Situation Report 4: COVID-19 transmission across Washington State

Counties in focus: Benton-Franklin, Spokane, Yakima

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Results as of June 12 2020 5 p.m.

From week to week, we will be highlighting situations around the state that we think warrant special attention. For a comprehensive and up-to-date picture of what's happening around the state, see the WA State COVID-19 Risk Assessment and WADoH COVID-19 data dashboards.

What do we already know?

The previous IDM report indicated that transmission is declining slightly in Western WA but continues to increase in Eastern WA. We noted geographic heterogeneity across WA, with the majority of cases stemming from Yakima and King counties.

What does this report add?

With updated data from the Washington State Disease Reporting System through June 10, we find that the trends in R_e suggest that transmission is likely increasing in both Western and Eastern WA. These results include possible increases in transmission over Memorial Day weekend but not increases that may have occurred from protests. We estimate that in Western WA, R_e has been increasing, and on May 31 we infer R_e was likely between 0.48 and 1.83, with best estimate 1.16. In Eastern WA, our best estimate is that R_e has been at or above 1 since April 27,and we infer on May 29 that R_e was likely between 1.32 and 1.63 with best estimate 1.48. The most recent estimates for R_e in Eastern and Western WA now appear on the WA State COVID-19 Risk Assessment dashboard

We continue to observe geographic heterogeneity in cases across the state. To help track the trend in each state, we introduce a new metric, termed Progress to Zero, defined as the percentage decline in cases from a previously recorded peak level. The metric ranges from 0% (representing an area that has not yet reached peak cases) to 100% (representing an area where no cases have been recorded for at least seven days). Progress to zero can go up or down from week-to-week, measuring either progress or deterioration of the local COVID-19 situation.

We highlight a few counties where case counts have been rapidly increasing, including Yakima, Spokane, Benton, and Franklin counties. We use the case data to model prevalence and scenario projections assuming no change in transmission or increased physical distancing and other non-pharmaceutical intervention to slow spread. **Current transmission levels will likely lead to increasingly explosive growth in cases and deaths if not contained, and local prevalence will likely soon exceed the peak reached in King county in late March.**

What are the implications for public health practice?

Our estimates indicate that transmission is likely increasing in both Western WA and Eastern WA. There is significant geographic heterogeneity in reported cases, and six counties have not yet reached the peak number of cases, and **additional interventions are needed to prevent exponential growth.**

Key inputs, assumptions, and limitations of our modeling approach

We use a COVID-specific transmission model fit to testing and mortality data to estimate the effective reproductive number over time and the associated COVID-19 prevalence. The key modeling assumption is that individuals can be grouped into one of four disease states: susceptible, exposed (latent) but non-infectious, infectious, and recovered.

- For an in-depth description of our approach and its assumptions and limitations, see this earlier report.
- In this situation report, we use data provided by Washington State Department of Health through the Washington Disease Reporting System (WDRS). **We use the WDRS test and death data compiled on June 10, and to hedge against delays in reporting, we analyze data up to June 5 for Western Washington and up to June 3 for Eastern Washington.**
- This week we provide prevalence estimates in Yakima County, Spokane County, and Benton and Franklin counties. WDRS data for those estimates was compiled on June 12. Data was used up to June 4 in Yakima County and up to June 5 in Spokane, Benton, and Franklin counties.
- Estimates of R_e describe average transmission rates across large regions, and **our current work does not separate case clusters associated with known super-spreading events from diffuse community transmission.** This further adds difficult-to-quantify uncertainty to our prevalence estimates, since large increases in cases due to specific clusters may not be representative of the region as a whole.
- Results in this report derive from data on testing, confirmed COVID-19 cases, and deaths (see previous WA State report for more details). Also as described previously, estimates of R_e are based on an adjusted epi curve that accounts for changing test availability, test-positivity rates, and weekend effects, but all biases may not be accounted for. **Ongoing research is focused on incorporating other data streams, including covid-like-illness reports and hospitalization data.**
- This report describes patterns of COVID transmission across Washington state, but it does not examine factors that may cause differences to occur. The relationships between specific causal factors and policies are topics of ongoing research and is not addressed herein.

Collaboration Notes

The Institute for Disease Modeling (IDM), Microsoft and the Fred Hutchinson Cancer Research Center are working with WADoH to provide regional modeling of case, testing, and mortality data across Washington state to infer effective reproduction numbers, prevalence, and incidence from data in the Washington Disease Reporting System. This report is based on models developed by IDM that are being advanced to better represent the state by Microsoft, and both together volunteer to support WADoH in its public health mission. This collaboration has evolved alongside the science, data systems, and analysis behind the models, and it reflects the ongoing commitment of all parties involved to improve our understanding of COVID-19 transmission. This collaboration and its outputs will continue to evolve as scientific frontiers and policy needs change over time.

Models of Eastern and Western WA highlight differences in trends for transmission across the state. With particularly high uncertainty in Western WA, recent data is consistent with increasing transmission across the state from mid-May onwards.

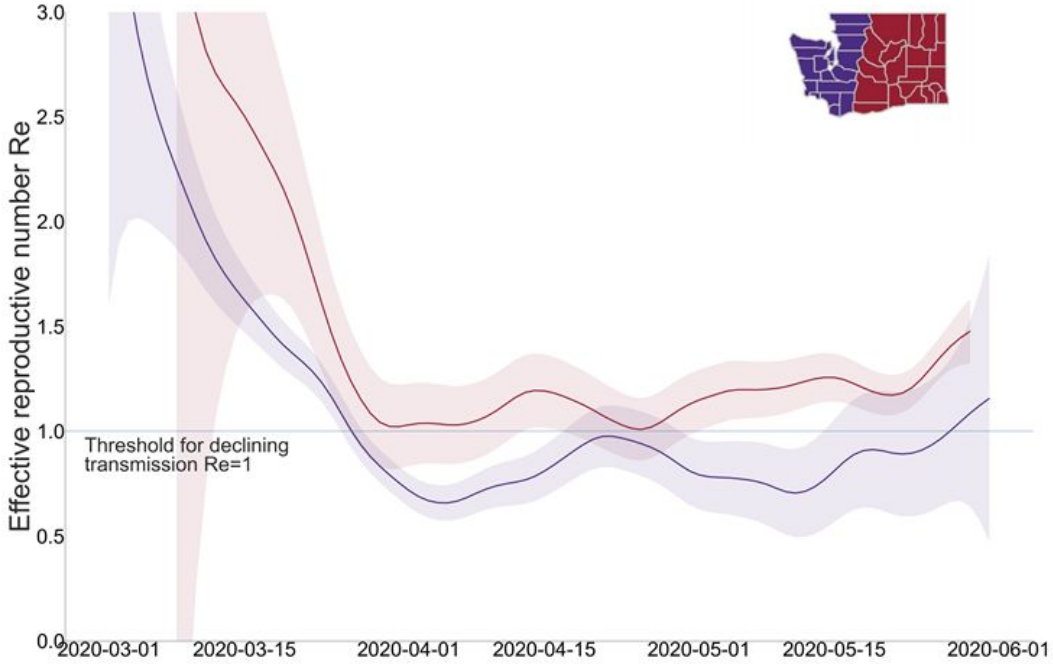

***Figure 1**: R_e estimates for Eastern (red) and Western (purple) WA, with 2 standard deviation error bars. Our most recent estimates suggest that R_e has recently been increasing and may be above 1 in Western WA, and R_e continues to increase above 1 in Eastern WA. For details on how these estimates are generated, see our technical report.*

Progress to Zero highlights differences in transmission across the state, emphasizing counties where case counts continue to climb.

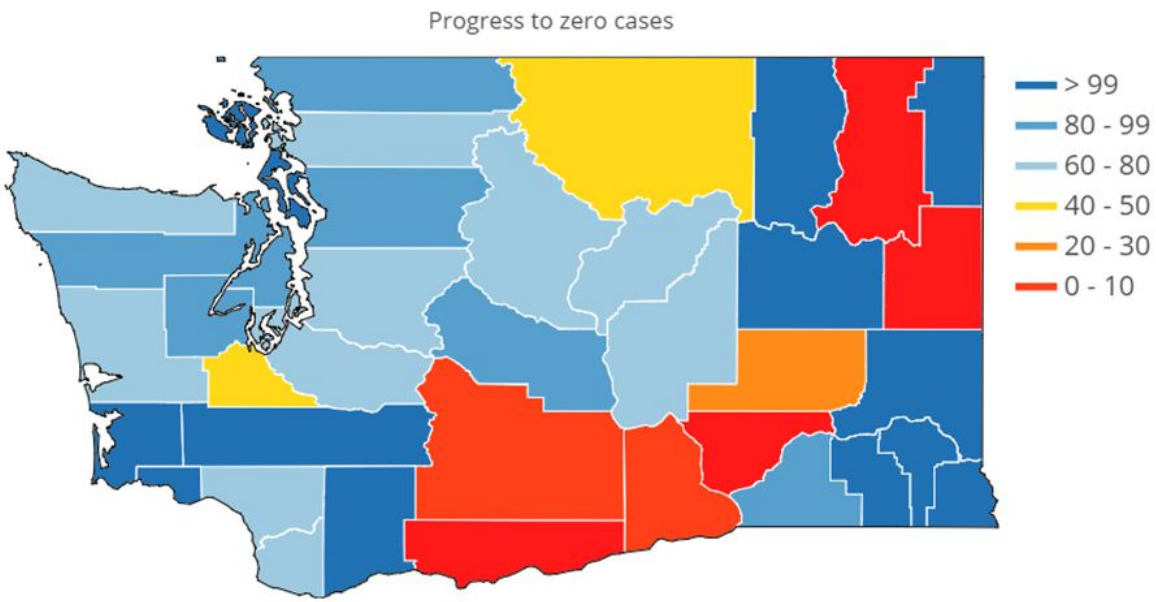

***Figure 2**: Progress to zero, the percentage decline in cases from a previously recorded peak level, is heterogeneous across the state. Six counties, including Yakima, Klickitat, Benton, Franklin, Spokane and Stevens, have not yet reached a peak level of cases.*

New daily case counts are increasing in several counties

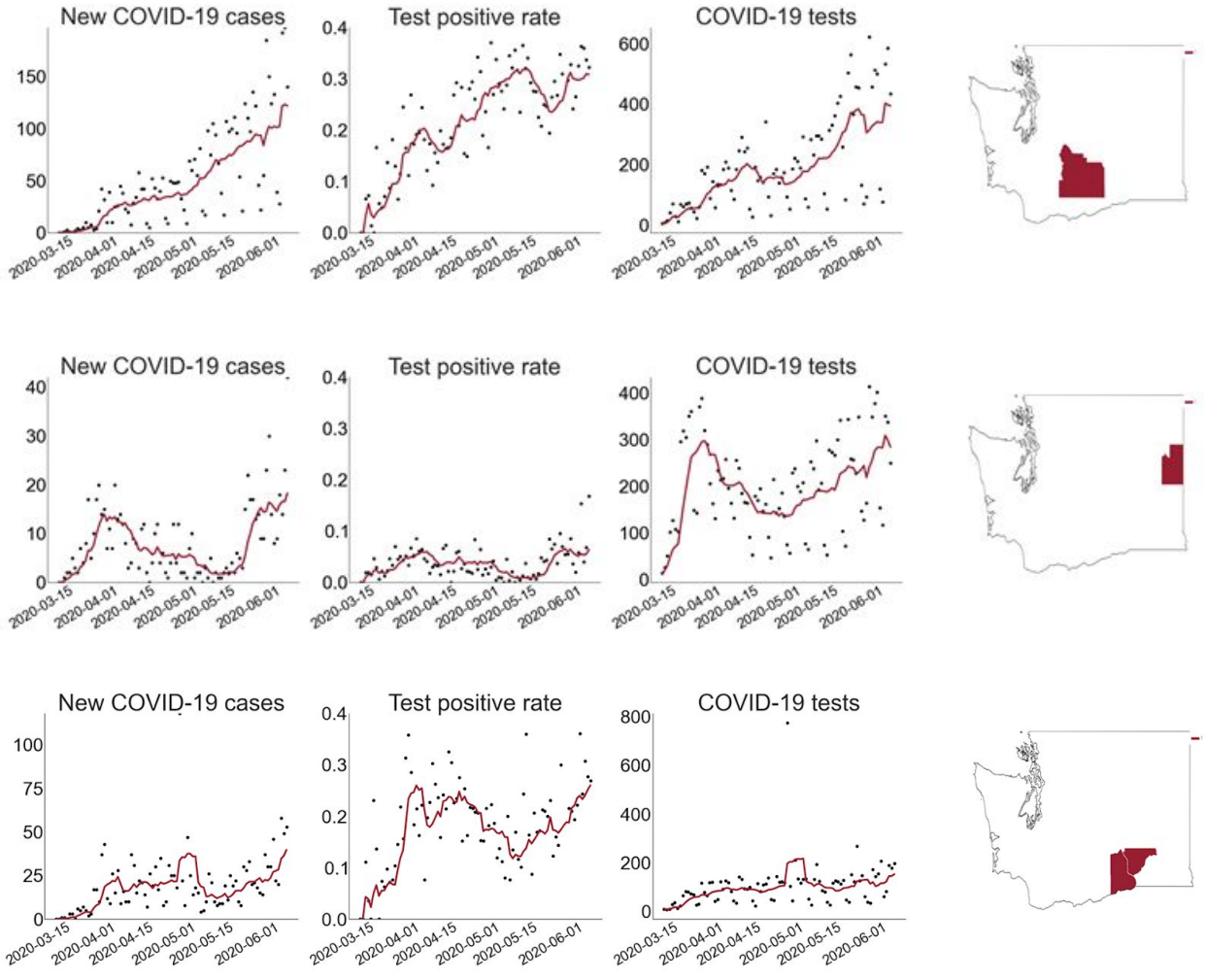

Figure 3*: Cases are rising quickly in Yakima, Spokane, and Benton-Franklin counties, with an increasing test positive rate in many of these counties. (Left) The daily new case counts (dots) and 7-day smoothed trend (red curves), (middle) the daily test positive rate (dots) and 7-day smoothed trend (red curves), and (right) the daily number of tests (dots) and 7-day smoothed trend (red curves). For the most recent data see the [WA DOH Data Dashboard](#).*

By May 15, COVID-19 prevalence was steadily increasing in multiple places across Washington State.

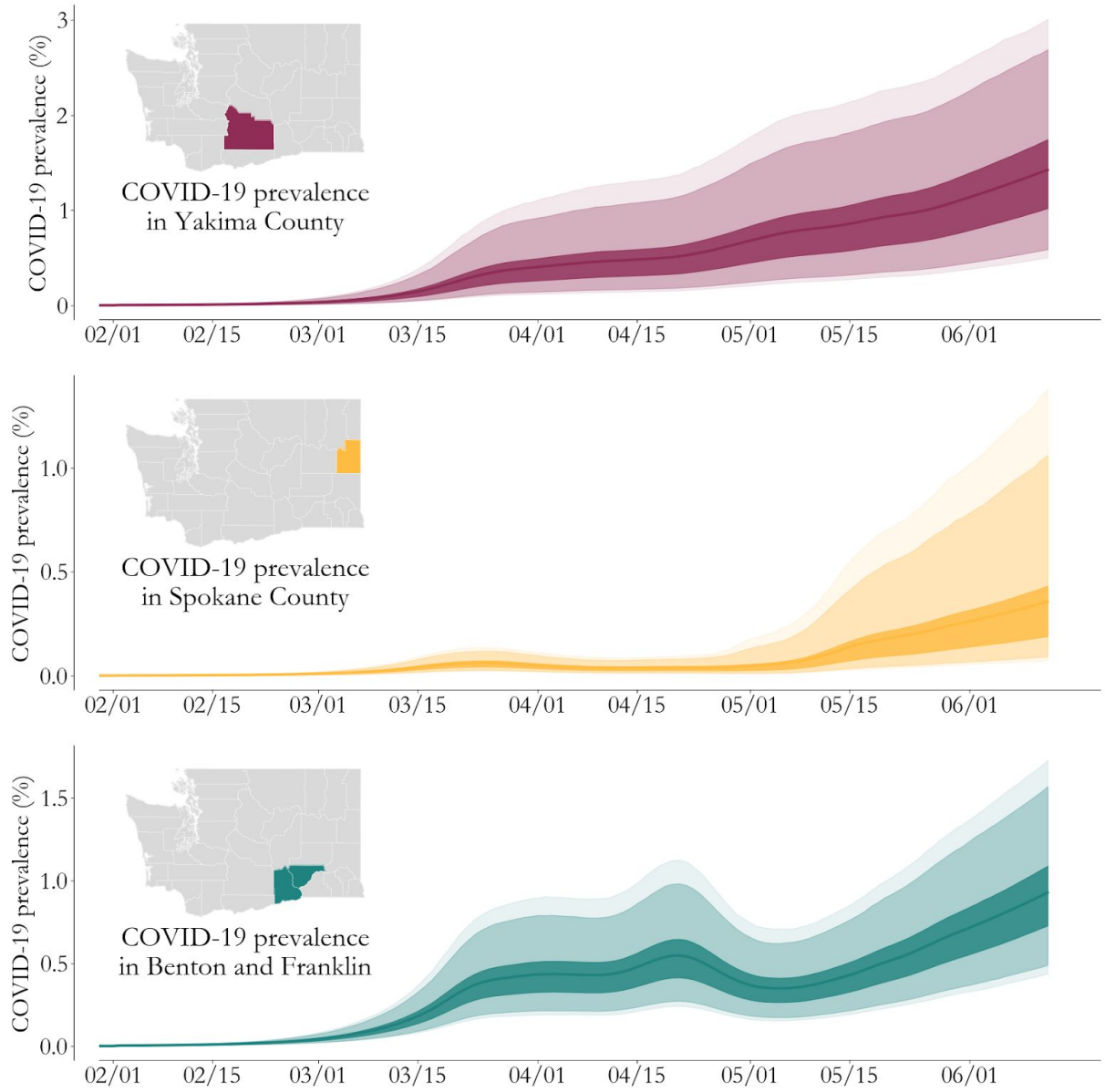

***Figure 4**: Estimated percentage of the population actively infected with COVID-19 (50% CI dark, 95% CI light, 99% CI lightest) in 3 Washington State regions. These three regions (Yakima County, Spokane County, and Benton and Franklin counties) were selected based on trends in the case data shown in Figure 3. Consistent with those trends, we see recent prevalence increases in response to increasing transmission, and by May 15, we estimate that prevalence was rising steadily in all three regions. For detailed information on how these estimates are generated, see our technical report. As shown in that report, peak prevalence in King County in late March was between 0.2% and 1.6%.*

Left unchecked, we expect COVID-19 burden to increase substantially in Yakima County, Spokane County, and Benton and Franklin counties.

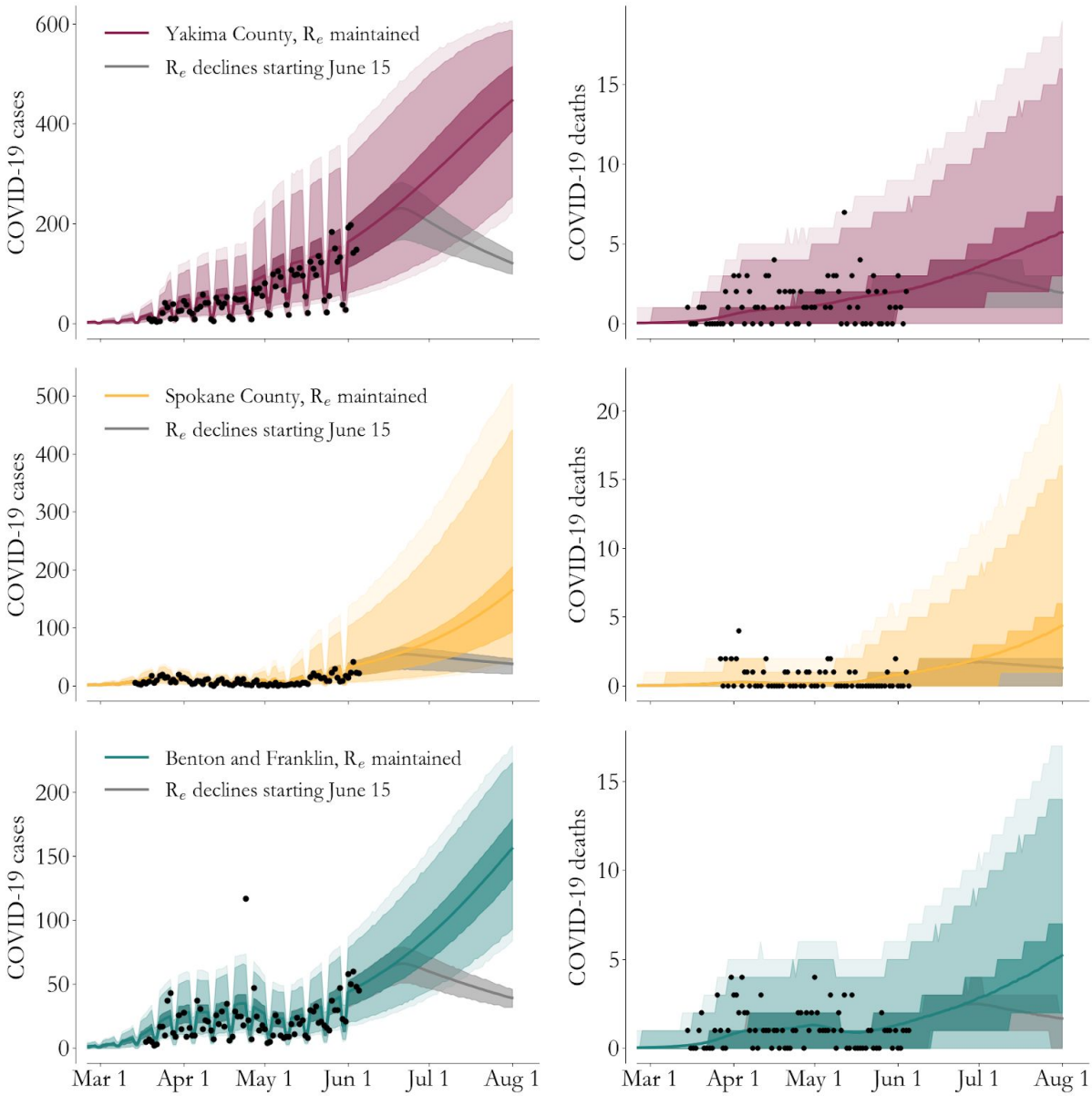

***Figure 5**: Projecting COVID-19 burden under different scenarios in Yakima County (top row), Spokane County (middle), and Benton and Franklin counties (bottom row). Under maintenance of current transmission levels (colors, 50% CI dark, 95% CI light, 99% CI lightest), our models project rapid increases in COVID-19 cases (left, assuming testing levels remain constant in the future) and deaths (right). However, in all 3 areas, if intervention and substantial physical distancing reduce the transmission rate (grey, 50% CI), the epidemic can be curtailed, emphasizing that future COVID-19 burden depends entirely on societal behavior. For detailed information on how these scenario projections are generated, see our technical report.*