COVID-19: What's New for May 18, 2020

Main updates on IHME COVID-19 predictions since May 12, 2020

Predicting the next phase of the COVID-19 epidemic: changes in human behavior

As with any disease modeling endeavor, building and refining models to generate disease projections evolves with updated or new data inputs. Capturing how populations respond to infectious disease outbreaks – and particularly novel pathogens – is never clear-cut, and this challenge is only elevated when human behavior is changing in real time. Collectively, the world is really only now starting to better understand how the interplay of government-mandated policies alongside recommendations (e.g., CDC's April 3 recommendation for individuals in the US to wear cloth face coverings when they leave the house) can ultimately affect human behavior and thus alter potential COVID-19 trajectories.

Today's update provides more information on a new area of work – quantifying the general public's mask use in the US – as well as a summary of key results in the US based on the latest available data. It is worth noting that we have not yet formally incorporated mask use into our broader estimation framework; this in-progress work offers important insights into the ever-changing dimensions of human behavior and its relationship to COVID-19 pandemic.

We would also like to highlight new features in the COVID-19 visualization tool:
Additional settings now allow for much more in-depth comparison of trends across and within locations, and map views enable more direct benchmarking of COVID-19 patterns and country response. Further, indicators can be viewed as both total counts and rates (per population), with and without uncertainty, and for different periods of time.

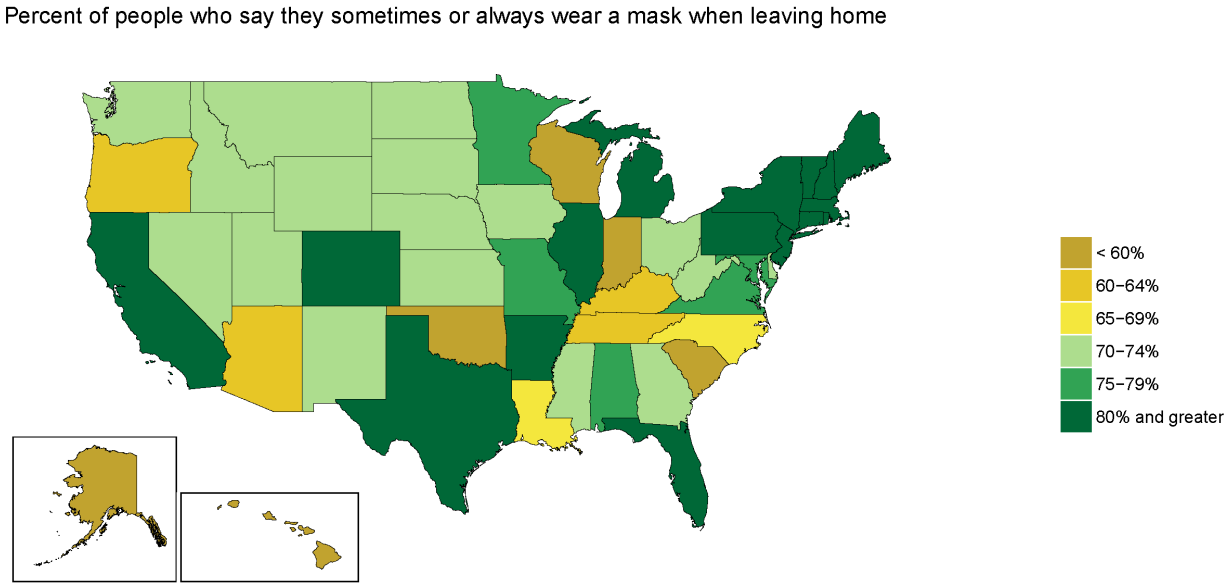
Measuring mask use in the US: initial estimates and next steps

With mobility rising throughout the US over the last several weeks, our team had expected to see large increases in reported COVID-19 cases and deaths in more recent days. After all, the time lag between heightened mobility and potential rise in COVID-19 infections is approximately two weeks. Yet such a surge has yet to materialize, suggesting that increases in human mobility alone may not fully capture risk of transmission.

Premise, a crowd-sourcing data collection company, is currently collecting sentiment data on COVID-19 through its 1.8 million contributors in 100 countries. One topical area covers the use of masks or cloth face coverings, asking app users whether they always, sometimes, or never use masks when they leave their homes. Such data are collected on a daily basis from contributors, which means these data are subject to various limitations related to self-reporting of behaviors. They are also based on a convenience sample, and thus users are not formally sampled to receive the interview; subsequently, it is not clear if these data are representative of each state's broader populations beyond those who use Premise and are contributors.

With these caveats in mind, our team ran some exploratory analyses to examine whether any patterns emerged regarding mask use within the US. As shown in the map below, for the week of May 9 to May 15, at least 80% of survey respondents in 18 states said they sometimes or always wore masks when

leaving their home. In contrast, four states – Indiana, Oklahoma, South Carolina, and Wisconsin – had 60% or fewer of survey respondents indicating that they sometimes or always wore masks when leaving the house last week. States currently have variable policies regarding mask use by the general public and employees who work in businesses with in-person services; as charted by the National Governors Association, such policies can be mandates (e.g., Massachusetts, Maine, New York) or recommendations (e.g., Texas, Wisconsin), or mandated for at least some activities or business operations (e.g., users of transit in New Jersey).



Given that cloth masks or face coverings have been shown to reduce transmission risk, these preliminary findings highlight the role of broader mask use as more states ease stay-at-home orders and other types of social distancing policies. Cloth masks or face coverings cannot fully prevent viral transmission, and their use should go hand-in-hand with other important actions to avoid close contact with others, especially while most places are still scaling up robust containment measures. Nonetheless, using masks when in public appears to be another important tool in curbing COVID-19's toll.

As for next steps: our team is currently exploring how such data and corresponding estimates can be incorporated into our modeling approach, as well as expanding the data sources and locations included for measuring mask use.

Key findings from today's release (May 18, 2020)

A focus on the United States

- Based on the latest available data, COVID-19 could lead to an estimated 143,357 (estimate range of 115,378 to 207,364) cumulative deaths in the US by August. This is somewhat lower than our May 12 release (147,040 cumulative COVID-19 deaths, with an estimate range of 113,182 to 226,971), with considerable overlap of the uncertainty intervals. National-level estimates and the US states with highest projected cumulative COVID-19 deaths are

summarized below. Most of these states have slightly to somewhat lower projected cumulative deaths relative to our May 12 release (though their uncertainty intervals still overlap quite a bit).

Location	Predictions for cumulative COVID-19 deaths through August from our May 18 release (today)	Predictions from our May 12 release	Change of average values since the May 12 release*
US (national)	**143,357 (115,378 to 207,364)**	**147,040 (113,182 to 226,971)**	**↓ 3,683 deaths**
New York	32,135 (30,885 to 34,919)	34,068 (32,779 to 35,983)	↓ 1,933 deaths
New Jersey	14,070 (12,324 to 16,723)	14,692 (12,843 to 18,365)	↓ 622 deaths
Pennsylvania	9,623 (6,571 to 22,797)	12,420 (6,218 to 33,620)	↓ 2,797 deaths
Massachusetts	8,949 (7,701 to 12,057)	9,629 (7,502 to 13,492)	↓ 680 deaths
Illinois	8,781 (5,542 to 14,095)	7,830 (5,232 to 14,675)	↑ 951 deaths
			Results as of 05/18/2020
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*Change estimates do not include uncertainty; they are only based on the average value. If prediction values' uncertainty intervals (the numbers reported in parentheses) overlap a lot across different releases, changes in these estimates are not considered substantively different.

Since our May 12 release, a number of states saw changes in their projected cumulative COVID-19 toll (see summary below). A combination of updated data inputs (i.e., six days of COVID-19 epidemiologic indicators), alongside more data on key drivers of viral transmission (i.e., testing rates, mobility, status of previously implemented social distancing policies) have likely contributed to these states' changes since the May 12 release.

- With that said, it is worth noting that the effects of easing social distancing policies may not be fully known for a few weeks. This is in part because understanding of the way people change their movement and contact patterns in response to eased policies is still emerging; the other key factor is the time lag between viral exposure, possible infection, and full disease progression. And as discussed above, mask use could also affect how projected transmission patterns unfold.

Location	Predictions for cumulative COVID-19 deaths through August from our May 18 release (today)	Predictions from our May 12 release	Change of average values since the May 12 release
Arizona	6,174 (1,187 to 22,117)	2,871 (1,079 to 8,442)	↑ 3,303 deaths
California	6,842 (4,618 to 10,141)	5,832 (4,320 to 8,471)	↑ 1,010 deaths
Colorado	2,281 (1,492 to 3,804)	1,641 (1,379 to 2,261)	↑ 641 deaths
Missouri	1,506 (895 to 4,385)	2,348 (1,017 to 5,403)	↓ 842 deaths
Florida	4,721 (3,252 to 9,146)	5,819 (3,365 to 11,335)	↓ 1,098 deaths

North Carolina	2,524 (1,099 to 9,037)	4,413 (1,416 to 11,321)	↓ 1,888 deaths
			Results as of 05/18/2020 © 2020 IHME See terms and conditions of use, https://bit.ly/3aK1FSO

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Data and methods updates since our last release on May 12, 2020

Data updates

- For all previously included locations, we have added reported data points on COVID-19 deaths, cases, mobility, and testing rates, as well as available information on social distancing policies for six days (May 11, May 12, May 13, May 14, May 15, and May 16 at about 10:00 p.m. Pacific). For all new locations, we include these data inputs from the first date of reporting through May 16.

Methods updates

- There are no substantive methods updates since our last release on May 12. We continue to use the multi-stage hybrid model, as introduced on May 4, for currently included locations. Ecuador remains the main exception, where we use all-cause mortality and compute excess mortality to then estimate COVID-19 deaths; more detail is provided in the May 12 estimation update.

What's in the development pipeline for IHME COVID-19 predictions

Before we introduce new model components or improvements to our current analytical platform for predictions, IHME's COVID-19 development team members test these additions or changes.

Based on currently available data and model testing progress, our immediate- and medium-term priorities are as follows:

- **Initial COVID-19 projections for additional countries**. Data collation and processing for a wider set of locations and countries worldwide are in progress. We are currently working on adapting our prediction model to countries that have experienced more than 50 total COVID-19 deaths to date. With the increasing recognition of under-counting of COVID-19 deaths in many locations outside of the European Economic Area and North America, we are exploring methods that can approximate excess mortality and incorporate such estimates into our COVID-19 models.

- **Additional key epidemic drivers**. Pending data availability across currently included locations, we are exploring how to incorporate additional model covariates such mask or face covering use by the broader public, human contact rates, household size, and use of public transit, as well as exploring whether trends in diseases such as pneumonia can be used to predict trends in COVID-

19. As discussed above, we have made progress in estimating mask use in the US; work is ongoing to further improve its measurement and identify data sources for additional locations.

A note of thanks

We would like to extend a special thanks to the Pan-American Health Organization (PAHO) for key data sources; our partners and collaborators in Argentina, Brazil, Chile, Colombia, the Dominican Republic, Ecuador, Egypt, Israel, Malaysia, Mexico, Moldova, Panama, Peru, the Philippines, South Korea, Turkey, and Ukraine for their support and expert advice; and to the tireless data collection and collation efforts of individuals and institutions throughout the world.

In addition, we wish to express our gratitude for efforts to collect social distancing policy information in Latin America to University of Miami Institute for Advanced Study of the Americas (Felicia Knaul, Michael Touchton); Fundación Mexicana para la Salud with support from the GDS Services International: Tómatelo a Pecho A.C.; and Centro de Investigaciones en Ciencias de la Salud, Universidad Anáhuac (Héctor Arreola-Ornelas); Lab on Research, Ethics, Aging and Community-Health at Tufts University (REACH Lab) and the University of Miami Institute for Advanced Study of the Americas (Thalia Porteny).

Further, IHME is grateful to the Microsoft AI for Health program for their support in hosting our COVID-19 data visualizations on the Azure Cloud.

For all COVID-19 resources at IHME, visit http://www.healthdata.org/covid.
Questions? Requests? Feedback? Please contact us here.