



COVID-19
coronavirus
EMPLOYER RESOURCES
WEBINAR SERIES

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PERMANENTE

Forecasting the COVID-19 Epidemic in Washington State

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Kaiser Permanente Washington Health Research Institute

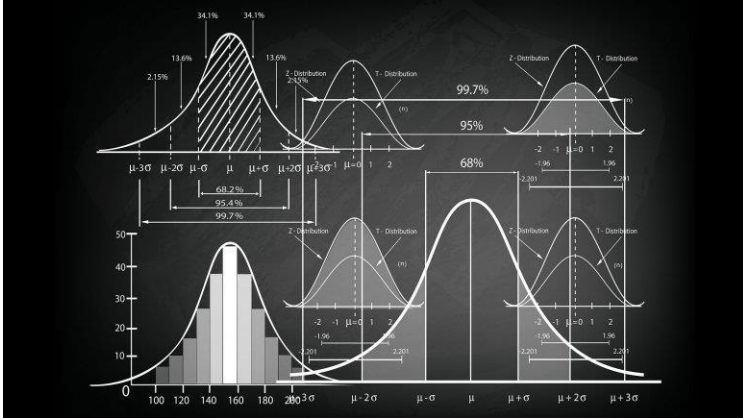
13th April, 2020

AWVB 

How do we forecast epidemics?

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Statistical



Source: <https://online.stanford.edu/courses/hrp259-introduction-probability-and-statistics-epidemiology>

Mechanistic

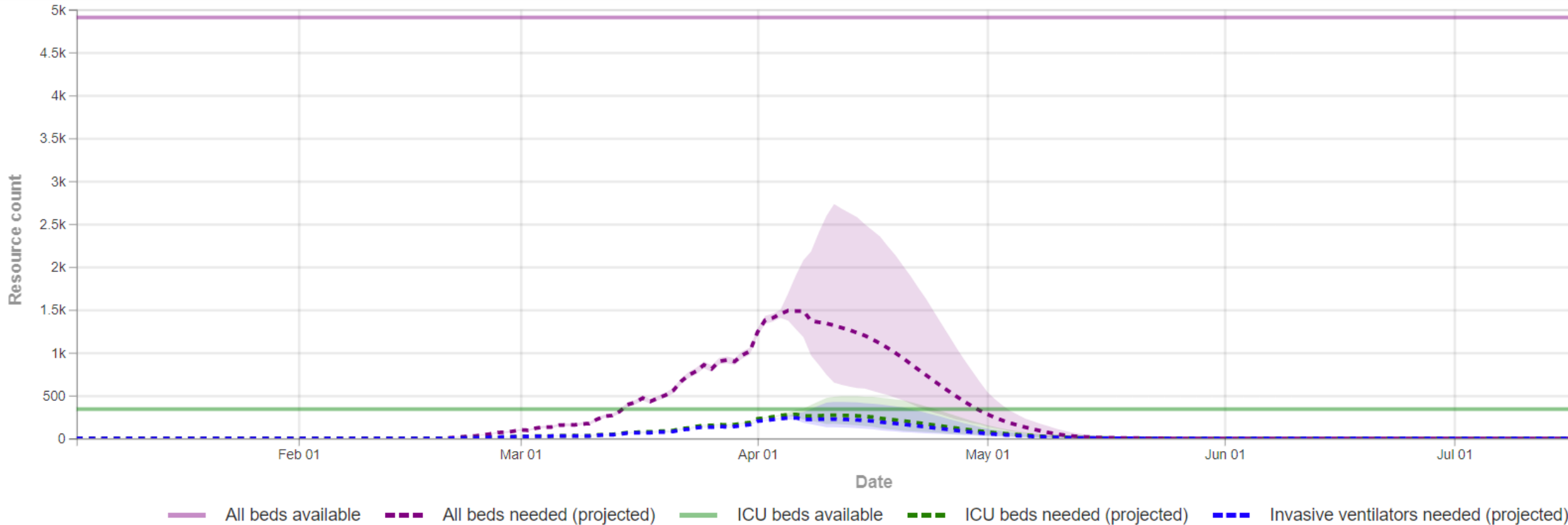


<https://mustangrobotics.net/gears-and-gear-reductions/>

University of Washington IHME forecast

COVID-19 COVID-19 estimate downloads | covid19.healthdata.org/united-states-of-america/washington

Washington

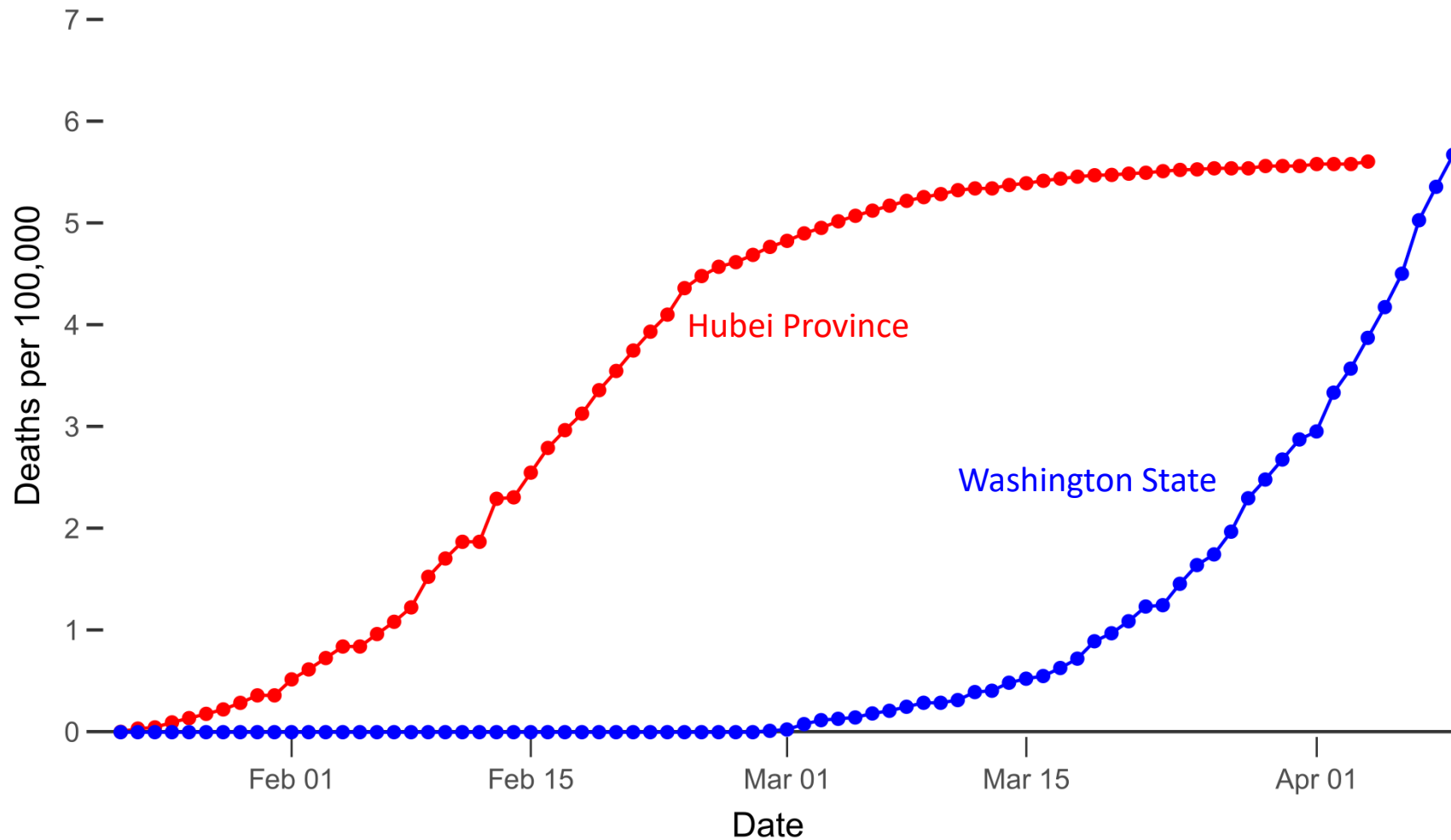


All resources specific to COVID-19 patients.

Shaded areas indicate uncertainty ⓘ

Using Wuhan to Predict Washington

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Forecasting using mechanistic models

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Susceptible

Exposed

Infectious

Recovered

$$\frac{dS}{dt} = B - \beta SI - \mu S$$

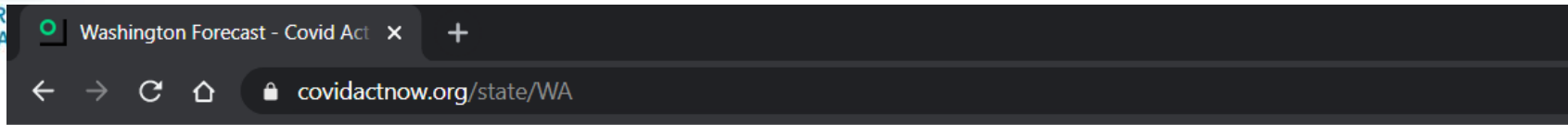
$$\frac{dE}{dt} = \beta SI - (\nu + \mu) E$$

$$\frac{dI}{dt} = \nu E - (\gamma + \mu + \delta) I$$

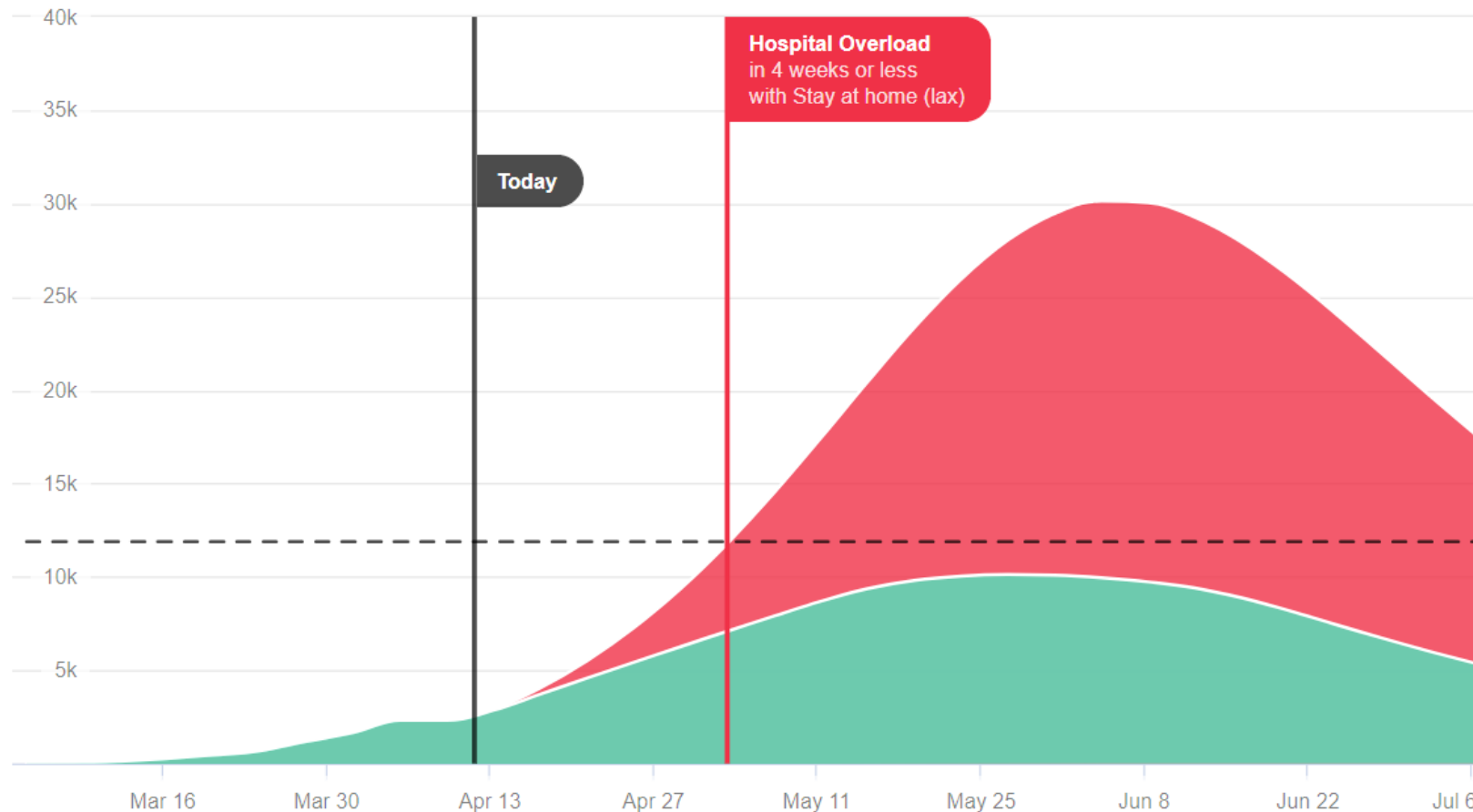
$$\frac{dR}{dt} = \gamma I - \mu R$$

Forecasting using mechanistic models

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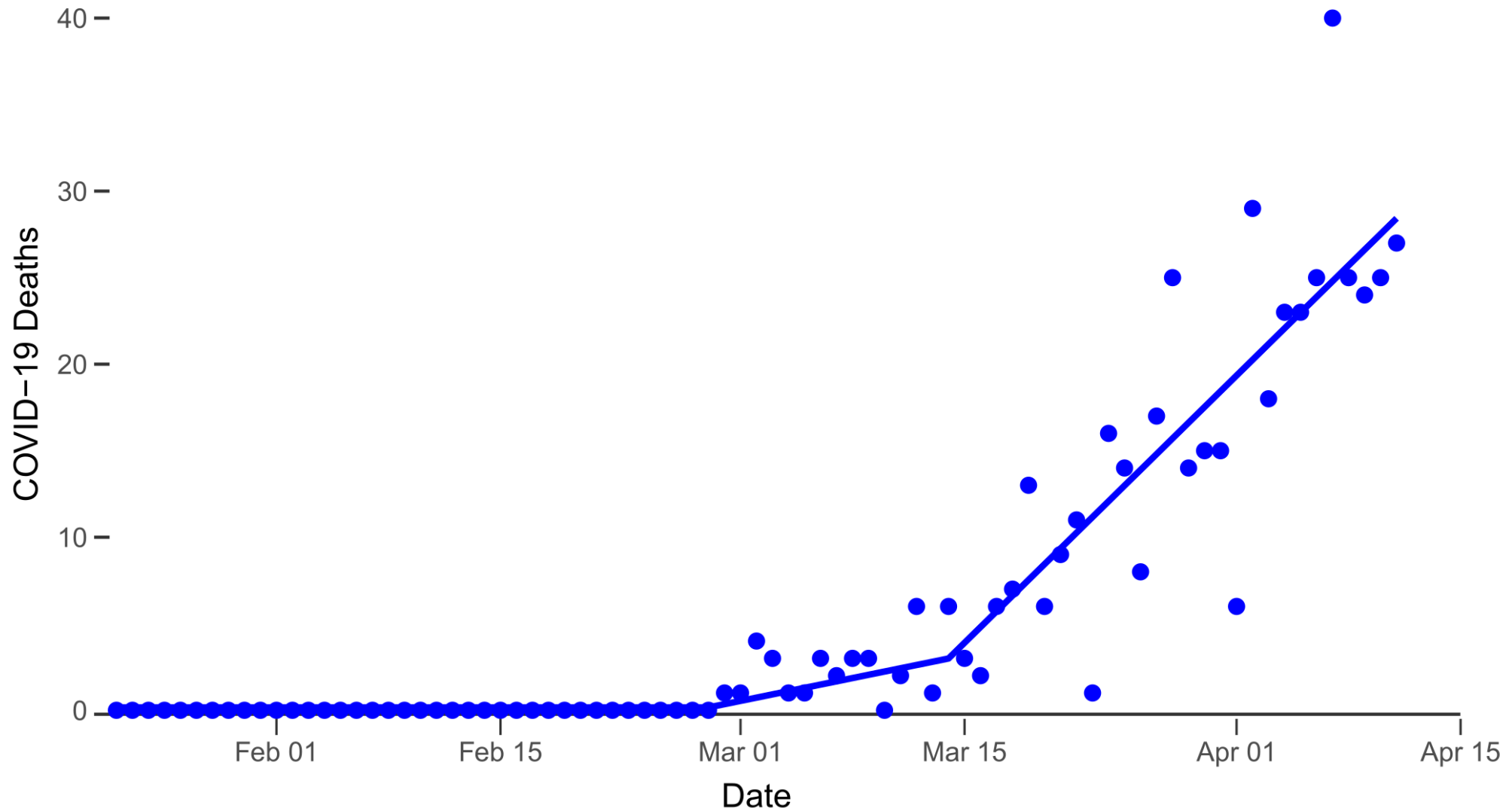


Projected hospitalizations
Washington

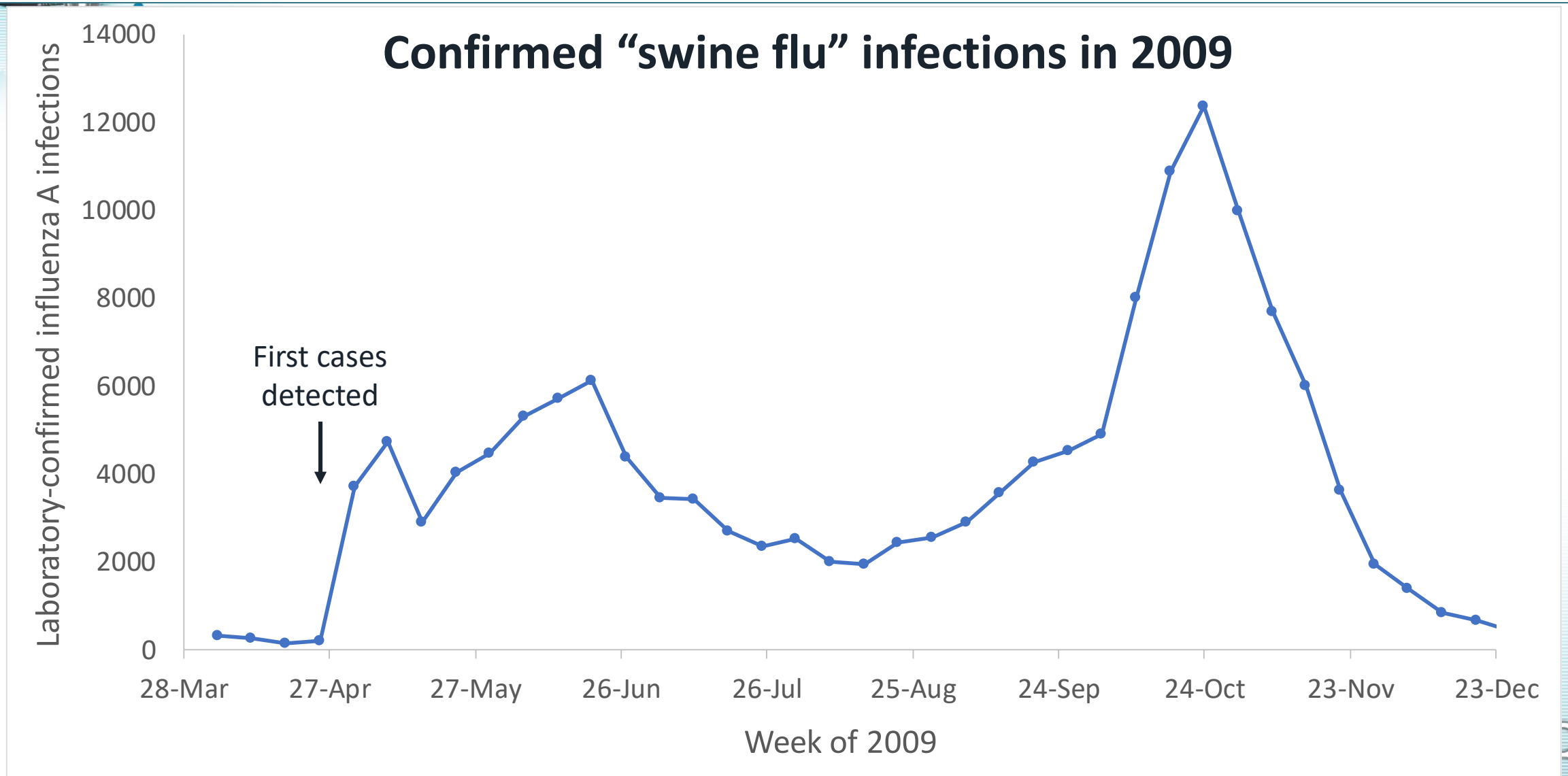


COVID-19 Deaths in Washington State

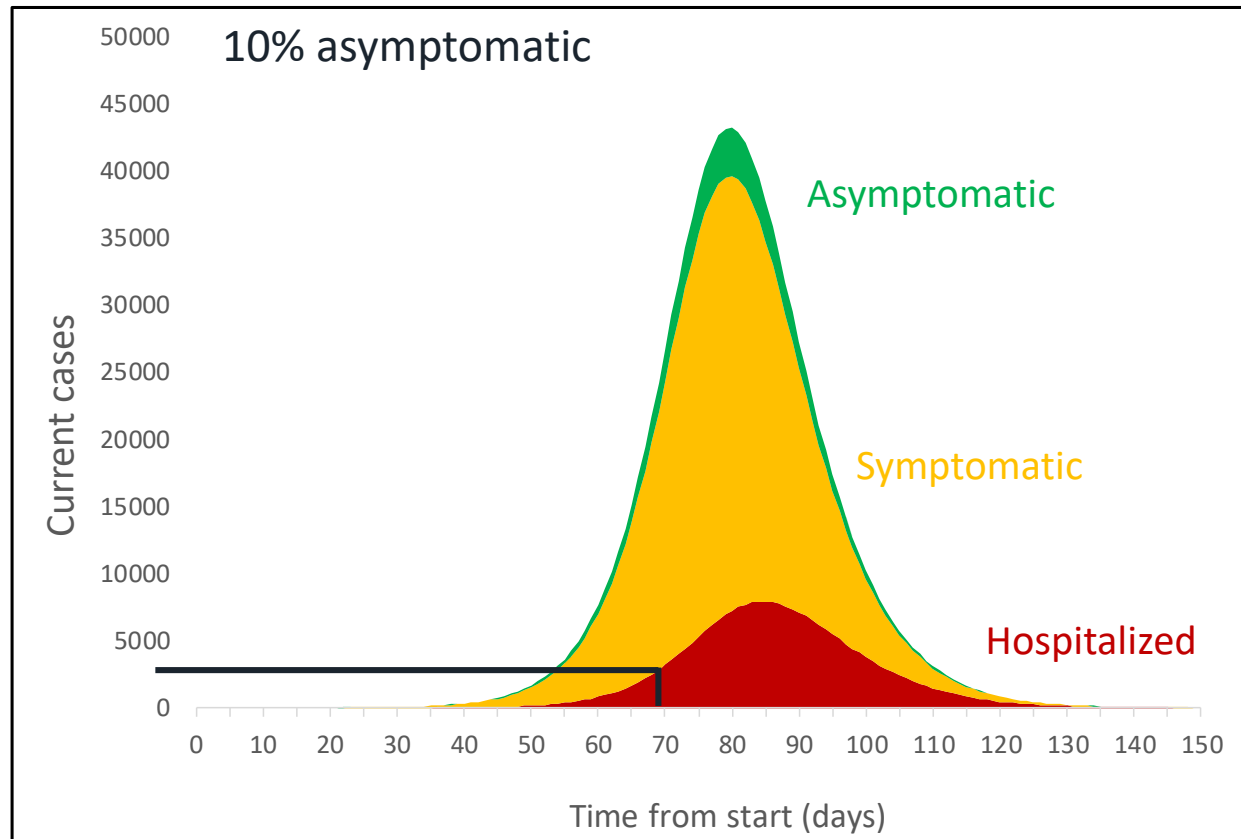
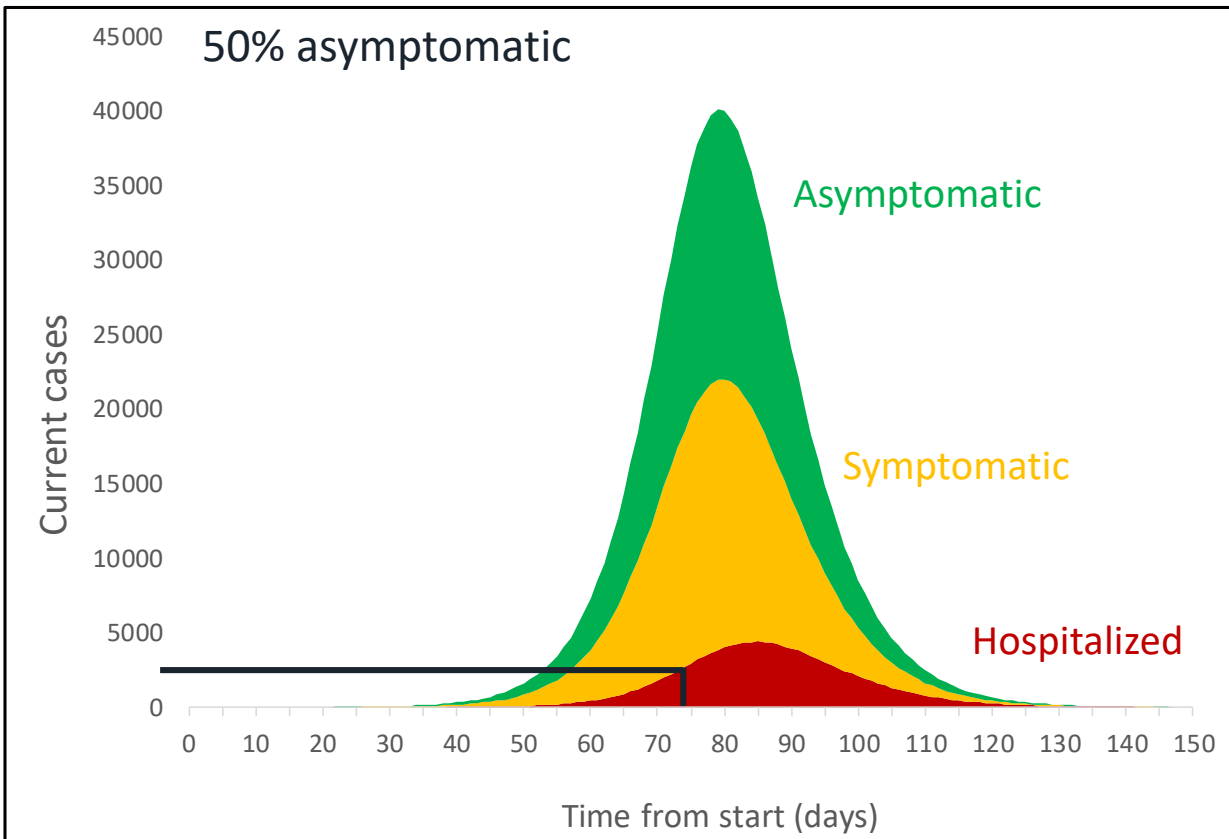
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First question: is SARS-CoV-2 is seasonal?



Question 2: How many asymptomatic infections? (Mock data)



COVID-19 Vaccine Trial at KPWA



- Sponsored by National Institutes of Health
- Vaccine made by Moderna Therapeutics
- Vaccine does not include any parts of the virus – can't cause infection
- Study started with people age 18 to 55
- May soon add people age 56+
- This is “Phase 1” —testing safety and immune response
- Effectiveness will be tested later
- Trial will take 14 months. Why so long? So we can assess safety and effectiveness before distributing to millions of healthy people.



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Thank you!