

# Introduction to the American Community Survey (ACS)

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Data Science for the Public Good Workshop  
Summer 2017

# Outline

- History
- ACS Basics
- Margin of Error
- ACS Data Product
- Resources for learning more
- Exercises

# History

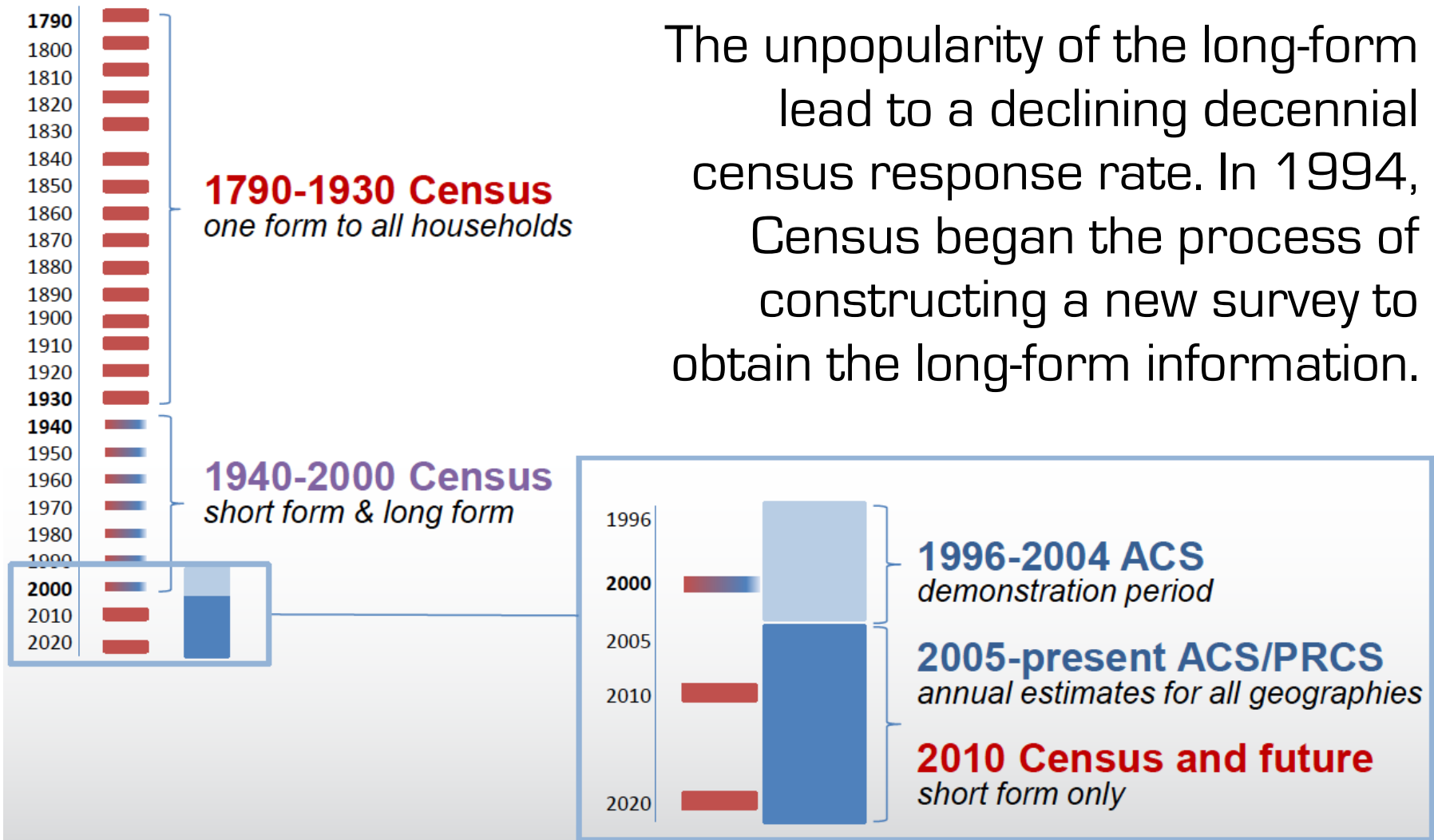
U.S. decennial census serves a constitutionally mandated purpose to provide the number of people in each state for reapportionment of the U.S. House of Representatives.

To draw congressional, state, and local legislative district boundaries, reapportionment data is needed at the block level.

Beginning in 1820, the decennial census collected additional information to respond to the needs of policy makers and the public to better understand the country. In 1940, a subset all Americans received a long-form containing additional questions.

# History

The unpopularity of the long-form lead to a declining decennial census response rate. In 1994, Census began the process of constructing a new survey to obtain the long-form information.



[Introduction to the American Community Survey \(ACS\)](#). August 31, 2016. Steve Klein.

# History

The questions on the decennial census long-form and now the ACS address: ancestry, educational attainment, income, language proficiency, migration, disability, employment, housing characteristics, and more...

These data are used by public, private, and nonprofit sectors. For example, the federal government uses these data to allocate funding, and to plan, monitor, and evaluate federal programs and policies, such as job discrimination.

In 2002, the GAO concluded the Bureau has the legal authority to conduct the ACS and "require responses from the public."

# ACS Basics

Unlike the decennial census which is a point-in-time survey, the ACS is a continuous survey:

- a fresh sample of 250,000 addresses is sampled every month;
- data products are cumulations of monthly data for 1-year and 5-year periods.

# ACS Basics

## Population Coverage

2005: households

2006: households + college dormitories, armed forces barracks, prisons, nursing homes, and other group quarters

*Definition:* A household includes all the persons who are current residents of a housing unit. A housing unit is an apartment, a mobile home, a group of rooms, or a single room that is occupied (or if vacant, is intended for occupancy) as separate living quarters.

# ACS Basics

## Resident Rules

ACS instructs the household respondent to provide data on all people who, at the time of filling out the questionnaire, are living or staying at the household address for > 2 months (including usual residents who are away for < 2 months).

## Content & Reference Periods

- ACS form includes approximately 48 questions for every person (up to 5, telephone follow-up is used to obtain information on additional household members) and 23 questions for every housing unit (the [2017 ACS form](#)).



# ACS Basics

## Social

Ancestry  
Citizenship  
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

## Housing

Computer & Internet Use  
Costs (Mortgage, Taxes, Insurance)  
Heating Fuel  
Home Value  
Occupancy  
Plumbing/Kitchen Facilities  
Structure  
Tenure (Own/Rent)  
Utilities  
Vehicles  
Year Built/ Year Moved In

**35+ Topics ➡ 1000+ Tables ➡ 11 Billion Estimates**

[\*Introduction to the American Community Survey\*](#) [ACS]. August 31, 2016. Steve Klein.

# ACS Basics

## Content & Reference Periods (cont.)

- Usual hours worked/week, weeks worked/year, and income refer to the 12 months prior to the day when the household filled out the survey.

## Sample Design & Size

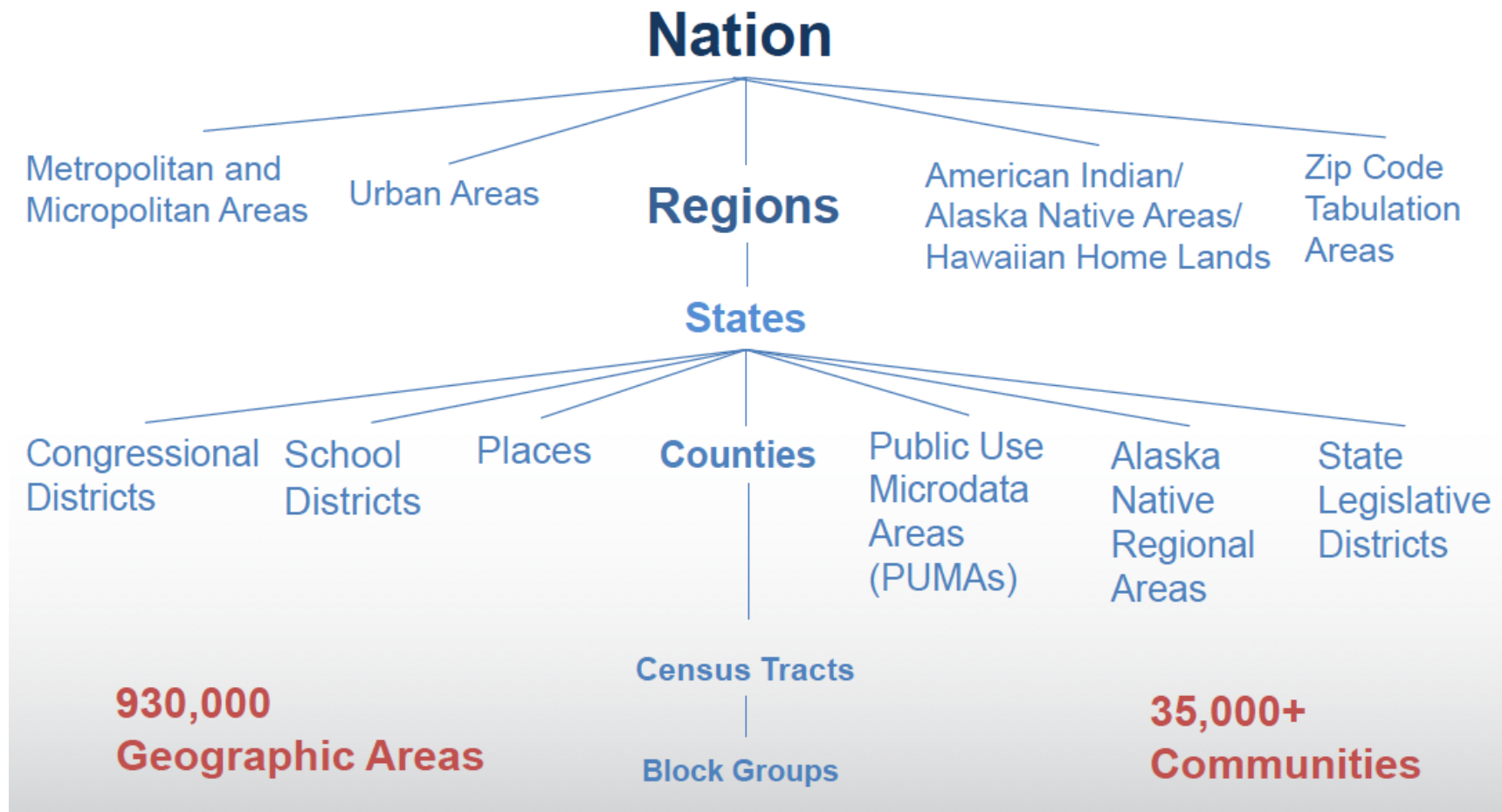
- Surveys sent to 250,000 housing unit addresses every month sampled from the Census Bureau's Master Address File.
- Each month's sample includes addresses in every 3,141 counties.
- No housing unit address will be included more than once every 5 years.

# ACS Basics

## Sample Design & Size (cont.)

- The monthly samples cumulate to ~3 million addresses every year or about 2.3% of the total number of housing unit addresses ([sample size by year](#)). (Note: 2000 long-form went out to 18 million addresses.)
- Accumulated over 5 years, the ACS sample contains 15 million housing unit addresses.
- ACS oversamples housing unit addresses in small governmental units – small counties, places, townships, school districts, American Indian, and Alaska Native areas.
- [Geographic Terms and Concepts](#)

# ACS Basics



## Census Geographic Concepts

[\*Introduction to the American Community Survey \(ACS\)\*](#). August 31, 2016. Steve Klein.

# ACS Basics

## Sample Design & Size (cont.)

Geographic Terms and Concepts	
Census Tract	Statistical subdivision of a county or equivalent entity; updated prior to each decennial census; contains between 1,200 to 8,000 people; optimum size is 4,000; boundaries follow visible and identifiable features; state and county boundaries are always census tract boundaries; there are 65,442 census tracts
Block Group	Statistical division of census tracts; contain between 600 to 3,000 people; optimal size is 1,500; there are 208,801 block groups

# ACS Basics

## Sample Design & Size (cont.)

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### Geographic Terms and Concepts

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PUMA	Public Use Microdata Areas are census constructed geographies each with a population of approximately 100,000; constructed based on county, neighborhood, and city boundaries; not allowed to cross state lines; useful in rural areas since they meet the $\geq 65,000$ threshold needed for 1-year ACS estimate; there are 2,071 PUMAs
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# ACS Basics

## Data Collection

- Each month ~95% of each month's sample of 250,000 addresses are sent a notification letter followed 4 days later by the questionnaire booklet.
- If the questionnaire is not returned within 3 weeks, a 2<sup>nd</sup> questionnaire is mailed – if still no response, trained interviewers conduct telephone follow-ups.

# ACS Basics

## Data Collection (cont.)

- If after 2 months no response is received a trained interviewer is sent to the address.

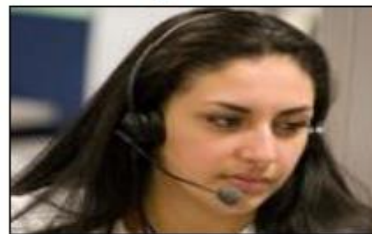
Online



Mail



Telephone



Personal Visit



**Self-Response Modes**

**Non-Response Modes**

ACS Data Collection Process

*[Introduction to the American Community Survey \(ACS\)](#)*. August 31, 2016. Steve Klein.

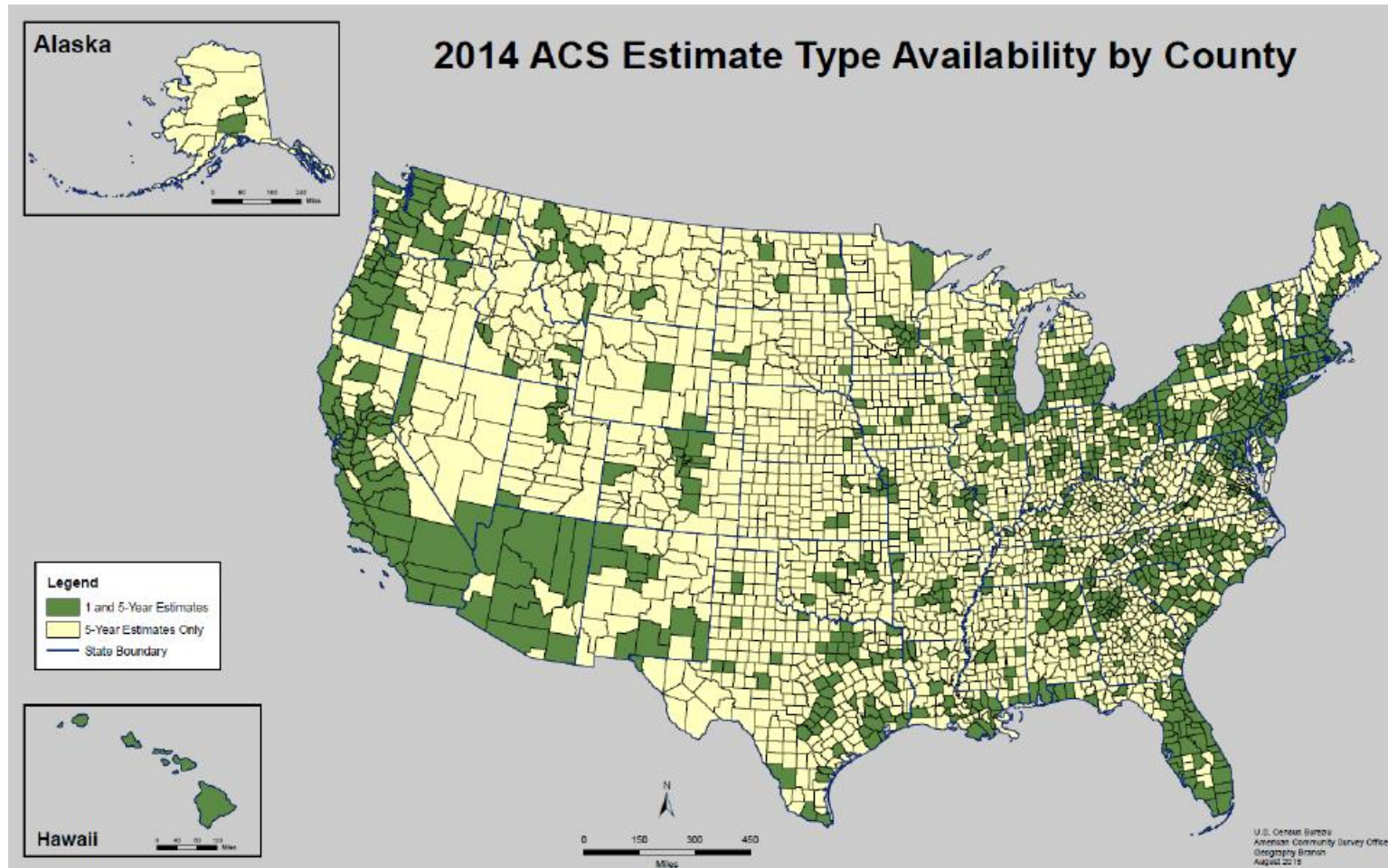


# Data Products

## Availability of data products

Estimated Population of Geographic Area	1-Year Estimates	5-Year Estimates
$\geq 65,000$	X	X
$< 65,000$		X
Release Date	September	December

# Data Products



*[Introduction to the American Community Survey \(ACS\)](#)*. August 31, 2016. Steve Klein.

# Data Products

## Data Products Types

Profiles	Tables
Data Profiles (DP)	Detailed Tables (B or C)
Narrative Profiles (NP)	Subject Tables (S)
Comparison Profiles (CP)	Ranking Tables (R)
Selected Population Profiles (S0201)	Geographic Comparison Tables (GCT)

# Data Products

## Profile/Table Identification

- >1,400 detailed tables

### **Example: B06004APR**

B	Data Product Type (B=detailed column breakdown) C = collapsed version (fewer columns)
06	Table Subject (06=Place of Birth) (01 - 27)
004	Unique Table Identifier (2 or 3 digits)
A	Race and Latino Origin (A=White Alone)
PR	Puerto Rico Geographies Only

(see [Table Codes](#))

# Data Products

[American FactFinder Download Center](#): Data Downloads

- [Table Tutorial](#)
- [Table Codes](#)

[OnTheMap for Emergency Management](#): Data for disaster, natural hazards, and weather events

[Census Business Builder](#): Demographic and economic data for small business and regional analyses

[Census Explorer](#): Interactive Maps

[Application Programming Interface \(API\)](#): Data sets via API

# Margin of Error

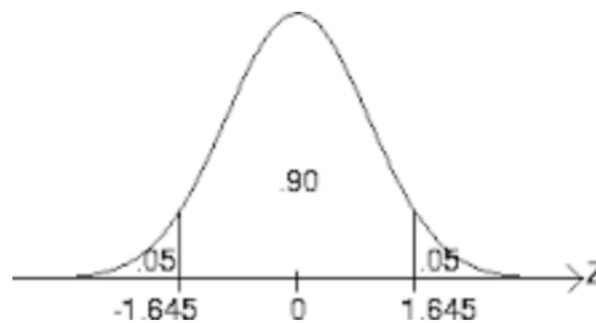
Unlike the decennial census estimates which are based on the “entire U.S. *population*”, the ACS estimates are based on a *sample*.

That is when you take another sample and calculate the estimate – the estimate will be different, this is referred to as *sampling error*.

ACS reports the *sampling error* as the *margin of error* or the *90% confidence interval* for the estimate.

# Margin of Error

Estimate  $\pm$  90% confidence limit



Estimate  $\pm$  1.65 \* Standard Error

Estimate / 1.65 = Standard Error

# Resources for Learning More

National Research Council. (2007). [\*Using the American Community Survey: Benefits and Challenges\*](#). Panel on the Functionality and Usability of Data from the American Community Survey, Constance F. Citro and Graham Kalton, Editors. Committee on National Statistics, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press.

Marshall, Aarian. (Feb. 26, 2015). [\*The Tragedy of Canada's Census\*](#).



# Resources for Learning More



- Promotes information sharing through a user's group [website](#), webinars, and an online community.
- Promotes the value and utility of the ACS.
- Conducts an Annual Data Users Conference ([2017 conference presentations](#)).

U.S. Census Bureau. (2008). [\*A Compass for Understanding and Using American Community Survey\*](#). U.S. Government Printing Office, Washington, D.C.