

# Statistical Testing Tool

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## American Community Survey (ACS)

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### Statistical Testing Tool

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The [Statistical Testing Tool](#) is a spreadsheet that tests whether American Community Survey (ACS) estimates are statistically different from one another. Simply copy or download ACS estimates and their margins of error (MOE) into the tool to get instant results of statistical tests.



[Download Statistical Testing Tool](#)  
[XLSX - 3.5 MB]

#### 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

[census.gov/programs-surveys/acs/data/data-tables-and-tools/statistical-testing-tool.html](https://census.gov/programs-surveys/acs/data/data-tables-and-tools/statistical-testing-tool.html)

# Overview of Tool

**Statistical Testing Tool**

**United States Census Bureau**

**Overview**

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**Overview**

By creating this Excel statistical comparison tool, the U.S. Census Bureau is helping to ensure that statistically sound practices are used when comparing estimates to each other.

While carrying out the statistical test, you will use estimates along with a margin of error (MOE)—downloaded from one of the Census Bureau’s data tools, like American FactFinder—to determine whether the estimates are significantly different (higher or lower) from each other or are NOT significantly different (statistically tied) from each other. It is important to remember that simply comparing an estimate from one year to another does not provide a reliable comparison. Because the estimates are representative of a sample of the population, using the MOE along with the estimate provides results close to the number you would get had the entire population been surveyed. The Census Bureau uses a confidence level of 90 percent. This represents the level of certainty about our estimates.

This spreadsheet includes instructions for testing two estimates and multiple estimates, the statistical testing spreadsheets for both, worked examples, and contact information. Please use the tabs to navigate through the spreadsheet.

**Importance of the Margin of Error (MOE)**

Surveys use a sample of the total population to provide an estimate of a characteristic (for example, an estimate of the total population). If the same survey was conducted using a different sample of the population, the estimates would most likely vary. The size of the MOE relative to the estimate provides a way for data users to assess the reliability of an estimate. A MOE equal to or greater than the estimate is generally considered unreliable.

The MOE is a measure of statistical uncertainty. An estimate from a sample may vary from the actual population value had the entire population been surveyed. The MOE provides a way to measure this variation. Testing statistical uncertainty allows you to compare estimates to each other and determine whether you may conclude that the perceived difference is simply due to chance or that two estimates are different from each another.

**The Test**

The statistical test used in this tool is a Z-score. Although this tool is developed to provide statistical testing for ACS estimates, estimates from other surveys may be used in this tool. Overview of the Z-score can be found in Appendix 4 in any of the [Handbooks for Data Users](#).


This tool only conducts statistical testing on the estimates keyed in by the data user for comparison within the spreadsheet. It does not adjust the MOE when making multiple comparisons, nor incorporate a Bonferroni correction or any other method in the results of

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# Statistical Testing for 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.

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	<u>Label</u>	<u>First Estimate</u>	<u>First Margin of Error (MOE)</u>	<u>Second Estimate</u>	<u>Second Margin of Error (MOE)</u>	<u>Statistically Different?</u>
1	Total	73,523	+/-2,477	75,815	+/-2,136	No
2	No vehicle available	652	+/-559	693	+/-425	No
3	1 vehicle available	9,633	+/-1,851	11,197	+/-1,726	No
4	2 vehicles available	28,469	+/-2,638	28,501	+/-3,007	No
5	3 vehicles available	22,660	+/-2,488	17,161	+/-2,564	Yes
6	4 vehicles available	7,272	+/-2,074	11,672	+/-2,848	Yes
7	5 or more vehicles available	4,837	+/-2,036	6,591	+/-2,037	No

# Statistical Testing for Multiple Estimates

## Statistical Testing Tool

**Statistical Testing for Multiple Estimates**



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

**How to Use this spreadsheet:**

1. Download data into an Excel or CSV (comma separated) file.
2. Insert geography or statistical variable keyword into "Estimate" column.
3. Insert number or percentage estimates into "Estimate" column.
4. Insert margins of error (MOE) into "Margin of Error (MOE)" column.
5. Sort the data by the "Estimate" column in ascending order. (Recommended to sort the data before pasting it into this spreadsheet.)
6. If the estimates use a standard error (SE) instead of a margin of error, change the "Parameters" column from "1.645" to "1" in the "Parameters" column.
7. (Optional) To change the confidence level, scroll to the "Parameters" column to the desired confidence level (e.g., 95).

**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.

	<u>Label</u>	<u>Estimate</u>	<u>Margin of Error (MOE)</u>	<u>Label</u>		<u>Label</u>			
						Maryland	Calvert County, Maryland	Charles County, Maryland	St. Mary's County, Maryland
						1	2	3	4
1	Maryland	9.10%	0.4	Maryland	1	X	Yes	Yes	Yes
2	Calvert County, Maryland	3.30%	1.4	Calvert County, Maryland	2	Yes	X	No	No
3	Charles County, Maryland	4.80%	1.5	Charles County, Maryland	3	Yes	No	X	No
4	St. Mary's County, Maryland	4.80%	1.9	St. Mary's County, Maryland	4	Yes	No	No	X