

Introduction to Dashboards & Dash

February 22, 2021

DSCI 551 - Lecture 1

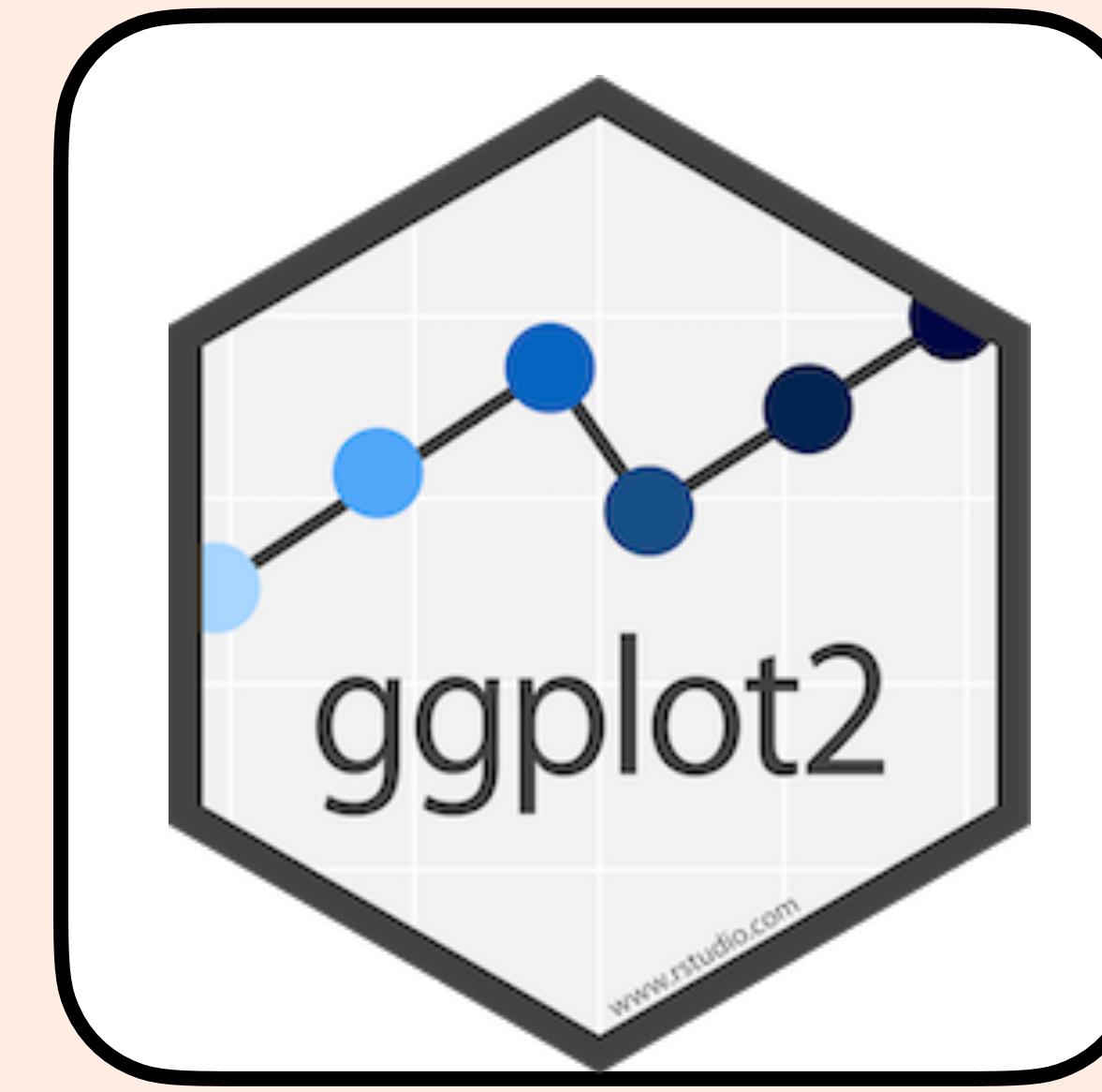
10 minutes

Part 1:

Vision for Visualization II



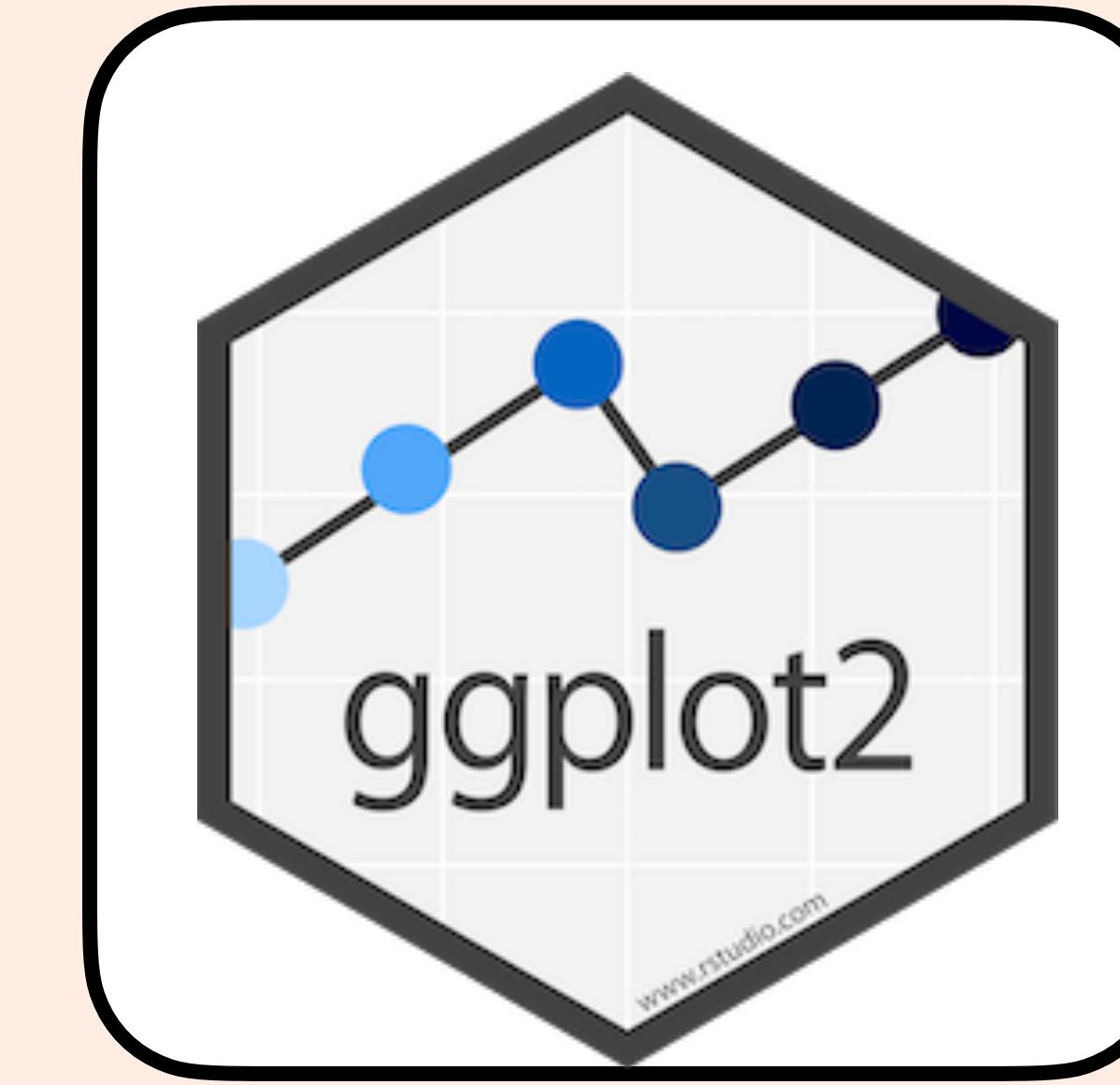
Effective Visualizations



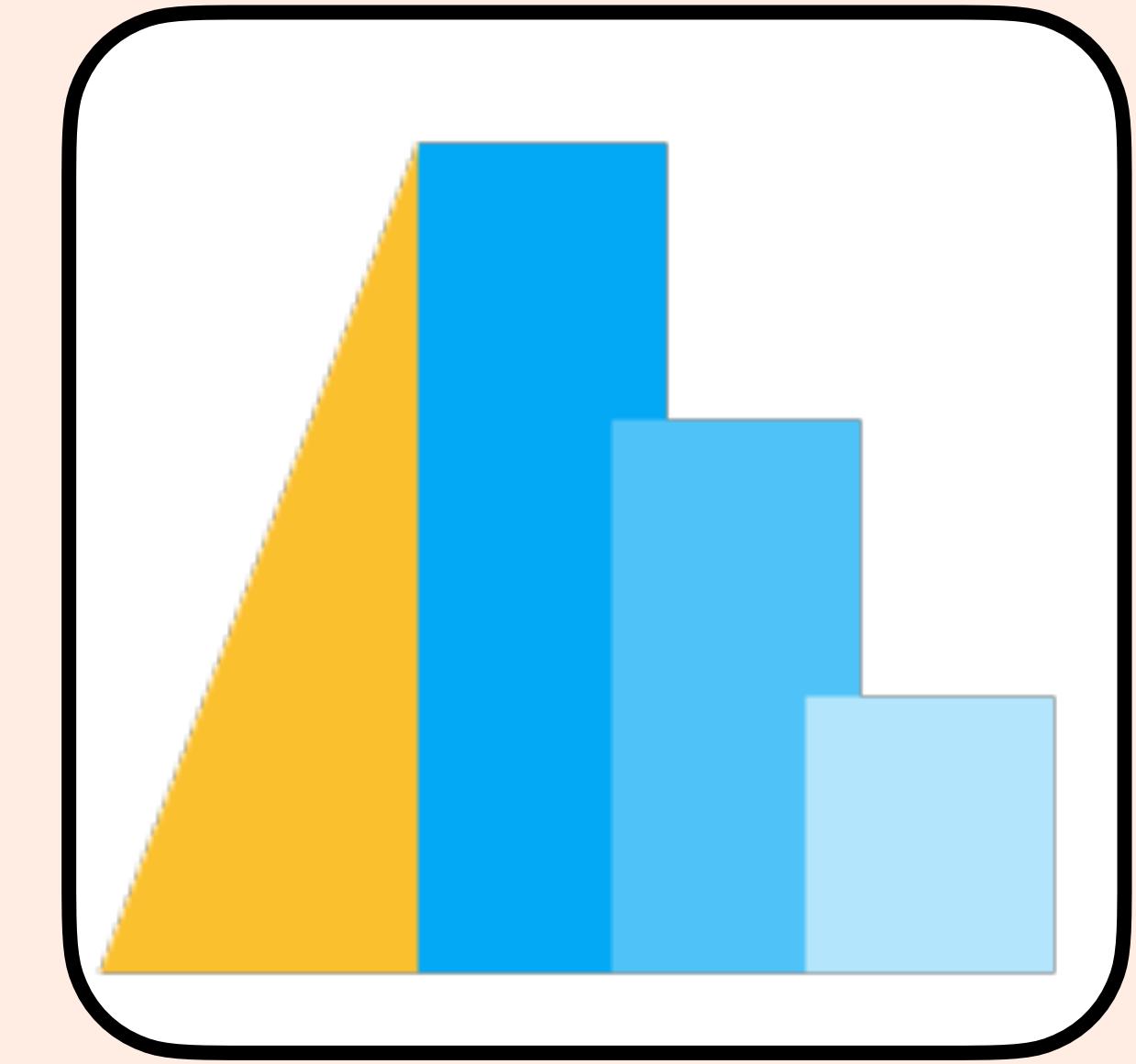
Effective Visualizations

ggplot2

Effective Visualizations



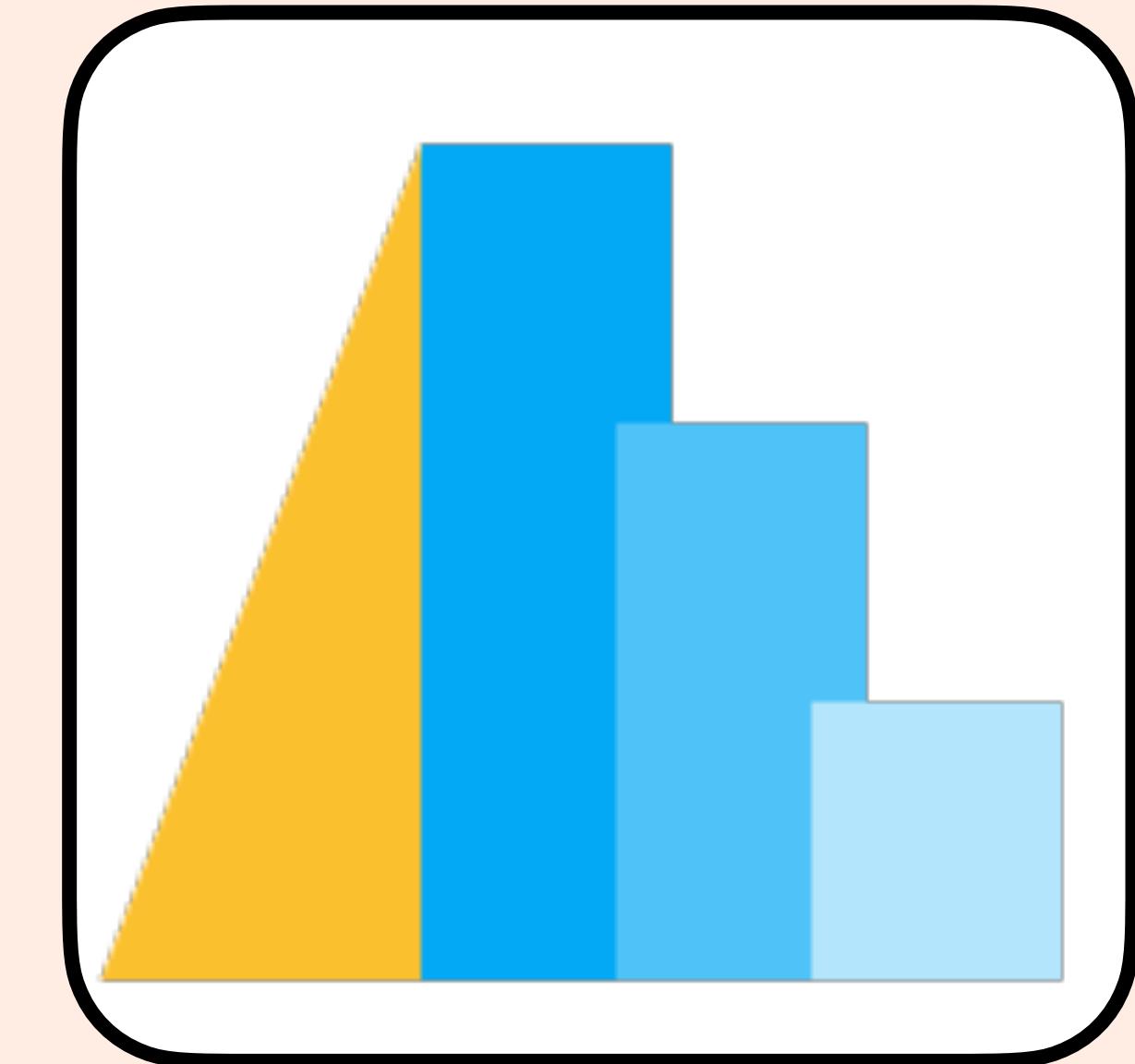
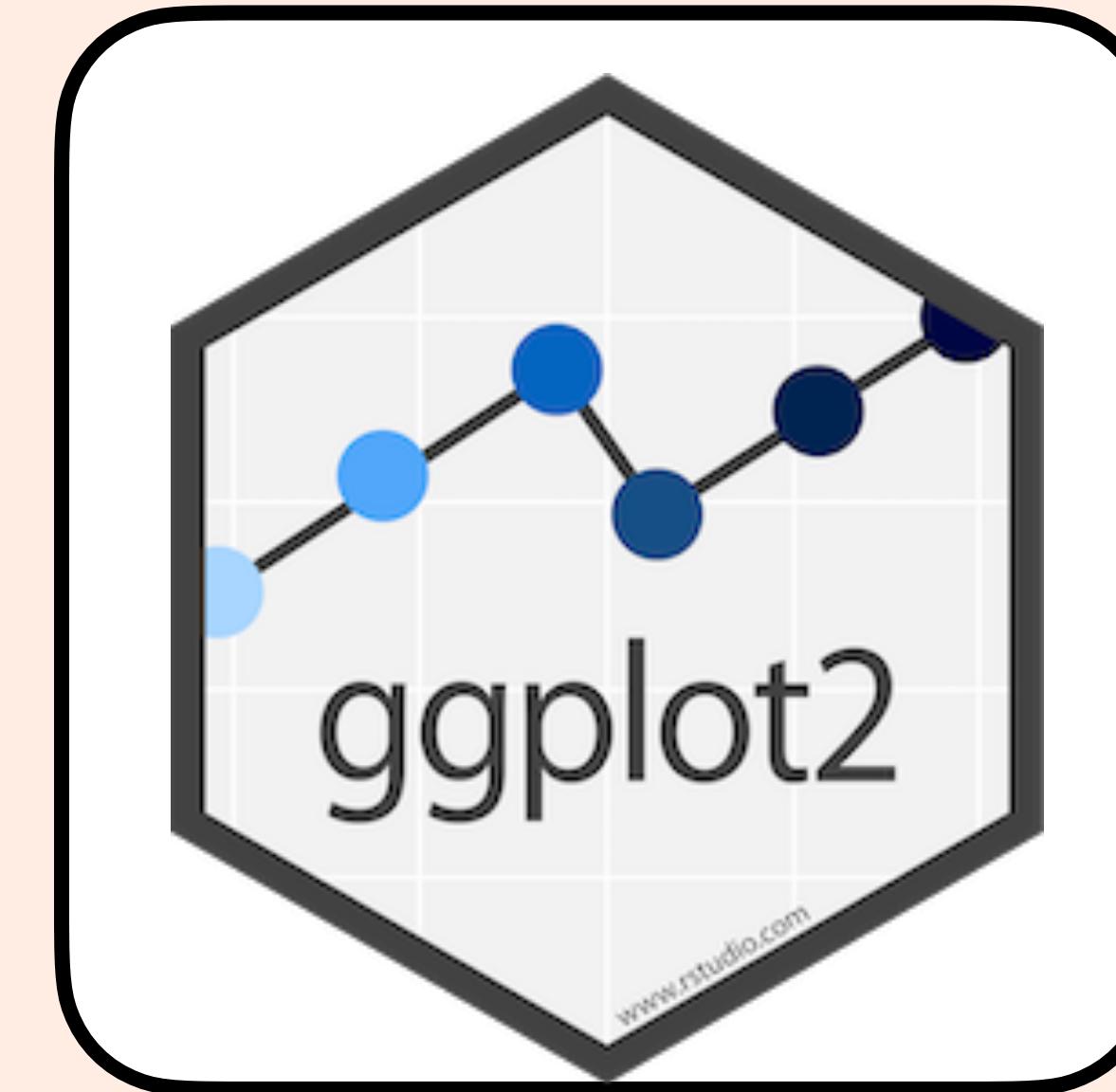
ggplot2



Altair

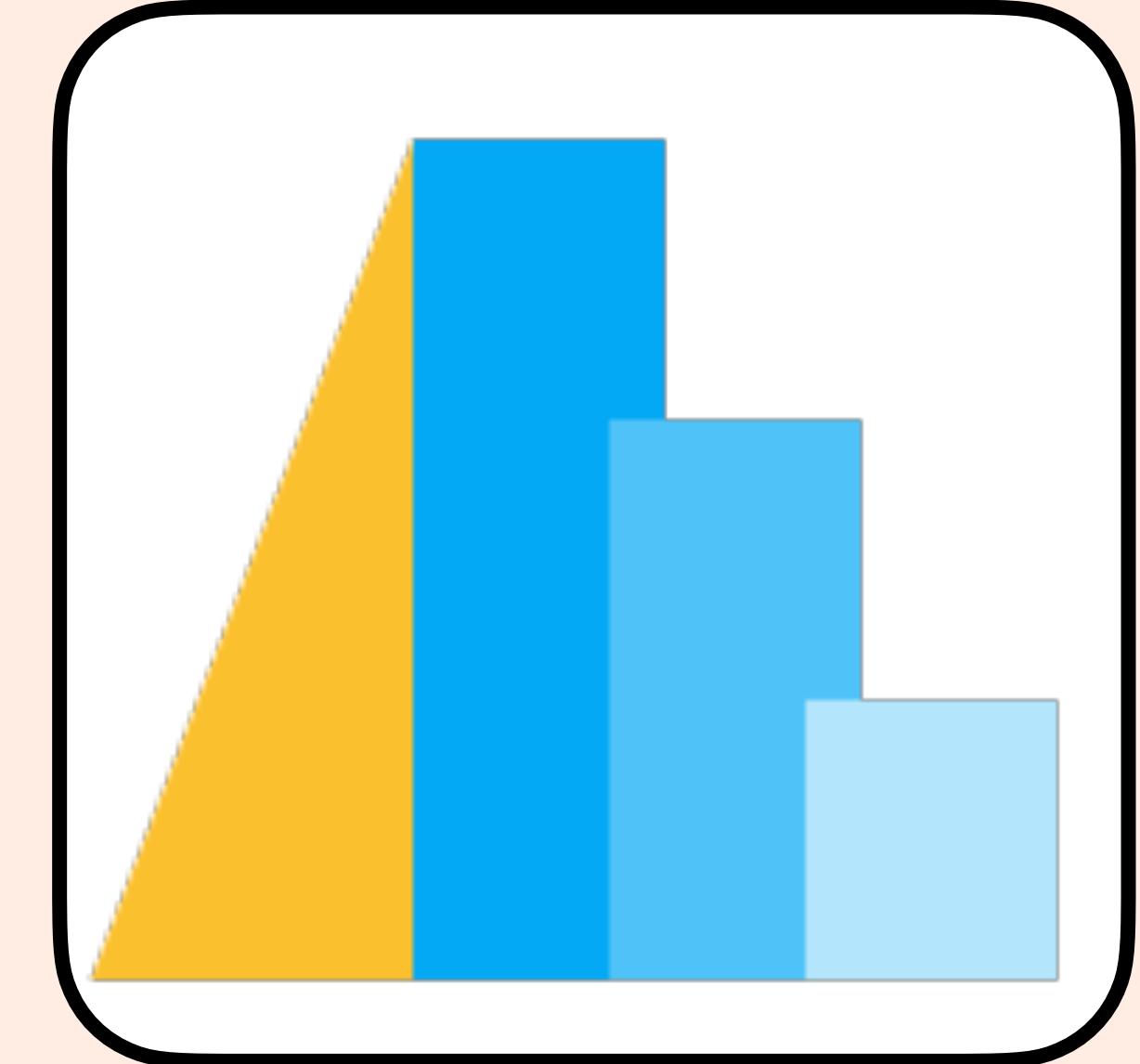
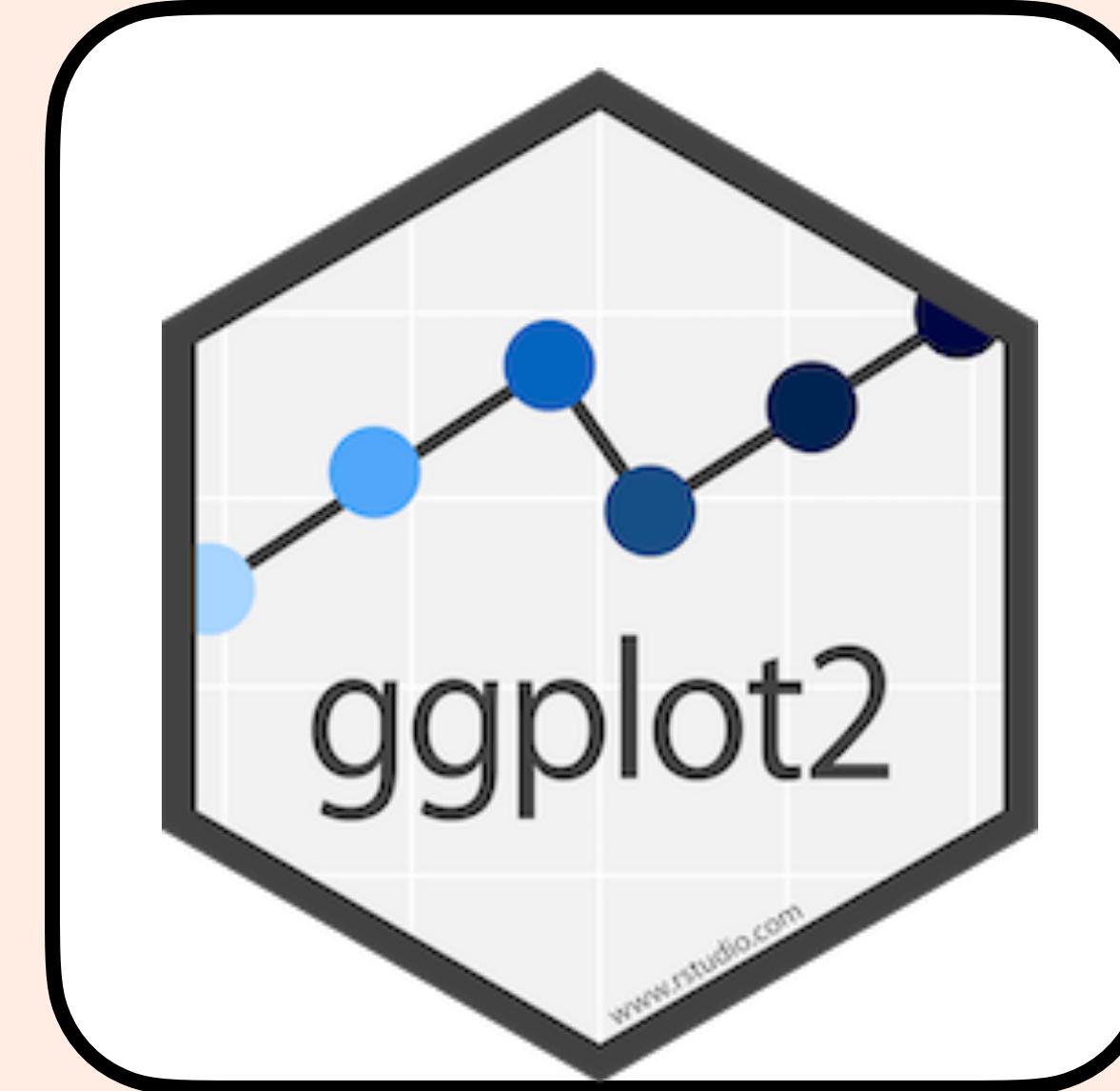


Dash





Dash

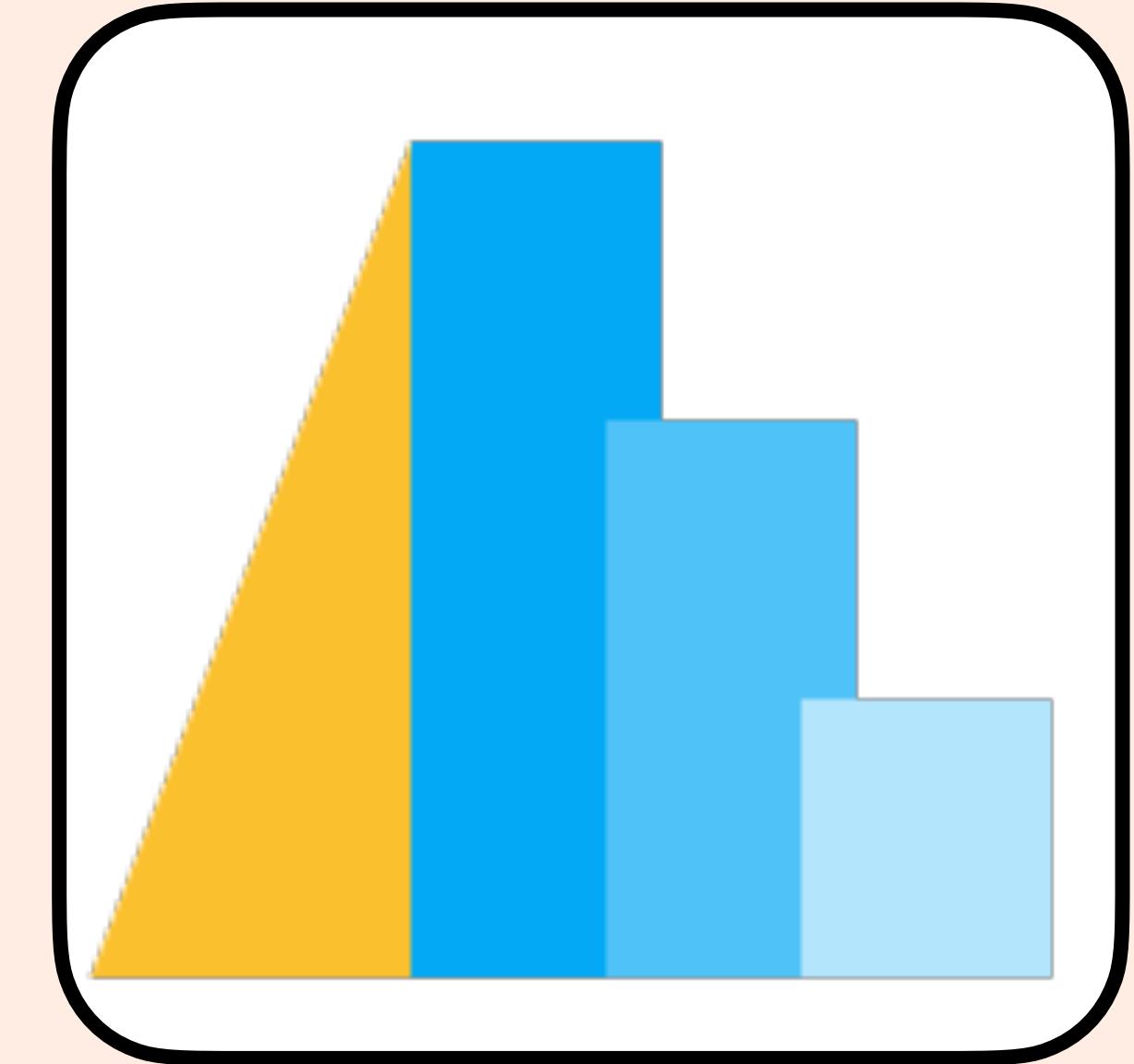
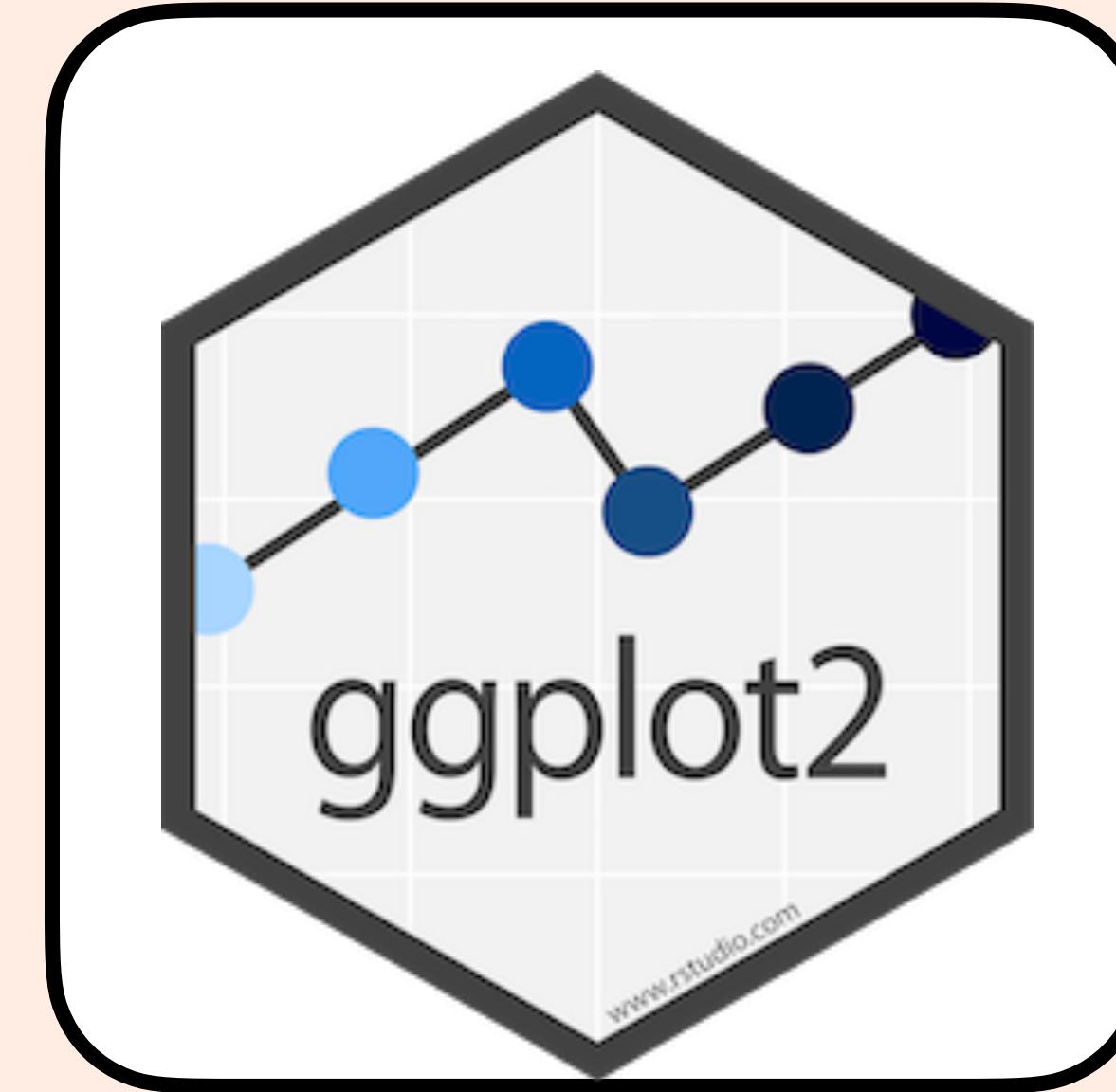


“One ring to bring them all, and in the darkness bind them.”

Source



Dash



“One ring to bring them all, and in the darkness bind them.”

Source

We will see...

Motivation

- DSCI 551 is a group project course!
- There are many cool & exciting new things you will learn in this course
- You have to get practice with these tools before Capstone and before you graduate!

DASH - UBER DATA APP

Select different days using the date picker or by selecting different time frames on the histogram.

April 1, 2014

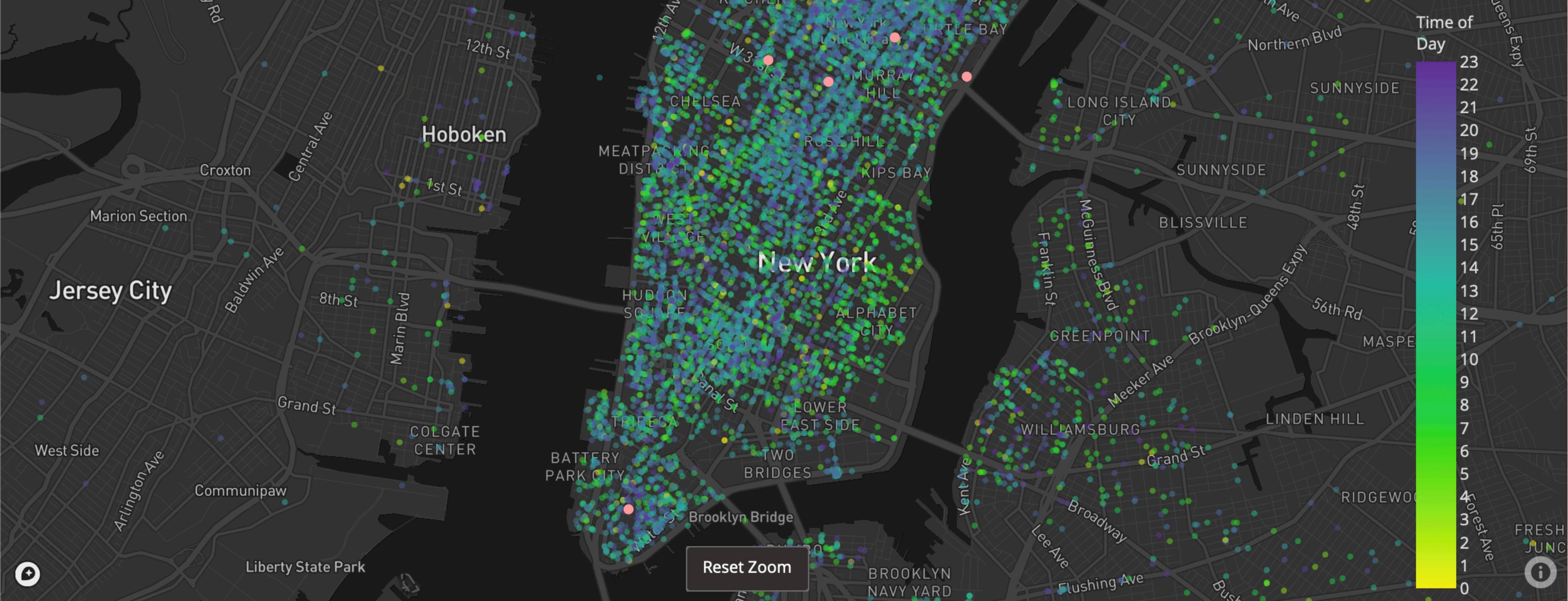
Select a location

Select certain hours

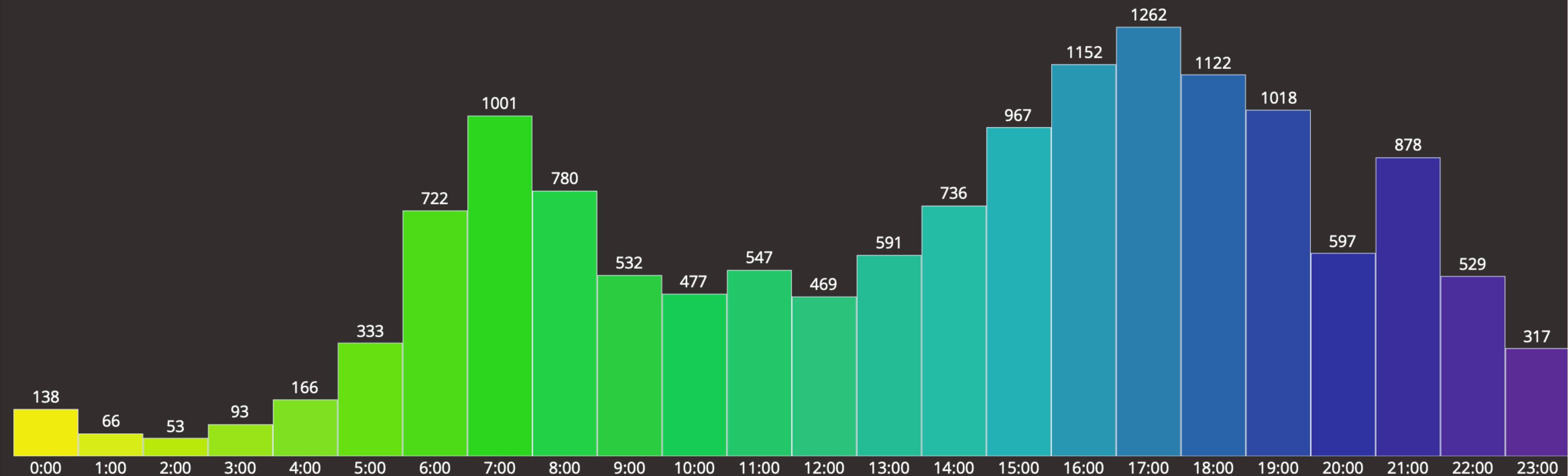
Total rides in selection: 0

2014-04-01 - showing hour(s): All

Source: [FiveThirtyEight](#)



Select any of the bars on the histogram to section data by time.



High level course structure

Weeks 1 & 2

**Project 1:
Dashboard in
Python using Altair**

- Project setup
- Team contract
- Milestone 1 (proposal)
- Milestone 2 (python app)

Weeks 3 & 4

**Project 2:
Dashboard in R
using ggplotly**

- Project setup
- Milestone 3 (R app)
- Peer Review
- Milestone 4 (final app)

20 minutes

Part 2:

Logistics and Groups

You have two options to do the Group projects in DATA 551

Option 1

Form a group of 4

- Your Dashboard will be richer
- You will get more practice with Git PRs and issues
- You may not get to do everything
- You will have more time to do more advanced things

Option 2

Stay in your group of 2

- Your Dashboard will be more basic
- You will get to do everything

You have two options to do the Group projects in DATA 551

Option 1

Form a group of 4

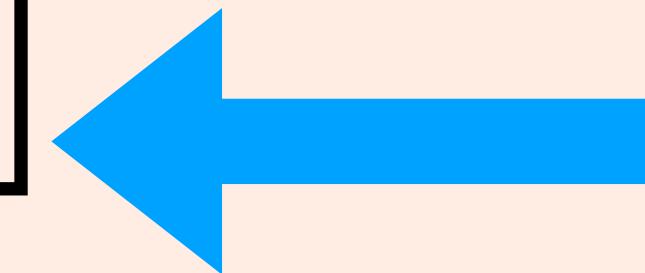
- Your Dashboard will be richer
- You will get more practice with Git PRs and issues
- You may not get to do everything
- You will have more time to do more advanced things

Option 2

Stay in your group of 2

- Your Dashboard will be more basic
- You will get to do everything

**HIGHLY recommend
Option 1**



Part 3:

What *is* a dashboard?

DSCI 532 - Lecture 1

Dashboard intro

- Understand what dashboards are
- Know when to use them
- Design effective dashboards
- Identify when interactivity is beneficial

What is a
dashboard?

Total Cases

 **56,632**

 Laboratory Diagnosed **56,131** | Epi-Linked **501**

Currently Hospitalized

 **358**

Total to Date: 3,165

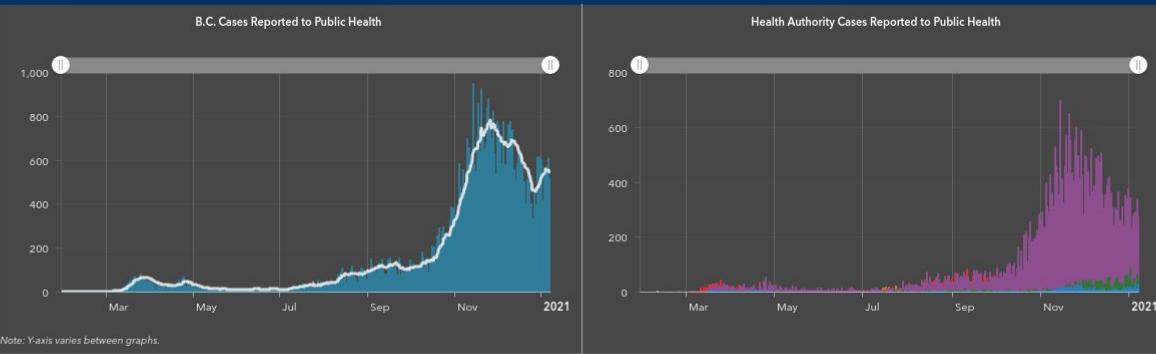
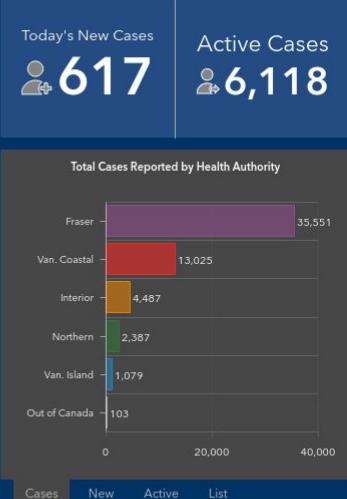
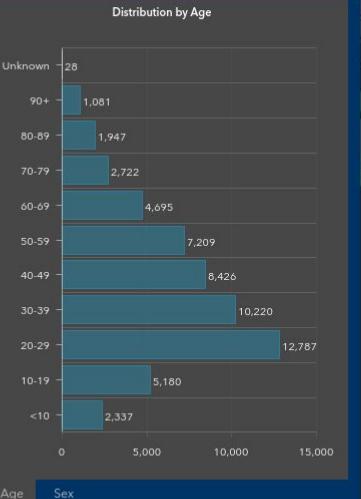
Currently in Critical Care

 **75**

Confirmed Deaths

 **988**

Recovered

 **48,205**
Last Update
1/8/2021, 4:30 PM

Note: As of January 7, 2021, the number of cases over time are reported by the result date of the client's first positive lab result where available; otherwise by the date they are reported to public health. Please refer to the data notes below for additional information.

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

BCCDC COVID-19 Epidemiology App

Date Range
2020-03-01 to 2021-01-09

Select Comparison Groups:
 Pre-selected Groups
 Custom Groups

Select Comparison Group:
BC Health Service Delivery Areas

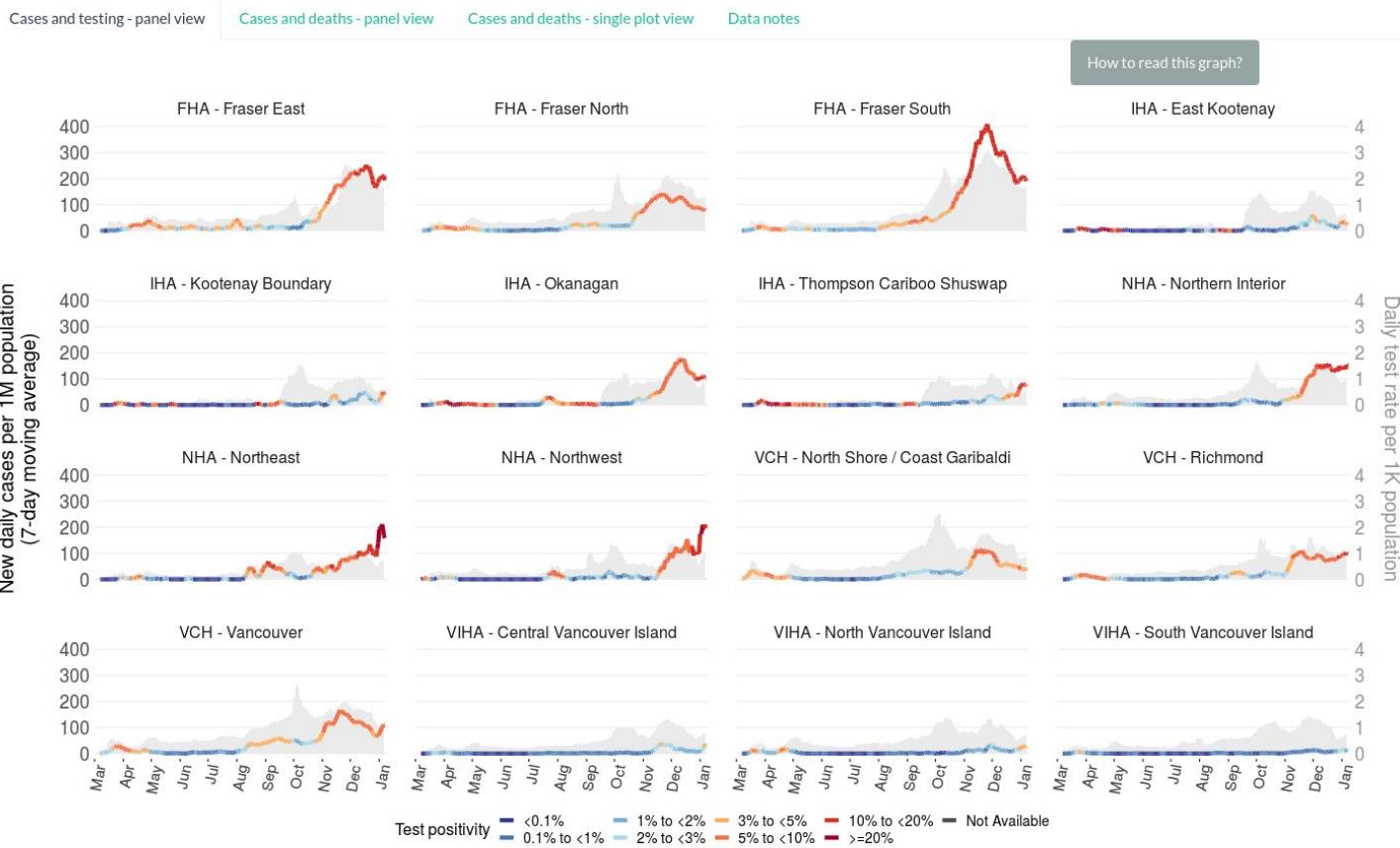
Select Y Scale
 Single Scale Individual Scales

Click the button below to download the figure shown:
[Download graph](#)

For more BC data, please visit BCCDC COVID-19 data page:
<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>

 BC Centre for Disease Control
Provincial Health Services Authority

 Provincial Health Services Authority
Province-wide solutions. Better health.



Data up to 2021-01-07

Cities with at least **5** breweries within **20** miles based on **all** beers.

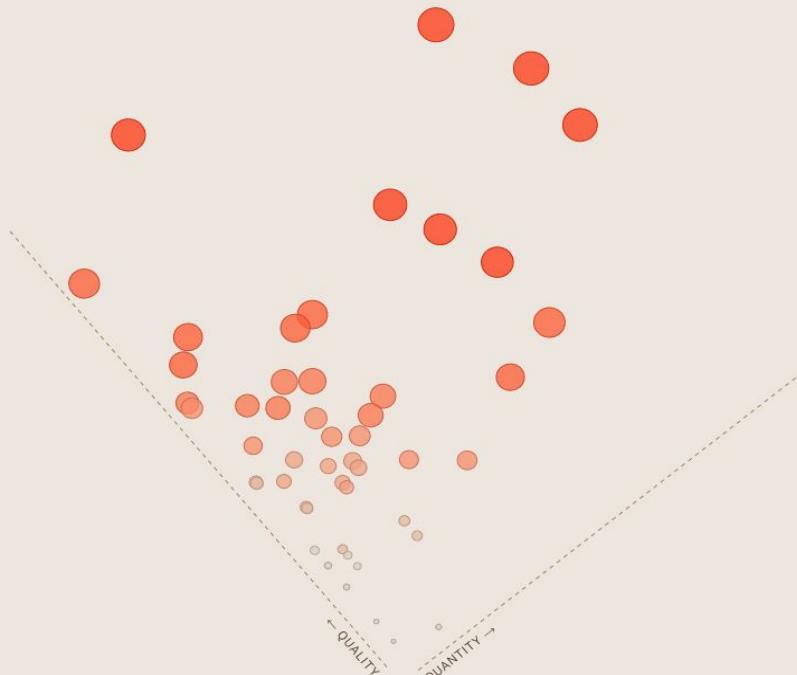
Average rating of all beers

55%

Number of breweries nearby

45%

Closer to here
the better



BEST CITIES

01. San Diego, CA
02. Denver, CO
03. Portland, OR
04. Santa Rosa, CA
05. Minneapolis, MN
06. Chicago, IL
07. Austin, TX
08. Seattle, WA
09. Anchorage, AK
10. St. Louis, MO
11. Bend, OR
12. Ann Arbor, MI
13. Philadelphia, PA
14. Salt Lake City, UT
15. San Francisco, CA
16. Oceanside, CA
17. Asheville, NC
18. Madison, WI
19. Richmond, VA
20. New York, NY
21. Frederick, MD
22. Washington, DC
23. Albuquerque, NM
24. Baltimore, MD
25. Columbus, OH
26. Pittsburgh, PA
27. Cincinnati, OH
28. Duluth, MN
29. Atlanta, GA
30. Dallas, TX
31. Boulder, CO
32. Wilmington, DE
33. Fort Collins, CO
34. Charlotte, NC
35. St. Paul, MN

[HIDE FILTERS](#)

SORT BY

Position: Ascending

CATEGORY

Decor

- Wall Art & Paintings
- Cushions & Throws
- Mirrors
- Lanterns & Candleholders
- Vases, Bowls & Trays
- Storage & Baskets
- Bedding
- Rugs
- Planters, Artificial Plants & Flowers
- Home Accents & Sculptures
- Curtains & Curtain rods
- Dinnerware & Table Linen
- Lightbulbs


BAUHAUS
basket 37cm

\$24
IN STOCK
[ADD TO CART](#)
MICAH
dinnerware set

(\$39) **\$29**
IN STOCK
[IN STORE ONLY](#)
LUCE
porcelain mug

(\$2) **\$1**
IN STOCK
[ADD TO CART](#)
SHANA
dinnerware set

(\$49) **\$39**
IN STOCK
[IN STORE ONLY](#)
RIPLEY
set of 4 tumblers

\$13
IN STOCK
[ADD TO CART](#)
SWIRL
set of 4 wine glasses

\$16
IN STOCK
[ADD TO CART](#)

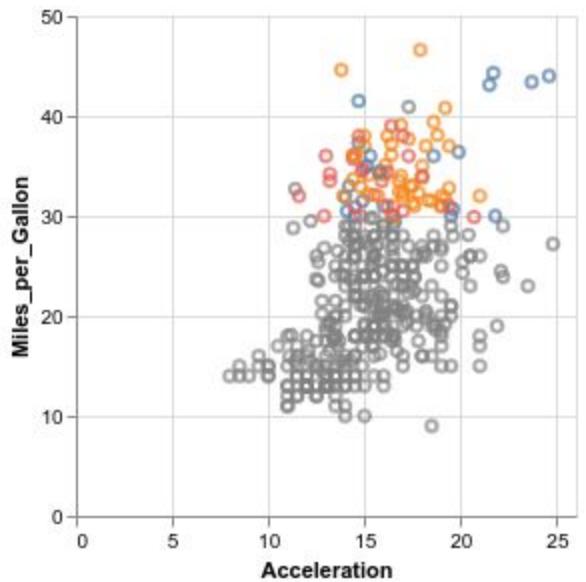
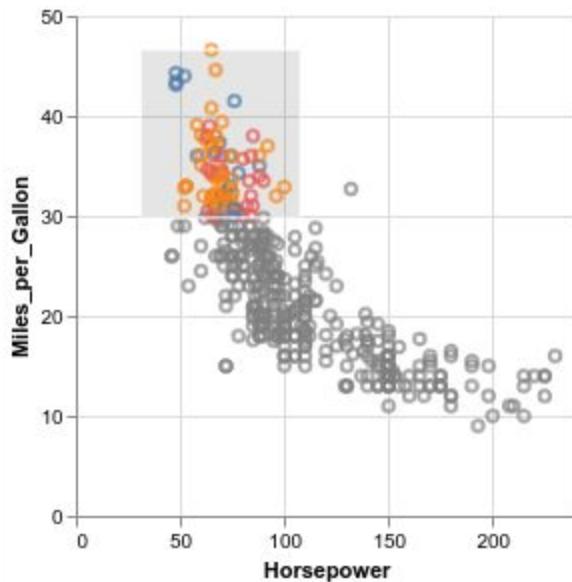
In essence, a dashboard is a board that displays information, usually as some key numbers and a few panels of plots.



Interactivity

Multi-panel Scatter Plot with Linked Brushing

This is an example of using an interval selection to control the color of points across multiple panels.



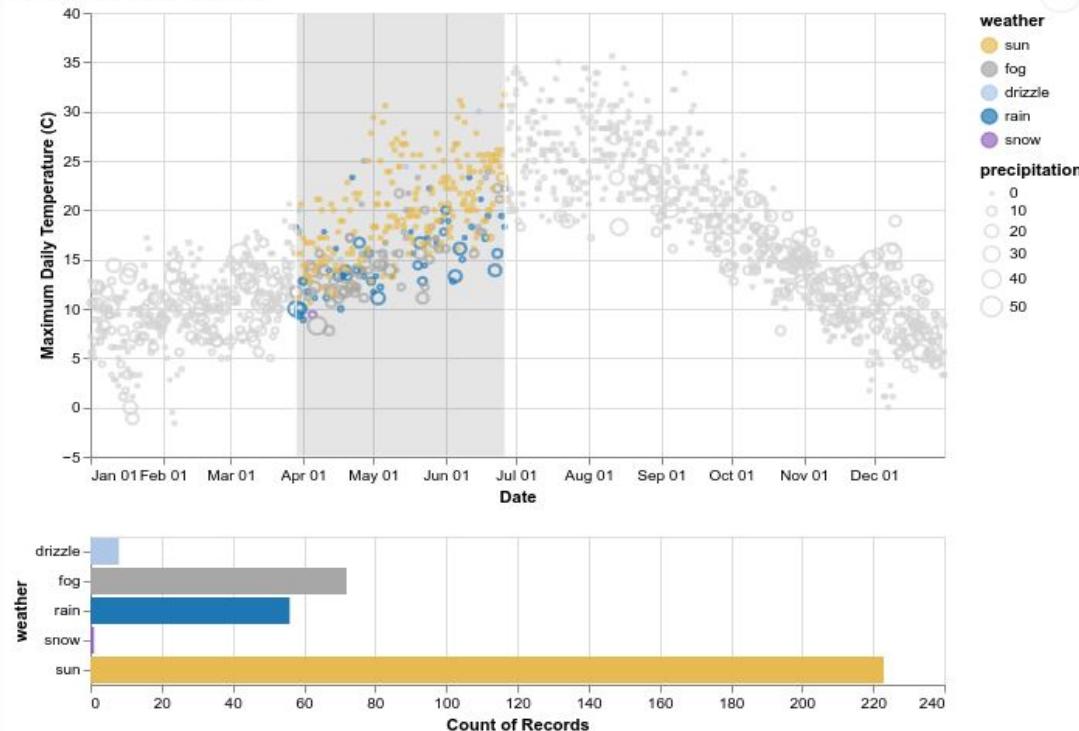
Origin
Europe
Japan
USA



Seattle Weather Interactive

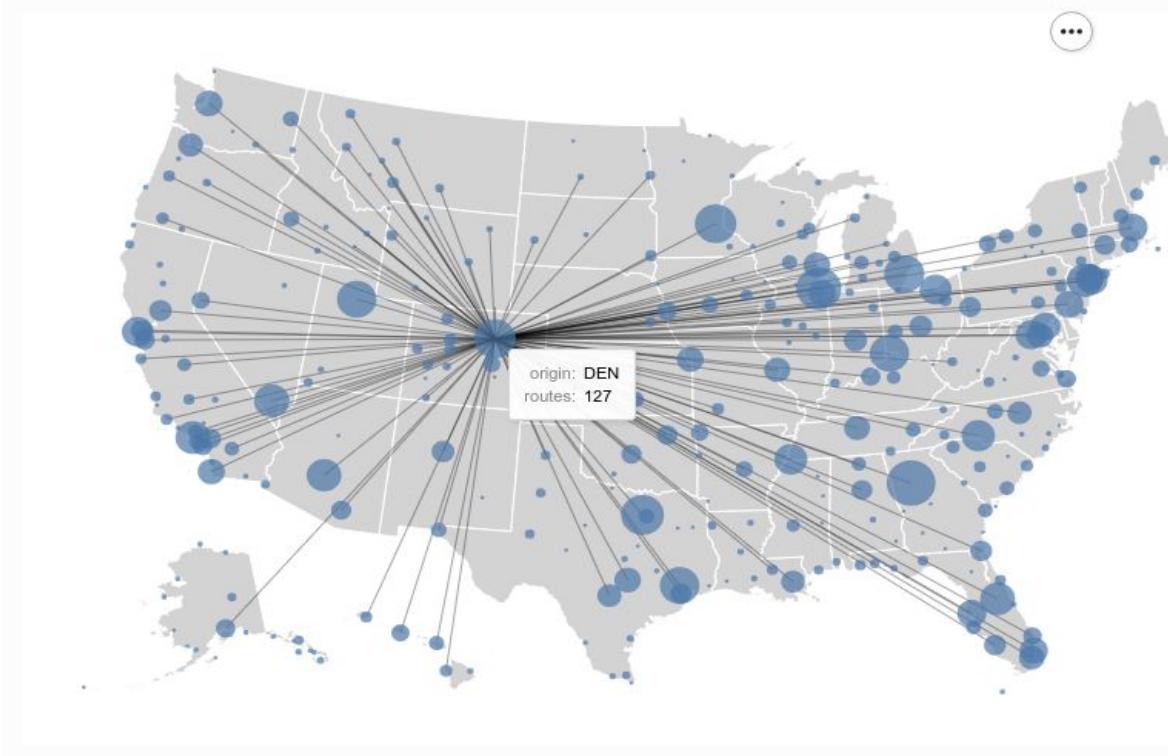
This chart provides an interactive exploration of Seattle weather over the course of the year. It includes a one-axis brush selection to easily see the distribution of weather types in a particular date range.

Seattle Weather: 2012-2015



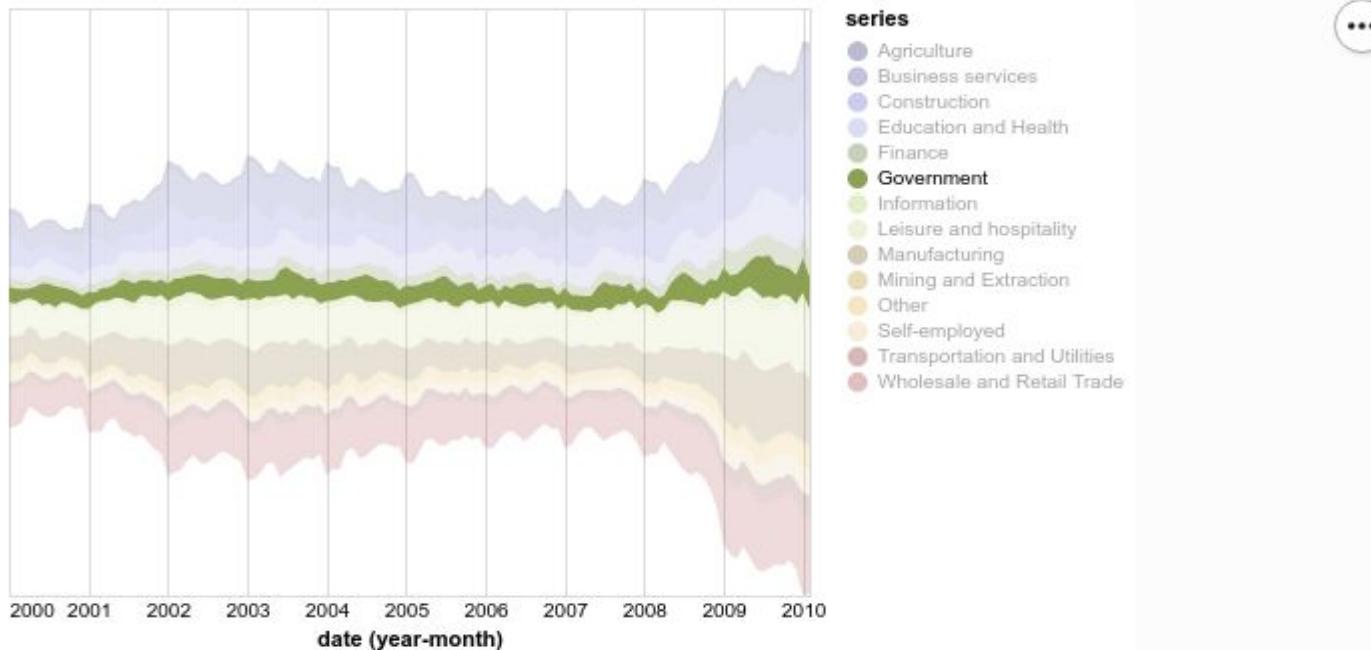
Connections Among U.S. Airports Interactive

This example shows all the connections between major U.S. airports. Lookup transformations are used to find the coordinates of each airport and connecting airports. Connections are displayed on mouseover via a single selection.



Interactive Legend

The following shows how to create a chart with an interactive legend, by binding the selection to `"legend"`. Such a binding only works with `selection_single` or `selection_multi` when projected over a single field or encoding.



Why use
dashboards?

1. Quicker exploration than with coding
2. Can enable people without programming skills to explore and understand data better.
3. Can engage users more than static viz
4. Can lead to more engaging storytelling in data journalism.
5. When there is too much data, interactivity can allow us to look at subsets.
6. People can be interested in different things when they look at the same data.

A few examples

Total Cases

56,632

Laboratory Diagnosed

56,131

Epi-Linked

501

Currently Hospitalized

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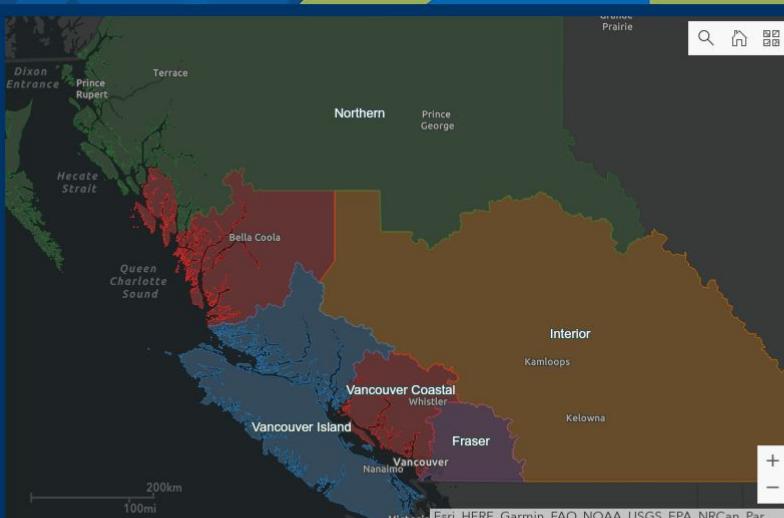
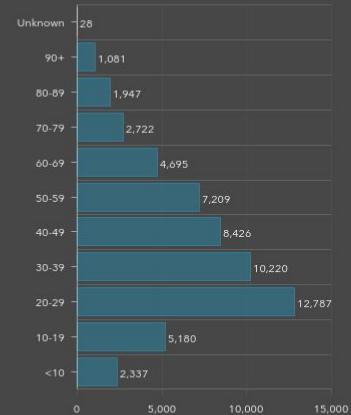
48,205

Last Update

1/8/2021, 4:30 PM

Cases by Day

Distribution by Age



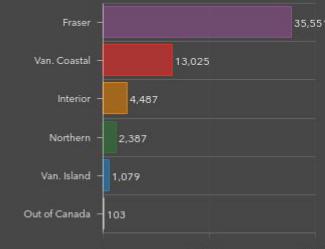
Today's New Cases

617

Active Cases

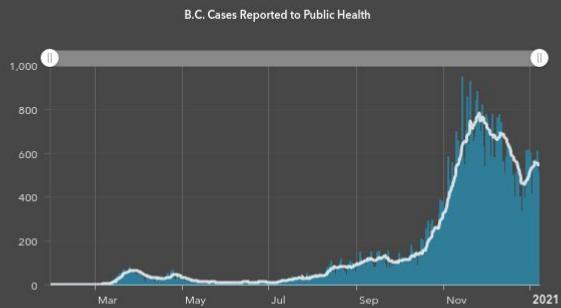
6,118

Total Cases Reported by Health Authority

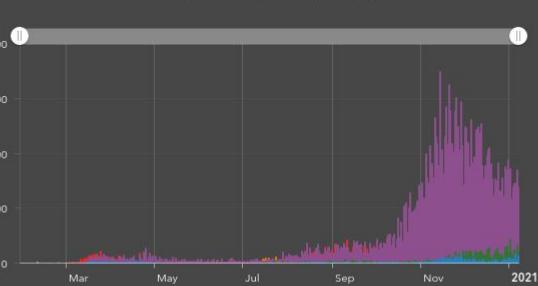


Cases New Active List

B.C. Cases Reported to Public Health



Health Authority Cases Reported to Public Health



Note: Y-axis varies between graphs.

Note: In an effort to provide as current information as possible, "Today's New Cases" (as shown on this dashboard and reported publicly through daily media statements) are calculated at different points in time and may not align exactly to what is reported on the graphs. See the Data Notes for details.

Total Tests 1,518,311 **New Tests** 9,345

B.C. Testing Rate 194,070 **Canadian Testing Rate** 381,241
People per 1,000,000 People per 1,000,000

Note: As of January 7, 2021, the number of cases over time are reported by the result date of the client's first positive lab result where available; otherwise by the date they are reported to public health. Please refer to the data notes below for additional information.

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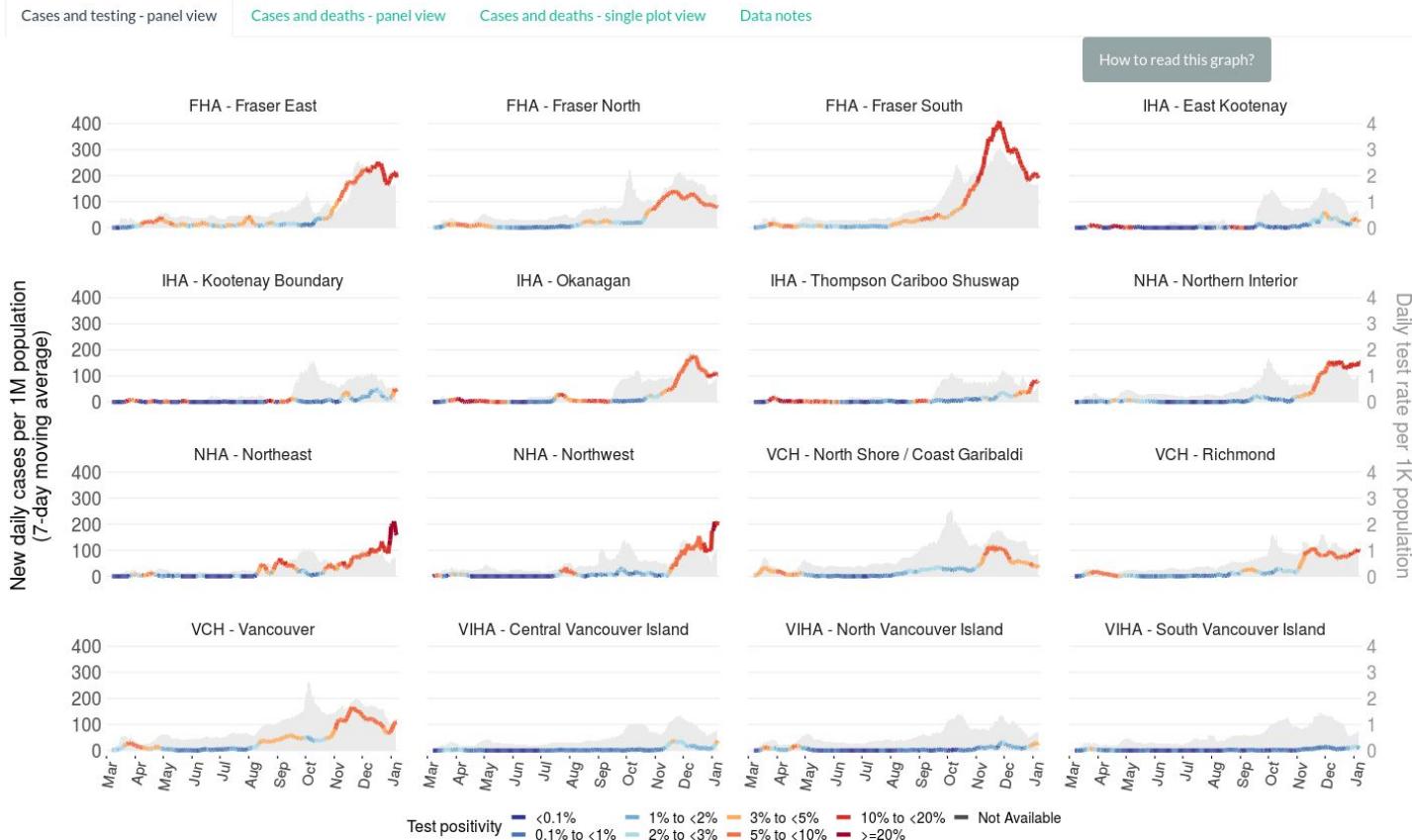
Select Comparison Group:
BC Health Service Delivery Areas

Select Y Scale
 Single Scale Individual Scales

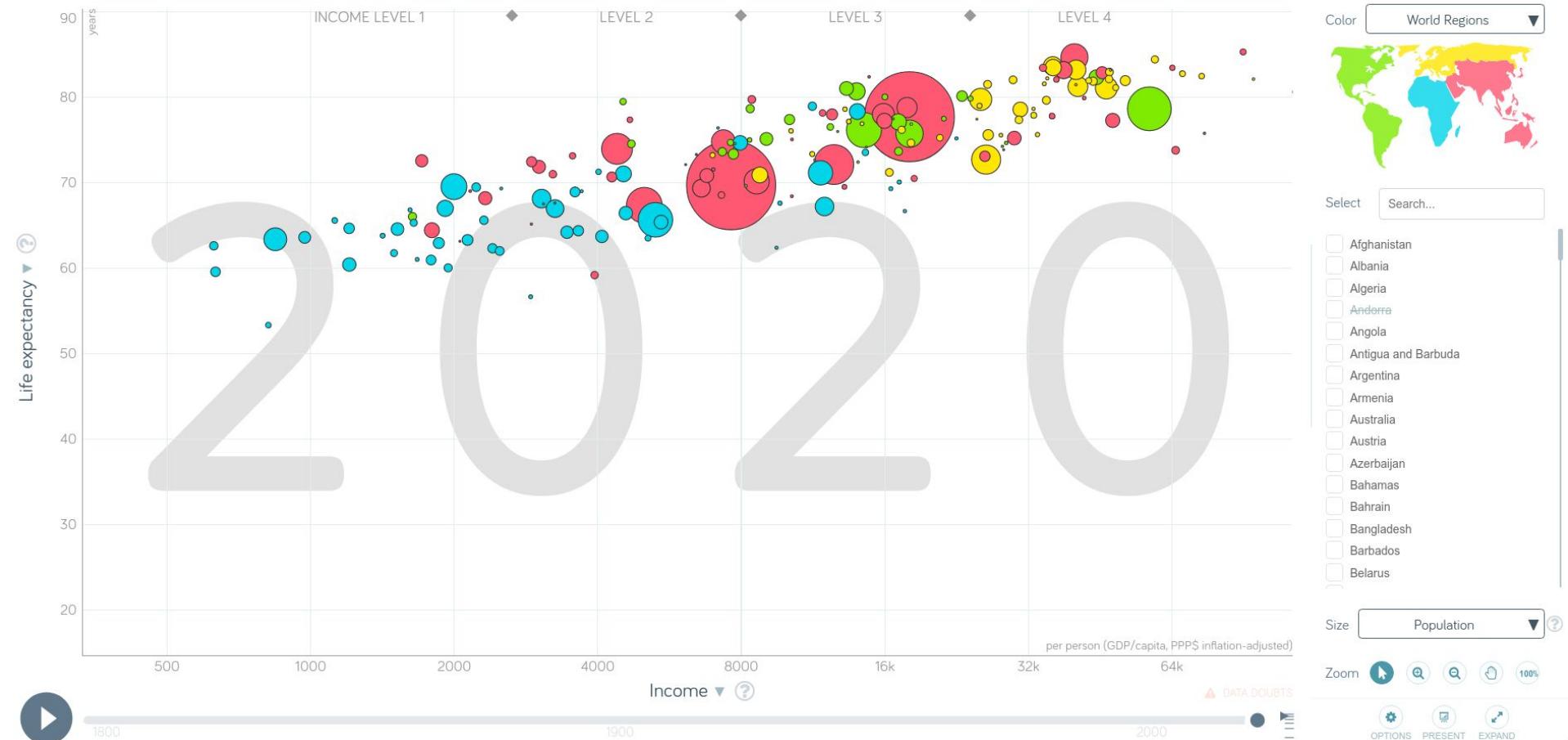
Click the button below to download the figure shown:
[Download graph](#)

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<http://www.bccdc.ca/health-info/diseases-conditions/covid-19/data>

 BC Centre for Disease Control
Provincial Health Services Authority
 Provincial Health Services Authority
Province-wide solutions. Better health.



Data up to 2021-01-07



Who Should Get Parole?

Even the best risk assessments yield probabilities, not certainties. That means they label as “high risk” some people who won’t commit another crime and label as “low risk” some people who will. This simulation lets you sort offenders into risk categories based on the results of an assessment. Think we should rarely lock up anyone who wouldn’t reoffend? Set the “low risk” threshold high and the “high risk” threshold even higher. Have little tolerance for recidivism? Try the opposite. In the real world, policymakers have to strike a balance. [Read more »](#)



Executive Insights

What is driving performance?



Total Profit



Profit Margin

Select a measure:



Average Order Quantity



Total Quantity

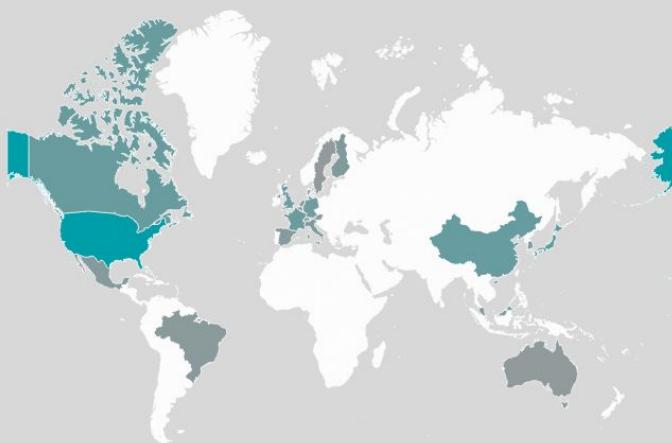
Select a perspective:



Total Revenue

How is our Total Profit distributed geographically?

USA	149M
Japan	65M
China	57M
Canada	55M
France	52M
United Kingdom	50M
Germany	47M
South Korea	36M
Malaysia	36M
Finland	34M
Italy	34M
Netherlands	33M
Mexico	30M
Spain	30M
Austria	26M
Brazil	25M
Belgium	21M
Australia	20M
Switzerland	18M
Sweden	17M
Denmark	11M



Total Profit
 Total Quantity
 Total Revenue

2

Product Category

All

Order Type

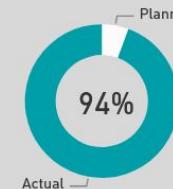
All



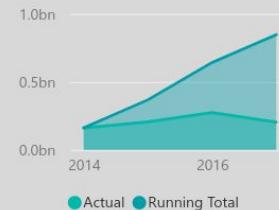
What is our YoY% change in Total Profit?



How close are we to our planned Total Profit?



What is my Running Total by Total Profit?



What are my Top 5 products by Total Profit?

Freya Alpha	24M
Achilles Zeta	23M
Perseus Kappa	23M
Zeus Pi	21M
Achilles Chi	21M

Top 5



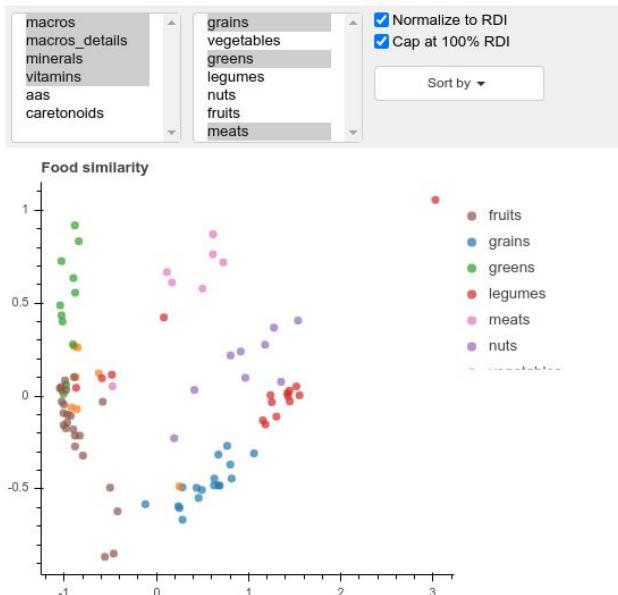
Filter

Nutrimap

This dashboard facilitates comparisons of nutrient composition between common food items to give an overview of which foods are high and low in what nutrients. I think colors are more efficient at presenting overviews than tables with numbers, so I chose to present this information as heatmaps. The data is from USDA, who don't yet collect phytonutrients, which are generally abundant in plant-based foods. Eventually I want to add more options computing the RDI, but for now, the RDI is based on a 70 kg male in his 30s. This is a minor issue since the dashboard mainly use RDI to provide a reference value for coloring the heatmap rather than recommending how much of a certain food item one should eat. For the latter, I highly recommend [Cronometer](#).

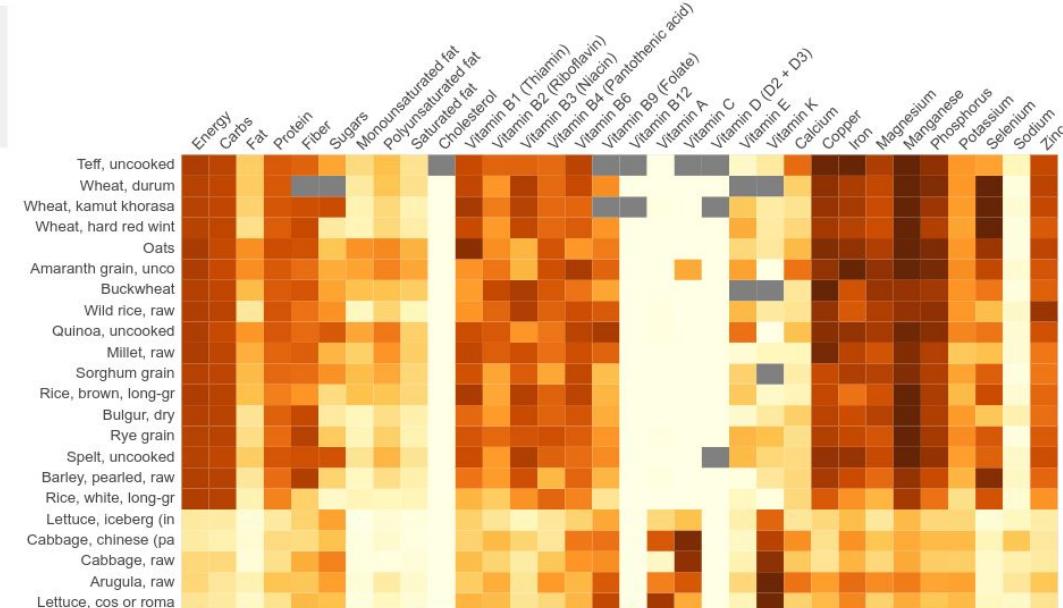
Selection tools

Pick nutrients and food groups to visualize using the lists or select individual food items in the food similarity scatter plot by dragging with the mouse or clicking to select. Ctrl and shift can be used to select multiple items.



Nutrient visualization

The nutrients for 100g of each food are shown (dry weight for grains and legumes, wet weight for everything else). The colors are normalized to RDI and capped at 100% by default.



Examples from MDS
previous years

World Wide Arms and Ammunition Movement and GDP Effects

This app is designed to explore how the movement of weapons globally has changed over the last 30 years, and how imports and exports of arms and ammunition relate to a country's GDP.

Choose statistic:

- Import
- Export

Choose country:

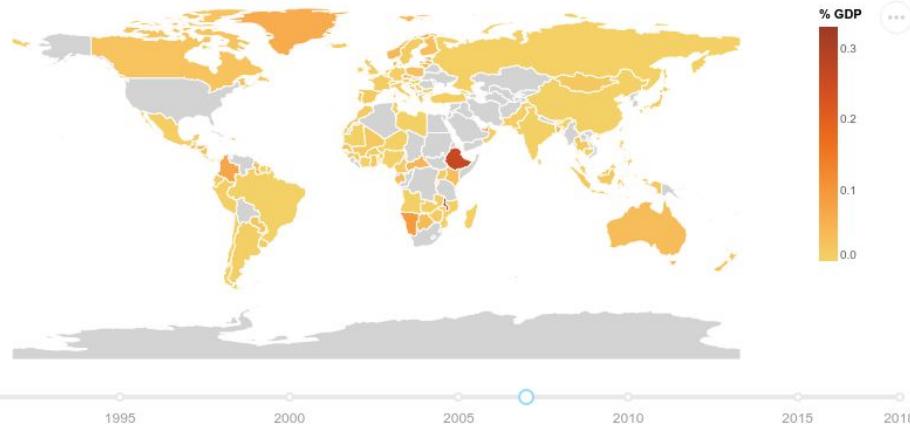
Togo

Explore changes through time of a single country using the lowermost visualizations.

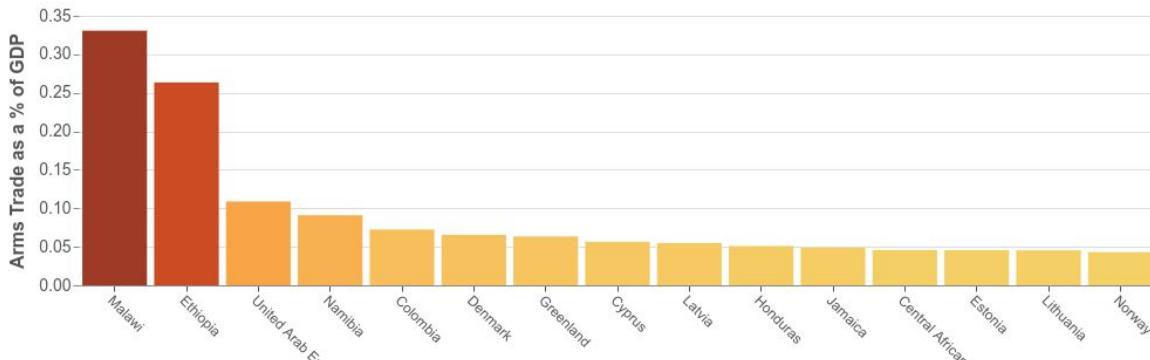
Include USA

Remove the outlier USA to better visualize differences between other nations.

% of GDP



Arms Trade as a Percentage of GDP for Major Importers in 2007

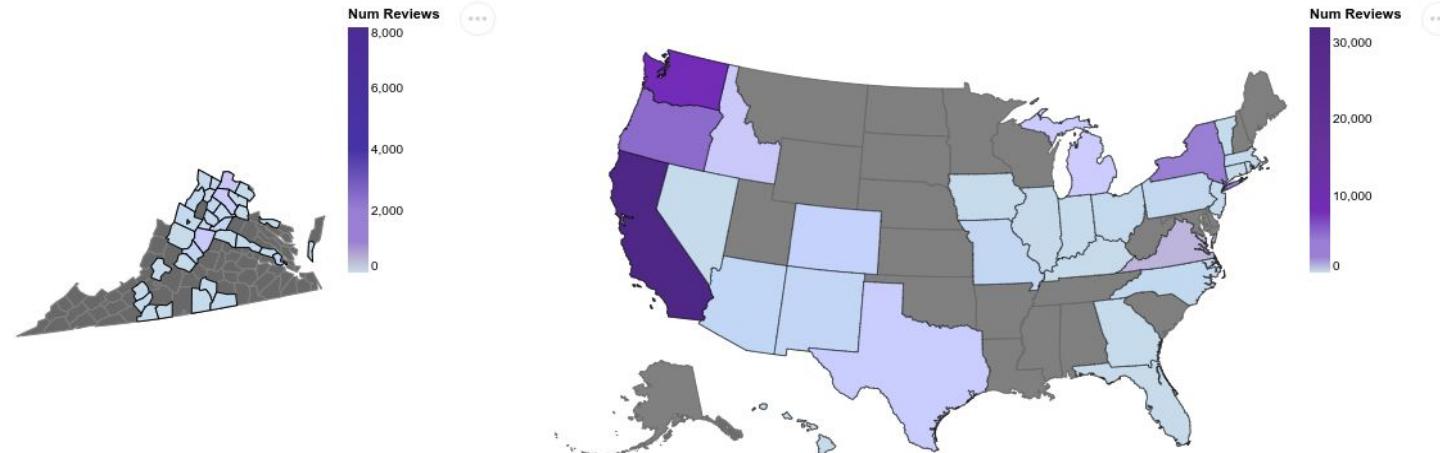


WINE REVIEWS BY GEOGRAPHIC LOCATION

See how wine is distributed across the U.S. Hover over a particular state or county to see some summary information for things like average price, points, or value rating. Use the dropdown menu to take a closer look at a particular state, where you can see a breakdown by county. Hover over a county to get more summary information. In no time at all you'll be an expert on where you can find the best wine's at the best prices in America.

TOTAL NUMBER OF REVIEWS

CHOOSE A STATE

 X ▼

Compare safest cities in the US

Select the Cities: ▾

Select your desired year range:



Dashboard

Description

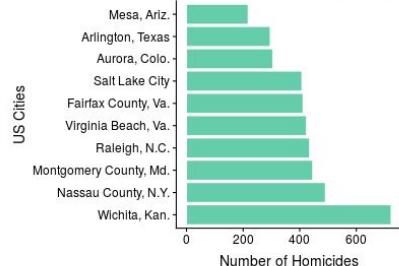
TOTAL REPORTED CRIMES
359524

AVERAGE NUMBER OF CRIMES
35952

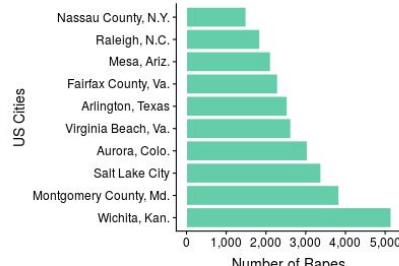
SAFEST CITY OVER SELECTED TIME FRAME
Virginia Beach, Va.

Compare your choice of cities

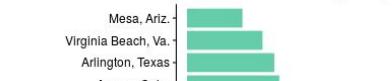
Number of Homicides per city



Number of Rapes per city

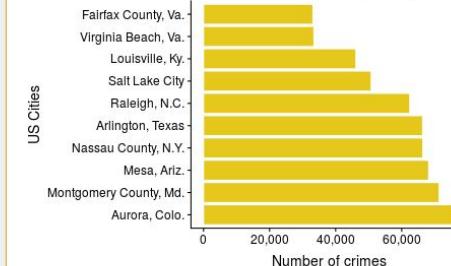


Number of Robberies per city



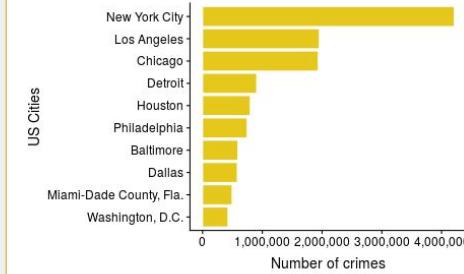
Top ten cities with minimum crimes

Number of crimes per city



Top ten cities with maximum crimes

Number of crimes per city

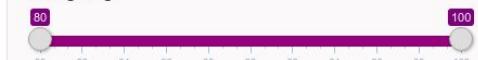


World Wine Explorer

This application will help you explore the world of wine!

*Reviews are only published for wines rated 80+ points

Rating range



Price range (\$USD).

(\$11 - \$30) Popular

Country

Canada

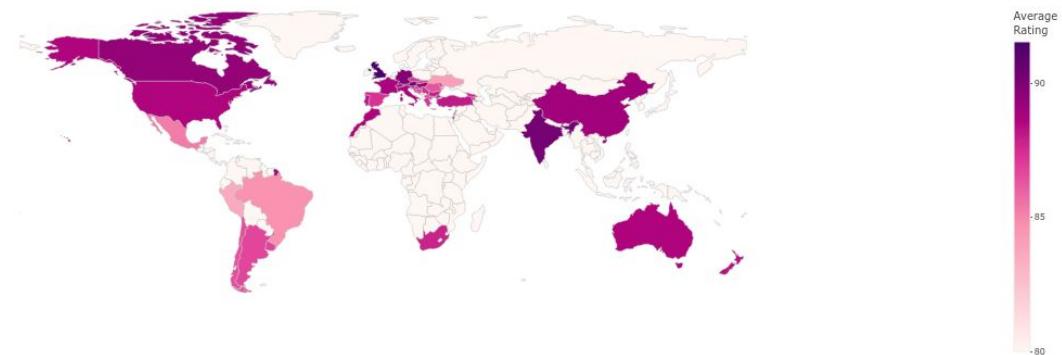
Region

Nothing selected

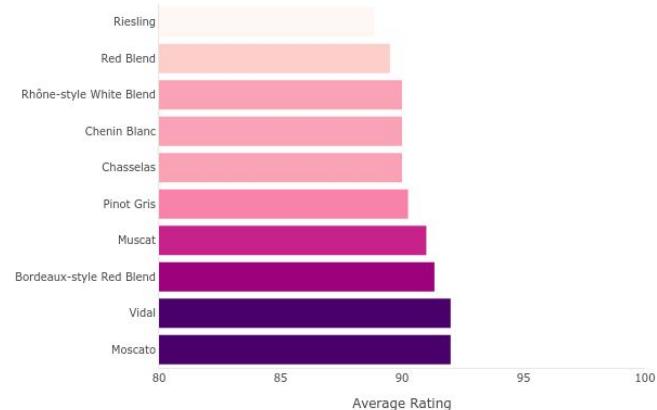
Vintage

Nothing selected

Average Wine Ratings by Country



Which Varieties have the highest ratings?



Price vs. Ratings



More MDS examples

<https://dsci-532-group203-maintenance.herokuapp.com/>

https://panntingq.shinyapps.io/mental_health_app_3_0/

https://hfboyce.shinyapps.io/dsci_532-boston-crime-rate/

<https://adityashrm21.shinyapps.io/us-police-shootings-analysis/>

<https://g105-milestone3.herokuapp.com/>

<https://dsci-532-l02-gr212-milestone3.herokuapp.com/>

<https://dsci532group114milestone3.herokuapp.com/>

Dash Enterprise App Gallery

This public instance of the [Dash Enterprise](#) app manager runs >60 Dash apps for 100s of concurrent users on Azure Kubernetes Service. Click on a Dash app's name below for more info and links to [Python & R source code](#) on GitHub.

[Aerospace](#) | [Automotive](#) | [Energy](#) | [Finance](#) | [Manufacturing](#) | [Medical Imaging](#) |
[Pharma](#) | [Retail](#)

All Apps (92)

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