Forecasts of Total Deaths

Updated July 15, 2020 Print

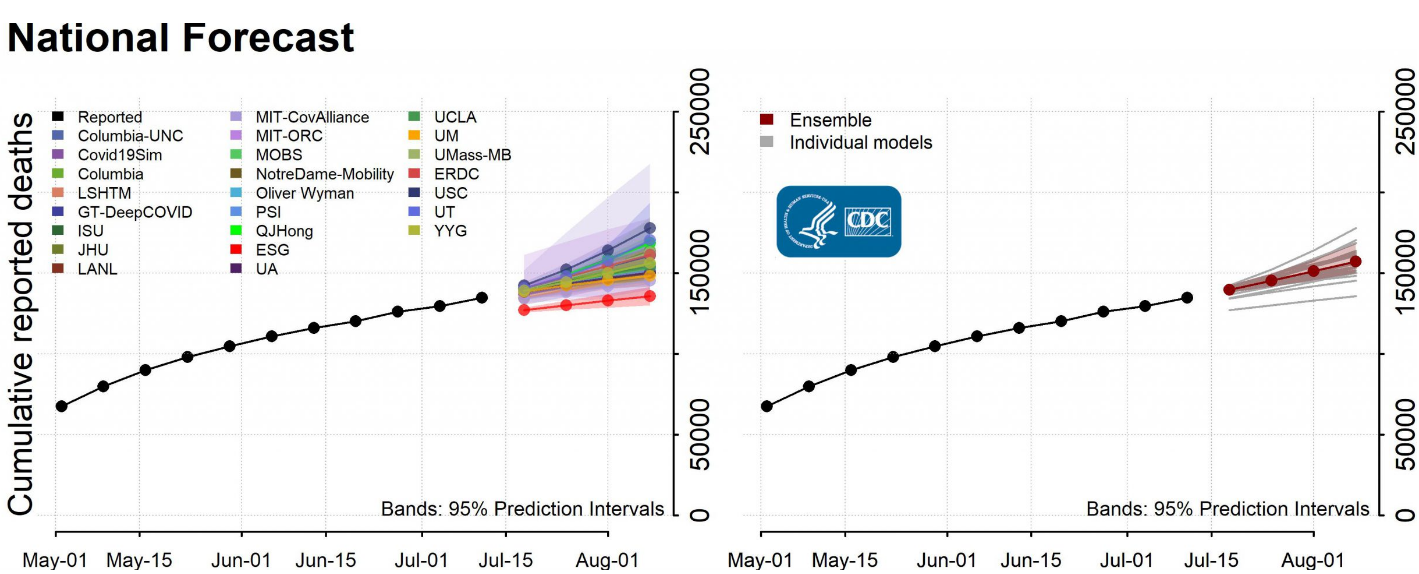
Observed and forecasted cumulative reported COVID-19 deaths as of July 13, 2020.

Interpretation of Cumulative Death Forecasts

- This week CDC received 24 individual national forecasts.
- This week's national ensemble forecast suggests that there will likely be between 150,000 and 170,000 total reported COVID-19 deaths by August 8th.

- The state-level ensemble forecasts suggest that the number of new deaths over the next four weeks will likely exceed the number reported over the last four weeks in 22 states and 2 territories. The jurisdictions with the greatest likelihood of a larger number of deaths include: Arizona, Florida, Idaho, Montana, Oklahoma, South Carolina, Tennessee, Texas, Utah, the Virgin Islands, and West Virginia.

National Forecast



- The figure shows cumulative reported COVID-19 deaths and forecasted deaths for the next four weeks in the United States.
- Models make various assumptions about the levels of social distancing and other interventions, which may not reflect recent changes in behavior. See model descriptions below for details.

State Forecasts

State-level forecasts figures show observed and forecasted state-level cumulative COVID-19 deaths in the US. Each state forecast uses a different scale, due to differences in the numbers of COVID-19 deaths occurring in each state.

Forecasts fall into one of two categories

- The Columbia-UNC, ERDC, ESG, GT-DeepCOVID, ISU, LANL, LSHTM, MIT-CovAlliance, MIT-ORC, MOBS, Oliver Wyman, NotreDame-Mobility, QJHong, UA, UM, UMass-MB, USC, and UT forecasts assume that existing control measures will remain in place during the prediction period.
- The Columbia, GT-CHHS, JHU, NotreDame-FRED, PSI, UCLA, and YYG forecasts make different assumptions about how levels of social distancing will change in the future.

Download state forecasts [12 pages]

Download forecast data [1 sheet]

Modeling Groups

Forecasts were provided by these modeling groups:

Auquan Data Science

Model names: Auquan

Note: This group did not submit a forecast this week.

Intervention assumptions: These projections do not make specific assumptions about which interventions have been implemented or will remain in place.

Methods: SEIR model

Columbia University

Model name: Columbia

Intervention assumptions: This model assumes that contact rates will increase 5% per week over the next two weeks. The reproductive number is then set to 1 for the remainder of the projection period.

Methods: Metapopulation SEIR model.

Columbia University and University of North Carolina

Model name: Columbia-UNC

Intervention assumptions: This model assumes that transmission intensity will peak in early July and then gradually decline.

Methods: Statistical survival-convolutional model.

COVID-19 Simulator Consortium

Model name: Covid19Sim

Intervention assumptions: This model is based on assumptions about how levels of social distancing will change in the future. It assumes a 20% increase in mobility as each state reopens.

Methods: SEIR model.

Georgia Institute of Technology, Center for Health and Humanitarian Systems (Georgia forecasts only)

Model name: GT_CHHS

Intervention assumptions: This model assumes that once stay-at-home orders are lifted, contact rates will gradually increase. It also assumes that households containing symptomatic cases will self-quarantine.

Methods: Agent-based model.

Georgia Institute of Technology, College of Computing

Model name: GT-DeepCOVID (formerly GA_Tech)

Intervention Assumptions: This model assumes that the effects of interventions are reflected in the observed data and will continue going forward.

Methods: Deep learning.

Institute of Health Metrics and Evaluation

Note: This group did not submit a forecast this week.

Model name: IHME

Intervention assumptions: Projections are adjusted to reflect differences in aggregate population mobility and community mitigation policies.

Methods: Combination of a mechanistic disease transmission model and a curve-fitting approach.

Iowa State University

Model name: ISU

Intervention Assumptions: These projections do not make specific assumptions about which interventions have been implemented or will remain in place.

Methods: Nonparametric spatiotemporal model.

Johns Hopkins University, Infectious Disease Dynamics Lab

Model name: JHU

Intervention Assumptions: This model assumes that the effectiveness of interventions is reduced after shelter-in-place orders are lifted.

Methods: Stochastic metapopulation SEIR model.

London School of Hygiene and Tropical Medicine

Model name: LSHTM

Intervention assumptions: These projections assume that current interventions will not change during the forecasted period.

Methods: This forecast is an ensemble of three different models: A time-varying reproductive number-based model, a time series model based on numbers of deaths, and a time series model based on numbers of cases and deaths.

Los Alamos National Laboratory

Model name: LANL

Intervention assumptions: This model assumes that currently implemented interventions and corresponding reductions in transmission will continue, resulting in an overall decrease in the growth rate of COVID-19 deaths.

Methods: Statistical dynamical growth model accounting for population susceptibility.

Massachusetts Institute of Technology, COVID-19 Policy Alliance

Model name: MIT-CovAlliance

Intervention Assumptions: The projections assume that current interventions will remain in place indefinitely.

Methods: SIR model.

Massachusetts Institute of Technology, Operations Research Center

Model name: MIT-ORC

Intervention Assumptions: The projections assume that current interventions will remain in place indefinitely.

Methods: SEIR model.

Northeastern University, Laboratory for the Modeling of Biological and Socio-technical Systems

Model name: MOBS

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.

Notre Dame University

Model names:

- NotreDame-Mobility
- NotreDame-FRED (state-level forecasts only)

Intervention assumptions: These forecasts assume that population-level mobility is a reliable proxy for adherence to social distancing, and that recent trends in mobility will continue over the coming weeks.

Methods:

- NotreDame-Mobility: SEIR model fit to data on deaths, test positivity, and population mobility.
- NotreDame-FRED: Agent-based model.

Oliver Wyman

Model name: Oliver Wyman

Intervention assumptions: These projections assume that current interventions, will remain unchanged during the forecasted period.

Methods: Time-dependent SIR model for detected and undetected cases.

Predictive Science Inc.

Model name: PSI

Intervention assumptions: These projections assume that current interventions will not change during the forecasted period.

Methods: Stochastic SEIRX model.

Qi-Jun Hong

Model name: QJHong

Intervention assumptions: These projections assume that current interventions will not change during the forecasted period.

Methods: Machine learning using case data and mobility data.

Robert Walraven

Model name: ESG

Intervention assumptions: These projections assume that current interventions will not change during the forecasted period.

Methods: Fitting reported data to multiple skewed gaussian distributions.

US Army Engineer Research and Development Center

Model name: ERDC

Intervention assumptions: These projections assume that current interventions will not change during the forecasted period.

Methods: SEIR model.

University of Arizona

Model name: UA

Intervention assumptions: This model assumes that current interventions will remain in effect for at least four weeks after the forecasts are made.

Methods: SIR mechanistic model with data assimilation.

University of California, Los Angeles

Model name: UCLA

Intervention assumptions: This model assumes that contact rates will increase as states reopen. The increase in contact rates is calculated for each state.

Methods: Modified SEIR model.

University of Massachusetts, Amherst

Model names: UMass-MB, Ensemble

Intervention assumptions:

- UMass-MB: These projections do not make specific assumptions about which interventions have been implemented or will remain in place.
- Ensemble: The national and state-level ensemble forecasts include models that assume certain social distancing measures will continue and models that assume those measures will not continue.

Methods:

- UMass-MB: Bayesian SEIRD model.
- Ensemble: Equal-weighted combination of 2 to 11 models, depending on the availability of national and state-level forecasts. To ensure consistency, the ensemble includes only models with 4 week-ahead forecasts and models that do not assign a significant probability to there being fewer cumulative deaths than have already been reported by the day of submission. Only one model was available for the forecasts for Guam and the Northern Mariana Islands.

University of Michigan

Model name: UM

Intervention assumptions:

- These projections assume that current interventions will remain unchanged during the forecasted period.

Methods:

- Ridge regression

University of Southern California

Model name: USC

Intervention assumptions: These projections assume that current interventions will remain unchanged during the forecasted period.

Methods: SIR Model.

University of Texas, Austin

Model name: UT

Intervention assumptions: This model estimates the extent of social distancing using geolocation data from mobile phones and assumes that the extent of social distancing will not change during the period of forecasting. The model is designed to predict confirmed COVID-19 deaths resulting from only a single wave of transmission.

Methods: Nonlinear Bayesian hierarchical regression with a negative-binomial model for daily variation in death rates.

Youyang Gu (COVID-Projections)

Model name: YYG

Intervention assumptions: The model accounts for individual state-by-state re-openings and their impact on infections and deaths.

Methods: SEIS mechanistic model.

Additional Resources:

Previous COVID-19 Forecasts

FAQ: COVID-19 Data and Surveillance

CDC COVID Data Tracker

COVID-19 Mathematical Modeling

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