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

June 17, 2020 Update

County DHS COVID-19 Predictive Modeling Team:

Roger J. Lewis, MD, PhD;¹ Juliana Tolles, MD, MHS;¹ M. Claire Jarashow, PhD, MPH;² Fei Wu, PhD;³ Joe Marion, PhD;⁴ Kert Viele, PhD;⁴ Todd Graves, PhD;⁴ Henry Shin;¹ Frederic Schoenberg, PhD;⁵ Andrea Bertozzi, PhD⁵

1. Los Angeles County, Department of Health Services
2. Los Angeles County, Department of Public Health
3. Los Angeles County, Office of the Chief Information Officer
4. Berry Consultants, LLC, Austin, TX
5. University of California, Los Angeles
Key Findings of the June 17\textsuperscript{th} Update

• This update includes data on hospital visits and volume through June 14, 2020.

• The model allows for changes in transmission associated with relaxation of physical distancing requirements. The total number of persons infected during the epidemic, assuming differences in future transmission, is determined through December 1, 2020.

• Key findings:
  • The overall volume of hospital-based care for patients with COVID-19 appears generally stable, although the number of daily new cases requiring hospitalization is slightly higher than it was 2 to 3 weeks ago. This is within the range of uncertainty of the prior predictions.
  • After appearing to rise slightly, the effective transmission number (“R”) now appears to be stable and slightly greater than 1, reflecting transmission 2 to 4 weeks ago.
  • It is not yet known with certainty what effect the relaxation of physical distancing requirements will have on transmission of COVID-19. Most likely, we have not yet seen the effect, if any, of protest activity on transmission.
  • The number of hospital beds and ventilators in Los Angeles County appears adequate to meet the projected need for the care of additional COVID-19 patients over the next 4 weeks. The number of ICU beds is more limited and may become inadequate if transmission increases.
A Patient’s Journey | COVID-19

Susceptible → Exposed (incubation 2-12 days) → Infectious (e.g., 10 to 30+ days) → Not Contagious

Exposure → Symptoms Begin → Symptomatic → Clinically Well (no symptoms)

Becomes contagious → No longer infectious

Goal of physical distancing, public use of cloth face coverings, quarantine, isolation and similar actions is to reduce the number of new susceptible people exposed during this time.
Goal of Public Health Response

Effects of physical distancing & public health interventions:

1. Delay peak in demand, increased time to prepare
2. Decrease peak demand, increased ability to surge
3. Decrease total population infected
Hospital Patient Projections

Effect of Physical Distancing

Where we are today

Additional Uncertainty if R increases

Uncertainty with no change in R
Effective Transmission Number “R”

Where we are today

Effect of Physical Distancing

Additional Uncertainty if R is increasing

Uncertainty with no change in R

R = 1.0
Current Bed Capacity for COVID-19 Patients

Predictions of Demand in LA County | Hospital Beds

Where we are today

Additional Uncertainty if R increases

Uncertainty with no change in R
Predictions of Demand in LA County | ICU Beds

Current ICU Bed Capacity for COVID-19 Patients

Where we are today

Additional Uncertainty if R increases

Uncertainty with no change in R
Predictions of Demand in LA County | Ventilators

Current Ventilator Availability for COVID-19 Patients

Where we are today

Additional Uncertainty if R increases
Uncertainty with no change in R
Predictions of Daily Mortality LA County

Where we are today

Additional Uncertainty if R increases
Uncertainty with no change in R
Effect of Behaviors to Control Transmission

If transmission....

- Maintained at Current Levels:
  - 13% (uncertainty 9% to 26%)

- Increases by ½ above Current Levels:
  - 61% (uncertainty 48% to 70%)

- Increases to Pre-order Levels:
  - 83% (uncertainty 78% to 95%)

... of LA County residents will have been infected by December 1, 2020 *

*(This includes adults and children)