American Community Survey (ACS) Best Practices

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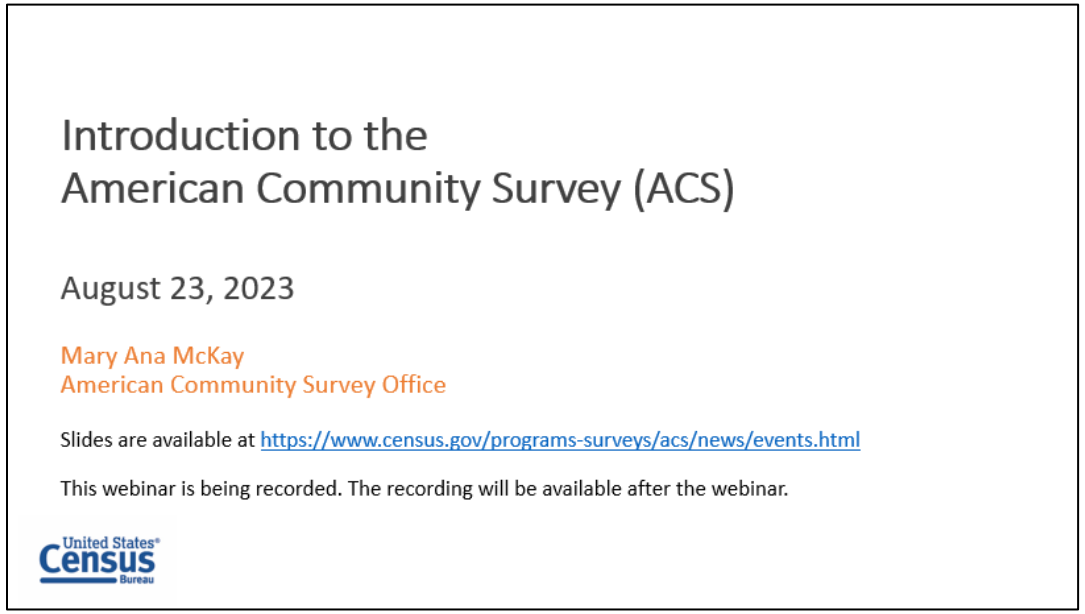
Slides available here: census.gov/data/academy/webinars/2024/best-practices-when-using-acs-data.html

United States® Census Bureau

The American Community Survey

Introduction to the American Community Survey



United States Census Bureau

census.gov/data/academy/webinars/2023/introduction-to-the-acs.html
census.gov/data/academy/courses/discovering-the-american-community-survey.html

American Community Survey Best Practices
Outline

- **American Community Survey (ACS) foundations**
- Best practices
- ACS statistical testing
- Resources for learning more

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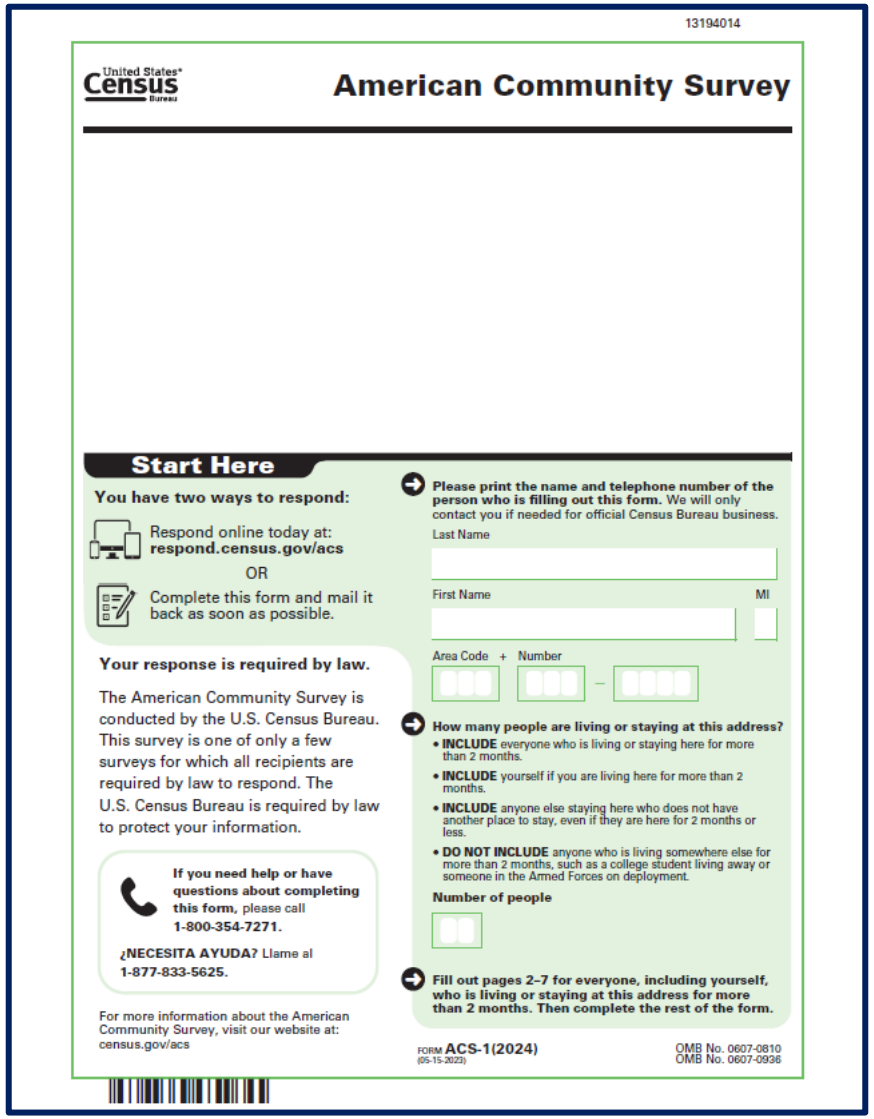
American Community Survey Best Practices

The Foundation

- The nation's most current, reliable, and accessible data source for local statistics on critical planning topics such as age, children, veterans, commuting, education, income, and employment
- Surveys **3.5 million** addresses and helps inform how trillions of dollars in federal funds are distributed each year
- Covers **40+ topics**, supports over **300** evidence-based federal government uses
- Three key annual data releases:
  - 1-year Estimates (for large populations, geographies of 65,000+ population)
  - 1-year Supplemental Estimates (for small populations, geographies of 20,000+ population)
  - 5-year Estimates (for very small populations, geographies down to Census Tracts and Block Groups)
- Officially started in 2005 (1-year estimates= 2005; 5-year 2005-2009).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American Community Survey

Start Here

You have two ways to respond:

Respond online today at:
respond.census.gov/acs

OR

Complete this form and mail it back as soon as possible.

Your response is required by law.

The American Community Survey is conducted by the U.S. Census Bureau. This survey is one of only a few surveys for which all recipients are required by law to respond. The U.S. Census Bureau is required by law to protect your information.

If you need help or have questions about completing this form, please call **1-800-354-7271.**

¿NECESITA AYUDA? Llame al **1-877-833-5625.**

For more information about the American Community Survey, visit our website at: census.gov/acs

Please print the name and telephone number of the person who is filling out this form. We will only contact you if needed for official Census Bureau business.

Last Name

First Name MI

Area Code + Number

How many people are living or staying at this address?

- **INCLUDE** everyone who is living or staying here for more than 2 months.
- **INCLUDE** yourself if you are living here for more than 2 months.
- **INCLUDE** anyone else staying here who does not have another place to stay, even if they are here for 2 months or less.
- **DO NOT INCLUDE** anyone who is living somewhere else for more than 2 months, such as a college student living away or someone in the Armed Forces on deployment.

Number of people

Fill out pages 2–7 for everyone, including yourself, who is living or staying at this address for more than 2 months. Then complete the rest of the form.

FORM **ACS-1(2024)** (05-15-2023)

OMB No. 0607-0810
OMB No. 0607-0936

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The American Community Survey

ACS Data Collection Process

ACS data are collected continuously throughout the year via:

1 **Internet**

2 **Mail**

Self-Response

3 **In-Person Visits**

Non-Response Follow-up

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Availability of Data Products

Estimated Population of Geographic Area	1-Year Estimates	1-Year Supplemental Estimates	5-Year Estimates
65,000 or more	X	X	X
20,000 to 64,999		X	X
Less than 20,000			X
Typical Release Month (Occurs in the calendar year after data collection)	**September**	**October**	**December**

census.gov/programs-surveys/acs/news/data-releases.html

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Best Use of Data Products

	1-Year Estimates	5-Year Estimates
Currency	X	
Looking at large populations	X	
Precision		X
Looking at smaller populations		X

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census.gov/programs-surveys/acs/guidance/estimates

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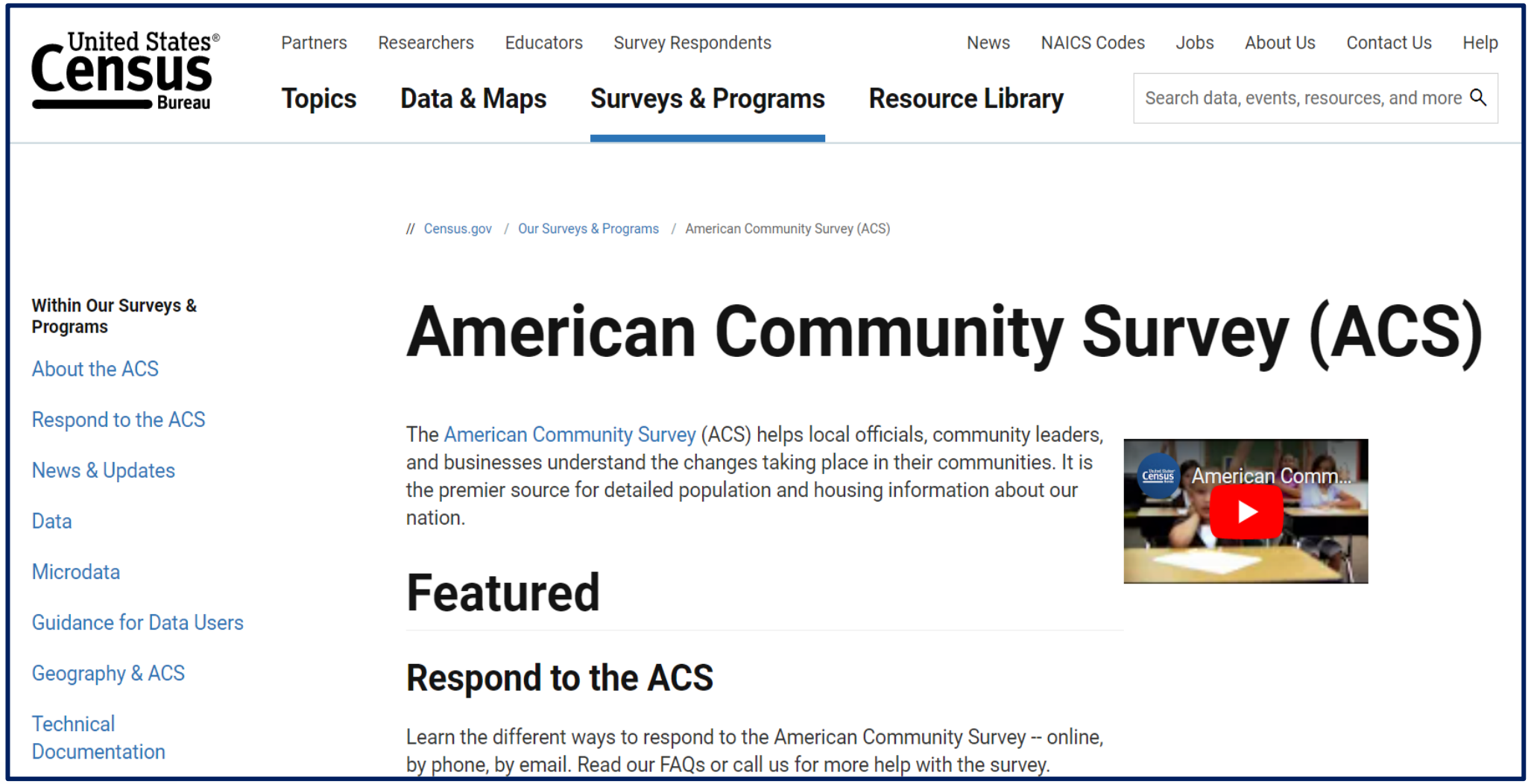
ACS Main Page



census.gov/acs

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Why We Ask

BACK TO TOPICS PAGE

Why We Ask Questions About...

Home Heating Fuel

We ask questions about home heating fuel to create statistics about home energy use.

These data are used in government programs that analyze community air quality and energy needs. Federal agencies use these statistics to forecast future energy demand, analyze the fuels available to community residents, and plan and fund programs that help low-income residents afford to heat their homes.

Your privacy concerns

We use your confidential survey answers to create statistics like those in the results below and in the full tables that contain all the data—no one is able to figure out your survey answers from the statistics we produce. The Census Bureau is legally bound to strict confidentiality requirements. Individual records are not shared with anyone, including federal agencies and law enforcement entities. By law, the Census Bureau cannot share respondents' answers with anyone—not the IRS, not the FBI, not the CIA, and not with any other government agency.

Question as it appears on the form

We ask one question about fuel used to better understand how people heat their homes.

VIEW QUESTION

census.gov/acs/www/about/why-we-ask-each-question

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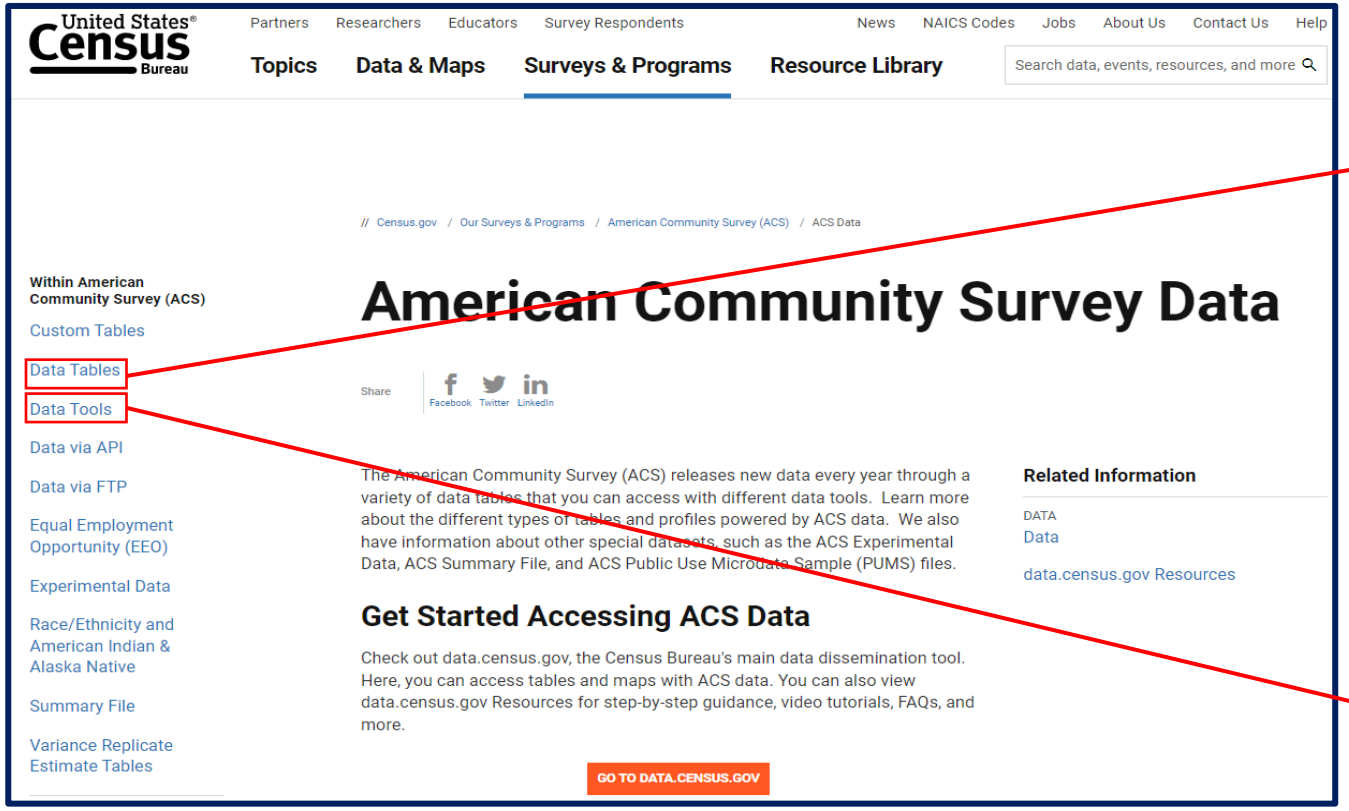
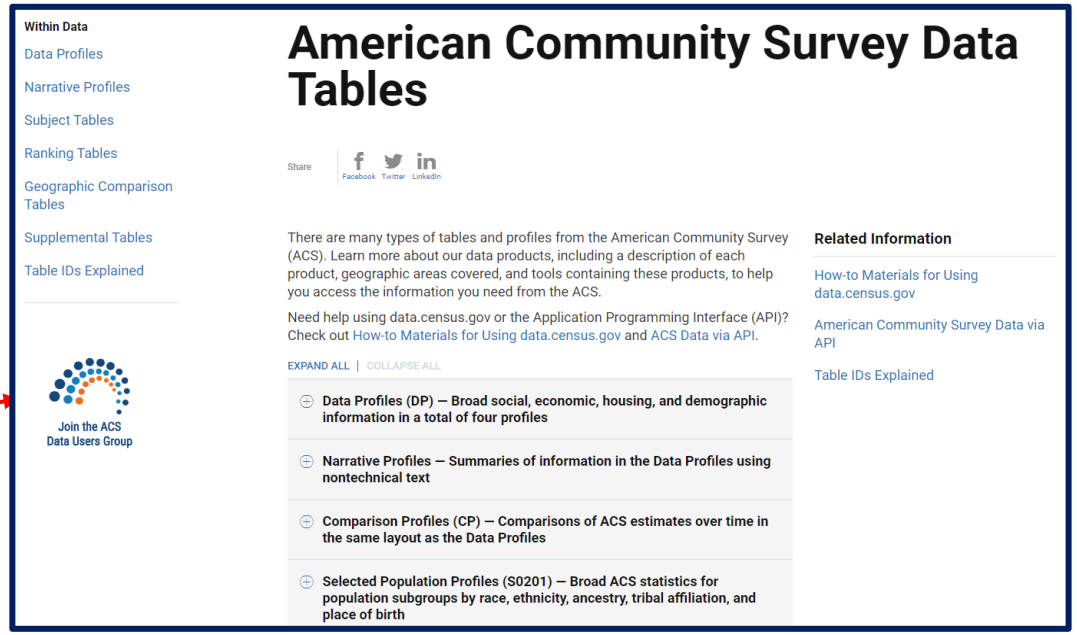
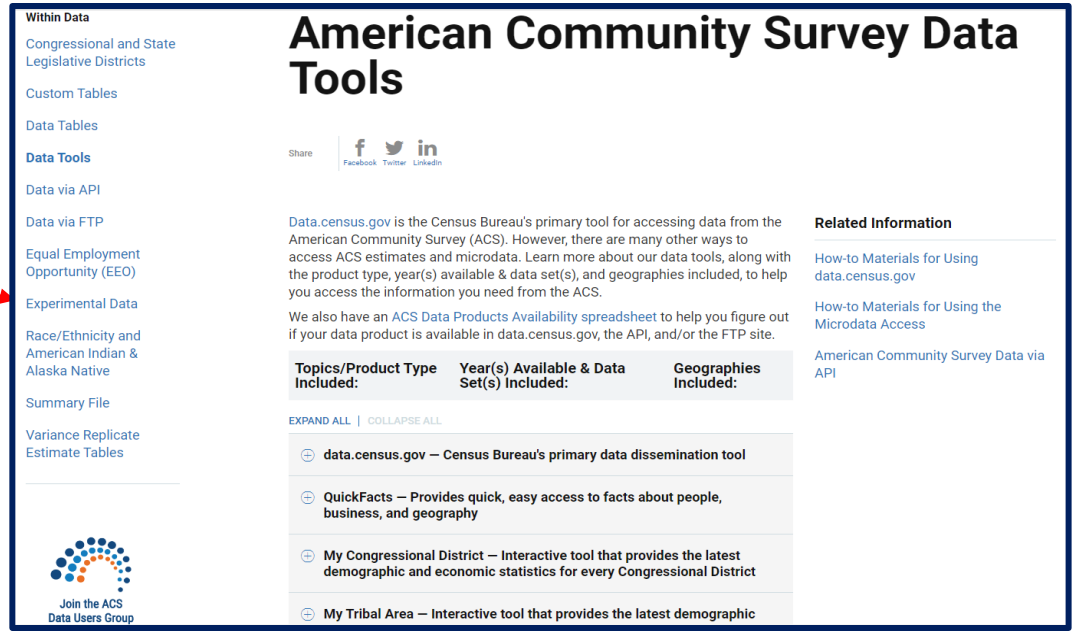
Data Tables and Tools







census.gov/programs-surveys/acs/data.html

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American Community Survey Best Practices
Outline

- American Community Survey (ACS) foundations
- **Best practices**
- ACS statistical testing
- Resources for learning more

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American Community Survey Best Practices

Comparison Guidance

DO	DO NOT
Use of ACS population characteristics (i.e., percentages, means, medians, rates) are preferred, but ACS counts can be used	Use ACS for population totals (instead use decennial census or the Population Estimates Program)
Compare non-overlapping datasets (i.e., 2013-2017 to 2018-2022)	Compare overlapping datasets (i.e., 2017-2021 to 2018-2022)
Compare similar period lengths (i.e., 1-year to 1-year and 5-year to 5-year)	Compare estimates from different period lengths (i.e., 1-year to 5-year)
Conduct statistical testing when making comparisons between estimates	Look at estimates alone to decide if they are higher or lower than one another

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census.gov/programs-surveys/acs/guidance/comparing-acs-data.html

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What is the Margin of Error (MOE)?

Definition: An MOE is a measure of the possible variation of the estimate around the population value

- At a given confidence level, the estimate and actual population value will differ by no more than the MOE
- **90% confidence level is the Census standard and ACS MOEs are provided in the same unit as the estimate**

Example: How many males under age 5 live in MD?

Lower bound = 180,371 – 2,215 = 178,156

Upper bound = 180,371 + 2,215 = 182,586

We are 90% confident the true number of males under age 5 in Maryland falls **between 178,156 and 182,586.**

	Maryland	
Label	Estimate	Margin of Error
Total:	6,164,660	*****
Male:	3,004,117	±3,849
Under 5 years	180,371	±2,215
5 to 9 years	192,144	±6,391
10 to 14 years	198,281	±6,087

2022 ACS 1-year Table B01001

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American Community Survey Best Practices

What is the Margin of Error (MOE)?

Definition: An MOE is a measure of the possible variation of the estimate around the population value

- At a given confidence level, the estimate and actual population value will differ by no more than the MOE
- **90% confidence level is the Census standard and ACS MOEs are provided in the same unit as the estimate**

MOE for 90% (Census standard)= SE * 1.645
MOE for 95%= SE * 1.96
MOE for 99%= SE * 2.575

To convert from the MOE to the standard error (SE) divide by 1.645.
Standard Error = Margin of Error / 1.645

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census.gov/programs-surveys/acs/technical-documentation/code-lists.html

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Converting to different confidence levels

- 90% confidence level is the Census standard and ACS MOEs are provided in the same unit as the estimate

Example: How many males under age 5 live in MD, with a 95% confidence level?

MOE for 90%= 2,215

1. **Convert from the MOE to the standard error (SE)**
   - SE = Margin of Error / 1.645
   - SE =2,215 / 1.645 = 1,346.50
2. **Multiply SE * 1.96 to get MOE at 95% confidence level**
   - MOE= SE * 1.96
   - MOE = 1,346.50 * 1.96 = 2,639
3. **Subtract and add MOE to estimate to get new lower and upper bounds**
   - Lower bound = 180,371 – 2,639 = 177,732
   - Upper bound = 180,371 + 2,639 = 183,010

MOE for 90% (Census standard)= SE * 1.645

We are 95% confident the true number of males under age 5 in Maryland falls between 177,730 and 183,012.

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Converting to different confidence levels

Example: How many males under age 5 live in MD?

90% confidence (*Census Bureau standard*)

- Lower bound = 180,371 – 2,215 = 178,156
- Upper bound = 180,371 + 2,215 = 182,586

We are **90%** confident the true number of males under age 5 in Maryland falls **between 178,156 and 182,586.**

95% confidence

- Lower bound = 180,371 – 2,639 = 177,732
- Upper bound = 180,371 + 2,639 = 183,010

We are **95%** confident the true number of males under age 5 in Maryland falls **between 177,732 and 183,010.**

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American Community Survey Best Practices
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- American Community Survey (ACS) foundations
- Best practices
- **ACS statistical testing**
- Resources for learning more

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What is Statistical Testing?

- **Definition**: A test to determine if a difference is unlikely to occur by chance
- To be “significantly different”, there must be statistical evidence that there is a difference between two estimates
- Testing should be conducted for all comparisons

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Statistical Testing Tool

Algebraically, the significance test can be expressed as follows:

If $\left| \frac{\hat{X}_1 - \hat{X}_2}{\sqrt{SE_1^2 + SE_2^2}} \right| > Z_{CL}$, then the difference between estimates $\hat{X}_1$ and $\hat{X}_2$ is statistically significant at the specified confidence level, CL

where $\hat{X}_i$ is estimate i (=1,2)

SE_i is the SE for the estimate i (=1,2)

Z_{CL} is the critical value for the desired confidence level (=1.645 for 90 percent, 1.960 for 95 percent, 2.576 for 99 percent).

// Census.gov / Our Surveys & Programs / American Community Survey (ACS) / Guidance for Data Users / Statistical Testing Tool

Within Guidance for Data Users

- Comparing ACS Data
- Handbooks
- Recorded Webinars
- Subjects Included in the Survey
- **Statistical Testing Tool**
- Using ACS Data with Open-Source Software
- When to Use 1-year or 5-year Estimates
- Which Data Table or Tool Should I Use?

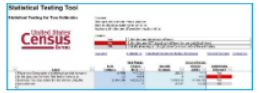
Join the ACS Data Users Group

Statistical Testing Tool

Share: Facebook Twitter LinkedIn

Comparing American Community Survey (ACS) estimates involves more than determining which statistic is higher or lower. Users should also conduct statistical testing to make sure differences are statistically significant and are unlikely to have occurred by chance. This testing takes into account the margin of error (MOE) associated with survey estimates, which are based on responses from a sample of the full population.

Looking for an easy way to conduct statistical testing? Try the Census Bureau's Statistical Testing Tool. Simply copy or download ACS estimates and their MOEs into the spreadsheet to get instant results of statistical tests.



Download Statistical Testing Tool [2.4 MB]

Related Information

VIDEO
Population Reference Bureau: Assessing ACS Reliability

RANDOM SAMPLINGS BLOG
Using Census Bureau Data Made Easier: New Statistical Testing Tool

Tool Features:

- Compares up to 3,230 pairs of estimates at once
- Compares multiple estimates simultaneously (up to 150 estimates)
- Displays statistical testing results ("Yes", "No") automatically
- Handles special formatting and characters, such as the '±' in front of the MOE, without additional editing by the data user
- Uses the Census Bureau's standard 90% confidence level, but can also process statistical testing at 95% or 99% confidence levels
- May be used to conduct statistical testing for other Census Bureau surveys

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census.gov/programs-surveys/acs/guidance/statistical-testing-tool.html

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Comparison profiles on data.census.gov

All | Tables | Maps | Profiles | Pages

CP03 | Comparative Economic Characteristics +2 | Notes | Geo 1 | Topics | Codes | Dataset | Year | Hide | Transpose | Restore | Excel | CSV | ZIP | Cite

	Maryland		
Label	**2022 Estimate**	**2021 Estimate**	**2022 - 2021 Statistical Significance**
PERCENTAGE OF FAMILIES AND PEOPLE WHOSE INCOME IN THE PAST 12 MONTHS IS BELOW THE POVERTY LEVEL			
All families	6.6%	7.4%	*
With related children of the householder under 18 years	9.9%	11.5%	*
With related children of the householder under 5 years only	8.7%	10.0%	
Married couple families	3.4%	3.6%	
With related children of the householder under 18 years	4.2%	4.6%	
With related children of the householder under 5 years only	2.9%	3.1%	
Families with female householder, no spouse present	16.5%	18.9%	*
With related children of the householder under 18 years	24.0%	26.5%	
With related children of the householder under 5 years only	24.4%	32.3%	
All people	9.6%	10.3%	*
Under 18 years	11.6%	14.0%	*
Related children of the householder under 18 years	11.3%	13.7%	*
Related children of the householder under 5 years	11.5%	15.2%	*
Related children of the householder 5 to 17 years	11.3%	13.2%	*
18 years and over	9.1%	9.2%	
18 to 64 years	8.8%	9.2%	
65 years and over	9.9%	9.1%	*

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American Community Survey Best Practices
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- Best practices
- ACS statistical testing
- **Resources for learning more**

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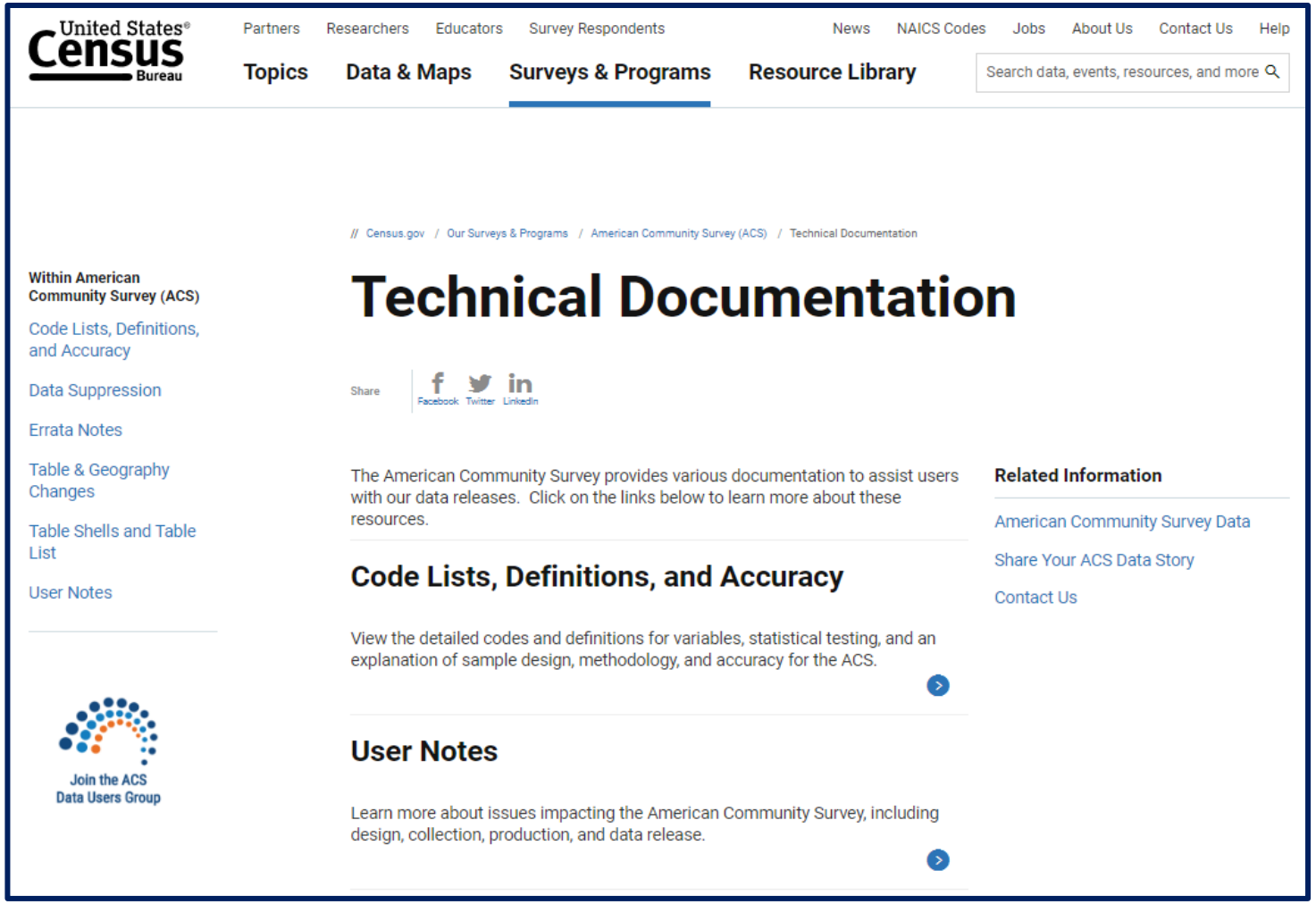
American Community Survey Best Practices
Technical Documentation



census.gov/programs-surveys/acs/technical-documentation.html

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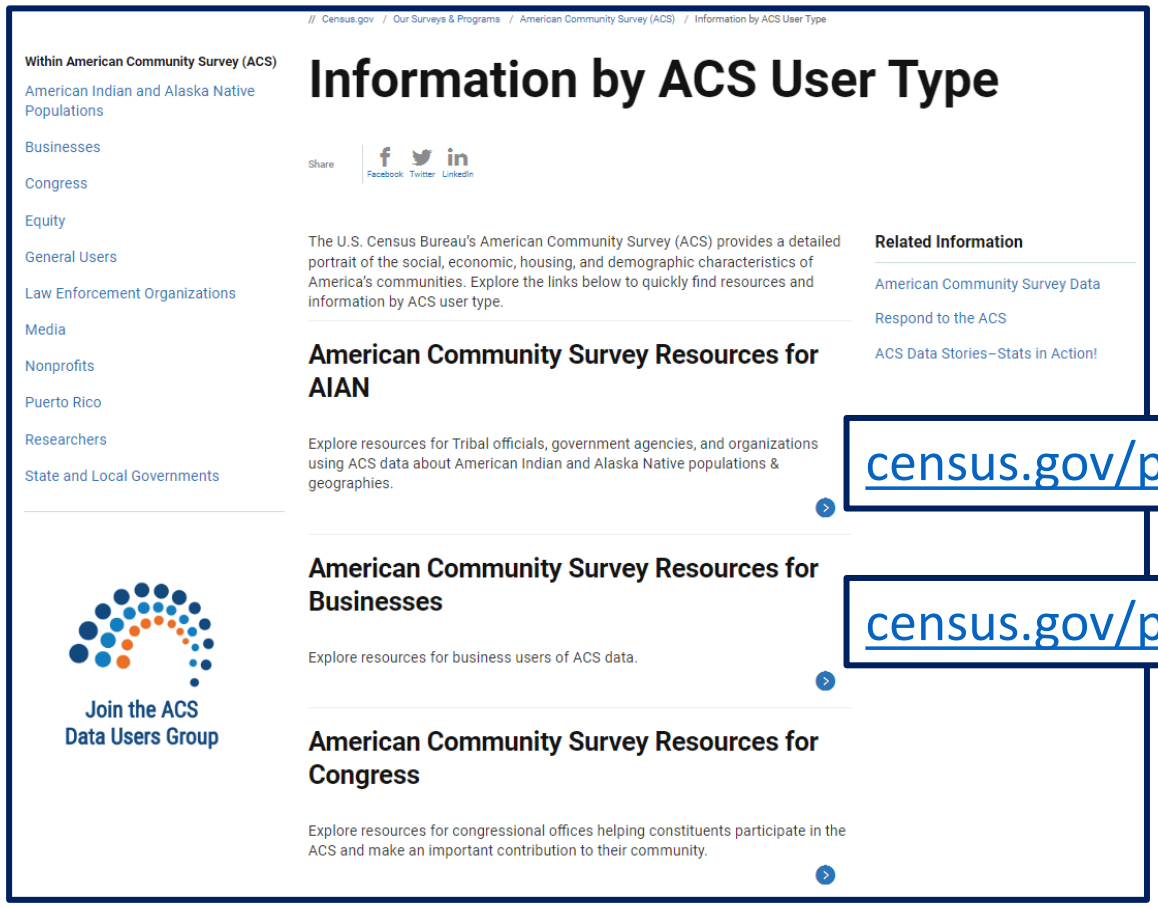
Information for…



census.gov/programs-surveys/acs/information-for/researchers.html

census.gov/programs-surveys/acs/information-for/equity.html

census.gov/programs-surveys/acs/information-for.html

American Community Survey Best Practices

Stay Connected

Share Your ACS Data Story

Join the ACS Data Users Group

Sign Up for Email Updates

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American Community Survey Best Practices

Find Answers, Get Support

Website
census.gov/acs

Census Academy
census.gov/academy

ACS Data User Support
acso.users.support@census.gov

Social Media
@uscensusbureau
#ACSdata

Census Customer Service Center
800-923-8282

Source Us
U.S. Census Bureau, [YYYY – YYYY] American Community Survey
[1/5]-year [estimates/statistics/data release]

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