COVID-19

COVID-19 Forecasting and Mathematical Modeling

Updated June 27, 2023

Why COVID-19 Forecasting and Mathematical Modeling Are Important

Forecasts of disease burden help inform public health decision making by projecting the likely impact of COVID-19 in the next few weeks. These forecasts are generated using mathematical models by CDC partners in the COVID-19 Forecast Hub ⧉ . Forecasts are used to inform public health decisions about pandemic planning, resource allocation, implementation of social distancing measures, and other interventions. CDC is working closely with state, tribal, local, and territorial health departments, and other public health partners, to respond to the COVID-19 pandemic.

Bringing Together Forecasts for COVID-19 in the United States

CDC works with partners to bring together weekly forecasts based on statistical or mathematical models that aim to predict national and state numbers of new COVID-19 hospitalizations per day for the next 4 weeks.

- COVID-19 Forecasts: Hospitalizations

Previously, forecasts also predicted the number of new COVID-19 deaths and cases per week. Death forecasts stopped in March 2023 and case forecasts stopped in February 2022. Archives of past case and death forecasts are available and a machine readable database of past forecasts is available at data.cdc.gov

Ensemble forecasts

Forecasting teams in the COVID-19 Forecasting Hub ⧉ predict numbers of hospitalizations using different modeling methods, types of data (e.g., COVID-19 data, demographic data, mobility data), and estimates of the impacts of interventions (e.g., social distancing, use of face coverings). These forecasts are developed independently and shared publicly here ⧉ . 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 near future.

An "ensemble" forecast combines each of the independently developed forecasts into one aggregate forecast to improve prediction over the next 4 weeks. This article, *Ensemble Forecasts of Coronavirus Disease 2019 (COVID-19) in the U.S.* ⧉ describes the "ensemble" forecast methodology and its usefulness as a real-time tool to help guide policy and planning.

Other Resources

COVID-19 Surge Tool

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