COVID-19 Forecasts: New Hospitalizations

Updated June 4, 2020

Interpretation of Forecasts of New Hospitalizations

- National-level forecasts estimate that 2,000 to 5,000 new COVID-19 hospitalizations are occurring per day. Some forecasts suggest an increase in the rate of new hospitalizations and others suggest a decrease over the next four weeks.
- Forecasts estimate the number of new hospitalizations from a variety of data sets of COVID-19 cases or deaths. The use of different data sets, with different limitations—along with the use of different assumptions about social distancing—may result in the high variation between forecasts.

Forecast Assumptions

CDC works with partners to bring together weekly forecasts for new COVID-19 hospitalizations. These forecasts make different assumptions about social distancing measures and use different methods and data sets to estimate the number of new hospitalizations. Individual models are described in more detail below.

Social distancing is incorporated into the forecasts in two different ways:

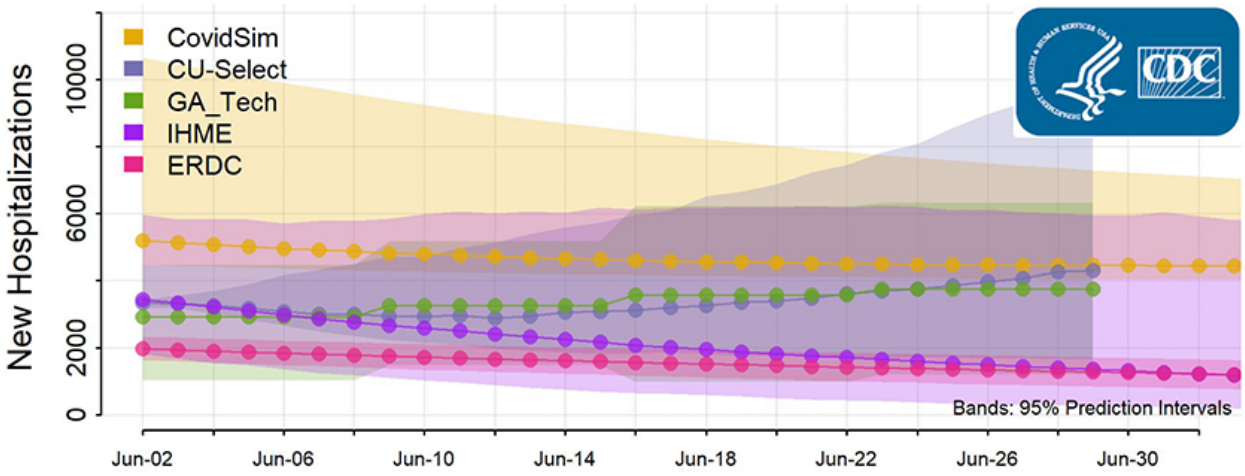
- The national- and state-level forecasts from Columbia University, the Institute for Health Metrics and Evaluation (IHME), and the COVID-19 Simulator Consortium make assumptions about how levels of social distancing will change in the future.
- The state-level forecasts from COVID Act Now and the Los Alamos National Laboratory (LANL) and the national and state-level forecasts from the Georgia Institute of Technology, College of Computing, and the US Army Engineer Research and Development Center (ERDC), assume that existing social distancing measures in each state will continue through the projected four-week time period.

The rate of new hospitalizations is estimated using three approaches:

- The forecasts from Columbia, LANL, COVID Act Now, ERDC, and the COVID-19 Simulator Consortium assume that a certain fraction of infected people will be hospitalized.
- The IHME forecast estimates hospitalizations based on numbers of forecasted deaths.
- The forecast from the Georgia Institute of Technology, College of Computing, uses COVID-19 hospitalization data reported by some states to forecast future hospitalizations.

National Forecasts

National Forecast



- The five national forecasts show the predicted number of new COVID-19 hospitalizations per day for the next four weeks in the United States.
- As noted above, the forecasts make different assumptions about hospitalization rates and levels of social distancing and other interventions and use different methods to estimate the number of new hospitalizations. See models below for details.

State Forecasts

Seven state-level models predicting the number of new hospitalizations per day were submitted this week. The state-level forecasts show the predicted number of new COVID-19 hospitalizations per day for the next four weeks in each state. Each state forecast uses a different scale, due to differences in number of new COVID-19 cases occurring per day in each state.

Download state forecasts [7 pages][1]

Download forecast data

Modeling Groups

Forecasts were provided by these modeling groups:

COVID Act Now (state-level forecasts only)

Model name: CAN

Intervention assumptions:

- This model assumes that the effects of current interventions are reflected in the observed data and that those effects will continue going forward.
- The number of new hospitalizations per day are estimated from the number of infections, using hospitalization rates reported for California counties.

Methods: SEIR model

COVID-19 Simulator Consortium

Model name: CovidSim

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 states reopen.
- The number of new hospitalizations per day are estimated from the number of infections, using state-specific hospitalization rates.

Methods: SEIR model

Columbia University

Model name: CU-Select

Intervention assumptions:

- This model is based on assumptions about how levels of social distancing will change in the future. It assumes a 20% reduction in contact rates for each successive week that stay-at-home orders remain in place or are expected to remain in place. Once a state has re-opened, contact rates are assumed to increase by 5% each week.
- The model uses state-specific hospitalization data, when available. In states without hospitalization data, the model uses the national average value for hospitalization data.

Methods: Metapopulation SEIR model

Georgia Institute of Technology, College of Computing

Model name: GA_Tech

Intervention assumptions:

- This model assumes that the effects of interventions are reflected in the observed data and will continue going forward.
- Daily hospitalizations are predicted from publicly available, state-level data sources.

Methods: Deep learning

Institute of Health Metrics and Evaluation

Model name: IHME

Intervention assumptions:

- Projections are adjusted to reflect differences in aggregate population mobility and community mitigation policies.
- Daily hospitalizations are estimated from predictions of daily deaths, using state hospitalization rates, where available

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

Los Alamos National Laboratory (state-level forecasts only)

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 COVID-19 infections and hospitalizations.
- State demographics and age-group symptomatic case hospitalization rates are used to estimate the daily number of hospitalizations, based on estimates of the total number of infections.

Methods: Statistical dynamical growth model accounting for population susceptibility

US Army Engineer Research and Development Center

Model name: ERDC

Intervention assumptions:

- This model assumes that the effects of current interventions are reflected in the observed data and that those effects will continue going forward.
- The number of new hospitalizations per day are estimated from the number of infections, using state-specific hospitalization rates.

Methods: SEIR mechanistic model

[1] The full range of the prediction intervals is not visible for all plots. The full range of state-level prediction intervals is available via the forecast data download.

Additional Resources

Previous COVID-19 Hospitalization Forecasts

FAQ: COVID-19 Data and Surveillance

CDC COVID Data Tracker

COVID-19 Mathematical Modeling

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