Coronavirus Disease 2019 (COVID-19)

COVID-19 Forecasts: New Hospitalizations

Updated May 27, 2020

Interpretation of Forecasts of New Hospitalizations

- Forecasts that estimate the numbers of daily new COVID-19 hospitalizations over the next four weeks vary considerably. The two national forecasts included here—from Columbia University and the Georgia Institute of Technology—predict different rates of hospitalizations over time, with large uncertainty bounds.

- Standardized reporting of state-level hospitalization data is limited, so most forecasts estimate the number of new hospitalizations from 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—results in 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 three different ways:

- The national and state-level Columbia forecasts make assumptions about how levels of social distancing will change in the future.

- The national and state-level forecasts from the Georgia Institute of Technology assume that existing social distancing measures in each state will continue through the projected four-week time period.

- The state-level Los Alamos National Laboratory (LANL) forecasts do not explicitly model the effects of individual social distancing measures but assume that the measures will continue at current levels, resulting in decreased rates of hospitalization.

The rate of new hospitalizations is estimated using two approaches:

- The forecasts from Columbia and LANL assume that a certain fraction of infected people will be hospitalized.

- The forecast from the Georgia Institute of Technology uses COVID-19 hospitalization data reported by some states to forecast future hospitalizations.

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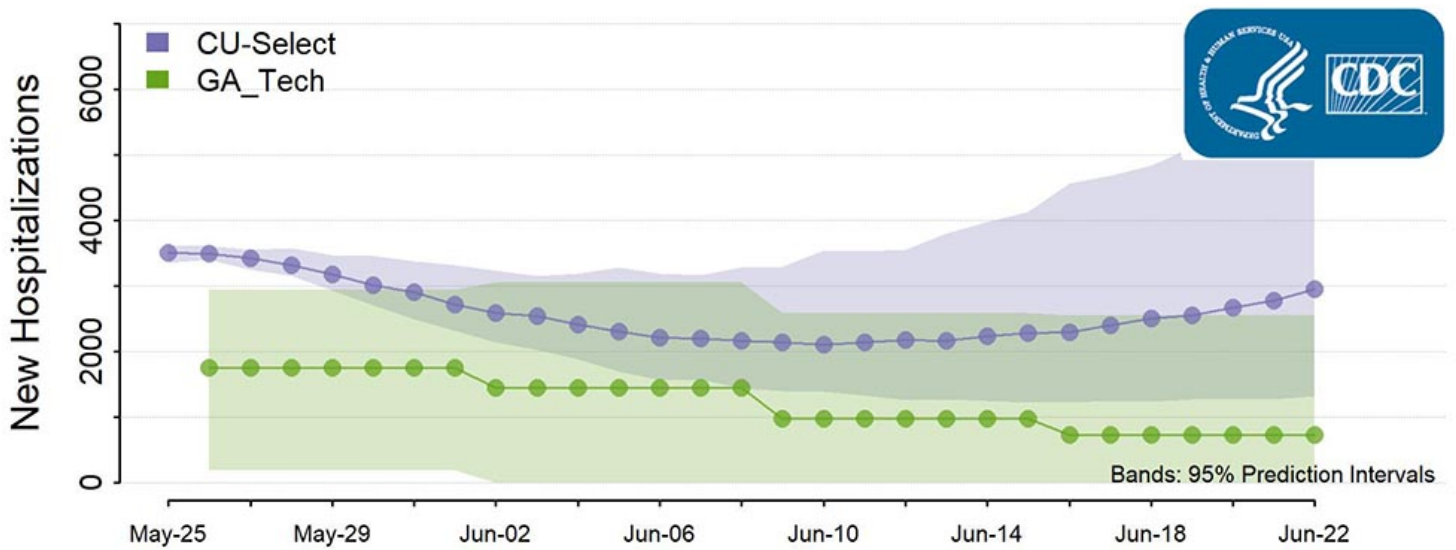
- The two national forecasts show the predicted number of new COVID-19 hospitalizations per day for the next four weeks in the United States.
- As noted above, the forecasts make different assumptions about hospitalization rates and levels of social distancing and other interventions and use different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

State Forecasts

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:

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 ⬀

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

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 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

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[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.