

Using the American Community Survey Table-Based Summary File

What Data Users Need to Know

Issued October 2023



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U.S. CENSUS BUREAU
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USING THE AMERICAN COMMUNITY SURVEY TABLE-BASED SUMMARY FILE: WHAT DATA USERS NEED TO KNOW

Introduction

The American Community Survey (ACS) Table-Based Summary File is a pipe-delimited text file that contains all the Detailed Tables from the ACS. Data users with programming skills and access to statistical software can use the Summary File to download and analyze ACS data for a wide range of geographic areas.

This guide provides an overview of the ACS Table-Based Summary File and how it can be used to access data on America's communities.

Starting with the 2022 ACS data releases, the table-based format will be the only format available. The 2021 data releases were the final releases of the original sequence-based format. For information about accessing the ACS Summary File in the original sequence-based format, refer to *Using the American Community Survey Summary File: What Data Users Need to Know*.¹

What Is the ACS?

The ACS is a nationwide survey designed to provide communities with reliable and timely social, economic, housing, and demographic data every year. A separate annual survey, called the Puerto Rico Community Survey (PRCS), collects similar data about the population and housing units in Puerto Rico. The U.S. Census Bureau uses data collected in the ACS and the PRCS to provide estimates on a broad range of population, housing unit, and household characteristics for states, counties, cities, school districts, congressional districts, census tracts, block groups, and many other geographic areas.

¹ U.S. Census Bureau, *Using the American Community Survey Summary File: What Data Users Need to Know*, <www.census.gov/programs-surveys/acs/library/handbooks/summary-file.html>.

The ACS has an annual sample size of about 3.5 million addresses with survey information collected nearly every day of the year. Data are pooled across a calendar year to produce estimates for that year. As a result, ACS estimates reflect data that have been collected over a period of time rather than for a single point in time, as in the decennial census, which is conducted every 10 years and provides population counts as of April 1 of the census year.

ACS 1-year estimates are data that have been collected over a 12-month period and are available for geographic areas with a population of at least 65,000. Starting with the 2014 ACS, the Census Bureau has been producing “1-year Supplemental Estimates”—simplified versions of popular ACS tables—for geographic areas with a population of at least 20,000. The Census Bureau combines 5 consecutive years of ACS data to produce multiyear estimates for geographic areas with fewer than 65,000 residents. These 5-year estimates represent data collected over a period of 60 months.

For more detailed information about the ACS—how to judge the accuracy of ACS estimates, understanding multiyear estimates, knowing which geographic areas are covered in the ACS, and how to access ACS data on the Census Bureau's website—refer to the Census Bureau's handbook on *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.²

² U.S. Census Bureau, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*, <www.census.gov/programs-surveys/acs/library/handbooks/general.html>.

1. OVERVIEW OF THE ACS SUMMARY FILE

The American Community Survey (ACS) Summary File is a unique data product that includes all estimates and margins of error (MOEs) from the Detailed Tables for all geographies that are published for the ACS. The Detailed Tables are designed for advanced data users or those who want access to the most comprehensive ACS tables. They begin with the letters “B” for base tables and “C” for collapsed tables (e.g., B01001 or C15002). The collapsed tables cover the same topics as the base tables, but with fewer categories. Other ACS data products, such as Subject Tables and Data Profiles, are created from the Detailed Tables and, therefore, are not available in the ACS Summary File.³

The 2005 through 2021 ACS Summary Files were released in a sequence-based format containing the estimates and MOEs from the tables in two separate files. The sequences excluded metadata such as the titles of the tables, the descriptions of the rows, and the names of the geographic areas. The metadata and MOEs were stored in other files that users had to merge with the data files to reproduce the complete tables.

Beginning with the 2018 ACS, the U.S. Census Bureau began testing a streamlined format that the estimates and MOEs were grouped by table ID. Under this table-based format, a file is posted for each table that contains the estimates and MOEs for all available geographies. Users can easily select the individual table(s), only needing to merge in a separate file containing geographic labels to reproduce the complete table(s). The table-based format will be the only format available starting with the 2022 ACS data release.

The ACS Summary File can be challenging to use and is intended for advanced users who work with statistical software, like SAS or Python. The Census Bureau provides SAS programs that can be used to access and process the data, as well as instructions for using Excel to merge the geography file with a sample data table in the Table-Based ACS Summary File format.⁴ Before using the Summary File, users should first check if the data of interest are easily available for download on data.census.gov—the Census Bureau’s data dissemination platform.⁵

³ For information about the types of ACS tables that are available, refer to the U.S. Census Bureau’s “Table IDs Explained” webpage at <www.census.gov/programs-surveys/acs/data/data-tables/table-ids-explained.html>.

⁴ U.S. Census Bureau, “Instructions on How to Read American Community Survey Geography Names into Summary File Tables Using Excel,” <https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/documentation/ACS_Table_Based_SF_Excel_Import%20GEO%20Names_Tool.pdf>.

⁵ U.S. Census Bureau, “<<https://data.census.gov>>.”

Benefits and Uses of the ACS Summary File’s Table-Based Format

The table-based format for the ACS Summary File provides access to each detailed table for all available geographies. The main benefit of the table-based format is that for each table, estimates and MOEs are combined into a single file and only require data users to merge in a single file of geography labels to create complete tables. The new format enables data users to:

- Make comparisons across different geographic areas.
- Evaluate the precision of a particular estimate since each table’s estimates and MOEs are now in a single file.
- Access the ACS data needed since each table is now in a separate file and the supporting documentation has been simplified.
- Use either a statistical (e.g., SAS, SPSS, or Python) or spreadsheet (e.g., Excel) program to work with the Summary File tables.

The table-based format still allows users the ability to:

- Connect data across tables. For example, calculate the number of people living in census tracts with at least 30 percent of the population living in poverty.
- Filter the data based on specified criteria. For example, only extract data for table totals and selected estimates.
- Recode variables. For example, aggregate data across several categories or calculate rates and percentages.
- Produce tabulations across many subjects and geographies. For example, tables about educational attainment, poverty, disability, and commuting for all 50 states, the District of Columbia, and Puerto Rico.

Geographies Covered

The ACS Summary File covers geographic areas based on “summary levels.” Summary levels range from very large reporting units such as “State,” to much smaller reporting units, such as “Census Tract.” Summary levels may nest within other geographic areas such as “State” to “County” to “Census Tract,” or they may cross between two or more geographic hierarchies to produce units that are only portions of geographic areas. For example, summary level “State-Place-County” crosses the “State-Place” hierarchy with the “State-County” hierarchy and may create units that cover only a portion of one county.

Each summary level has an assigned three-digit summary level code to help data users link each summary level to its appropriate use in a table, map, or other data summarization format. Here are some common summary levels used to identify types of geographic areas:⁶

- 010 Nation
- 020 Region
- 030 Division
- 040 State
- 050 State-County
- 140 State-County-Census Tract
- 250 American Indian Area/Alaska Native Area/Hawaiian Home Land
- 310 Metropolitan Statistical Area/Micropolitan Statistical Area
- 500 State-Congressional District

Not all geographic levels are published for all ACS Summary File datasets. While all available geographic levels are available for the 5-year files, some levels are not available for the 1-year datasets as they may not meet the minimum population threshold of 65,000. For a list of the most common geographic levels published for the 1-year and 5-year Summary Files (as well as for the 1-year Supplemental Files), refer to the “Areas Published” or “Reference Materials” webpages on the Census Bureau’s website.⁷

Many resources are available to help users understand the ACS geographic terms and concepts. For additional information, refer to the Census Bureau’s “About Geographic Areas” and “Geography and ACS” webpages.⁸

⁶ A figure showing the complete geographic hierarchy for standard entities is available in the file “Standard Hierarchy of Census Geographic Entities” at <<https://www2.census.gov/geo/pdfs/reference/geodiagram.pdf>>.

⁷ U.S. Census Bureau, “Areas Published,” <www.census.gov/programs-surveys/acs/geography-acs/areas-published.html>. To view the complete list of geographic levels published, refer to the Census Bureau’s “Reference Materials” webpage at <www.census.gov/programs-surveys/acs/geography-acs/reference-materials.html>.

⁸ U.S. Census Bureau, “About Geographic Areas,” <www.census.gov/programs-surveys/geography/guidance/geo-areas.html> and “Geography & ACS,” <www.census.gov/programs-surveys/acs/geography-acs.html>.

Comparing Published Detailed Tables to the ACS Summary File

The ACS Summary File contains the same data as the Detailed Tables but in a more flexible format to allow data users to extract only the desired data.

Figure 1.1 shows an example using a table from data.census.gov, and Figure 1.2 shows the corresponding estimates from the Summary File. The published table includes information such as the table ID (B17001), the table title “Poverty Status in the Past 12 Months by Sex by Age,” and the source file “2021 American Community Survey, 1-year estimates.” The body of the table provides the estimates and MOEs for each selected geography (e.g., Citrus County, Florida). The highlighted box shows that in 2021, there were 155,317 people whose poverty status was determined in Citrus County, and there were 25,014 people whose income in the past 12 months was below the poverty level. (The MOEs for these estimates were $\pm 2,105$ and $\pm 4,670$, respectively.)

As conveyed in Figure 1.2, the Summary File does not contain any of the metadata included in the published table. Rather, the file only contains the geographic identifiers, estimates, and MOEs that are separated by pipes (i.e., vertical bar symbols).

Data Release Schedule and Notable Changes to the Summary File

You can learn more details about each data release by visiting the ACS Data Releases webpage on the Census Bureau’s website.⁹ This webpage includes links to a schedule, notes about new estimates or new guidance, and technical information about geography and product changes. Check the updated data release information before using the Summary File as changes may impact the tables or geographies. You can also browse notes from previous years.

⁹ U.S. Census Bureau, “Data Releases,” <www.census.gov/programs-surveys/acs/news/data-releases.html>.

Figure 1.1. Excerpt From 2021 American Community Survey 1-Year Estimates on Data.census.gov

United States®
Census Bureau

Search

All **Tables** Maps Pages

American Community Survey
B17001 | POVERTY STATUS IN THE PAST 12 MONTHS BY SEX BY AGE
2021: ACS 1-Year Estimates Detailed Tables | Universe: Population for whom poverty status is determined

Notes Geos Years Topics Surveys Codes Hide Transpose Margin of Error Restore Excel CSV ZIP Share Print Map

Citrus County, Florida		
Label	Estimate	Margin of Error
▼ Total:	155,317	±2,105
▼ Income in the past 12 months below poverty level:	25,014	±4,670
▼ Male:	12,438	±2,686
Under 5 years	747	±570
5 years	107	±127
6 to 11 years	1,215	±980
12 to 14 years	576	±541
15 years	181	±198
16 and 17 years	689	±404
18 to 24 years	877	±738

Source: U.S. Census Bureau, 2021 American Community Survey, 1-year estimates Detailed Tables, Table B17001, <<https://data.census.gov/table?q=B17001:+POVERTY+STATUS+IN+THE+PAST+12+MONTHS+BY+SEX+BY+AGE&g=050XX00US12017&tid=ACSDT1Y2021.B17001>>.

Figure 1.2. Excerpt From 2021 American Community Survey 1-Year Summary File

0500000US09015	112082	1129	13789	3496	5507	1778	382	362	119	166	1404	900	214	266	56
0500000US10001	179342	941	22146	4315	8732	1880	1918	863	484	424	1126	503	273	250	0
0500000US10003	555211	1437	62599	6633	26806	3485	2510	1120	1063	670	3551	1418	1405		
0500000US10005	244122	668	28705	4214	12033	2085	1333	665	592	407	1196	641	900	583	6
0500000US11001	637491	1884	105007	8772	44023	3963	4245	1302	463	568	4243	1200	3360		
0500000US12001	265881	2009	51142	5641	23645	3022	869	555	480	434	353	268	421	355	64
0500000US12005	176731	813	24005	3863	11265	2442	1775	759	303	444	1730	759	823	608	4
0500000US12009	610446	1216	67665	7890	29804	4396	3692	1913	300	284	3081	1372	1010	7	
0500000US12011	1912890	4036	241133	15249	111157	8376	9904	2240	1954	1073	10824	2516			
0500000US12015	190061	2889	20613	4242	8512	2308	751	443	158	215	566	476	231	215	194
0500000US12017	155317	2105	25014	4670	12438	2686	747	570	107	127	1215	980	576	541	1
0500000US12019	219230	1852	15650	4004	6755	2098	586	444	12	25	643	640	328	353	749
0500000US12021	382645	1418	40874	8756	21653	5115	915	922	121	202	2857	1159	1824	949	

Source: U.S. Census Bureau, 2021 American Community Survey 1-year estimates, 1-year Summary File (table-based), Table B17001 (truncated). The complete file is available on the Census Bureau's website at <www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/data/1YRData/acsdt1y2021-b17001.dat>.

2. HOW TO USE THE ACS TABLE-BASED SUMMARY FILE

The American Community Survey (ACS) Summary File is located on the U.S. Census Bureau's file transfer protocol server.¹⁰ The easiest way to find the file is to start at the ACS website.¹¹ From the ACS main page <www.census.gov/programs-surveys/acs>, select the "Data" navigation link on the left. From there, click on the "Summary File" navigation link on the left, as shown in Figure 2.1.

The ACS Table-Based Summary File is in pipe-delimited, Unicode Transformation Format (UTF-8), which can easily be imported into software packages. The file is divided into three components: table labels (or table shells), geography labels

(or geography files), and data files. This section describes the components of the Summary File and the next section provides information and resources to put them together.

- **Data files:** Data (including estimates, margins of error, and geographies) organized by table ID for the 1-year or 5-year release:
 - *Folder:* 1YRData, 5YRData.
 - *Example:* The file acsdt1y2021-b01001.dat, variable B01001_E003 for 0400000US06 = 1,129,355.
- **Geography labels (or geography files):** All geography labels for the 1-year or 5-year data release:
 - *File name example:* Geos20211YR.txt or Geos20215YR.txt.
 - *Variable label example:* 0400000US06 = "California."

¹⁰ U.S. Census Bureau, "American Community Survey Data via the File Transfer Protocol Server," <www.census.gov/programs-surveys/acs/data/data-via-ftp.html>.

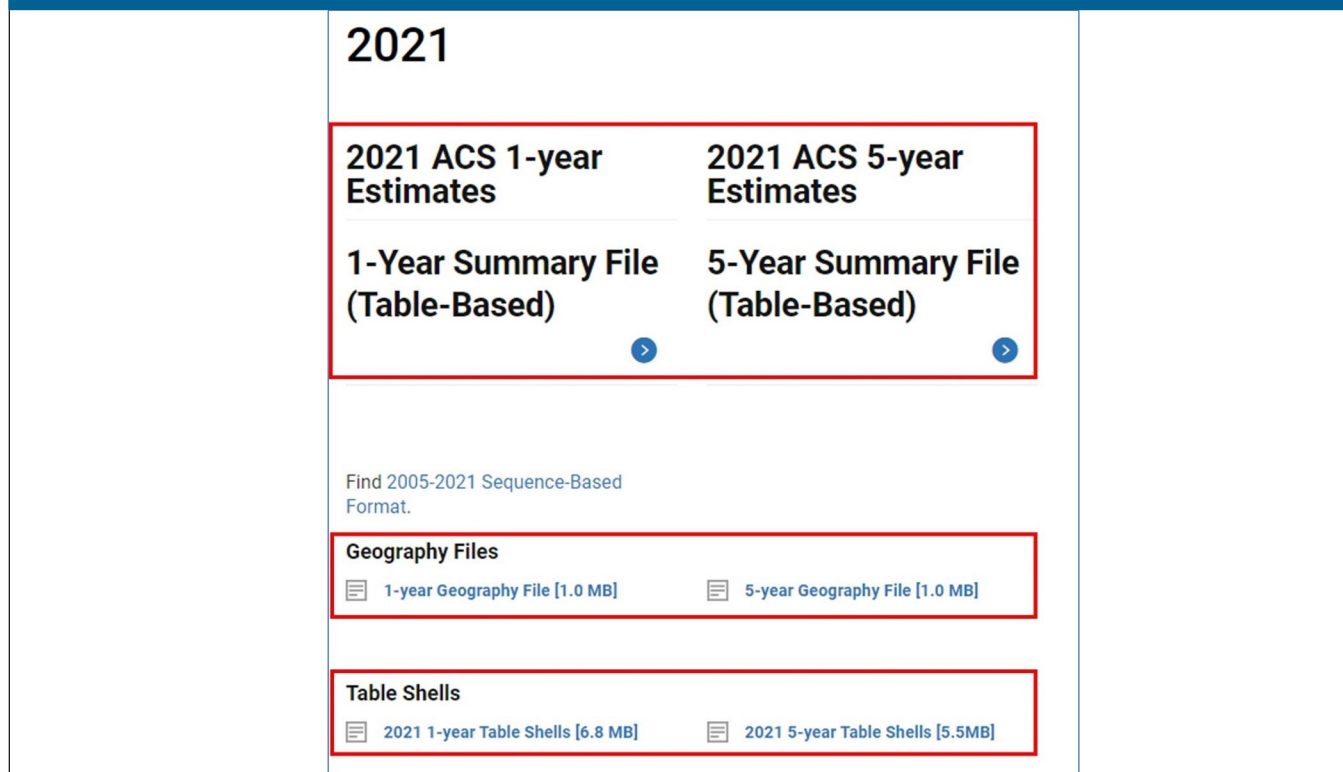
¹¹ U.S. Census Bureau, "American Community Survey," <www.census.gov/programs-surveys/acs>.

Figure 2.1. Locating the American Community Survey Summary File

The screenshot shows the U.S. Census Bureau website. The top navigation bar includes links for Partners, Researchers, Educators, Survey Respondents, News, NAICS Codes, Jobs, About Us, Contact Us, and Help. Below this is a secondary navigation bar with Topics, Data & Maps, Surveys & Programs (highlighted), and Resource Library. A search bar is located on the right. The main content area is titled "American Community Survey Data" and includes a sidebar on the left with a list of links: Within American Community Survey (ACS), Congressional and State Legislative Districts, Custom Tables, Data Tables, Data Tools, Data via API, Data via FTP, Equal Employment Opportunity (EEO), Experimental Data, Race/Ethnicity and American Indian & Alaska Native, Summary File (circled in red), Variance Replicate, and Estimate Tables. The main content area contains a description of the ACS, social media sharing options, and a "Get Started Accessing ACS Data" section with a "GO TO DATA.CENSUS.GOV" button. A "Related Information" section on the right lists "DATA Data" and "data.census.gov Resources".

Source: U.S. Census Bureau, "American Community Survey Data," <www.census.gov/programs-surveys/acs/data.html>.

Figure 2.2. American Community Survey Summary File Components Associated With the 2021 Data Release



Source: U.S. Census Bureau, “American Community Survey Summary File,” <www.census.gov/programs-surveys/acs/data/summary-file.2021.html#list-tab-1622397667>.

• **Table labels (or table shells):** A description of each line item in a table for the 1-year or 5-year data release:

- *File name example:* ACS20211YR_Table_Shells.txt or ACS20215YR_Table_Shells.txt.
- *Variable label example:* B01001_003 = “SEX BY AGE – Total Males Under 5 Years.”

Figure 2.2 shows the location of each of these components on the Census Bureau’s ACS Summary File website (2021 data release).

Data Files


Under the new table-based format, the ACS Summary File is organized by individual Detailed Tables that can be downloaded separately. Each data file contains estimates and margins of error (MOEs) for all available geographies. Figure 2.3 lists a compressed file of the entire dataset.


Table 2.1 lists the naming convention used for a selected file in the 1-year data directory (for 2021). The file name, “acsdt1y,” refers to the ACS 1-year Detailed Tables; “2021” refers to the data collection year; and “b01001” refers to the table ID.




















Figure 2.4 lists the first few rows from a 2017–2021 ACS 5-year Summary File estimate for “Table B08121: Median Earnings in the Past 12 Months (In 2021 Inflation-Adjusted Dollars) by Means of Transportation to Work.” The first row of the pipe-delimited file lists the variable labels, while subsequent rows list the ACS estimates for this table. The rows highlighted in the table list the results for the United States, rural areas, and the Midwest region (spotlighted in the “Geography Files” subsection).

The directory for the ACS 1-year Summary File is organized in a similar fashion.

Figure 2.3. Summary File Directory for the 2021 American Community Survey 1-Year Data

 An official website of the United States government



<u>Name</u>	<u>Last modified</u>	<u>Size</u>	<u>Description</u>
 Parent Directory		-	
 1YRData.zip	2022-08-22 14:36	515M	
 acsdt1y2021-b01001.dat	2022-08-22 14:33	3.7M	
 acsdt1y2021-b01001a.dat	2022-08-22 14:33	2.3M	
 acsdt1y2021-b01001b.dat	2022-08-22 14:33	1.2M	
 acsdt1y2021-b01001c.dat	2022-08-22 14:33	259K	
 acsdt1y2021-b01001d.dat	2022-08-22 14:33	862K	
 acsdt1y2021-b01001e.dat	2022-08-22 14:33	63K	
 acsdt1y2021-b01001f.dat	2022-08-22 14:33	945K	
 acsdt1y2021-b01001g.dat	2022-08-22 14:33	1.7M	
 acsdt1y2021-b01001h.dat	2022-08-22 14:33	2.3M	
 acsdt1y2021-b01001i.dat	2022-08-22 14:33	1.7M	
 acsdt1y2021-b01002.dat	2022-08-22 14:33	335K	
 acsdt1y2021-b01002a.dat	2022-08-22 14:33	336K	
 acsdt1y2021-b01002b.dat	2022-08-22 14:33	330K	
 acsdt1y2021-b01002c.dat	2022-08-22 14:33	364K	
 acsdt1y2021-b01002d.dat	2022-08-22 14:33	340K	
 acsdt1y2021-b01002e.dat	2022-08-22 14:33	529K	
 acsdt1y2021-b01002f.dat	2022-08-22 14:33	327K	

Source: U.S. Census Bureau, 2021 American Community Survey, 1-year estimates, 1-year Summary File (table-based), data via file transfer protocol at <https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/data/1YRData/>.

Table 2.1. Naming Convention for Files Within Data Directory

acsdt1y2021-b01001.dat		
Example	Name	Range or Type
acs	Survey Name	American Community Survey
dt	Table Type	Detailed Table
1y	Period Covered	1y=1-year, 5y=5-year
2021	Reference Year	ACS data year (last year of the period for multiyear periods)
-	Hyphen	
b01001	Table Number	Unique table number

Source: U.S. Census Bureau.

Figure 2.4. Excerpt of 2017–2021 American Community Survey 5-Year Data File

GEO_ID	B08121_E001	B08121_M001	B08121_E002	B08121_M002	B08121_E003	B08121_M003	B08121_E004
0100000US	42296	74	42770	71	31995	93	42437
0100001US	42471	84	42970	76	31610	101	42367
0100043US	41575	72	41962	73	34105	204	46427
0100089US	34342	330	35371	392	29797	904	29331
0100090US	44063	12926	42500	16203	-666666666	-222222222	-666666666
0100091US	37113	263	38378	269	29813	650	22741
0100092US	42766	922	43676	1040	34631	3087	43000
0100093US	45819	1040	50299	1035	50022	3143	32593
0100094US	35445	454	36987	494	26517	820	19757
0100095US	39520	1088	41034	980	34446	3116	25764
01000A0US	42701	74	43153	71	32043	92	42525
01000C0US	43349	75	43760	74	32232	99	42690
01000C1US	41131	78	41642	85	30915	135	39349
01000C2US	44699	83	44906	82	33328	156	53368
01000E0US	35785	115	37165	117	30204	232	24214
01000E1US	32723	179	34596	186	26998	315	20165
01000E2US	37533	108	38416	113	31740	282	30786
01000G0US	35061	104	36046	108	31236	233	25091
01000H0US	35499	95	36724	96	30615	184	24532
0200000US1	47697	149	48568	144	34756	254	47871
0200000US2	41686	80	42491	81	31676	156	36776
0200000US3	39898	85	40511	86	30098	145	32768
0200000US4	43298	87	43724	89	34232	156	37673
0200001US1	48265	162	49370	152	34575	301	47672
0200001US2	41520	98	42391	105	30592	193	36975
0200001US3	39965	90	40689	93	29432	209	32467
0200001US4	43277	89	43679	92	33978	160	37503
0200043US1	45004	179	45351	201	35997	579	75502
0200043US2	42184	89	42752	91	35915	330	28980
0200043US3	39680	114	39981	115	32089	270	41192
0200043US4	43505	183	44157	180	37788	647	46096
02000A0US1	48117	154	49027	145	34874	261	47888
02000A0US2	42198	87	42947	84	31577	171	37059

Source: U.S. Census Bureau, 2017–2021 American Community Survey, 5-year estimates, Table B08121 (truncated). The complete file is available on the Census Bureau’s website at <https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/data/5YRData/acsdt5y2021-b08121.dat>.

Geography Labels (or Geography Files)

The Census Bureau provides a separate file that contains labels for all geographies in both the 1-year and 5-year ACS data files. You can use the geography identifier (GEO_ID) in this geography file to match the corresponding geographic identifier in each data file. Table 2.2 lists the contents of the geography file, which is available in .TXT format. Each

row represents a different geographic area and the first four fields contain metadata such as the state postal abbreviation and summary level. Following those fields are the different geographic levels available for a particular data release. The fields in the table are left blank if the geographic level is not available for a particular data release. The GEO_ID is displayed in a red box in the table.

Table 2.2. Contents of 2017–2021 American Community Survey 5-Year Geography File

Variable Name	Description	Code Type
FILEID	Always equal to ACS Summary File identification	Record
STUSAB	State Postal Abbreviation	Record
SUMLEVEL	Summary Level	Record
COMPONENT	Geographic Component	Record
US	US	Geographic
REGION	Census Region	Geographic
DIVISION	Census Division	Geographic
STATE	State (FIPS Code)	Geographic
COUNTY	County of current residence	Geographic
COUSUB	County Subdivision (FIPS)	Geographic
PLACE	Place (FIPS Code)	Geographic
TRACT	Census Tract	Geographic
BLKGRP	Block Group	Geographic
CONCIT	Consolidated City	Geographic
AIANHH	American Indian Area/Alaska Native Area/Hawaiian Home Land (Census/FIPS)	Geographic
AIANHHFP	American Indian Area/Alaska Native Area/Hawaiian Home Land (LEFT BLANK)	Geographic
AIHHTLI	American Indian Trust Land/Hawaiian Home Land Indicator	Geographic
AITS	American Indian Tribal Subdivision (Census/FIPS)	Geographic
AITSFP	American Indian Tribal Subdivision (LEFT BLANK)	Geographic
ANRC	Alaska Native Regional Corporation	Geographic
CBSA	Metropolitan and Micropolitan Statistical Area	Geographic
CSA	Combined Statistical Area	Geographic
METDIV	Metropolitan Statistical Area—Metropolitan Division	Geographic
MACC	Metropolitan Area Central City	Geographic
MEMI	Metropolitan/Micropolitan Indicator Flag	Geographic
NECTA	New England City and Town Area	Geographic
CNECTA	New England City and Town Combined Statistical Area	Geographic
NECTADIV	New England City and Town Area Division	Geographic
UA	Urban Area	Geographic
CDCURR	Current Congressional District***	Geographic
SLDU	State Legislative District Upper	Geographic
SLDL	State Legislative District Lower	Geographic
ZCTA5	5-digit ZIP Code Tabulation Area	Geographic
SUBMCD	Subminor Civil Division (FIPS)	Geographic
SDELM	State-School District (Elementary)	Geographic
SDSEC	State-School District (Secondary)	Geographic
SDUNI	State-School District (Unified)	Geographic
UR	Urban/Rural	Geographic
PCI	Principal City Indicator	Geographic
PUMA5	Public Use Microdata Area—5% File	Geographic
GEO_ID	Geographic Identifier	Geographic
NAME	Area Name	Geographic
BTTR	Tribal Tract	Geographic
BTBG	Tribal Block Group	Geographic
TL_GEO_ID	Geographic Identifier (for TIGER/Line Shapefiles)	Geographic

Source: U.S. Census Bureau, 2017–2021 American Community Survey, 5-year estimates, 5-year geography file, <https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/documentation/Geos20215YR.txt>.

Figure 2.5. Excerpt of 2017–2021 American Community Survey 5-Year Geography File

FILEID	STUSAB	SUMLEVEL	COMPONENT	US	REGION	DIVISION	STATE	COUNTY	COUSUB	PLACE	TRACT	BLKGRI
ACSSF	US	010	00	1			0100000US	United States				
ACSSF	US	010	01	1			0100001US	United States -- Urban				
ACSSF	US	010	43	1			0100043US	United States -- Rural				
ACSSF	US	010	89	1			0100089US	United States -- American				
ACSSF	US	010	90	1			0100090US	United States -- American				
ACSSF	US	010	91	1			0100091US	United States -- Oklahoma				
ACSSF	US	010	92	1			0100092US	United States -- Tribal De				
ACSSF	US	010	93	1			0100093US	United States -- Alaska Na				
ACSSF	US	010	94	1			0100094US	United States -- State Des				
ACSSF	US	010	95	1			0100095US	United States -- Hawaiian I				
ACSSF	US	010	A0	1			01000A0US	United States -- In metrop				
ACSSF	US	010	C0	1		1	0100C0US	United States -- In metrop				
ACSSF	US	010	C1	1		1	0100C1US	United States -- In metrop				
ACSSF	US	010	C2	1		1	0100C2US	United States -- In metrop				
ACSSF	US	010	E0	1		2	0100E0US	United States -- In micro				
ACSSF	US	010	E1	1		2	0100E1US	United States -- In micro				
ACSSF	US	010	E2	1		2	0100E2US	United States -- In micro				
ACSSF	US	010	G0	1		9	0100G0US	United States -- Not in me				
ACSSF	US	010	H0	1			0100H0US	United States -- Not in me				
ACSSF	US	020	00	1			0200000US1	Northeast Region				
ACSSF	US	020	00	2			0200000US2	Midwest Region				
ACSSF	US	020	00	3			0200000US3	South Region				
ACSSF	US	020	00	4			0200000US4	West Region				
ACSSF	US	020	01	1			0200001US1	Northeast Region -- Urban				
ACSSF	US	020	01	2			0200001US2	Midwest Region -- Urban				
ACSSF	US	020	01	3			0200001US3	South Region -- Urban				
ACSSF	US	020	01	4			0200001US4	West Region -- Urban				
ACSSF	US	020	43	1			0200043US1	Northeast Region -- Rura				
ACSSF	US	020	43	2			0200043US2	Midwest Region -- Rural				
ACSSF	US	020	43	3			0200043US3	South Region -- Rural				

Source: U.S. Census Bureau, 2017–2021 American Community Survey, 5-year estimates, 5-year geography file (truncated). The complete file is available on the Census Bureau’s website at <https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/documentation/Geos20215YR.txt>.

Figure 2.5 lists the first few rows and columns in the 5-year geography file. The first row displays the variable labels and the following rows include identifiers for all the geographic areas included in the Summary File. For example:

- In Row 2, the GEO_ID is “0100000US,” representing the United States.
- In Row 4, the GEO_ID is “0100043US,” representing rural areas.
- In Row 21, the GEO_ID is “0200000US2,” representing the Midwest region.

Table Labels (or Table Shells)

Table shells provide descriptions of each line item in the ACS Summary File without the estimates or MOEs filled in. They contain the table IDs, line numbers, unique IDs, and descriptions of each data cell in the Census Bureau’s Detailed Tables. Table shells are available 1 week before ACS data are released, allowing users to preview the contents of a new data

release in advance. Figure 2.6 lists the columns and first few rows of the table shells for the 2017–2021 ACS 5-year release.

Table IDs

All ACS tables have a table ID that follows specific naming conventions. This makes it easy to identify the same table across different tools such as on data.census.gov, the Summary File, and the application programming interface. You will need to know the table ID to identify the table from the Summary File. The Census Bureau provides a spreadsheet with table shells and associated table IDs for all Detailed Tables on their website.¹²

Table IDs consist of up to five elements. The first element is a letter that indicates the table type. For example, in Figure 2.7, the first letter is “B” indicating that the data are from a detailed (or

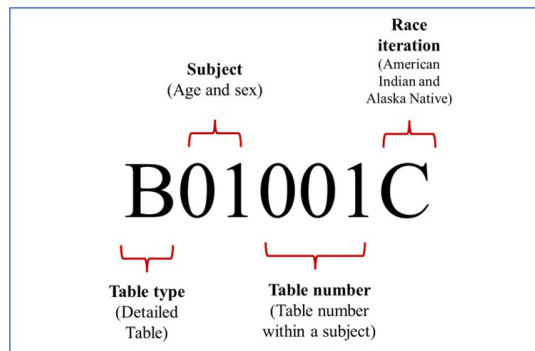
¹² U.S. Census Bureau, “Table Shells and Table List” can be found at <www.census.gov/programs-surveys/acs/technical-documentation/table-shells.html>.

Figure 2.6. Excerpt of 2017–2021 American Community Survey 5-Year Table Shells

```
Table ID|Line|Tndent|Unique ID|Label|Title|Universe|Type
B010011.0|0|B01001_001|Total:|SEX BY AGE|Total population|int
B010012.0|1|B01001_002|Male:|SEX BY AGE|Total population|int
B010013.0|2|B01001_003|Under 5 years:|SEX BY AGE|Total population|int
B010014.0|2|B01001_004|5 to 9 years:|SEX BY AGE|Total population|int
B010015.0|2|B01001_005|10 to 14 years:|SEX BY AGE|Total population|int
B010016.0|2|B01001_006|15 to 17 years:|SEX BY AGE|Total population|int
B010017.0|2|B01001_007|18 and 19 years:|SEX BY AGE|Total population|int
B010018.0|2|B01001_008|20 years:|SEX BY AGE|Total population|int
B010019.0|2|B01001_009|21 years:|SEX BY AGE|Total population|int
B0100110.0|2|B01001_010|22 to 24 years:|SEX BY AGE|Total population|int
B0100111.0|2|B01001_011|25 to 29 years:|SEX BY AGE|Total population|int
B0100112.0|2|B01001_012|30 to 34 years:|SEX BY AGE|Total population|int
B0100113.0|2|B01001_013|35 to 39 years:|SEX BY AGE|Total population|int
B0100114.0|2|B01001_014|40 to 44 years:|SEX BY AGE|Total population|int
B0100115.0|2|B01001_015|45 to 49 years:|SEX BY AGE|Total population|int
B0100116.0|2|B01001_016|50 to 54 years:|SEX BY AGE|Total population|int
B0100117.0|2|B01001_017|55 to 59 years:|SEX BY AGE|Total population|int
B0100118.0|2|B01001_018|60 and 61 years:|SEX BY AGE|Total population|int
B0100119.0|2|B01001_019|62 to 64 years:|SEX BY AGE|Total population|int
B0100120.0|2|B01001_020|65 and 66 years:|SEX BY AGE|Total population|int
B0100121.0|2|B01001_021|67 to 69 years:|SEX BY AGE|Total population|int
B0100122.0|2|B01001_022|70 to 74 years:|SEX BY AGE|Total population|int
B0100123.0|2|B01001_023|75 to 79 years:|SEX BY AGE|Total population|int
B0100124.0|2|B01001_024|80 to 84 years:|SEX BY AGE|Total population|int
B0100125.0|2|B01001_025|85 years and over:|SEX BY AGE|Total population|int
```

Source: U.S. Census Bureau, 2017–2021 American Community Survey, 5-year estimates, 5-year table shells (truncated). The complete file is available on the Census Bureau’s website at <www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/documentation/ACS20215YR_Table_Shells.txt>.

Figure 2.7. American Community Survey Table IDs Explained



Source: U.S. Census Bureau, American Community Survey Data Tables, “Table IDs Explained,” <www.census.gov/programs-surveys/acs/data/data-tables/table-ids-explained.html>.

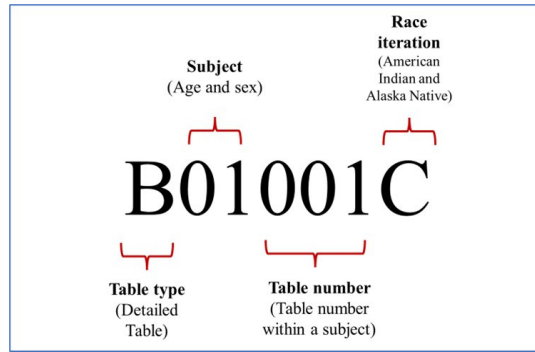
base) table. Table IDs that start with “C” refer to collapsed tables. The “B” tables have the most detail for a given topic, while “C” tables have collapsed categories.

The next two characters identify the subject of the table. Tables beginning with “01,” for example, are for tables in the age and sex subject. Each subject has a unique two-digit subject number.

The following three digits are a sequential table number that uniquely identifies a table within a given subject.

The fourth element is an alphabetic suffix that indicates the corresponding ACS table is repeated for different race and Hispanic origin groups. For example, table IDs ending in a “C” are for the American Indian and Alaska Native alone population. Those with an “H” suffix are for the non-Hispanic White population. Lastly, selected tables will have a final alphabetic suffix “PR” to indicate a table is available for Puerto Rico geographies only.

Figure 2.8. **Unique IDs for American Community Survey Variable Names Explained**



Source: U.S. Census Bureau, 2021 American Community Survey, 1-year Summary File (table-based), Table B01001, <www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/data/1YRData/acsdt1y2021-b01001.dat>.

Refer to the Census Bureau’s website for more details about naming conventions and subject numbers for ACS tables.¹³

Unique ID for Variable Names

In the ACS Summary File, variable names for estimates and MOEs are displayed using a unique, alpha-numeric identifier (a unique ID).

¹³ U.S. Census Bureau, American Community Survey, “Table IDs Explained,” <www.census.gov/programs-surveys/acs/data/data-tables/table-ids-explained.html>.

The unique ID includes four elements: a table ID, an underscore, a letter to indicate the variable type (E = estimate, M = margin of error), and a three-digit line number, which identifies ACS estimates within each table.¹⁴ For example, in Table B01001, “Sex by Age,” the unique ID for the estimated total number of people who are American Indian and Alaska Native alone is “B01001C_E001” (Figure 2.8).

¹⁴ The table shells for the American Community Survey Summary File provide unique IDs without the “variable type” displayed, since all rows represent estimates rather than MOEs. However, the data files include this information.

3. TOOLS AND RESOURCES FOR THE ACS SUMMARY FILE

The U.S. Census Bureau provides several resources to help data users access and use the table-based American Community Survey (ACS) Summary File on the “Getting Started” webpage, including:

- Links to the ACS Summary File data.
- Release notes and supporting materials.
- Instructions on how to read ACS geography names into Summary File tables using Excel.
- Example programs to access the ACS Summary File using SAS or Python.
- Webinars that provide guidance on using the ACS Summary File in the table-based format.¹⁵

Reading the ACS Summary File Into Excel

The Census Bureau provides a document that describes how data users without access to SAS or other statistical software—or who are seeking data for just a few tables—can retrieve ACS Summary File tables using Excel.¹⁶

- Select a table of interest from the Census Bureau’s file transfer protocol (FTP) directory and download it as a text file.
- In Excel, open the text file of the table of interest, using Excel’s Text Import Wizard. The table file uses pipe delimiters (i.e., vertical bar symbols).
- Download the corresponding geography file, either from the Table-Based Format webpage or the FTP website. Make sure the geography file corresponds with the ACS Summary File from where you selected the table. For example, if the data table comes from the 2021 1-year Summary File, you will want to download the 2021 ACS 1-year geography file. Like the data table, the geography file will be saved as a text file.
- Open the geography file in Excel using the Text Import Wizard. Like the table file, the geography file uses pipe delimiters.
- Once both the data table and geography files are open, use the VLOOKUP function to merge the geography names into the data table.

¹⁵ U.S. Census Bureau, American Community Survey Summary File, “Getting Started,” <www.census.gov/programs-surveys/acs/data/summary-file/Getting_Started.html#list-tab-1622397667>.

¹⁶ U.S. Census Bureau, “Instructions on How to Read ACS Geography Names into Summary File Tables Using Excel,” <https://www2.census.gov/programs-surveys/acs/summary_file/2021/table-based-SF/documentation/ACS_Table_Based_SF_Excel_Import%20GEO%20Names_Tool.pdf>.

SAS and Other Statistical Programs

More advanced users can also use the Census Bureau’s example programs, available on the “ACS Summary File” webpage, as a starting point to access ACS data using SAS, Python, or other statistical software.¹⁷ These programs can be used to access:

- The ACS 1-year data for all the geographies in a single state (California).
- The ACS 5-year data for all the tracts in the United States.

The SAS code listed in Figure 3.1 could be used to output 2021 ACS 1-year data for all geographies in California from Table B01001, “Sex and Age.” The Census Bureau also has an “ACS Data Users GitHub” webpage where data users can share code for working with ACS data with different programming languages (R, Python, SAS, Stata, etc.).¹⁸

Webinars and Other Supporting Materials

The Census Bureau has organized a series of webinars for data users who want more information about using the ACS Table-Based Summary File.¹⁹

USER NOTES

Population Thresholds

The Census Bureau publishes American Community Survey 1-year and 5-year estimates with population thresholds set for the ACS 1-year estimates to provide reliable data. Table 3.1 provides a brief comparison of the two types of estimates:

For more guidance on using ACS 1-year and 5-year estimates, refer to the chapter on “Understanding Multiyear Estimates” in *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.²⁰

¹⁷ U.S. Census Bureau, American Community Survey Summary File, “Getting Started,” <www.census.gov/programs-surveys/acs/data/summary-file/Getting_Started.html#list-tab-1622397667>.

¹⁸ U.S. Census Bureau, American Community Survey, “Data Users GitHub” webpage, <<https://github.com/Census-ACS>>.

¹⁹ U.S. Census Bureau, American Community Survey Summary File, “Getting Started,” <www.census.gov/programs-surveys/acs/data/summary-file/Getting_Started.html#list-tab-1622397667>.

²⁰ U.S. Census Bureau, *Understanding and Using American Community Survey Data: What All Data Users Need to Know*, <www.census.gov/programs-surveys/acs/library/handbooks/general.html>.

Figure 3.1. SAS Code Used to Output 2021 American Community Survey 1-Year Data for California Geographies

```

/*-----ADD INPUT HERE -----*/
%let Table_ID =b01001;
%let State =ca;
%let Data_Dir =../1YRData;
%let Geo_File =../Geos20211YR.txt;
/*-----*/
libname out ".";

/** Import Data **/
proc import datafile = "&Data_Dir./acsd1y2021-&Table_ID.dat"
  out = &Table_ID
  dbms = dlm
  replace;
  getnames = yes;
  delimiter = "|";
  GUESSINGROWS=10000;
run;

/* import geography labels */
proc import datafile="&Geo_File"
  out = Geos
  dbms = dlm
  replace;
  getnames=yes;
  delimiter = "|";
  GUESSINGROWS=10000;
run;

/* merge data with geography labels and output */
proc sql;
  create table out.&Table_ID as
  select geo.name, tbl.*
  from &Table_ID as tbl
  left join Geos as geo
  on tbl.GEO_ID = geo.GEO_ID
  where geo.stusab = upcase("&State");

```

Source: U.S. Census Bureau, American Community Survey, "Data Users GitHub Repository," <<https://github.com/Census-ACS/acs-summary-file/blob/master/SAS/Example01.sas>>.

Table 3.1. Understanding American Community Survey 1-Year and 5-Year Estimates

1-Year Estimates	5-Year Estimates
Published for selected geographic areas with populations of 65,000 or greater.	Published for all geographic areas.
Represent the average characteristics over 1 calendar year.	Represent the average characteristics over a 5-year period of time.
Have fewer published geographic areas than the 5-year estimates.	Have more published areas than the 1-year estimates.

Source: U.S. Census Bureau, *Using the American Community Survey Summary File: What Data Users Need to Know*, <www.census.gov/programs-surveys/acs/library/handbooks/summary-file.html>.

Explanation of Missing Estimates and Data Release Filtering Rules

Data users often question why certain ACS estimates are not available. Missing estimates can be caused by data suppression through various methods or restrictions that are applied to ACS data to limit the disclosure of information about individual respondents and the number of published estimates with unacceptable statistical reliability.

Filtering rules, based on statistical reliability of the ACS 1-year estimates, are used to ensure that Detailed Tables are not released where the majority of estimates in the Detailed Tables have an unacceptable level of reliability.

Learn more about missing estimates and filtering rules on the Census Bureau's "Data Suppression" webpage.²¹

Margins of Error (MOEs) and Rounding Rules

There are a few special rules on how certain MOEs are determined for ACS estimates. The accuracy of the estimate (decimal place) within the Detailed Tables determine the number of digits to where the MOE is rounded.

Some ACS tables and estimates do not have MOEs associated with them, including:

- Tables B98001, B98002, and B98003, which are sample counts, not estimates.
- The remaining tables in series B98 (quality measure tables) and B99 (allocation tables).
- ACS estimates that are controlled to independent population or housing unit totals.

²¹ U.S. Census Bureau, American Community Survey, "Data Suppression," <www.census.gov/programs-surveys/acs/technical-documentation/data-suppression.html>.

Jam Values

A "jam value" is a hard-coded value used to explain the absence of data. The Table-Based Summary File uses numeric jam values, whereas, the previous sequence-based format used character values. For example, a jam value is represented by a value in the data display, such as "-6666666666," in cases where the estimate could not be computed because there was an insufficient number of sample observations. The sequence-based format used a dot (.) to express this information. Learn more about these special data values on the Census Bureau's "Code Lists, Definitions, and Accuracy" webpage.²²

Display of ACS Estimates

The estimates in the Summary File are stored using standard notation instead of in scientific notation. The estimates are stored as whole numbers. The largest estimate in the ACS Summary File contains 14 digits.

For More Information

For any technical questions or comments on the ACS Summary File, email <acso.users.support@census.gov>. If you have questions or comments about the ACS, you can submit a question online at <<https://ask.census.gov/>>.

²² U.S. Census Bureau, "Code Lists, Definitions, and Accuracy," <www.census.gov/programs-surveys/acs/technical-documentation/code-lists.html>.