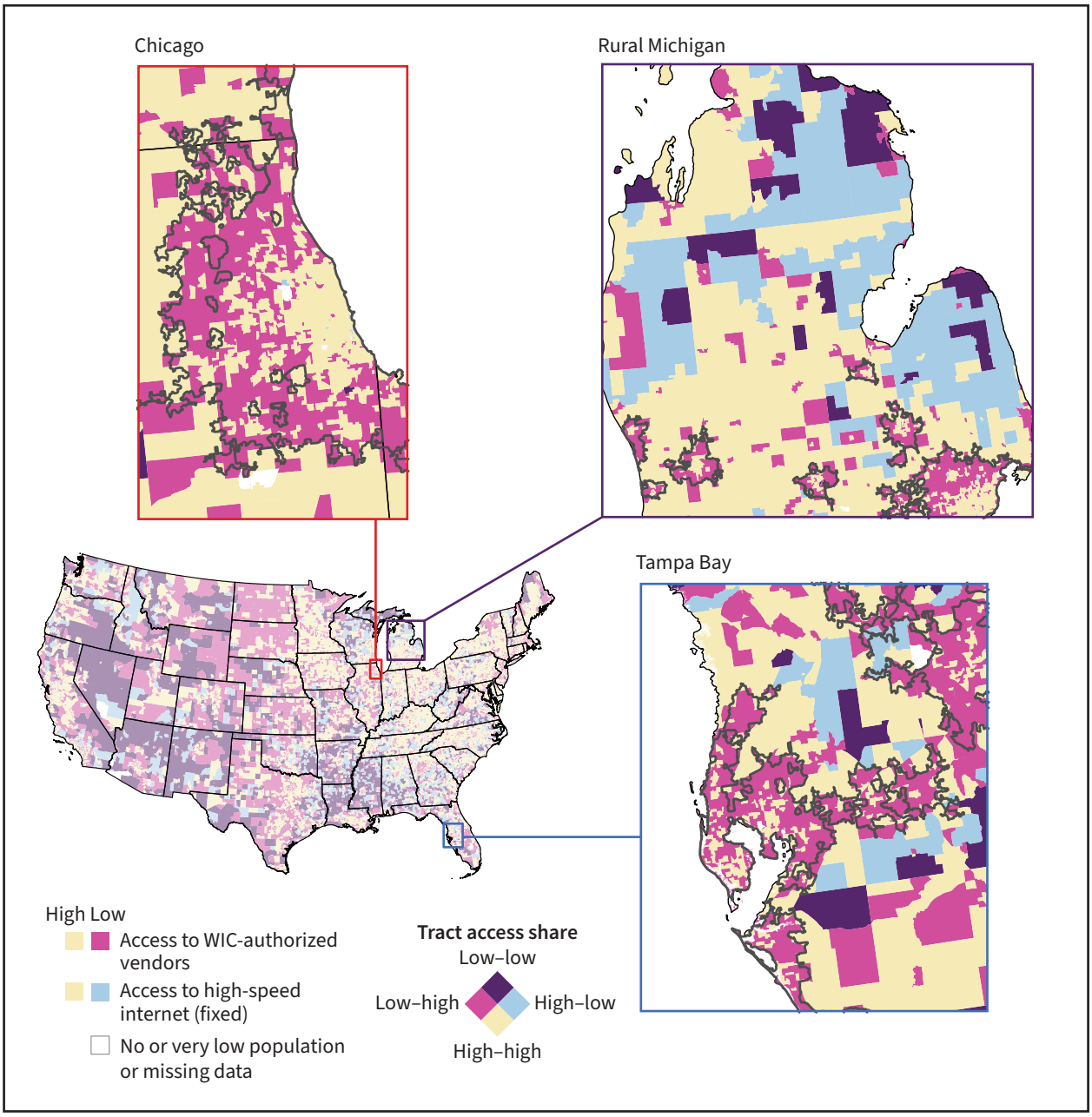
Note: Low access to a WIC-authorized vendor in fiscal year 2021 was defined as a tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor; more than half a mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor; or more than 1 mile (urban areas) or 20 miles (rural areas) from the nearest WIC vendor. Low vehicle access and 20 miles are defined as a tract where at least 100 households are more than one-half mile from the nearest WIC vendor and have no access to a vehicle; or at least 500 people or 33 percent of the population live more than 20 miles from the nearest WIC vendor, regardless of vehicle access. A tract is low income if the tract's poverty rate is 20 percent or greater; the tract's median family income is less than or equal to 80 percent of the State-wide median family income; or if the tract is in a metropolitan area and has a median family income less than or equal to 80 percent of the metropolitan area's median family income.

Source: USDA, Economic Research Service (ERS) using data from USDA, ERS; USDA, Food and Nutrition Service; and the U.S. Department of Commerce, Bureau of the Census.

Appendix B: Additional Figures

Figure B.1

Access to WIC-authorized vendors and fixed high-speed internet in Chicago, rural Michigan, and Tampa Bay



WIC = Special Supplemental Nutrition Program for Women, Infants, and Children.

Note: Low access to a WIC-authorized vendor is defined as a tract with at least 500 people or 33 percent of the population living more than 1 mile (urban areas) or 10 miles (rural areas) from the nearest WIC vendor. Low fixed high-speed internet access is defined as a tract where less than 90 percent of the population live in census blocks with at least 1 residential service provider that advertises download speeds of at least 25 Megabits per second (Mbps) and upload speeds of at least 3 Mbps. WIC vendor data are as of fiscal year 2021. High-speed internet data are as of December 2020. Areas outlined within States are urban areas with more than 100,000 people.

Source: USDA, Economic Research Service using data from USDA, Food and Nutrition Service; Federal Communications Commission; and the U.S. Department of Commerce, Bureau of the Census.