Insights on Vaccine Hesitancy and Health Inequities from a Survey of Millions of Adults in the US and Worldwide

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Responding to the Need for Syndromic Surveillance

Syndromic surveillance enables policymakers and public health systems to make decisions before diagnosis data are available, especially in low resource areas with limited testing capabilities.
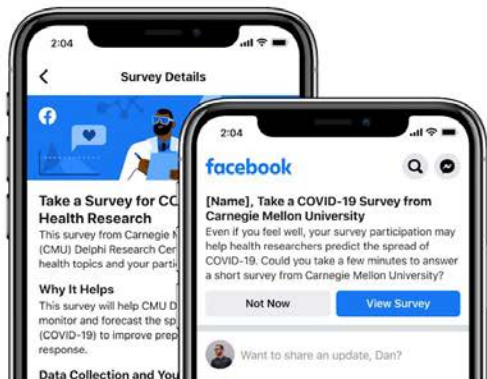
Facebook can reach large segments of the target population daily with the technical infrastructure to provide bias correction. And, the speed and scale of the surveys allow them to act as early warning systems.

The COVID Tracking and Impact Survey (CTIS) was created in April 2020 to meet this need.

Project Structure

1 Who's Taking the Survey

Facebook invites a new, random sample of users to participate each day.

2 How the Survey Works

Users are sent to the survey hosted by UMD or CMU using Qualtrics.

Facebook does not receive responses, but does calculate weights to correct for non-response bias and sampling frame coverage bias using internal Facebook data for 115 countries or territories.
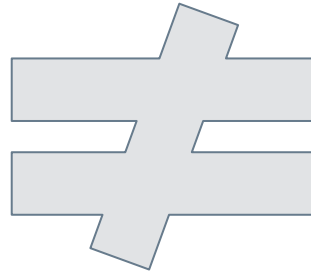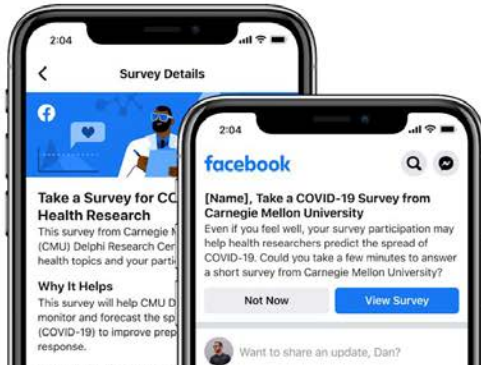
3 Using the Survey Data

Using the aggregated data, Facebook created a map visualization to help policymakers and public health systems make decisions.
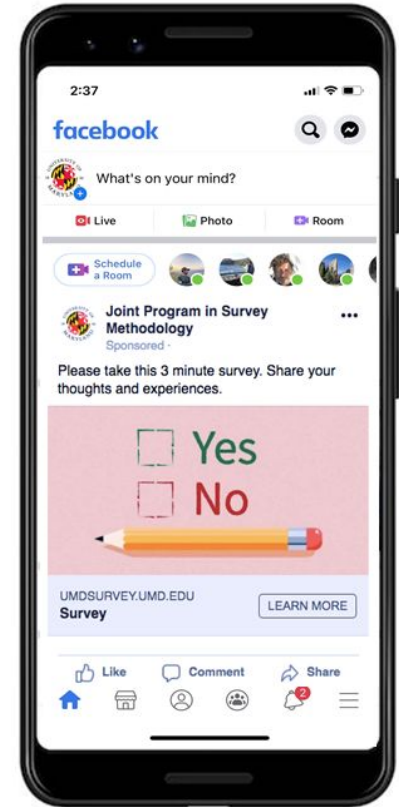
The non-aggregate data are available to eligible academic and nonprofit researchers by request.

This invitation is different from surveys fielded via Facebook through the paid advertisement feature.

We can come back to this later.
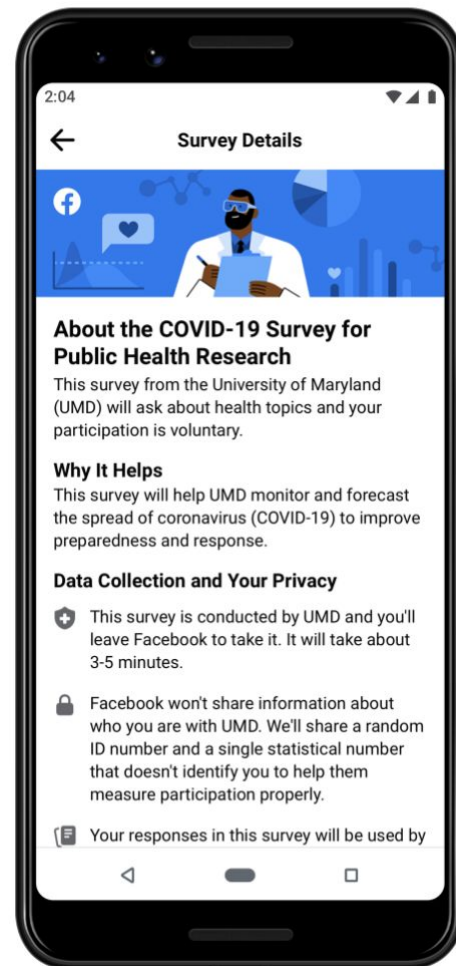
Survey through advertisement on FB

Survey Instrument and Weights

UMD - CMU CTIS
Survey Instrument

Available in 50+ languages

Survey instrument has 5 sections:

- Consent
- Health symptoms
- Contacts with others
- Mental health, economic (in-)security, vaccination
- Demographic characteristics

52M+
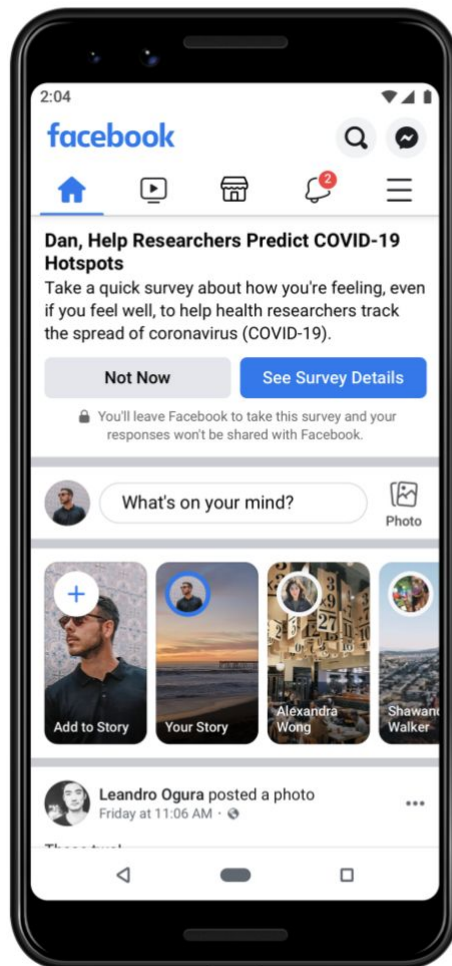
Completed the UMD global survey launched in 200+ countries or territories, including 114 for which we provide weights.

20M+

Completed the CMU survey launched in the United States.

Figures as of June 2021

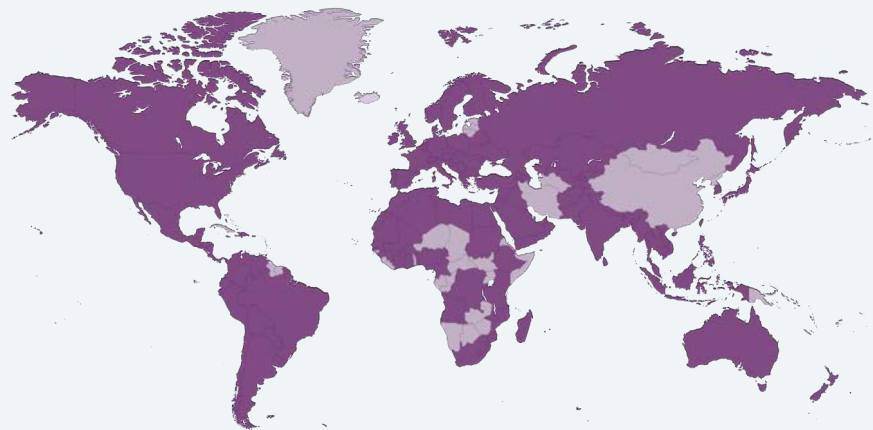# Non-Response Weights

Facebook calculates the inverse probability that sampled users complete the survey using their self-reported age and gender as well as other characteristics they know correlate with non-response to web surveys.

Post-Stratification Weights

Facebook adjusts the non-response weights the distribution of age and gender in the survey sample reflects that of the general population using benchmarks from the US American Community Survey and the UN Population Division.

In most countries or territories, this adjustment also corrects for population size of subnational administrative regions using benchmarks from the Facebook Data for Good Population Density Maps.

Vaccination Questions

- If a vaccine to prevent COVID-19 were offered to you today, would you choose to get vaccinated?
- Which of the following, if any, are reasons that you *<definitely>* wouldn't choose to get a COVID-19 vaccine?

- Did you experience any of the following barriers to getting the COVID-19 vaccine?
- How concerned are you that you would experience a side effect from a COVID-19 vaccination?
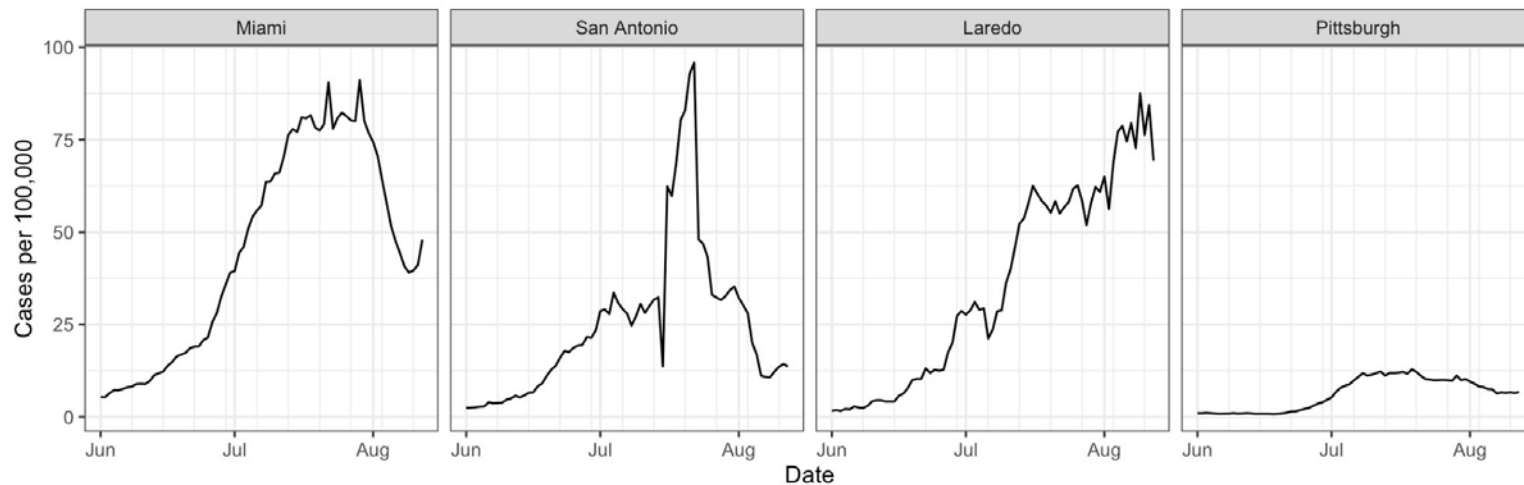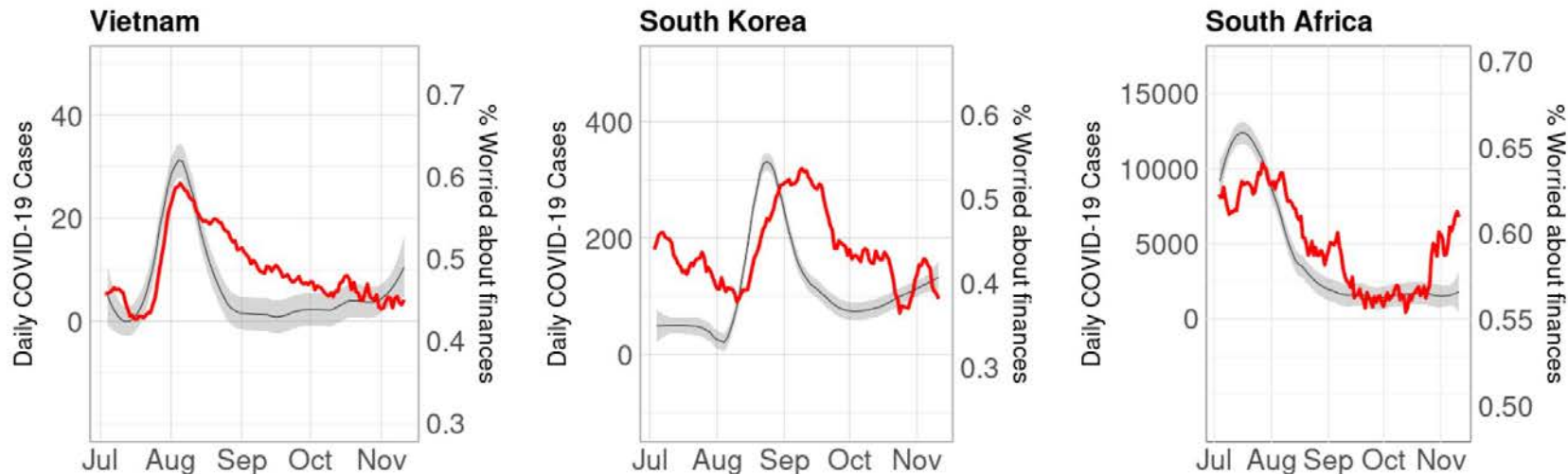
Insights: Face Validity

Respondents reporting they know someone sick
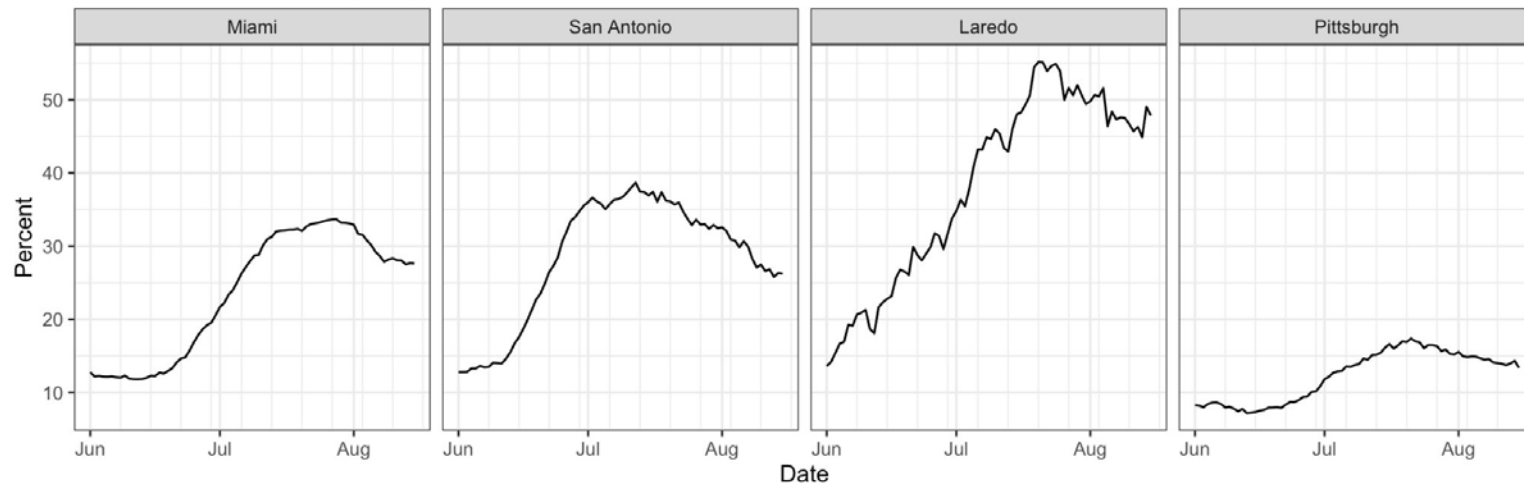
Daily new confirmed cases per 100,000 (7-day average)

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Financial anxiety and COVID-19 cases

Red line represents weighted proportion of individuals who responded `very worried` or `somewhat worried` to the question `How worried are you about your household's finances in the next month?` Black line represents smoothed daily COVID-19 cases available at COVID-19 Data Repository by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University.
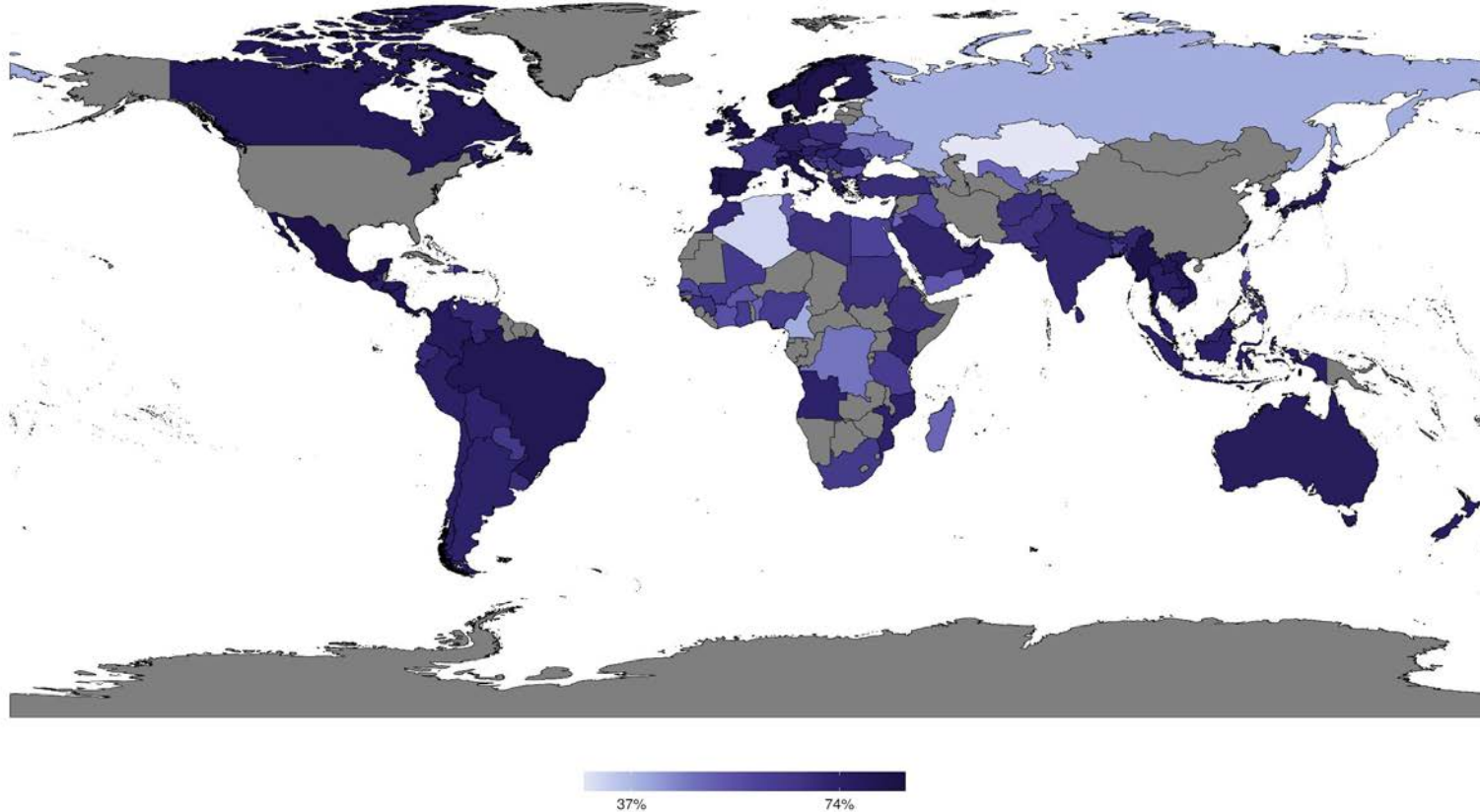
Insights: Vaccination Trends

Global COVID-19 vaccination acceptance

Weighted 7-day mean percent of respondents who said 'yes, definitely' or 'yes, probably'.
Responses from January 24 - January 30, 2021.

37%   74%

event COVID-19 were offered to you today, would you choose to get vaccinated?*
Asked of all survey respondents who had not already been vaccinated.
Data from COVID-19 Symptom Survey collected by the University of Maryland in partnership with Facebook.

Vaccine acceptance in selected countries

Vaccine acceptance in the United States

Global COVID-19 vaccine acceptance by gender

January 2021

Global COVID-19 vaccine acceptance by gender

April 2021

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Vaccine acceptance from symptom survey

Seven day weighted percentage of respondents that reported yes to definitely or probably choosing to get vaccinated as of January 30th

60% 65% 70% 75% 80% 85%
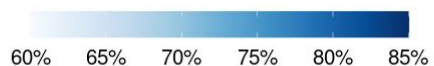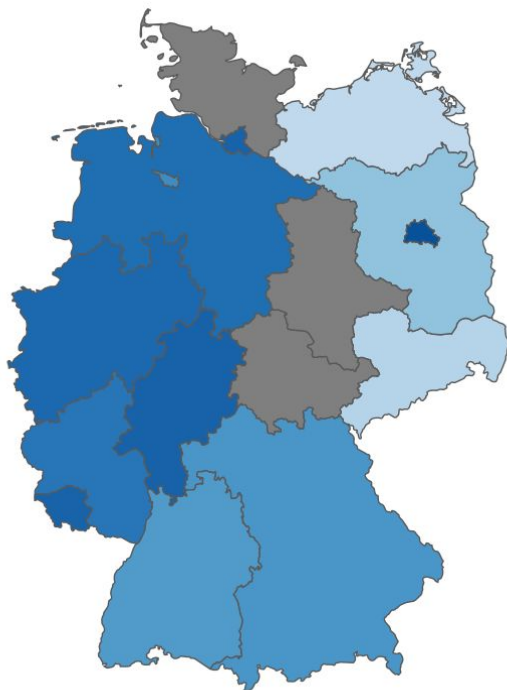
Vaccine acceptance varies over time and space

Daily 7d smoothed vaccine acceptance since December 21st, 2021
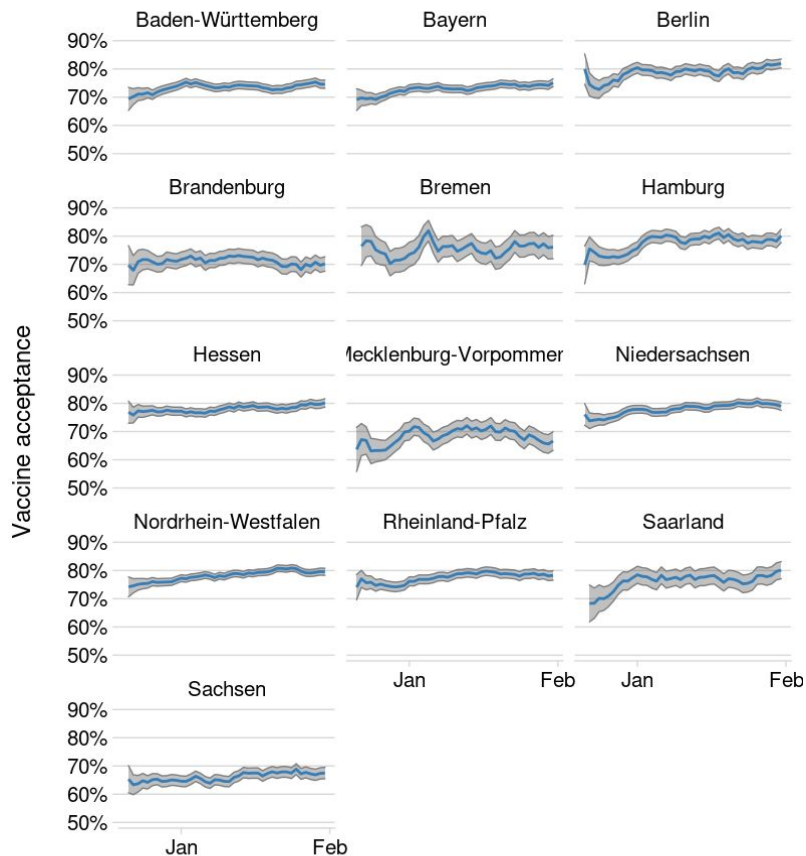
Insights: Changing the Trend

Would people more likely to get a COVID-19 vaccination if it were recommended by:

World Health Organization (WHO), local healthcare workers, politicians, friends or family, government health officials

Countries where COVID-19 vaccine is:
- Available
- Unavailable
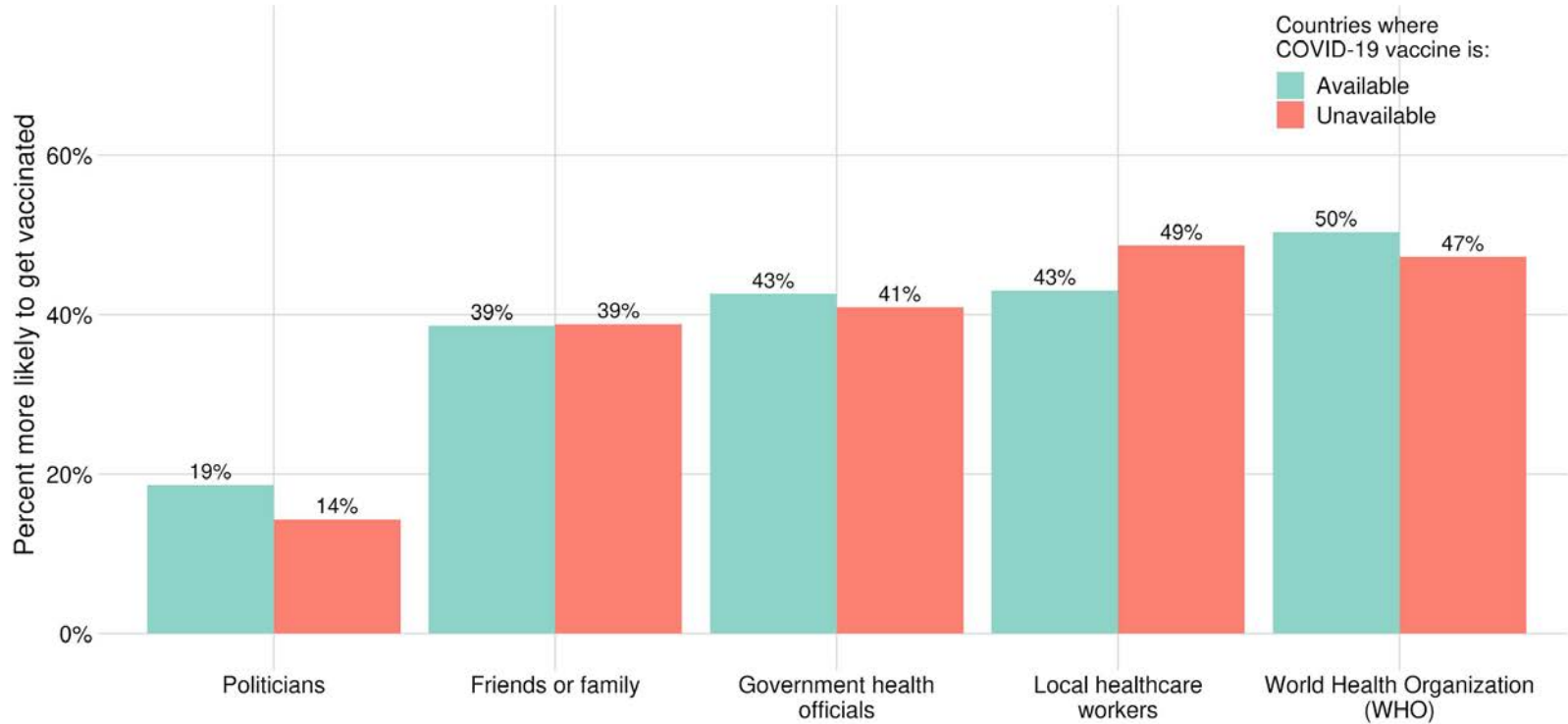
Would you be more or less likely to get a COVID-19 vaccination if it were recommended to you by each of the following: Friends or family, local healthcare workers, World Health Organization (WHO), politicians, government health officials
Among survey respondents who were not yet vaccinated.
Data from COVID Symptom Survey collected by the University of Maryland in partnership with Facebook, January 8-15, 2021.

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Insights

## Percent of Facebook Survey Respondents Who Said They Would Either "Probably Reject" or "Would Reject" the COVID-19 Vaccine if Offered to Them Today

In most countries, females tend to be more likely to report that they would reject or probably reject a vaccine compared to males

● South Asia ● High-income ○ Not Significant ○ Sub-Saharan Africa ○ Latin America and Caribbean ○ North Africa and Middle East ○ Southeast Asia, East Asia, and Oceania ● Central Europe, Eastern Europe, and Central Asia

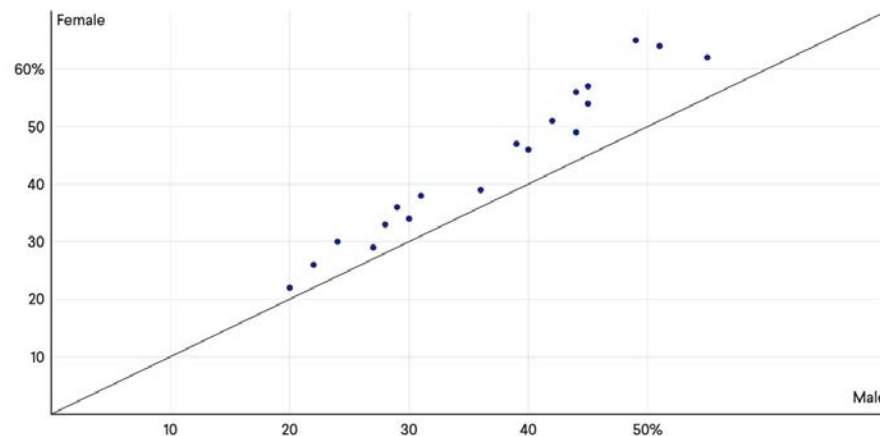Note: : The four countries with the greatest gender gap in vaccine hesitancy are **Belarus, Côte d'Ivoire, Ethiopia, and South Korea.** Figure shows countries with at least 100 respondents per country and sex. Non-significant differences are defined as a p-value of >=0.05. Numbers are derived from the percent of Facebook survey respondents from February 7 to March 22, 2021 that said they would either probably reject or would reject the COVID-19 vaccine if offered to them today.

Chart: IHME/Alejandra Arrieta • Source: Global and U.S. COVID-19 Symptom Survey

Think Global Health

|	Side effects	Efficacy	No need	Dislike Vaccines	Wait and See	Altruist	Cost	Religion ▼	Other
Sub-Saharan Africa	57%	28%	16%	9%	51%	22%	9%	5%	11%
High-income	56%	27%	19%	12%	50%	27%	3%	3%	11%
Latin America and Caribbean	59%	35%	9%	7%	58%	29%	6%	2%	10%
Global	57%	29%	18%	10%	51%	26%	5%	2%	11%
Central Europe, Eastern Europe, and Central Asia	55%	27%	22%	10%	43%	18%	3%	1%	16%
North Africa and Middle East	62%	40%	18%	12%	55%	20%	7%	1%	9%
South Asia	47%	25%	11%	5%	51%	29%	5%	1%	12%
Southeast Asia, East Asia, and Oceania	66%	40%	13%	8%	61%	42%	16%	1%	9%

Note: Columns represent global super-regions from the Global Burden of Disease Study. Reasons are ordered from top to bottom for percentage of women globally choosing each reason. Respondents can choose more than one response.

Table: IHME/Alejandra Arrieta • Source: Global and U.S. COVID-19 Symptom Survey
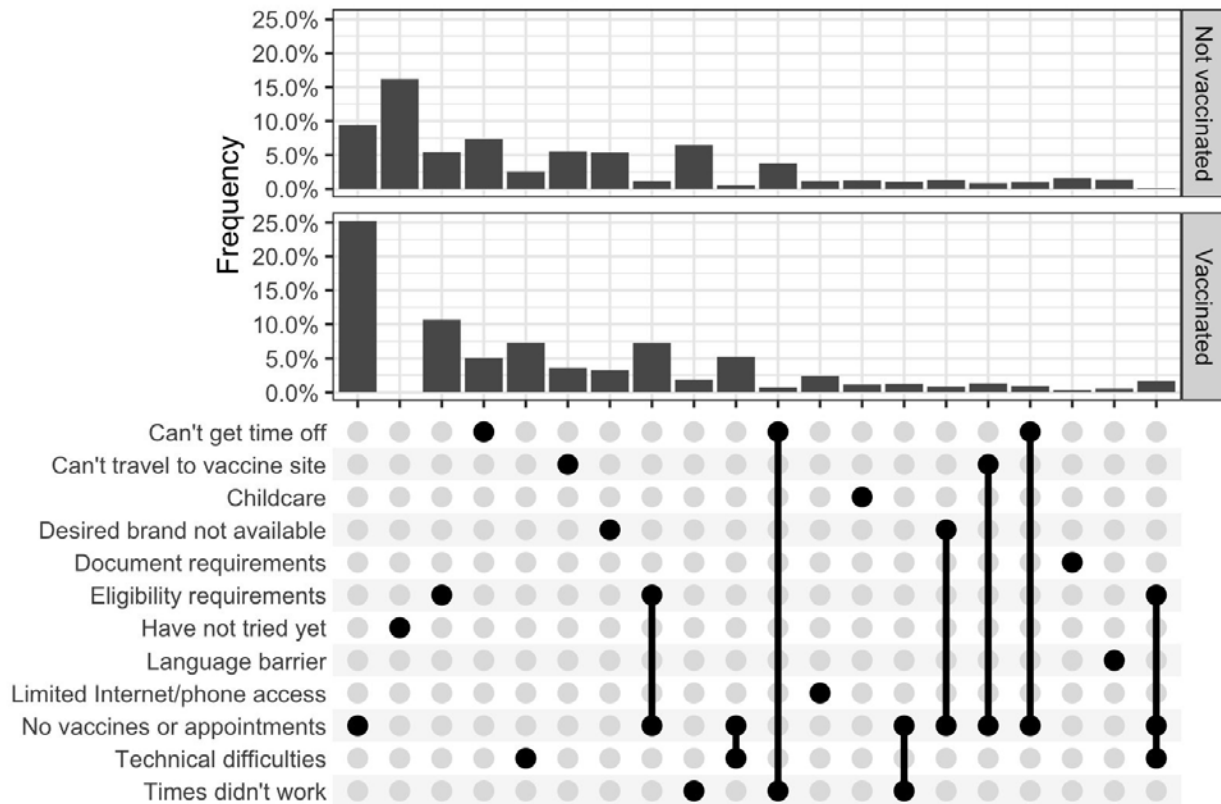
Think Global Health

Common vaccine hesitancy reasons
United States, May 2021
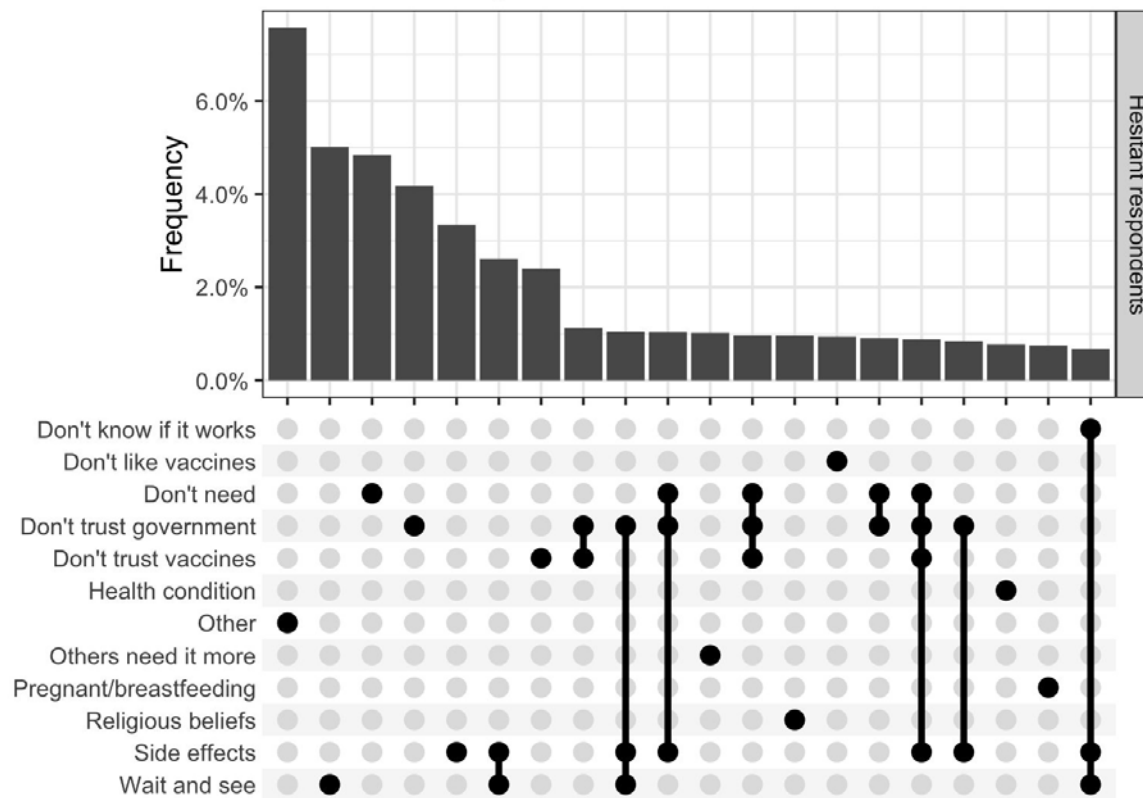
Common barriers to vaccination
United States, May 2021

Data Access

Publicly Available, Aggregate Data, Contingency Tables

Global Survey Data:
https://covidmap.umd.edu/

US Survey Data:
https://cmu-delphi.github.io/delphi-epidata/symptom-survey/

Non-Aggregate Data for Research

Researchers from academic and non-profit institutions can request access.

Signed Data Use Agreements are required.

Central portal for project documentation and data access requests is on Facebook's Data for Good website: dataforgood.fb.com.

DATA FOR GOOD SURVEY PARTNERSHIPS

Future of Business Survey

In partnership with the World Bank and OECD, we survey millions of small businesses globally on Facebook bi-annually.

https://dataforgood.fb.com/tools/future-of-business-survey/

Survey on Gender Equality at Home

We surveyed more than 450K people around the world, sharing public reports to support progress on the UN Sustainable Development Goals.

https://dataforgood.fb.com/tools/gendersurvey/

COVID-19 Preventive Health Survey

In partnership with MIT and Johns Hopkins University, we're monitoring knowledge, attitudes and practices about COVID-19.

https://dataforgood.fb.com/tools/preventive-health-survey/

COVID-19 Tracking and Impact Surveys

In partnership with Carnegie Mellon and the University of Maryland, we survey hundreds of thousands of people daily around the world to help slow the spread.

https://dataforgood.fb.com/tools/symptomsurvey/

Other Complimentary Data

Delphi, through its COVIDcast Epidata API, publishes case and death data, plus medical claims and aggregates from the US surveys: https://cmu-delphi.github.io/delphi-epidata/api/covidcast.html
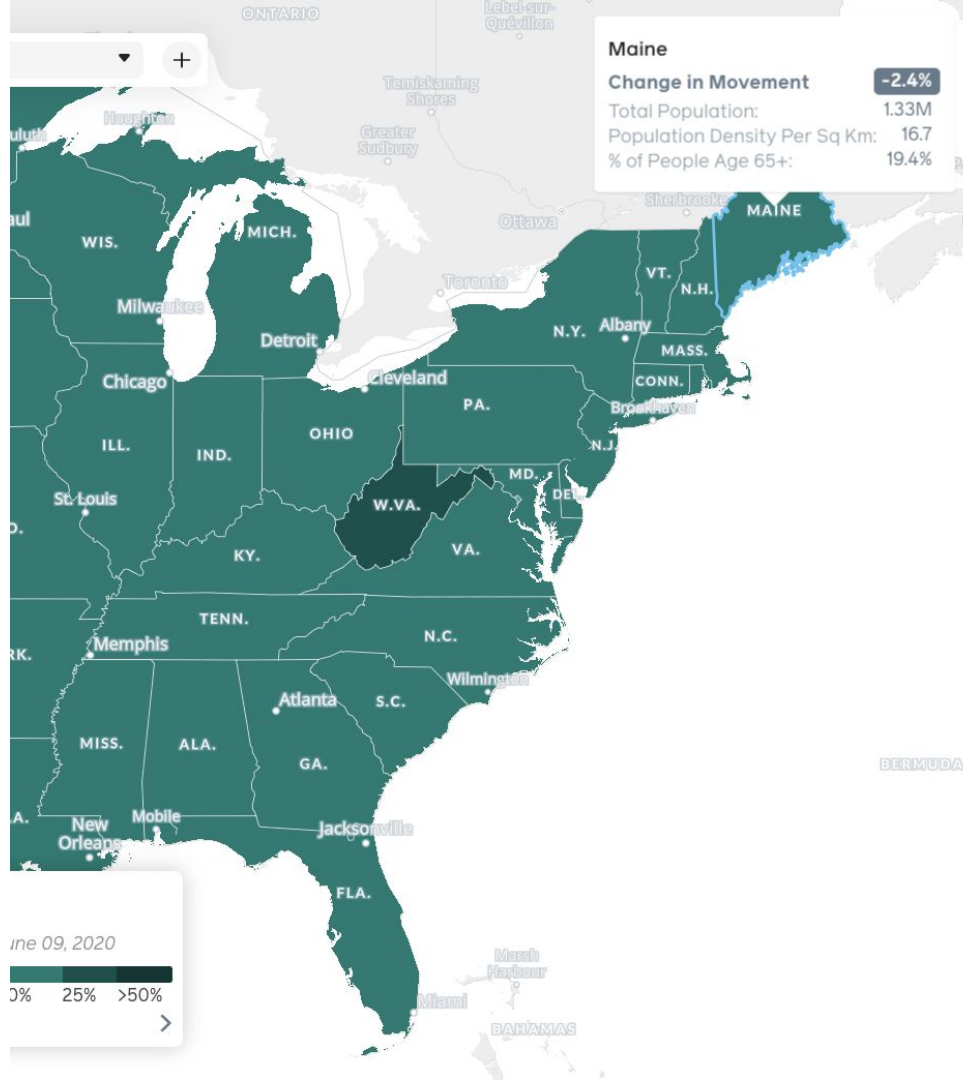
Facebook's Data for Good publishes additional datasets: dataforgood.fb.com.

COVID-19 Symptom Data Challenge: symptomchallenge.org/
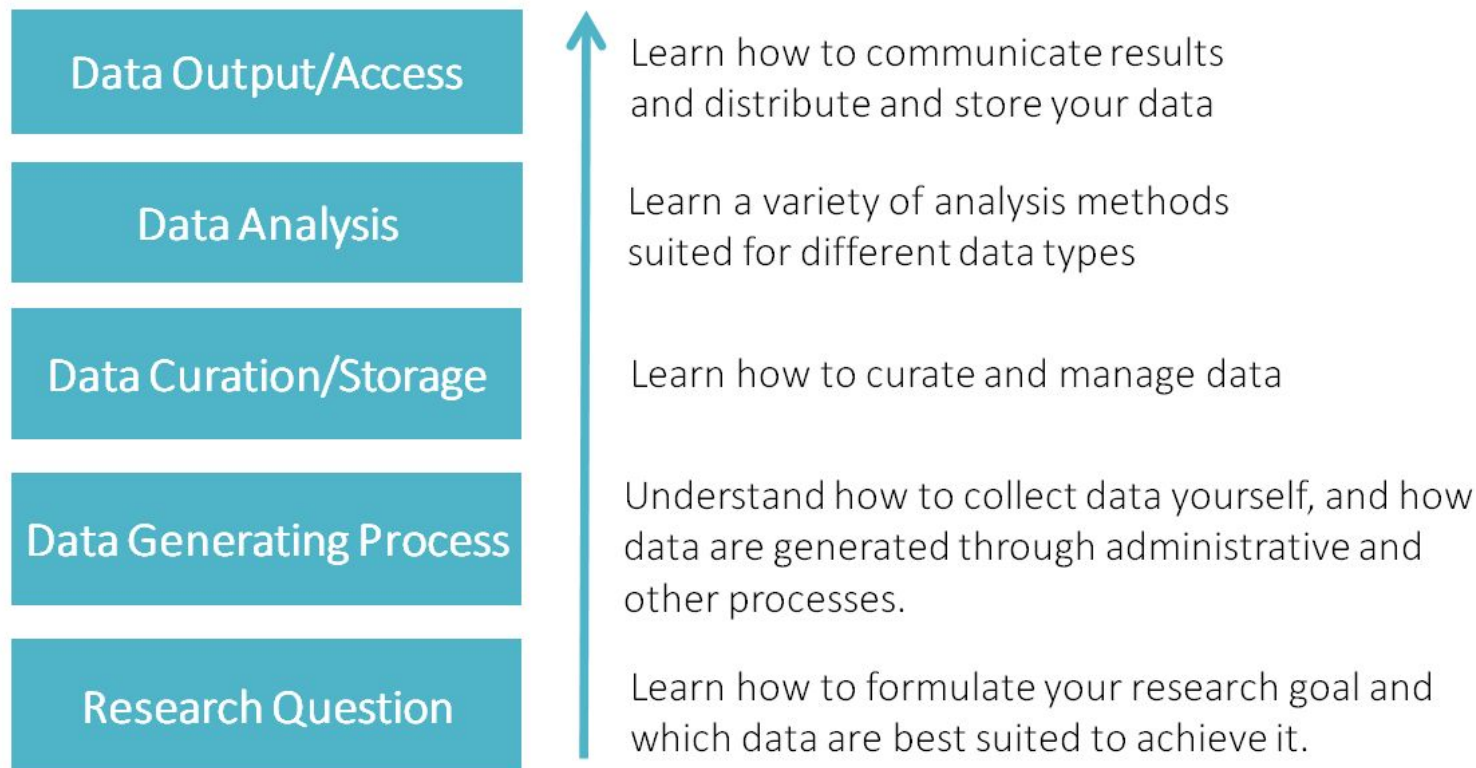
UMD Impact Analysis https://data.covid.umd.edu/ https://socialdatascience.umd.edu/

Skills and Challenges

Data Output/Access	Learn how to communicate results and distribute and store your data
Data Analysis	Learn a variety of analysis methods suited for different data types
Data Curation/Storage	Learn how to curate and manage data
Data Generating Process	Understand how to collect data yourself, and how data are generated through administrative and other processes.
Research Question	Learn how to formulate your research goal and which data are best suited to achieve it.

Japec, L., Kreuter, F., Berg, M., Biemer, P., Decker, P., Lampe, C., Lane, J., O'Neil, C., & Usher, A. (2015). Big data in survey research: AAPOR task force report. *Public Opinion Quarterly*, *79*(4), 839-880. https://doi.org/10.1093/poq/nfv039
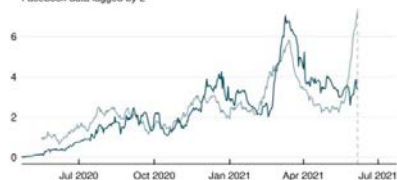
Challenges of Syndromic Surveillance at Scale

There are numerous challenges to a global daily tracking survey, which requires broad support and coordination across partners as well as with the survey platform itself.
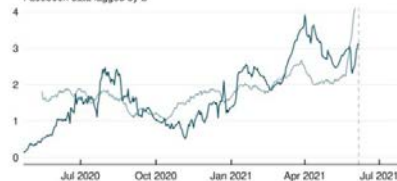
For example, pre- or pilot testing is difficult due to translation needs, changes to sampling pipelines, and the wide variety of device types used to complete the survey across contexts.

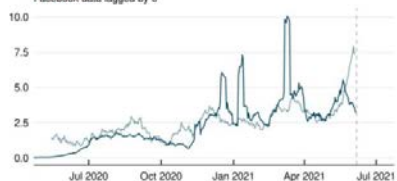# Adapting Questions to Current Events / Knowledge / Priorities

Source: https://covidmap.umd.edu/
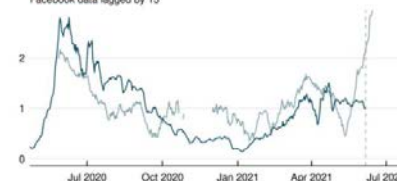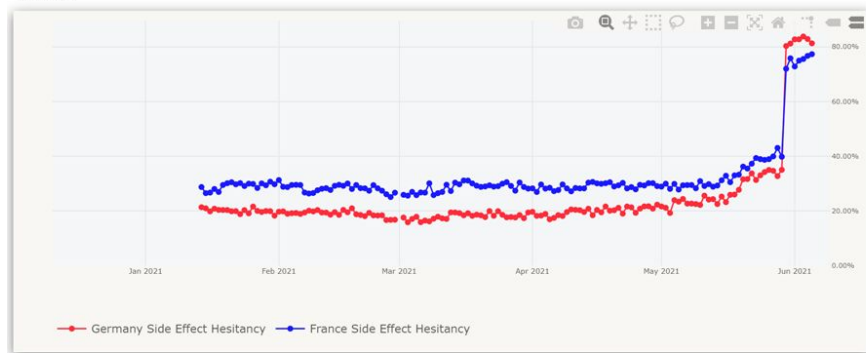
Method reports

COVID-19 World Survey
Contengency Tables

Contengency tables providing more granular
breakdows of survey reponses such as vaccine
update and acceptance.

Go to Contengency Tables

Detailed Methodology: Weights and Methodology Brief for the COVID-19 Symptoms Survey

Choose a survey version: Version 11 (new) - (06/07/2021-Present) ⌄   Open

What's new

June 7, 2021
- On 06/07/2021, we reverted to the Wave 10 version of the symptom section questions to prevent continued discontinuity. Personal symptom questions (B1, B1b, B2) are now displayed before community symptom questions (B3, B4). The question stem in B1 also changed back to "In the last 24 hours, have you had any of the following?" However, the symptoms 'changes to sleep' and 'eye pain' remain dropped from B1. Please see the updated survey instrument for more information.

June 3, 2021
- A new version of the survey (V11) was launched on 05/20/2021. This was a major revision of the survey, and as a result of these revisions, we have observed discontinuities in our covid (COVID-like illness) and flu (influenza-like illness) aggregate indicators that are reported in our API.

To test the effects of the changes to the survey, 20% of respondents have been receiving the old version of the survey (V10) and 80% have been receiving the new version of the survey (V11) since its launch on 05/20/2021. To enable monitoring of the observed discontinuities in the existing covid and flu aggregate indicators, we will be adding two new aggregate indicators to the API which are calculated using the same methodology. These new indicators (cli

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Other Uses – Impact

Mask use

Mask use

Mask use represents the percentage of the population who say they always wear a mask in public. Mask use can reduce transmissio... ∨

Scenario ⓘ [Projection ✕] [Masks ✕] ∨
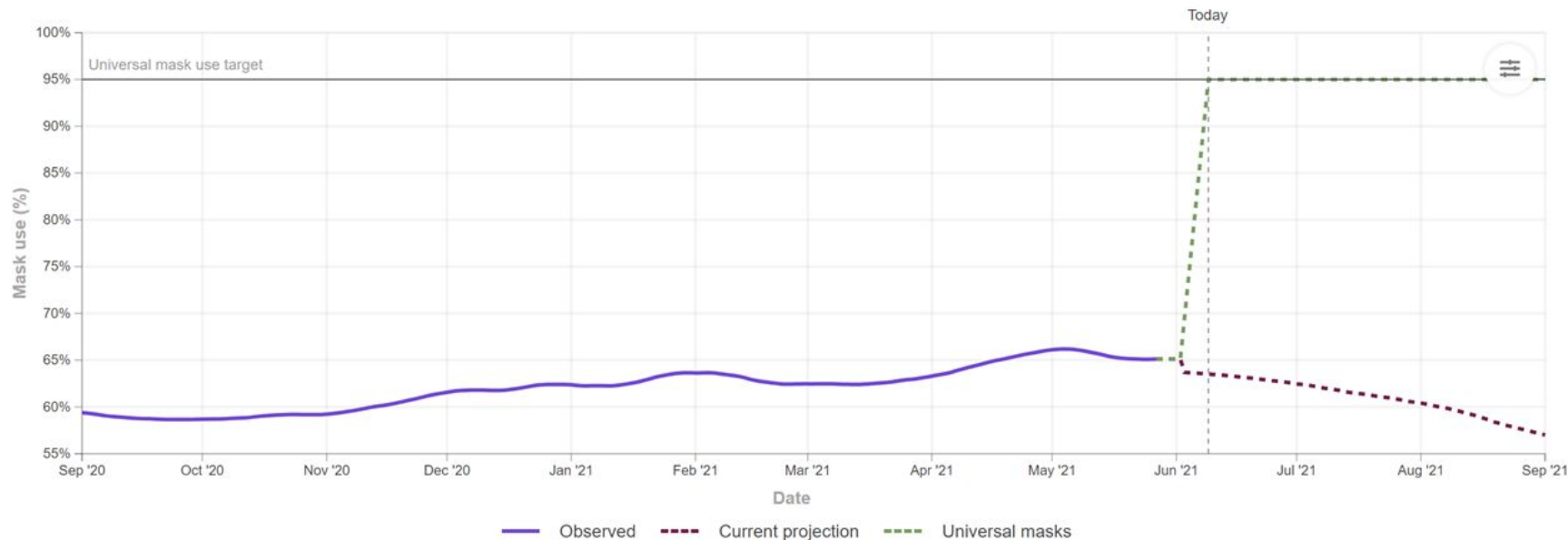
Data sources: Premise; Global COVID-19 Symptom Survey (this research is based on survey results from University of Maryland Social Data Science Center with Facebook's support); US COVID-19 Symptom Survey (this research is based on survey results from Carnegie Mellon University's Delphi Research Group with Facebook's support); Kaiser Family Foundation; YouGov COVID-19 Behaviour Tracker survey.

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Household COVID-19 risk and in-person schooling

🆔 Justin Lessler[1,*], 🆔 M. Kate Grabowski[1,2], 🆔 Kyra H. Grantz[1], 🆔 Elena Badillo-Goicoechea[3], 🆔 C. Jessica E. Metcalf[4], …

+ See all authors and affiliations

Article   **Figures & Data**   **Info & Metrics**   **eLetters**   📄 **PDF**

Back to school—safely

Severe COVID-19 in children is rare, but many schools remain closed because the transmission risk that school contact poses to adults and the wider community is unknown. Observing the heterogeneity of approaches taken among U.S. school districts, Lessler *et al.* investigated how different strategies influence COVID-19 transmission rates in the wider community using COVID-19 Symptom Survey data from Carnegie Mellon and Facebook. The authors found that when mitigation measures are in place, transmission within schools is limited and infection rates mirror that of the surrounding community.

Science, abh2939, this issue p. **1092**

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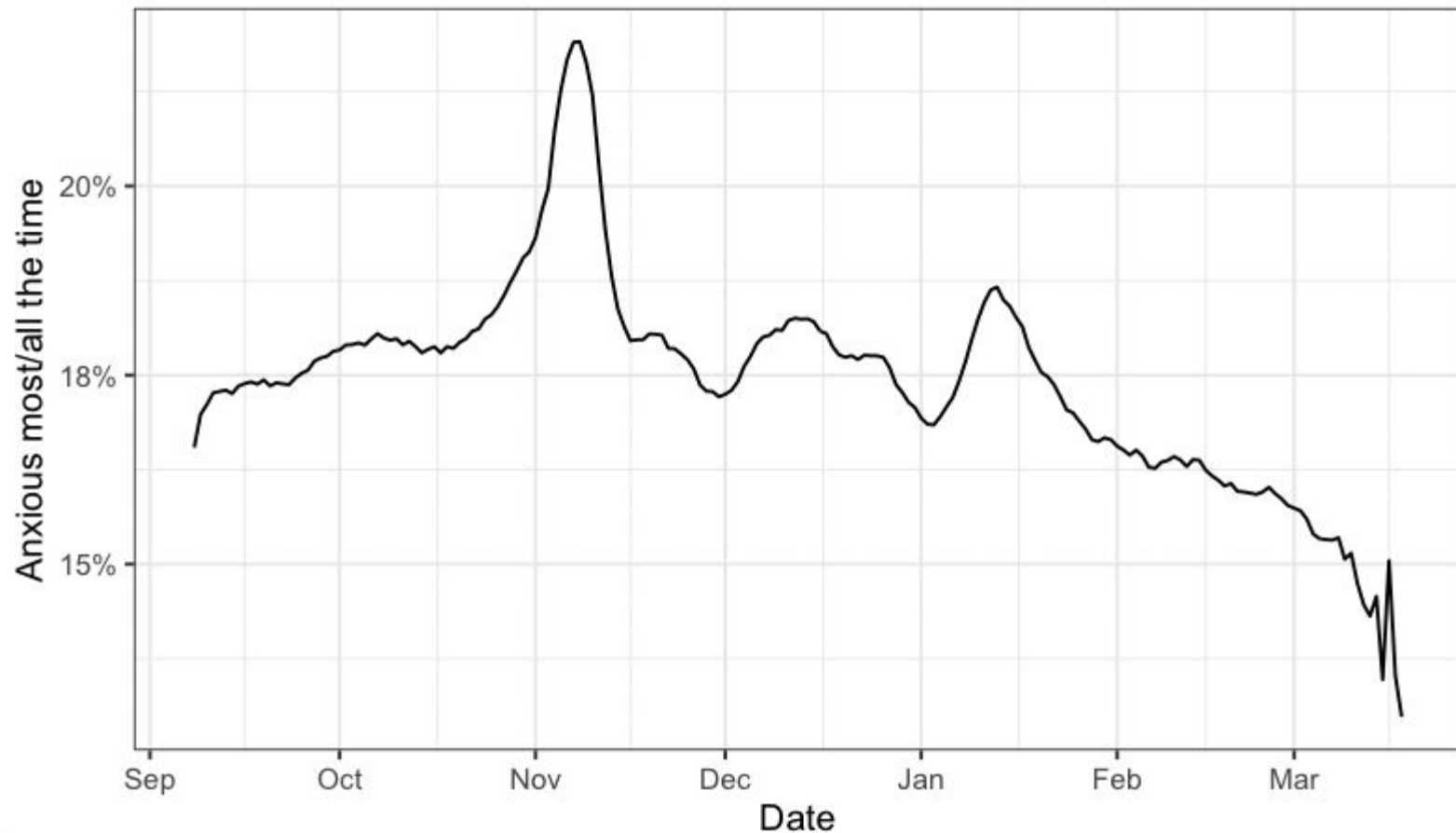**MY SAVED FOLDERS**
🗁 Save to my folders

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Questions?

For the Global survey, you can also email:
COVID19symptomsurvey@fb.com

fkreuter@umd.edu
areinhar@stat.cmu.edu