

Engaging Internal and External Audiences with the American Community Survey through Data Visualization

R. Chase Sawyer

U.S. Census Bureau

May 18, 2018

2018 American Association for Public Opinion Research Conference

Denver, CO



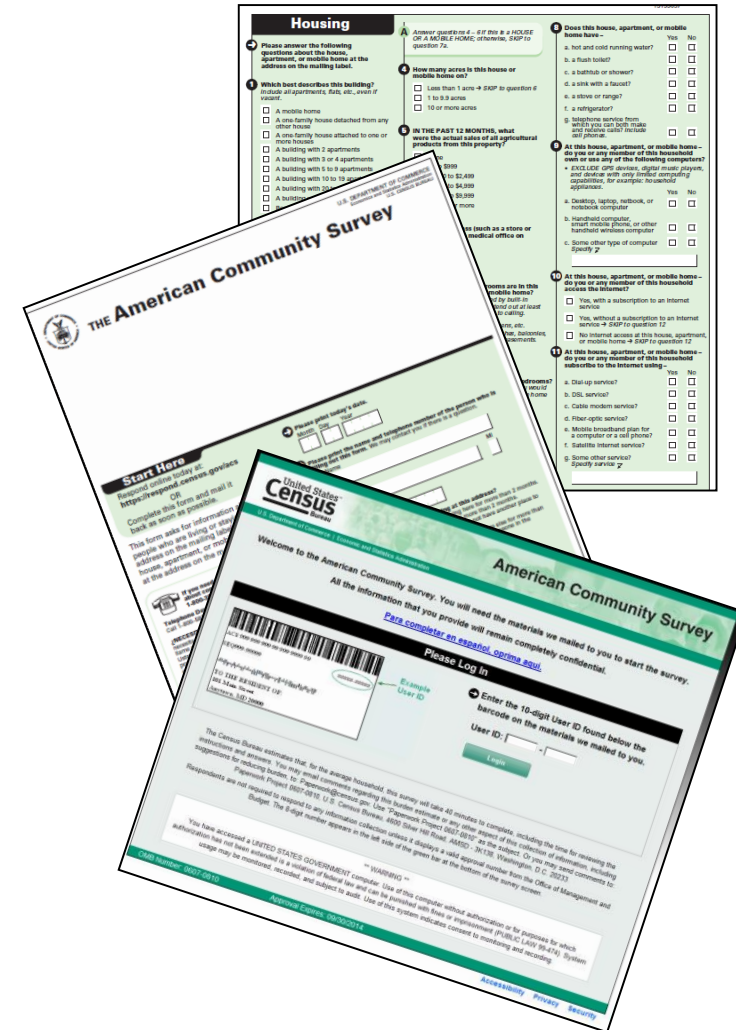
U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
[census.gov](https://www.census.gov)

This presentation is released to inform interested parties of ongoing research and to encourage discussion of work in progress. The views expressed are those of the author and not necessarily those of the U.S. Census Bureau.

Best Practices for Data Visualization

American Community Survey (ACS) Basics

- Flagship survey of the U.S. Census Bureau
- Data previously collected on the decennial long form
- Samples 3.5 million addresses in 12 panels per year
 - Collect data via internet, mail, telephone assistance, personal interview, group quarters interview
- Estimates for small areas and small population groups for 35+ topics
- Two types of releases each year
 - 1-year estimates (12 months of data)
 - 5-year estimates (60 months of data)



Best Practices for Data Visualization

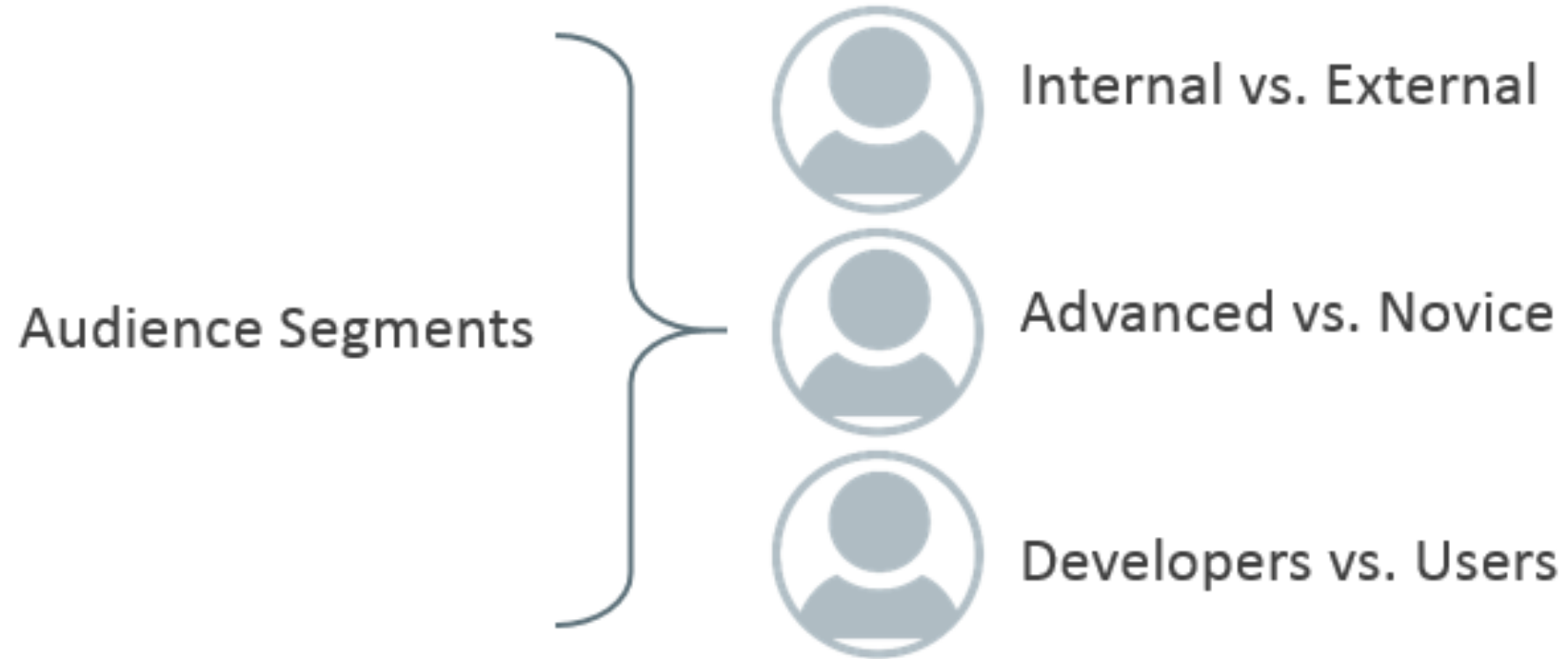
- PREPARATION** 
 - Know your audience
 - Know limitations of your data
- DESIGN** 
 - Use colors wisely
 - Use imagery people recognize
 - Think about different formats
- REVIEW** 
 - Review, review, review
 - Make sure you told your data's story

Best Practices for Data Visualization

PREPARATION

Best Practices for Data Visualization

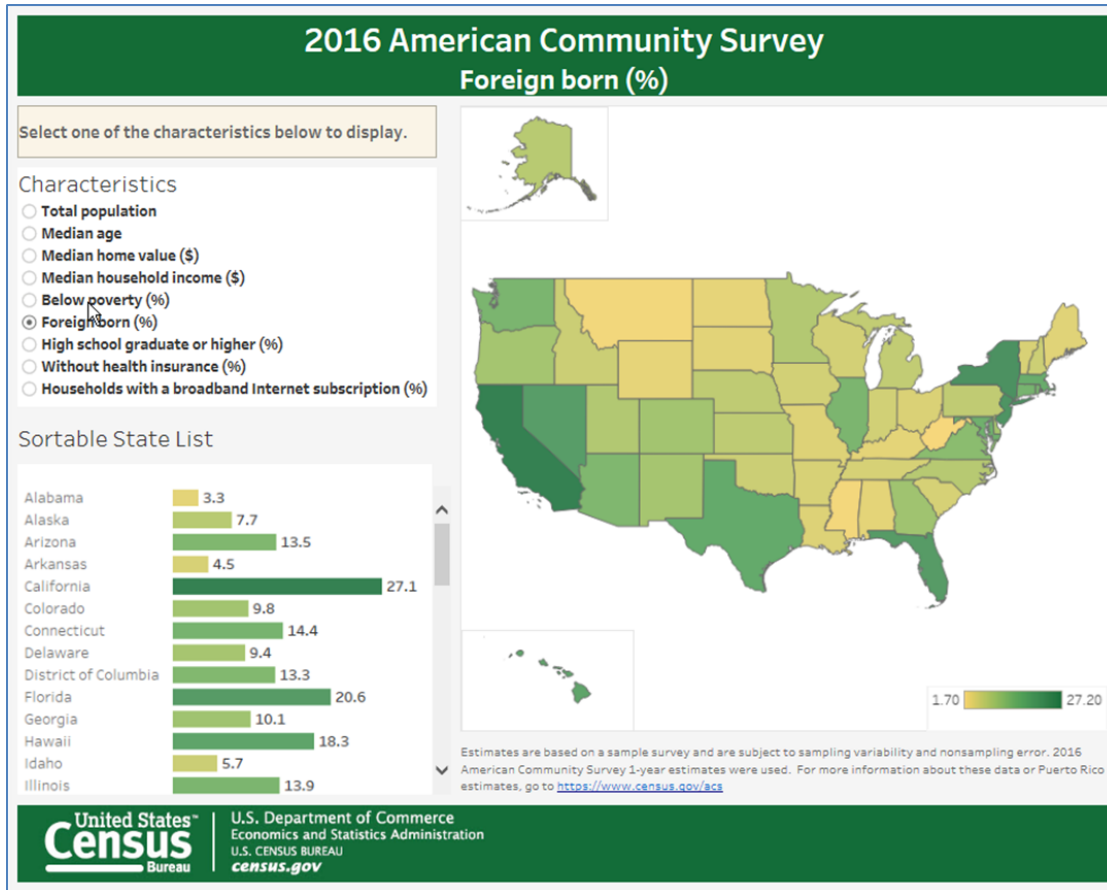
Preparation: Know Your Audience



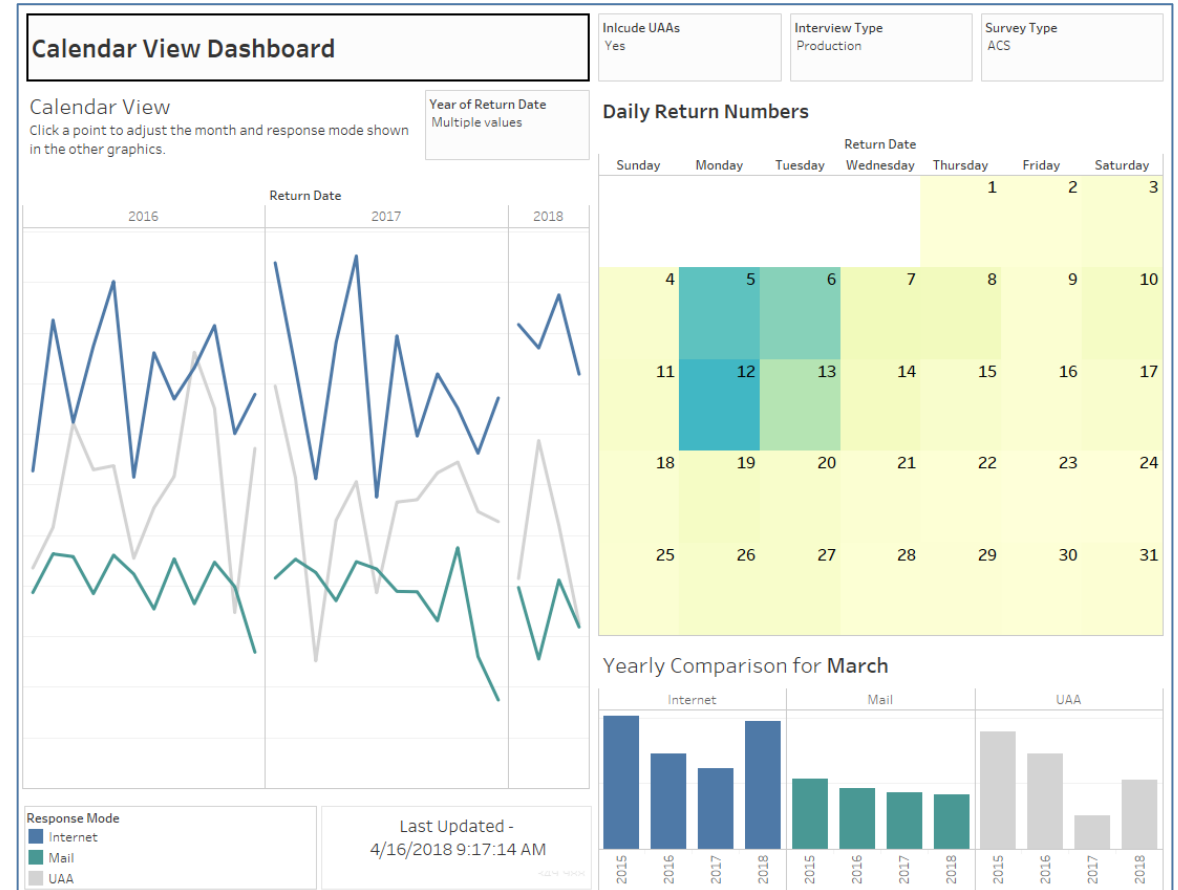
Best Practices for Data Visualization

Preparation: Know Your Audience

External Visualization



Internal Visualization



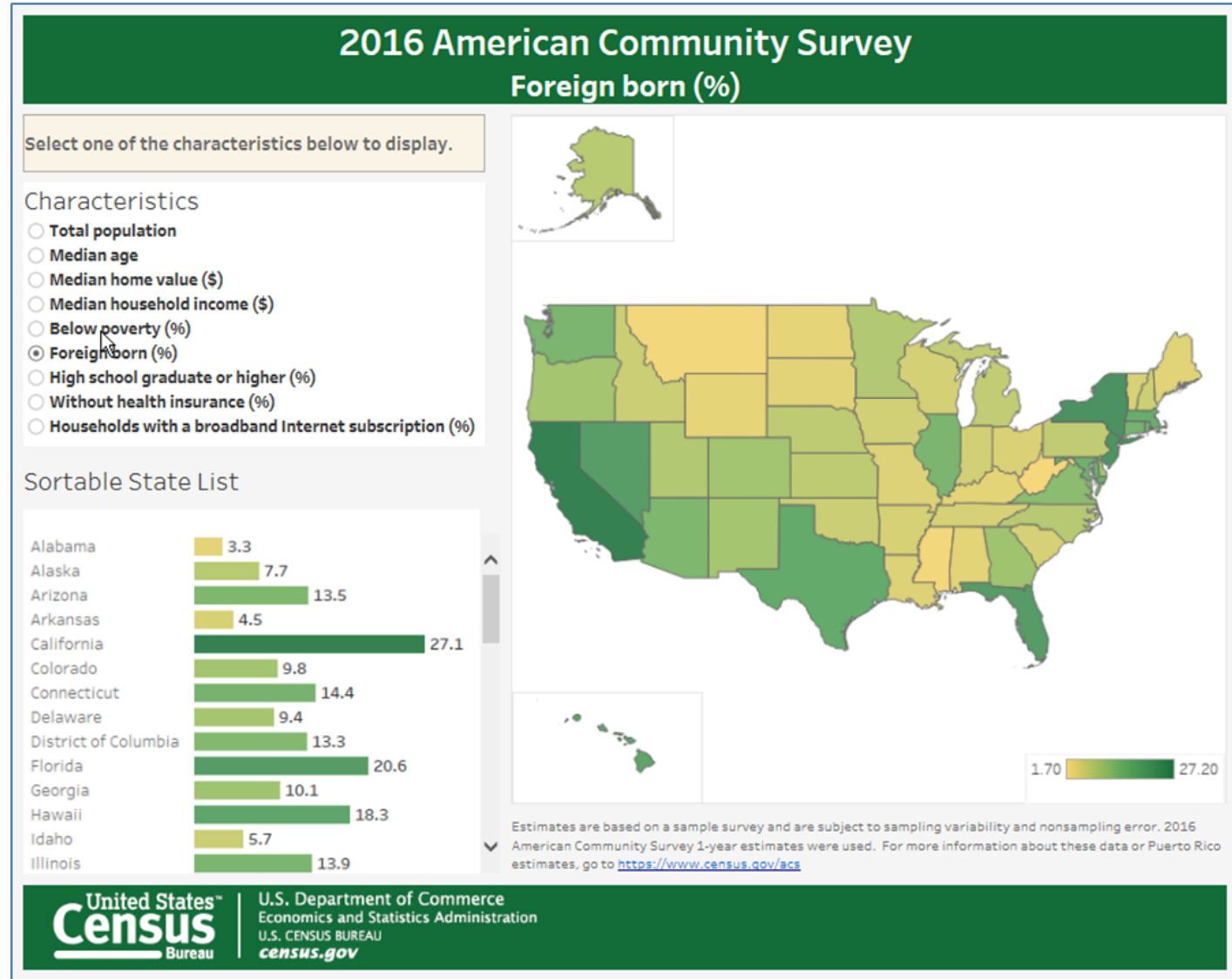
Note: The data in this visualization has been fabricated for informational purposes.

Best Practices for Data Visualization

Preparation: Know Your Audience

EXTERNAL VISUALIZATIONS

- Well polished
- Explains itself
- Follows a style guide



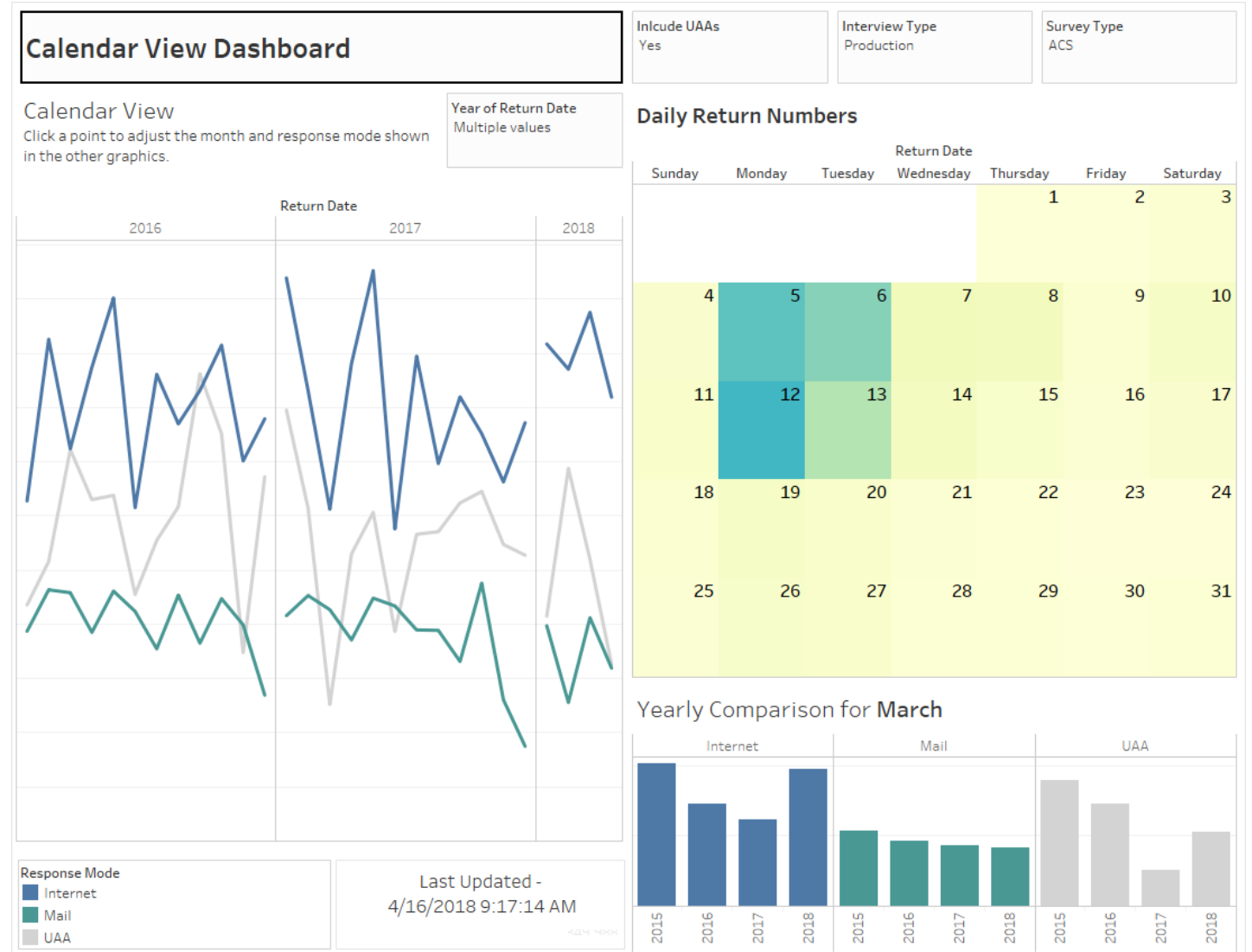
<https://www.census.gov/library/visualizations/interactive/acs-datamap.html>

Best Practices for Data Visualization

Preparation: Know Your Audience

INTERNAL VISUALIZATIONS

- Customization
- Can be explained
- Defer to customer



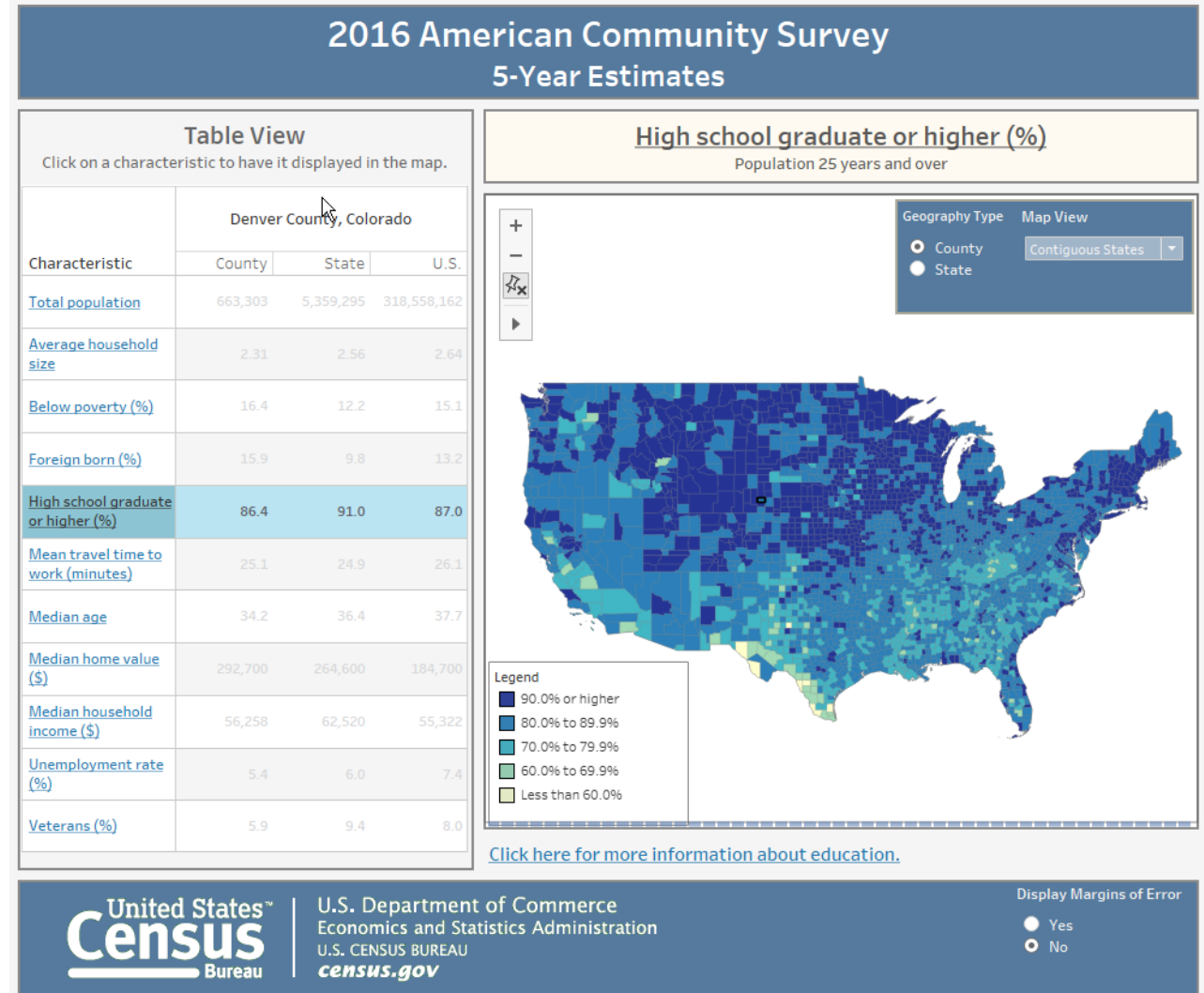
Note: This data has been fabricated for informational purposes.

Best Practices for Data Visualization

Preparation: Know The Limitations Of Your Data

KNOW YOUR DATA

- What can it do
- What it can't do



Best Practices for Data Visualization

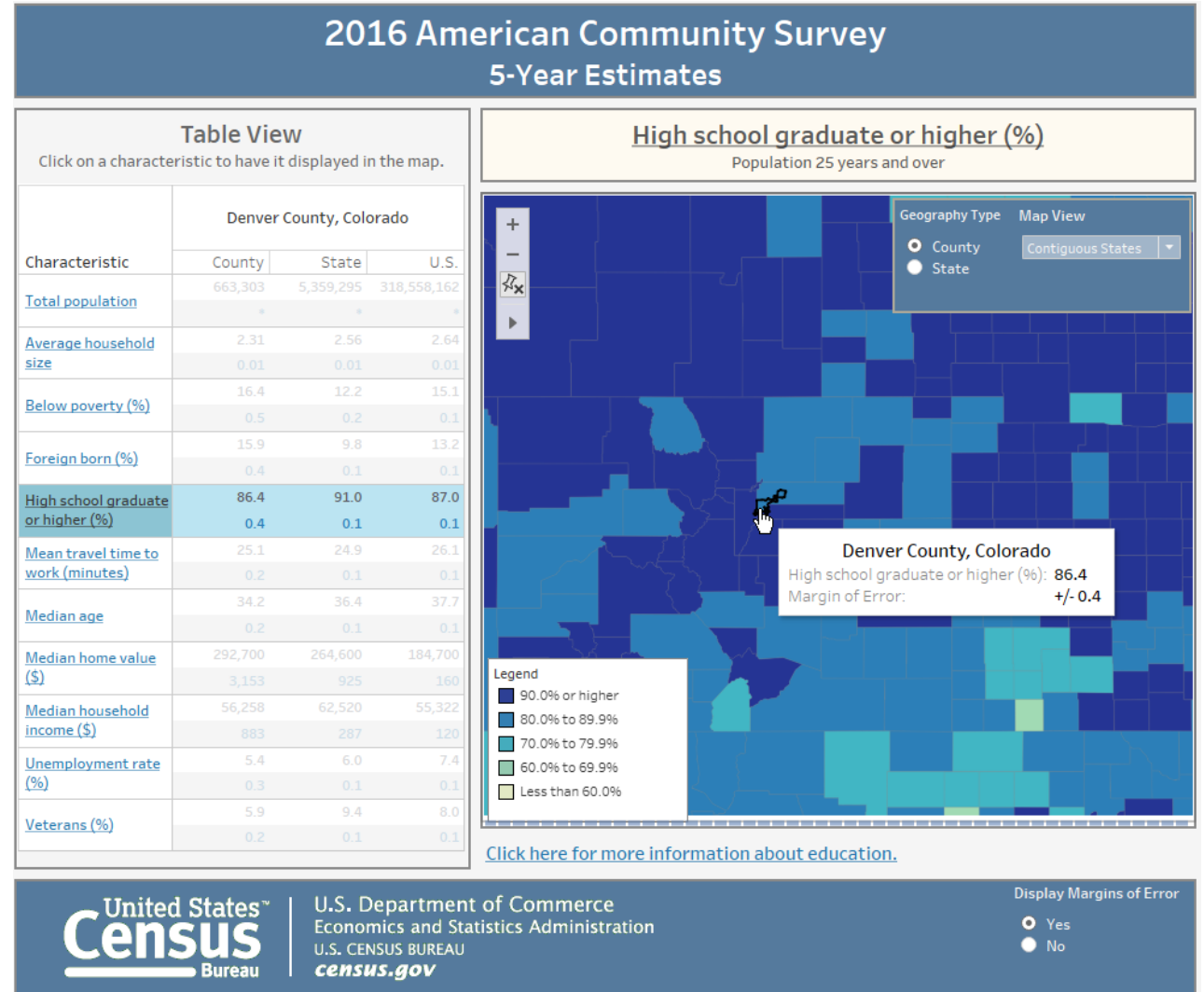
Preparation: Know The Limitations Of Your Data

KNOW YOUR DATA

- What can it do
- What it can't do

THINK ABOUT SAMPLING ERROR BEFORE YOU START

- How to display it
- Legends and margins of error



Best Practices for Data Visualization

DESIGN

Best Practices for Data Visualization

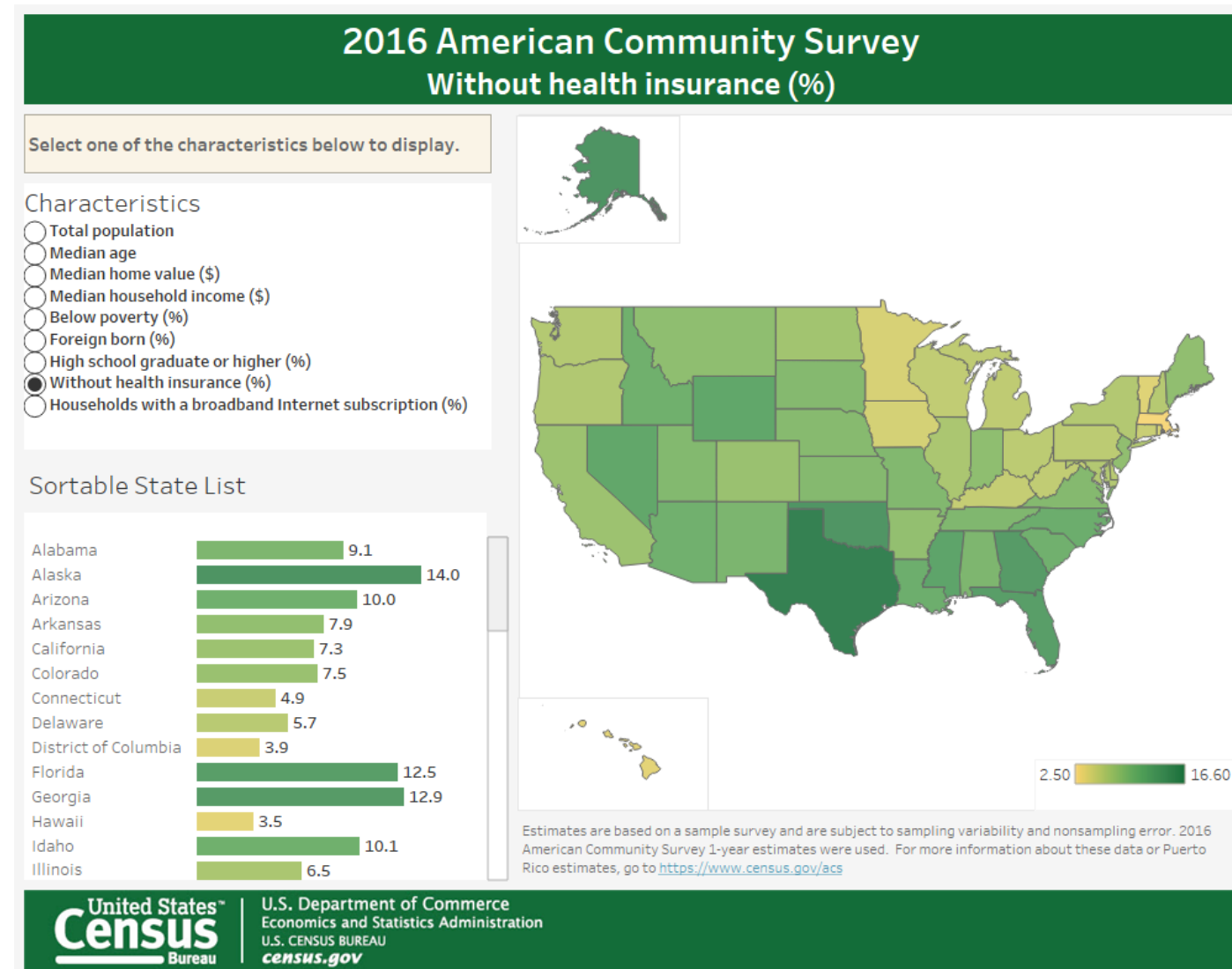
Design: Use Colors Wisely

AVOID COLORS WITH MEANING

- Good vs. bad
- Political (Depending)

DON'T USE COLORS THAT ARE TOO SIMILAR

- Multi-hue color schemes



Best Practices for Data Visualization

Design: Use Colors Wisely

AVOID COLORS WITH MEANING

- Good vs. bad
- Political (Depending)

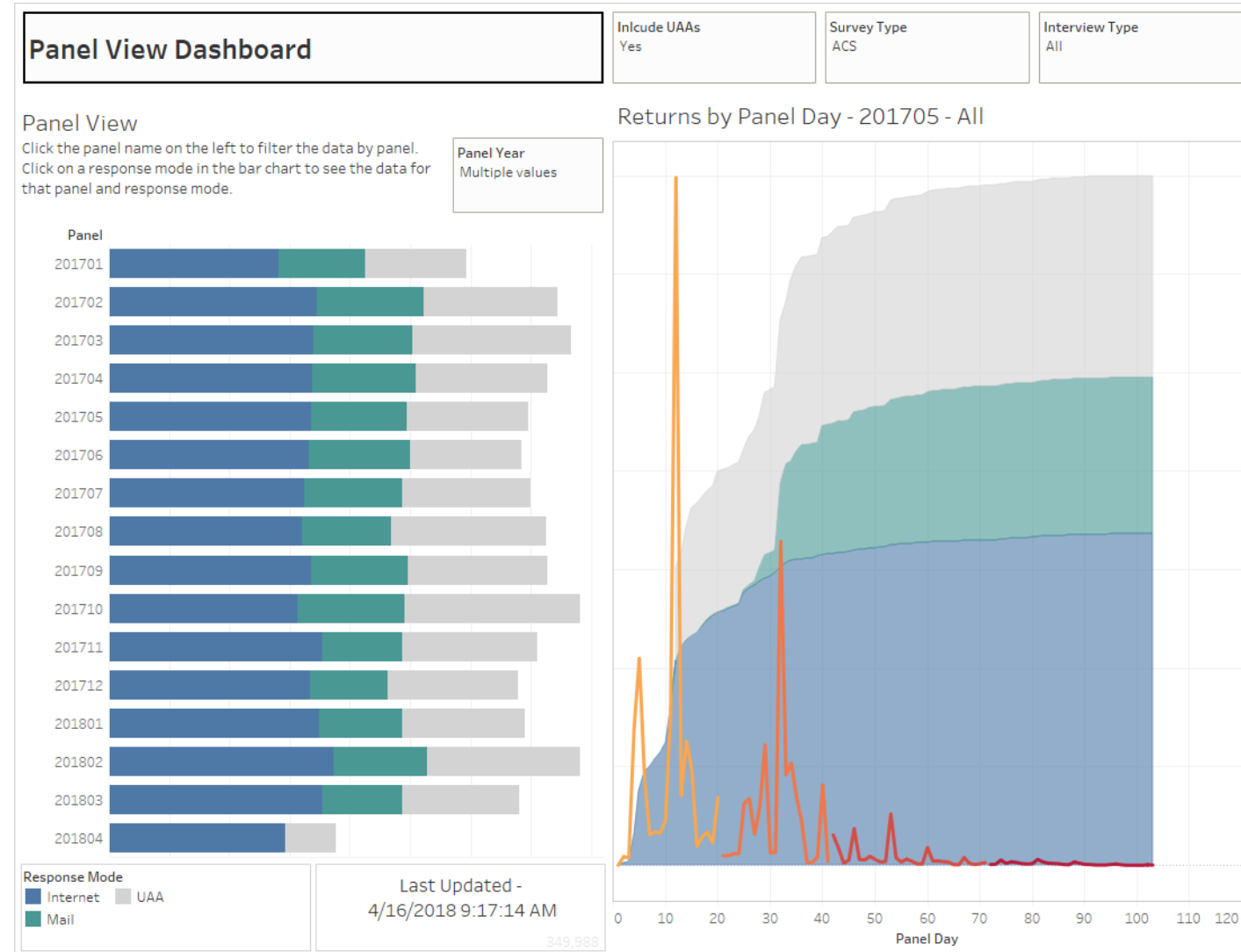
DON'T USE COLORS THAT ARE TOO SIMILAR

- Multi-hue color schemes

USE COLOR TO MAKE DISTINCTIONS

- Color and Gray

THINK ABOUT COLOR BLINDNESS AND PRINTING



Note: This data has been fabricated for informational purposes.

Best Practices for Data Visualization Design: Use Imagery People Recognize

SIMPLE EVERYDAY THINGS RESONATE

Day of Return Date	Panel				Grand Total
	201707	201708	201709	201710	
1	###	###	###		###
2	###	###	###		###
3	###	###	###		###
4	###	###	###		###
5	###	###	###		###
6	###	###	###		###
7	###	###	###		###
8	###	###	###		###
9	###	###	###		###
10	###	###	###		###
11	###	###	###		###
12	###	###	###		###
13	###	###	###		###
14	###	###	###		###
15	###	###	###		###
16	###	###	###		###
17	###	###	###		###
18	###	###	###		###
19	###	###	###		###
20	###	###	###		###
21	###	###	###		###
22	###	###	###	###	###
23	###	###	###	###	###
24	###	###	###	###	###
25	###	###	###	###	###
26	###	###	###	###	###
27	###	###	###	###	###
28	###	###	###	###	###
29		###	###	###	###
30	###	###	###	###	###
Grand Total	###	###	###	###	###



U.S. Department of Commerce
 Economics and Statistics Administration
 U.S. CENSUS BUREAU
 census.gov

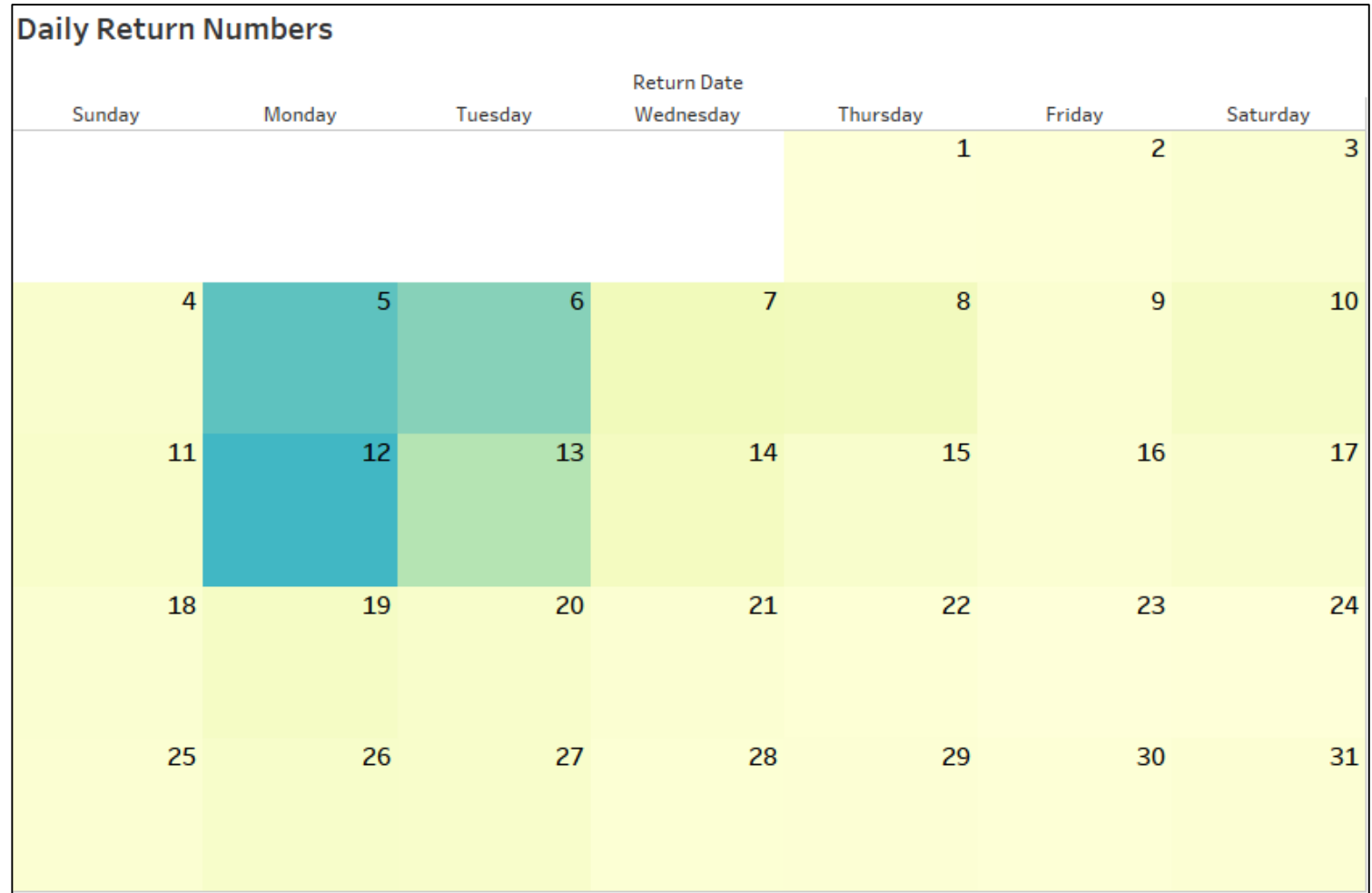
Note: This data has been fabricated for informational purposes.

Best Practices for Data Visualization

Design: Use Imagery People Recognize

SIMPLE EVERYDAY THINGS RESONATE

- Calendar heat map



Note: This data has been fabricated for informational purposes.

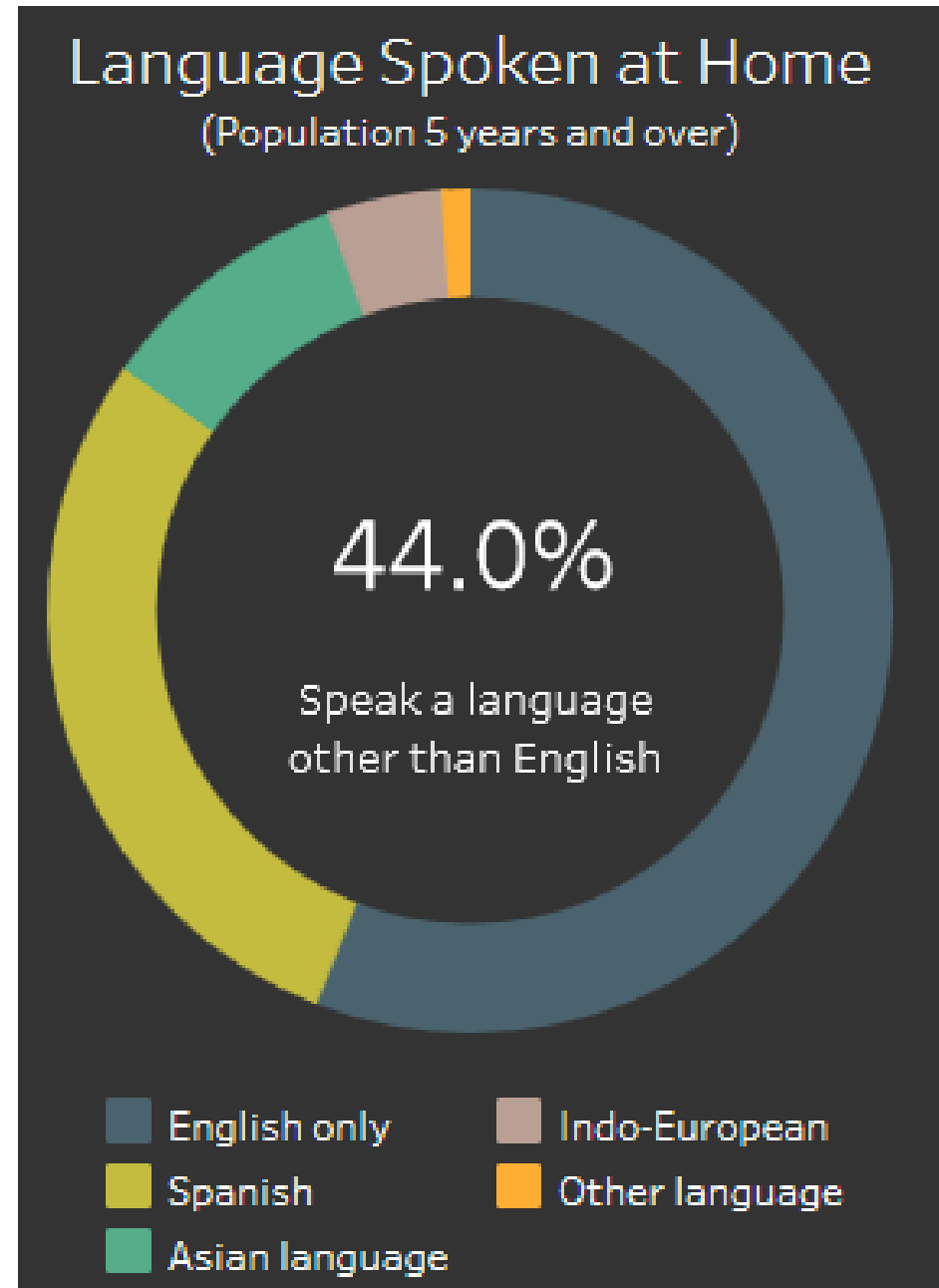
Best Practices for Data Visualization Design: Use Imagery People Recognize

SIMPLE EVERYDAY THINGS RESONATE

- Calendar heat map

LIKE IT OR NOT, PEOPLE LIKE PIE CHARTS

- Use donut chart if it helps



Best Practices for Data Visualization Design: Use Imagery People Recognize

SIMPLE EVERYDAY THINGS RESONATE

- Calendar heat map

LIKE IT OR NOT, PEOPLE LIKE PIE CHARTS

- Use donut chart if it helps

DATA WHEEL

- Physical product
- Create a digital version



U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
[census.gov](https://www.census.gov)



Best Practices for Data Visualization Design: Think About Different Formats

PAPER

- White background
- Fits on 8 ½ x 11

“We can’t overestimate the value of computers. Yes, they are great for playing games and forwarding funny emails, but real business is done on paper.”

– Michael Scott



U.S. Department of Commerce
 Economics and Statistics Administration
 U.S. CENSUS BUREAU
 census.gov

What people and households are represented in each ACS Data Collection Mode (Internet, Mail, Telephone, or Personal Interview)?

Introduction

The American Community Survey collects data in every state, county, and community in the United States. In an effort to reach everyone, the Census Bureau uses several different data collection techniques. First, response is encouraged via the internet and then mail. Then respondents were contacted by phone and finally smaller group is contacted for an in person interview. These different techniques, also referred to as response modes, have changed over the years, including the addition of the internet response mode in 2013, and the declining use of telephone interviews. This visualization allows you to explore multiple housing and population variables. You are also able to switch the year of data collection so you can see a specific year, or toggle through the years to observe changes.

Select a Category

Select a Topic

Select a Year

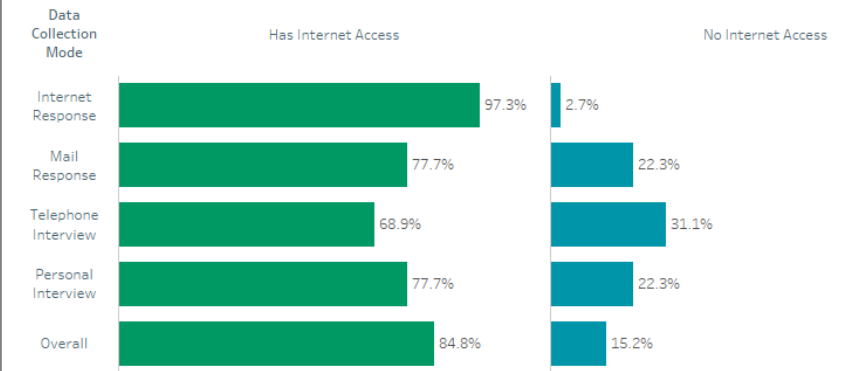
Housing Level Data

Person Level Data

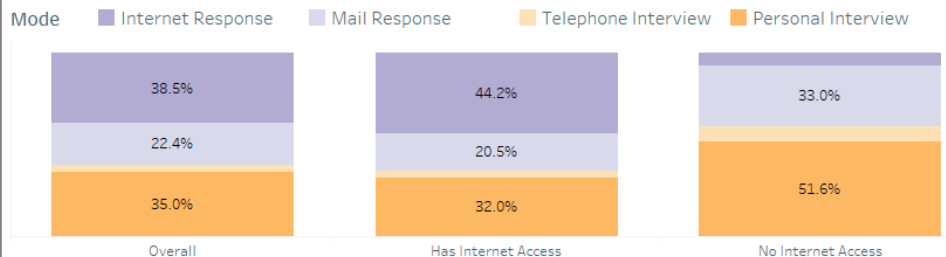
Age of Householder Building Type Household Income Household Type
 Internet Access Region Rent Tenure Urban or Rural Value Year Structure Built

2016

How Do Internet Access Traits Vary by Mode?



What Response Mode is Used for Each of the Internet Access Characteristics?



Data Notes: Estimates are based on a sample survey and are subject to sampling variability and nonsampling error. 2010 - 2016 American Community Survey 1-year estimates were used. This tool only displays estimates for households and the people within them; data from group quarters are excluded. Data may not add due to rounding. For more information about these data or estimates, go to <https://www.census.gov/acs>



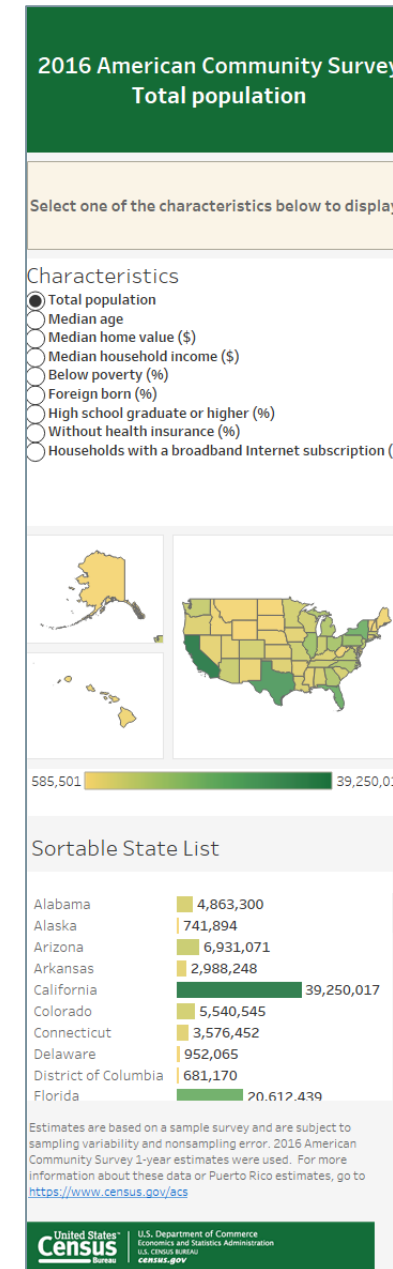
Best Practices for Data Visualization Design: Think About Different Formats

PAPER

- White background
- Fits on 8 ½ x 11

MOBILE

- Mobile ready visualizations
- Responsive website
- Provide images



Best Practices for Data Visualization Design: Think About Different Formats

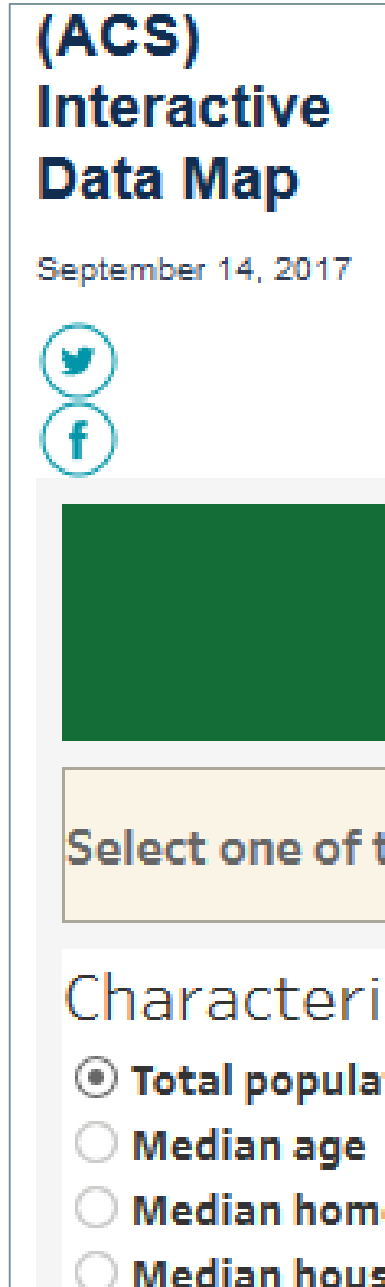
PAPER

- White background
- Fits on 8 ½ x 11

MOBILE

- Mobile ready visualizations
- Responsive website
- Provide images

DON'T IGNORE DIFFERENT FORMATS



Best Practices for Data Visualization

REVIEW

Best Practices for Data Visualization

Review: Review, Review, Review

CREATE MULTIPLE VISUALIZATIONS

LET PEOPLE TEST THE TOOLS

- Don't tell them how to use it
- Watch them use it

Table View			
Click on a characteristic to have it displayed in the map.			
Characteristic	Denver County, Colorado		
	County	State	U.S.
Total population	663,303	5,359,295	318,558,162
Average household size	2.31	2.56	2.64
Below poverty (%)	16.4	12.2	15.1
Foreign born (%)	15.9	9.8	13.2
High school graduate or higher (%)	86.4	91.0	87.0
Mean travel time to work (minutes)	25.1	24.9	26.1
Median age	34.2	36.4	37.7
Median home value (\$)	292,700	264,600	184,700
Median household income (\$)	56,258	62,520	55,322
Unemployment rate (%)	5.4	6.0	7.4
Veterans (%)	5.9	9.4	8.0

Table View			
Click on a characteristic to have it displayed in the map.			
Characteristic	Denver County, Colorado		
	County	State	U.S.
Total population	663,303	5,359,295	318,558,162
Average household size	2.31	2.56	2.64
Below poverty (%)	16.4	12.2	15.1
Foreign born (%)	15.9	9.8	13.2
High school graduate or higher (%)	86.4	91.0	87.0
Mean travel time to work (minutes)	25.1	24.9	26.1
Median age	34.2	36.4	37.7
Median home value (\$)	292,700	264,600	184,700
Median household income (\$)	56,258	62,520	55,322
Unemployment rate (%)	5.4	6.0	7.4
Veterans (%)	5.9	9.4	8.0

Best Practices for Data Visualization

Review: Review, Review, Review

CREATE MULTIPLE VISUALIZATIONS

LET PEOPLE TEST THE TOOLS

- Don't tell them how to use it
- Watch them use it

MAKE SURE YOUR DATA ARE CORRECT

2016 American Community Survey 5-Year Estimates

Table View

Click on a characteristic to have it displayed in the map.

Characteristic	Denver County, Colorado		
	County	State	U.S.
Total population	663,303	5,359,295	318,558,162
Average household size	2.31	2.56	2.64
Below poverty (%)	16.4	12.2	15.1
Foreign born (%)	15.9	9.8	13.2
High school graduate or higher (%)	86.4	91.0	87.0
Mean travel time to work (minutes)	25.1	24.9	26.1
Median age	34.2	36.4	37.7
Median home value (\$)	292,700	264,600	184,700
Median household income (\$)	56,258	62,520	55,322
Unemployment rate (%)	5.4	6.0	7.4
Veterans (%)	5.9	9.4	8.0

Below poverty (%)

Population for whom poverty status is determined

Geography Type: County State
Map View:

Legend:
■ 29.0% or higher
■ 21.0% to 28.9%
■ 16.0% to 20.9%
■ 11.0% to 15.9%
■ Less than 11.0%

[Click here for more information about poverty.](#)

Display Margins of Error: Yes No

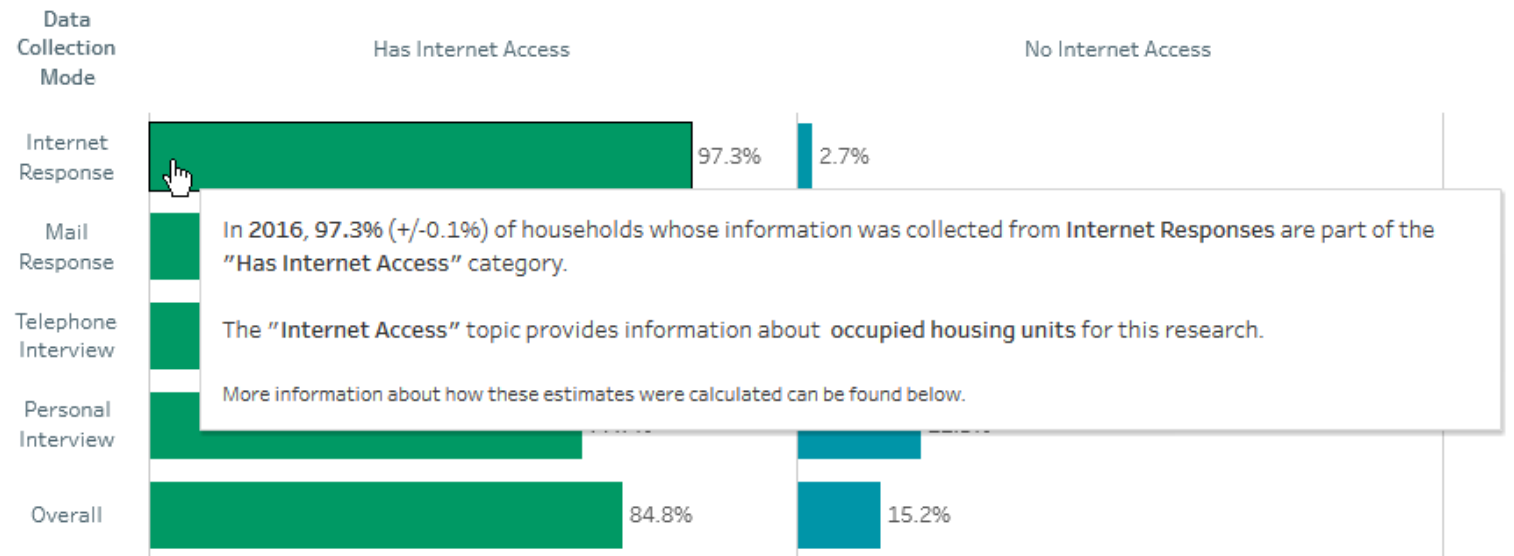
Best Practices for Data Visualization

Review: Make Sure You Told Your Data's Story

MAKE SURE PEOPLE CAN UNDERSTAND YOUR VISUALIZATION

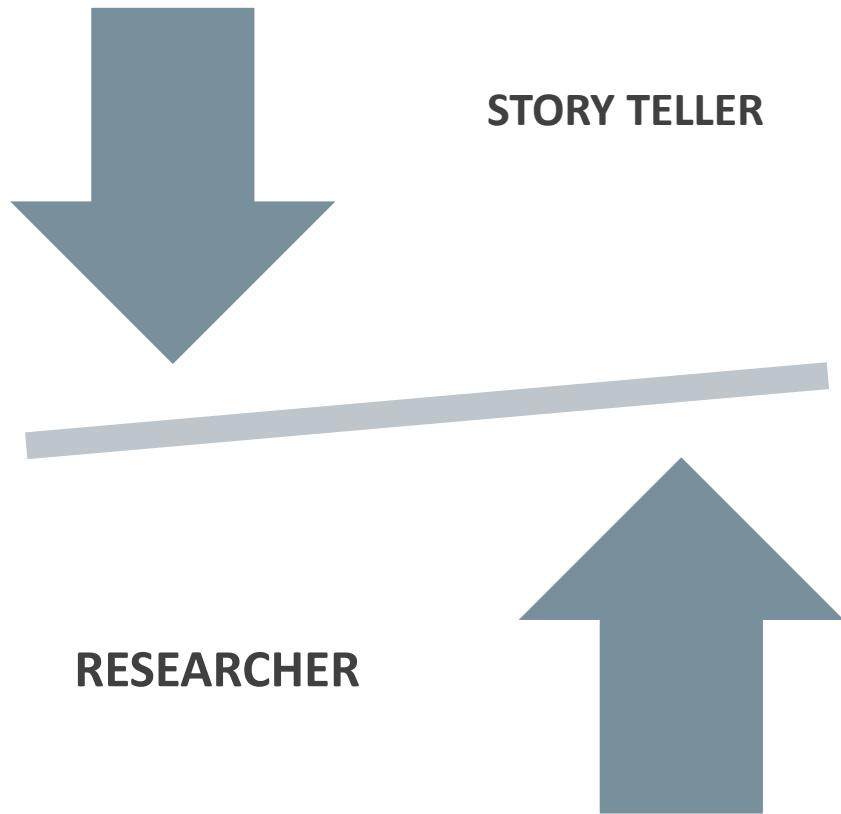
USE NARRATIVES FOR TOUGH TO UNDERSTAND VISUALIZATIONS

How Do Internet Access Traits Vary by Mode?



Best Practices for Data Visualization

Review: Make Sure You Told Your Data's Story



2016 American Community Survey 5-Year Estimates

Table View

Click on a characteristic to have it displayed in the map.

Characteristic	Denver County, Colorado		
	County	State	U.S.
Total population	663,303	5,359,295	318,558,162
Average household size	2.31	2.56	2.64
Below poverty (%)	16.4	12.2	15.1
Foreign born (%)	15.9	9.8	13.2
High school graduate or higher (%)	86.4	91.0	87.0
Mean travel time to work (minutes)	25.1	24.9	26.1
Median age	34.2	36.4	37.7
Median home value (\$)	292,700	264,600	184,700
Median household income (\$)	56,258	62,520	55,322
Unemployment rate (%)	5.4	6.0	7.4
Veterans (%)	5.9	9.4	8.0

Below poverty (%)

Population for whom poverty status is determined

Geography Type: County State
 Map View:

Legend

- 29.0% or higher
- 21.0% to 28.9%
- 16.0% to 20.9%
- 11.0% to 15.9%
- Less than 11.0%

[Click here for more information about poverty.](#)

United States
Census
Bureau

U.S. Department of Commerce
Economics and Statistics Administration
U.S. CENSUS BUREAU
[census.gov](https://www.census.gov)

Display Margins of Error
 Yes
 No

Links and Contact Information

AMERICAN COMMUNITY SURVEY

- www.census.gov/acs/

CENSUS BUREAU INFOGRAPHICS & VISUALIZATIONS

- <https://www.census.gov/library/visualizations.html>

2016 AMERICAN COMMUNITY SURVEY (ACS) INTERACTIVE DATA WHEEL

- <https://www.census.gov/library/visualizations/interactive/acs-datawheel.html>

2016 AMERICAN COMMUNITY SURVEY (ACS) INTERACTIVE DATA MAP

- <https://www.census.gov/library/visualizations/interactive/acs-datamap.html>

2016 AMERICAN COMMUNITY SURVEY (ACS) STATE AND COUNTY DASHBOARD

- <https://www.census.gov/library/visualizations/interactive/acs-5year-datamap.html>

CONTACT INFORMATION

- R. Chase Sawyer Robert.C.Sawyer@census.gov (301)763-8688