Using the American Community Survey Summary File

What Data Users Need to Know

Issued September 2019

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USING THE AMERICAN COMMUNITY SURVEY SUMMARY FILE: WHAT DATA USERS NEED TO KNOW

1. INTRODUCTION

The American Community Survey (ACS) Summary File is a comma-delimited text file that contains all the Detailed Tables for 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 Summary File and how it can be used to access data on America's communities.

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.

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 at least 65,000 people. Starting with the 2014 ACS, the Census Bureau is also producing "1-year Supplemental Estimates"—simplified versions of popular ACS tables—for geographic areas with at least 20,000 people. 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 Web site—see the Census Bureau's handbook on *Understanding and Using American Community Survey Data: What All Data Users Need to Know.*[1]

Overview of the ACS Summary File

The ACS Summary File is a unique data product that includes all estimates and margins of error from the Detailed Tables for all geographies that are published for the ACS. 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.[2]

The ACS Summary File is in American Standard Code for Information Interchange (ASCII) format. The file is divided into three types:

- Geographies—(position based and comma delimited).
- Estimates—(comma delimited).
- Margins of Error—(comma delimited).

Section 2 describes each component in detail and how to put them all together.

Since the Detailed Tables contain a large number of cells, the tables are stored in a series of files, called sequences, containing only the estimates from the tables. The sequences exclude metadata such as the titles of the tables, the descriptions of the rows, and the names of the geographic areas. The metadata is stored in other files that you must merge with the data files to reproduce the complete tables. Learn more about metadata in Sections 2 and 3.

The ACS Summary File can be challenging to use and is intended for advanced users who work with

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

[2] For information about the types of ACS tables that are available, see the Census Bureau's Table IDs Explained Web page, <www.census.gov/programs-surveys/acs/guidance/which-data-tool/table-ids-explained.html>.

statistical software. The Census Bureau provides programs written in SAS that can be used to access and process the data. There is also an Excel-based tool for those without access to a statistical package. However, 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 new data dissemination platform.[3]

Section 4 provides information about tools to help you access the tables you need. You can access these tools through the Summary File Documentation on the Census Bureau's ACS Web site.[4]

Benefits and Uses of the ACS Summary File

Because the ACS Summary File provides access to all the Detailed Tables for all available geographies, it enables data users to more easily:

- 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." A summary level specifies the content and the hierarchical relationships of the geographic elements that are required to tabulate and summarize data.

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:

- 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

A complete list of Cartographic Boundary File Summary Level Codes is available on the Census Bureau's Web site.[5]

Many resources are available to help users understand the ACS geographic terms and concepts. For additional information, refer to the Census Bureau's Geography Reference Manual and Geography and ACS Web page.[6]

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

[3] U.S. Census Bureau, data.census.gov, <https://data.census.gov>.

[4] U.S. Census Bureau, American Community Survey (ACS), Summary File Documentation, <www.census.gov/programs-surveys/acs/technical-documentation/summary-file-documentation.html>.

[5] U.S. Census Bureau, Geography Program, Cartographic Boundary File Summary Level Codes, <www.census.gov/programs-surveys/geography/technical-documentation/naming-convention/cartographic-boundary-file/carto-boundary-summary-level.html>.

[6] U.S. Census Bureau, Geography Program, Geographic Areas Reference Manual, <www.census.gov/programs-surveys/geography/guidance/geographic-areas-reference-manual.html>; and U.S. Census Bureau, American Community Survey (ACS), Geography and ACS, <www.census.gov/programs-surveys/acs/geography-acs.html>.

Figure 1.1. **Excerpt From a Published Table in Data.census.gov**

	Atlantic County, New Jersey		Bergen County, New Jersey		Burlington County, New Jersey		Camd
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	263,996	+/-1,665	937,588	+/-1,798	436,598	+/-2,199	504
Income in the past 1...	39,172	+/-4,856	61,596	+/-7,325	27,642	+/-4,188	57
Male:	17,639	+/-2,869	27,414	+/-4,120	11,720	+/-2,200	25
Under 5 years	1,309	+/-653	1,542	+/-868	1,219	+/-568	3
5 years	79	+/-131	114	+/-140	255	+/-209	
6 to 11 years	2,791	+/-938	2,253	+/-814	1,278	+/-645	3
12 to 14 years	567	+/-328	1,172	+/-589	676	+/-354	1
15 years	343	+/-261	475	+/-377	230	+/-206	
16 and 17 years	1,146	+/-615	571	+/-419	472	+/-309	
18 to 24 years	1,771	+/-744	2,625	+/-1,004	1,169	+/-836	1
25 to 34 years	755	+/-491	4,526	+/-1,316	964	+/-539	2
35 to 44 years	1,978	+/-788	2,304	+/-856	1,130	+/-551	3

Source: U.S. Census Bureau, Table B17001: Poverty Status in the Past 12 Months by Sex By Age, <data.census.gov>.

Figure 1.2. **Excerpt From a Summary File**

```
ACSSF,2017e1,nj,000,0062,0000001,8831200,882673,387129,39721,7588,47155,
ACSSF,2017e1,nj,000,0062,0000002,8379555,857808,374849,38727,7463,46295,
ACSSF,2017e1,nj,000,0062,0000003,451645,24865,12280,994,125,860,730,52,24
ACSSF,2017e1,nj,000,0062,0000004,8831200,882673,387129,39721,7588,47155,
ACSSF,2017e1,nj,000,0062,0000005,8831200,882673,387129,39721,7588,47155,
ACSSF,2017e1,nj,000,0062,0000006,947215,241099,105983,14114,2520,15305,7
ACSSF,2017e1,nj,000,0062,0000007,7883985,641574,281146,25607,5068,31850,
ACSSF,2017e1,nj,000,0062,0000008,263996,39172,17639,1309,79,2791,567,343,
ACSSF,2017e1,nj,000,0062,0000009,937588,61596,27414,1542,114,2253,1172,47
ACSSF,2017e1,nj,000,0062,0000010,436598,27642,11720,1219,255,1278,676,230
```

Source: U.S. Census Bureau, 2017 ACS 1-year Summary File, e20171nj0062000.txt, <https://www2.census.gov/programs-surveys/acs/summary_file/2017/data/1_year_by_state/>.

(B17001), the table title ("Poverty Status in the Past 12 Months by Sex by Age"), and the source file ("2017 American Community Survey 1-year Estimates"). The body of the table provides the estimates and margins of error for each selected geography (in this case, counties in New Jersey). The highlighted box shows that in 2017, there were 263,996 people whose poverty status was determined in Atlantic County, New Jersey, and there were 39,172 people whose income in the past 12 months was below the poverty level.

As shown in Figure 1.2, the Summary File does not contain any of the metadata that is included in the published table. Rather, the file only contains the estimates and they are separated by commas. The estimates are the same but in a different format.

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 page on the Census Bureau's Web site.[7] This page includes 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 table sequences or geographies. You can also browse notes from previous years.

[7] U.S. Census Bureau, American Community Survey (ACS), Data Releases, <www.census.gov/programs-surveys/acs/news/data-releases.html>.

2. HOW TO USE THE ACS SUMMARY FILE

Basic Steps to Using the ACS Summary File

To use the American Community Survey (ACS) Summary File, data users should follow the steps outlined below.

- Locate the files that you need. ACS Summary File data are stored on the U.S. Census Bureau's file transfer protocol (FTP) server in zipped files. The desired Summary File data need to be downloaded and unzipped.
- Data users will need to download:
  - Geography file(s).
  - Estimate file(s).
  - Margin of error file(s).
  - Excel templates and Instructions on How to Read the ACS Summary File into Excel (if using Excel).
  - SAS programs and/or SAS macro code (if using SAS).
- Identify the tables of interest. The Summary File Documentation on the ACS Web site includes a series of Excel workbooks that provide a complete list of the tables that are in the Summary File, as well as table IDs, sequence numbers, the starting and ending positions for the table data, and any geographic restrictions.[8] Sequence numbers uniquely identify tables within a given subject. The Sequence Number/Table Number Lookup Files provide information about the relationship between sequence numbers and tables, as well as the line numbers for the individual data points. Learn more about identifying tables in Section 3.
- Identify the tool that you will use to retrieve the desired tables. The Census Bureau provides instructions on how to access tables in the Summary File using Excel and SAS. Learn more about using these tools in Section 4. Advanced data users can also write their own programs using other statistical software.

Locating the ACS Summary File

The ACS Summary File is located on the Census Bureau's file transfer protocol (FTP) server.[9] The file can be reached by navigating through the FTP site in a few different ways. The easiest way is to start at the ACS Web site.[10] Then select the desired data release. From the ACS main page, <www.census.gov/acs>, click on the "Data" tab in the left navigation, select the option for "Summary File Data," as shown in Figure 2.1.

[8] U.S. Census Bureau, American Community Survey (ACS), Summary File Documentation, <www.census.gov/programs-surveys/acs/technical-documentation/summary-file-documentation.html>.

[9] U.S. Census Bureau, American Community Survey (ACS), Data via FTP, <www.census.gov/programs-surveys/acs/data/data-via-ftp.html>.

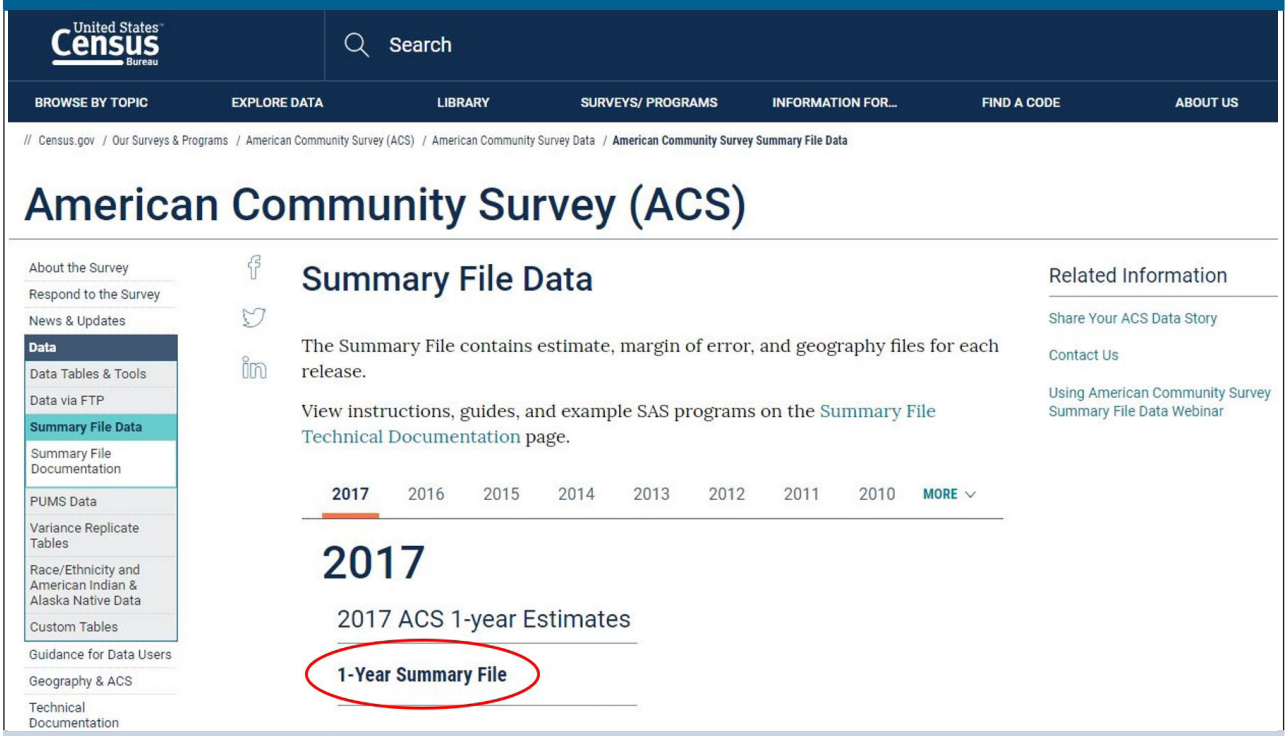
[10] U.S. Census Bureau, American Community Survey (ACS), <www.census.gov/programs-surveys/acs>.

Figure 2.1. **Accessing ACS Summary File Data**

Source: U.S. Census Bureau, American Community Survey (ACS), <www.census.gov/acs>.

This will take you to the ACS Summary File page. Select the desired data year and then click on "1-Year Summary File" (see Figure 2.2) or "5-Year Summary File" to go to the ACS Summary File FTP site.

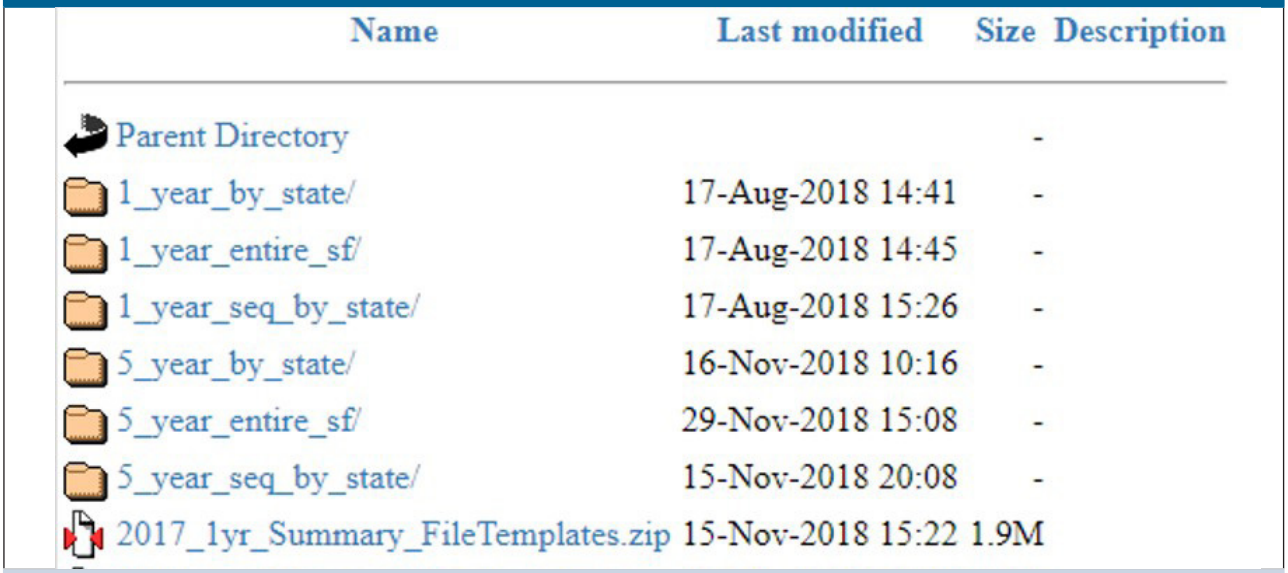
Figure 2.2. **Selecting an ACS Summary File**



Source: U.S. Census Bureau, American Community Survey (ACS), Summary File Data, <www.census.gov/programs-surveys/acs/data/summary-file.html>.

Figure 2.3 shows the ACS Summary File directory for the 2017 ACS 1-year and 5-year data files. As described in the next section, each file is actually comprised of three folders, as well as templates, for each data release.

Figure 2.3. **ACS Summary File Directory for the 2017 ACS 1-Year and 5-Year Data**



Name	Last modified	Size	Description
Parent Directory		-	
1_year_by_state/	17-Aug-2018 14:41	-	
1_year_entire_sf/	17-Aug-2018 14:45	-	
1_year_seq_by_state/	17-Aug-2018 15:26	-	
5_year_by_state/	16-Nov-2018 10:16	-	
5_year_entire_sf/	29-Nov-2018 15:08	-	
5_year_seq_by_state/	15-Nov-2018 20:08	-	
2017_1yr_Summary_FileTemplates.zip	15-Nov-2018 15:22	1.9M	

Source: U.S. Census Bureau, <https://www2.census.gov/programs-surveys/acs/summary_file/2017/data/?#>.

Summary File Organization

The ACS Summary File is organized in three directories per data release. For example, data users have a choice of three ACS 1-year Summary File directories:

- 1_year_entire_sf (entire summary file).
- 1_year_by_state (summary file subdivided by state).
- 1_year_seq_by_state (summary file subdivided by state and sequence).

These three directories contain the same combination of files, and each folder can be used to access all ACS Detailed Tables; they are simply arranged differently to accommodate different user needs. Each data release also includes a corresponding zipped file for templates.

Each of the three directories is further subdivided into three types of files: geography, estimate, and margin of error files, which are available for each of the 50 states, the District of Columbia, Puerto Rico, and cross-state geographies such as metropolitan statistical areas. The geography files start with "g," the estimate files start with "e," and the margin of error files start with "m." Lastly, the estimate and margin of error files are segmented by "sequence." Each sequence contains the data points for a single table or multiple tables within the same subject area. This means that the Summary File is actually a set of over 10,000 files. Learn more about sequences in Section 3.

- **All-in-one directory** (1_year_entire_sf, 5_year_entire_sf)
  This directory contains a single zipped file, which includes all the geography, estimate, and margin of error files (over 10,000 files in all). This zipped file is ideal to download if you want estimates and margins of error for all geographies throughout the nation. The file is very large and should only be used by those who can easily process a very large file.

- **State table directory** (1_year_by_state, 5_year_by_state)
  This directory contains a zipped file for each state, the District of Columbia, Puerto Rico, and cross-state geographies such as metropolitan statistical areas. Each zipped file contains a geography file and an estimate and margin of error file for each sequence. Downloading files from these state-level folders is ideal if you want all the tables for a particular geography.

- **Topic table directory** (1_year_seq_by_state, 5_year_seq_by_state)
  Like the state table directory, the topic table directory contains a folder for each state, state-level equivalent (District of Columbia and Puerto Rico), and cross-state geography. Within each folder, there is a geography file and a zipped file for each sequence, containing the estimate and margin of error files for that sequence. Downloading from these folders is ideal if you only want a few tables for a particular geography.

Table 2.1 shows the naming convention used for a selected zipped file in the "1_year_seq_by_state" directory. In the file name, "ak" refers to the State of Alaska.

Table 2.1. **Naming Convention for Zipped Topic Tables**

20171ak0001000.zip		
Example	**Name**	**Range or Type**
2017	Reference Year	ACS data year (last year of the period for multiyear periods).
1	Period Covered	1=1-year, 5=5-year.
ak	State Level	US or abbreviations for state, District of Columbia, and Puerto Rico.
0001	Sequence Number	0001 to 9999 (uniquely identifies a table within a given subject).
000	IterationID	Iteration ID for Selected Population Tables and American Indian and Alaska Native Tables. Note: Iteration ID is always "000" for the standard 1-year and 5-year products.

Source: U.S. Census Bureau.

- **Templates** (1yr_Summary_FileTemplates.zip, 5yr_SummaryFileTemplates.zip)
  These zipped files contain Excel file templates for each sequence (for example, Seq1.xls, Seq2.xls), as well as the geography file (for example, 2017_SFGeoFileTemplate.xls). These files include two rows of metadata containing the variable names and their descriptions for every column. The templates are meant to be used with the comma-delimited versions of the geography, estimate, and margin of error files and can be used to import the ACS Summary File into Excel. ACS Summary File templates are located in the same directory as the 1-year and 5-year data files (See Figure 2.4).

- **5-year Summary File organization**
  The ACS 5-year Summary File has an additional layer within the directories. The file is divided into two groups, one that contains the data for all geographic levels other than census tracts and block groups, called "All_Geographies_Not_Tracts_Block_Groups" and another that includes only census tracts and block groups, called "Tracts_Block_Groups_Only."

Figure 2.4. **ACS Summary File Templates for the 2017 ACS 1-Year and 5-Year Data**

Name	Last modified	Size	Description
Parent Directory		-	
1_year_by_state/	17-Aug-2018 14:41	-	
1_year_entire_sf/	17-Aug-2018 14:45	-	
1_year_seq_by_state/	17-Aug-2018 15:26	-	
5_year_by_state/	16-Nov-2018 10:16	-	
5_year_entire_sf/	29-Nov-2018 15:08	-	
5_year_seq_by_state/	15-Nov-2018 20:08	-	
2017_1yr_Summary_FileTemplates.zip	15-Nov-2018 15:22	1.9M	
2017_5yr_Summary_FileTemplates.zip	06-Dec-2018 03:15	1.5M	
computer_internet_tables/	19-Feb-2019 08:16	-	

Source: U.S. Census Bureau, <https://www2.census.gov/programs-surveys/acs/summary_file/2017/data/?#>.

Geography Files

The ACS Summary File is organized so there is a set of files for each state or state-level equivalent (District of Columbia and Puerto Rico). Each state-level file contains the data for the geographic levels that are always entirely within a state, such as counties and places. There is also a file called "United States," which includes the data for the geographic areas that cross state boundaries such as the nation, regions, divisions, metropolitan statistical areas, Zip Code Tabulation Areas (ZCTAs), and tribal areas. The U.S. level does not contain tables for geographies that are entirely within a state.

Table 2.2 lists the geographic levels available in the state- and U.S.-level files.

Table 2.2. **Examples of Geographic Levels Available in the State- and U.S.-Level Files**

State	Nation
County	Region
County Subdivision	Division
Place	Metropolitan or Micropolitan Statistical Areas
Congressional District	New England City and Town Areas (NECTA)
Public Use Microdata Area (PUMA)	American Indian/Alaska Native/Hawaiian Home Land areas
School District	Urban areas
Alaska Native Regional Corporation	Zip Code Tabulation Areas (ZCTAs)

Source: U.S. Census Bureau.

Each geography has a single geography file associated with it, regardless of how the ACS Summary File is accessed. The geography files are used to link the geographic information for an area to the data in the estimate and margin of error files. To link the files together, merge the geography file with the estimate and margin of error files using the variable, LOGRECNO, the logical record number. Geography files begin with a "g" and are ASCII files using either a position-based format (.txt) or comma-delimited format (.csv).

Geography files follow a specific naming convention. Table 2.3 shows the naming convention used for the 1-year geography ("g") file for Alaska ("ak").

Table 2.3. **Naming Convention for a Geography File**

g20171ak.txt or.csv		
Example	**Name**	**Range or Type**
g	File Type	g=geography
2017	Reference Year	ACS data year (last year of the period for multiyear periods)
1	Period Covered	1=1-year, 5=5-year
ak	State Level	U.S. or abbreviations for state, District of Columbia, and Puerto Rico

Source: U.S. Census Bureau.

Table 2.4 shows the contents of the geography file, which is available in both .csv and .txt formats. Each row represents a different geographic area, and the first five fields contain metadata, such as the state postal abbreviation and logical record number. Following those fields are the different geographic levels available for a particular data release. The fields in the table are blank if the geographic level is not available for a particular data release.

Table 2.4. **Contents of Geography File**

Variable Name	Description	Field Size	Starting Position	Code Type
FILEID	Always equal to ACS Summary File identification	6	1	Record
STUSAB	State Postal Abbreviation	2	7	Record
SUMLEVEL	Summary Level	3	9	Record
COMPONENT	Geographic Component	2	12	Record
LOGRECNO	Logical Record Number	7	14	Record
US	US	1	21	Geographic
REGION	Census Region	1	22	Geographic
DIVISION	Census Division	1	23	Geographic
STATECE	State (Census Code)	2	24	Geographic
STATE	State (FIPS Code)	2	26	Geographic
COUNTY	County of current residence	3	28	Geographic
COUSUB	County Subdivision (FIPS)	5	31	Geographic
PLACE	Place (FIPS Code)	5	36	Geographic
TRACT	Census Tract	6	41	Geographic
BLKGRP	Block Group	1	47	Geographic
CONCIT	Consolidated City	5	48	Geographic
AIANHH	American Indian Area/Alaska Native Area/ Hawaiian Home Land (Census)	4	53	Geographic
AIANHHFP	American Indian Area/Alaska Native Area/ Hawaiian Home Land (FIPS)	5	57	Geographic
AIHHTLI	American Indian Trust Land/ Hawaiian Home Land Indicator	1	62	Geographic
AITSCE	American Indian Tribal Subdivision (Census)	3	63	Geographic
AITS	American Indian Tribal Subdivision (FIPS)	5	66	Geographic
ANRC	Alaska Native Regional Corporation (FIPS)	5	71	Geographic
CBSA	Metropolitan and Micropolitan Statistical Area	5	76	Geographic
CSA	Combined Statistical Area	3	81	Geographic
METDIV	Metropolitan Statistical Area- Metropolitan Division	5	84	Geographic
MACC	Metropolitan Area Central City	1	89	Geographic
MEMI	Metropolitan/Micropolitan Indicator Flag	1	90	Geographic
NECTA	New England City and Town Area	5	91	Geographic
CNECTA	New England City and Town Combined Statistical Area	3	96	Geographic
NECTADIV	New England City and Town Area Division	5	99	Geographic
UA	Urban Area	5	104	Geographic
BLANK		5	109	Geographic
CDCURR	Current Congressional District ***	2	114	Geographic
SLDU	State Legislative District Upper	3	116	Geographic
SLDL	State Legislative District Lower	3	119	Geographic
BLANK		6	122	Geographic
BLANK		3	128	Geographic
ZCTA5	5-digit ZIP Code Tabulation Area	5	131	Geographic
SUBMCD	Subminor Civil Division (FIPS)	5	136	Geographic
SDELM	State-School District (Elementary)	5	141	Geographic
SDSEC	State-School District (Secondary)	5	146	Geographic
SDUNI	State-School District (Unified)	5	151	Geographic
UR	Urban/Rural	1	156	Geographic
PCI	Principal City Indicator	1	157	Geographic
BLANK		6	158	Geographic
BLANK		5	164	Geographic
PUMA5	Public Use Microdata Area – 5% File	5	169	Geographic
BLANK		5	174	Geographic
GEOID	Geographic Identifier	40	179	Geographic
NAME	Area Name	1000	219	Geographic
BTTR	Tribal Tract	6	1219	Geographic
BTBG	Tribal Block Group	1	1225	Geographic
BLANK		44	1226	Geographic

Source: U.S. Census Bureau.

The Census Bureau also provides data users with an Excel template for each geography file. These templates include two rows containing the variable names and their descriptions for each column in the geography file. The Excel files are meant to be used with the comma-delimited versions of the geography files. They are available in the zipped template files in the main Summary File directory and on the Summary File data page.[11] Figure 2.5 shows a screenshot of the Excel template for 2017 (named "2017_SFGeoFileTemplate.xls," which can be found in either 2017_1yr_Summary_FileTemplates.zip or 2017_5yr_Summary_FileTemplates.zip).

[11] U.S. Census Bureau, American Community Survey (ACS), Summary File Documentation, <www.census.gov/programs-surveys/acs/data/summary-file.html>.

Figure 2.5. **Excerpt of 2017 Geography File Template**

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	FILEID	STUSAB	SUMLEVEL	COMPONENT	LOGRECNO	US	REGION	DIVISION	STATECE	STATE	COUNTY	COUSUB	PLACE
2	Always equal to ACS Summary File identification	State Postal Abbreviation	Summary Level	Geographic Component	Logical Record Number	US	Census Region	Census Division	State (Census Code)	State (FIPS Code)	County of current residence	County Subdivision (FIPS)	Place (FIPS Code)
3													
4													

Source: U.S. Census Bureau, 2017 ACS Summary File, Geography File Template, <https://www2.census.gov/programs-surveys/acs/summary_file/2017/data/>.

Figure 2.6 shows the first few rows of the text-file version of the geography file for Maryland, though not all columns are shown here. Each row in the file represents a geographic area. The first row corresponds with the state of Maryland, the 12th row with Anne Arundel County, and the 13th row with Baltimore County. The logical record numbers for these geographies are circled below: for the state of Maryland it is "0000001," for Anne Arundel County it is "0000012," and for Baltimore County it is "0000013."

Figure 2.6. **Excerpt of Geography File for the State of Maryland**

File Edit Format View Help

```
ACSSF   MD040000000001  24      04000US24       Maryland

ACSSF   MD040010000002  24      04001US24       Maryland -- Urban

ACSSF   MD040430000003  24      04043US24       Maryland -- Rural

ACSSF   MD040A00000004  24      040A0US24       Maryland -- In metropolitan or micropolitan statistical area

ACSSF   MD040C00000005  24      040C0US24       Maryland -- In metropolitan statistical area

ACSSF   MD040C10000006  24      040C1US24       Maryland -- In metropolitan statistical area -- in principal city

ACSSF   MD040C20000007  24      040C2US24       Maryland -- In metropolitan statistical area -- not in principal city

ACSSF   MD040E00000008  24      040E0US24       Maryland -- In micropolitan statistical area

ACSSF   MD040G00000009  24      040G0US24       Maryland -- Not in metropolitan or micropolitan statistical area

ACSSF   MD040H00000010  24      040H0US24       Maryland -- Not in metropolitan statistical area

ACSSF   MD050000000011  24001   05000US24001    Allegany County, Maryland

ACSSF   MD050000000012  24003   05000US24003    Anne Arundel County, Maryland

ACSSF   MD050000000013  24005   05000US24005    Baltimore County, Maryland
```

Note: Excess spaces in the pictured geography file have been removed for illustrative purposes.
Source: U.S. Census Bureau, 2017 ACS Summary File, g20171md.txt, <https://www2.census.gov/programs-surveys/acs/summary_file/2017/data/1_year_seq_by_state/Maryland/>.

Estimate and Margin of Error Files

In the ACS Summary File, published estimates and their associated margins of error are available in separate files. Individual files also follow a specific naming convention. Table 2.5 shows the naming convention used for a selected estimate ("e") file for Alaska ("ak").

Table 2.5. **Naming Convention for Estimate File**

e20171ak0001000.txt		
Example	**Name**	**Range or Type**
e	File Type	e=estimate, m=margin of error
2017	Reference Year	ACS data year (last year of the period for multiyear periods)
1	Period Covered	1=1-year, 5=5-year
ak	State Level	U.S. or abbreviations for state, District of Columbia and Puerto Rico
0001	Sequence Number	0001 to 9999
000	Reserved for future use	Iteration value for future use

Source: U.S. Census Bureau.

The estimates and margins of error for Detailed Tables are grouped together by sequence numbers. There is an estimate and margin of error file for each sequence number.

The formats of the estimate and margin of error files are identical; they are strings of comma-delimited ASCII text. Each row represents a different geographic area and the first six fields contain metadata such as the geographic area and the sequence number.

Following those fields are the estimates or margins of error for the Detailed Tables. Starting and ending positions of the fields associated with each Detailed Table can be found using the Sequence Number and Table Number Lookup file, which is described in Section 3. The estimates or margins of error for one Detailed Table span several fields within a row.

Table 2.6 shows the record layout of the estimates and the margin of error files:

Table 2.6. **Contents of Estimates and Margin of Error File**

Field Name	Description	Field Size
FILEID	File Identification	6 Characters
FILETYPE	File Type	6 Characters
STUSAB	State/U.S.-Abbreviation (USPS)	2 Characters
CHARITER	Character Iteration	3 Characters
SEQUENCE	Sequence Number	4 Characters
LOGRECNO	Logical Record Number	7 Characters
Field 7 and up	Estimates (or Margins of Error)	Various

Source: U.S. Census Bureau.

Figure 2.7 shows the first few rows from a 2017 ACS 1-year Summary File estimate file for the State of Maryland. The sequence number is "0038," which corresponds to Table B08406: "Sex of Workers by Means of Transportation to Work for Workplace Geography." Data are shown for all geographies for the State of Maryland except census tracts and block groups. The logical record numbers corresponding to Maryland, Anne Arundel County, and Baltimore County are circled. The ACS estimates for these geographies can be found within their respective rows at field 7 and continuing for 50 additional fields.

With SAS or another statistical software program, you can use the logical record number (LOGRECNO) variable to merge the geography file with the estimate and margin of error files. An Excel-based tool can also be used. See Section 4 for more details.

Figure 2.7. **Excerpt of Estimate File for the State of Maryland**

```
ACSSF,2017e1,md,000,0038,0000001,2804022,2389014,2135024,253990,192590,33311,28089,153222,
ACSSF,2017e1,md,000,0038,0000002,,,
```

3. TABLE IDS, SEQUENCES, AND VARIABLE NAMES

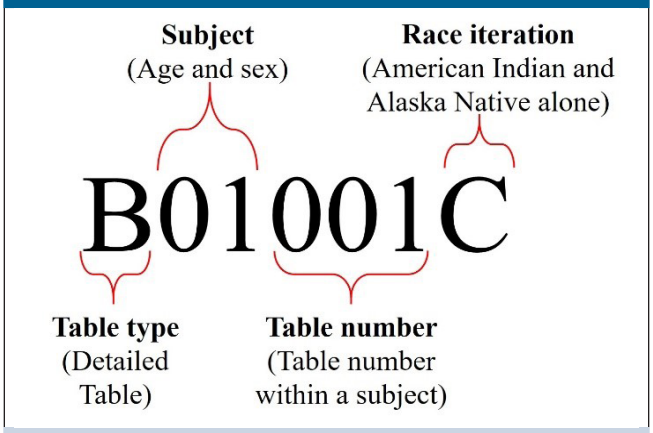
Table IDs

All American Community Survey (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 in data.census.gov, the Summary File and the Application Programming Interface (API). You will need to know the table ID in order to extract a table from the Summary File. Table IDs consist of up to five elements.

The first element is a letter that indicates the table type. For example, as shown in Figure 3.1, the first letter is "B" indicating that the data are from a Detailed (or Base) Table. Table IDs that start with "C" refer to collapsed tables. 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 2-digit subject number.

Figure 3.1. **Table IDs Explained**



Source: U.S. Census Bureau.

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 American Indian and Alaska Native Alone populations. Those with an "H" suffix are for non-Hispanic White populations.

Lastly, selected tables will have a final alphabetic suffix "PR" to indicate a table is available for Puerto Rico geographies only.

Refer to the U.S. Census Bureau's Web site for more details about naming conventions and subject numbers for ACS tables.[12]

Sequence Numbers

There are so many tables in the ACS that they cannot all fit into a single zipped file. The Detailed Tables are split across numerous files, called sequences. There are approximately 170 sequences for the ACS 1-year Summary File, and 120 sequences for the ACS 5-year Summary File. The rules governing how many tables can be assigned the same sequence number depend on the following:

- There are no more than 256 cells per sequence, so the data can be read into a spreadsheet. There are 245 cells reserved for data and 11 other cells reserved for identifying information.
- Tables are grouped numerically by the "root" of their Table ID, (for example, Table B00001 is in sequence file 0001).
- Tables with race iterations are grouped in the same sequence.

Sequence Number/Table Number Lookup File

You need to know the sequence number associated with a Detailed Table to access the correct estimate and margin of error files for that table. The start position for the estimates or margins of error of a particular table depends on the sequence number.

To help data users find the sequence number associated with an ACS Detailed Table, the Census Bureau provides a Sequence Number/Table Number Lookup file with each ACS data release. The file is available in SAS, Excel, and text format and can be found on the Summary File Technical Documentation page.[13] Use the SAS data set version when processing the Summary File data in SAS. Use the Excel version to view the list of tables, their associated table IDs, sequence numbers, and line numbers for ACS estimates within each table.

Suppose you are interested in obtaining data on transportation methods men and women use to get to work (Table B08406). To find the sequence number associated with the table, open and look for the appropriate

[12] U.S. Census Bureau, American Community Survey (ACS), Table IDs Explained, <www.census.gov/programs-surveys/acs/guidance/which-data-tool/table-ids-explained.html>.

[13] U.S. Census Bureau, American Community Survey (ACS), Summary File Documentation, <www.census.gov/programs-surveys/acs/technical-documentation/summary-file-documentation.html>.

table ID in the Sequence Number and Table Number Lookup file. Applying a filter and/or searching within the Excel file will ease this process. Figure 3.2 shows several of the rows for Table B08406. The sequence number associated with this table is "38." Therefore, to access the 2017 ACS 1-year estimates in Table B08406 for the nation as a whole, use the file labeled "e20171us0038000.txt." To access the corresponding margins of error for these estimates, use the file labeled "m20171us0038000.txt."

Figure 3.2. **Portion of Sequence Number and Table Number Lookup File**

	A	B	C	D	E	F	G	H	I	J
1	File ID	Table ID	Sequence Number	Line Number	Start Position	Total Cells in Table	Total Cells in Sequence	Table Title	Subject Area	
7439	ACSSF	C08301	37	11				Worked at home		
7440	ACSSF	B08406	38		7	51 CELLS		SEX OF WORKERS BY MEANS OF TRANSPORTATION TO WORK FOR WORKPLACE GEOGRAPHY	Journey to Work	
7441	ACSSF	B08406	38					Universe: Workers 16 Years And Over		
7442	ACSSF	B08406	38	1				Total:		
7443	ACSSF	B08406	38	2				Car, truck, or van:		
7444	ACSSF	B08406	38	3				Drove alone		
7445	ACSSF	B08406	38	4				Carpooled:		
7446	ACSSF	B08406	38	5				In 2-person carpool		
7447	ACSSF	B08406	38	6				In 3-person carpool		
7448	ACSSF	B08406	38	7				In 4-or-more-person carpool		

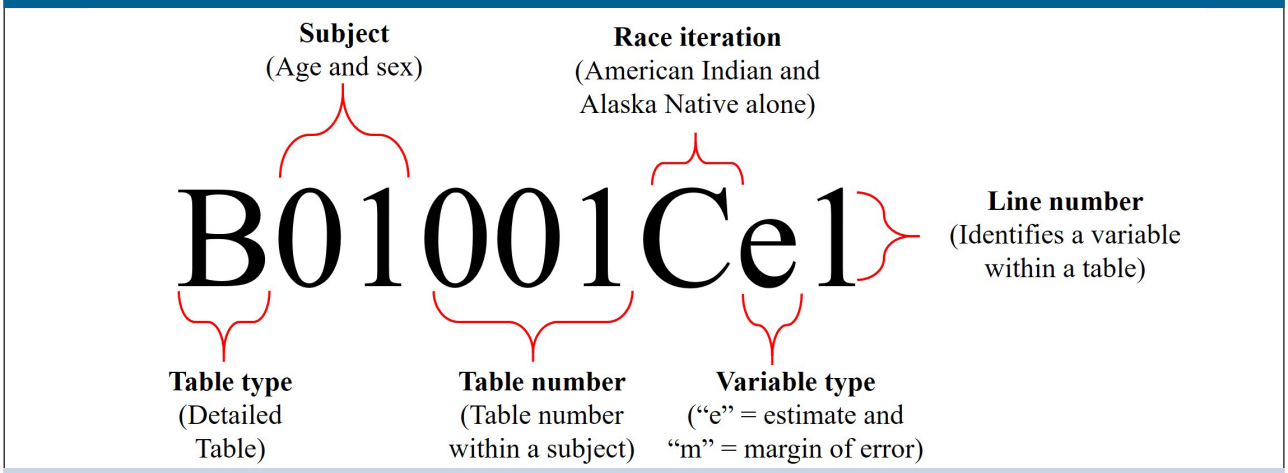
Source: U.S. Census Bureau.

Variable Names

In the ACS Summary File, variable names for estimates and margins of error are alpha-numeric.

Variable names include three elements: a table ID, a letter to indicate the data type (e=estimate, m=margin of error), and a line number, which identifies ACS estimates within each table. For example, in the SAS programs provided by the Census Bureau, the variable name for the estimated total number of people who are American Indian and Alaska Native alone is "B01001Ce1" (see Figure 3.3).

Figure 3.3. **Variable Names Explained**



Source: U.S. Census Bureau.

In the Excel file templates, the variable names are similar, except the "e" and "m" components have been removed because the estimates and margins of error are located in separate sheets. The line numbers in the Excel templates are preceded by an underscore ("_") and contain up to three digits, including leading zeros. For example, the variable name for the estimated total number of people who are American Indian and Alaska Native alone is "B01001C_001."

You can use the information in the Lookup file to identify the variable names that will be used in the provided SAS programs and in the template files.

4. TOOLS AND RESOURCES FOR THE ACS SUMMARY FILE

Summary File Excel Import Tool and Simplified Geography Files

The Summary File Excel Import Tool provides an option for retrieving tables from the American Community Survey (ACS) Summary File for data users without access to SAS or other statistical programming software. This tool is also useful if you are seeking data for just a few tables and/or geographies. To use this tool, download the Summary File data, the appropriate template for importing the data, and the Simplified Geography File (described below).[14] A guide titled "Instructions on How to Read the ACS Summary File into Excel" is available on the ACS Summary File Documentation Web page and walks you through each step to import the data into a spreadsheet.[15]

The Simplified Geography Files include basic information (LOGRECNO, GEOID, and name of geography) and are designed to be used with the Excel templates as outlined in the guide for reading the ACS Summary File into Excel. This Excel file contains a sheet for the United States, as well as each state or state equivalent. Compared to the standard geography files in .csv and .txt format, these simplified files contain only the geography variables needed to read the ACS Summary File into Excel. You can find the Simplified Geography Files on the ACS Summary File Documentation Web page.

SAS Programs

There are two programming options for SAS users. The first option is a set of individual SAS programs, one for each Summary File by geography, sequence, and file type (estimate or margin of error). These programs are best for users only interested in looking at a specific sequence for a specific geography. The individual SAS programs provide code for reading in each sequence into SAS, labeling variables, and saving the table as a SAS data set. However, you need to produce your own code to merge the geography, estimation, and margin of error files together.

The second option is a single SAS program that is parameterized to allow users to read the entire Summary File into SAS. This program includes a series of macros and is designed for advanced users who need a large quantity of data. You can access these programs, as well as an example SAS program, on the Summary File Documentation Web page.[16]

Appendix Tables

The U.S. Census Bureau produces a series of appendix tables for data users who want more information about ACS Detailed Tables and the types of geographies that are available. The 1-year and 5-year appendixes can be downloaded as Excel files from the Summary File Documentation page.[17] Each file contains a separate sheet for Appendix A and Appendix B.

Appendix A lists all the Detailed Tables included in the ACS Summary File, along with their associated sequence numbers. This appendix also includes information on geography restrictions for each table. For data quality and geographic reasons, some tables are published with specific geography restrictions. For example, Table B05001PR, "Citizenship Status in Puerto Rico," is produced for Puerto Rico only, and Table B08501, "Means of Transportation to Work by Age for Workplace Geography," is only produced for the workplace geographies.

The Topics column in the Appendix A sheet includes the ACS data topics covered, such as Age and Sex, Commuting, and School Enrollment; while the Universe column describes the total number of units in the population of interest, such as total population, housing units, or workers 16 years and over.

Appendix B contains a list of the summary levels and components for each geography that is included in the ACS Detailed Tables.

[14] U.S. Census Bureau, American Community Survey (ACS) Summary File Data, <www.census.gov/programs-surveys/acs/data/summary-file.html>.

[15] U.S. Census Bureau, American Community Survey (ACS) Summary File Documentation, <www.census.gov/programs-surveys/acs/technical-documentation/summary-file-documentation.html>.

[16] U.S. Census Bureau, American Community Survey (ACS) Summary File Documentation, <www.census.gov/programs-surveys/acs/technical-documentation/summary-file-documentation.html>.

[17] U.S. Census Bureau, American Community Survey (ACS) Summary File Documentation, <www.census.gov/programs-surveys/acs/technical-documentation/summary-file-documentation.html>.

5. USER NOTES

Population Thresholds

The U.S. Census Bureau publishes American Community Survey (ACS) 1-year and 5-year estimates, with population thresholds set for the ACS 1-year estimates to provide reliable data. Table 5.1 provides a brief comparison of the two types of estimates:

Table 5.1. **Understanding ACS 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 down to the block group level
Represent the average characteristics over a 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.

For more guidance on using ACS 1-year and 5-year estimates, see the Chapter on "Understanding Multiyear Estimates" in *Understanding and Using American Community Survey Data: What All Data Users Need to Know*.[18]

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 Web page.[19]

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

[19] U.S. Census Bureau, American Community Survey (ACS), Data Suppression, <www.census.gov/programs-surveys/acs/technical-documentation/data-suppression.html>.

Rounding Rules and Margins of Error

Tables B00001, B00002, B98001, and B98002 are sample counts, not estimates, and do not have margins of error associated with them. Tables in series B99 imputation tables and B98 (except B98001 and B98002) quality measure tables do not provide margin of error calculations. The margin of error calculations are set to "–1" for these tables.

There are a few special rules on how certain margins of error are determined for ACS estimates. The accuracy of the estimate (decimal place) within the Detailed Tables determines to how many digits the margin of error is rounded.

Jam Values

Some data values represent unique situations where either the information to be conveyed is an explanation for the absence of data, represented by a symbol in the data display, such as "(X)," or the information to be conveyed is an open-ended distribution, such as "115 or greater," represented by 115+. These are the so-called "jam values."

The following special data values can appear in an ACS Summary File table as an explanation for the absence of data:

- **Missing Value** = “”
  A missing string indicates that the estimate is unavailable. This value appears in the estimate and margin of error files as two commas adjacent to each other without any characters between them. A missing value indicates an estimate is missing because of geographic restrictions, unacceptable statistical reliability, or the Census Bureau’s Disclosure Review Board requirements. If the last cell in a data file is filtered, then there will be a comma followed immediately by a carriage return or end-of-file (EOF) indication.

- **Dot** = “.”
  A dot indicates that the estimate has no sample observations or too few sample observations. In the margin of error files, this value could also indicate that the margin of error is unavailable for a median estimate that has been replaced with a jam value.

- **Zero** = “0”
  A “0” entry in the margin of error column indicates that the estimate is controlled. This is similar to the “*****” symbol used in data.census.gov.

- **Negative 1** = “–1”
  This indicates that an estimate does not contain a margin of error. Tables B00001 and B00002 and tables starting with B98 and B99 do not have margins of error associated with them.

- **Jam Values for Medians**
  Table 5.2 lists the jam values for medians. For example, a dollar amount is not calculated for Table B10010 if the estimate is 2,500 or less.

Table 5.2. **Jam Values for Medians**

Jam Value	Actual Meaning	Use for Medians
0	1 or less	Age, Duration of Marriage
9	9.0 or more	Rooms
10	10.0 or less	Gross Rent as Percentage of Income, Owner Costs as Percentage of Income
50	50.0 or more	Gross Rent as Percentage of Income, Owner Costs as Percentage of Income
99	100 or less	Rent, Gross Rent, Selected Monthly Owner Costs, Monthly Housing Costs
101	101 or more	Duration of Marriage
116	115 or more	Age
199	200 or less	Tax
1001	1,000 or more	Selected Monthly Owner Costs
1939	1939 or earlier	Year Built
1969	1969 or earlier	Year Moved In
2001	2,000 or more	Rent, Gross Rent
2010	2010 or later	Year Built, Year Moved In
2499	2,500 or less	Income, Earnings
4001	4,000 or more	Selected Monthly Owner Costs, Monthly Housing Costs
9999	10,000 or less	Value
10001	10,000 or more	Tax
200001	200,000 or more	Income
250001	250,000 or more	Income, Earnings
1000001	1,000,000 or more	Value

Source: U.S. Census Bureau.

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.

Multiple Sequences for a Table

There are eight tables with more than the maximum 245 cells that cannot fit into a single sequence, so each of these tables is divided into multiple sequence files. Table 5.3 shows the tables that contain multiple sequences.

Check Appendix A of the 1-year Appendixes or 5-year Appendixes Excel files to verify the sequences for these tables.[20] The last six tables on the list are only produced at the national level (summary level 010), and the files for these sequences will be blank for all other summary levels.

For More Information

Please send any technical questions or comments you have on the ACS Summary File via e-mail to: <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/>.

[20] U.S. Census Bureau, American Community Survey (ACS) Summary File Documentation, <www.census.gov/programs-surveys/acs/technical-documentation/summary-file-documentation.html>.

Table 5.3. **Tables That Are Contained in More Than One Sequence File**

Table ID	Table Title
B24010	Sex by Occupation for the Civilian Employed Population 16 Years and Over
B24020	Sex by Occupation for the Full-Time, Year-Round Civilian Employed Population 16 years and Over
B24121	Detailed Occupation by Median Earnings in the Past 12 Months for the Full-Time, Year-Round Civilian Employed Population 16 Years and Over
B24122	Detailed Occupation by Median Earnings in the Past 12 Months for the Full-Time, Year-Round Civilian Employed Male Population 16 Years and Over
B24123	Detailed Occupation by Median Earnings in The Past 12 Months for the Full-Time, Year-Round Civilian Employed Female Population 16 Years and Over
B24124	Detailed Occupation for the Full-Time, Year-Round Civilian Employed Population 16 Years and Over
B24125	Detailed Occupation for the Full-Time, Year-Round Civilian Employed Male Population 16 Years and Over
B24126	Detailed Occupation for the Full-Time, Year-Round Civilian Employed Female Population 16 Years and Over

Source: U.S. Census Bureau.