6. CASE STUDIES USING ACS DATA

Case Study 1: Community Resilience Indicators

Skill Level: Novice/Intermediate
Subject: Assessing county characteristics that contribute to disaster resilience
Type of Analysis: Analysis of American Community Survey (ACS) indicators at the county level
Tools Used: Data.census.gov, mapping software

As disasters continue to increase in frequency and cost, researchers have attempted to identify and quantify features that make communities more resilient to disasters. The Federal Emergency Management Agency (FEMA) National Integration Center (NIC) Technical Assistance (TA) Branch asked Argonne National Laboratory (Argonne) to review this body of research and provide a data-driven approach to prioritize locations for TA. FEMA included project management, research support, peer-to-peer learning, in-person and distance learning, coaching from subject-matter experts, and other topics as factors to be considered during the review.[33]

Most of the data for this analysis came from the U.S. Census Bureau's 2013–2017 ACS 5-year estimates. The primary advantage of using the ACS 5-year estimates is the increased statistical reliability compared with the ACS 1-year estimates, especially for small geographic areas and small population subgroups. The 5-year data also enabled Argonne to display maps that included estimates for every county in the country.

Methods

Argonne's first step was to conduct a literature review to identify previous methods used to assess community resilience. Argonne focused on county-level analyses that involved multiple hazards, had a predisaster focus, used quantitative measures, and incorporated publicly available data and methods.

Based on this review, Argonne selected 20 key indicators for their analysis, including 11 population-focused measures and 9 community-focused measures:

Population-Focused Indicators

- Educational Attainment
- Unemployment Rate
- Disability
- English Language Proficiency
- Home Ownership
- Mobility
- Age
- Household Income
- Income Inequality
- Health Insurance
- Single-Parent Household

Community-Focused Indicators

- Connection to Civic and Social Organizations
- Hospital Capacity
- Medical Professional Capacity
- Affiliation With a Religion
- Presence of Mobile Homes

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[33] U.S. Federal Emergency Management Agency and Argonne National Laboratory, "Community Resilience Indicator Analysis: County-Level Analysis of Commonly Used Indicators From Peer-Reviewed Research," 2019, <www.fema.gov/sites/default/files/2020-11/fema_community-resilience-indicator-analysis.pdf>, 2020 update.

- Public School Capacity
- Population Change
- Hotel/Motel Capacity
- Rental Property Capacity

The percentage of people with disabilities was identified as one of the 20 key indicators of disaster resilience. Here are steps to access disability estimates for every county in the country (including Puerto Rico):

Navigate to <https://data.census.gov> and type "disability" into the search bar. Then click "Search" (see Figure 6.1).

Figure 6.1. **Searching for Disability Tables in Data.census.gov**
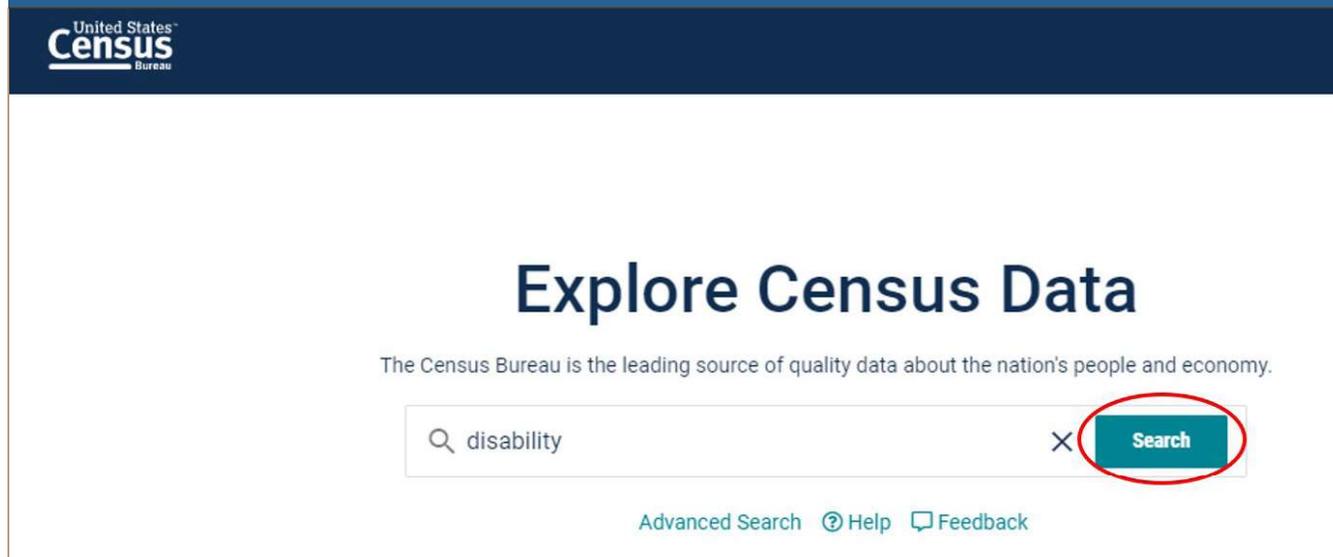
Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.

Click on the first table on the results page: Table S1810: "Disability Characteristics" (see Figure 6.2).

Figure 6.2. **Selecting a Table in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.

This will bring you to a preview of Table S1810 with the United States as the default geography. Select "Customize Table" in the upper right corner (see Figure 6.3).

Figure 6.3. **Previewing and Customizing a Table in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.

To access data for all counties in the United States, first select the "Geographies" filter (see Figure 6.4).

Figure 6.4. **Selecting Geographic Areas Using the Geography Filter in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.

Next:

- Select "County."
- Then check the box for "All counties in United States." This selection will appear at the bottom of the page next to "Selected Filters:"
- Click "Close" in the lower right corner (see Figure 6.5).

Figure 6.5. **Selecting All Counties in the United States in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.
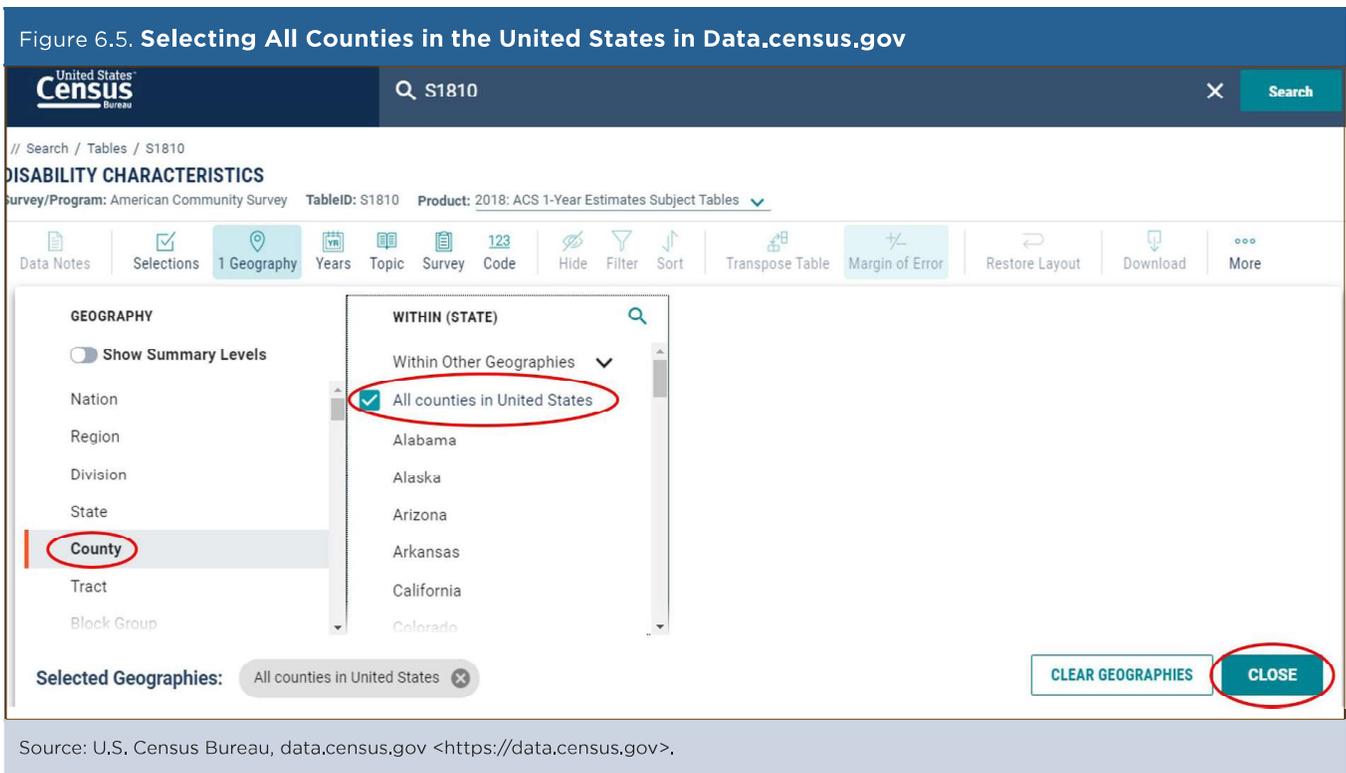
This table is too large to display in the preview window, so select "Download Table" (see Figure 6.6).

Figure 6.6. **Downloading a Table in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.
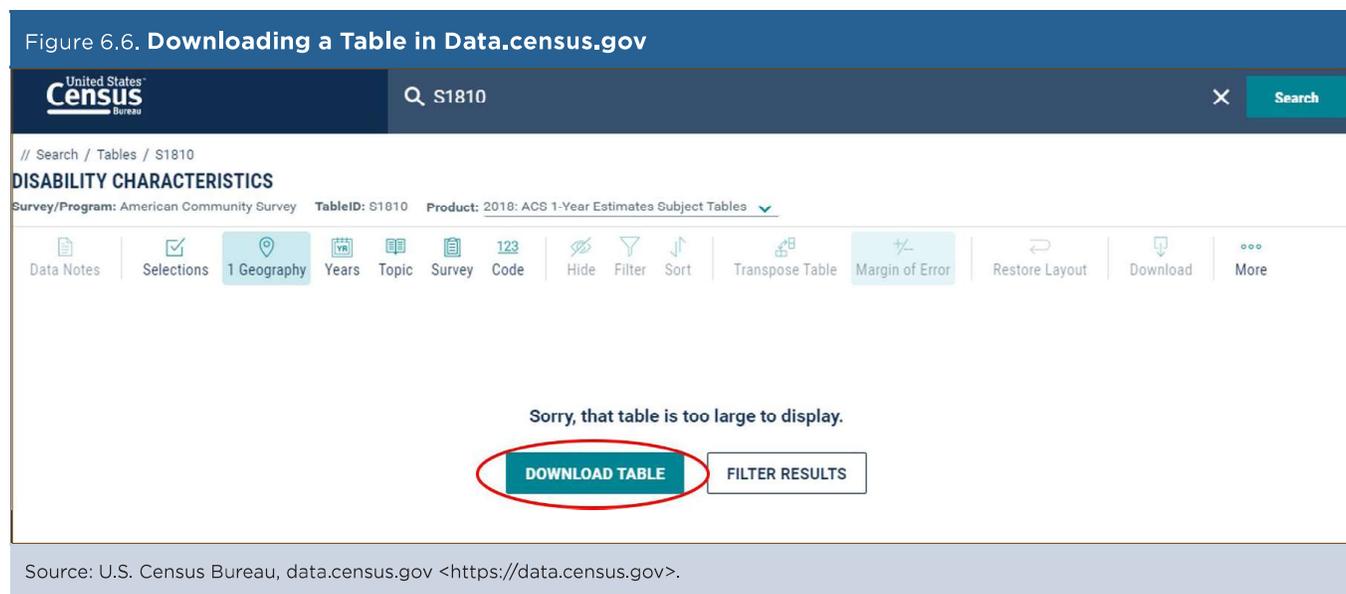
For this case study, select the 2017 ACS 5-year data. After checking that the other default download specifications in the "Download/Print/Share" window are correct, select "Download" again (see Figure 6.7).

Figure 6.7. **Using the Download/Print/Share Window in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.

Select "Download Now" after the file is prepared (see Figure 6.8).

Figure 6.8. **Downloading a Compressed (ZIP) File in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov <https://data.census.gov>.

This download yields a compressed folder with three files: metadata, data, and table title. These data can be used to access the percentage of the population with a disability in each U.S. county. The research team created county-level choropleth maps for each key indicator. Counties were shaded based on a five-color scale (see Figure 6.9). The scale used cooler colors to indicate potentially higher relative levels of resilience, with blue at the top of the scale, and warmer colors to indicate potentially lower relative levels of resilience, with red at the bottom.

Figure 6.9. **Color Scale for Choropleth Maps**

Source: U.S. Federal Emergency Management Agency and Argonne National Laboratory, Community Resilience Indicator Analysis, <www.fema.gov/sites/default/files/2020-11/fema _community-resilience-indicator-analysis.pdf>, 2020 update.

Figure 6.10 shows a sample map of disaster resilience based on disability rates. The map shows relatively high concentrations of disability in parts of Alabama, Arkansas, Kentucky, Mississippi, New Mexico, Oklahoma, Oregon, Tennessee, Puerto Rico, and West Virginia.

Figure 6.10. **Percentage of the Population With a Disability by County**
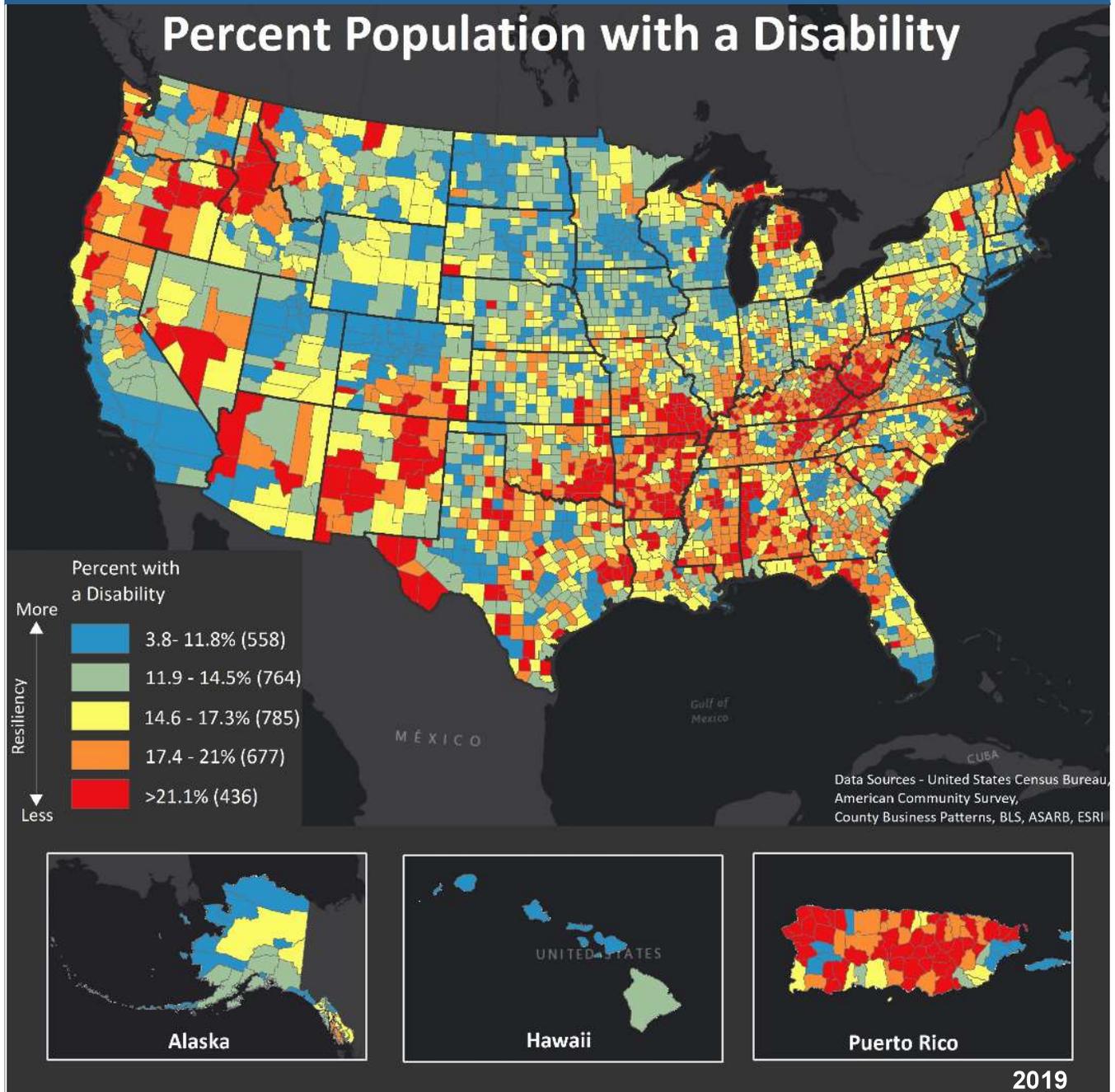
Source: U.S. Federal Emergency Management Agency and Argonne National Laboratory, Community Resilience Indicator Analysis, <www.fema.gov/sites/default/files/2020-11/fema_community-resilience-indicator-analysis.pdf>, 2020 update.

Next, the research team developed a method to aggregate county-level data from all 20 indicators and sort each U.S. county into one of five bins. The research team used the same color scale for the aggregate maps as for the individual indicator maps, with blue indicating higher relative resilience levels and red indicating lower relative resilience levels (see Figure 6.11). This aggregate map provides a data-driven basis for identifying areas where FEMA should offer community resilience Collaborative TA.

Figure 6.11. **Color Scale for Aggregated Resilience Indicators Map**

Color	Description
Blue	+1 standard deviation or more above the average
Green	Above 0 but <+1.0 standard deviation above average
Yellow	Below 0, but >−0.5 standard deviation below average
Orange	Between −0.5 and −1.0 standard deviation below average
Red	−1.0 standard deviation or more below the average

Source: U.S. Federal Emergency Management Agency and Argonne National Laboratory, Community Resilience Indicator Analysis, <www.fema.gov/sites/default/files/2020-11/fema_community-resilience-indicator-analysis.pdf>, 2020 update.

Using these aggregated data, Argonne created an "Aggregated Commonly Used Community Resilience Indicators" choropleth map (see Figure 6.12). This analysis identified 96 counties in the lowest bin that are facing the greatest challenges to resilience, with 63 of these counties in Puerto Rico. A total of 309 counties sorted into the next bin. Many counties in this category are also within Puerto Rico, while others are primarily within the southeast and southwest regions of the United States and in Alaska.

Figure 6.12. **Aggregated Commonly Used Resilience Indicators**
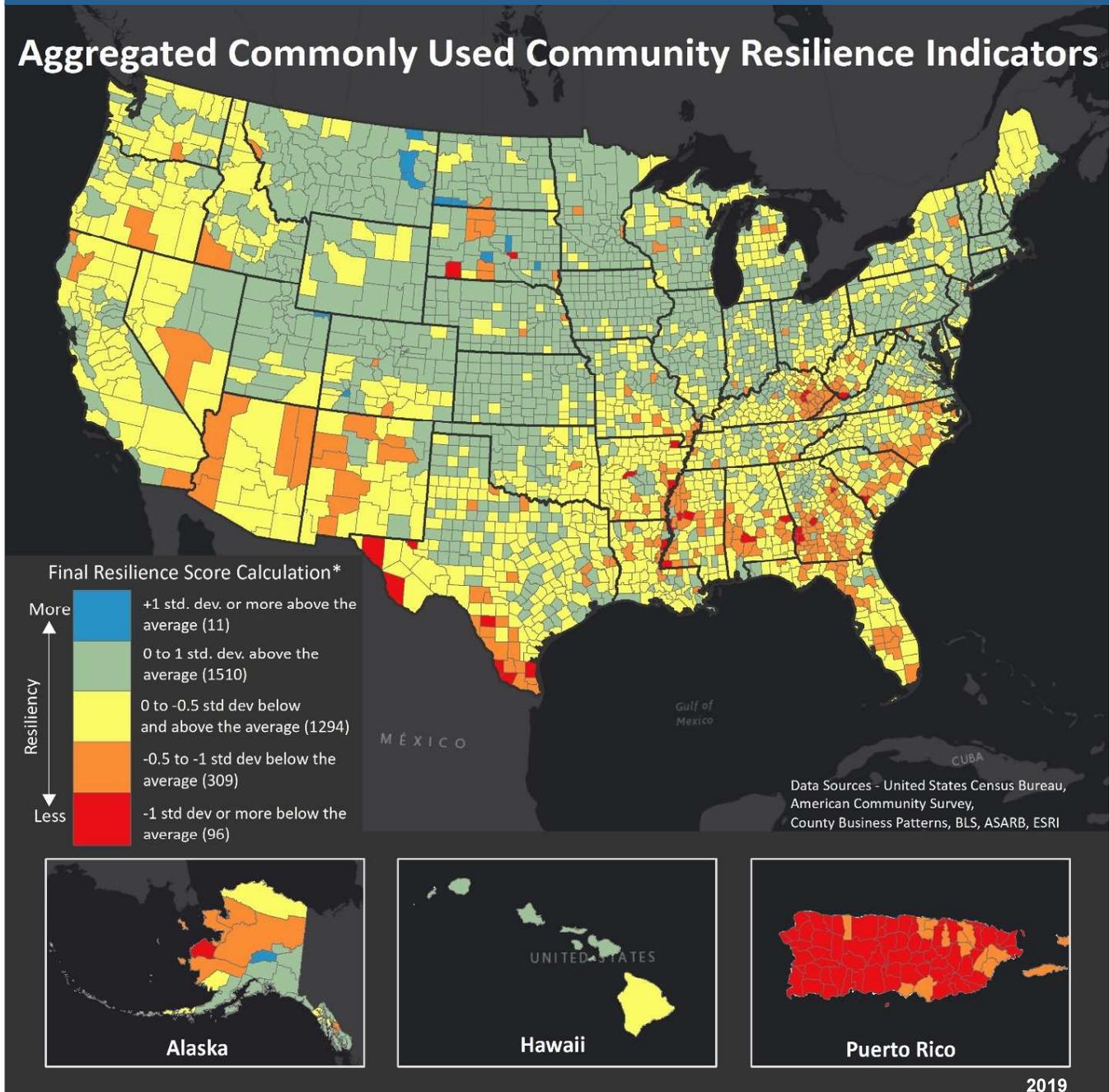
Aggregated Commonly Used Community Resilience Indicators

Final Resilience Score Calculation*

More ↑ / Less ↓ — Resiliency

- +1 std. dev. or more above the average (11)
- 0 to 1 std. dev. above the average (1510)
- 0 to -0.5 std dev below and above the average (1294)
- -0.5 to -1 std dev below the average (309)
- -1 std dev or more below the average (96)

Data Sources - United States Census Bureau, American Community Survey, County Business Patterns, BLS, ASARB, ESRI

Alaska

Hawaii

Puerto Rico

2019

Source: U.S. Federal Emergency Management Agency and Argonne National Laboratory, Community Resilience Indicator Analysis, <www.fema.gov/sites/default/files/2020-11/fema_community-resilience-indicator-analysis.pdf>, 2020 update.

Although this analysis was conducted for the FEMA NIC TA Branch, the findings have relevance for many FEMA program areas, as well as for state, local, territorial, and tribal emergency managers and other partners. By reviewing county data for these 20 indicators, emergency managers can gain insights for targeted outreach strategies and for adapting emergency operations plans to community characteristics.

All of the maps and data can be found within an interactive map viewer on FEMA's geospatial portal at <www.fema.gov/sites/default/files/2020-11/fema_community-resilience-indicator-analysis.pdf>, 2020 update.

Case Study #2: Exploring Social Determinants of Health Using ACS-CMS Linked Data

Skill Level: Intermediate/Advanced
Subject: Social determinants of health
Type of Analysis: Linking administrative data to American Community Survey (ACS) data
Tools Used: Data.census.gov, Chronic Conditions Data Warehouse, spreadsheet, statistical software
Authors: Shondelle Wilson-Frederick, Statistician, Centers for Medicare & Medicaid Services; and Sharon R. Ennis, Statistician, Department of Veterans Affairs

The Centers for Medicare & Medicaid Services (CMS) is an operating division within the U.S. Department of Health and Human Services. CMS oversees the two largest federal health care programs—Medicare and Medicaid—as well as the Children's Health Insurance Program and the exchanges. CMS programs will touch the lives of over 145 million beneficiaries and consumers in FY 2020.[34]

The CMS Chronic Conditions Data Warehouse (CCW) is a research database designed to make Medicare, Medicaid, Assessments, and Part D Prescription Drug Event data more readily available to support research designed to improve the quality of care and reduce costs and utilization.[35] The Medicare Master Beneficiary Summary File (MBSF), which is stored in the CCW, includes Medicare enrollment status, demographic, and eligibility information for all beneficiaries.

While the MBSF can be used to study racial, ethnic, and geographic disparities among Medicare Fee-for-Service (FFS) beneficiaries, data on the social determinants of health are limited. The MBSF contains individual level characteristics; however, it does not include any personal identifiable information. The American Community Survey (ACS) is a rich source of demographic, socioeconomic, and housing estimates that can be combined with claims data by linking at the geographical level of ZIP codes to enhance our understanding of Medicare FFS beneficiaries. This aggregated linked file can be analyzed to learn more about the social determinants of health among Medicare FFS beneficiaries.

This case study summarizes the steps to compile and analyze data for one of the key ACS variables—language spoken at home. Communication and language barriers are associated with structural and clinical challenges and poorer health outcomes.[36] Limited English proficiency may contribute to a lower quality of care, patient satisfaction, post-care adherence, patient safety, and lack of equity in the provision of healthcare.[37]

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[34] U.S. Department of Health and Human Services, Fiscal Year 2020: Centers for Medicare & Medicaid Services, Justification of Estimates for Appropriations Committees, <www.cms.gov/files/document/fy2020-cms-congressional-justification-estimates-appropriations-committees.pdf>.

[35] Centers for Medicare & Medicaid Services, "Chronic Conditions Warehouse," <https://www2.ccwdata.org/web/guest/home/>.

[36] Centers for Medicare & Medicaid Services, Office of Minority Health, "Building an Organizational Response to Health Disparities: Guide to Developing a Language Access Plan," <www.cms.gov/About-CMS/Agency-Information/OMH/Downloads/Language-Access-Plan-508.pdf>.

[37] Kimberly Proctor, Shondelle M. Wilson-Frederick, and Samuel C. Haffer, "The Limited English Proficient Population: Describing Medicare, Medicaid, and Dual Beneficiaries," Health Equity, 2(1): 82–89, Baltimore, MD, 2018.

To access ACS data on language spoken at home:

We start by navigating to <https://data.census.gov>. Since we already know which table we would like to access, we type C16001 into the search bar and click the first result C16001: "Language Spoken at Home for the Population 5 Years and Over" (See Figure 6.13).

Figure 6.13. **Searching for a Table in Data.census.gov**
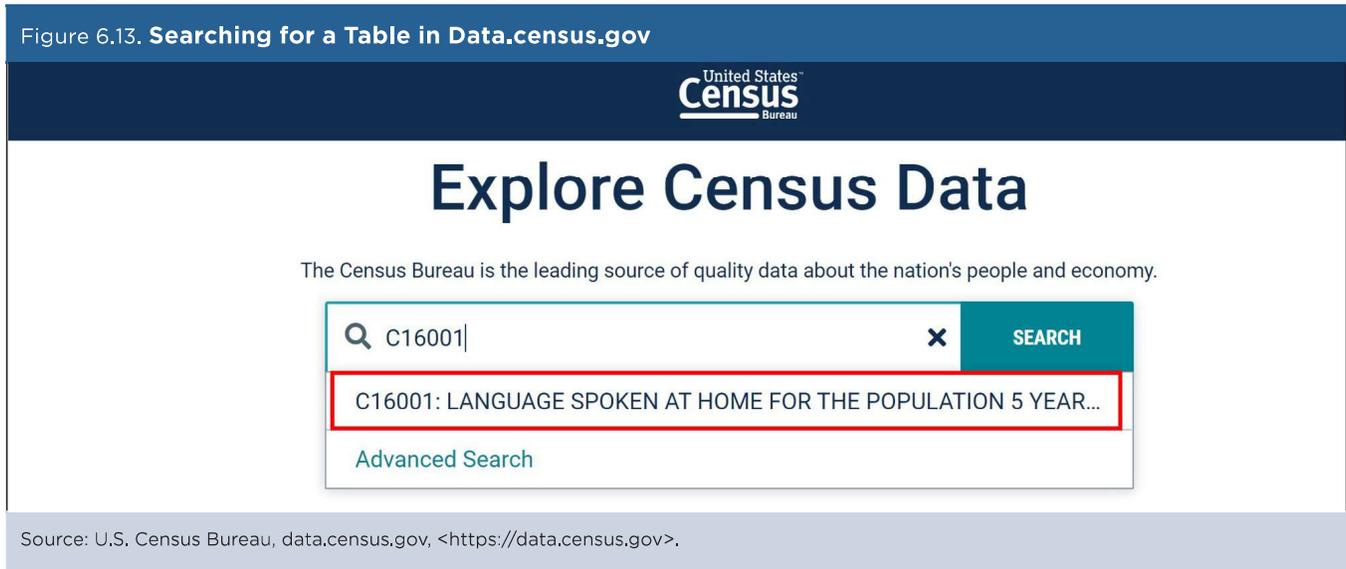
Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

Select the desired survey year by clicking on the current "Product" selection. For the purposes of this case study, we are using 2012–2016 ACS 5-year estimates. The product selection should read "2016 ACS 5-Year Estimates Detailed Tables" (see Figure 6.14). Data.census.gov automatically defaults geography to the national level unless otherwise specified. Since we would like to study Medicare beneficiaries across ZIP Code Tabulation Areas (ZCTAs), we click on "Geos" to view the geography filters. ZCTAs are generalized areal representations of United States Postal Service ZIP code service areas.

Figure 6.14. **Changing the Data Product Year and Selecting Geographic Areas Using the Geography Filter in Data.census.gov**
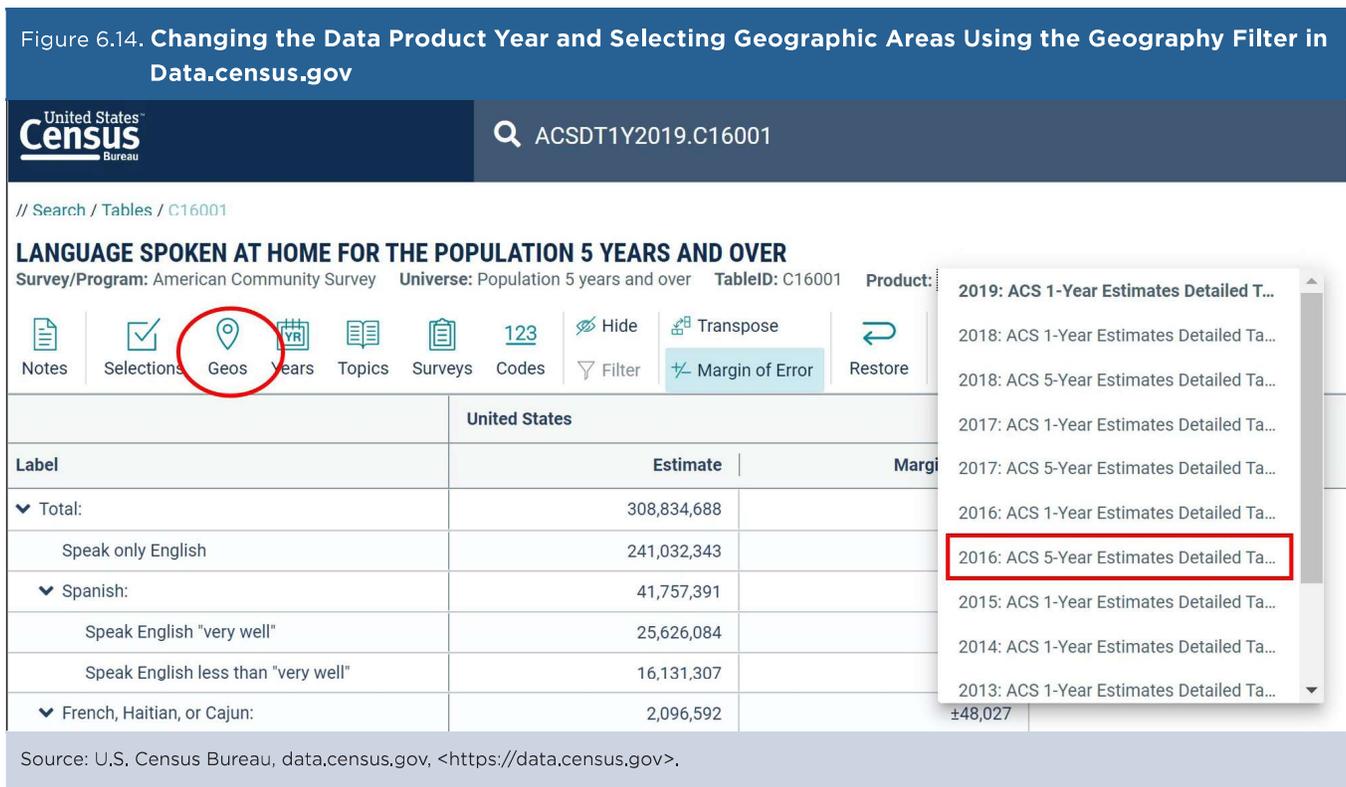
Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

Next:

- Turn on the "Show Summary Levels" toggle switch.
- Select "860 – 5-Digit ZCTA."
- Check the box for "All ZCTAs in the United States." This selection will appear at the bottom of the page next to "Selected Geographies."
- Click "Close" in the bottom right corner (see Figure 6.15).

Figure 6.15. **Selecting All ZCTAs in the United States in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

Typically, the table would update to show the geographies selected. However, since there are over 33,000 ZCTAs in the United States, the table is too large to display. Therefore, we need to select "Download Table" (See Figure 6.16).

Figure 6.16. **Downloading a Table in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

For this case study, we select the 2016 ACS 5-year data. After making sure that the download specifications in the "Download/Print/Share" window are correct, we select "Download" again (see Figure 6.17).

Figure 6.17. **Using the Download/Print/Share Window in Data.census.gov**

Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

Select "Download Now" after the file is prepared (see Figure 6.18).

Figure 6.18. **Downloading a Compressed (ZIP) File in Data.census.gov**
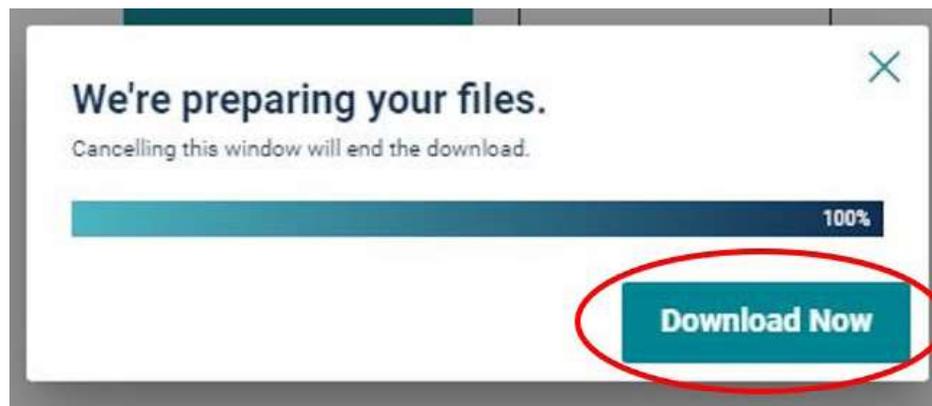
Source: U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

A compressed folder that includes three files; metadata, data, and table title will be available. We, generally, can use these data to combine beneficiary data with ACS data by ZCTA. To complete the analysis, we:

• Upload the ACS data to the CCW.

• Import the data as statistical software data sets.

• Recode the ACS variables and create percentages.

• Merge individual ACS data sets by ZCTA and sort by ZCTA.

• Merge Medicare beneficiary health information by a CMS unique identifier.

• Sort Medicare beneficiary data sets by ZCTA.

• Link the ACS and Medicare by ZCTA/ZIP code.

• Omit all unmatched ZCTA/ZIP codes pairs or ZIP codes with less 10,000 ZIP codes.

Findings/Summary of Case Study on Using ACS Data

The combined ACS/MBSF results show that compared to all beneficiaries, a higher percentage of White and Black Medicare beneficiaries resided in communities with a higher mean English-only speaking population, relative to Asian, Native Hawaiian or Other Pacific Islander, and Hispanic beneficiaries (see Figure 6.19). By linking the MBSF to the ACS, it was possible to examine the language needs for Medicare beneficiaries. This analysis would not have been possible by using the MBSF only.

Figure 6.19. Percentage of Medicare Beneficiaries in ZIP Codes That Speak English Only (Mean)
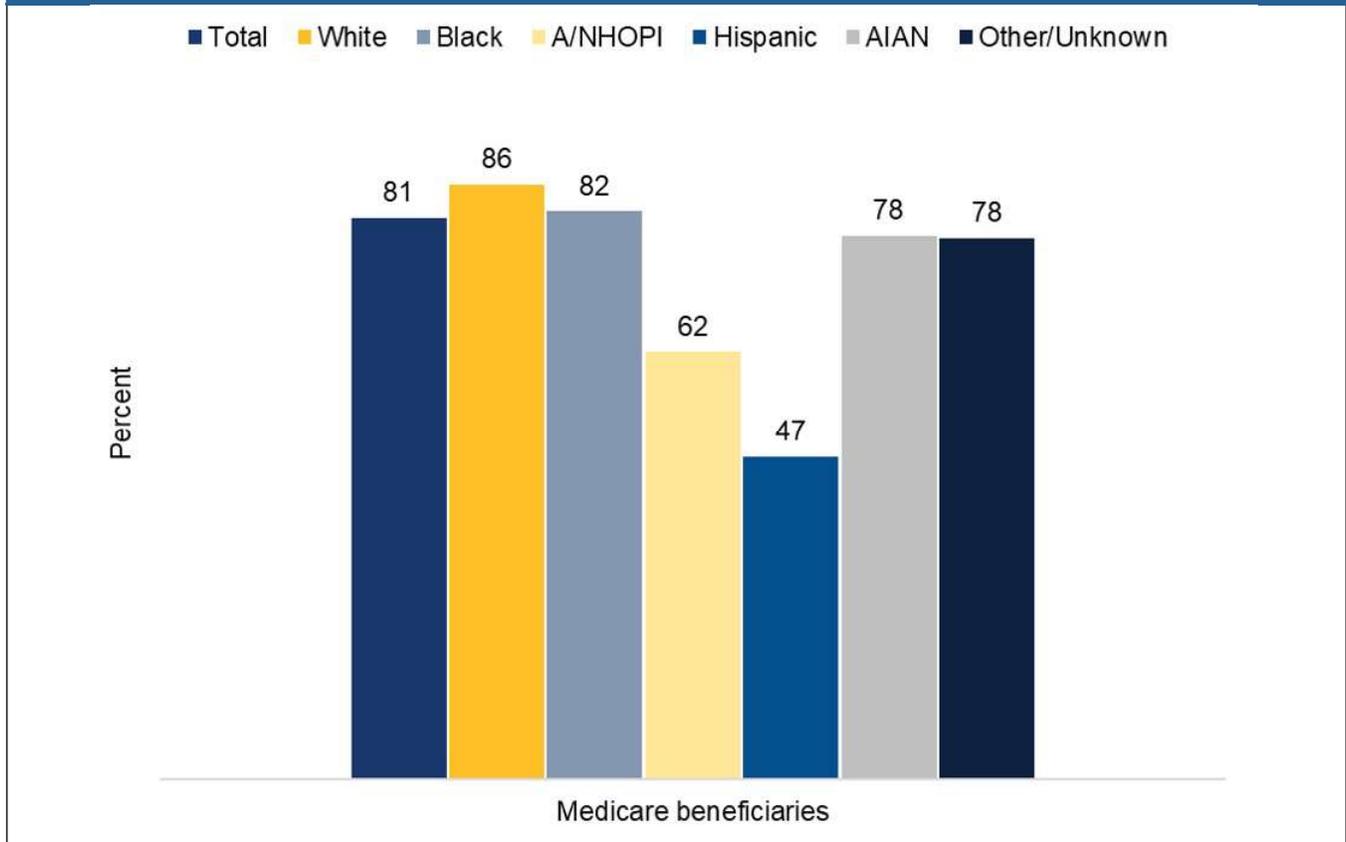
Note: A/NHOPI = Asian/Native Hawaiian and Other Pacific Islander. AIAN = American Indian/Alaska Native.
Source: Authors' analysis of data from the U.S. Census Bureau, American Community Survey; and Centers for Medicare and Medicaid Services.

CMS provides free publicly accessible resources in 18 languages to help people make informed health care decisions and be active partners in their health care and the health care of their families.[38] Additionally, the CMS Office of Minority Health has designed several initiatives to eliminate disparities in health care quality and access, so that all CMS beneficiaries can achieve their highest level of health.[39] To learn more about CMS' equity resources to assist with understanding the communication needs of diverse populations of Medicare beneficiaries, please visit <www.cms.gov/About-CMS/Agency-Information/OMH/research-and-data/information-products/issue-briefs>.

Linking the MBSF with the ACS strengthened the utility of CMS administrative data to explore how social determinants of health may contribute to racial, ethnic, and geographic disparities. These study findings highlight the diversity of the Medicare population and supports identification of appropriate targets to develop effective interventions aimed at promoting equity for all Americans.

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[38] Centers for Medicare & Medicaid Services, "Resources by Language," <www.cms.gov/About-CMS/Agency-Information/OMH/resource-center/resources-by-language>.
[39] Centers for Medicare & Medicaid Services, "Equity Initiatives," <www.cms.gov/About-CMS/Agency-Information/OMH/equity-initiatives>.

Case Study #3: Learning More About HUD-Assisted Households Through Data Linkage

Skill Level: Advanced
Subject: Analyzing characteristics of households receiving U.S. Department of Housing and Urban Development rental assistance with American Community Survey (ACS) data
Type of Analysis: Administrative record linkage and analysis using ACS data
Tool Used: Statistical software
Authors: Shawn Bucholtz, Federal Housing Finance Agency (formerly U.S. Department of Housing and Urban Development); Emily Molfino, U.S. Census Bureau; and Quentin Brummet, National Opinion Research Center (NORC) at the University of Chicago

The U.S. Department of Housing and Urban Development (HUD) administers several rental assistance programs that help low-income households afford their rental units, including those housing seniors, disabled persons, and veterans. The largest of these programs is the Housing Choice Voucher (HCV) program with approximately 2.3 million households receiving rental assistance. The second largest of these programs is project-based rental assistance (PBRA) with approximately 1.3 million households receiving rental assistance, while the third largest program, Public Housing (PH), currently provides housing for approximately 950,000 households. These three programs, as well as a myriad of much smaller HUD programs, provide rental assistance for more than 4.6 million households, or about 3.8 percent of all households in the United States.

To administer rental assistance programs in a manner consistent with statutory, regulatory, and program-specific requirements, HUD must collect information from the beneficiaries. However, like many federal programs, HUD's data collection is generally limited only to the information necessary to implement the program. This short-coming limits HUD's ability to fully monitor ongoing program performance or evaluate longer-term program effects. As a result, evaluating program effects often requires additional surveys, which are expensive.

This shortcoming in the ability to evaluate programmatic impact is also well known to policymakers and members of research and advocacy communities. It is partially addressed by the Foundations for Evidence-Based Policymaking Act of 2019, which requires agencies to develop written evaluation plans and establish evaluation officers. One promising method for low-cost evaluation of program performance and effects is linking administrative records to data from existing surveys, like the U.S. Census Bureau's American Community Survey (ACS). The ACS contains a wealth of household and demographic information that is not currently collected by HUD including:

- Type of occupation and commuting mode.
- Veteran status.
- Health insurance status.
- Expanded racial categories and household relationship types.
- Internet access.

Linking ACS data to HUD-assisted housing units and households allows HUD to gain insights that would otherwise not be possible with current rental assistance administrative records, potentially leading to more robust program evaluation. For example, the HUD/ACS linked data set can be used to create summary statistics of characteristics of the HUD-assisted housing units or households present in the ACS sample, such as the percentage of HUD-assisted housing units that have high-speed Internet—a characteristic available in the ACS.

In this case study, we describe how we linked HUD–assisted housing unit and household administrative records to ACS housing unit records to identify ACS households receiving HUD rental assistance.

Access to the ACS/HUD linked data is available to researchers through a Federal Statistical Research Data Center, after obtaining Special Sworn Status and approval for their project.[40]

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[40] U.S. Census Bureau, Federal Statistical Research Data Centers, <www.census.gov/fsrdc>.

Record Linkage Process

HUD-assisted housing units were first linked to ACS housing units based on housing unit addresses using the Census Bureau's Master Address File (MAF), which is the source of addresses for the ACS, other Census Bureau demographic surveys, and the decennial census. Then, HUD-assisted housing units were linked to ACS units if a household member (person) within the ACS household roster matched a person in a HUD-assisted household roster. We refer to this roster-based linking process as "Protected Identification Key (PIK) matching." Any ACS housing unit that linked to a HUD administrative record by either a MAF match or PIK match was considered a HUD-assisted housing unit. A complete description of the record linkage process, as well as potential problems with the linkage process, is available in Bucholtz, Molfino, and Brummet's technical report.[41]

Record Linkage Quality Assessment

Table 6.1 shows the number of ACS records linked to a HUD administrative record by the type of link. Although not the subject of this article, we speculate that the downward trend in the total number of ACS records linked to a HUD administrative record reflects a general downward trend in response rates for HUD-assisted households. The authors have observed a similar trend in another household survey, the American Housing Survey.[42]

Table 6.1. **Breakdown of HUD/ACS Links Made by Address (MAF) and Person (PIK)**								
Breakdown		**Year**						
		2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
MAF-matched	Count	60,000	63,500	55,500	58,000	57,000	54,500	51,500
	Percent	81.6	81.9	82.2	82.9	82.6	83.8	84.4
PIO-matched	Count	13,500	14,000	12,000	12,000	12,000	10,500	9,500
	Percent	18.4	18.1	17.8	17.1	17.4	16.2	15.6
Total	Count	73,500	77,500	67,500	70,000	69,000	65,000	61,000

Notes: MAF = Master Address File. PIK = Protected Identification Key. Numbers are rounded to comply with U.S. Census Bureau disclosure guidelines.
Source: Authors' analysis of American Community Survey (ACS) and U.S. Department of Housing and Urban Development (HUD) data.

To determine whether the linking process performed well, we compared the "prelinking" count of HUD rental assistance administrative records with the "post-linking" ACS weighted estimate of ACS housing units identified as HUD-assisted. All else being equal, if the linking process performs well, the post-link ACS weighted estimate of HUD-assisted units should be very similar to the prelink known record count.

Table 6.2 below presents linking quality metrics for 2015 through 2017. The table shows that HUD provided the Census Bureau with 4.74 million rental assistance administrative records and housing unit records in 2017. When these records were linked to ACS housing units, the weighted estimate of HUD-assisted housing units was 4.62 million, or 97.3 percent of the real total. Across all years of the data linkage (2011–2017), the ACS-weighted estimate of HUD-assisted housing units ranges from 97.0 to 99.4 percent. There is some variation in linkage rate across the three categories of HUD programs, however, with the PBRA program consistently performing worse than PH or HCV. Reasons for this difference are explored in the technical report, but are generally due to variations in the quality of HUD addresses.

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[41] Shawn Bucholtz, Emily Molfino, and Quentin Brummet, "Identifying Subsidized Housing Units Within the American Community Survey Through Administrative Record Linkage: A Technical Report," U.S. Department of Housing and Urban Development, Washington, DC, 2020, <www.huduser.gov/portal/publications/Identifying-Subsidized-Housing-Units.html>.
[42] Based on unpublished analysis of 2015, 2017, and 2019 American Housing Survey internal use files.

Given the results in Table 6.2, it's reasonable to conclude that the linking process performed well enough to ensure that the ACS housing units flagged as HUD-assisted units are a representative cross-section of all possible ACS housing units that are truly HUD-assisted units. In statistical terms, although there are false negatives (positives), they appear to be limited in quantity, and we feel their omission (inclusion) should not result in biased estimates of housing or household characteristics of HUD-assisted households. Regardless of the extent to which our linking process introduced any bias, a method for overcoming this bias is described in the technical report.[43]

Table 6.2. **Results of HUD/ACS Administrative Linking**				
	All	**PH**	**HCV**	**PBRA**
2015				
HUD records provided to Census	4,757,000	998,200	2,265,000	1,494,000
ACS estimate of HUD-assisted households	4,678,000	1,021,000	2,256,000	1,400,000
ACS estimate as share of HUD records	98.3%	102.3%	99.6%	93.7%
ACS 90 percent margin of error	0.7%	1.4%	1.2%	1.3%
2016				
HUD records provided to Census	4,760,000	1,014,000	2,300,000	1,446,000
ACS estimate of HUD-assisted households	4,623,000	1,001,000	2,248,000	1,374,000
ACS estimate as share of HUD records	97.1%	98.7%	97.7%	95.0%
ACS 90 percent margin of error	0.7%	1.5%	1.1%	1.1%
2017				
HUD records provided to Census	4,744,000	977,100	2,313,000	1,453,000
ACS estimate of HUD-assisted households	4,615,000	979,700	2,268,000	1,367,000
ACS estimate as share of HUD records	97.3%	100.3%	98.1%	94.1%
ACS 90 percent margin of error	0.80%	1.50%	1.10%	1.30%

Note: ACS = American Community Survey. HCV = Housing Choice Voucher program. PBRA = project-based rental assistance. PH = public housing.
Source: Authors' analysis of American Community Survey (ACS) and U.S. Department of Housing and Urban Development (HUD) data.

Uses of the Linked Data

In this section, we illustrate two uses of the linked data to produce estimates that are otherwise not feasible to derive using HUD rental assistance administrative records alone.

On HUD forms 50058 and 50059, current and prospective HUD-assisted renters supply a host of demographic information including age, sex, race, and ethnicity. Consistent with federal guidelines governing the collection of race and ethnicity data, HUD collects race information using five standard categories: White, Black or African American, Asian, American Indian or Alaska Native, and Native Hawaiian or Other Pacific Islander. ACS follows the same federal guidelines but expands the number of categories for Asians from one to six detailed Asian race categories and offers respondents a write-in option.[44]

The linked HUD/ACS data can be used to estimate the number of HUD-assisted householders reporting their race as Asian by detailed Asian race category. Table 6.3 presents these results from the 2013–2017 ACS 5-year data. The results reveal significant variation within the Asian race groups in the share of households receiving HUD assistance relative to those eligible for HUD assistance. While it is beyond the scope of this case study to explain these differences further, this analysis illustrates the potential value of the data linkage for better understanding who is served by HUD rental assistance programs.

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[43] Shawn Bucholtz, Emily Molfino, and Quentin Brummet, "Identifying Subsidized Housing Units Within the American Community Survey Through Administrative Record Linkage: A Technical Report," U.S. Department of Housing and Urban Development, Washington, DC, 2020, <www.huduser.gov/portal/publications/Identifying-Subsidized-Housing-Units.html>.

[44] At the time of this analysis, the ACS questionnaire included write-in fields for "Other Asian," "Other Pacific Islander," and "Some other race." Starting with the 2020 ACS questionnaire, there are now write-in fields for "White" and "Black or African American." For more information, see <www.census.gov/programs-surveys/acs/methodology/questionnaire-archive.html>.

Table 6.3. Detailed Asian Race for HUD-Assisted Households: 2013–2017

Householder race	HUD-assisted households	Households eligible for HUD assistance	Share of eligible households receiving HUD assistance (in percent)
Asian Indian	5,973	105,533	6
Cambodian	5,480	16,640	33
Chinese	53,810	259,710	21
Filipino.	12,340	82,330	15
Hmong.	4,515	14,389	31
Japanese.	3,117	34,187	9
Korean	24,000	116,480	21
Laotian.	2,289	9,847	23
Other Asian or Two Groups.	9,879	116,379	8
Vietnamese.	32,370	89,910	36

Source: Authors' analysis of 2013–2017 American Community Survey, 5-Year Estimates.

As another example, HUD and the U.S. Department of Veterans Affairs (VA) partner to implement the VA Supportive Housing (VASH) program, which provides housing vouchers to homeless veterans. As of 2017, the HUD-VASH program provided housing to nearly 88,000 households with a veteran.[45] HUD leaders long suspected that other HUD rental assistance programs provided housing to many additional veterans that were not part of the VASH program. As is the case with detailed race and ethnicity data, however, HUD forms 50058 and 50059 do not collect information on veteran's status.

The linked HUD/ACS data can be used to estimate the number of HUD-assisted households with a veteran to inform this program. Table 6.4 below presents these results by year from the ACS 1-year estimates for 2011 through 2017. The results reveal that HUD is serving between 285,000 and 324,000 households with a veteran.

Table 6.4. Number of HUD-Assisted Households With Veterans by Year: 2011–2017

Year	HUD-assisted households with a veteran
2011	302,000
2012	314,200
2013	289,900
2014	288,200
2015	286,000
2016	285,600
2017	291,900

Source: Author's analysis of 2011–2017 American Community Surveys, 1-Year Estimates.

Conclusion

Using a multifaceted approach, we have linked administrative data from HUD's rental housing assistance programs to ACS housing units for years 2011 through 2017. In each year of the ACS, we identify 61,000 to 78,000 ACS households as being HUD-assisted. Our analysis of the data linkage quality suggests that false-positive links and false-negative links are minimal, enabling high-quality analysis of the linked data. By linking the two data sources, we can learn more about HUD-assisted households without having to conduct an expensive, one-off survey. In the future, this work will continue, and we plan to link HUD administrative records to future years of the ACS as they become available.

Our goal with this project was to develop the linkage process and build the linked data sets so researchers at HUD and elsewhere can further explore the data.

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[45] Ann Elizabeth Montgomery and Meagan Cusack, "HUD-VASH Exit Study: Final Report," U.S. Department of Housing and Urban Development, Washington, DC, 2017, <www.huduser.gov/portal/publications/HUD-VASH-Exit-Study.html>.