

Using the Census Bureau's American Community Survey Data Correctly

Roger Magnus

Roger Magnus Research

Amherst, MA

Phone: 413-687-8466

Email: roger@rogermagnusresearch.com

Web: www.rogermagnusresearch.com

Who is Your Trainer?

Bachelor's – English – Tulane University (New Orleans, LA) and Master's
- Library and Information Science – University of Texas at Austin
(Austin, TX)

Business and Demographics librarian/researcher 15+ years; own
research business - Roger Magnus Research

Position State Library of North Carolina in mid 2000's - Point person for
answering Census questions from all over the state

Position at UMASS Donahue Institute (2008-2010) - Surveyed Group
Quarters in MA to help create annual population estimates

Articles about using ACS data –

- “Delivering Data: The American Community Survey” *Online Searcher* Sept.-
Oct. 2016
- ACS Statistical Testing Tool - *Online Searcher* – coming out Nov. 2019

Major Census Population Programs

Decennial Census

Population Estimates

American Community Survey

Decennial Census

Decennial Census - <https://www.census.gov/programs-surveys/decennial-census/data.html>

- Every 10 years for April 1 of year ending in 0
- No Margin of Error - 100% count or approximated to it
- Down to Block Level – smallest Census geography
- Basic variables: Population and Housing Counts and Breakdowns by gender, age, race, Hispanic origin, native American, Two or More Races, etc.

Population Estimates

Population Estimates - <https://www.census.gov/programs-surveys/popest.html>

- Every year in-between Decennial Census on July 1 including year ending in 0
- Data revised retrospectively each year
- No Margin of Error
- Down to City/Town level for population counts
- Down to County level for gender, age, gender, race, Hispanic origin

American Community Survey

American Community Survey (ACS) -

<https://www.census.gov/programs-surveys/acs.html>

- 1-Year Average over 12 months – geographies 65,000+ population
- 5-Year Average over 60 months - geographies <65,000 (Exception: for Supplemental Estimates that provide 1-year average data)
- Margin of Error (MOE)
- Down to Block Group level – However, hard to find much data at this level due to small sample.
- Many other kinds of variables including education, income, poverty, etc. –
Subjects Included in the Survey - <https://www.census.gov/programs-surveys/acs/guidance/subjects.html>

Decennial Census

TOTAL POPULATION

Survey/Program: Decennial Census Universe: Total population Year: 2010 TableID: P1

[CUSTOMIZE TABLE](#)

Simsbury town, Hartford County, Connecticut

Total

23,511

Population Estimates

Geography	April 1, 2010		Population Estimate (as of July 1)								
	Census	Estimates Base	2010	2011	2012	2013	2014	2015	2016	2017	2018
Sherman town, Fairfield County, Connecticut	3,581	3,581	3,587	3,619	3,649	3,664	3,661	3,653	3,638	3,619	3,614
Stamford town, Fairfield County, Connecticut	122,643	122,633	122,782	123,980	125,054	126,318	127,974	128,407	129,042	129,951	129,775
Stratford town, Fairfield County, Connecticut	51,384	51,381	51,443	51,838	52,154	52,135	52,690	52,532	52,258	51,981	51,967
Trumbull town, Fairfield County, Connecticut	36,018	36,011	36,050	36,299	36,520	36,516	36,611	36,435	36,114	35,930	35,802
Weston town, Fairfield County, Connecticut	10,179	10,179	10,191	10,284	10,348	10,355	10,358	10,345	10,288	10,262	10,247
Westport town, Fairfield County, Connecticut	26,391	26,389	26,437	26,770	27,100	27,319	27,527	27,827	27,861	27,836	28,115
Wilton town, Fairfield County, Connecticut	18,062	18,047	18,071	18,484	18,620	18,616	18,645	18,654	18,548	18,453	18,397
Avon town, Hartford County, Connecticut	18,098	18,091	18,156	18,197	18,284	18,328	18,375	18,344	18,345	18,307	18,302
Berlin town, Hartford County, Connecticut	19,866	19,873	19,900	20,170	20,484	20,566	20,608	20,559	20,533	20,457	20,432
Bloomfield town, Hartford County, Connecticut	20,486	20,480	20,490	20,539	20,628	20,615	20,786	20,713	20,573	21,352	21,301
Bristol town, Hartford County, Connecticut	60,477	60,474	60,478	60,569	60,635	60,542	60,576	60,513	60,289	60,110	60,032
Burlington town, Hartford County, Connecticut	9,301	9,301	9,315	9,385	9,428	9,467	9,560	9,605	9,609	9,620	9,665
Canton town, Hartford County, Connecticut	10,292	10,292	10,297	10,325	10,354	10,347	10,349	10,336	10,312	10,276	10,270
East Granby town, Hartford County, Connecticut	5,148	5,148	5,158	5,164	5,184	5,200	5,204	5,190	5,169	5,155	5,147
East Hartford town, Hartford County, Connecticut	51,252	51,249	51,262	51,316	51,335	51,218	51,091	50,660	50,440	50,132	49,998
East Windsor town, Hartford County, Connecticut	11,162	11,162	11,186	11,339	11,390	11,407	11,420	11,400	11,380	11,372	11,375
Enfield town, Hartford County, Connecticut	44,654	44,654	44,648	44,691	44,688	44,711	44,544	44,371	44,455	44,453	44,466
Farmington town, Hartford County, Connecticut	25,340	25,348	25,357	25,423	25,523	25,548	25,608	25,571	25,549	25,503	25,506
Glastonbury town, Hartford County, Connecticut	34,427	34,427	34,441	34,572	34,674	34,708	34,683	34,640	34,575	34,495	34,491
Granby town, Hartford County, Connecticut	11,282	11,288	11,291	11,303	11,327	11,311	11,311	11,301	11,269	11,335	11,375
Hartford town, Hartford County, Connecticut	124,775	124,770	125,359	125,431	125,277	125,142	124,683	124,338	123,679	122,902	122,587
Hartland town, Hartford County, Connecticut	2,114	2,114	2,117	2,130	2,133	2,129	2,124	2,123	2,114	2,108	2,120
Manchester town, Hartford County, Connecticut	58,241	58,251	58,251	58,297	58,327	58,245	58,139	58,071	58,045	57,809	57,699
Marlborough town, Hartford County, Connecticut	6,404	6,395	6,395	6,412	6,420	6,404	6,421	6,410	6,393	6,370	6,358
New Britain town, Hartford County, Connecticut	73,206	73,202	73,251	73,267	73,217	73,055	73,055	73,219	72,817	72,613	72,453
Newington town, Hartford County, Connecticut	30,562	30,538	30,529	30,503	30,499	30,598	30,558	30,455	30,344	30,166	30,112
Plainville town, Hartford County, Connecticut	17,716	17,716	17,725	17,771	17,835	17,822	17,803	17,794	17,732	17,647	17,623
Rocky Hill town, Hartford County, Connecticut	19,709	19,709	19,718	19,669	19,743	19,888	20,061	20,081	20,223	20,178	20,145
Simsbury town, Hartford County, Connecticut	23,511	23,511	23,511	23,546	23,584	23,757	23,959	24,282	24,388	24,890	24,979
Southington town, Hartford County, Connecticut	43,069	43,088	43,179	43,321	43,530	43,647	43,786	43,786	43,734	43,739	43,807
South Windsor town, Hartford County, Connecticut	25,709	25,702	25,712	25,757	25,796	25,788	25,765	25,730	25,654	25,879	26,054
Suffield town, Hartford County, Connecticut	15,735	15,735	15,766	15,824	15,589	15,610	15,637	15,672	15,652	15,627	15,743

American Community Survey

SEX BY AGE

CUSTOMIZE TABLE

Survey/Program: American Community Survey Universe: Total population Year: 2017 Estimate: 5-Year TableID: B01001

Simsbury town, Hartford County, Connecticut

	Estimate	Margin of Error
▼ Total:	24,307	+/-34
▼ Male:	12,177	+/-284
Under 5 years	571	+/-154
5 to 9 years	1,014	+/-188
10 to 14 years	995	+/-192
15 to 17 years	605	+/-125
18 and 19 years	245	+/-99
20 years	48	+/-33
21 years	114	+/-63
22 to 24 years	432	+/-122

Why Do We Care about the American Community Survey?

Data unavailable in Decennial Census or Population Estimates on education, employment, income, health, poverty, and more.

Data updated yearly (for both 1-year average and 5-year average) instead of every 10 years like the Decennial Census.

Data available down to Census Block Group (population = 600-3,000).

Overview of ACS

- What Is the American Community Survey?
- What Geographic Levels Do ACS Data Cover?
- When will the 2018 ACS Data Be Released?
- How Are the Data Accessed?
- What are Margins of Error?
- How to Add or Aggregate Data
- Other Ways to Compute Data
- Comparing ACS Data
- Real Life Example #1
- Final Thoughts

What Is the American Community Survey?

A continuous MONTHLY survey of about 1 out of 40 households (3 million+ annually)

Estimates include MOE to 90% Confidence Level

- Reason: small sample size
- MOE's MUST be included in any computations or comparisons of data

Replaced Decennial Census Summary File (SF) 3 or Long Form - 2010

Started Mid 1990s, ramped up over several years, and fully operational by 2005

Geographies go down to Census Block Group level (Decennial - Census Block level)

Contains 1-year average and 5-year average data (geographies < 65,000 population/recommended use non-overlapping years)

***Comparisons tricky

- Computations or Statistical Testing Tool needed
- Data tables variables definitions and scope can change from year-to-year
- Income tables must account for inflation

What Geographic Levels Do ACS Data Cover?

Major Levels - <https://www.census.gov/programs-surveys/geography/about/glossary.html>

- Nation
- State
- Congressional District
- County
- Place (Incorporated – New England towns)/County Subdivision)
- PUMAS – 100,000 (5% sample for microdata)
- ZCTA – Similar, but don't always correspond, to 5-digit zip codes
- Census Tract – 1,200-8,000 (within County) – Optimally around 4,000
- Block Group – 600-3,000 (within County and Census Tract)

What Geographic Levels Do ACS Data Cover?

Address Search (American FactFinder – Not available in
data.census.gov)

[https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?
ref=addr&refresh=t](https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?ref=addr&refresh=t)

Geographies containing 725 Hopmeadow St, SIMSBURY, CT, 06070:
Select geographies to add to Your Selections

Geography Results:

Geography Name	Geography Type	Geography Code	About
Northeast Region	Region	020	<i>i</i>
New England Division	Division	030	<i>i</i>
Connecticut	State	040	<i>i</i>
Hartford County, Connecticut	County	050	<i>i</i>
Simsbury town, Hartford County, Connecticut	County Subdivision	060	<i>i</i>
Block 2008, Block Group 2, Census Tract 4663, Hartford County, Connecticut	Block	100	<i>i</i>
Census Tract 4663, Hartford County, Connecticut	Census Tract	140	<i>i</i>
Block Group 2, Census Tract 4663, Hartford County, Connecticut	Block Group within Census Tract	150	<i>i</i>



What Geographic Levels Do ACS Data Cover?

Address Search (Geocoder - can be funky/results hard to read)

<https://geocoding.geo.census.gov/geocoder/geographies/address?form>

```
2010 Census Blocks:  
SUFFIX:  
GEOID: 090034663002008  
CENTLAT: +41.8758779  
BLOCK: 2008  
AREAWATER: 0  
STATE: 09  
BASENAME: 2008  
OID: 210404189596355  
LSADC: BK  
FUNCSTAT: S  
INTPTLAT: +41.8758779  
NAME: Block 2008  
OBJECTID: 983041  
TRACT: 466300  
CENTLON: -072.8093658  
BLKGRP: 2  
AREALAND: 770944  
INTPTLON: -072.8093658  
MTFCC: G5040  
LWBLKTYP: L  
COUNTY: 003
```

When Will the 2018 ACS Data Be released?

2018 ACS Data Release Dates -

<https://www.census.gov/programs-surveys/acs/news/data-releases/2018/release-schedule.html>

- 1-Year – Starts Sept. 26, 2019 (Detailed Tables and Data Profiles)
- 5-year – Starts Dec. 19. 2019 (Detailed Tables and Data Profiles)

How Are the Data Accessed?

ACS Data Repositories

- American FactFinder - factfinder.census.gov
 - Going away early 2020
 - Sometimes need for small geographies when data are not yet fully added to [Data.census.gov](https://data.census.gov) or for address search
- [Data.census.gov](https://data.census.gov)
 - Only new data being added to
 - Buggy (can send comment listing problem)

How Are the Data Accessed?

Data Products - Tables -

<https://www.census.gov/acs/www/data/data-tables-and-tools/american-factfinder/>

Moving to Data.census.gov:

- ****Detailed** - Cross tabulations
- **Subject (topic)** - <https://www.census.gov/acs/www/data/data-tables-and-tools/subject-tables/> - link to AFF – S number
- **Supplemental** – 1 year data in areas 20,000-64,999 – selected variables – State, County, Place, county subdivisions - <https://www.census.gov/acs/www/data/data-tables-and-tools/supplemental-tables/> - link to AFF – K number – Moving to Data.census.gov

How Are the Data Accessed?

Data Products – Cont.

Moving Elsewhere:

- **Ranking** - <https://www.census.gov/acs/www/data/data-tables-and-tools/ranking-tables/> - Nation and States - 86 variables for 1-year data link to AFF – R number – Moving to FTP site.
- Geographic Comparison Tables – Similar to Ranking Tables for Counties and Congressional Districts – GCT number - Moving to FTP site

Others:

- **Variance Replicate** – 5 year data – more exact as includes co-variance - <https://www.census.gov/programs-surveys/acs/data/variance-tables.html>
- **Custom** – Cost \$3,000, Time: 8 weeks - <https://www.census.gov/programs-surveys/acs/data/custom-tables.html>

How Are the Data Accessed?

Data Products – Profiles (link to AFF)

Moving to Data.census.gov:

- **Comparison** – Selected geography over several years
- **Data** - Social, economic, housing, Demographic for selected geography (Nation? State, County, Place - <https://www.census.gov/acs/www/data/data-tables-and-tools/data-profiles/2017/> - link to AFF)
- **Selected Population** – Social, economic, housing for specific race, ethnic, ancestry, country of birth groups

Others: Narrative – text and bar charts - 15 topics - Nation, State, County, Place, Census Tract, ZCTA - <https://www.census.gov/acs/www/data/data-tables-and-tools/narrative-profiles/2017/>

How Are the Data Accessed?

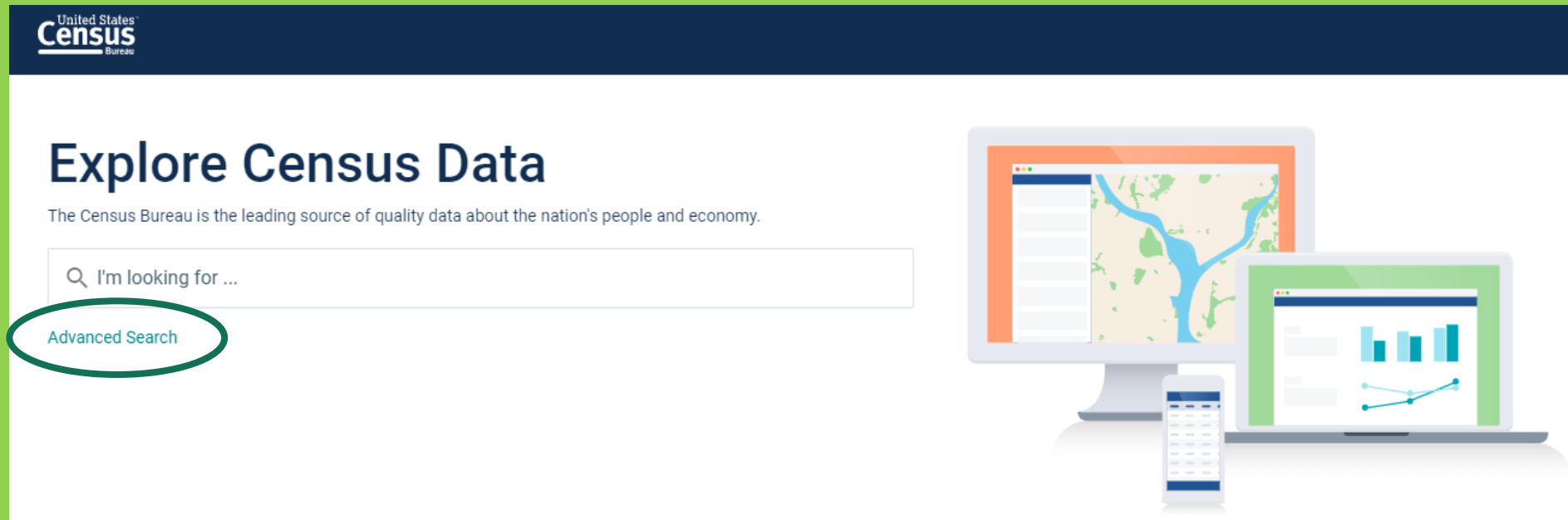
Data Products - Others

- PUMS – Microdata (customized variables) - <https://www.census.gov/programs-surveys/acs/data/pums.html>
- API (for programmers)- <https://www.census.gov/developers/>

How Are the Data Accessed?

Data.census.gov (Searching in flux) – Main Screen

- Basic Search /I'm looking for ...
- Advanced Search



How Are the Data Accessed?

Advanced Search (Filters) (Note: Search box (top of screen) also for specific queries) -

<https://data.census.gov/cedsci/advanced>

- Find a Filter
- Browse Filters (Note: Sequence on page (below) but can go in any order to conduct data search.)
 - Topics – Subject areas of tables (Populations and People, Housing, Education, etc.)
 - Geographies – Summary Levels (Nation, State, County, etc.)
 - Years – 2018, 2017 , ... 2010
 - Surveys – ACS 1-year and 5-year data products
 - Codes – Industry codes, etc. (doesn't apply to ACS)

How Are the Data Accessed?

Advanced Search (Filters) -

<https://data.census.gov/cedsci/advanced>

Narrow search with filters

FIND A FILTER

e.g. 336111 - Automobile Manufacturing

BROWSE FILTERS	TOPICS	HOUSING
Topics	Business and Economy	<input type="checkbox"/> Housing
Geography	Education	<input type="checkbox"/> Absorption Rate
Years	Employment	Financial Characteristics
Surveys	Families and Living Arrangements	Health and Safety Characteristics
Codes	Government	<input type="checkbox"/> Homeownership Rate
	Health	<input type="checkbox"/> Housing Units
	Housing	

How Are the Data Accessed?

Search Strategy

- Front End – Use filters to create search string.
 - Topics
 - Geography
 - Years
 - Survey
- Back End – Use one filter (Topics, Geographies, etc.), Search button, and, once inside table, Customize Table button (to add other filters once data retrieved).

How Are the Data Accessed?

Search Strategy – Front End

Example: Commuting in Simsbury and South Windsor 2017

How Are the Data Accessed?

Search Strategy – Back End

Example: Commuting in Simsbury and South Windsor 2017

How Are the Data Accessed?

Customize Table – Other Features (Tabs along Top Screen)

- Margin of Error button – Yes or No
- Transpose Table – Flip
- Hide/Show Columns or Rows – Customize
- Download - .CSV (Excel)
- More - Map

What Are Margins of Error?

Estimate is actually three numbers, not one.

- Comes with a Lower Limit and Upper Limit due to Margin of Error (MOE) – Ex. 10,000+/- 1,500
- 90% Confidence Level – Census Bureau is 90% confident the real number falls within this range
- * MOE MUST be reported as part of estimate (frequently is not)
- Population of Simsbury: **Wrong:24,307 (2017): Right: 24,307 +/-34 (2013-2017 5-year average)**

What Are Margins of Error?

Search

TOTAL POPULATION

Survey/Program: American Community Survey Universe: Total population Year: 2017 Estimate: 5-Year TableID: B01003

[CUSTOMIZE TABLE](#)

Simsbury town, Hartford County, Connecticut

	Estimate	Margin of Error
Total	24,307	+/-34

How to Add or Aggregate Data

Population of Simsbury and Canton: (2013-2017 5-Year Estimates) Simsbury: 24,307 +/- 34, Canton: 10,339 +/- 26)

- **Wrong: $24,307 + 10,339 = 34,646$**
- **Right: $34,646 \pm 43$ (34,403 to 34,489 90% Confident)**
- How to Add:
 1. Add up the estimates: $24,307 + 10,339 = 34,646$
 2. Compute the Standard Error (Standard Deviation of a sample) for each town:
 - Simsbury: $34 / 1.645$ (Z Score for the 90% CI) = 20.669
 - Canton: $26 / 1.645 = 15.805$
 3. Compute the Aggregate Standard Error: Sq. Root (20.669 Squared + 15.805 Squared) = Sq. Root (427.208 + 249.813) = Sq. Root (677.021) = 26.020
 4. Derive the Aggregate Margin of Error: $1.645 * 26.020 = 42.802$

FINAL ANSWER: $34,646 \pm 43$

Source: <https://www.census.gov/programs-surveys/acs/guidance/handbooks/general.html> > Section 8

Other Ways to Compute Data

Calculating Proportion/Percent (Note: many tables show already with MOEs):

https://www2.census.gov/programs-surveys/acs/tech_docs/accuracy/ACS_Accuracy_of_Data_2017.pdf > Page 29 > Example 3

Ex. Proportion of Those with a Graduate or Professional Degree to Those 25+ Years Old in Simsbury:

- Total Population 25+: 16,931+/-258
- Graduate or Professional Degree: 5,262 +/-317

Other Ways to Compute Data

PLACE OF BIRTH BY EDUCATIONAL ATTAINMENT IN THE UNITED STATES

[CUSTOMIZE TABLE](#)

Survey/Program: American Community Survey Universe: Population 25 years and over in the United States Year: 2017

Estimate: 5-Year TableID: B06009

	Simsbury town, Hartford County, Connecticut	
	Estimate	Margin of Error
▼ Total:	16,931	+/-289
Less than high school graduate	528	+/-299
High school graduate (includes equivalency)	1,784	+/-248
Some college or associate's degree	3,291	+/-298
Bachelor's degree	6,066	+/-358
Graduate or professional degree	5,262	+/-317

Other Ways to Compute Data

Calculating Proportion/Percent (Cont.):

+++++

Formula: Estimate = $5,262/16,931 = 31.08\%$

Standard Error (Grad or Prof Degree and 25+) = $317/1.645 = 192.71$

Standard Error (25+) = $258/1.645 = 156.8$

Standard Error (Estimate) = $100\% (1/16,931 * (Sq. Root (192.71 squared - .3108 squared * 156.84 Squared))) = 100\% (.000059 * (Sq. Root (37,137.14 - .0966 * 24,598.79)) = 100\% (.00059 * (Sq. Root (37,1314-2,376.24))) = 100\% (.0059 * 186.44) = 100\% (1.10) = .011$

MOE (Estimate): $.011 * 1.645 = .0181$ or 1.81%

CI (Estimate) $31.08\% +/- 1.81\% = 29.27\%$ to 32.89%

Other Ways to Compute Data

Calculating Ratio:

https://www2.census.gov/programs-surveys/acs/tech_docs/accuracy/ACS_Accuracy_of_Data_2017.pdf > Page 29 >

Example 4 (Similar to Proportion calculation)

Ex. Proportion of Those 25+ with a Graduate or Professional Degree to Those with a Bachelor's Degree:

- Graduate or Professional Degree: 5,262 +/-317
- Bachelor's Degree: 6,066 +/-358

Other Ways to Compute Data

Adjusting for inflation with dollar-denominated variables over time - Income, Value, etc.

- Uses CPI-U-RS (Consumer Price Index)
- Different Formulae for comparing one and five year averages
- Caveats:
 - National in scope and may not account for local differences
 - Covers all items so may not account for different prices in particular areas (housing, ie.)

Source: <https://www.census.gov/programs-surveys/acs/guidance/handbooks/general.html> > Section 10

Comparing ACS Data

Sometimes cannot compare from year-to-year

- Variable definitions change.
- Local Boundaries redrawn after each year.
- Statistical boundaries (Census Tracts, etc.) redrawn after each Decennial Census.
- Population estimate controls change with each Decennial Census,
- If one geography has 5-year average data, all others being compared must also use this time frame even if 1-year average data are available (compare apples-to-apples).

****Note:** For 5-year periods, recommended to compare ONLY non-overlapping years. (Ex. 2013-2017 to 2008 to 2012).

Comparing ACS Data

Guides:

- Comparing ACS Data - <https://www.census.gov/programs-surveys/acs/guidance/comparing-acs-data.html>
- Comparing 2017 American Community Survey Data - <https://www.census.gov/programs-surveys/acs/guidance/comparing-acs-data/2017.html>
- Comparing 2008-2012 ACS 5-year and 2013-2017 ACS 5-year - <https://www.census.gov/programs-surveys/acs/guidance/comparing-acs-data/2017/5-year-comparison.html>

Comparing ACS Data

Stoplight Analogy for Comparing ACS Data to Previous Years:

- Compare (Green)
- Compare with Caution (Yellow)
- Don't Compare (Red)

EXAMPLES

^ Poverty Status (17)

2017 ACS 1-Year with 2016 ACS 1-Year (Poverty Status of Families and People in Families)

Compare with Caution

As ACS data are collected every month of the year, adjacent years will have some reference months in common. Hence, comparing the 2017 ACS 1-year with the 2016 ACS 1-year estimates is not an exact comparison of the economic conditions in 2017 with those in 2016. For a discussion of this and related issues, see Hogan, Howard, "Measuring Population Change Using the American Community Survey," Applied Demography in the 21st Century, Steven H. Murdock and David A. Swanson eds., Springer Netherlands, 2008. For specific questions and answers about sources of poverty data, see [Questions and Answers about Sources of Poverty Data](#)[PDF - <1.0 MB].

^ Migration/Residence 1 Year Ago (07)

2017 ACS 1-Year with 2016 ACS 1-Year (Residence 1 Year Ago/Migration)

Compare

2017 ACS with 2010 Census (Residence 1 Year Ago/Migration)

The question was not asked in the 2010 Census

2017 ACS with Census 2000 (Residence 1 Year Ago/Migration)

Do Not Compare

The ACS asked for residence 1 year ago whereas Census 2000 asked for residence 5 years ago.

Comparing ACS Data

Subject Definitions (2017):

https://www2.census.gov/programs-surveys/acs/tech_docs/subject_definitions/2017_ACSSubjectDefinitions.pdf

EXAMPLE:

House Heating Fuel

The data on house heating fuel were obtained from Housing Question 12 in the 2017 American Community Survey (ACS). The question was asked at occupied housing units. The data show the type of fuel used most to heat the house, apartment, or mobile home.

House heating fuel provides information on energy supply and consumption. These data are used by planners to identify the types of fuel used in certain areas and the consequences this usage may have on the area. The data also serve to aid in forecasting the need for future energy needs and power facilities such as generating plants, long distance pipelines for oil or natural gas, and long distance transmission lines for electricity.

House heating fuel is categorized on the ACS questionnaire as follows:

Utility Gas – This category includes gas piped through underground pipes from a central system to serve the neighborhood.

Bottled, Tank, or LP Gas – This category includes liquid propane gas stored in bottles or tanks that are refilled or exchanged when empty.

Electricity – This category includes electricity that is generally supplied by means of above or underground electric power lines.


Comparing ACS Data

If you are able to compare data by time frame or geography, use the Statistical Testing Tool (Excel spreadsheet) to compare 2 or multiple estimates.

<https://www.census.gov/programs-surveys/acs/guidance/statistical-testing-tool.html>

American Community Survey (ACS)


- Subjects Included in the Survey
- Which Data Table or Tool Should I Use?
- When to Use 1-year, 3-year, or 5-year Estimates
- Handbooks
- Comparing ACS Data
- Statistical Testing Tool**
- Training Presentations
- [Back to Guidance for Data Users](#)



Statistical Testing Tool

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 only a sample of the full population.

Looking for an easy way to conduct statistical testing? Try the Census Bureau's new [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 \[XLSX - 3.5 MB\]](#)

Comparing ACS Data

Statistical Testing Tool – EXAMPLE - Comparing Two Estimates

Statistical Testing Tool

Statistical Testing for Two Estimates



Purpose

This spreadsheet determines whether there is statistical evidence to conclude that two estimates are different from each another.

Results

Yes	Estimates are statistically different.
No	Estimates are NOT statistically different (or are statistically tied).
N/A	Statistical testing is not applicable for one or both of the estimates.

[Overview](#)

[Instructions](#)

[Statistical Testing for Multiple Estimates](#)

[Worked Example](#)

[Contact Us](#)


How to Use this spreadsheet:

1. Download data from American Factfinder
2. Insert geography or statistical variable
3. Insert the first number or percentage
4. Insert the corresponding margin of error
5. Put the second estimate and MOE in the spreadsheet and change the number of rows
6. If the first estimate or second estimate is not in the spreadsheet, insert the number in the spreadsheet and change the number of rows
7. (Optional) To change the confidence level to the desired confidence level (e.g., 90%, 95%, 99%)

	Label	First Estimate	First Margin of Error (MOE)	Second Estimate	Second Margin of Error (MOE)	Statistically Different?	
1	Private Health Insurance by Sex by Age - Simsbury, CT						
2	Males Under 6/Females Under 6	645	174	445	131	No	Example Suppose you want to know how poverty over time (year to year). This spreadsheet compares two different years and determines if the poverty rate was or was not statistically different.
3	Males 6-18/Females 6-18	2424	242	2014	244	Yes	
4							
5							
6							

Comparing ACS Data

Statistical Testing Tool – EXAMPLE - Comparing Multiple Estimates



Statistical Testing for Multiple Estimates

Purpose
This spreadsheet determines whether there is statistical evidence to conclude that two estimates are different from each another.

Results

Yes	Estimates are statistically different.
No	Estimates are NOT statistically different (or are statistically tied).
X	Estimate is compared to itself.
-	Statistical testing is not appropriate.

How to

1. Down
2. Inser
3. Inser
4. Inser
5. Sort t
6. If the
7. (Opti

(Rec

"1.645

column

[Overview](#)

	<u>Label</u>	<u>Estimat</u>	<u>Margin of Error (MO</u>	<u>Label</u>	<u>Label</u>	<u>Private Health Insuran</u>	<u>Canton</u>	<u>Hartford</u>	<u>Simsbury</u>
						1	2	3	4
2	Canton	314	108	Canton	2	X	Yes	Yes	
3	Hartford	1652	208	Hartford	3	Yes	X	Yes	

Data Quirks with ACS

Special Cases for MOE's

- ***** = 0 (Often an estimate from Population Estimates Program that is controlled) – No statistical testing
- 0 Estimates can have MOE
- - = Too few observations (Cannot do statistical testing)
- N – number of cases too small and not displayed
- (X) – Not applicable nor available
- Others

Coefficient of Variation (CV) - $SE/Estimate$; Standard Error = $MOE/1.645$

- If >61% median for all table cells, some are combined.
- If still > 61%, table not published.
- Optimal CV: <15% according to statistical experts

Real Life Example - #1

QUESTION:

Your company does home remodels and is trying to find out how many older homes (particularly before 1950) exist in three towns and if there is a significant difference in numbers between them: Avon, Simsbury, and West Hartford.

Real Life Example - #1

ANSWER:

Table B25034 – Year Structure Built

The three towns are all statistically significantly different from each other with 90% confidence regarding housing units before 1950.

Ranking is 1. West Hartford 2. Simsbury 3. Avon.

Bonus: What else could you compare besides raw numbers?

Other Useful Resources for ACS

Maps of Census Blocks (2010 Census): Useful for visualizing Block Groups and Tracts <https://www.census.gov/geographies/reference-maps/2010/geo/2010-census-block-maps.html>

Final Thoughts

- ACS special and useful, but tricky and time-consuming for computations and comparisons.
- Other Census population and economic programs may answer question.
- Data.census.gov – work-in progress.
- Data relevance not just displayed but derived.

THANK YOU!!