



EXPLORING THE VAX POTENTIAL

Real-Time Dashboard for
Virginia COVID-19 Report and Vaccination

Presented by: Crystal Huang
Metis Bootcamp Project VII

INTRODUCTION

The Washington Post

Democracy Dies in Darkness

Spread of delta coronavirus variant exposes poorly vaccinated regions to renewed danger

By [Ariana Eunjung Cha](#), [Karla Adam](#),

[Ben Guarino](#) and [Lenny Bernstein](#)

June 23, 2021 at 11:06 a.m. EDT



1557

D-19

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Coronavirus
Vaccine

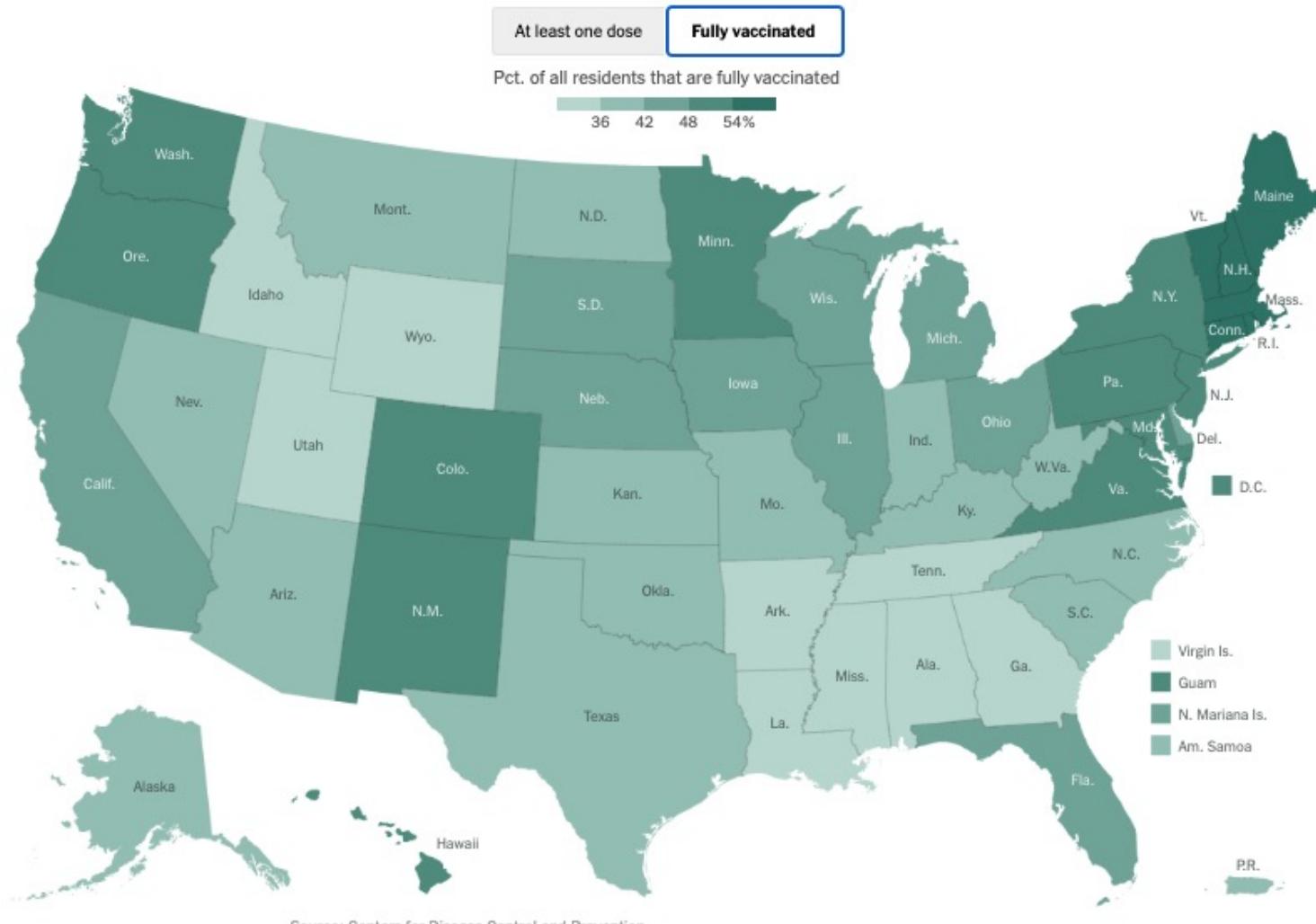
Vaccine

08/15/2020-290v217

INTRODUCTION

How Is Each State Doing?

Some jurisdictions have been more efficient than others at administering their doses from the federal government.



Source: CDC and
The New York Times

| Name | Percent of people | | | | | |
|------------------|-------------------------|------------------|-----------------|-------------|------------|--|
| | Given at least one shot | Fully vaccinated | Doses delivered | Shots given | Doses used | |
| U.S. total* | 53% | 45% | 377,935,390 | 316,048,776 | 84% | |
| Palau | 77% | 70% | 24,600 | 24,408 | 99% | |
| Vermont | 73% | 64% | 910,980 | 832,904 | 91% | |
| Massachusetts | 69% | 59% | 9,605,260 | 8,612,018 | 90% | |
| Hawaii | 69% | 51% | 1,922,410 | 1,653,891 | 86% | |
| Connecticut | 66% | 58% | 4,660,855 | 4,288,566 | 92% | |
| Maine | 66% | 60% | 1,835,190 | 1,577,123 | 86% | |
| Rhode Island | 63% | 57% | 1,493,905 | 1,241,067 | 83% | |
| New Jersey | 63% | 54% | 11,368,015 | 9,799,660 | 86% | |
| Pennsylvania | 62% | 48% | 15,458,235 | 13,535,439 | 88% | |
| New Hampshire | 61% | 54% | 1,803,430 | 1,491,368 | 83% | |
| Maryland | 60% | 54% | 8,342,780 | 6,640,011 | 80% | |
| New Mexico | 60% | 52% | 2,334,725 | 2,272,676 | 97% | |
| Washington | 60% | 52% | 9,265,975 | 8,273,921 | 89% | |
| California | 60% | 48% | 48,498,755 | 41,189,877 | 85% | |
| Washington, D.C. | 60% | 50% | 1,053,115 | 834,262 | 79% | |
| New York | 59% | 52% | 23,576,255 | 21,067,193 | 89% | |

#17

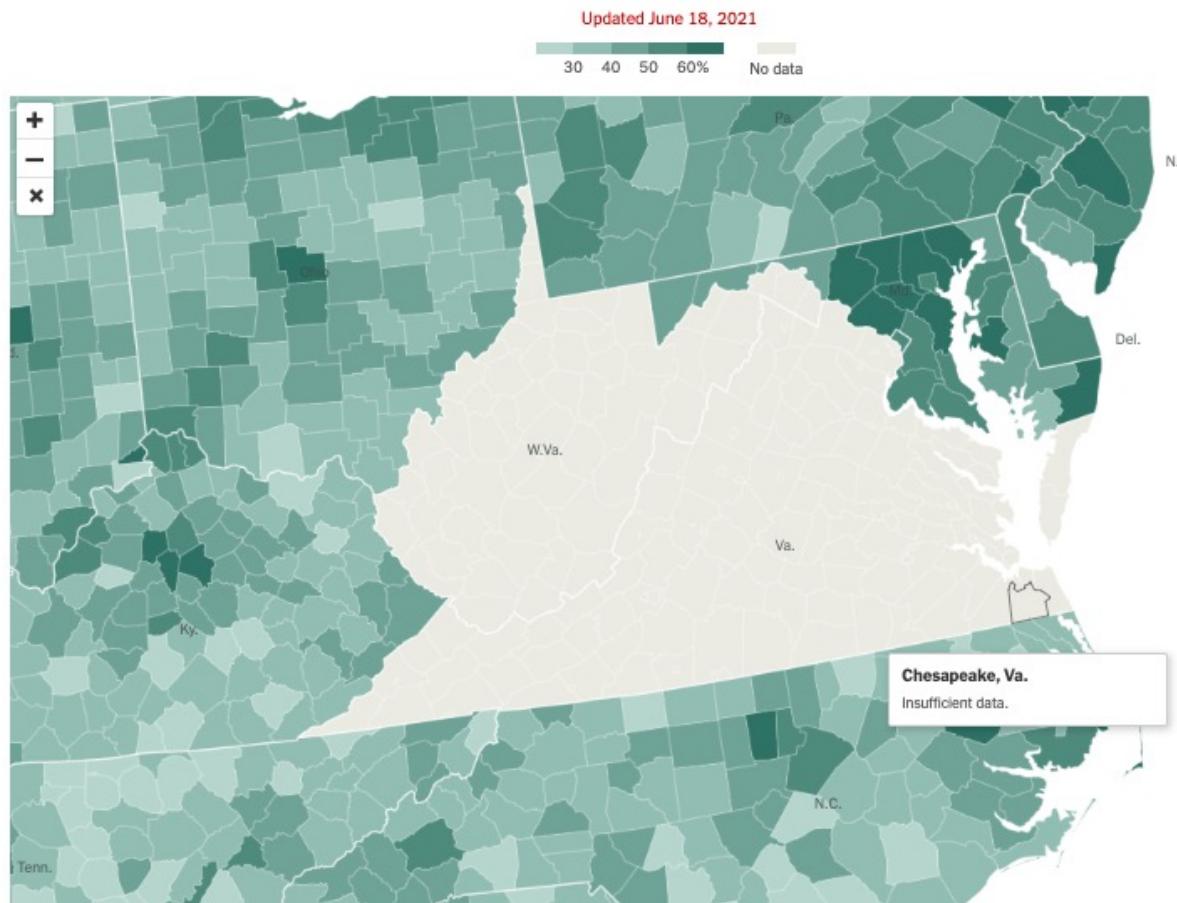
| | | | | | |
|----------|-----|-----|------------|-----------|-----|
| Virginia | 58% | 50% | 10,209,725 | 8,972,583 | 88% |
|----------|-----|-----|------------|-----------|-----|

| | | | | | |
|-----------|-----|-----|-----------|-----------|-----|
| Guam | 58% | 49% | 215,770 | 177,118 | 82% |
| Oregon | 57% | 51% | 5,586,365 | 4,405,722 | 79% |
| Delaware | 57% | 47% | 1,262,455 | 1,001,204 | 79% |
| Colorado | 57% | 50% | 6,931,935 | 5,992,415 | 86% |
| Minnesota | 56% | 50% | 6,466,740 | 5,712,582 | 88% |
| Wisconsin | 53% | 47% | 6,049,145 | 5,743,485 | 95% |

Source: CDC and
The New York Times

INTRODUCTION

See How Vaccinations Are Going in
Your County and State



Source: CDC and
The New York Times

INTRODUCTION

Google virginia covid dashboard

All Images Shopping News Maps More Settings Tools

About 13,000,000 results (0.82 seconds)

COVID-19

Coronavirus disease

Virginia

Overview

Statistics

Testing

Symptoms

Prevention

Coping

Treatments

Share

Statistics

New cases and deaths

From [The New York Times](#) · Last updated: 19 hours ago

New cases ▾ United States ▾ Virginia ▾ All counties ▾ All time ▾

May 24, 2021
New cases: 76
7-day avg: 377

Jun 26 Sep 21 Dec 17 Mar 14 Jun 9

0 2,000 4,000 6,000 8,000 10,000

● New cases — 7-day average

Each day shows new cases reported since the previous day · [About this data](#)

Cases

From [Wikipedia](#) and [The New York Times](#) · Last updated: 19 hours ago

Total ▾ United States ▾ Virginia ▾

| Cases | Deaths |
|---------------------|---------------------|
| 679K +228 | 11,368 +1 |

Location Cases Deaths

COVID-19 vaccine

See updates and local info

Map of cases (last 14 days)

From [The New York Times](#) and others

NEW YORK, PENNSYLVANIA, OHIO, MARYLAND, WEST VIRGINIA, KENTUCKY, TENNESSEE, NORTH CAROLINA, SOUTH CAROLINA

Map data ©2021 Google, INEGI · Terms of Use

Cases overview

From [Wikipedia](#) and others · Last updated: 30 mins ago

Virginia

| Total cases | Recovered | Deaths |
|-------------|-----------|---------------|
| 679K | - | 11,368 |

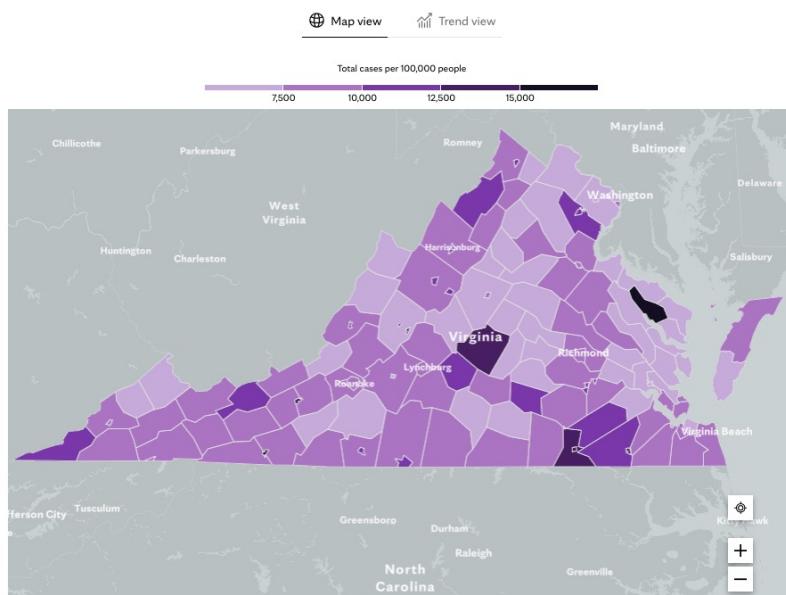
Source: Google

INTRODUCTION

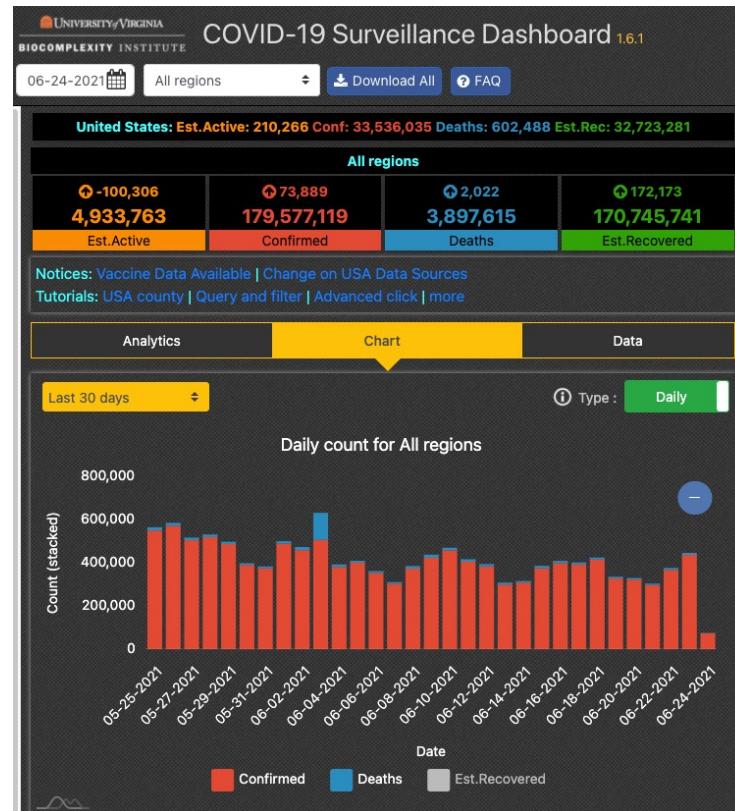
- Mostly Cases Surveillance Dashboard

Total cases for Virginia

This map shows the cumulative number of COVID-19 cases, since the pandemic started. This includes probable cases and cases confirmed by testing.



Source: Mayo Clinic



Source: UVA

- Separate Vaccine Dashboard



COVID-19 in Virginia: Vaccine Summary

Dashboard Updated: 6/24/2021

COVID-19 Vaccinations in Virginia

Total Doses Administered - 8,915,179

| People Vaccinated with at Least One Dose* | % of the Population Vaccinated with at Least One Dose | People Fully Vaccinated^ | % of the Population Fully Vaccinated |
|---|---|--------------------------|--------------------------------------|
| 4,963,465 | 58.2% | 4,252,807 | 49.8% |

% of the Adult (18+) Population
Vaccinated with at Least One Dose
70.3%

% of the Adult (18+) Population Fully Vaccinated
60.8%

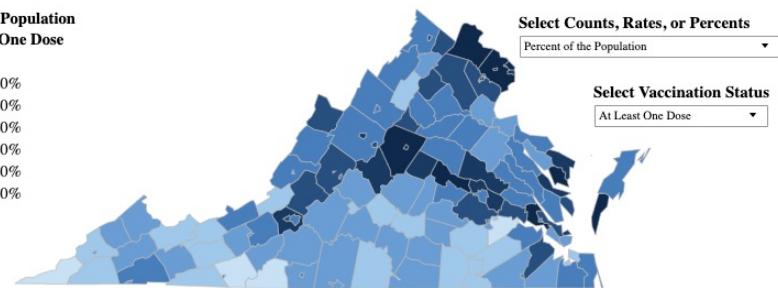
* People vaccinated with one dose of a two-dose vaccine and one dose of a single dose vaccine, including doses administered through the Federal CDC Pharmacy Partnership. Doses on the Federal Doses Administered dashboard are included.

^ People vaccinated with two doses of a two-dose vaccine and one dose of a single dose vaccine, including doses administered through the Federal CDC Pharmacy Partnership. Doses on the Federal Doses Administered dashboard are included.

People Vaccinated by Locality of Residence and Vaccination Status - Percent of the Population

Percent of the Population with At Least One Dose

- 30.1% - 35.0%
- 35.1% - 40.0%
- 40.1% - 45.0%
- 45.1% - 50.0%
- 50.1% - 55.0%
- 55.1% - 60.0%
- 60.1+%



Source: VDH



GOAL

Build a pipeline for a
dashboard to visualize
Virginia COVID-19 reports
and vaccination records
with **real-time** data



DATA

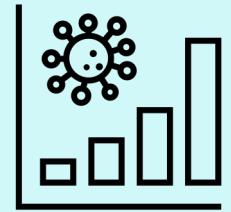
Virginia Open Data



**Vaccine Doses
Administered Dataset**
267 k data points

(Updates every day at 12pm EST)

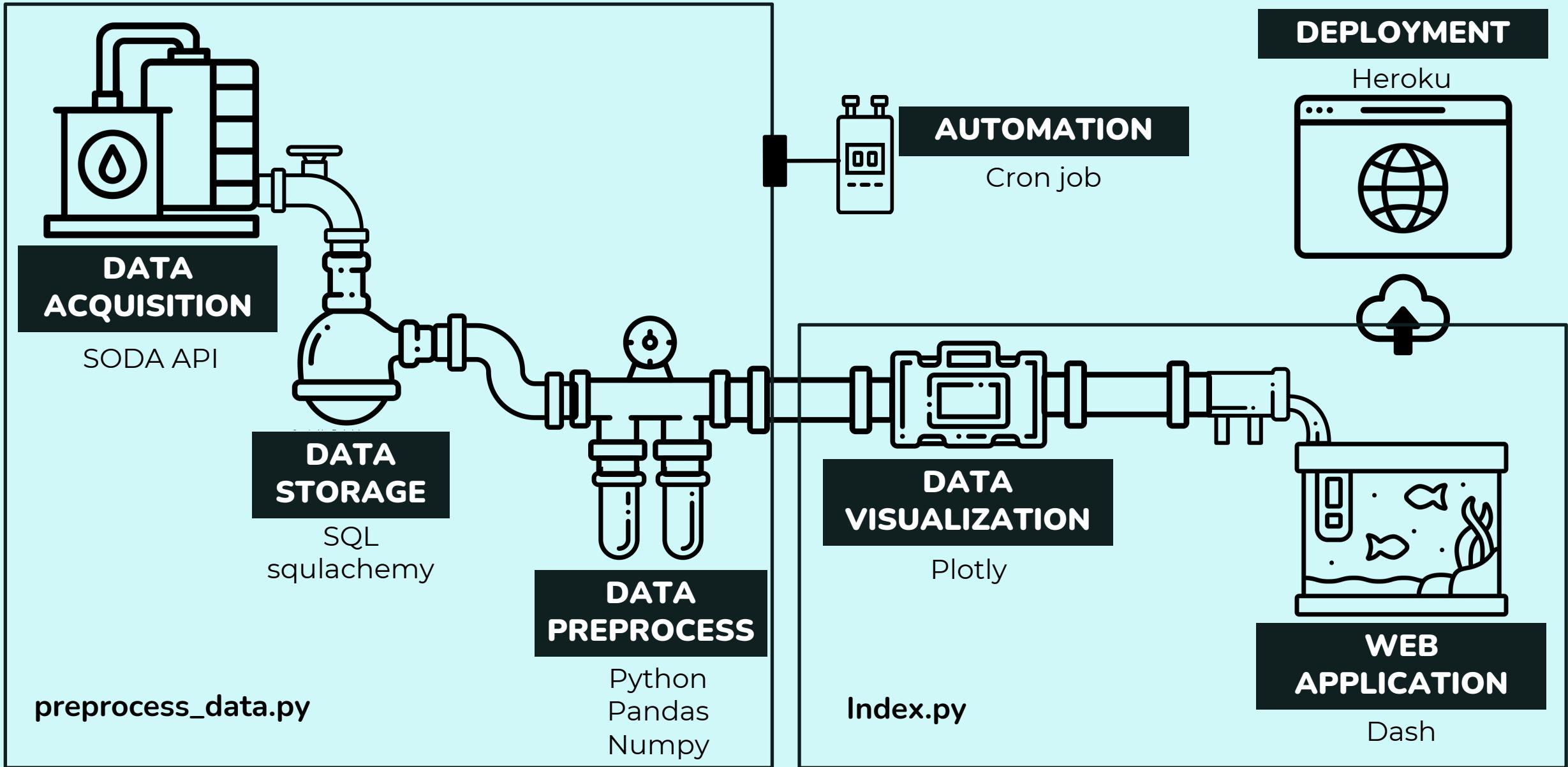
**COVID-19 Cases
Dataset**
61.8 k data points



Census Data
Virginia Counties Population

PIPELINE

(Disclaimer: Figure not drawn to scale)

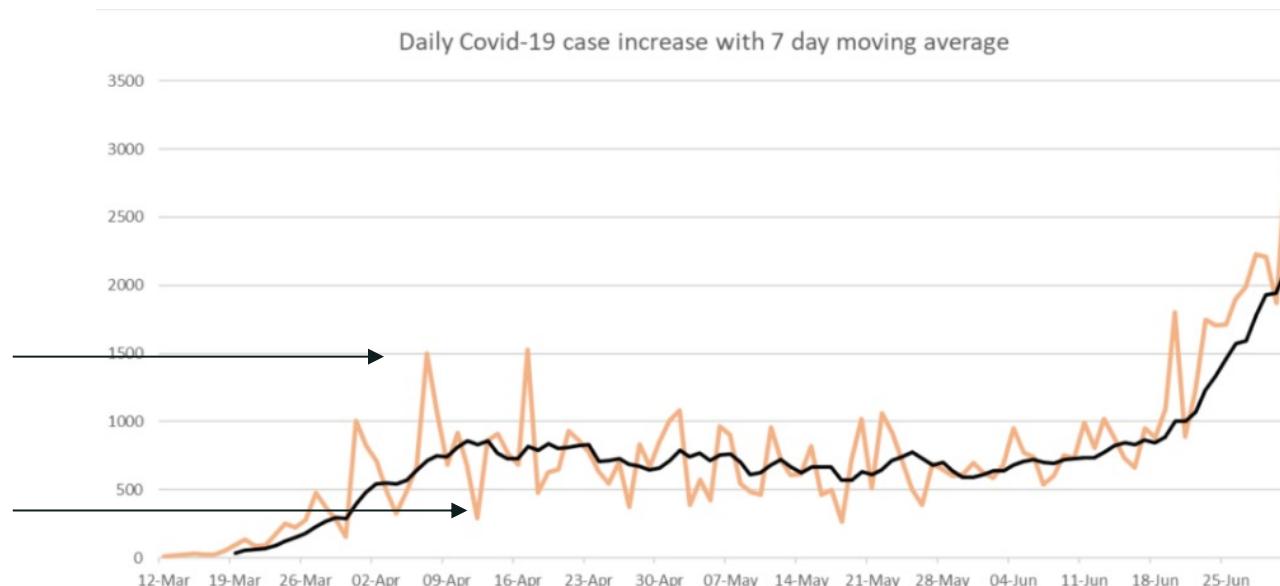


DATA PREPROCESSING

- **Rate per 100,000** – measure of disease frequency

$$\text{Rate per 100,000} = \frac{\# \text{ of cases}}{\text{total population}} \times 100,000$$

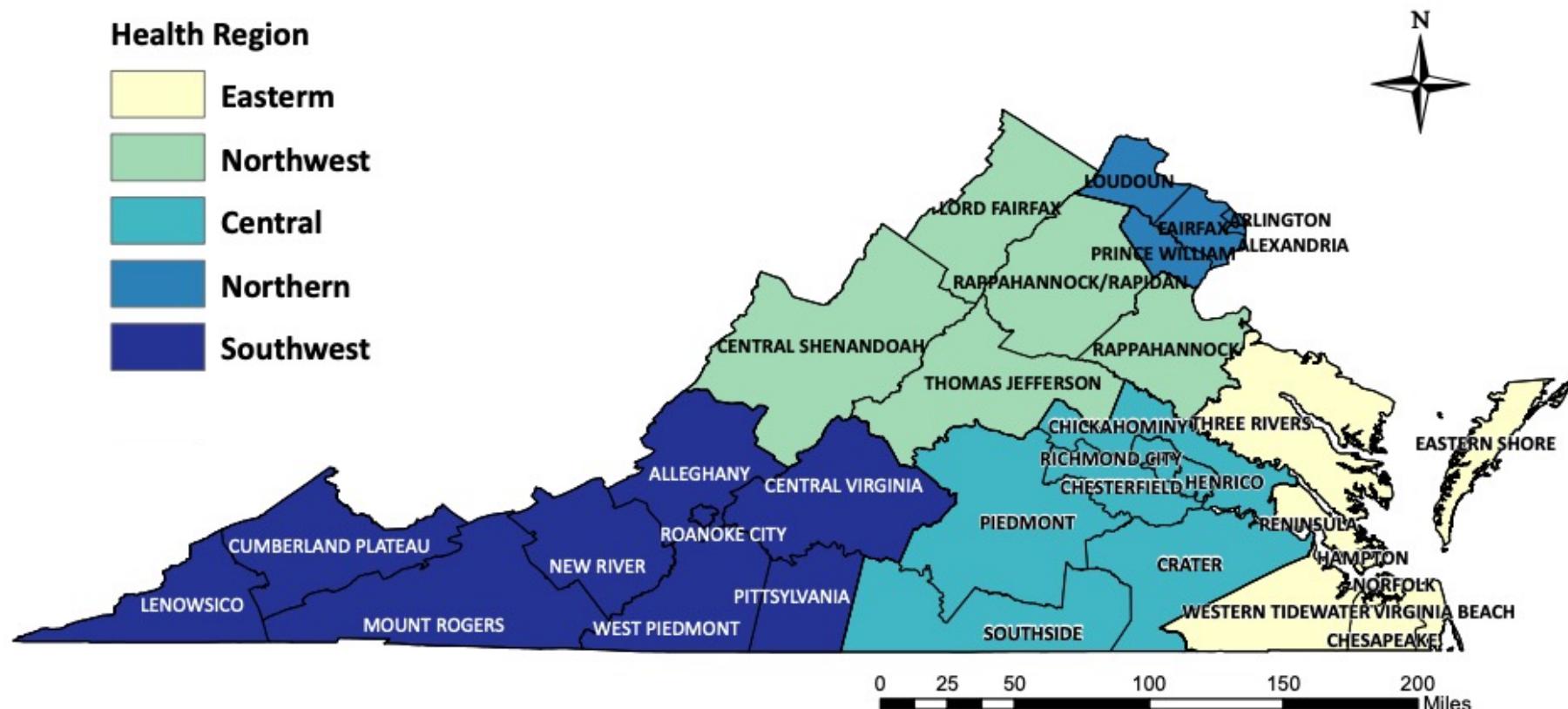
- **7-Days rolling (moving) average**



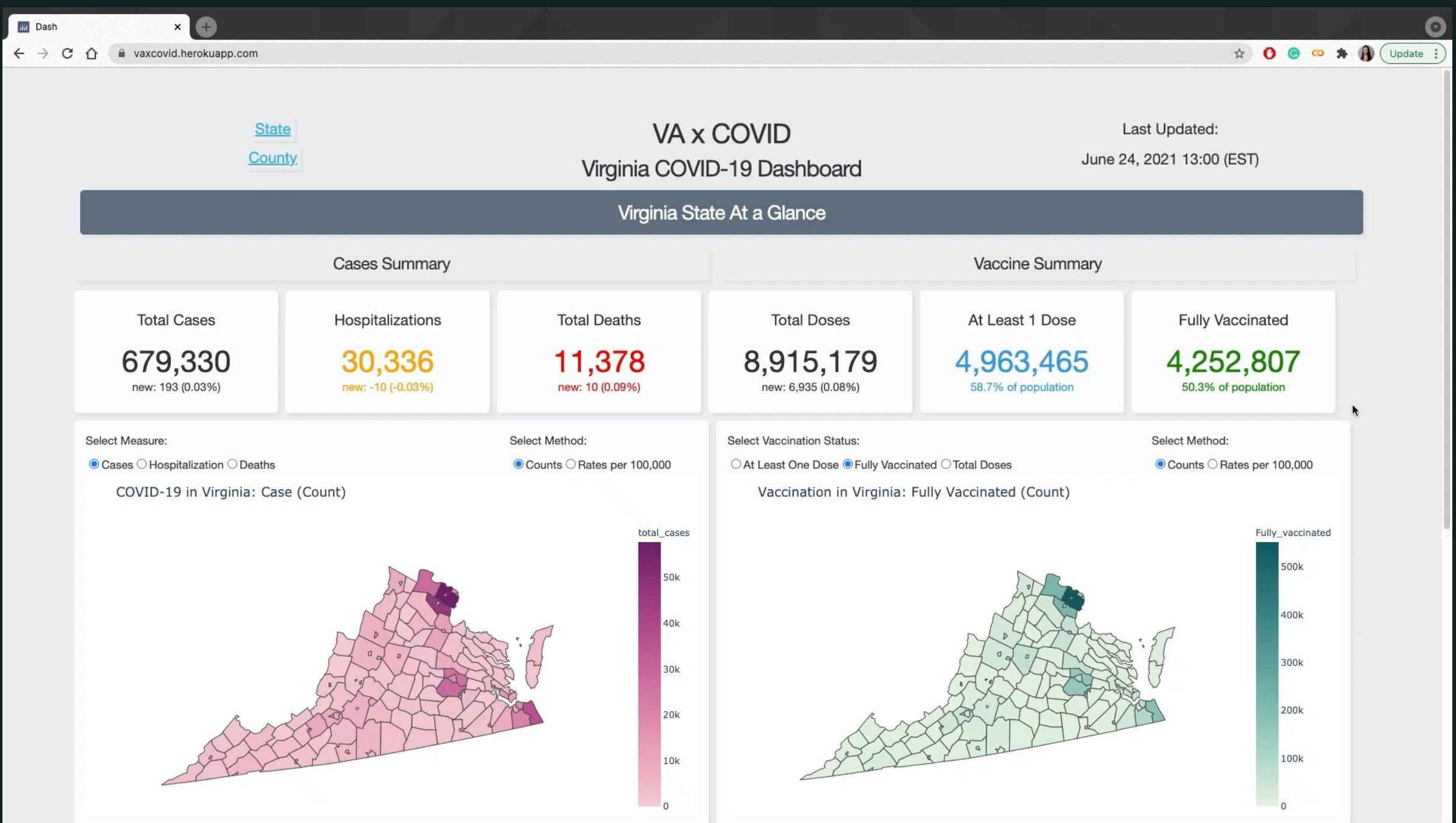
DATA PREPROCESSING

- Map **County** to **Region**

Virginia Health Districts and Regions



THE DASH



PRELIMINARY ANALYSIS

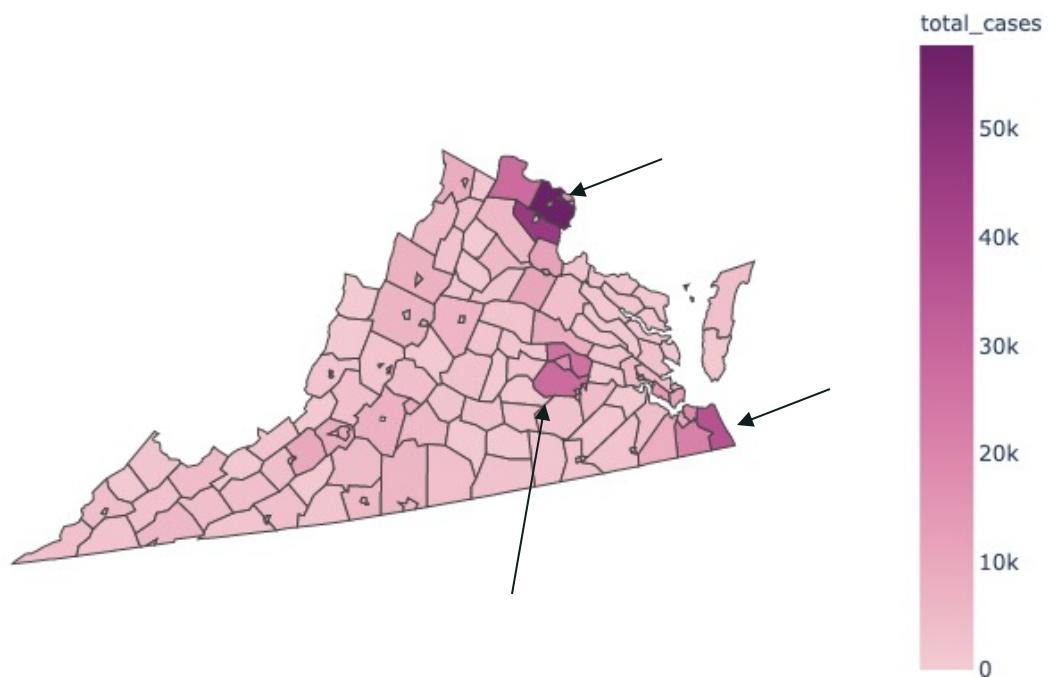
Select Measure:

- Cases Hospitalization Deaths

Select Method:

- Counts
 Rates per 100,000

COVID-19 in Virginia: Case (Count)



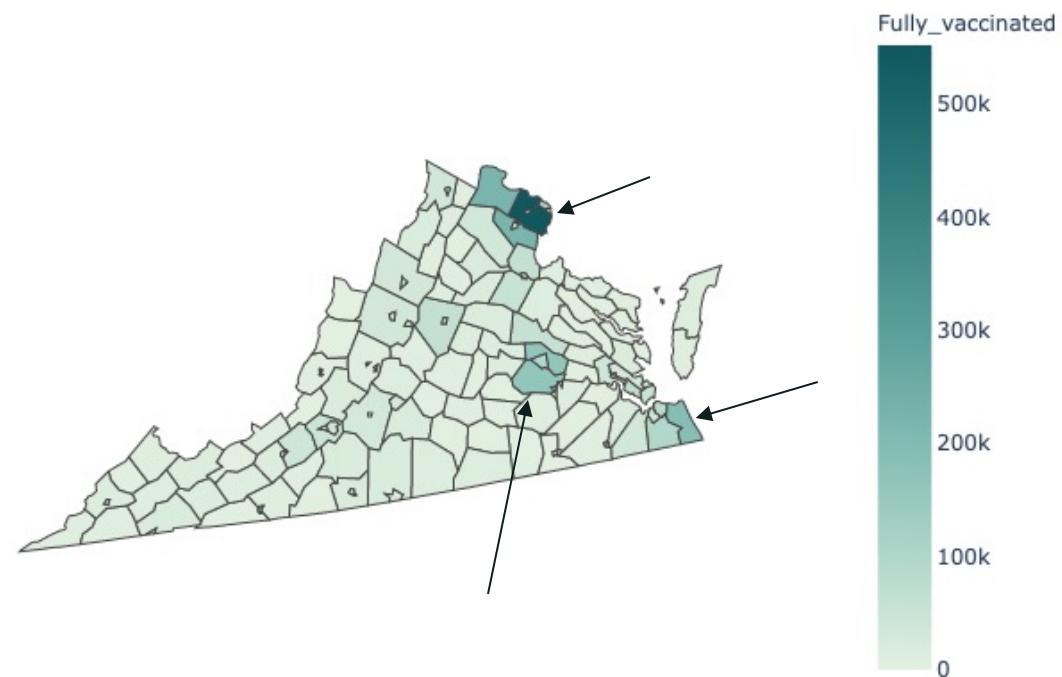
Select Vaccination Status:

- At Least One Dose Fully Vaccinated Total Doses

Select Method:

- Counts
 Rates per 100,000

Vaccination in Virginia: Fully Vaccinated (Count)



PRELIMINARY ANALYSIS

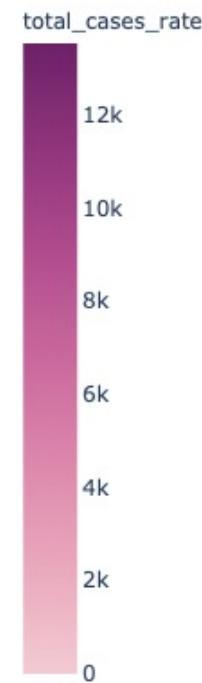
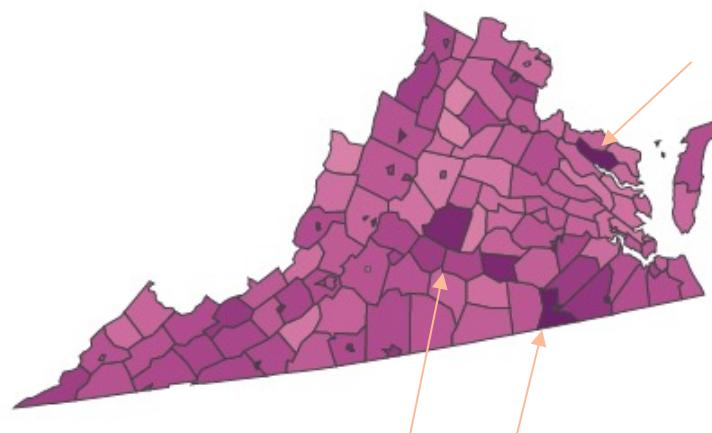
Select Measure:

Cases Hospitalization Deaths

Select Method:

Counts
 Rates per 100,000

COVID-19 in Virginia: Cases (Rate per 100,000)



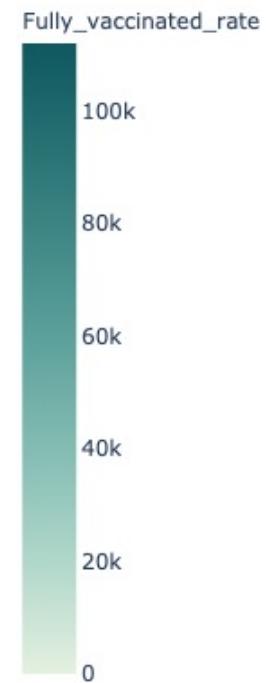
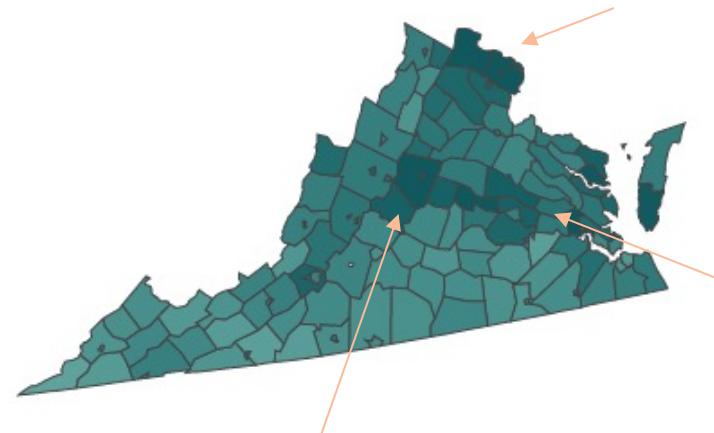
Select Vaccination Status:

At Least One Dose Fully Vaccinated Total Doses

Select Method:

Counts
 Rates per 100,000

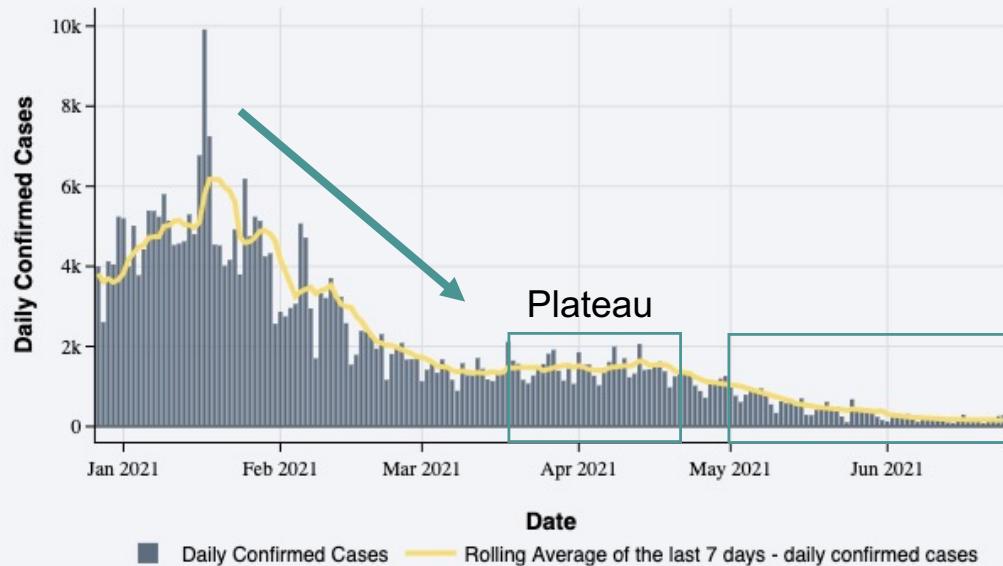
Vaccination in Virginia: Fully Vaccinated (Rate per 100,000)



PRELIMINARY ANALYSIS

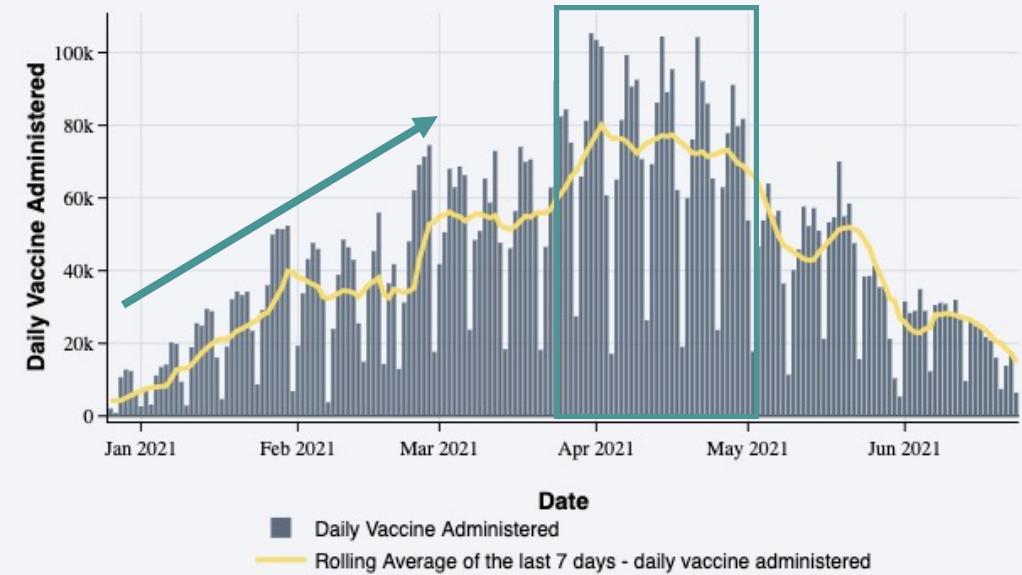
Past 180 Days

Last 180 Days of Daily Cases in Virginia



Past 180 Days

Last 180 Days of Vaccine Administered in Virginia



PRELIMINARY ANALYSIS

[State](#)

[County](#)

VA x COVID

Virginia COVID-19 Dashboard

Last Updated:

June 24, 2021 13:00 (EST)

Virginia Beach

x ▾

As Of:
June 24, 2021

New Confirmed
9 ▼-15

New Hospitalization
6 ▲6

New Deaths
0 -

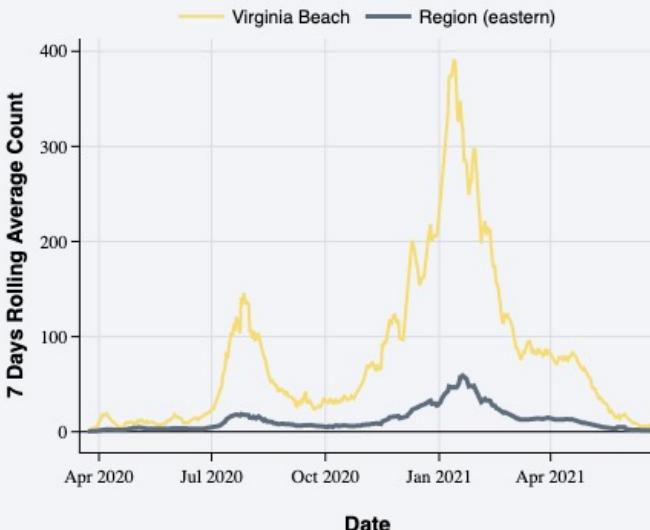
Vaccination Status:



How is the County Doing Compared to the Region Average?

Cases Hospitalization Deaths

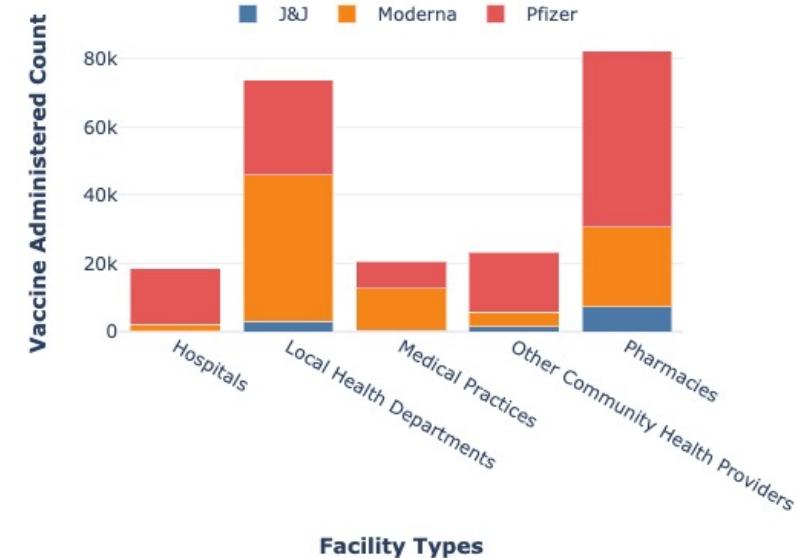
Weekly Rolling Average Count of
Virginia Beach County and Eastern Region



Where and Which Vaccine are People Getting?

First Dose Second Dose

Types of Vaccine Administered at Different Facilities



PRELIMINARY ANALYSIS

[State](#)

[County](#)

VA x COVID

Virginia COVID-19 Dashboard

Last Updated:

June 24, 2021 13:00 (EST)

Northampton

X ▾

As Of:
June 24, 2021

New Confirmed
0 -

New Hospitalization
0 -

New Deaths
0 -

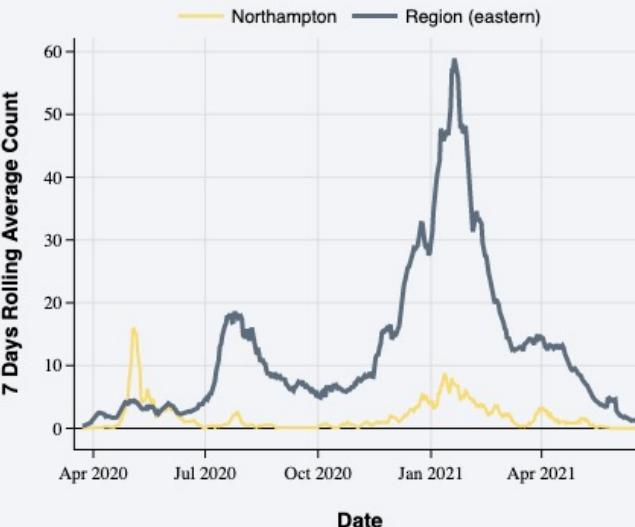
Vaccination Status:



How is the County Doing Compared to the Region Average?

Cases Hospitalization Deaths

Weekly Rolling Average Count of Northampton County and Eastern Region



Where and Which Vaccine are People Getting?

First Dose Second Dose

Types of Vaccine Administered at Different Facilities



INSIGHTS



Rates can be a more helpful indicator



There is a trend of **decreasing** number of **cases** coincided with a trend of **increasing** number of **vaccine**



County dashboard can be used to decide outreach/education strategy/planning

FUTURE POTENTIAL

1

Build a Predictive Model

Using Timeseries algorithm

2

Apply More Filters on the App

Dates, Regions etc.

3

Update Dashboard Graphs and Visual

Based on user feedbacks

THANKS!

Questions?
Give it a shot!



<https://vaxcovid.herokuapp.com>

STAY IN TOUCH!



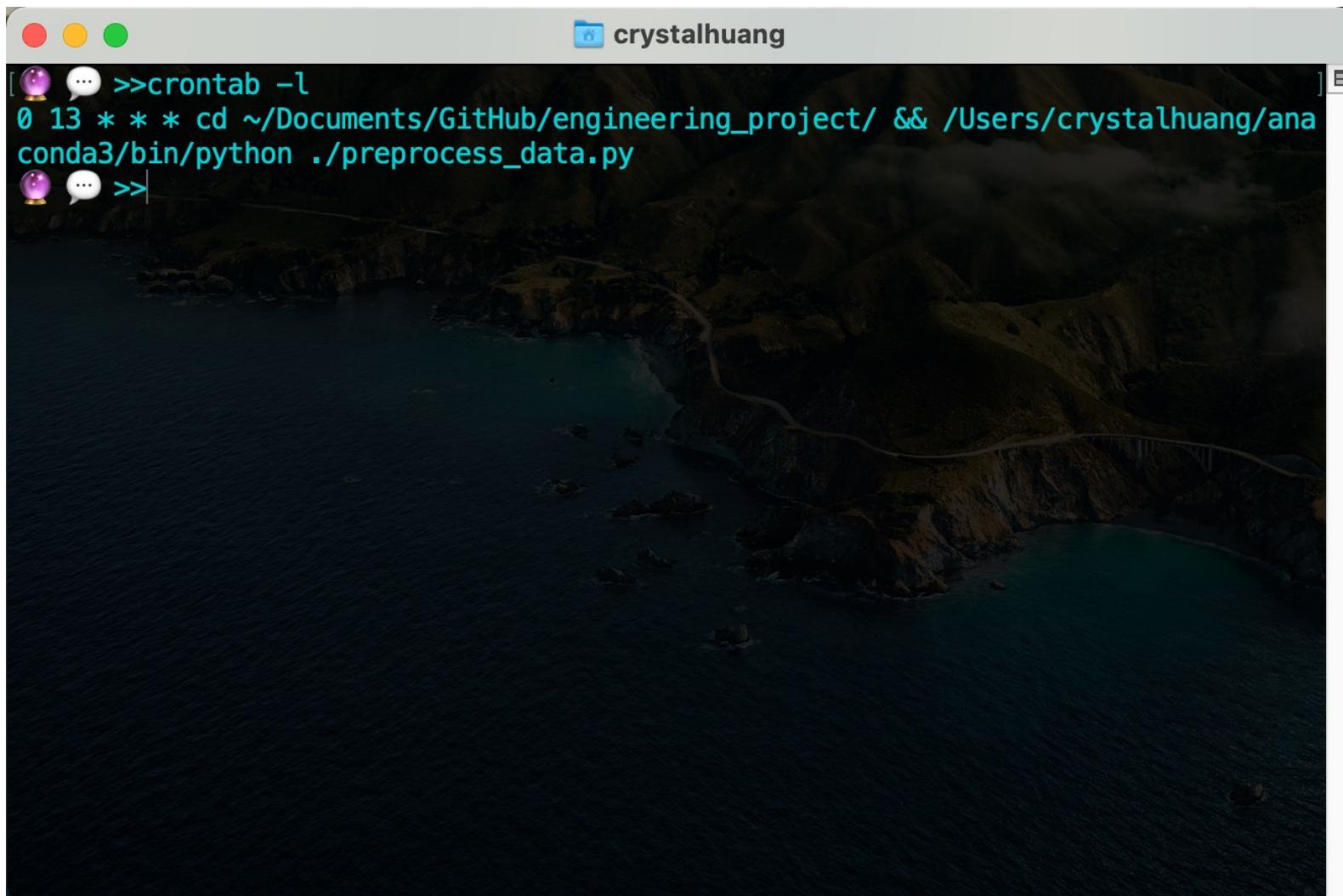
crystal-ctrl



crystal-huang-ds

crystaldatasy.medium.com

APPENDIX 1



```
>>crontab -l
0 13 * * * cd ~/Documents/GitHub/engineering_project/ && /Users/crystalhuang/ana
conda3/bin/python ./preprocess_data.py
>>
```

APPENDIX 2

| Purpose | Connects | Main script | Function library |
|-------------------------|-----------------|--------------------|---------------------------------|
| Update content database | API -> Database | preprocess_data.py | collect_data.py |
| Launch Dash app | Database -> App | Index.py | App.py State.py County.py |
| Deploy app on Heroku | App -> Web | Procfile | Requirements.txt |