COVID-19 Forecasts

Last updated April 21, 2020

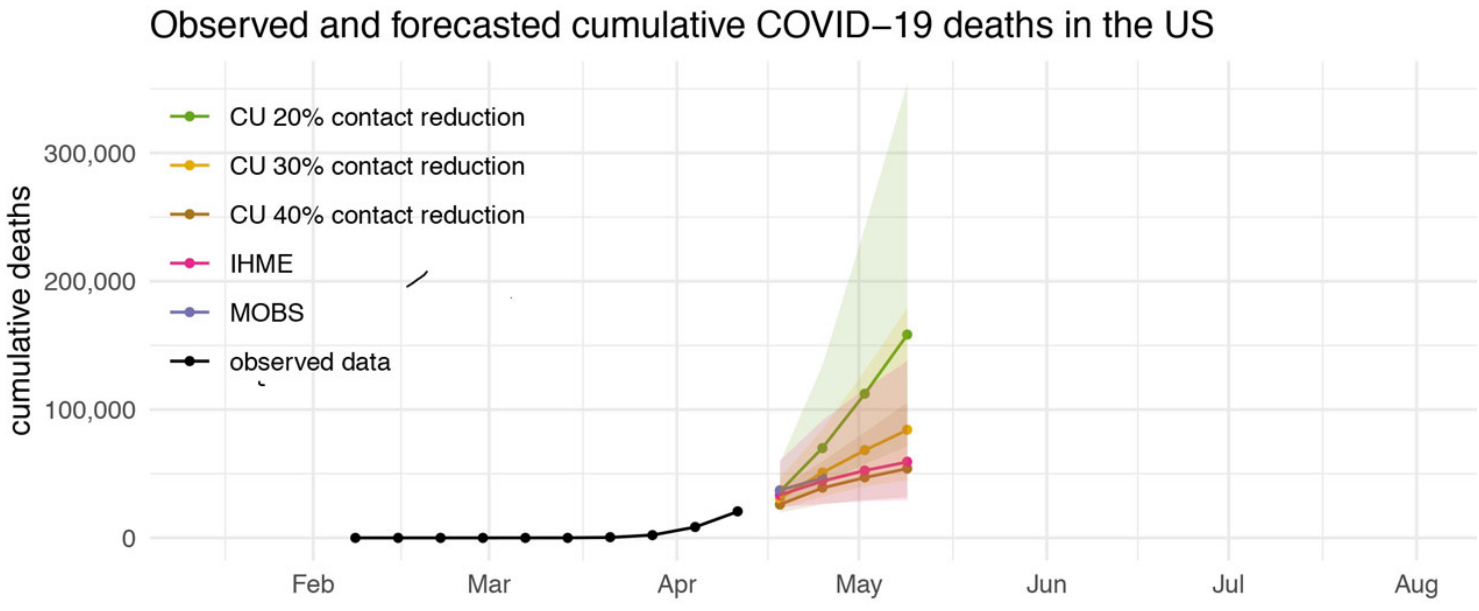
Why Forecasting COVID-19 Deaths in the US is Critical

CDC is responding to a pandemic of coronavirus disease 2019 (COVID-19) caused by a novel coronavirus, SARS-CoV-2, that is spreading from person to person. The federal government is working closely with state, tribal, local, and territorial health departments, and other public health partners, to respond to this situation. Forecasts of deaths will help inform public health decision-making by projecting the likely impact in coming weeks.

What the Forecasts Aim to Predict

Forecasts based on the use of statistical or mathematical models (subsequently referred to as "models") aim to predict changes in national and state level cumulative reported COVID-19 deaths for the next four weeks. Forecasting teams predict numbers of deaths using different types of data (e.g., COVID-19 data, demographic data, mobility data), methods (see below), and estimates for the impacts of interventions (e.g. social distancing, use of face coverings).

National Forecast



The IHME and MOBS models are conditional on existing social distancing measures continuing through the projected time−period shown. The CU models make different assumptions about the effectiveness of current interventions. Intervals shown are at the 95% uncertainty level.

- These forecasts show cumulative reported COVID-19 deaths since February and forecasted deaths for the next four weeks in the United States.
- The IHME and MOBS models assume existing social distancing measures continue through the forecasting period while the CU models assume different levels of social distancing.

Interpretation of Forecasts

- National-level forecasts indicate that deaths are likely to continue to rise in the coming weeks but with a lot of uncertainty as to how quickly they will increase.
- Models that incorporate strong contact reduction (IHME, MOBS) suggest that new deaths will continue to occur, but slow substantially over the next four weeks. Conversely, models that do not incorporate strong contact reduction (CU 20%, CU 30%) suggest a more rapid rise in deaths.
- State-level forecasts vary widely, reflecting differences in early epidemic phases, in timing of interventions, and in model-specific patterns similar to those in the national forecasts.

State Forecasts

State level forecasts show observed and forecasted state level cumulative COVID-19 deaths in the US.

Forecasts fall into one of three categories

- The LANL model does not explicitly model the effects of individual social distancing measures but assumes that implemented interventions will continue to be upheld in the future resulting in decreased growth.
- The IHME and MOBS_NEU models are conditional on existing social distancing measures continuing through the projected time−period.
- The CU models make different assumptions about the effectiveness of current social distancing interventions.

Download state forecasts [PDF – 57 KB]

Download model data [XLS – 106 KB]

Working to Bring Together Forecasts for COVID-19 Deaths in the US

CDC works with partners to bring together weekly forecasts for COVID-19 deaths in one place. These forecasts have been developed independently and shared publicly. It is important to bring these forecasts together to help understand how they compare with each other and how much uncertainty there is about what may happen in the upcoming four weeks.

Columbia University

Model names: CU 20% contact reduction, CU 30% contact reduction, CU 40% contact reduction

Intervention assumptions
These models are based on assumptions of reducing the number of contacts per case. Three different adaptive scenarios of contact reduction are projected: 20%, 30%, and 40% contact reduction in US counties with at least 10 cases. Additional reductions are implemented with additional new cases, and all social distancing interventions remain in place until the end of the projection.

Methods
Metapopulation SEIR model

Institute for Health Metrics and Evaluation

Model name: IHME

Intervention assumptions
This model assumes social distancing stays in place until the pandemic, in its current phase, reaches the point when COVID-19 deaths are less than 0.3 per million people. Based on these latest projections, IHME expects social distancing measures to be in place through the end of May.

Methods
Non-linear mixed effects curve-fitting

Los Alamos National Laboratory

Model name: LANL

Intervention assumptions
Currently implemented interventions and the corresponding reductions in transmission will continue to be upheld in the future, resulting in an overall decrease in the growth rate of COVID-19. Over the course of the forecast, the model assumes that the growth will decrease over time.

Methods
Statistical dynamical growth model accounting for population susceptibility

Northeastern

Model name: MOBS (Laboratory for the Modeling of Biological + Socio-technical Systems)

Intervention assumptions
The projections assume that social distancing policies in place at the date of calibration are extended for the future weeks.

Methods
Metapopulation, age-structured SLIR model

Additional Resources:

COVID Cases, Data, and Surveillance

FAQ: COVID-19 Data and Surveillance

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Content source: National Center for Immunization and Respiratory Diseases (NCIRD), Division of Viral Diseases