

Investigators	Key Findings	Interpretation
<p>Institute for Health Metrics and Evaluation - Projected Deaths & Hospital Utilization Objective: Examine projected deaths and excess demand for hospital services due to COVID-19 infections in the U.S.</p>	<p>By modeling reporting deaths, the model predicts that the demand for total beds and ICU beds will exceed the current U.S. capacity during the peak of the epidemic, projected for the second week of April. Additional estimates are provided by individual states.</p>	<p>Even with social distancing measures in place, the peak of the epidemic will surpass the U.S. peak surge capacity. Information is integrated into a platform that is expected to update regularly and refine projections over time.</p>
<p>Harvard T.H. Chan School of Public Health - Social Distancing Objective: Examine potential impact of social distance measurements on transmission of infection.</p>	<p>One-time social distancing measures reduce the epidemic peak. The reduction is proportional to the intensity of the measures. If social distancing is effective, very little population immunity will be built. However, the social distancing is so effective that virtually no population immunity is built. A single period of social distancing will not be sufficient to prevent critical care capacities from being overwhelmed by the pandemic, because under any scenario considered it leaves enough of the population susceptible that a rebound in transmission after the end of the period will lead to an epidemic that exceeds this capacity.</p>	<p>Need to implement aggressive social distancing measures to reduce transmission. As effective social distancing measures are implemented, the population will not develop population immunity. As a consequence, a single period of social distancing will not be sufficient to prevent critical care capacities from being overwhelmed by the pandemic. Major findings from these models were largely consistent with the Imperial College's model.</p>
<p>Imperial College/Ferguson - Intervention Effectiveness Objective: Examine effectiveness of interventions in the U.S. and U.K.</p>	<p>Without interventions, the peak in mortality will be ~3 months from March 14, 2020. Critical care bed capacity would be exceeded by mid April. Reducing the spread of the infection will lead to a collapse in the healthcare system. The only viable alternative is to aggressively suppress transmission through a combination of case isolation, generalized social distancing and either household quarantine or school and university closure are required to be in place for 5 months – starting one month after start date. The relative effectiveness of different policies did not vary substantially by the criterion used for their initiation (absolute numbers of cases compared to per-capita incidence), R0 (in the range 2.0-2.6), and varying case fatality ratio (0.25%-1.0%)</p>	<p>Need to implement and sustain a layer of aggressive multiple social distancing interventions in an aggressive and sustained manner to 'suppress' viral transmission. Case isolation, generalized social distancing and either household quarantine or school and university closure are required to be in place for several months. If social distancing is effective, subsequent peaks are anticipated and additional interventions will be required.</p>
<p>Harvard - Hospital and ICU needs Objective: Estimate hospital and ICU care needs in the U.S., based on Chinese experience</p>	<p>During the peak of the epidemic in Wuhan ~26 per 100,000 ≥15 year olds needed critical care per day. In the US, after accounting for age differences and presence of comorbidities (using hypertension as proxy) a similar outbreak would result in 21-49 per 100,000 ≥15 year olds requiring critical care per day during the epidemic peak. Assessment by U.S. cities showed Nashville at risk for shortage of critical care resources.</p>	<p>A Wuhan-like outbreak in the U.S. may substantially exceed current critical bed surge capacity. This is likely even after layering multiple interventions for pandemic mitigation. According to the 2010 article referenced in the study, there are 28 critical-care hospital beds for every 100,000 American adults. A separate study, from 2015, suggests that those beds generally have a sixty-five-per-cent occupancy rate. Not included in this study is a more recent assessment on surge potential.</p>