

Projections of Hospital-based Healthcare Demand due to COVID-19 in Los Angeles County

April 19, 2021 Update

Los Angeles County DHS COVID-19 Predictive Modeling Team (alphabetical):

Tom Belin, PhD;¹ Andrea Bertozzi, PhD;¹ Nishchal Chaudhary, MS;² Todd Graves, PhD;³
Jeffrey Guterman, MD, MS;⁴ M. Claire Jarashow, PhD, MPH;⁵ Roger J. Lewis, MD, PhD [*Team Lead*];⁴
Joe Marion, PhD;³ Frederic Schoenberg, PhD;¹ Megha Shah, MD, MPH, MS;⁵
Juliana Tolles, MD, MHS;⁴ Elizabeth Traub, MPH;⁵ Kert Viele, PhD;³ Fei Wu, PhD⁶

1. University of California, Los Angeles
2. City of Long Beach
3. Berry Consultants, LLC, Austin, TX
4. Los Angeles County, Department of Health Services
5. Los Angeles County, Department of Public Health
6. Los Angeles County, Office of the Chief Information Officer



Key Findings of the April 19th Update

- This update includes data on hospitalizations through April 16, 2021.
- The underlying statistical prediction model has been significantly modified to incorporate the effect of vaccination in predicting future hospital demand.
- Key findings:
 - The daily number of newly hospitalized patients with positive tests for COVID-19 across Los Angeles County has continued to gradually decrease.
 - Some patients newly hospitalized for reasons other than COVID-19 may have a positive COVID-19 test from a prior infection and be included in our data. This could result in estimates for new transmission and for the value of R that are too high.
 - Patients requiring hospitalization for reasons other than COVID-19 illness, who happen to have a positive COVID-19 test from prior infection, tend to have lower lengths of hospital stay and less need for intensive care or mechanical ventilation. This leads to a slight overestimation in our predictions of the need for these hospital resources, as seen on Slides 9-11.

Key Findings of the April 19th Update (continued)

- Key findings (continued):
 - Based on recent data, reflecting transmission that occurred in early April, the estimated transmission number (“R”) at that time was 0.86 with an uncertainty of 0.79 to 0.99. This estimate for R, obtained from the new model that includes immunizations, is similar to our estimate with the prior model one week earlier of 0.90 with an uncertainty of 0.83 to 0.98.
 - Based on the pattern in hospitalizations, and the resulting estimate for R, the demand for hospital-based services including hospital beds, ICU beds, and ventilators over the next 4 weeks is expected to decrease or be stable. We expect daily mortality to decrease or be stable as well over the same time interval.
 - We expect the supply of hospital beds, ICU beds, and ventilators over the next 4 weeks to be adequate.

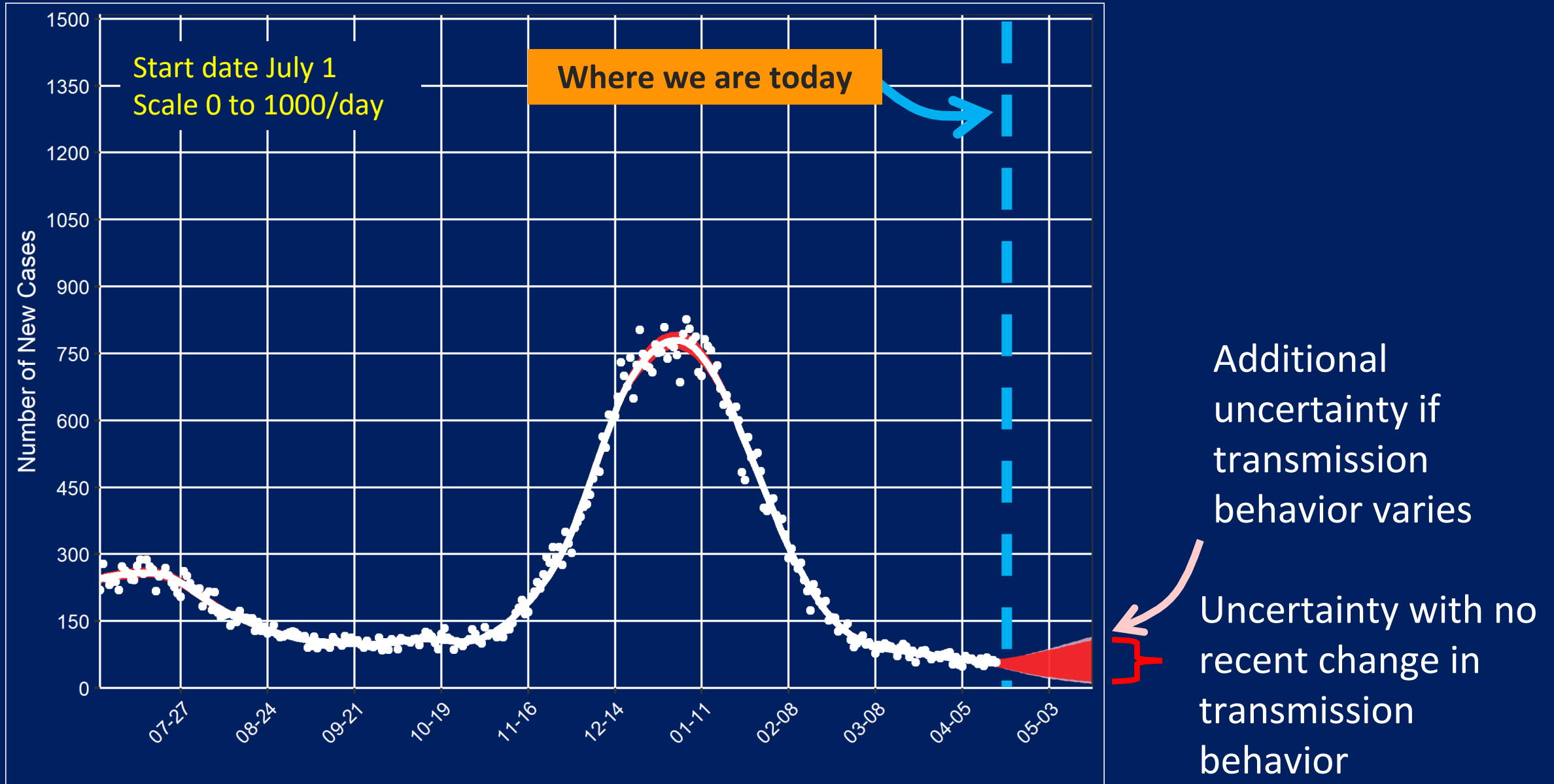
Key Findings of the April 19th Update (continued)

- Comments on Interpretation of the Model Results
 - The results of the new model are highly encouraging, predicting a continued and more rapid decline in the number of hospitalizations and the number of critically ill patients over the next 4 weeks and beyond.
 - Those predictions are based on 3 key assumptions:
 - General preventative measures, e.g., wearing masks and maintaining physical distance continue to be used, particularly by persons who are not yet vaccinated;
 - The current rate of vaccination continues, so the number of people susceptible to COVID-19 continues to decrease; and
 - The current circulating viruses are not replaced by variants that are either significantly more transmissible or evade the immunity acquired through prior infection or vaccination.

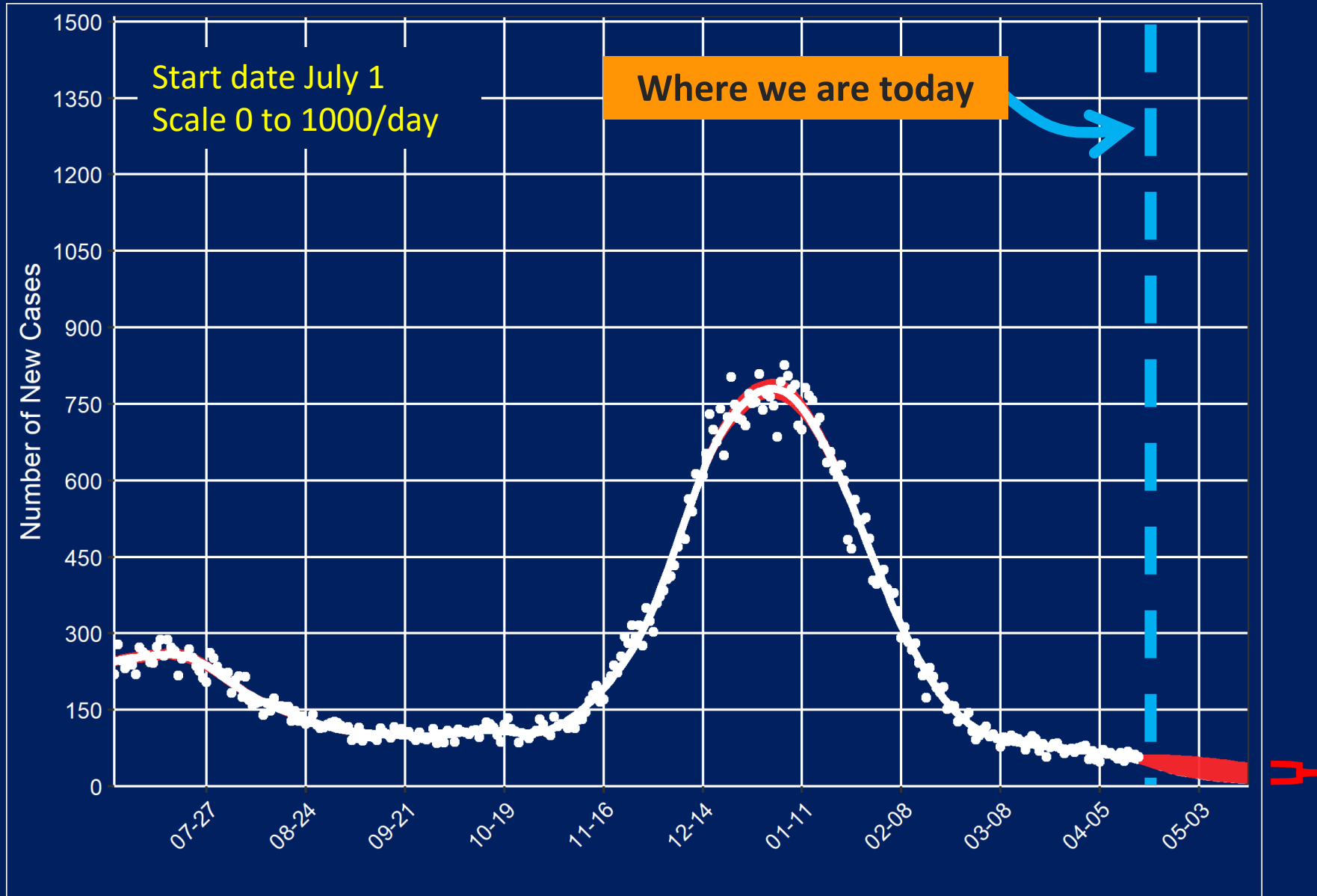
How Many in Los Angeles are Infectious to Others?

- The DHS team's epidemic model estimates the number of people in Los Angeles County who are **susceptible** to infection with COVID-19, have been **exposed**, are **infectious** to others, and have **recovered** or been vaccinated so they are no longer susceptible.
- The model suggests that about 0.06% (uncertainty of 0.03% to 0.11%) of everyone in Los Angeles County is currently infectious to others.
- This would suggest about 1 in 1600 (between 1 in 3000 and 1 in 870) Los Angeles County residents are currently infectious to others. One week ago, this estimate was 1 in 1400.
- Almost 5 in every 8 persons in Los Angeles County is estimated to be protected from COVID-19. Approximately 3 in every 8 persons in Los Angeles County has been infected and approximately another 2 in 8 have acquired protection through vaccination.

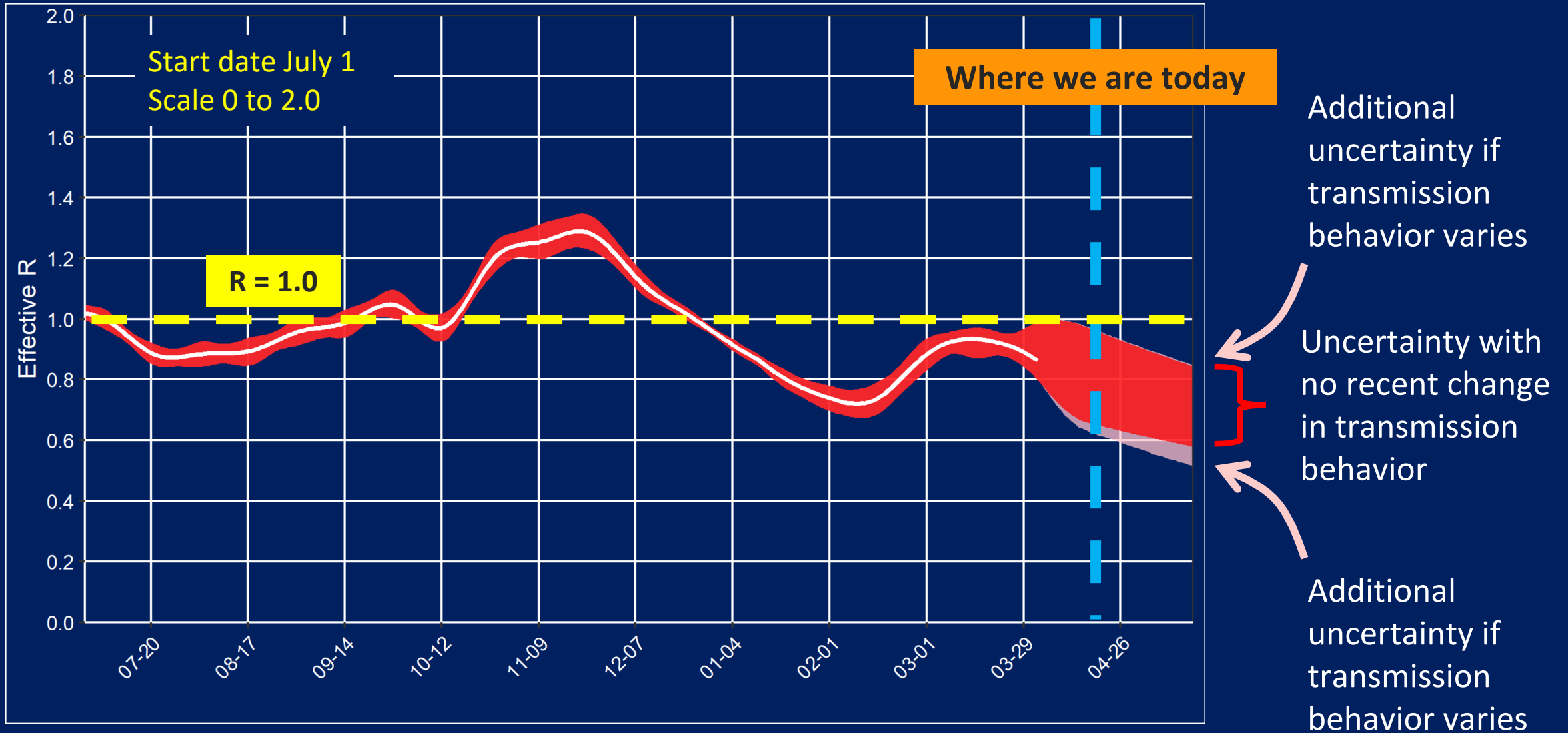
Hospital New Patient Projections: Old Model without Vaccination



Hospital New Patient Projections: New Model with Vaccinations

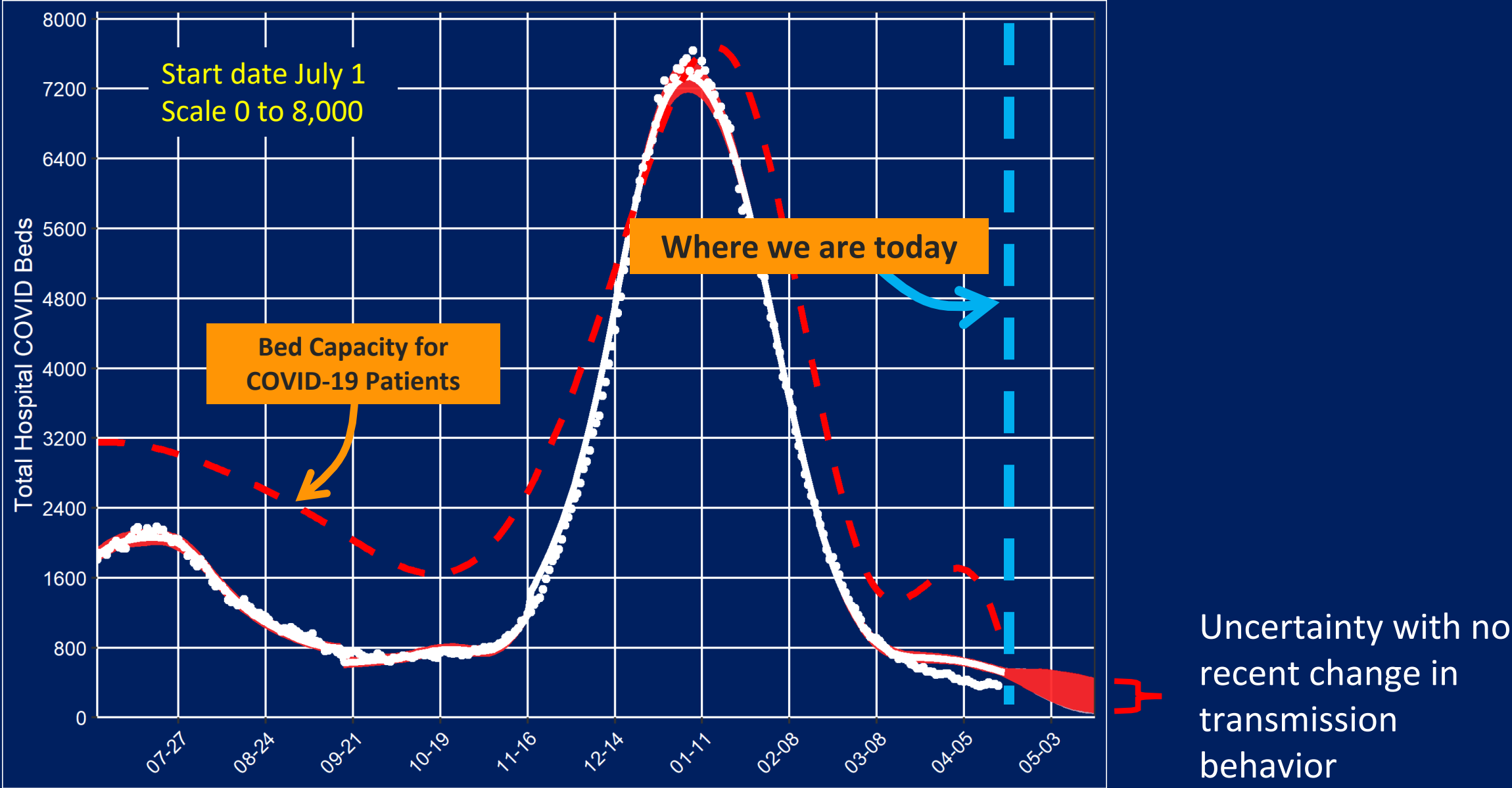


Effective Transmission Number “R”

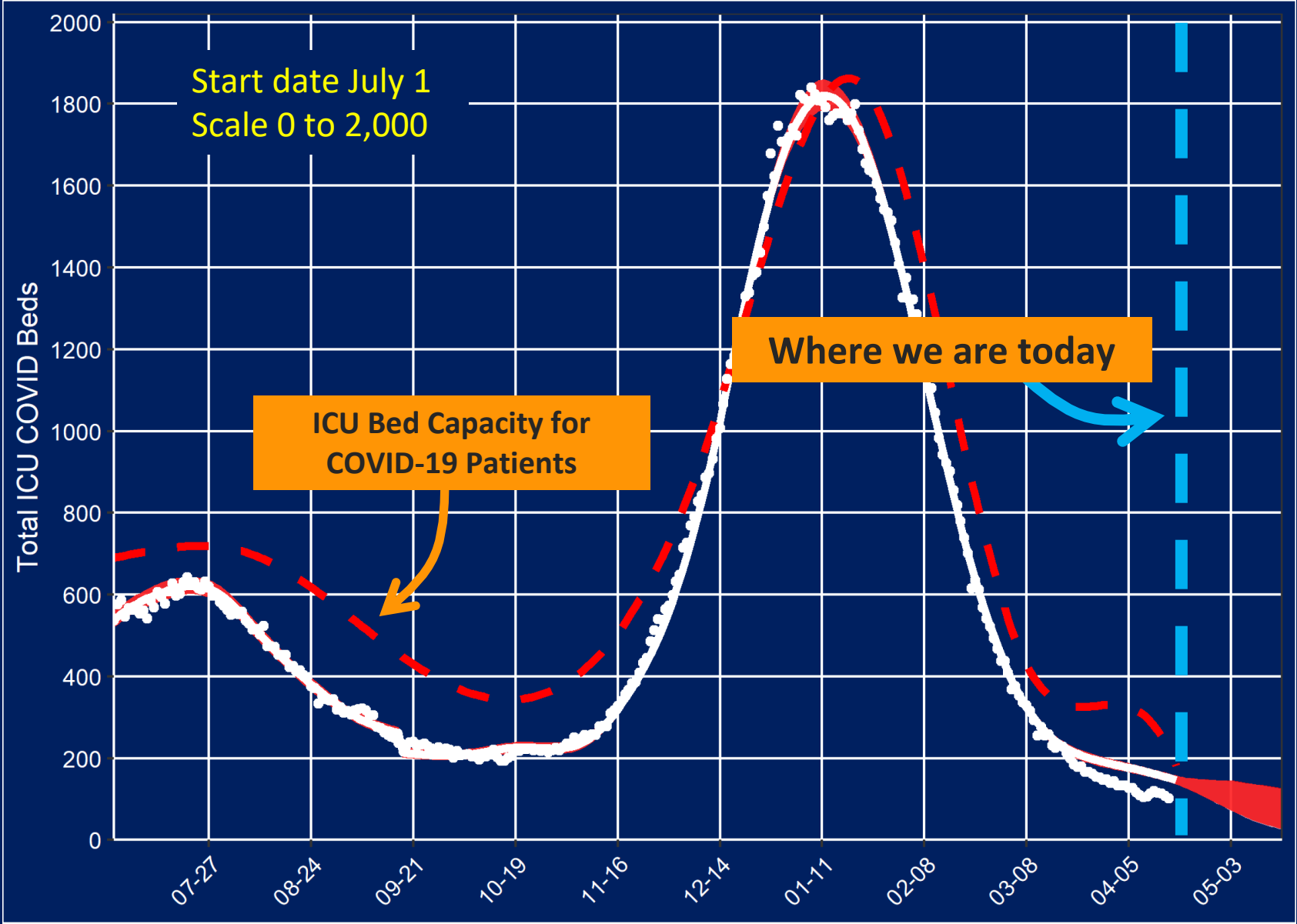


Note: The effective transmission number R is reduced by the partial herd immunity due to persons who have either experienced and recovered from COVID-19 or have been immunized.

Predictions of Hospital Bed Demand

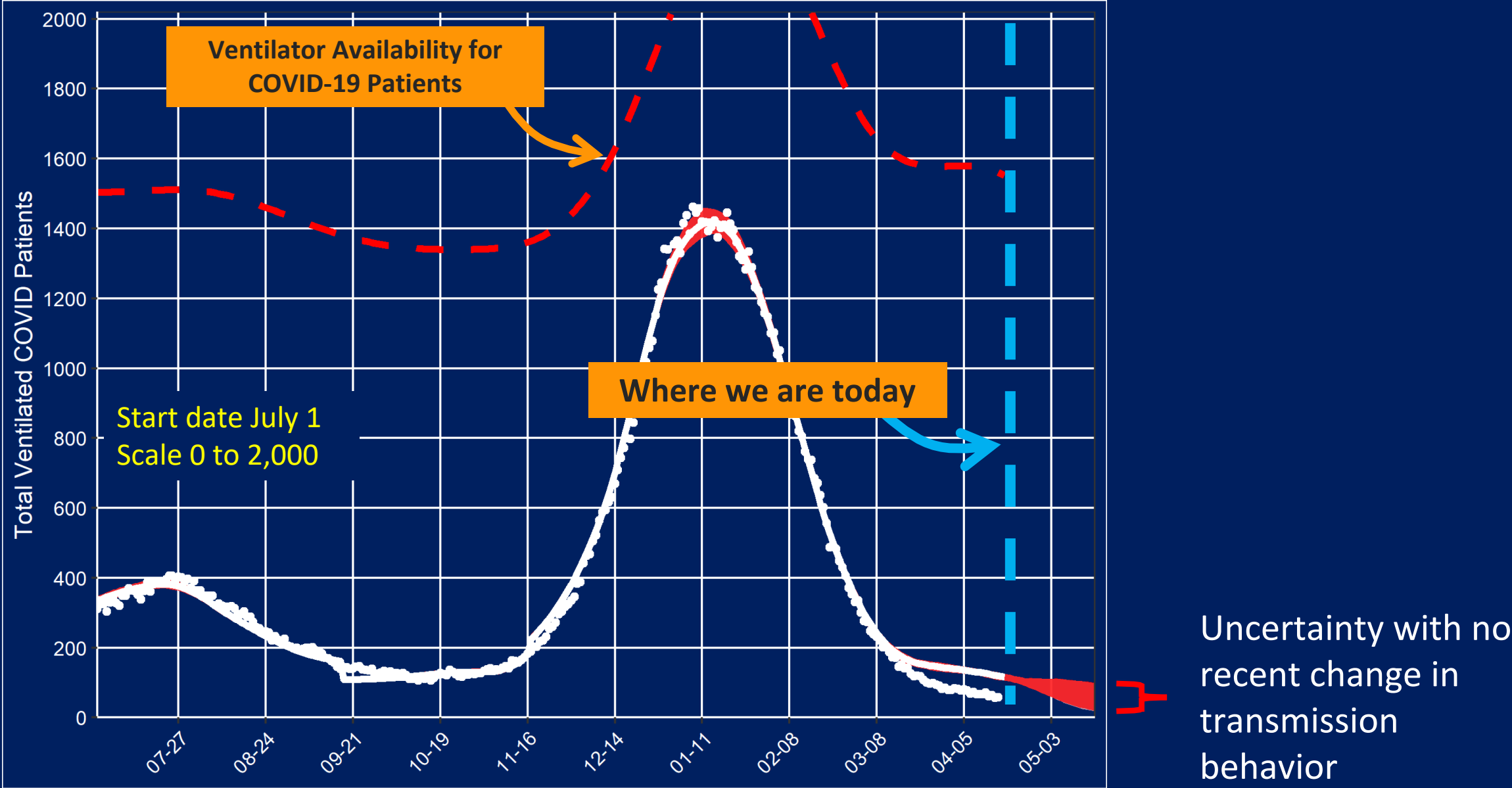


Predictions of ICU Bed Demand



Uncertainty with no recent change in transmission behavior

Predictions of Ventilator Demand



Predictions of Daily Mortality

