

Principles of Effective Dashboard Design

DATA 301

Announcements

5 minutes

- Milestone 4 deadline extended to Monday Nov. 21 at 6 PM (with the regular 48h grace period)
- This week: Test 3 (to be done online on PrairieLearn)
- Continue working on your projects to enhance your project, “finished product” should be ready for Milestone 5

Part 1: What **is a Dashboard?**

Total Cases

15,884

Laboratory Diagnosed: **15,745** | Epi-Linked: **139**

Currently Hospitalized

27

Total to Date: 817

Currently in Critical Care

10

Confirmed Deaths

165

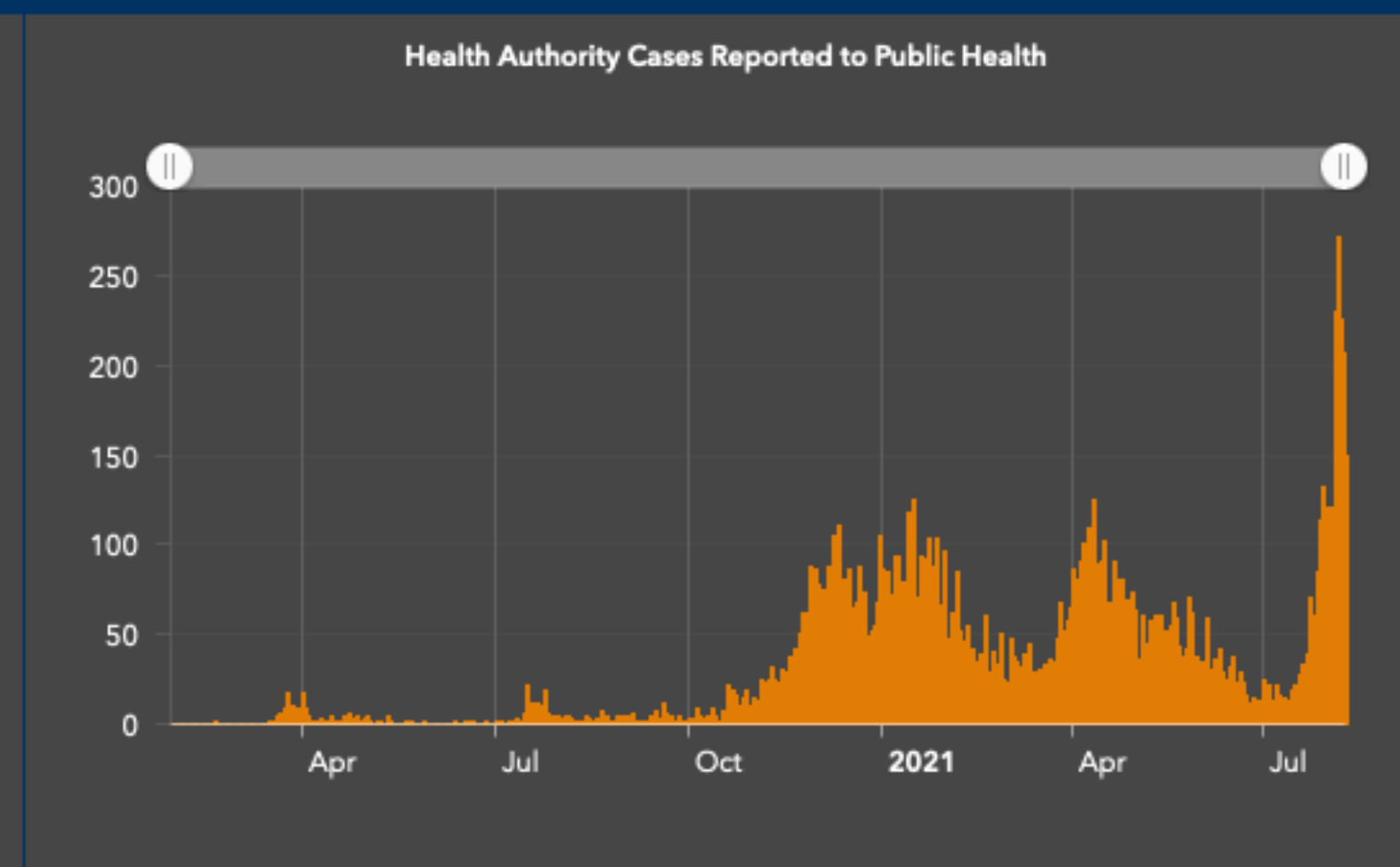
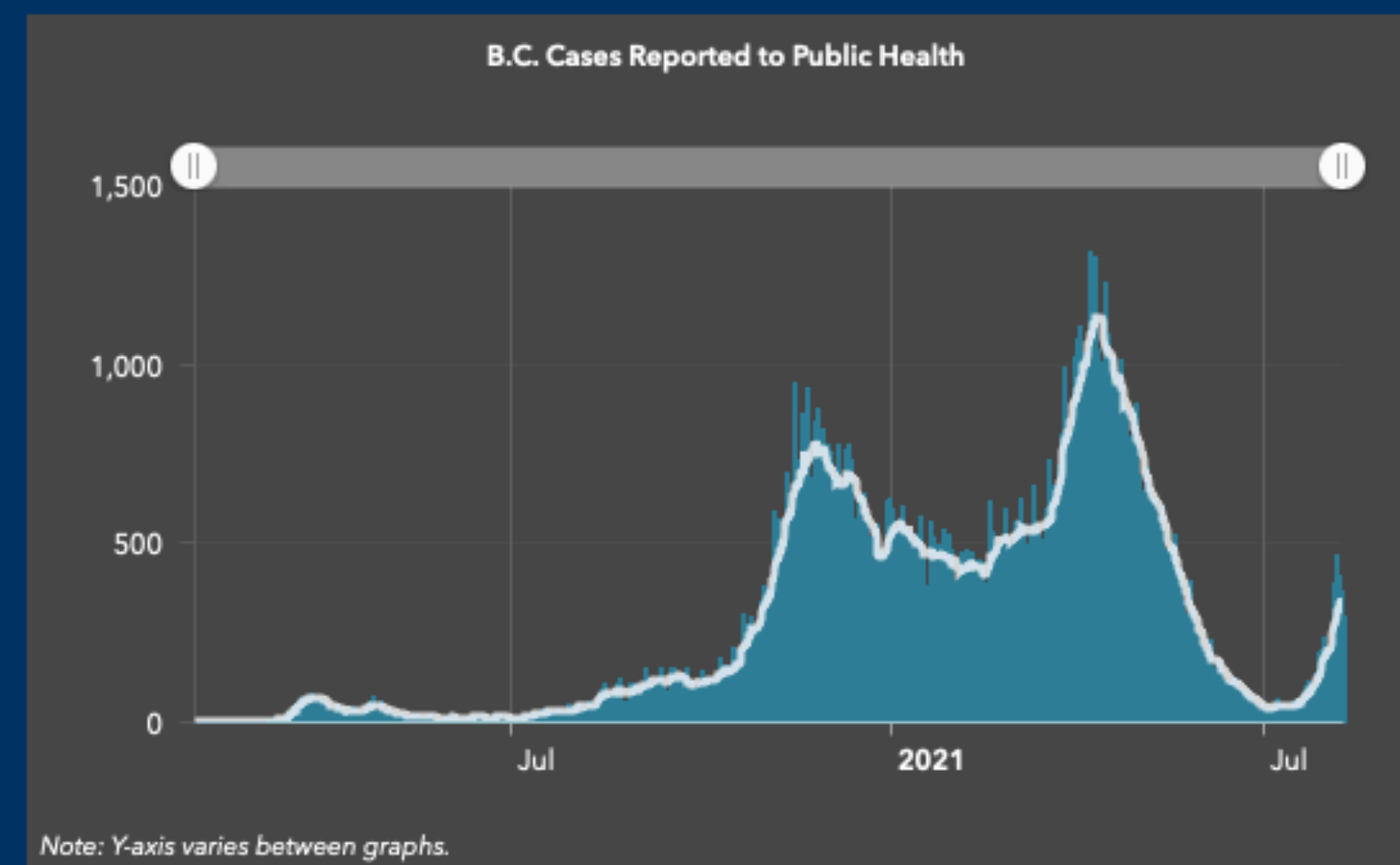
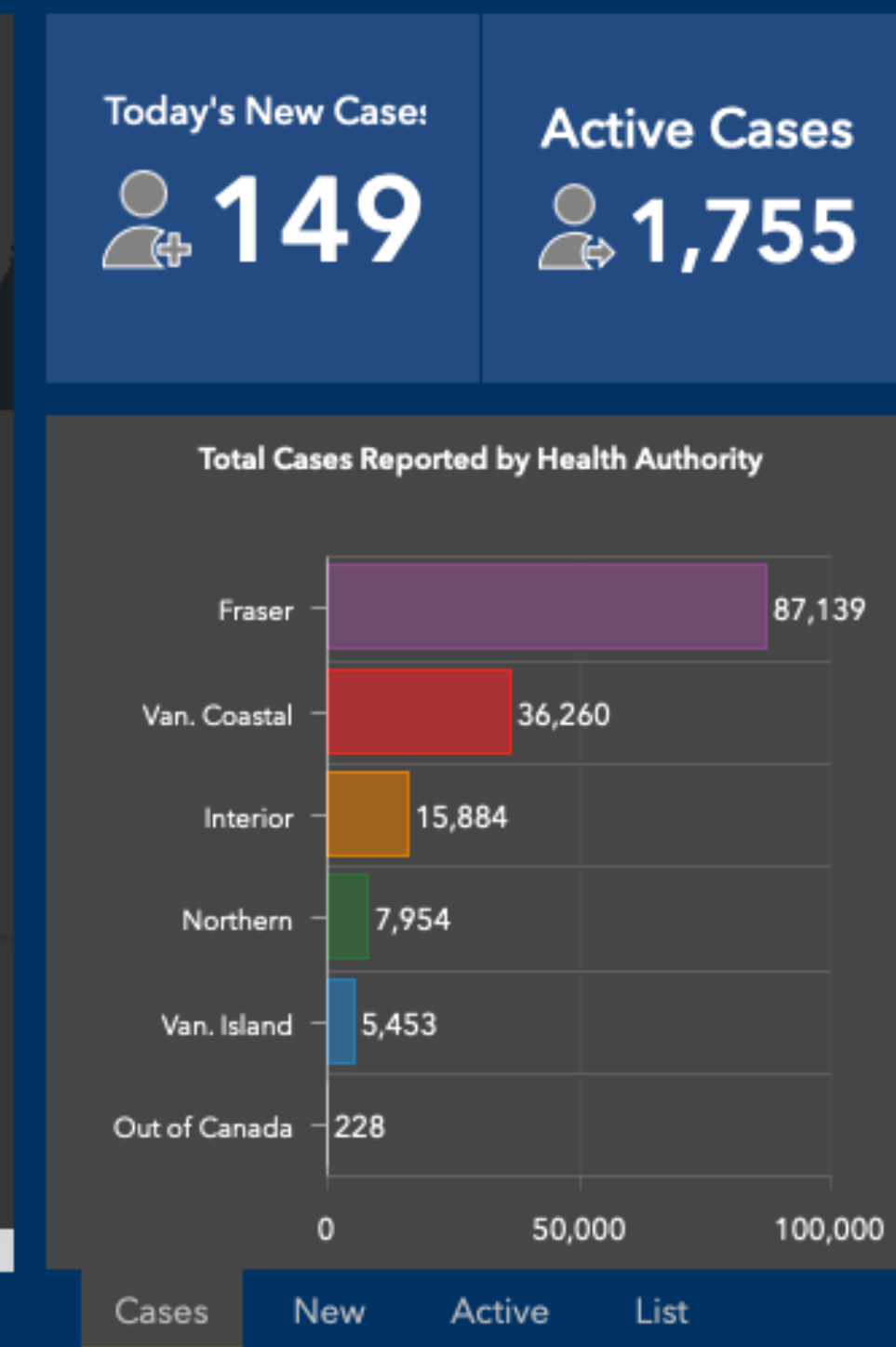
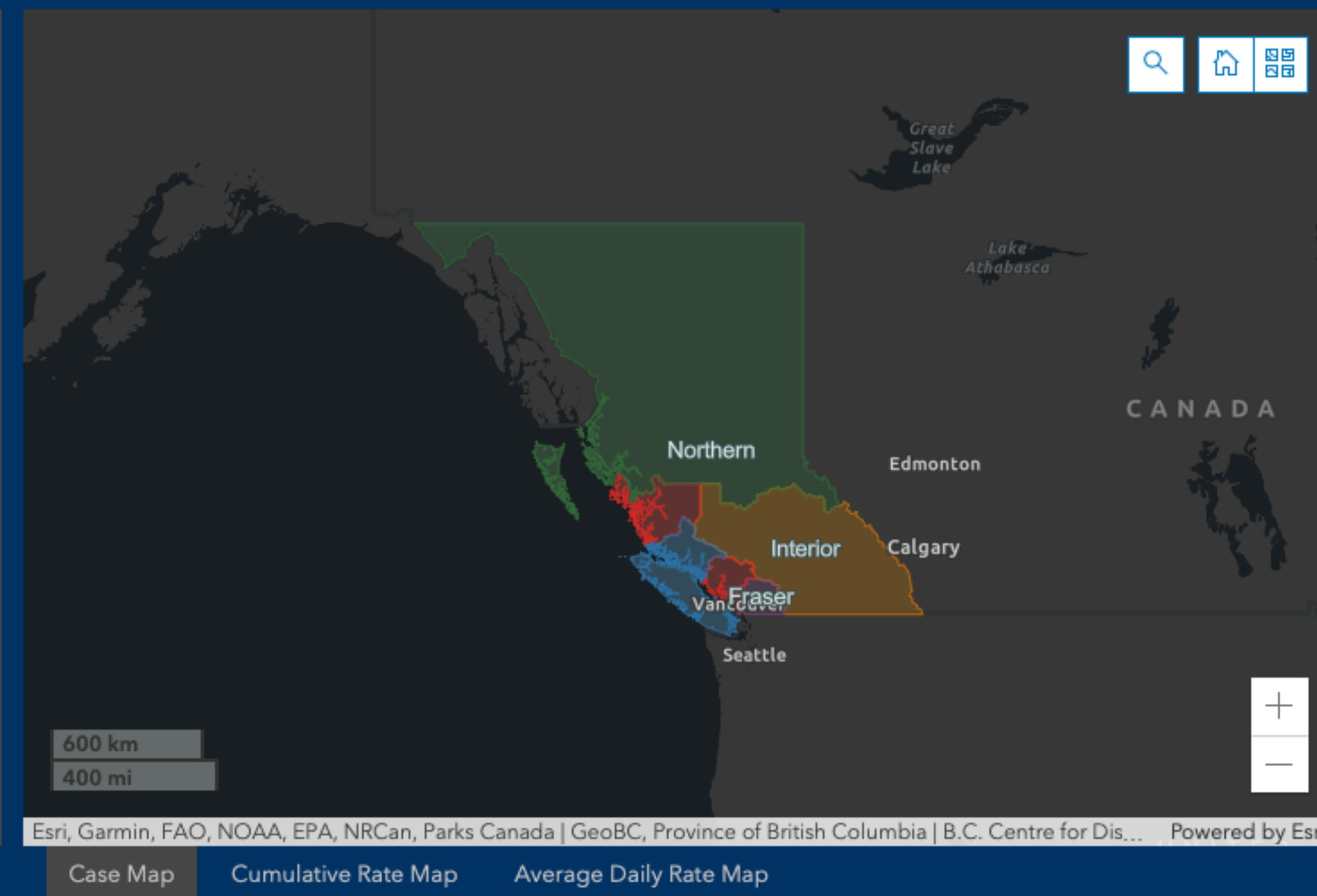
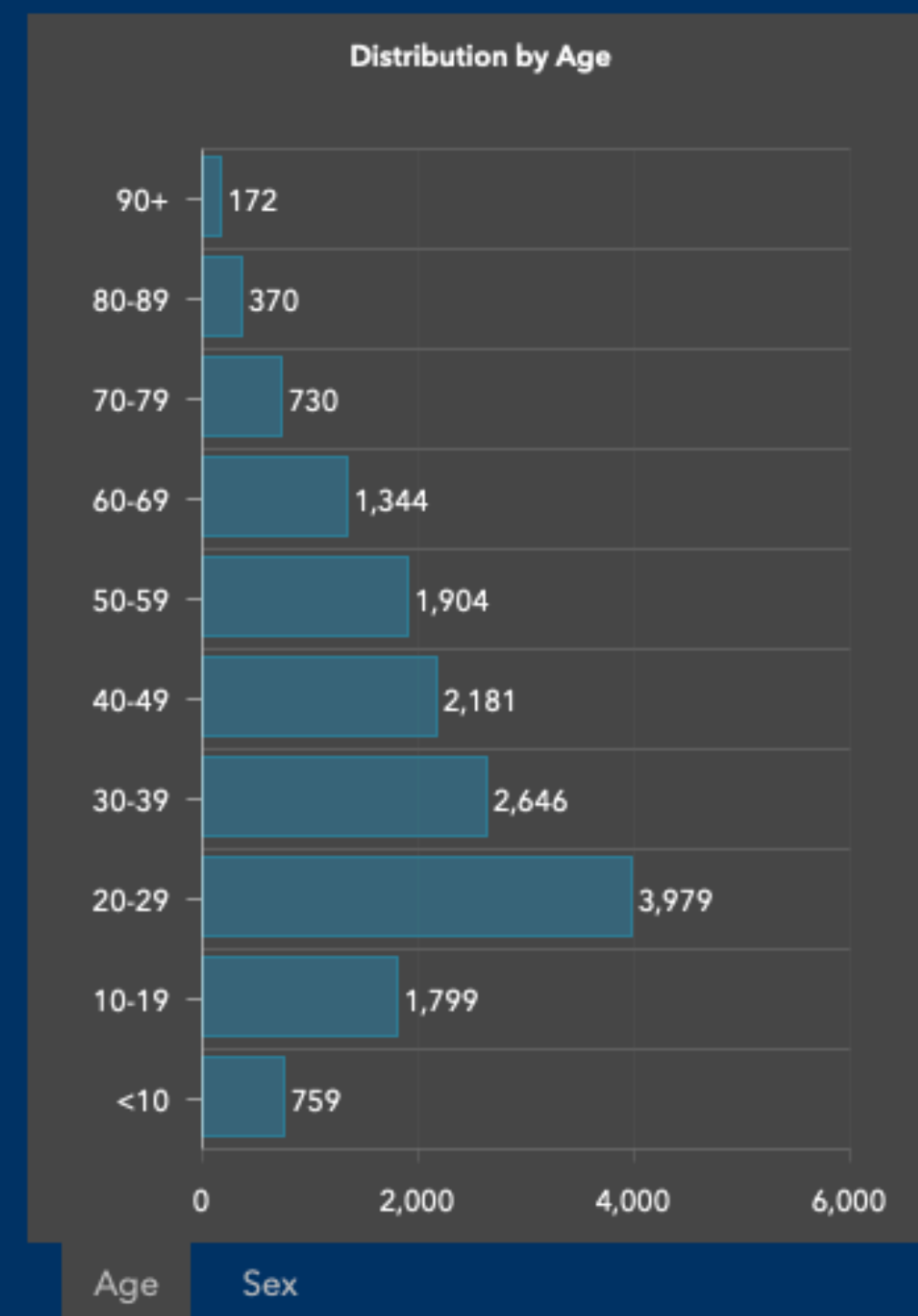
Recovered

13,961

Total Vaccine Doses Administered in B.C.

7,067,738

Total Doses Distributed: 7,666,480



Total Tests

335,857

New Tests

1,137

B.C. Testing Rate

611,423

People per 1,000,000

Canadian Testing Rate

1,023,370

People per 1,000,000

Data notes, terms of use, disclaimer and limitations of liability

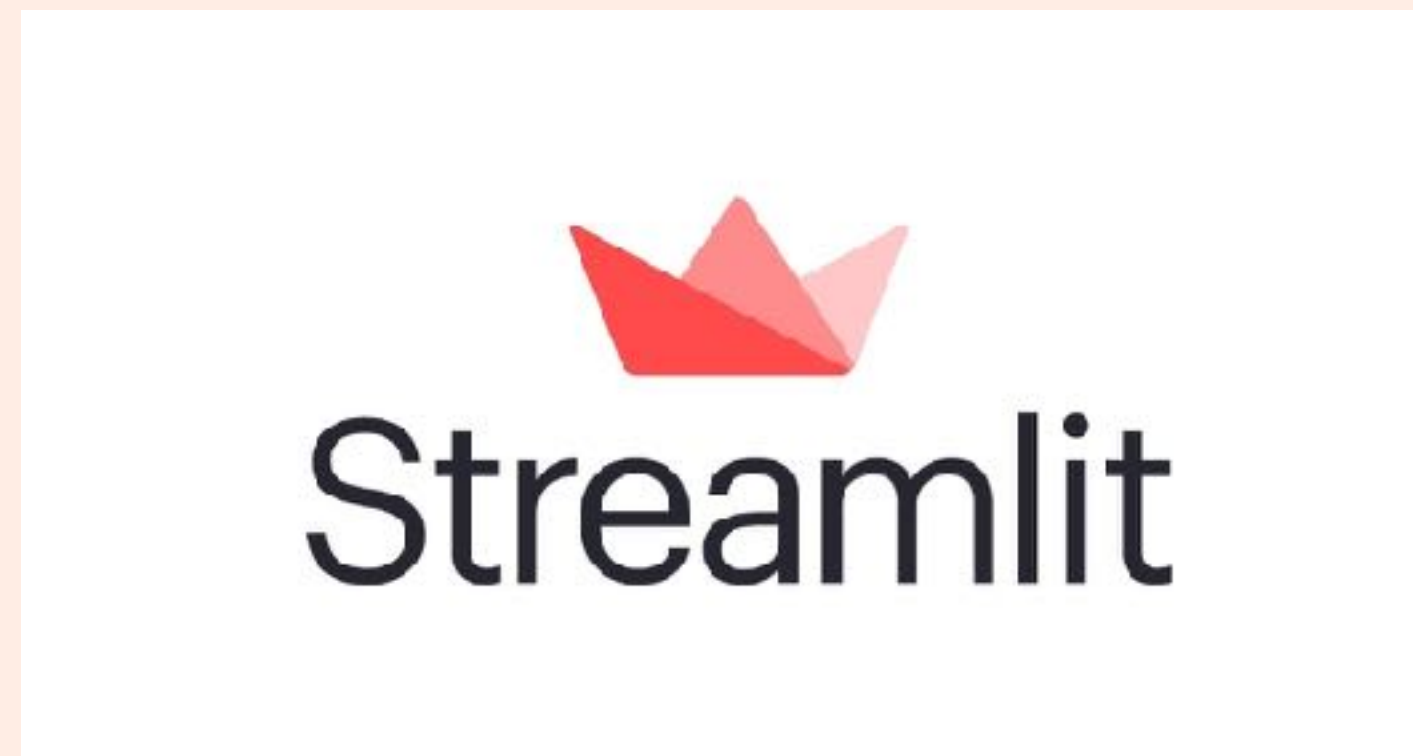
Explore the BCCDC COVID-19 Epidemiology App [here](#).

The following data notes define the indicators presented on the public dashboard and describe the data sources involved. Data changes daily as new cases are identified, characteristics of

Dashboards are everywhere!



Popular Tools for Dashboards



Panel

... many others!

Why do we need dashboards?

- Dashboards **tell stories** about analyses you've done
- Dashboards help users **see the punchline** faster, and more accurately than interpreting plots
- Dashboards help users explore their own questions from the data you've processed.



Connect

Search for Data

Tableau Server

To a File

Microsoft Excel

Text file

JSON file

PDF file

Spatial file

Statistical file

More...

To a Server

Microsoft SQL Server

MySQL

Oracle

Amazon Redshift

More...

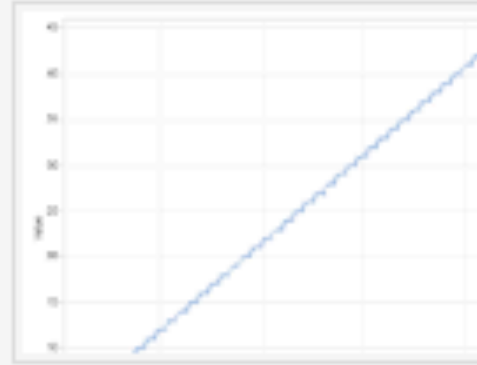


Saved Data Sources

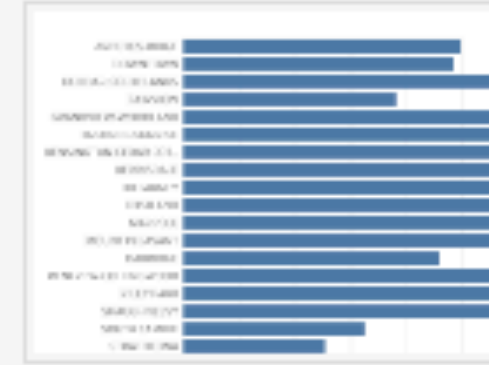
Sample - Superstore

World Indicators

Open



lab10



lab7



first_explore



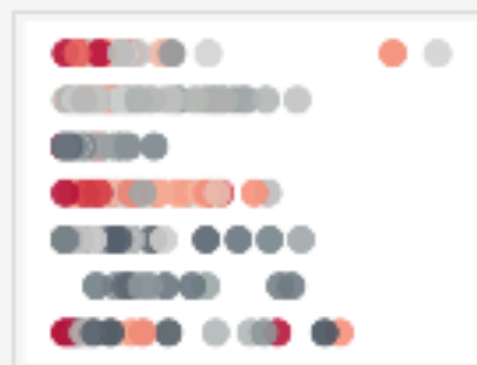
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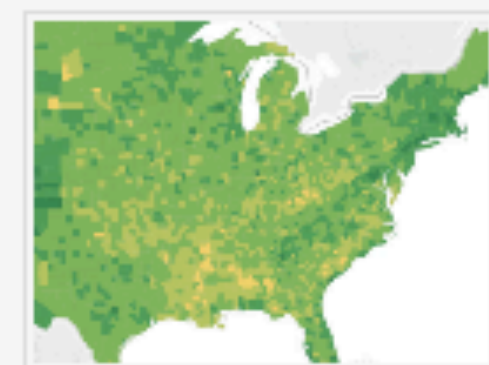
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Open a Workbook

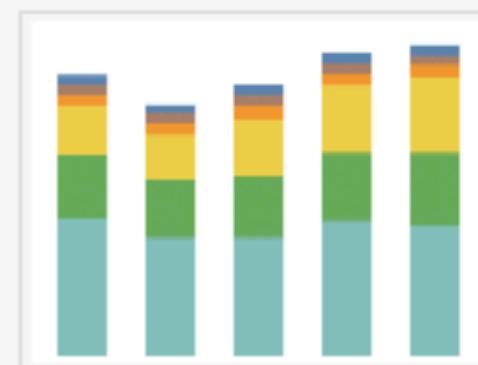
Sample Workbooks



Superstore



Regional



World Indicators

More Samples

Discover

Training

Getting Started

Connecting to Data

Visual Analytics

Understanding Tableau

More training videos...

Resources

Get Tableau Prep

Blog - Read latest post

The NEW Community Forums

Sample data for Relationships

Do No Harm Guide

Learn how to collect and present data through a more diverse, equitable, and inclusive lens. → Explore the Guide now



The Ultimate Cheat Sheet on Tableau Charts



Kate Strachnyi May 14, 2018 · 11 min read ★



Tableau Desktop is an awesome data analysis and data visualization tool. It allows you to see your data immediately (with a few drag and drops). The “Show Me” feature is extremely helpful especially for those just starting out with Tableau. Once you drag in or double click on the dimensions and measures that you want in your analysis, you can use the Show Me feature to see the available charts that you can create by simply clicking on the chart types.

One thing you’ll notice is that some charts will be highlighted and some will appear to be more faded. The highlighted charts are the ones available for your use. This is determined by the number of measures, dimensions, bins, etc. that you have placed in your view. Each chart has a minimum specified number of dimensions, measures, bins, or other items that it needs in order to build that chart. As you hover over each view type, the description at the bottom shows the minimum requirements.

Types of Charts



There are 24 available charts in Tableau’s Show Me feature.

Let’s discuss when we should be using each of these charts and what the minimum requirements are in terms of measures and dimensions — keep scrolling down :)

Reference: <https://towardsdatascience.com/the-ultimate-cheat-sheet-on-tableau-charts-642bca94dde5>

Part 2: Dashboards & Principles of Effective Dashboard Design

The “laws” of crappy dashboards

Source: <http://attackwithnumbers.com/the-laws-of-shitty-dashboard>

Law 1	Most software dashboards are crappy
Law 2	If it’s called “Dashboard”, it’s probably crappy
Law 3	If you don’t know what to take away from your dashboard, your users will definitely not
Law 4	Not talking to users will result in a crappy dashboard
Law 5	Give users full control of your dashboard, and users will fully break it
Law 6	Just because it was useful in a Powerpoint doesn’t mean it’s useful on a dashboard
Law 7	Just because it moves, does not mean it’s not crappy

Purpose-Driven Dashboards

Before you build a dashboard, make sure it has a purpose!

Do not build one just for the sake of building one and contribute more noise!

Questions to ask yourself:

- What is the research question?
- What is the business question?
- Who will use it (audience matters, a lot!)
- How long will they use it (one-time thing vs. continued use) ?
- Do you have time to build it, maintain it, and make it effective?

- Home
- Payments
- Customers
- Products
- Reports
- Apps
- Developers
- Viewing test data
- Settings

Today

Net volume Yesterday
\$456,581.14 **\$253,702.97**



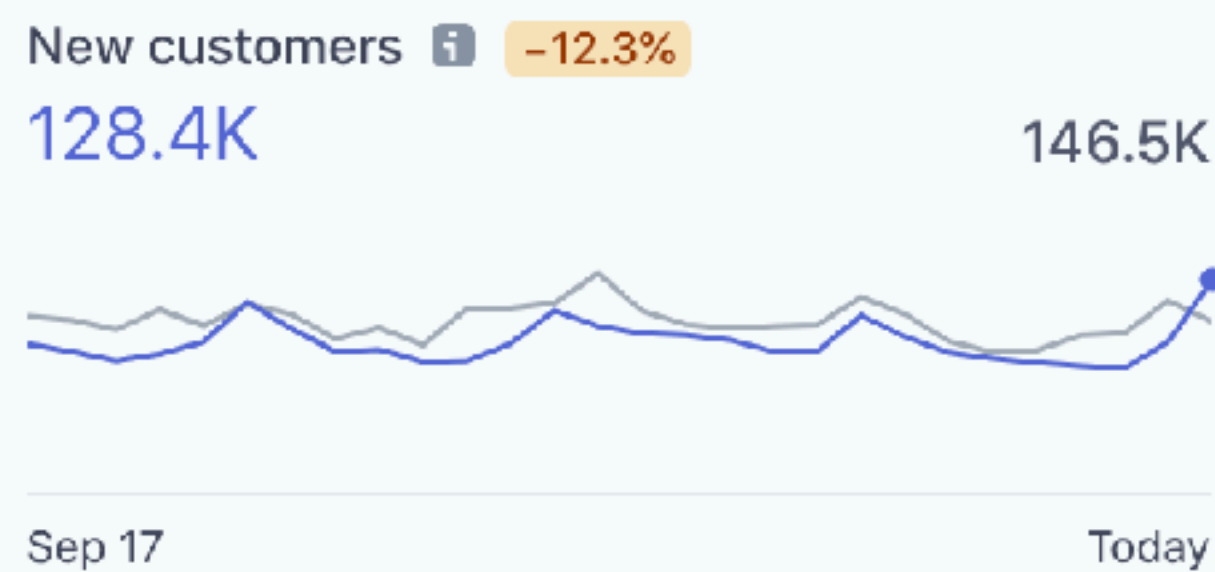
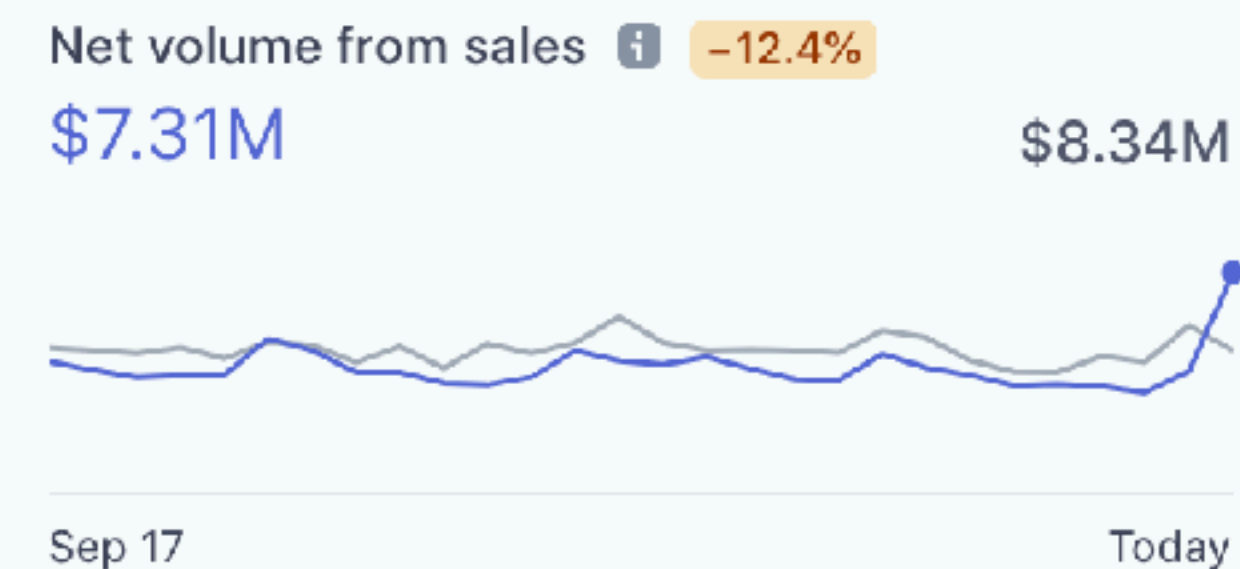
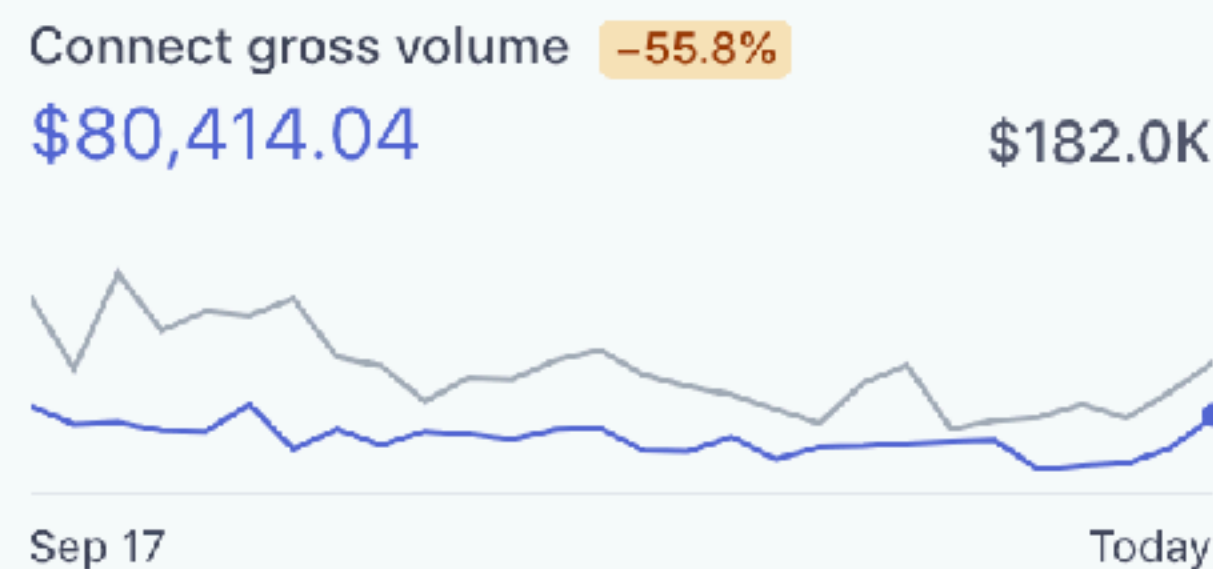
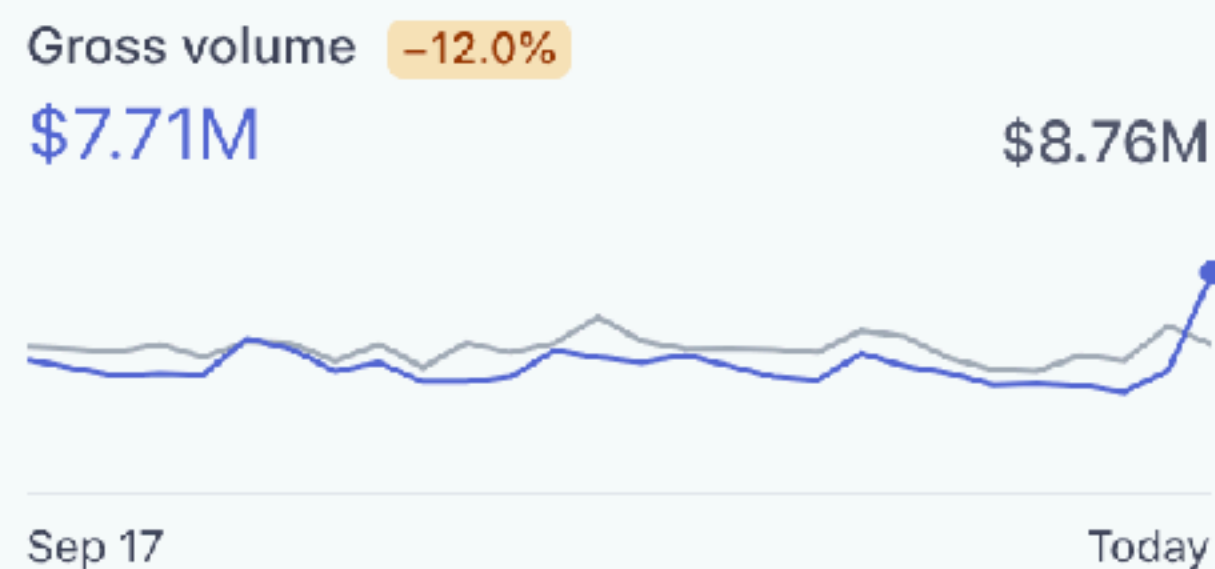
USD Balance
\$5,383.52
 Available to pay out [View detail](#)

Payouts [View detail](#)
\$229,069.82
 Expected tomorrow

Analytics

4w Sep 17, 2019 → Oct 14, 2019 vs. Aug 20, 2019 → Sep 16, 2019 Daily

Customize



- Home
- Payments
- Customers
- Products
- Reports
- Apps
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- Viewing test data
- Settings



Today

Net volume \updownarrow Yesterday \updownarrow
\$456,581.14 \$253,702.97

USD Balance \updownarrow View detail
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! y-axis ticks



Analytics

4w \updownarrow Sep 17, 2019 \rightarrow Oct 14, 2019 vs. Aug 20, 2019 \rightarrow Sep 16, 2019 Daily \updownarrow



Customize

Gross volume -12.0%
\$7.71M \$8.76M



Connect gross volume -55.8%
\$80,414.04 \$182.0K



Net volume from sales -12.4%
\$7.31M \$8.34M



New customers -12.3%
128.4K 146.5K



New connected accounts -93.3%
1 15



Successful payments -10.4%
154.5K 172.6K



Purpose-Driven Dashboards

FiveThirtyEight



Politics

Sports

Science & Health

Economics

Culture

Should Prison Sentences Be Based On Crimes That Haven't Been Committed Yet?

By Anna Maria Barry-Jester, Ben Casselman and Dana Goldstein
Graphics by Matthew Conlen, Reuben Fischer-Baum and Andy Rossback

Filed under Criminal Justice

Published Aug. 4, 2015



Principles of Effective Visualizations

Principle	Definition	Examples
• Proportional Ink	The amount of ink used to indicate a value should be proportional to the value itself.	Truncating the y-axis on a bar chart to exaggerate the difference between bars violates the principle of proportional ink.
• Data:ink ratio	Remove distracting visual elements to focus attention on the data	Lighten line weights, remove backgrounds, never use 3D or special effects, remove avoid unnecessary/redundant labels.
• Labels & legends	Use axes labels and titles to highlight/communicate data	Never leave your data column names as axes labels! Generally good to add a title.
• Overplotting	With large datasets, points overlap, resulting in large clouds of data	To fix overplotting, could plot just a sample subset of the data, use alpha, and use smaller points. Or, jitter - but check if appropriate!
• Visualization choice	Must be informed by the data you have, the research question being asked and the audience that cares.	Pick the simplest plot that best shows most/all of the data needed to answer the research question. If you only have summary statistics, cannot show distributions. Tailor the visualization to your audience (within reason) but don't dumb it down.
• Colour & Accessibility	Colour can be used to encode information or for aesthetics/style/design. However, colour can also be distracting if used inappropriately or poorly.	Choose a perceptually uniform colour palette; can be sequential or diverging for quantitative data. Opt for colour-blind friendly palettes. Categorical data can use qualitative colour schemes.

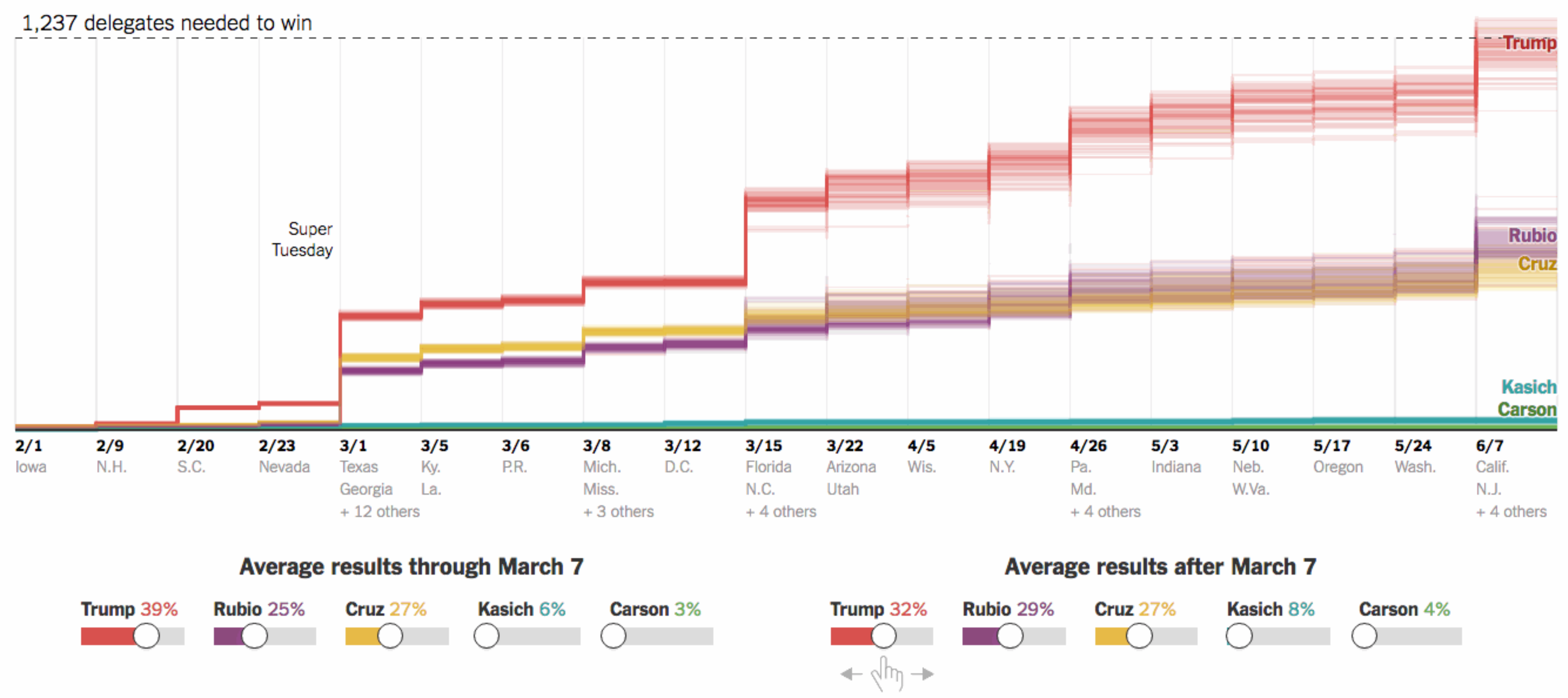
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• Data:ink ratio	Remove distracting visual elements to focus attention on the data	Lighten line weights, remove backgrounds, never use 3D or special effects, remove avoid unnecessary/redundant labels.
• Labels & legends	Follow these principles and you will be 80% there to making an effective dashboard !!	Use your data column names as axes labels. It is generally good to add a title.
• Overplotting		When overplotting, could plot just a sample of the data, use alpha, and use smaller markers - but check if appropriate!
• Visualization choice		Choose the simplest plot that best shows most/all of the data needed to answer the research question. If you only have summary statistics, cannot show distributions. Tailor the visualization to your audience (within reason) but don't dumb it down.
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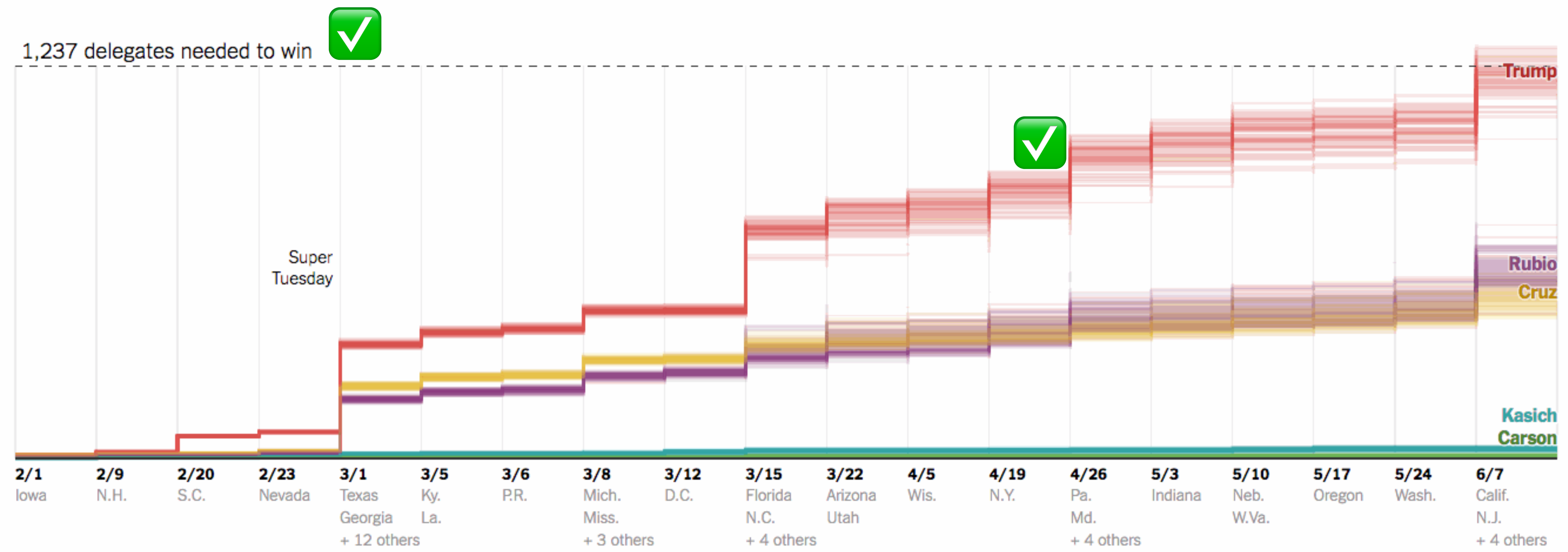
Principles of Effective Dashboards

Principle	Explanation
Audience Matters (a lot!)	You may need to build dashboards with different views: <ul style="list-style-type: none">- one for a manager/executive- one for yourself to explore and understand the data- one for the public
Purpose-driven Dashboards	Every dashboard should have a purpose! Resist the idea to bake in the “purpose” as a dropdown or menu option. What are the usage scenarios? List your intent/purpose in your dashboard!
Choose defaults wisely	Interactivity with your dashboard should NOT be mandatory! When your audience first arrive at your app, self-sufficient.
Less is more	Resist the urge to “plot everything in every way for every category/option/filter. Go back to the “purpose” of the dashboard, make sure you stay true to that. Put cool charts you want people to look at in an appendix, or build a second app.
Add a narrative and signposts	Have a conversation with your reader, add sign-posts, consider adding a “reset/home/defaults” button so they can always get back to the main point if they mess around too much.
Aesthetics matter!	Styling, branding, colour schemes (including colour-blind friendly), typography, layout, user interface (UI) and experience (UX) matter! Think hard about them and make good choices. Find the right balance between aesthetics and functionality.

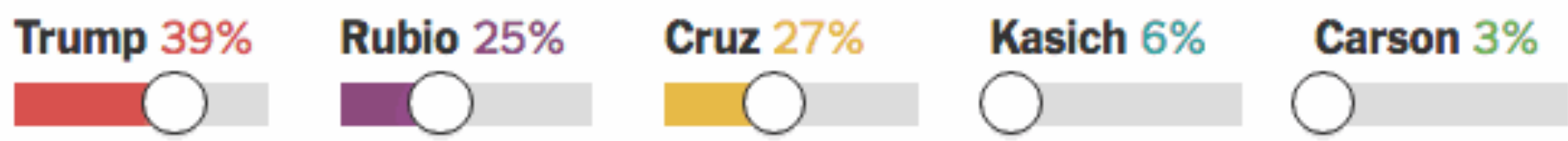
Purpose of Interactivity & Dashboards



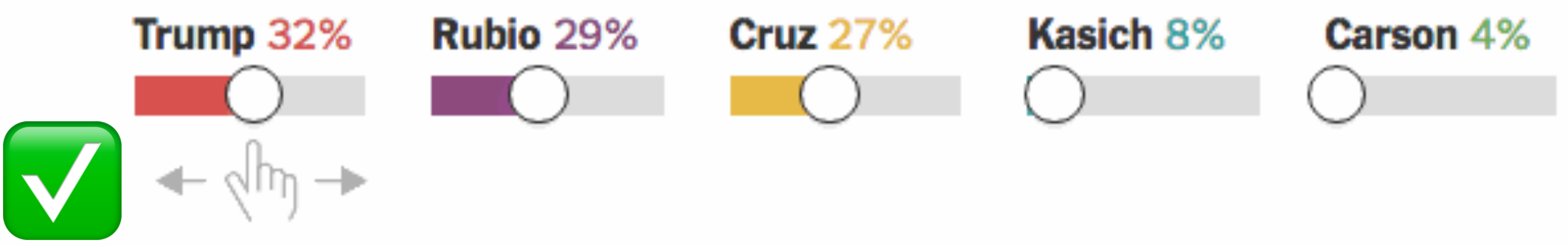
Purpose of Interactivity & Dashboards



Average results through March 7



Average results after March 7



Republican nomination. Here are some presets to get you started:

Rubio with small margins

Rubio and Trump head-to-head

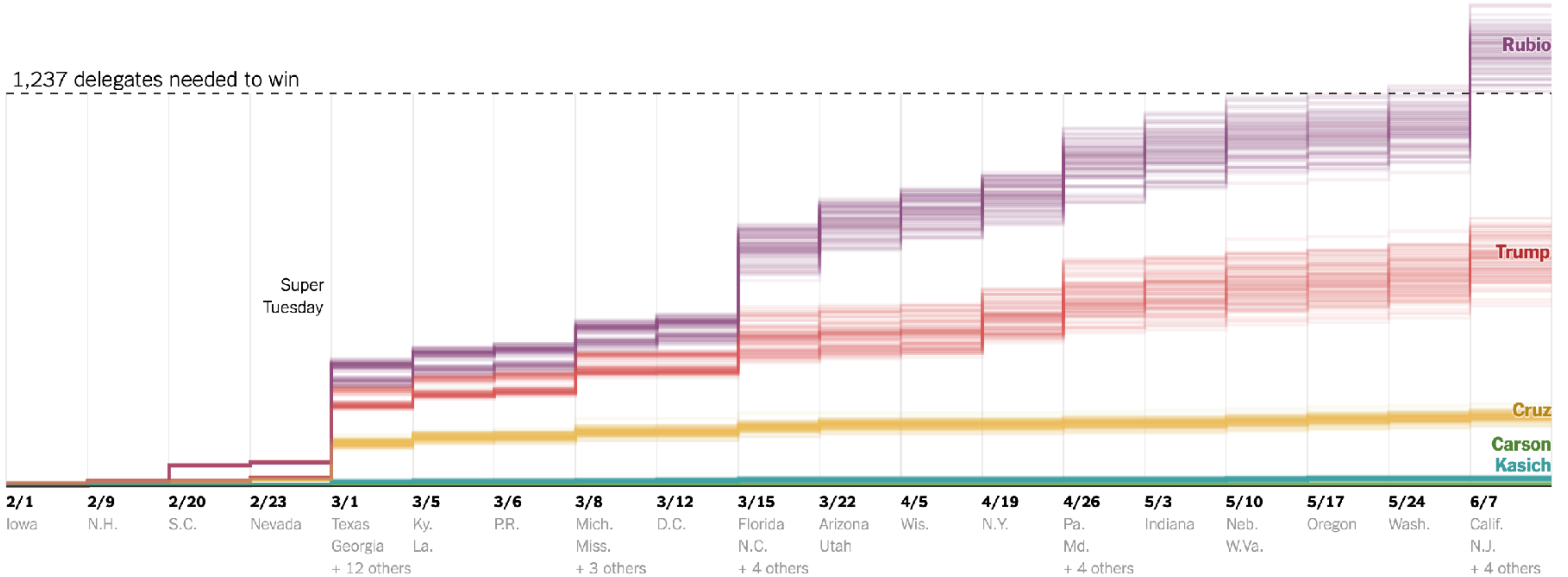
Trump wins with huge margins

Cruz makes a comeback

Three-way tie

Trump hits a ceiling

1,237 delegates needed to win



Average results through February 28

Trump 31% Rubio 34% Cruz 26% Kasich 6% Carson 3%

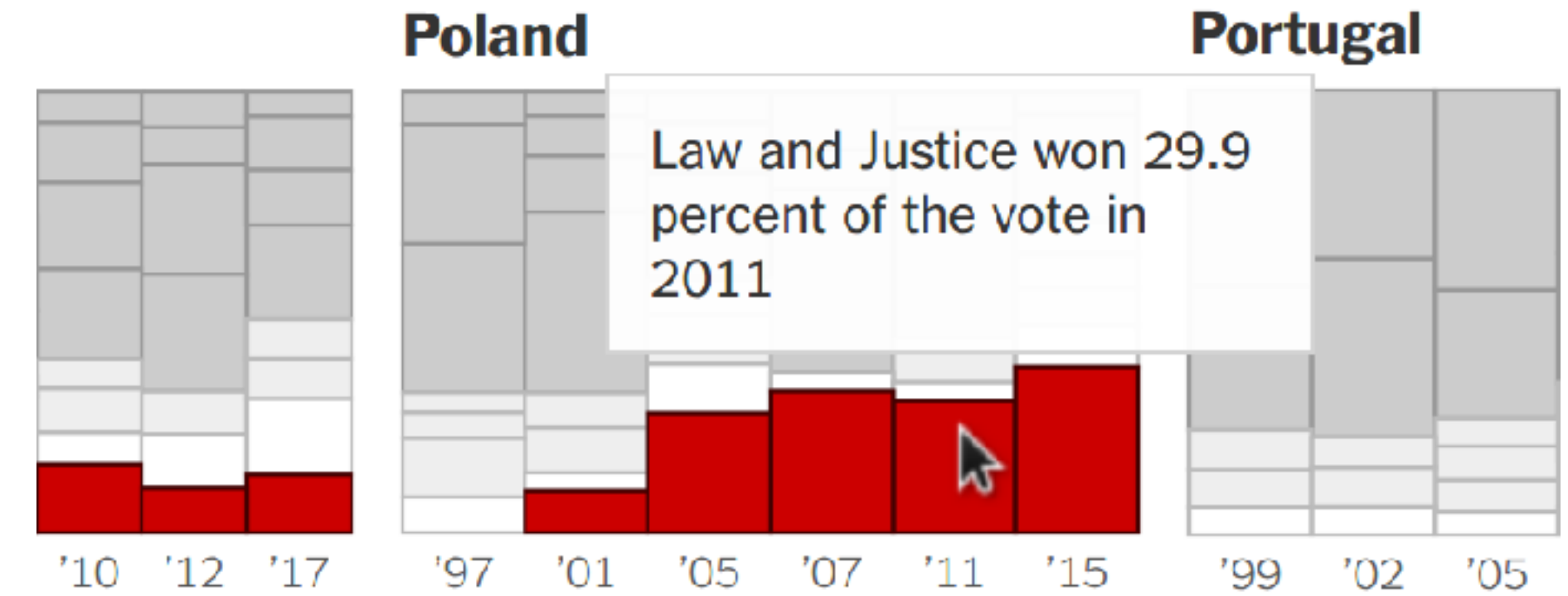
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Purpose of Interactivity & Dashboards

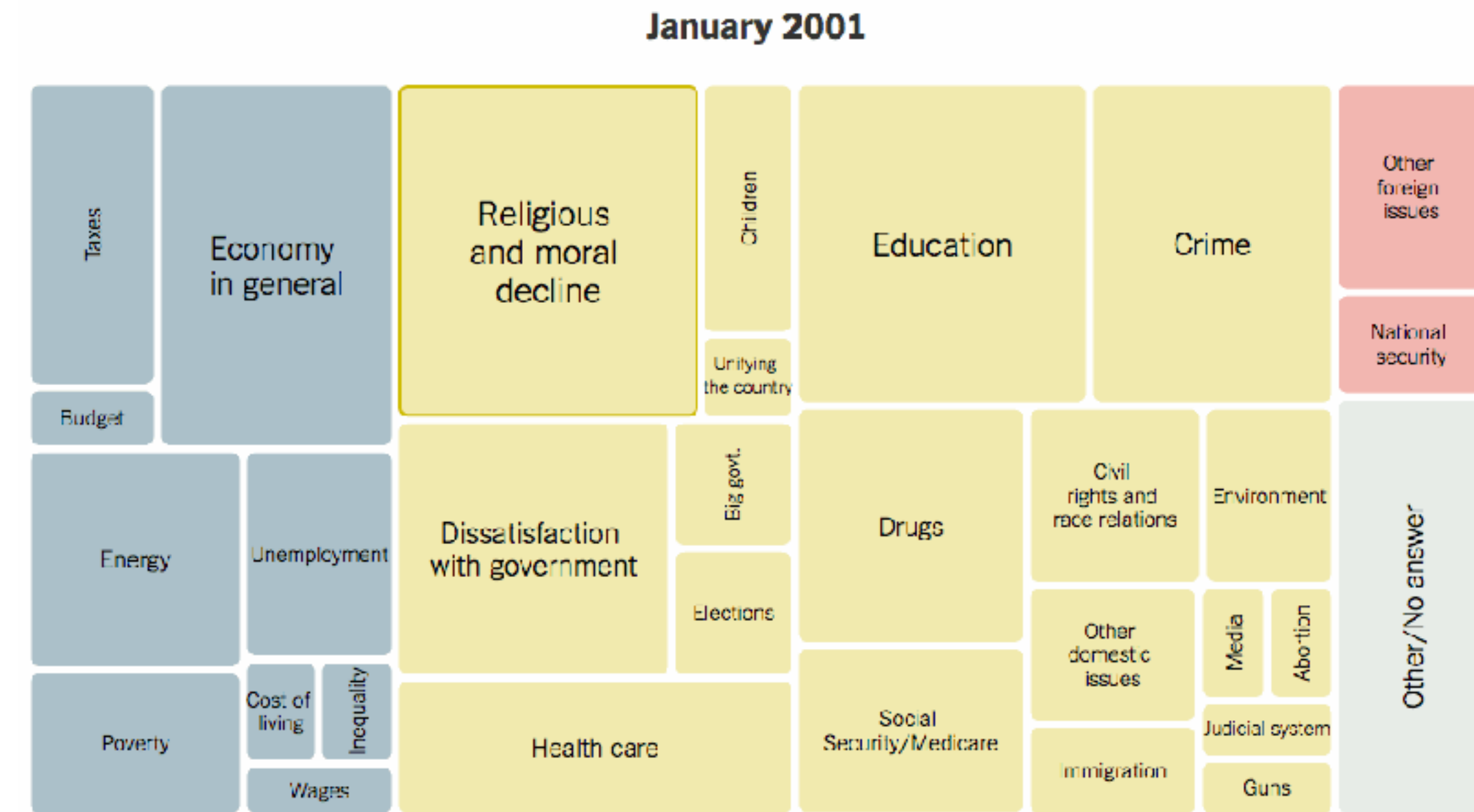
1. Tooltips allow your most interested users to dig deep

Take a look at the following graphic which summarized election results across 20 European countries. Everything you need to see is shown right away. You see the country names, the years and the red bars representing results of right-wing and far-right parties.



2. Interaction allow readers to discover the full dataset

There are cases when you have far more data than fit on a page, which means you have to select which charts to show and which to hide. To avoid cherry-picking we usually try to come up with a selection rule that we apply consistently throughout the piece. For instance, in a recent graphic we decided to show the first poll after the start of the term for each president. Deciding on such a rule is definitely better than just picking charts, but it can still feel arbitrary sometimes. Fortunately we had already set up the graphic in a way that the charts are rendered dynamically. So it didn't cost us much to add in a little bonus feature that allows browsing through the entire dataset.



Principles of Effective Dashboards

Principle

Explanation

Build trust in your analysis

Think about ways you can increase transparency of your data sources and analysis methods. Be upfront about missing data and accuracy of your data. Add tooltips so users can check data.

Think about the “onboarding” experience

What happens when users first visit your site? Related to “set good defaults” but more than that: how do they use it?
Where are the controls? What do they do?

Use a consistent layout

Do not burden your users by making them think about the layout of your app and how it’s structured ; should be natural!

Use animations sparingly

Animations can be distracting, use them if you think it will help drive your point home (e.g., prison parole example)

**Allow users to filter data
(if applicable)**

If you start with a giant dataset - say, the gapminder dataset - allow users the ability to filter the data and show data for the country they are interested in; have a good default comp

User testing is critical!

Get someone to look at your dashboard during development. Ideally someone who will be using it

Q&A