

Projected COVID-19 epidemic trends and health system needs for Oregon

Authors: Cliff Kerr¹, Brittany Hagedorn¹, Dina Mistry¹, Daniel Klein¹

Reviewers: Assaf Oron¹, Prashanth Selvaraj¹, Jen Schripsema¹, Roy Burstein¹

¹Institute for Disease Modeling, Bellevue, Washington

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What is already known?

The global COVID-19 pandemic threatens to overload health care systems. Patients with severe symptoms will have significantly higher mortality if they are unable to receive timely care.

What is added by this report?

We ran model simulations specific to Oregon projecting the number of cumulative, active, and severe infections (requiring inpatient care) as of April 11 under four different intervention levels. See the table below summarizing the infections and number of inpatient hospital beds required at each intervention level.

	Cumulative infections	Active infections	Inpatient beds needed
Business as usual	5000	3400	484
Current interventions	1100	510	125
Schools remain closed	790	250	16
Aggressive social distancing	340	16	35

What are the implications for public health practice?

Only aggressive social distancing is predicted to decrease the number of active infections by April 11. Health care systems are likely to be overburdened by late April without sustained interventions to keep the number of infections under control.

Previous work

The resource needs estimated by the previous report are shown in Figure 1, based on an exponential growth model of the disease and parameter estimates informed by Daegu and other international contexts.

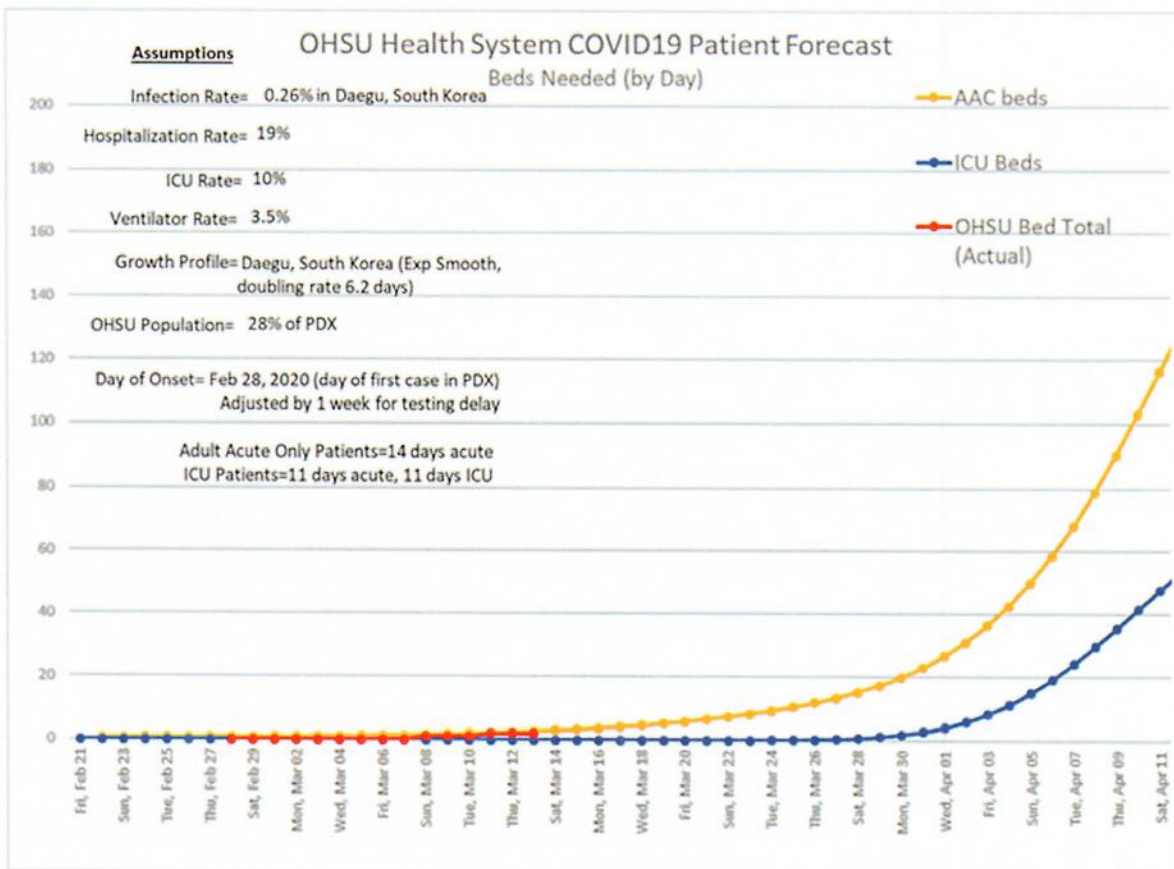


Figure 1: Previously estimated Oregon Health & Sciences University hospital system needs, produced by Peter Graven on 2020-03-14.

Summary of methods

A detailed summary of our methods is available for transmission modeling in Appendix 1, and for health systems usage in Appendix 2. In brief, we have coupled an individual-based transmission model (COVID-19 Agent-based Simulator, or COVASim) to a discrete event care usage model as follows.

COVID-19 transmission takes place on a fixed network of contacts with best-available disease parameters. In fitting transmission model output to testing and diagnosis data for Oregon, we found that a single importation on February 17th was insufficient to match the data. Increasing the number of importations to 3-5 on this date resolved the discrepancy.

Results from the transmission model feed directly into the hospital utilization module, which has the following assumptions:

- Of all symptomatic cases, 25% require hospitalization and 8% have severe illness requiring an ICU bed