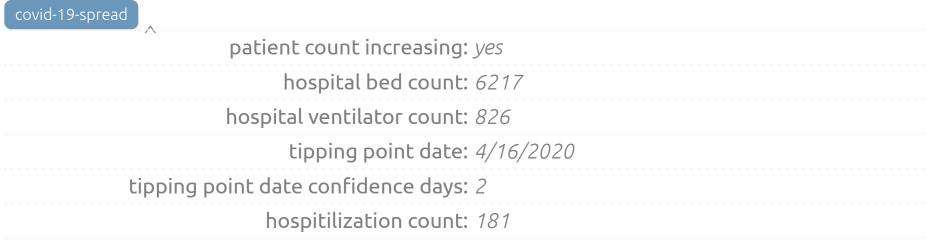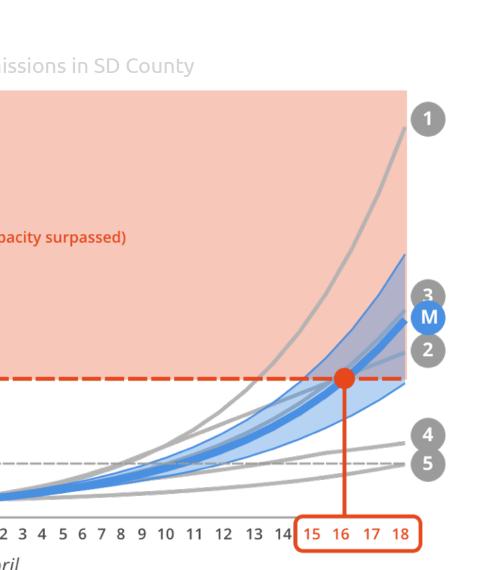# COVID-19 Outbreak Forecast for San Diego County, April 2020
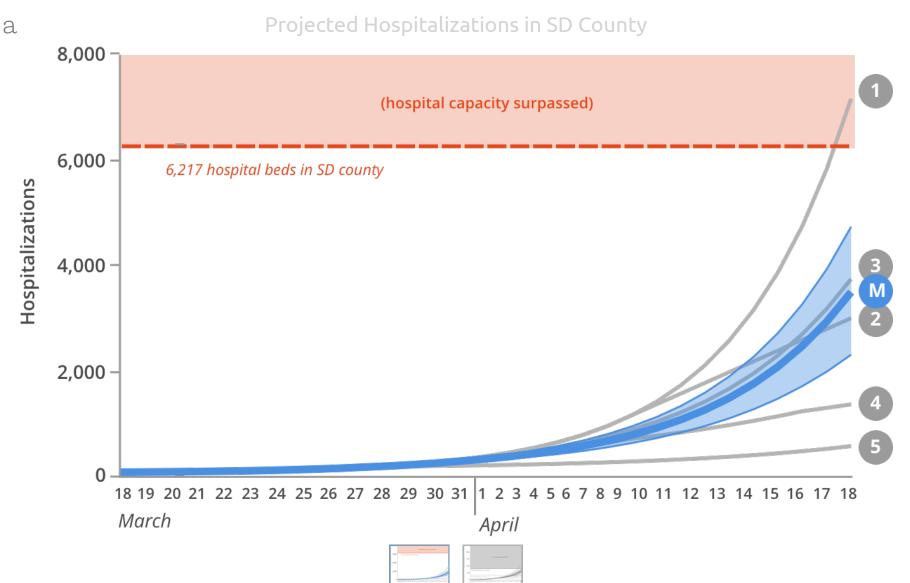
by Jeffrey Morgan, Emily A Eshraghian, Nicole Brye, Lauren Chun, Darrick Suen, Nathan S Jacobs
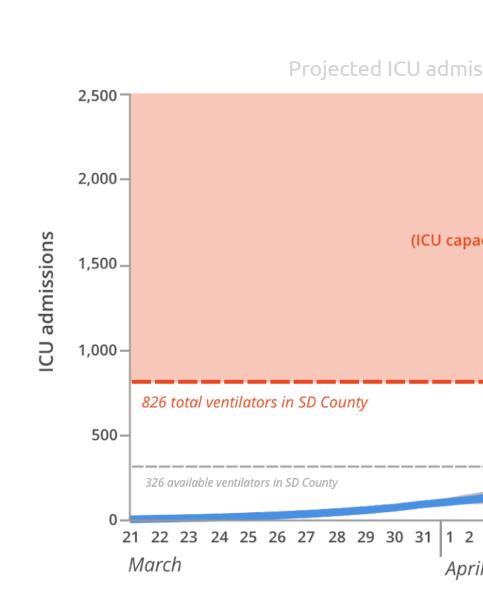
Apr 03, 2020

covid-19-spread

patient count increasing:	*yes*
hospital bed count:	*6217*
hospital ventilator count:	*826*
tipping point date:	*4/16/2020*
tipping point date confidence days:	*2*
hospitilization count:	*181*
city:	*San Diego County, CA*

We used a wisdom of crowds approach to identify the most likely model of COVID-19 spread and resulting hospitalizations and ventilator use for San Diego County, CA, USA in the month of April. San Diego confirmed its first case of COVID-19 on March 7, 2020. Social distancing measures (stay-at-home order from state governor) were issued on March 19, with additional local measures enacted March 23 to improve compliance such as patrolling beach parking lots and signage in areas of congregation. Incident cases are currently increasing. Our models are based on data collected up to March 28 and do not forecast beyond April 18, 2020.

The current set of outbreak models (see link to methods for details) range from worst case scenarios (Model 1) to best case scenarios (Model 5). Votes were collected from a mix of experts and non-experts (n=8), with input from individuals living within San Diego that have informal contextual awareness. A weighted average of the models was constructed (Model "M") to predict when San Diego is likely to hit hospital capacity (hospital beds and/or ventilators). The merged Model M curve was most similar to Model 3, with an exponential growth rate that would occur if social distancing behaviors were partially working but failing to strongly attenuate infection rates.

Using this approach we predict whether or not San Diego will hit hospital capacity (hospital beds and/or ventilators) by April 18. Model M projects a growth in hospitalizations that should not surpass existing hospital bed capacity by April 18 (*panel a*). Model M projects a growth in ICU admissions (and presumed need for ventilator usage) that is predicted to surpass the number of current available ventilators (326) and all ventilators (826) some time *between April 15 and April 18* unless additional ventilators are made available (*panel b*). The date range was determined by the intersection of upper and lower standard deviations with ventilator capacity.

Additional factors such as non COVID-19 hospitalizations, potential future construction of new hospital facilities, and procurement of additional ventilators are not reflected in this model and should be considered.

We encourage all residents of San Diego to continue rigorously following social distancing practices to improve the likelihood of best case scenarios and limit the scope of possible worst case scenarios.

References:

1) https://doi.org/10.1115/IMECE2018-86559

Protocols:

1) Model descriptions and formulas

Datasets:

1) Data and model calculations

2) San Diego County Health & Human Services

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a

Projected Hospitalizations in SD County

b

Projected ICU admissions in SD County

(ICU capacity surpassed)

826 total ventilators in SD County

326 available ventilators in SD County

ICU admissions

2,500
2,000
1,500
1,000
500
0

March
21 22 23 24 25 26 27 28 29 30 31

April
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

1
3
M
2
4
5