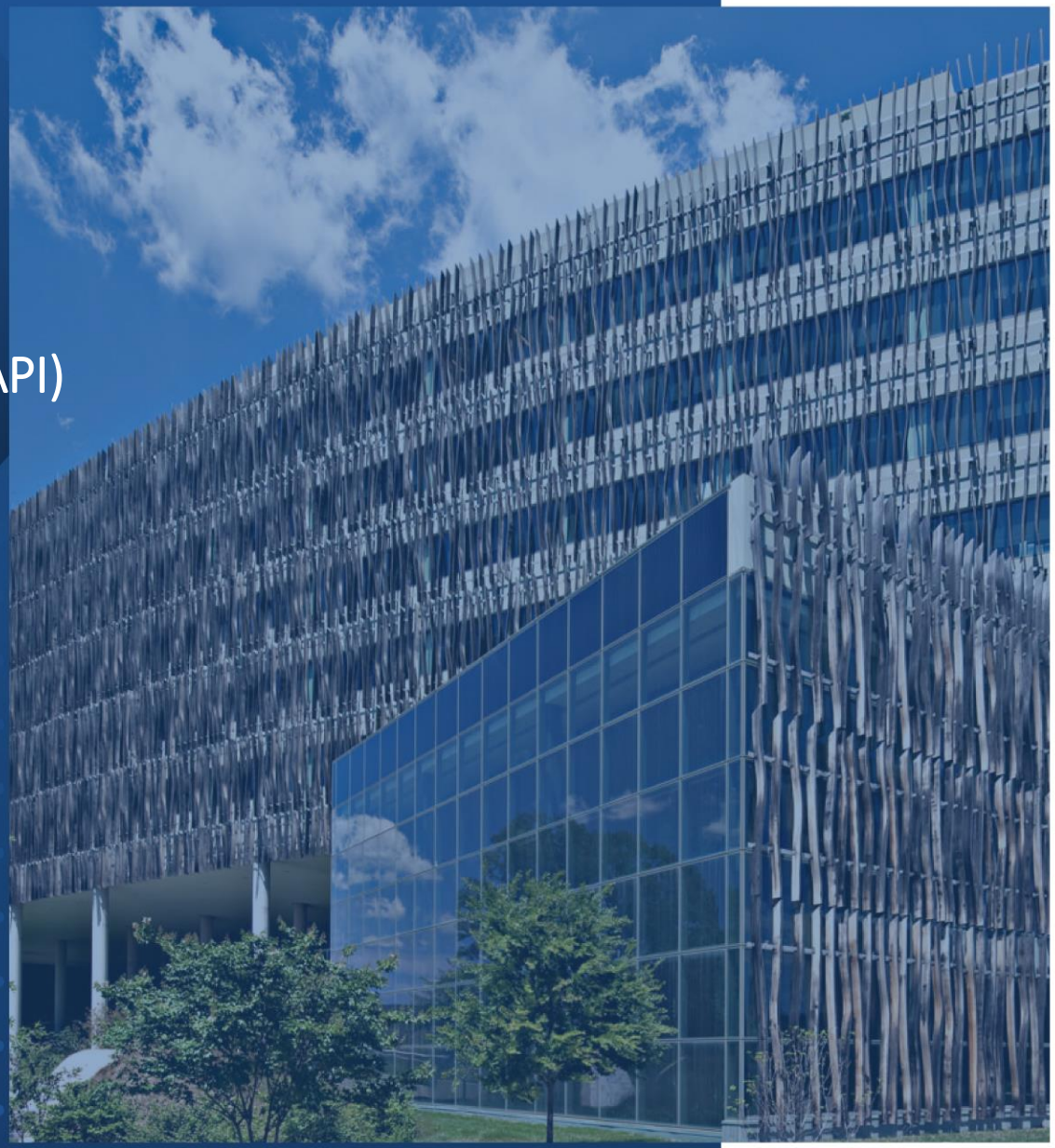
Census Bureau's Application Programming Interface (API)



November 15, 2022

Tim Sarko

Data Dissemination Specialist

U.S. Census Bureau, Data Dissemination and Training Branch

United States® Census Bureau

Objectives

- ✓ American Community Survey basics
- ✓ Find available datasets in the application programming interface (API)
- ✓ Edit a sample URL to access the data you need
- ✓ View results in your web browser
- ✓ Save your results as a .csv file and format it to a readable format

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Outline

- ✓**American Community Survey (ACS) Basics**
- ✓Census API Basics
- ✓Building an API Request
- ✓API Demo
- ✓Resources for Learning More
- ✓Questions

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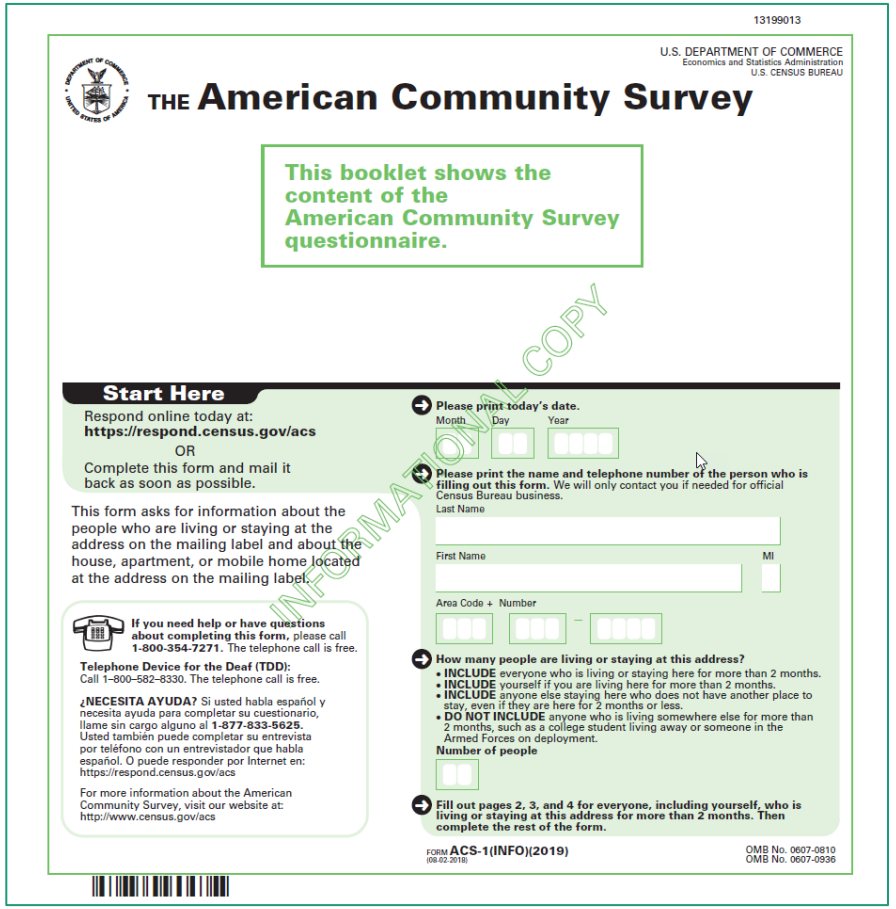
American Community Survey (ACS) Basics

The American Community Survey is on the leading edge of survey design, continuous improvement, and data quality

- ✓ 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 informs over **$675 billion** of Federal government spending each year
- ✓ Covers **40+ topics**, supports over **300** evidence-based Federal government uses, and produces **11 billion** estimates each year
- ✓ Key annual data releases:
  - ✓ 1-year Estimates (for large populations)
  - ✓ 5-year Estimates (for very small populations)



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U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

THE American Community Survey

This booklet shows the content of the American Community Survey questionnaire.

INFORMATIONAL COPY

Start Here

Respond online today at:
https://respond.census.gov/acs
OR
Complete this form and mail it back as soon as possible.

This form asks for information about the people who are living or staying at the address on the mailing label and about the house, apartment, or mobile home located at the address on the mailing label.

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

Telephone Device for the Deaf (TDD):
Call 1–800–582–8330. The telephone call is free.

¿NECESITA AYUDA? Si usted habla español y necesita ayuda para completar su cuestionario, llame sin cargo alguno al **1-877-833-5625.** Usted también puede completar su entrevista por teléfono con un entrevistador que habla español. O puede responder por Internet en: https://respond.census.gov/acs

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

Please print today's date.
Month Day Year

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, 3, and 4 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(INFO)(2019)** (08.02.2018)
OMB No. 0607-0810
OMB No. 0607-0936

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American Community Survey (ACS) Data

POPULATION		HOUSING
SOCIAL Ancestry Citizenship Citizen Voting Age Population Disability Educational Attainment Fertility Grandparents Language Marital Status Migration School Enrollment Veterans	**DEMOGRAPHIC** Age Hispanic Origin Race Relationship Sex **ECONOMIC** Class of Worker Commuting Employment Status Food Stamps (SNAP) Health Insurance Hours/Week, Weeks/Year Income Industry & Occupation	Computer & Internet Use Costs (Mortgage, Rent, Taxes, Insurance) Heating Fuel Home Value Occupancy Plumbing/Kitchen Facilities Structure Tenure (Own/Rent) Utilities Vehicles Year Built/ Year Moved In

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ACS 1-Year vs. 5-Year Estimates

1-Year	5-Year
12 months of collected data	60 months of collected data
Statistics for areas with populations of 65,000+	Statistics for all geographic areas down to the block group (sub-neighborhood) level
Smaller sample size – less reliable	Larger sample size – most reliable
More current statistics	Less current statistics
Best used when current data are more important, or for analyzing large populations	Best used when precise data are more important, or for analyzing small populations

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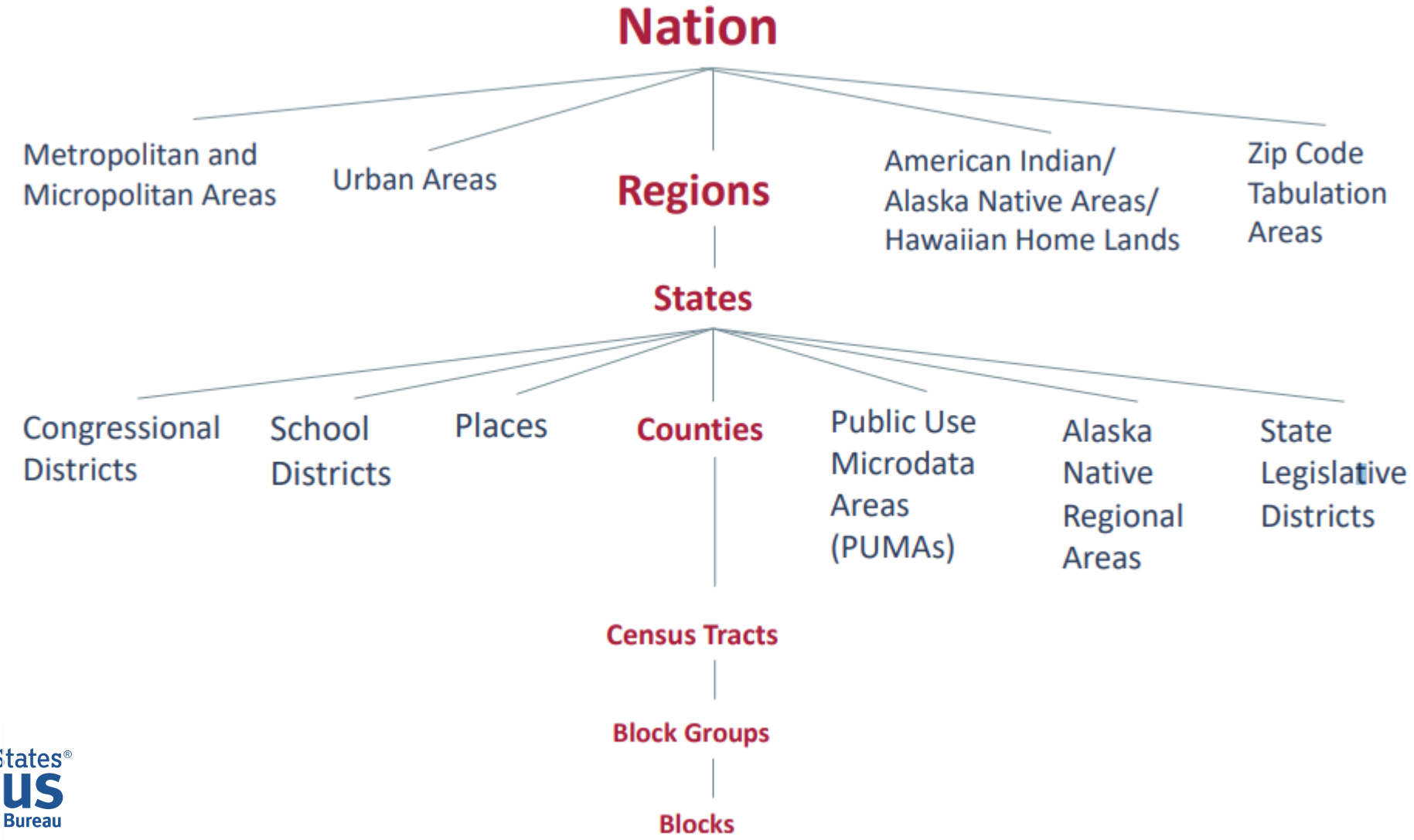
Available Geographic Areas



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Census Data API

Census Data API

- Data service that allows software developers and other users to access public data in a standardized way

Uses:

- Supports mobile and web applications (internal and external)
- Drives interactive data visualizations
- Connects to statistical analysis software like SAS and R

Advantages:

- Easily downloads target variables and geographies
- Immediate access to most current data
- No need to host data on another server
- More data than what is available on data.census.gov

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Census Programs in the API

Demographic Programs

- American Community Survey
- Decennial Census
- Decennial Census Self Response Rates
- Health Insurance Stats (from Current Population Survey, Survey of Income Program Participation, ACS, Small Area Health Insurance Estimates)
- International Database
- Population Estimates and Projections
- Poverty stats (from CPS, Small Area Income & Poverty Estimates)

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Economic Business Programs

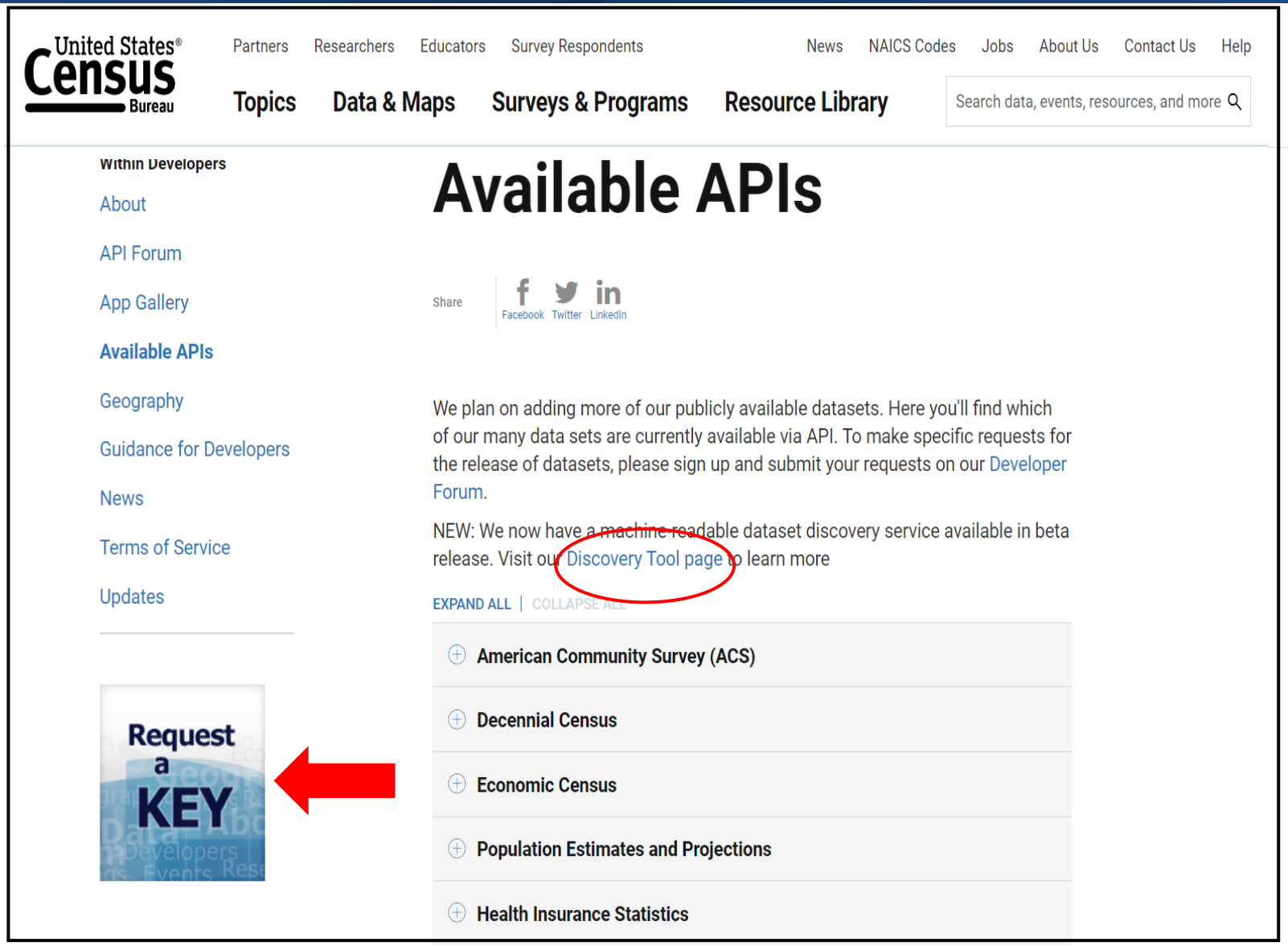
- Annual Survey of Entrepreneurs & Annual Survey of Manufacturers
- Business Dynamics Statistics
- County Business Patterns & NonEmployer Statistics
- Economic Census & Economic Indicators
- International Trade
- Quarterly Workforce Indicators
- Survey of Business Owners

Other Programs

- Census Planning Database

www.census.gov/data/developers/data-sets.html

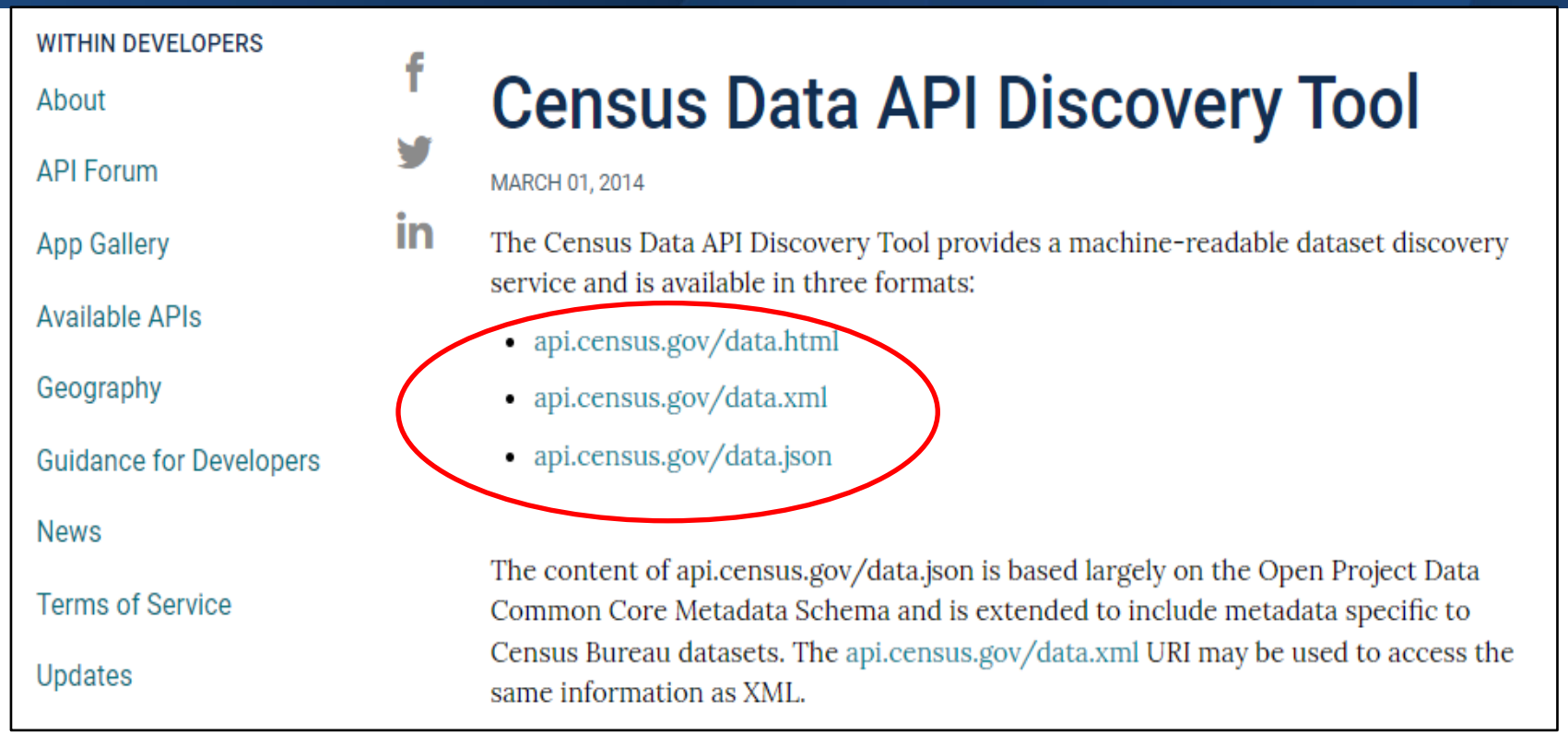
Developers Page



Accessing the API

- Request a key
  - No charge
  - Can make up to 500 API queries per IP address per day without a key
- Browse the Discovery Tool
  - List of several hundred datasets
  - Descriptions, variables, geographies, examples, etc
- Review updates
- Share your experiences in the Developers Forum

Discovery Tool



WITHIN DEVELOPERS

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Available APIs

Geography

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Terms of Service

Updates

Census Data API Discovery Tool

MARCH 01, 2014

The Census Data API Discovery Tool provides a machine-readable dataset discovery service and is available in three formats:

- api.census.gov/data.html
- api.census.gov/data.xml
- api.census.gov/data.json

The content of api.census.gov/data.json is based largely on the Open Project Data Common Core Metadata Schema and is extended to include metadata specific to Census Bureau datasets. The api.census.gov/data.xml URI may be used to access the same information as XML.

Information Provided

- Dataset descriptions
- Variable labels and attributes
- Supported geographies
- Sample calls
- Links to program technical documentation

American Community Survey: 5-Year Estimates: Detailed Tables 5-Year	The American Community Survey (ACS) is an ongoing survey that provides data every year -- giving communities the current information they need to plan investments and services. The ACS covers a broad range of topics about social, economic, demographic, and housing characteristics of the U.S. population. Summary files include the following geographies: nation, all states (including DC and Puerto Rico), all metropolitan areas, all congressional districts (116th Congress), all counties, all places, and all tracts and block groups. Summary files contain the most detailed cross-tabulations, many of which are published down to block groups. The data are population and housing counts. There are over 64,000 variables in this dataset.	2019	acs › acs5	Aggregate	geographies	variables	groups	sorts	examples	documentatio

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Starting Your Data Request

api.census.gov/data

1

Requests always begin with:

https://api.census.gov/data

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Add the Year and Dataset Name Acronym

https://api.census.gov/data/2021/acs/acs1

2

Find the dataset names by browsing the Discovery Tool

https://api.census.gov/data.html

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Begin Your Variable Request

https://api.census.gov/data/2021/acs/acs1?get=

3

Always start your variable request with **?get=**

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Add Your Variables

https://api.census.gov/data/2021/acs/acs1?get=
NAME,B19013_001E,B19013_001M

4

Find the variables you want here:

https://api.census.gov/data/2021/acs/acs1/variables.html

- The variable called **NAME** provides the geographic name you are using to limit your search.
- The variables **B19013_001E** and **B19013_001M** provide the ACS estimate for median household income (E) and its margin of error (M).

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Common ACS Variables

Variables Ending In…	Meaning
E	Estimate
M	Margin of Error
PE	Percent Estimate
PM	Percent Margin of Error
EA	Annotation of Estimate
MA	Annotation of Margin of Error
PEA	Annotation of Percent Estimate
PMA	Annotation of Percent Margin of Error

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Add Your Geography

https://api.census.gov/data/2021/acs/acs1?get=NAME,B19013_001E,B19013_001M&for=state:*

5

Find available geographies here:

https://api.census.gov/data/2021/acs/acs1/examples.html

- **state:*** the wildcard (*) is added to include all states
- state:01 is for Alabama, state:02 = Alaska and so on…

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Output from the API

https://api.census.gov/data/2021/acs/acs1?get=NAME,B19013_001E,B19013_001M&for=state:*

This URL returns data in JSON format which looks like this:


```
[["NAME","B19013_001E","B19013_001M","state"],
["Alabama","53913","781","01"],
["Puerto Rico","22237","478","72"],
["Arizona","69056","686","04"],
["Arkansas","52528","1002","05"],
["California","84907","542","06"],
["Colorado","82254","791","08"],
["Connecticut","83771","1112","09"],
["Delaware","71091","1795","10"],
["District of Columbia","90088","3477","11"],
["Florida","63062","425","12"],
["Georgia","66559","712","13"],
["Hawaii","84857","2106","15"],
["Idaho","66474","1752","16"],
["Illinois","72205","574","17"],
["Indiana","62743","716","18"],
["Iowa","65600","777","19"],
["Kansas","64124","951","20"],
["Kentucky","55573","701","21"],
["Louisiana","52087","750","22"],
["Maine","64767","1258","23"],
["Maryland","90203","1065","24"],
["Massachusetts","89645","1287","25"],
["Michigan","63498","526","26"],
["Minnesota","77720","915","27"],
["Mississippi","48716","1242","28"],
```


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Save the File and Clean It Up

- Save the file and add .csv to file name
- Change ‘Save as Type’ to ‘All Files’
- In Excel, use REPLACE to delete unneeded characters ([ ] “)

State	Median Household Income	MOE
Maryland	$90,203	$1,065
District of Columbia	$90,088	$3,477
Massachusetts	$89,645	$1,287
New Jersey	$89,296	$1,088
New Hampshire	$88,465	$2,144
California	$84,907	$542
Hawaii	$84,857	$2,106
Washington	$84,247	$844
Connecticut	$83,771	$1,112
Colorado	$82,254	$791
Virginia	$80,963	$731
Utah	$79,449	$1,246
Alaska	$77,845	$2,148
Minnesota	$77,720	$915
New York	$74,314	$613
Rhode Island	$74,008	$2,381
Vermont	$72,431	$2,216
Illinois	$72,205	$574
Oregon	$71,562	$1,058

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API Variable Call vs API Entire Table Call

api.census.gov/data/2021/acs/acs1?get=NAME,B19013_001E,B19013_001M&for=state:*

- Example API call for 2 variables: **B19013_001E** and **B19013_001M**
- You can include up to 50 variables in the same API call, separated by commas

api.census.gov/data/2021/acs/acs1?get=NAME,group(B19013)&for=state:*

- Example API call for the entire B19013 table for all states
- The **GROUP** function allows you to get results for an entire table in one API call

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American Community Survey (ACS) Data Tables

ACS Data Tables	Table ID Begins With	API Call Begins With
Detailed Tables	B or C	api.census.gov/data/2021/acs/acs1
Subject Tables	S	api.census.gov/data/2021/acs/acs1/**subject**
Data Profiles	DP	api.census.gov/data/2021/acs/acs1/**profile**
Comparison Profiles	CP	api.census.gov/data/2021/acs/acs1/**cprofile**
Selected Population Profiles	S0201	api.census.gov/data/2021/acs/acs1/**spp**

www.census.gov/programs-surveys/acs/guidance/which-data-tool/table-ids-explained.html

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API Demos

1. **Multiple estimates and multiple geographies (American Community Survey)**
   - **What is the homeownership rate and median household income across all counties in Tennessee?**
2. **Entire table – Group function (American Community Survey)**
   - **How do I download the Housing Demographic Profile, table DP04 for all states?**
3. **Economic Data (County Business Patterns)**
   - **What are the total numbers and employment sizes of all business establishments in Davidson County, Tennessee?**

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API Demo – County Business Patterns

Economic Surveys

CB2000CBP | All Sectors: County Business Patterns, including ZIP Code Business Patterns, by Legal Form of Organization

2020: ECNSVY Business Patterns County Business Patterns

Notes | Geos 1 | Years | Topics | Surveys 1 | Codes | Hide | Filter | Restore | Excel | CSV | ZIP | Print | More Data | Map

Geographic Area Name	Meaning of NAIC...	Year	Meaning of Employment size of establi...	Number of establishments	Annual payroll ($1,000)
Davidson County, Tennessee	Total for all sectors	2020	All establishments	20,512	26,899,504
Davidson County, Tennessee	Total for all sectors	2020	Establishments with less than 5 employees	9,665	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 5 to 9 employees	3,737	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 10 to 19 employees	2,958	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 20 to 49 employees	2,493	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 50 to 99 employees	884	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 100 to 249 employees	538	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 250 to 499 employees	155	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 500 to 999 employees	52	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 1,000 employees or m...	30	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 1,000 to 1,499 employ...	12	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 1,500 to 2,499 employ...	11	N
Davidson County, Tennessee	Total for all sectors	2020	Establishments with 2,500 to 4,999 employ...	5	N

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Accessing Data in Bulk

Benefits of the API

- Get the exact variables and geographies that you need
- Can easily update API calls to get data across years: Most variables are consistent from year to year
- The API has more historical data than data.census.gov

Limitations of the API

- Only one geographic summary level at a time
- Not all collections of geographies are available (e.g. all census tracts in the U.S.)

Other Ways to Get Data in Bulk

- data.census.gov
- FTP sites

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Update the Year in Your API Call to Get Data Over Time

- Most variables are consistent from year to year. But, be sure to check for possible changes
  - api.census.gov/data/2018/acs/acs1/ profile?get=**NAME,DP02_0015E**&for=state:*
  - api.census.gov/data/2019/acs/acs1/ profile?get=**NAME,DP02_0016E**&for=state:*

2018 Variable: **DP02_0015E** – Average Household Size

DP02_0015E	Estimate!!HOUSEHOLDS BY TYPE!!Total households!!Average household size	SELECTED SOCIAL CHARACTERISTICS IN THE UNITED STATES	not required	DP02_0015EA, DP02_0015M, DP02_0015MA	0	float	DP02

2019 Variable: **DP02_0016E** – Average Household Size

DP02_0016E	Estimate!!HOUSEHOLDS BY TYPE!!Total households!!Average household size	SELECTED SOCIAL CHARACTERISTICS IN THE UNITED STATES	not required	DP02_0016EA, DP02_0016M, DP02_0016MA	0	float	DP02

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Data Dissemination and Training

✓ **Bring our data experts to you.**
Request a free data training for your organization.

✓ **Receive our Data Gems.**
These short "how-to" videos are an easy and quick way to increase your knowledge of Census data. Get them in your inbox!

✓ **Get access to our Courses.**
You will learn-at-your-own-pace with these video-tutorials designed for different skill levels.

✓ **Interact with our instructors via Webinars.**
Learn about our data releases and tools while attending these live virtual classes.

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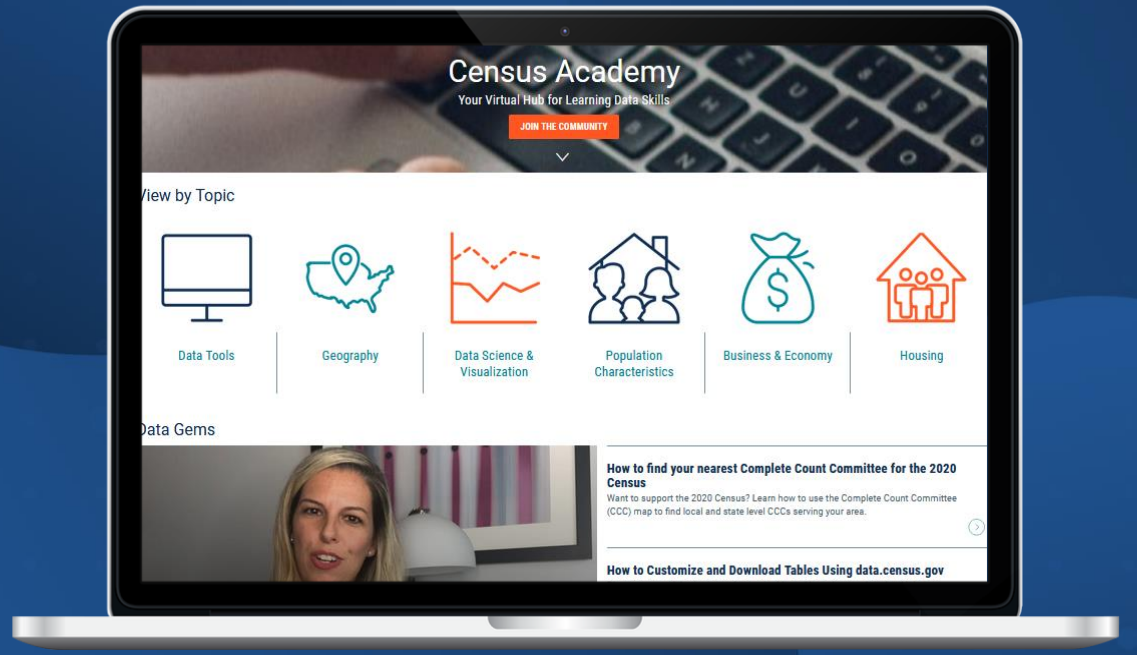
Census.gov/Academy



Contact us:
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1-844-ASK-DATA

Share your ideas and feedback at census.academy@census.gov

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THANK YOU