Graphs vs Germs

Data Visualization's Role in Public Health

Iroshini Gunasekera

What is Public Health?

Public health is the science and art of preventing disease, prolonging life, and promoting health through organized efforts and informed choices of society, organizations, public and private, communities, and individuals.

Who is the Public?

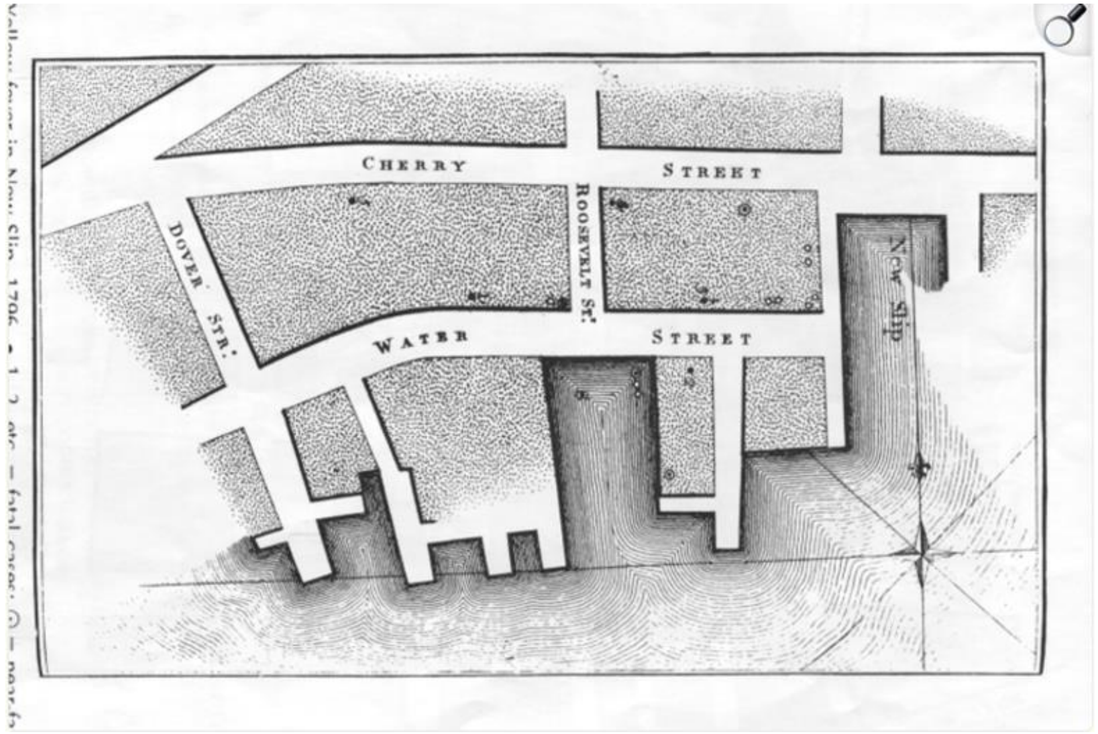
A group of people

A Town

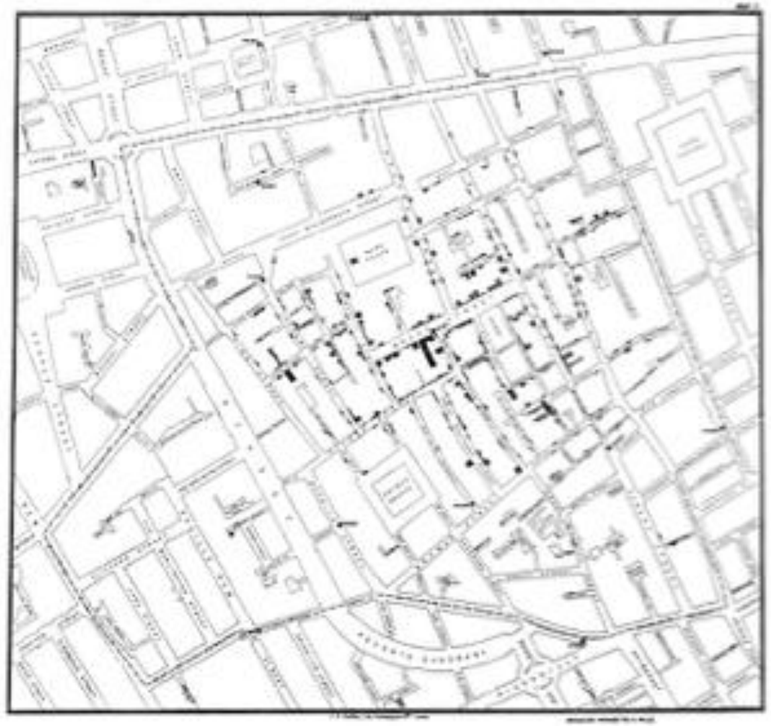
A City

Early Public Health Visualizations

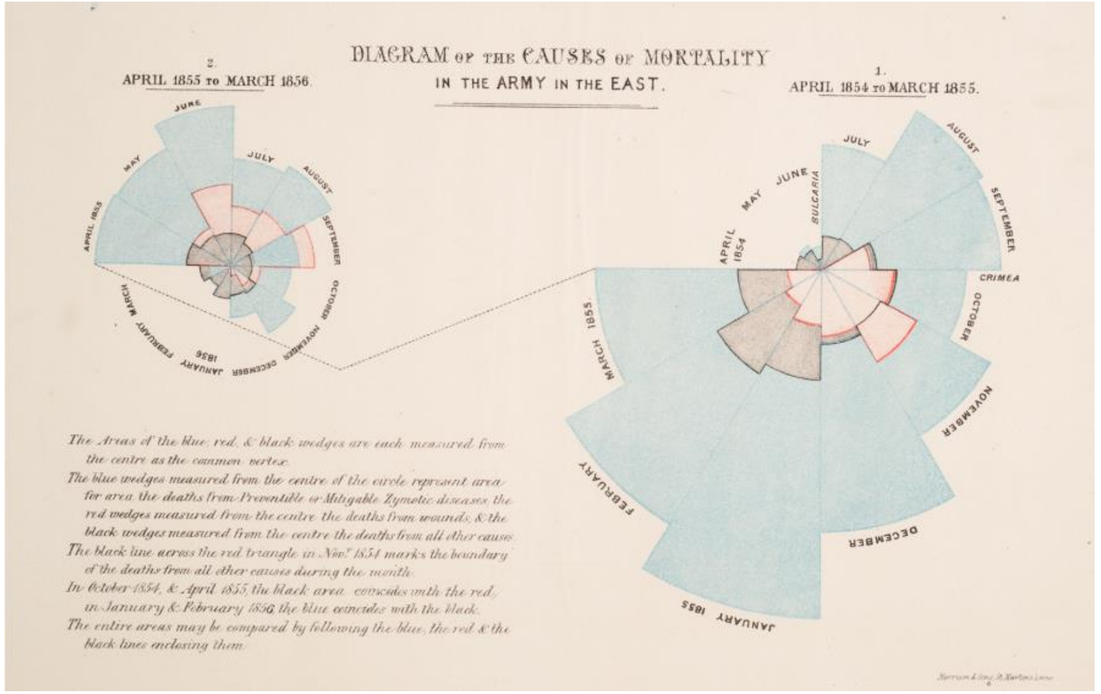
Valentine Seaman's Yellow Fever map (1798)



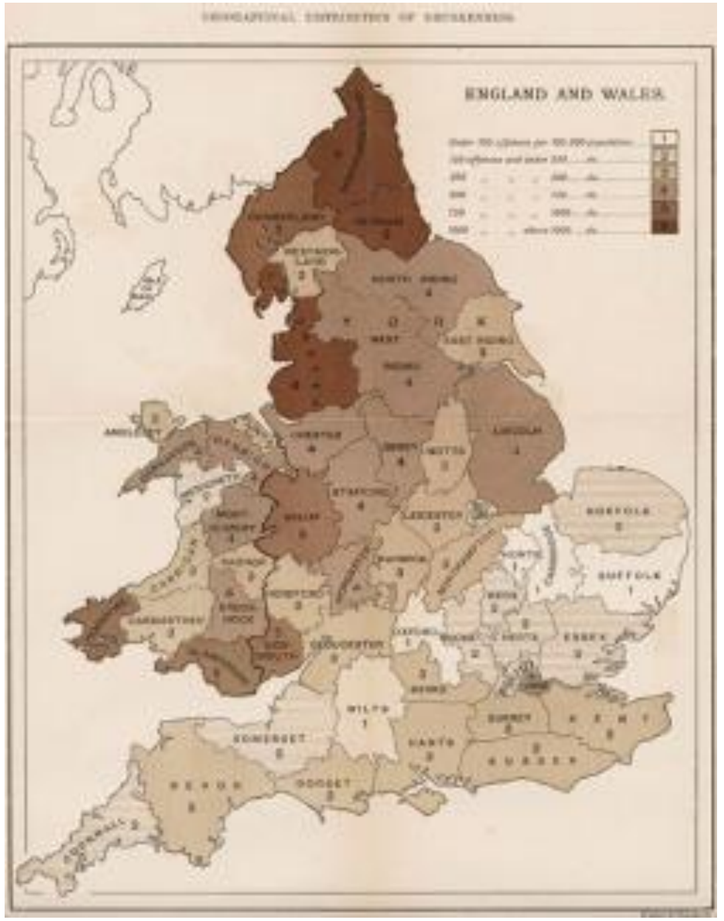
Jon Snow's Cholera Epidemic Map (1849)



Florence Nightingale’s Rose Charts (1859)

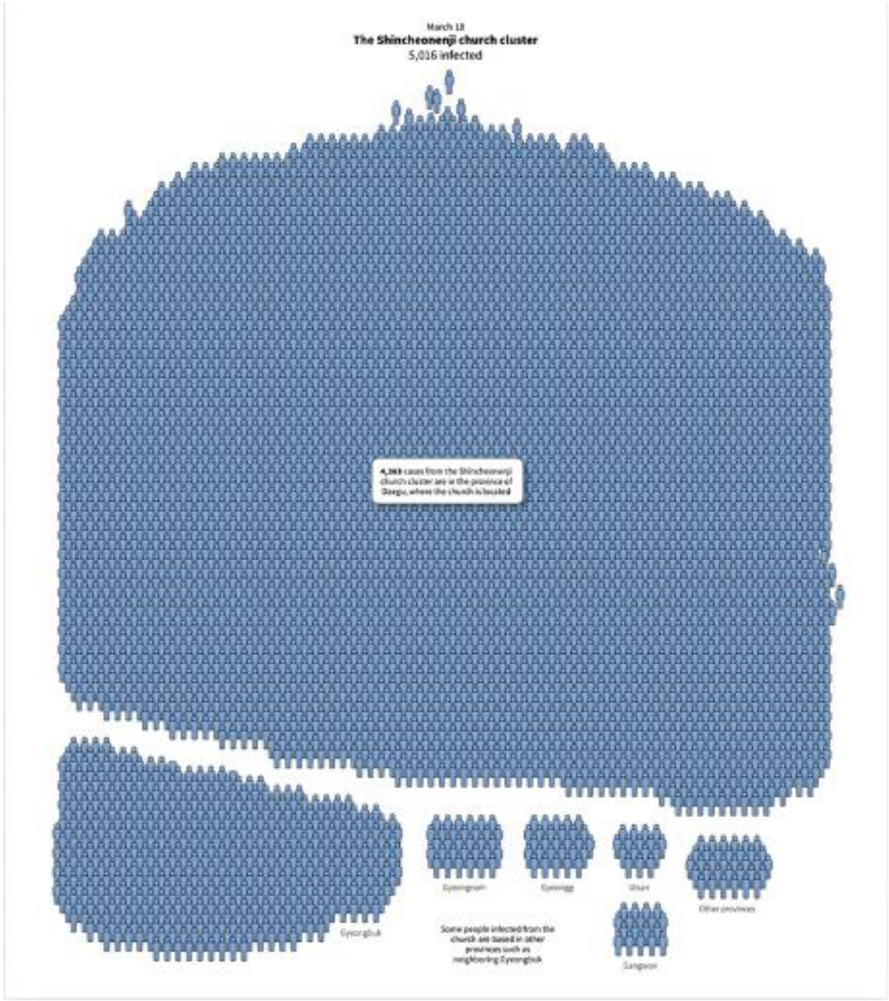


J. Rowntree and A. Sherwell (1899)

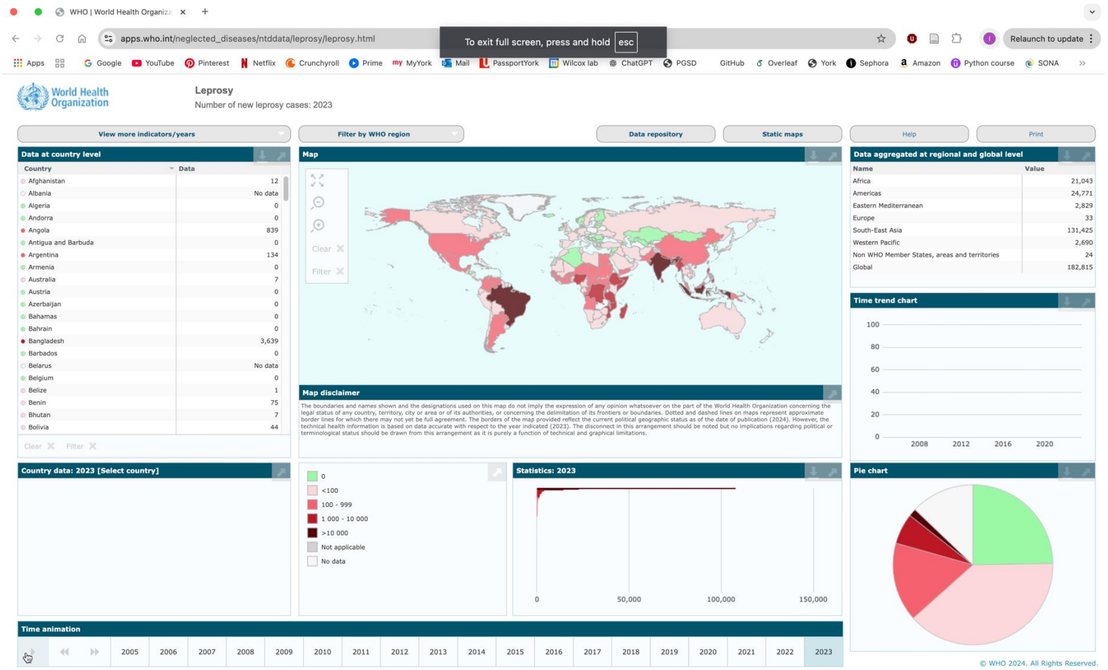


Modern Public Health Visualizations

COVID - 19 in South Korea



Leprosy rates worldwide



Why is Public Health Visualization Important?

Patients

Healthcare workers

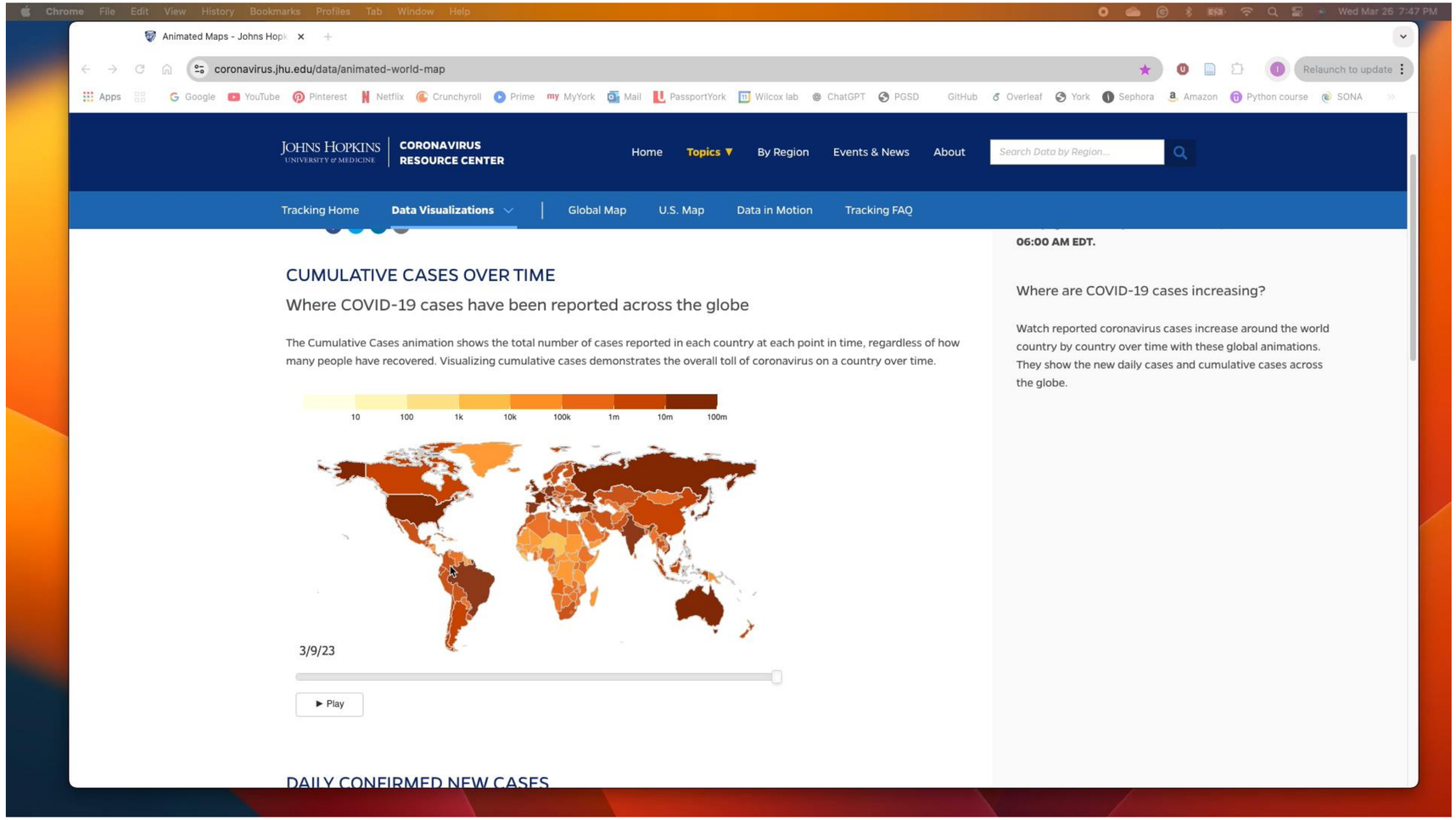
Administrators

Politicians

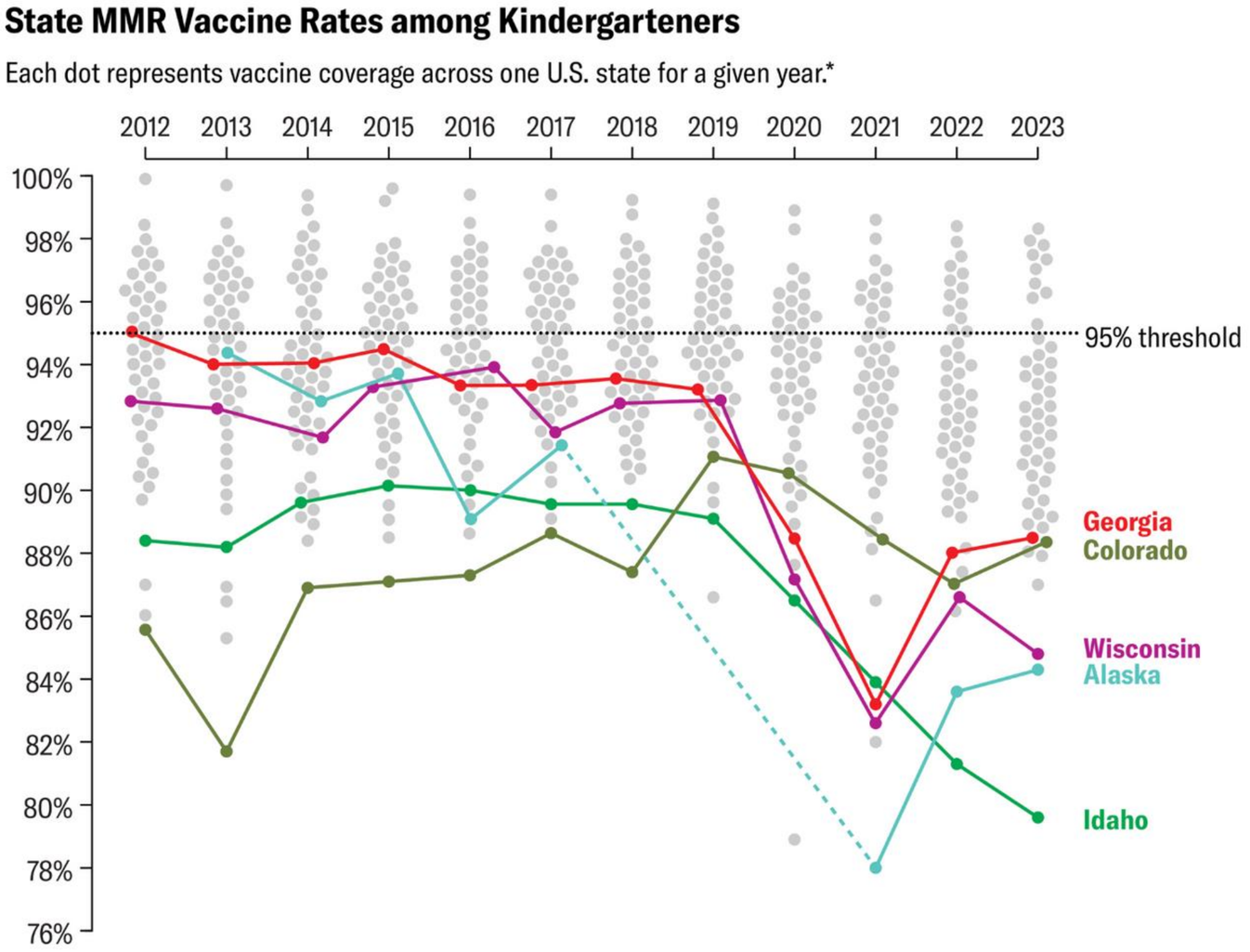
KEY APPLICATIONS OF DATA VISUALIZATION FOR PUBLIC HEALTH

1. Early detection of outbreaks.
2. Monitoring health trends.
3. Public health education.
4. Identifying risk factors.
5. Evaluating intervention effectiveness.

Early detection of outbreaks



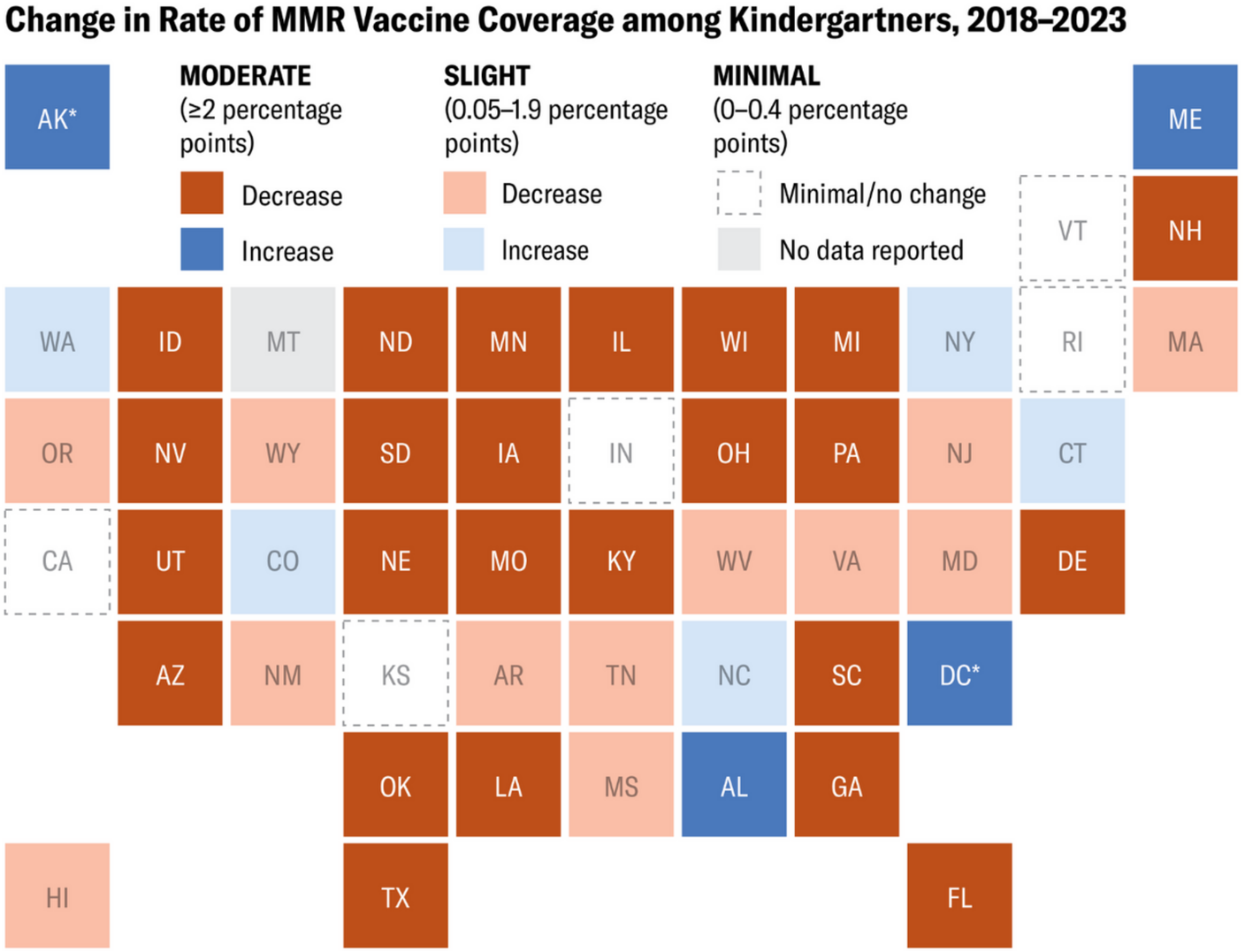
Monitoring health trends



Alaska, Delaware, Hawaii, Illinois, New Hampshtire, North Carolina, Oklahoma, Washington, D.C., West Virginia and Wyoming only reported data for select years.

Ripley Cleghorn; Source: Centers for Disease Control and Prevention *(data)*

Monitoring health trends

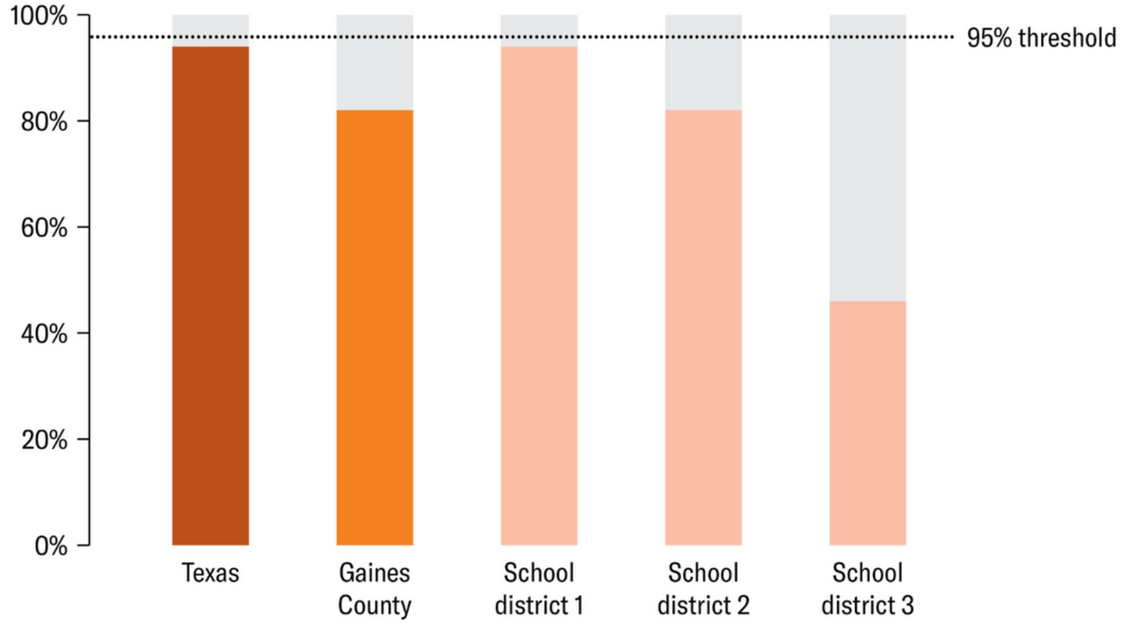


Public Health Education

Some Texas School Districts Fall below the State's Overall MMR Vaccine Coverage

Gaines County, Texas's measles, mumps and rubella (MMR) vaccination rate of 82 percent falls below the state's overall rate of 94 percent). Two of the three school districts in the county are far lower than the state's rate and the recommended rate for herd immunity (95 percent). Texas collects data from public, private and charter schools.*

MMR Vaccine Rates among Kindergarteners, 2023–2024 School Year



**Reported data do not include children who are homeschooled.*

Ripley Cleghorn; Source: Annual Reports of Immunization Status *(data)*

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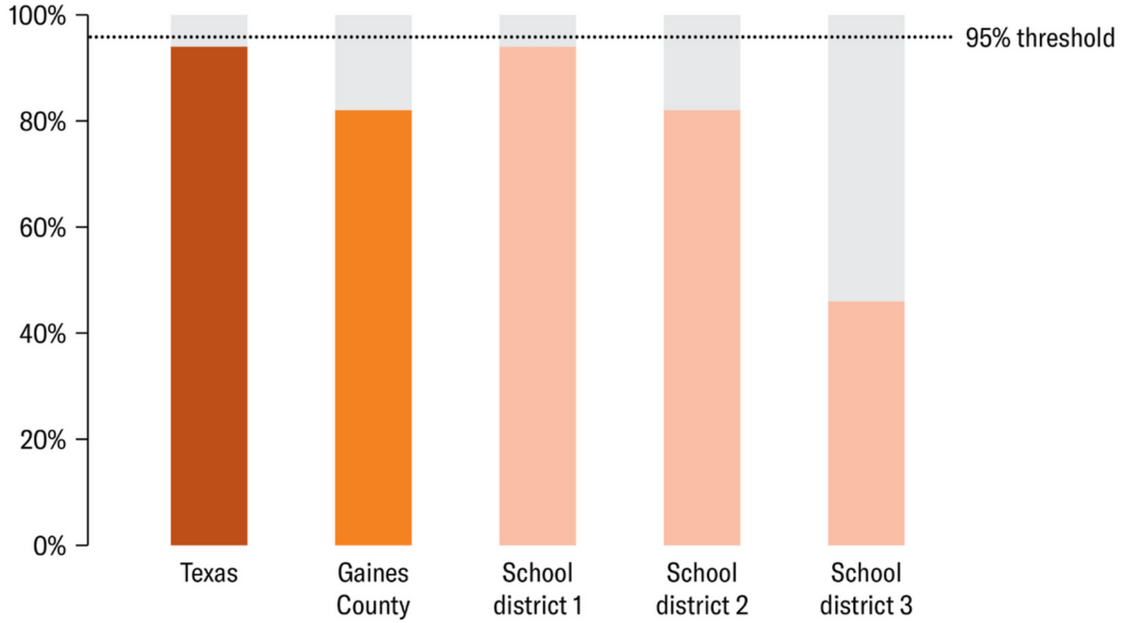

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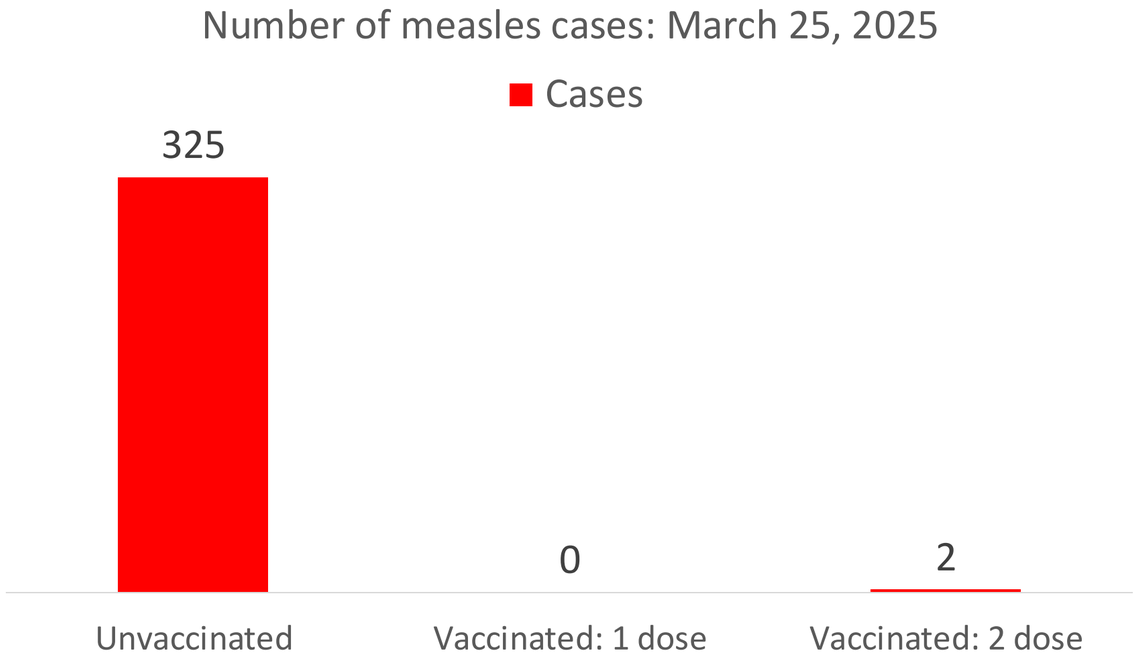
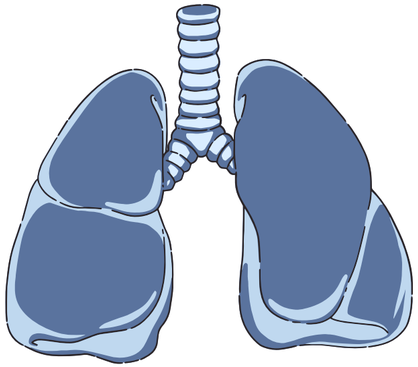
Ripley Cleghorn; Source: Annual Reports of Immunization Status *(data)*

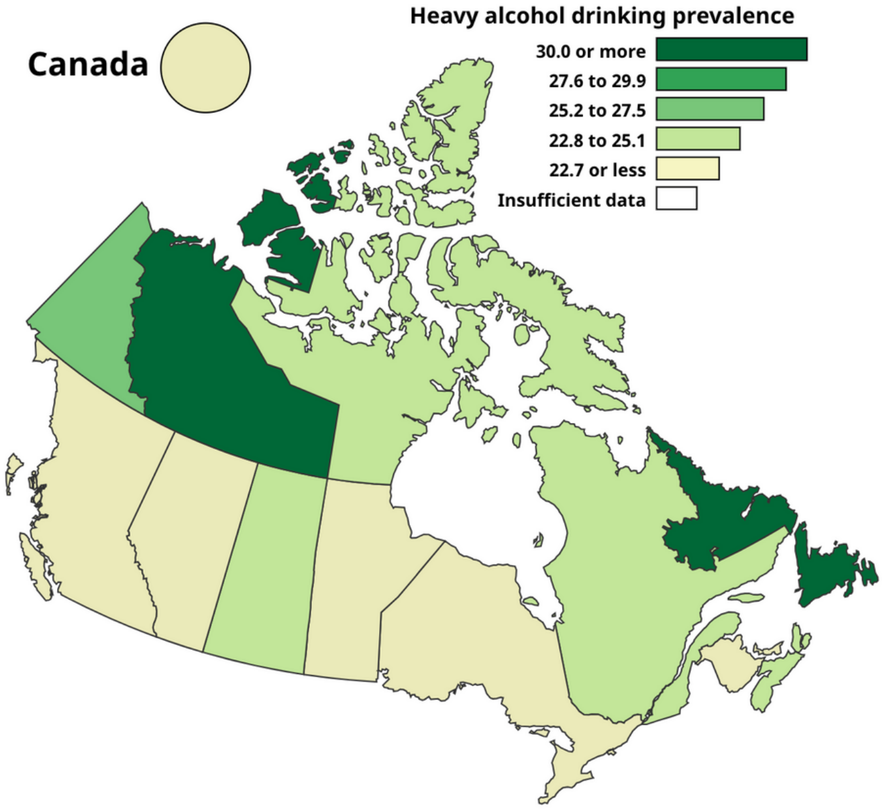



TikTok
@ goodliars0
We don't have the vibrational frequency
to host that virus.
THE GOOD LIARS

Identifying Risk Factors



Heavy alcohol drinking : Prevalence of heavy alcohol drinking, among Canadian adults aged 18+ years , by province/territory, both sexes, age-standardized rates, 2015-2018

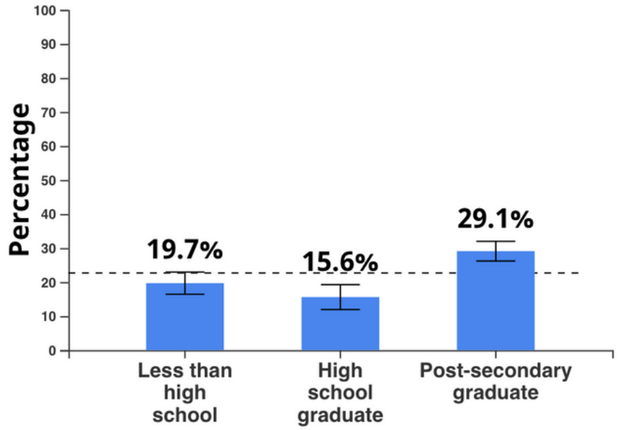


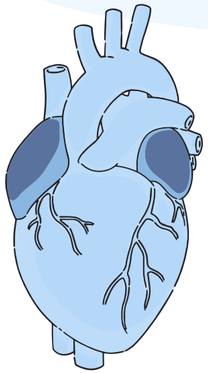
Toggle Population Ecumene | Map (.png) | Map Data | Graph Data

The **heavy alcohol drinking** age-standardized rate for **adults of both sexes** in **Nunavut** is **24.7%**. This is **not significantly different from the** national average of **22.7%**.

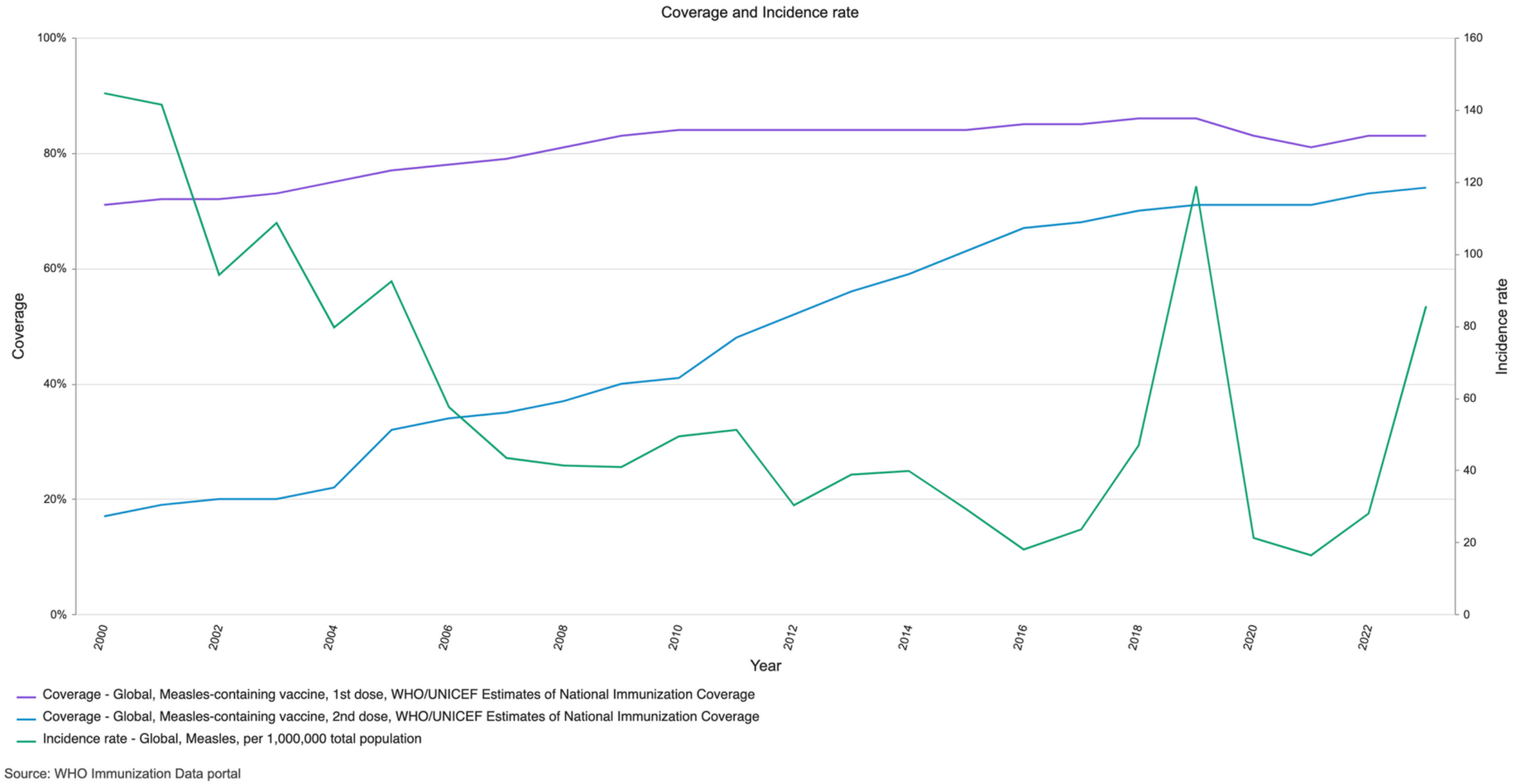
Prevalence of **heavy alcohol drinking** in **adults of both sexes** located in **Nunavut** by

Highest level of education (household)

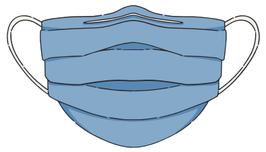


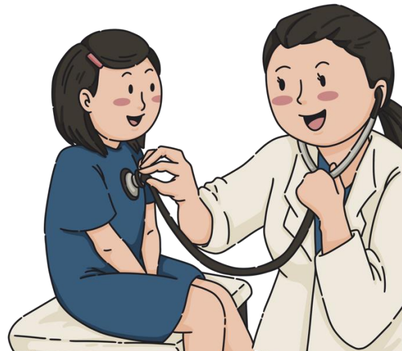


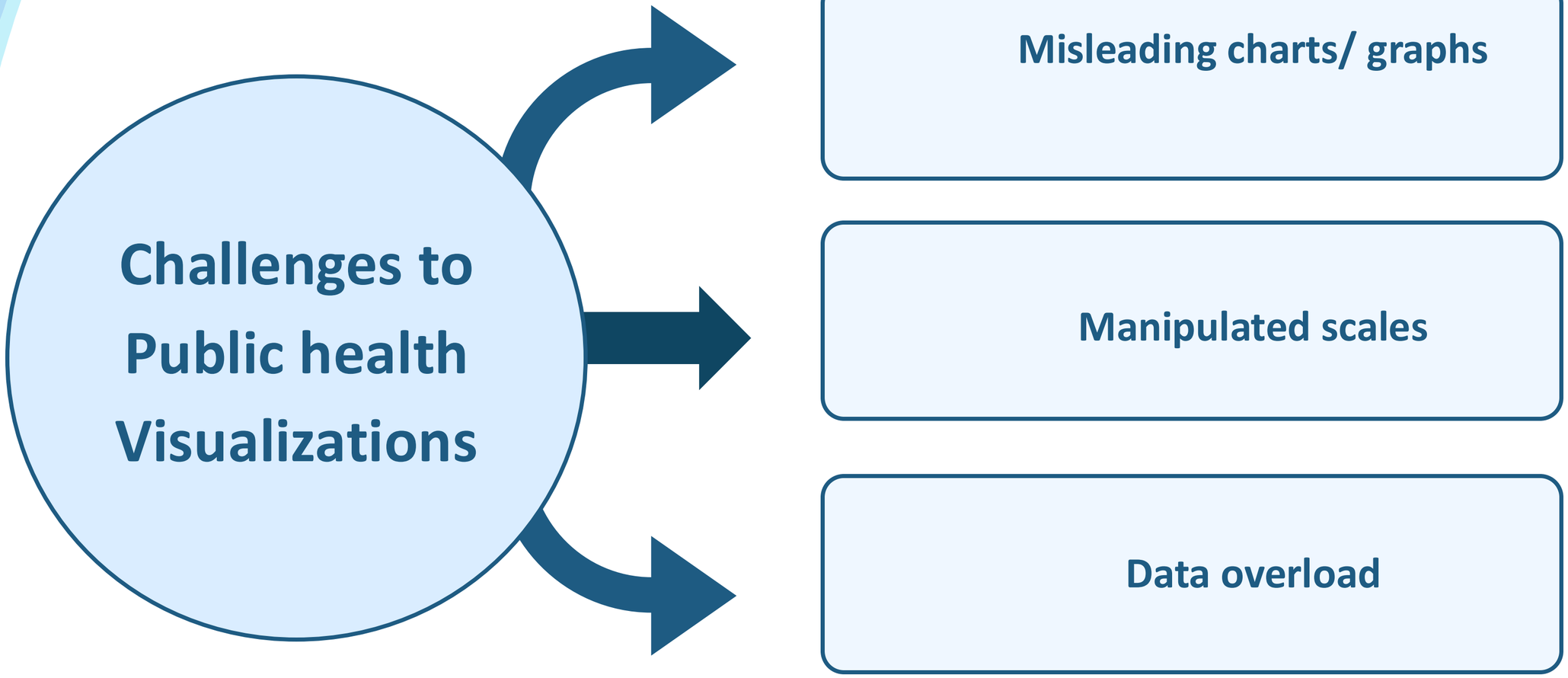
Evaluating Intervention Effectiveness



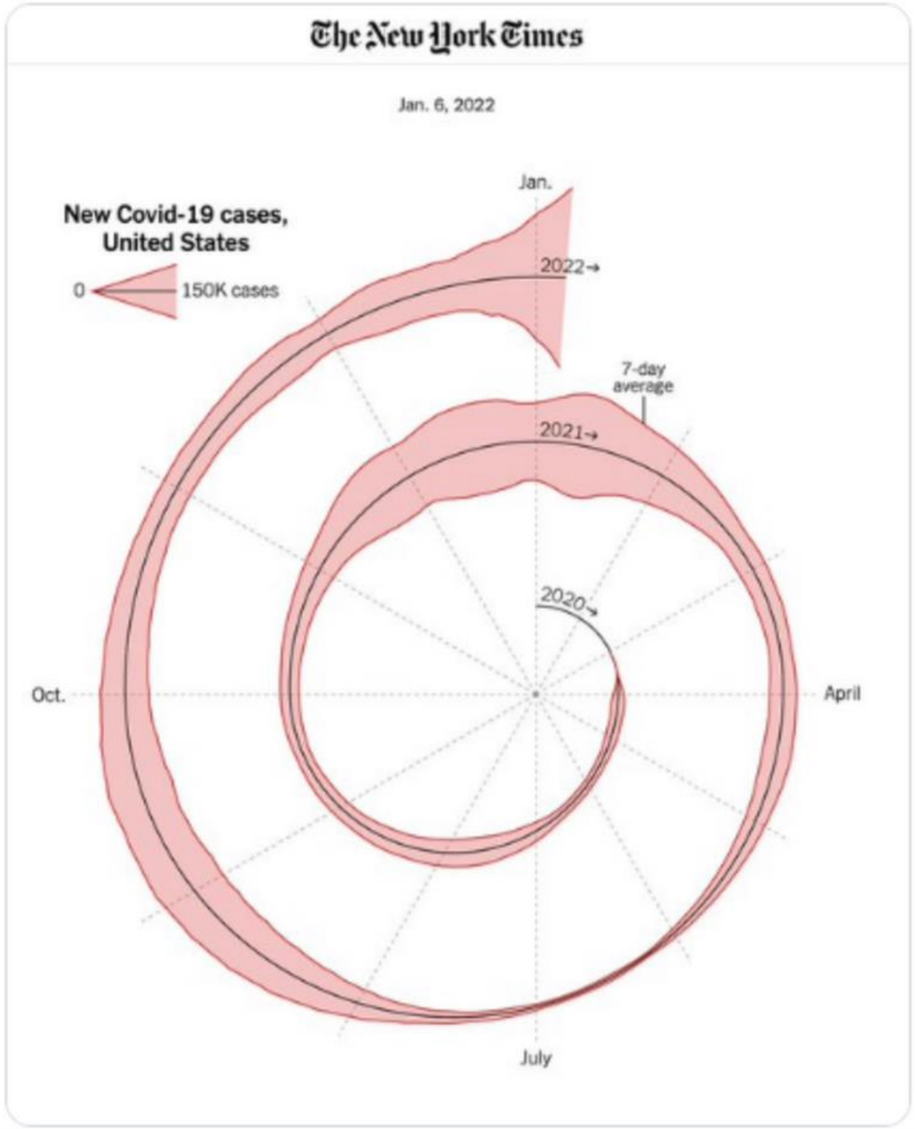
Source: WHO Immunization Data portal






Challenges to Public health Visualizations
Misleading charts/ graphs
Manipulated scales
Data overload

Misleading Charts/Graphs



Zach Freed
@FreedZach

literally no reason to make this graph into a spiral

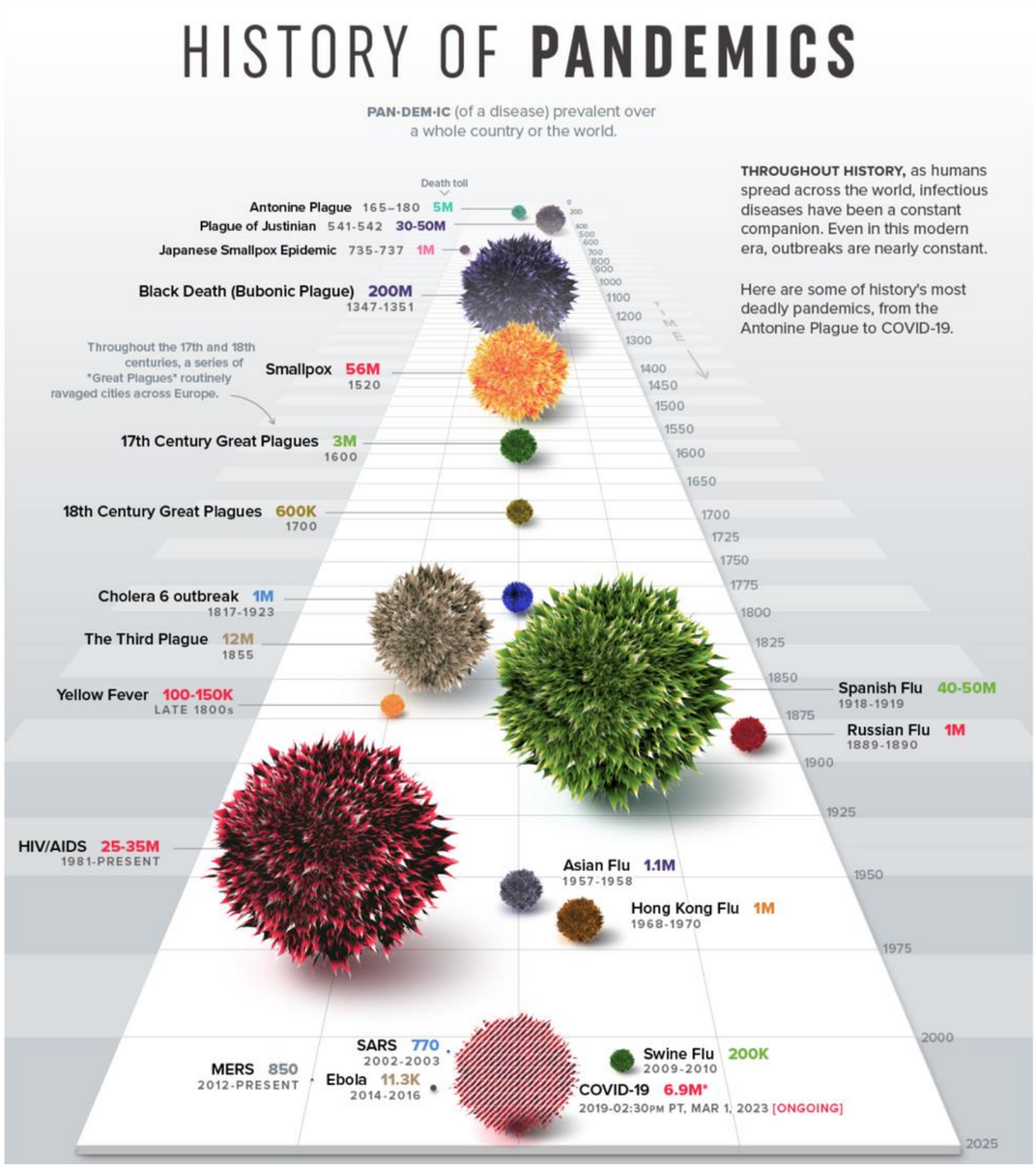
Dr Ellie Murray, ScD
@EpiEllie

Is this graph real because wow that is the most unhelpful graph I have ever seen, and I have seen some truly bad graphs in my day

Randall Koutnik @rkoutnik · Jan 8

Client: Can you make it more intestinal?

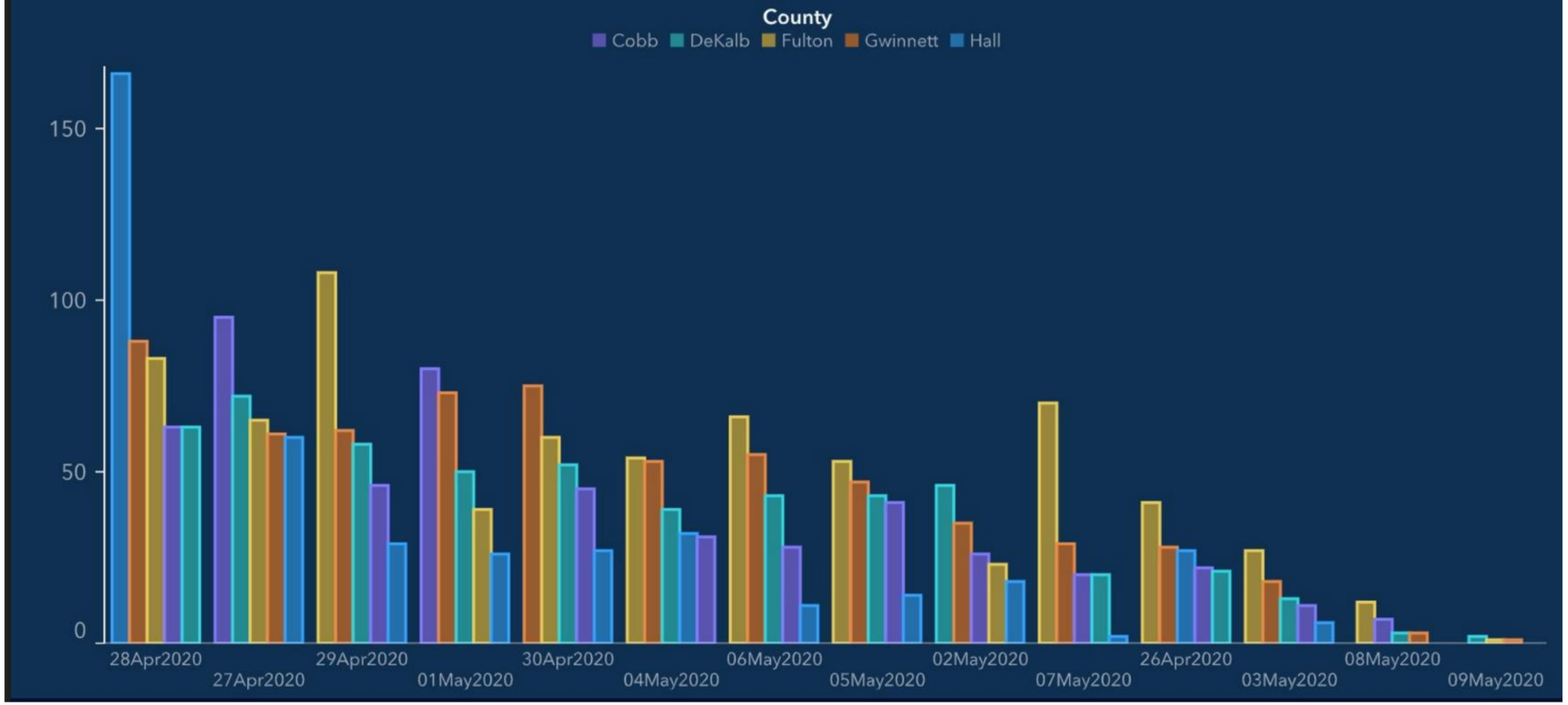
Misleading Charts/Graphs



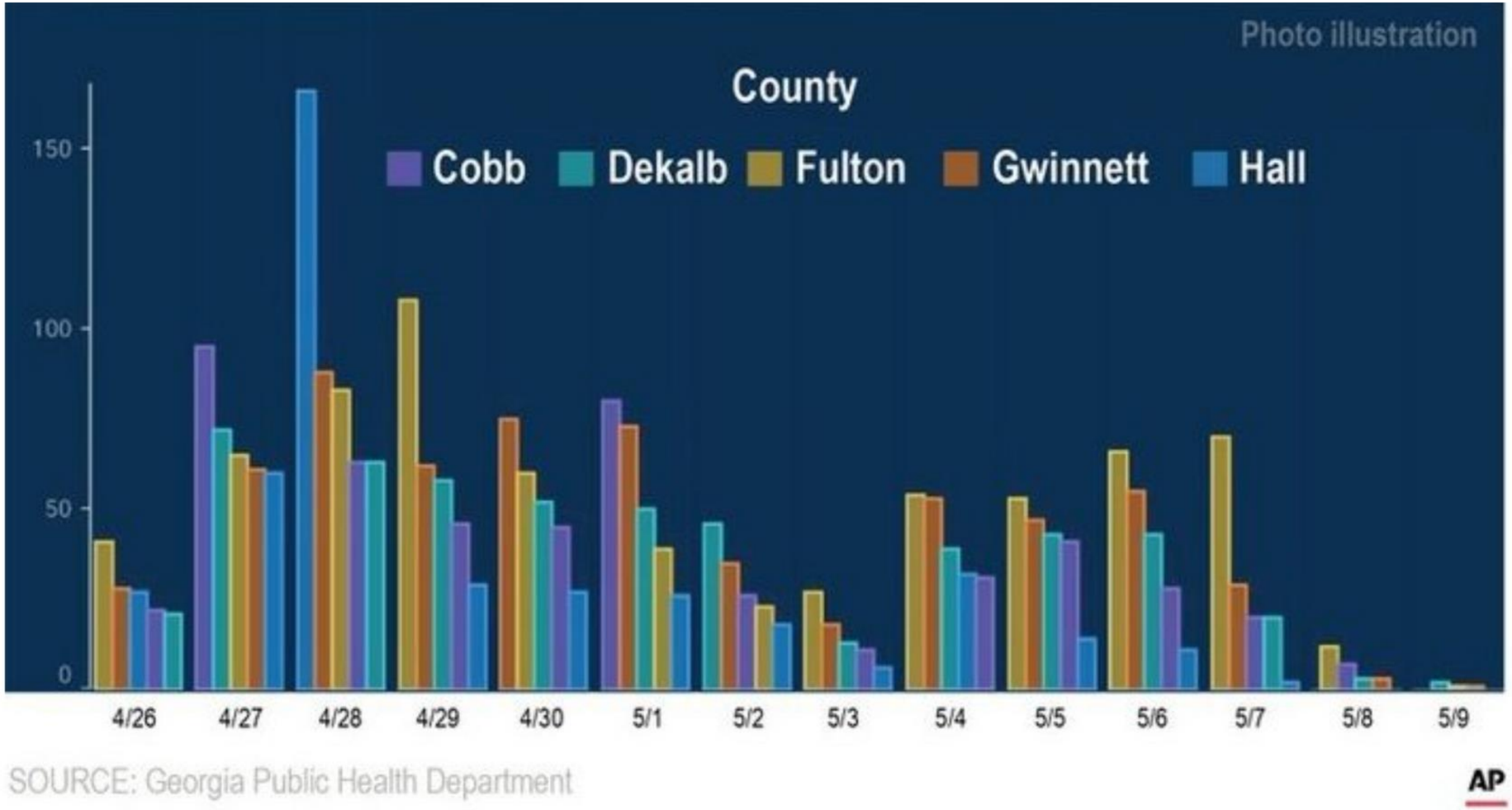
Manipulated Scales

Top 5 Counties with the Greatest Number of Confirmed COVID-19 Cases

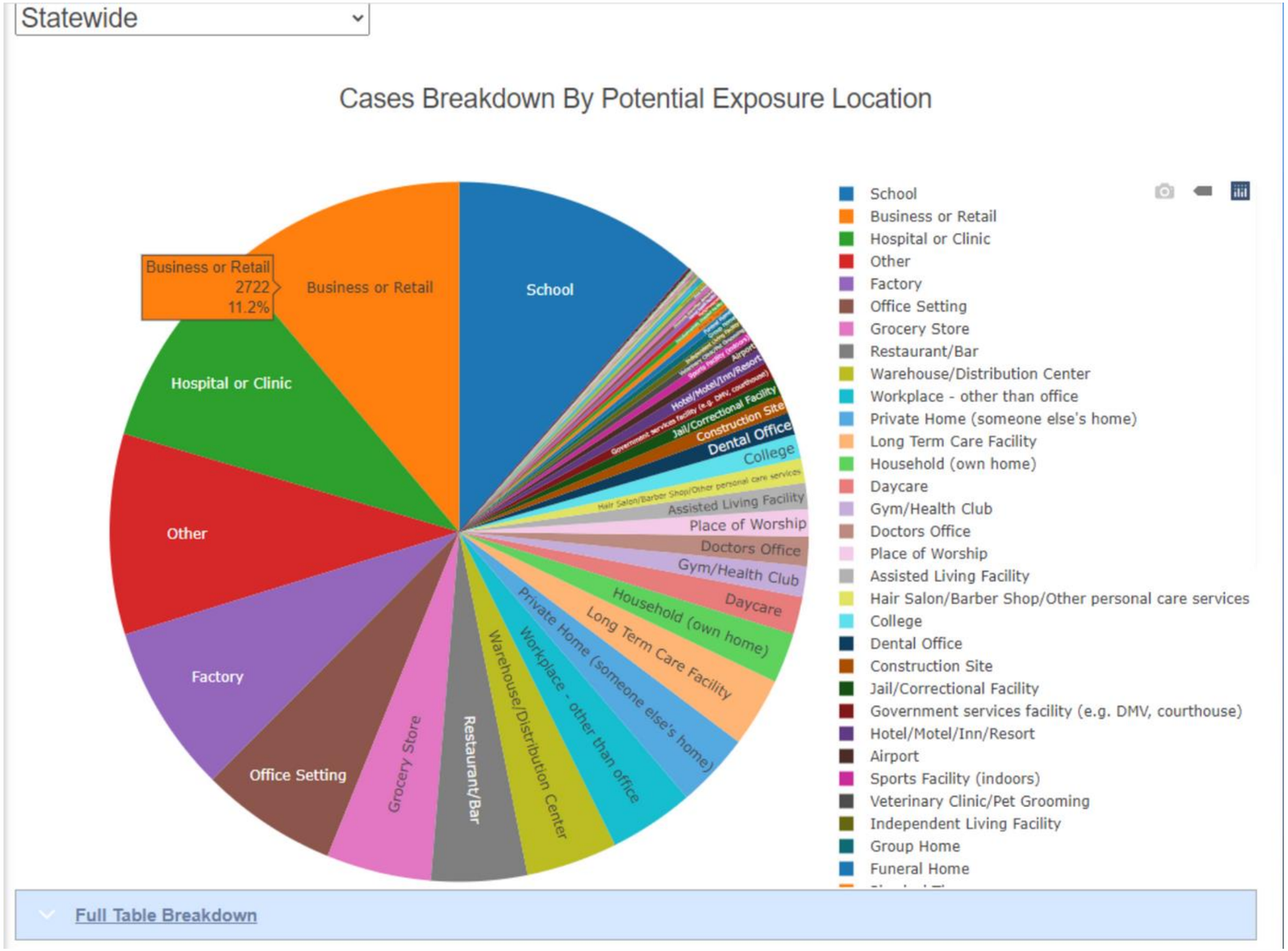
The chart below represents the most impacted counties over the past 15 days and the number of cases over time. The table below also represents the number of deaths and hospitalizations in each of those impacted counties.



Manipulated Scales



Data Overload



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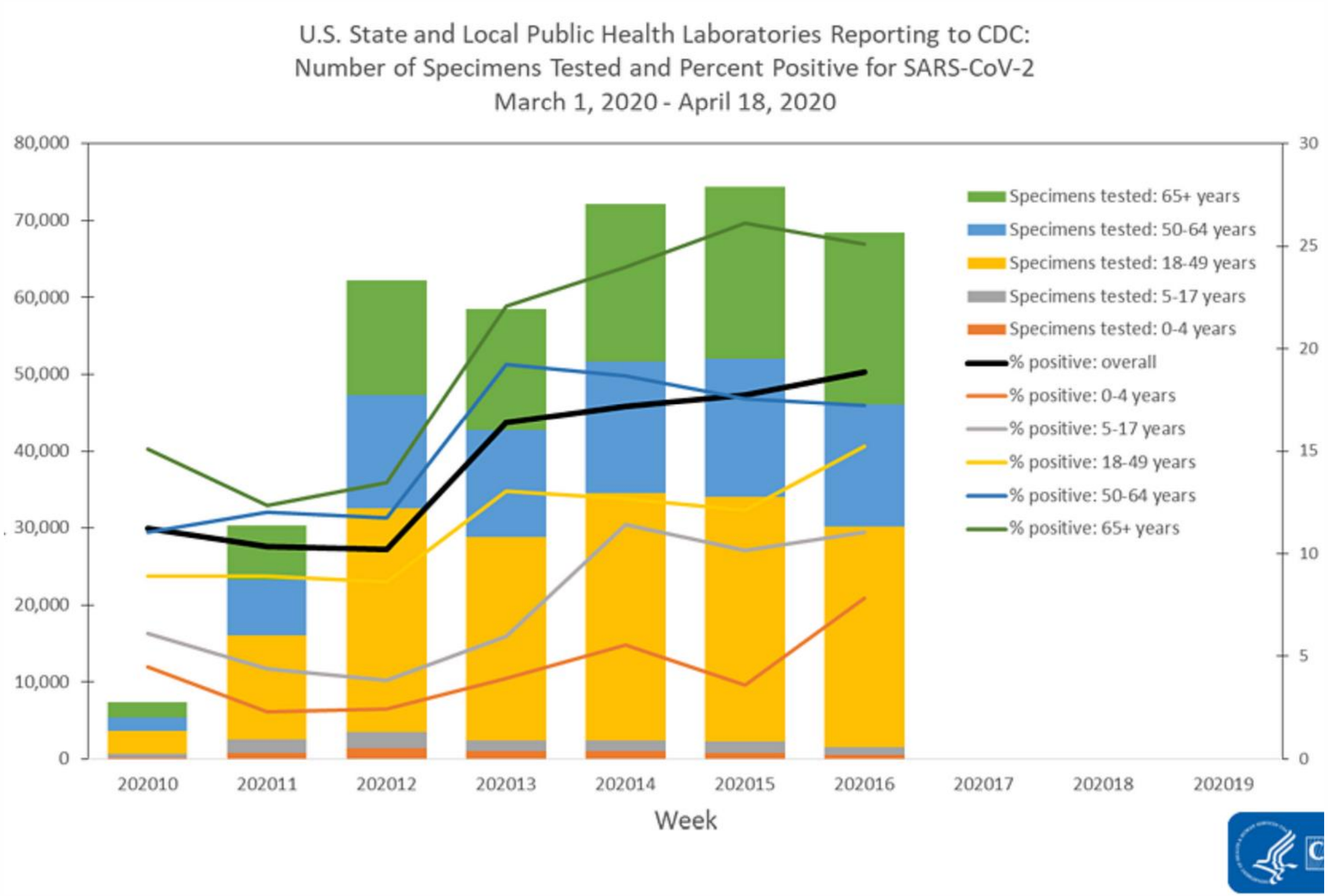
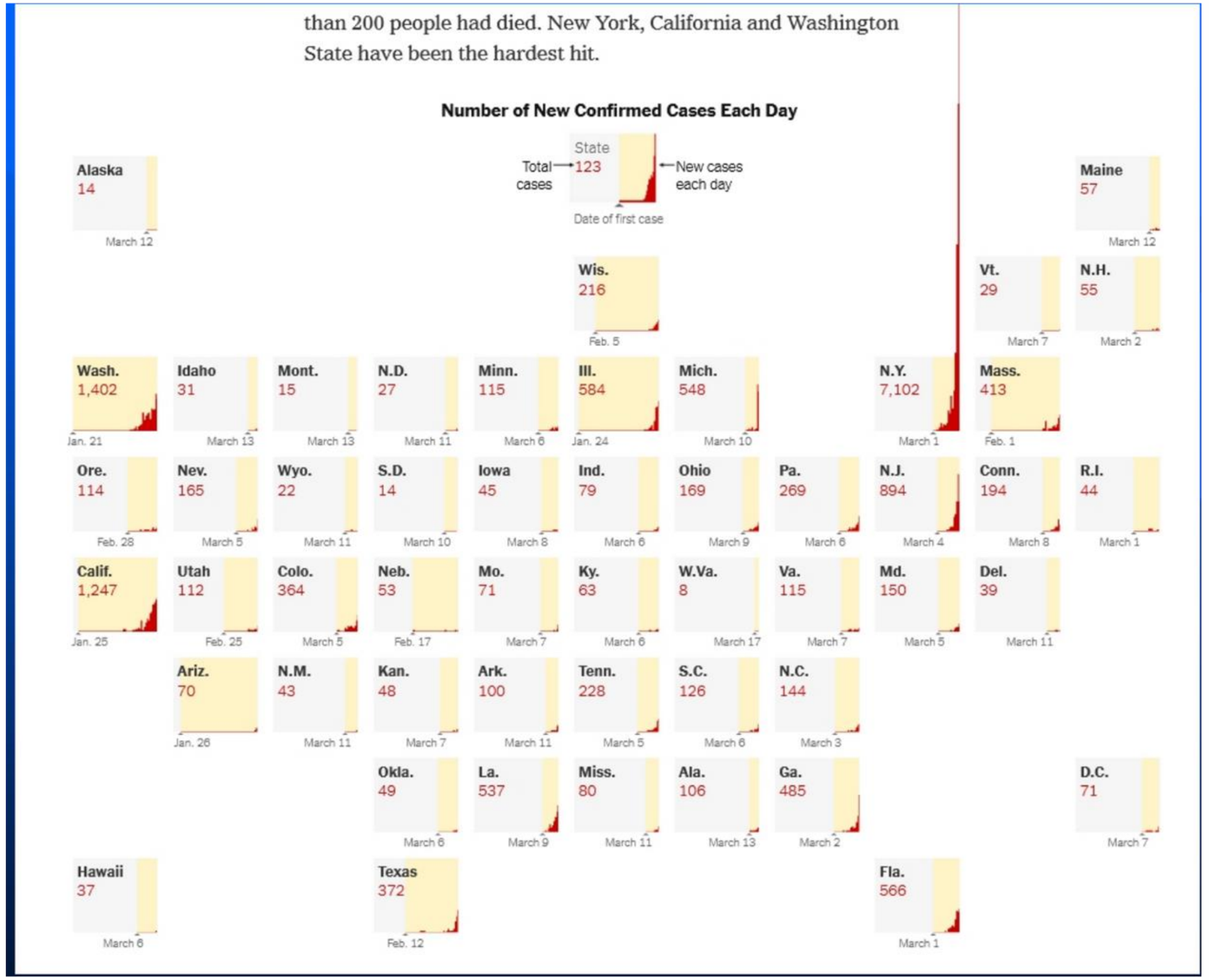


Some GOOD Graphs/Charts



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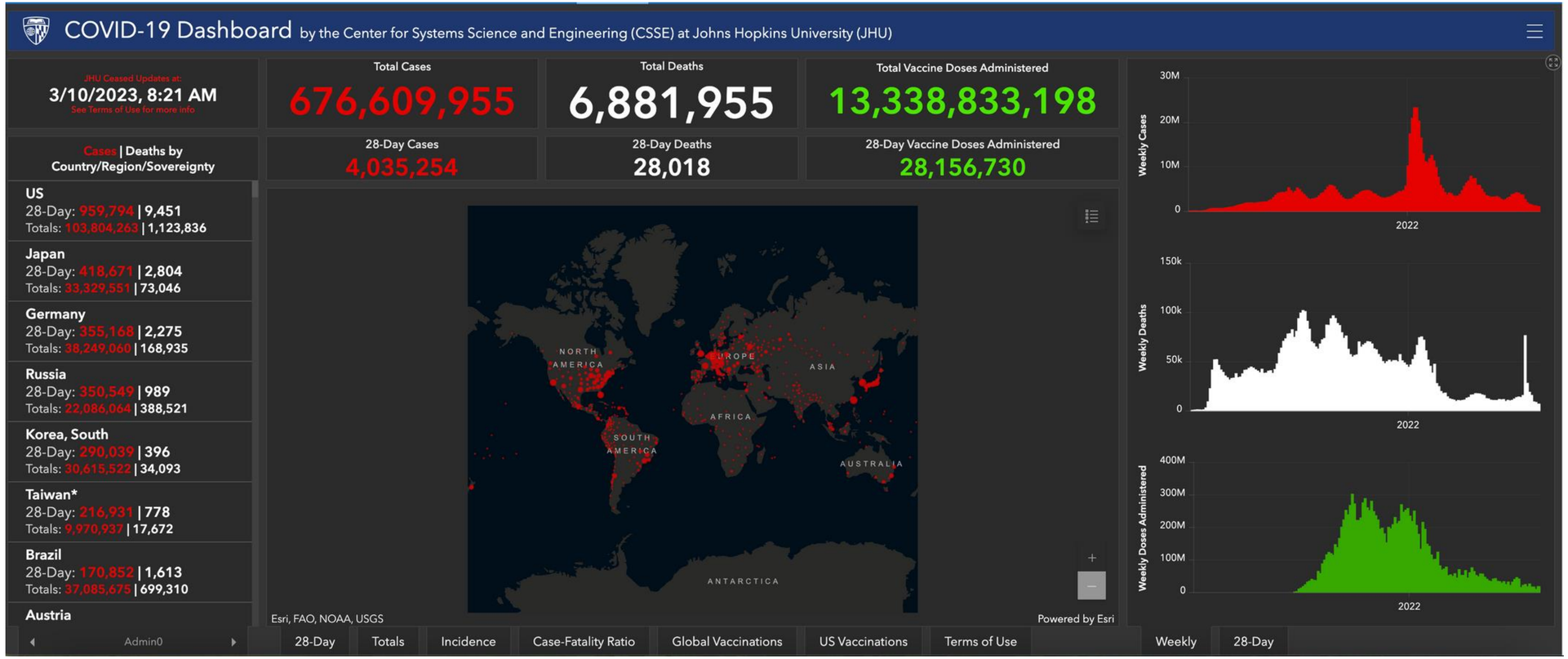
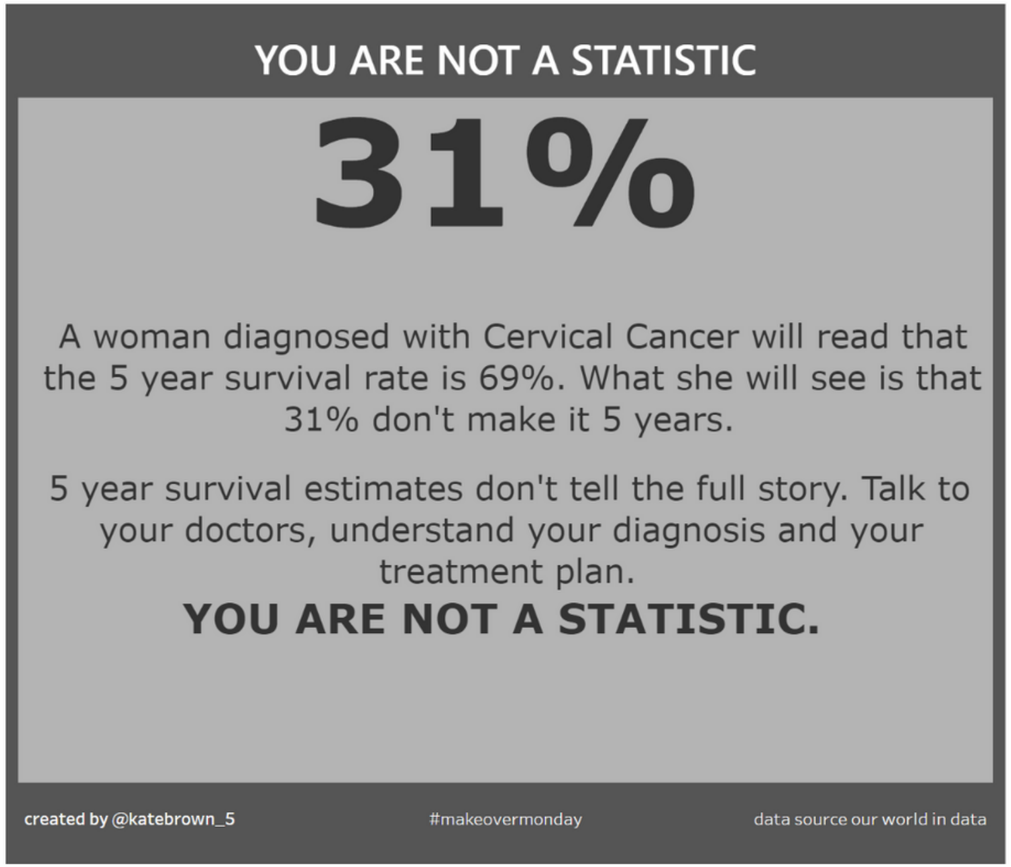


Ethics of Data Visualization



Kate Brown, Tableau Public

- Demographics
- Sources
- Audience
- Purpose and Intent

Future of Public Health Data Visualizations

Machine Learning

- Predictive visualizations
- Anomaly detection

Artificial Intelligence

- Geospatial analysis
- Data simplification

https://www.visualcapitalist.com/history-of-pandemics-deadliest/

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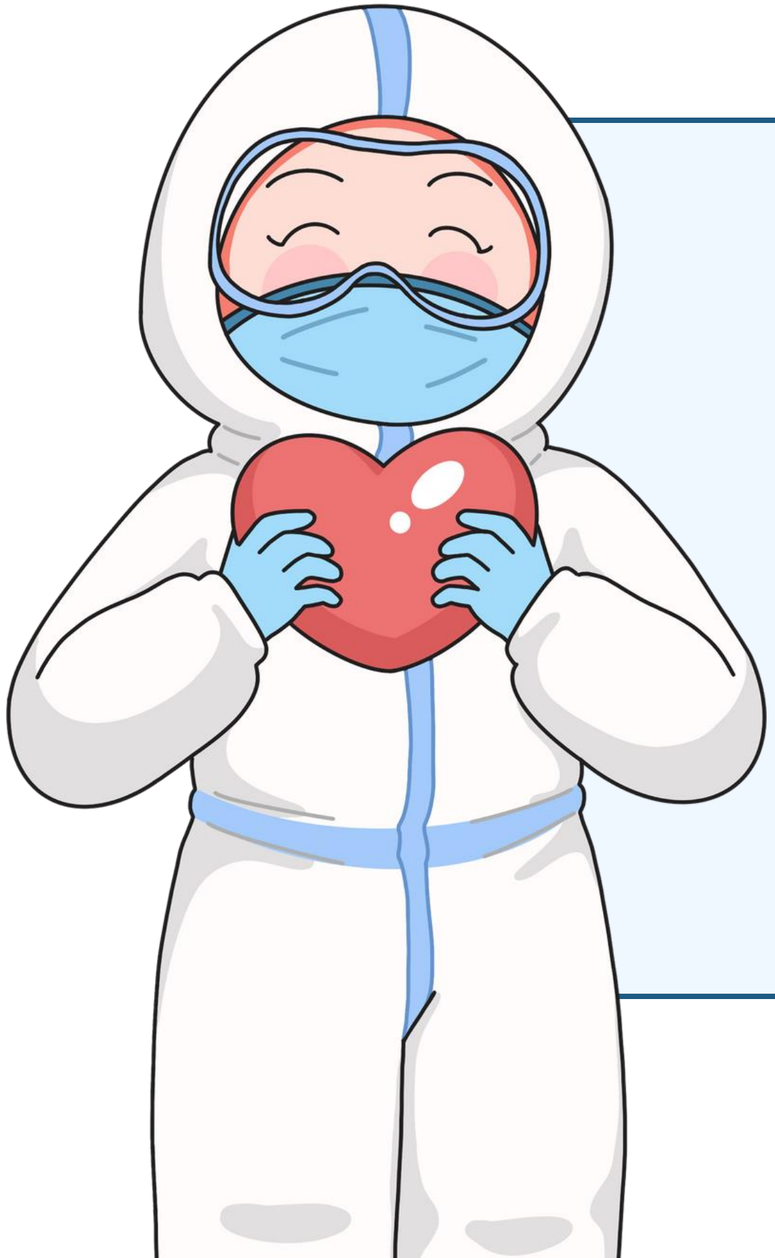
https://www.usu.edu/math/symanzik/talks/2021_SouthwestMichiganChapter.pdf

https://coronavirus.jhu.edu/data/animated-world-map



THANK YOU!