Situation Report 5: COVID-19 transmission across Washington State

Counties in focus: Benton-Franklin, Spokane, Yakima, Chelan-Douglas, King

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Results as of June 18 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 increasing in both Western WA and Eastern WA. We noted significant geographic heterogeneity across WA, and six counties that have not yet reached their peak number of cases.

What does this report add?

With updated data from the Washington State Disease Reporting System through June 18, we find that the trends in R_e suggest that transmission is increasing across the state, with less certainty in our estimates for Western WA. We estimate that in Western WA on June 5, R_e was likely between 0.54 and 1.86, with best estimate 1.2. In Eastern WA, our best estimate is that R_e has been at or above 1 since April 27,and we infer on June 3 that R_e was likely between 0.94 and 1.23 with best estimate 1.08. The most recent estimates for R_e in Eastern and Western WA now appear on the WA State COVID-19 Risk Assessment dashboard

In Eastern WA, the estimate for R_e has declined since last week's report, primarily driven by decreasing case counts observed in Chelan and Douglas Counties. However, R_e is still likely above 1, **and the overall case count in Eastern WA continues to trend upwards and has reached a new peak**. Cases in Eastern WA account for 74% of all cases within WA, despite only 21% of WA population living in this region. **We continue to observe rapidly increasing case counts in Yakima, Spokane, Benton, and Franklin counties.** Our transmission model-based estimates further show that local prevalence in these areas is near or has exceeded the estimated late-March peak in King County.

In Western WA, the increasing trend of R_e is associated with high uncertainty, and absolute case counts in Western WA overall are only slightly increasing. In King County, the case counts and the Progress to Zero, have remained relatively stable from last week. Note that our estimates use data for approximately 10 days following the start of the protests against police violence. At this time, there is no obvious county-level evidence for a protest-driven spike in COVID-19 cases. However, given the inherent lags between COVID transmission and testing, largely as a result of COVID's latent period, continued monitoring is needed to identify associated onward community transmission if it exists.

What are the implications for public health practice?

Our estimates overall indicate that transmission continues to increase in Eastern WA, and is stabilizing, though with high uncertainty, in Western WA. While some county hotspots seem to have subsided, **interventions are still needed to limit exponential growth in several counties.**

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 18, and to hedge against delays in reporting, we analyze data up to June 10 for Western Washington and up to June 8 for Eastern Washington.**
- This week we provide prevalence estimates in Yakima County, Spokane County, King County, and Benton and Franklin counties. WDRS data for those estimates was compiled on June 14. Data was used up to June 8 in Yakima and King counties 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 come 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 transmission stabilizing in Western WA but continuing to increase in Eastern WA
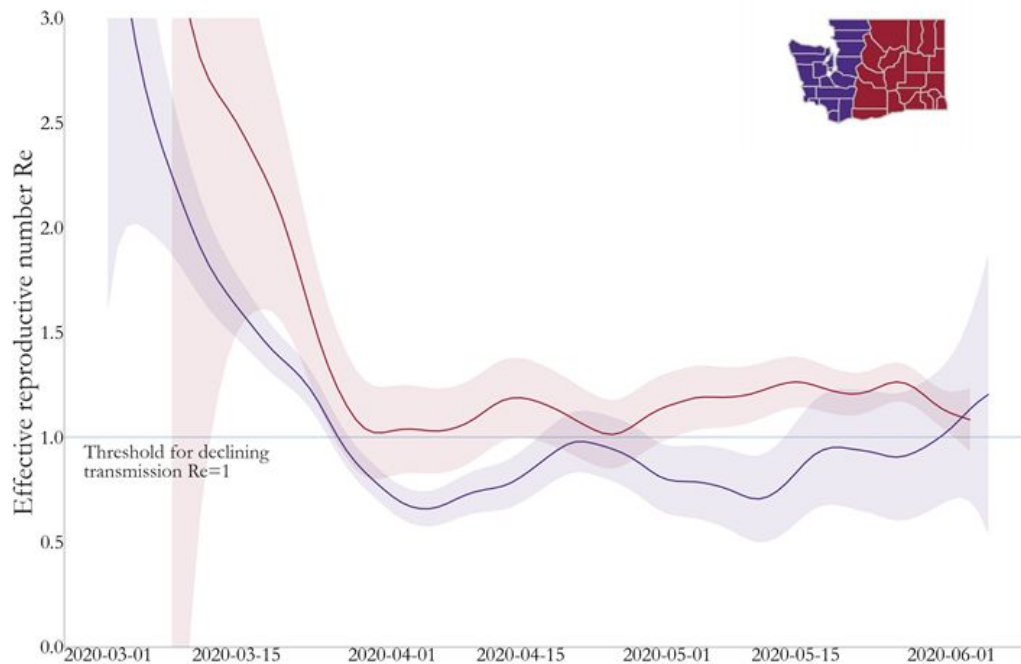

Figure 1: R_e estimates for Eastern (red) and Western (purple) WA, with 2 standard deviation error bars. Our most recent estimates suggest that R_e has recently been increasing and may be above 1 in Western WA, and may be decreasing in Eastern WA, though it is still above 1. For details on how these 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.
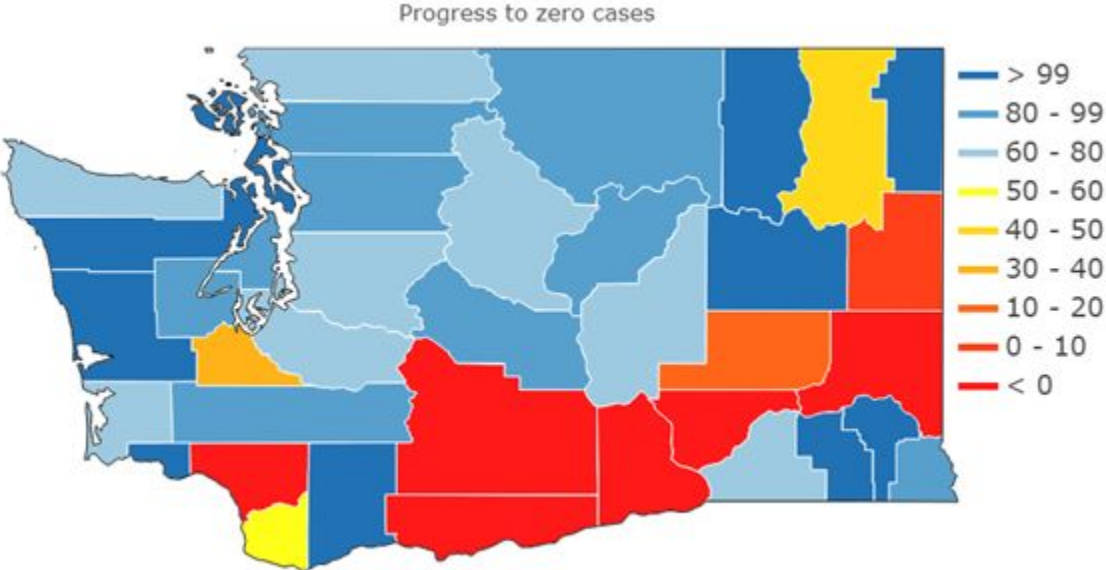

Figure 2: *Progress to zero, the percentage decline in cases from a previously recorded peak level, is heterogeneous across the state. Yakima, Klickitat, Benton, Franklin, and Spokane counties have not yet reached a peak level of cases. Whitman and Clark counties also recorded peak case counts, but the absolute number of cases in each of these counties is small.*

New daily case counts are increasing in several counties, are relatively stable in King County, and have declined in Chelan and Douglas counties
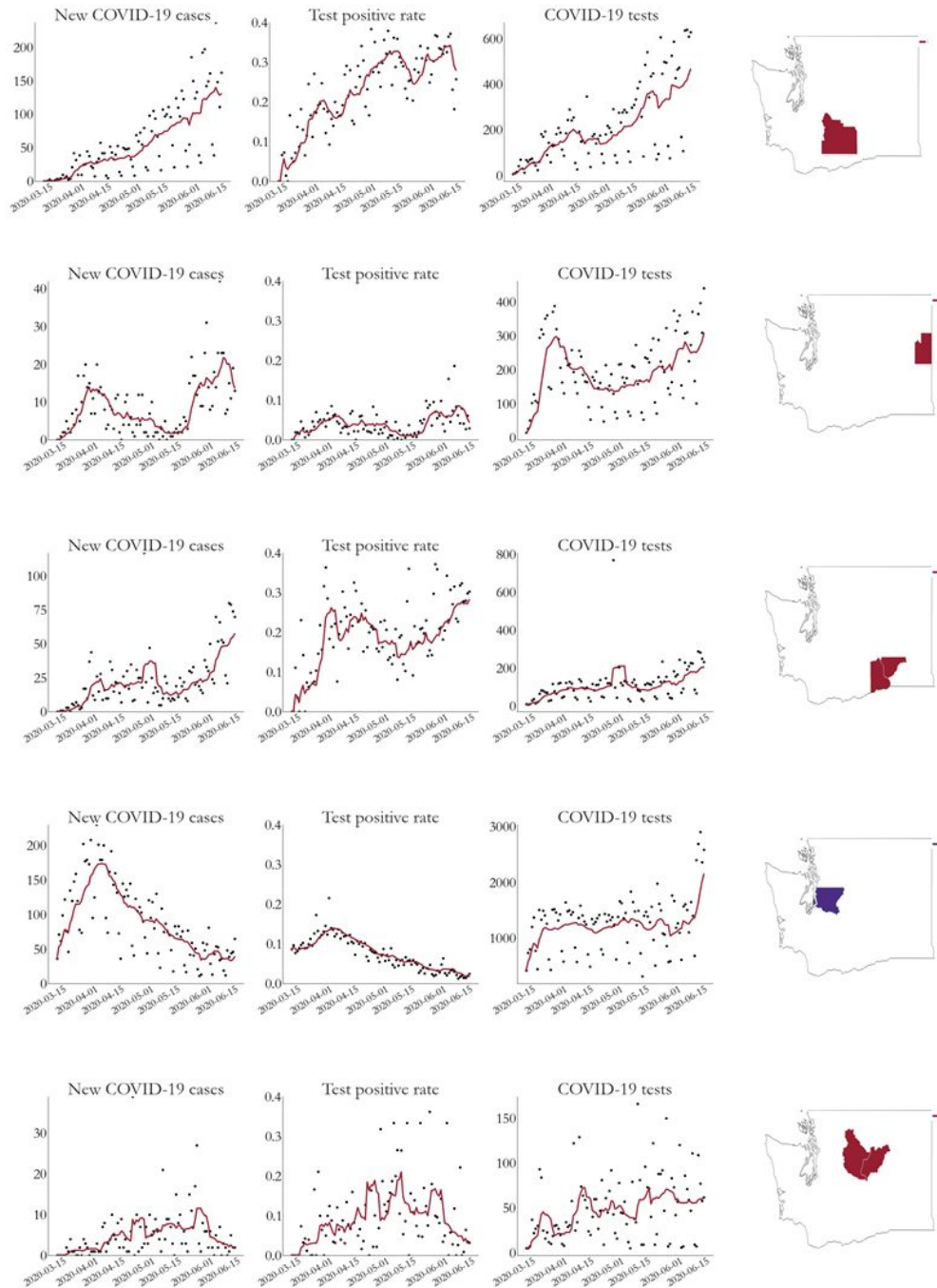

Figure 3: *Cases are rising quickly in Yakima, Spokane, and Benton-Franklin counties, with an increasing test positive rate in many of these counties. Cases are relatively stable in King County and have recently declined in Chelan-Douglas counties. (Left) The daily new case counts (dots) and 7-day smoothed 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* <u>WA DOH Data Dashboard</u>.

In Yakima, Spokane, Benton, and Franklin counties, population prevalence of active COVID infections is comparable or higher than the late-March peak observed in King County.
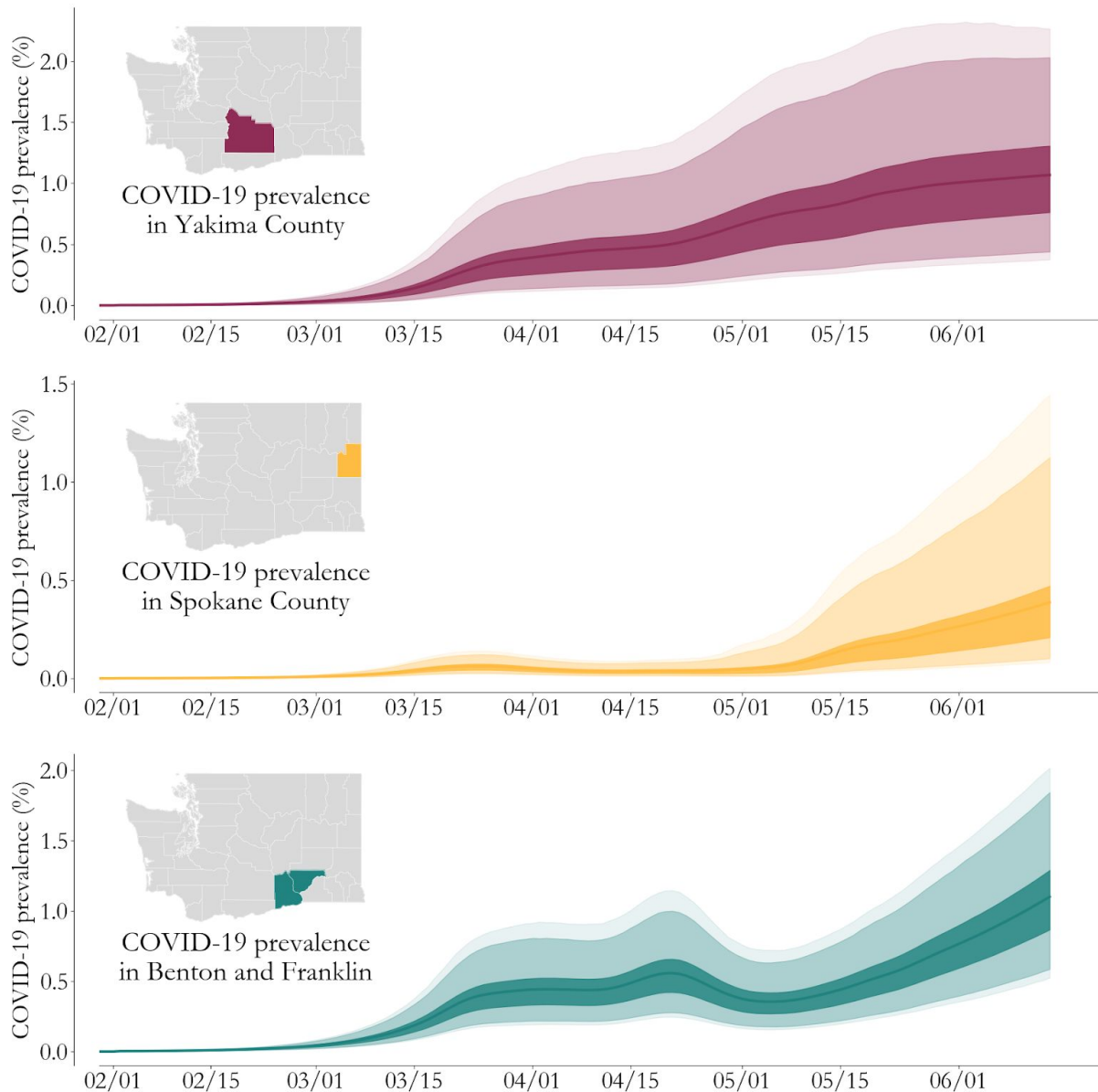

Figure 4: *Estimated percentage of the population actively infected with COVID-19 (50% CI dark, 95% CI light, 99% CI lightest) in 3 Washington State regions. These three regions (Yakima County, Spokane County, and Benton and Franklin counties) were selected based on trends in the case data shown in Figure 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%.*

We estimate that roughly 0.15% of the population in King County was actively infected with COVID as of June 8. With that estimate in mind, we do not yet expect to see a large effect on cases as a result of protests against police violence.
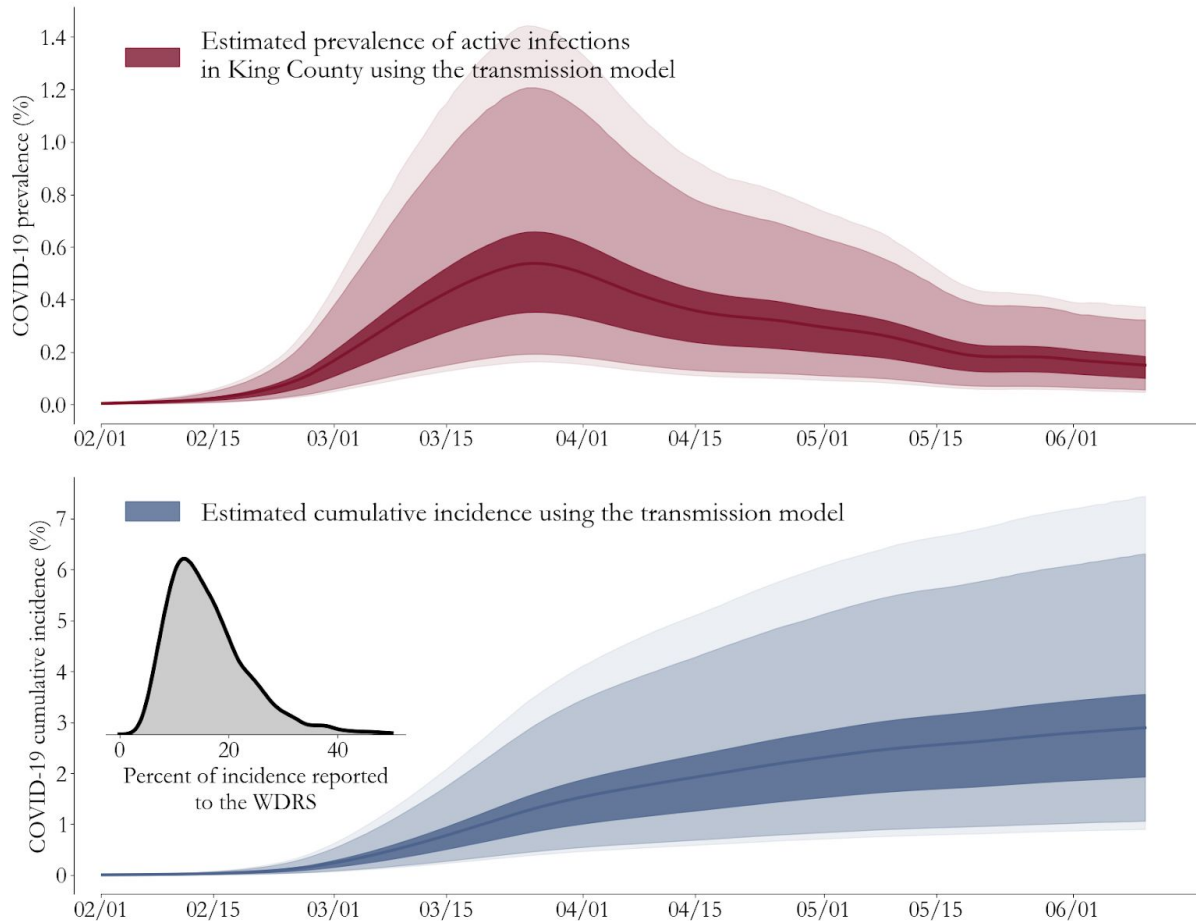

Figure 5*: (Top) Model estimated percentage of King County's population actively infected with COVID-19 (mean line, 50% CI dark, 95% CI light, 99% CI lightest). (Bottom) Model estimated percentage of the population no longer fully susceptible to COVID-19. In the inset, comparison to the total number of cases reported indicates that roughly 16.4% (6.1% to 36.5% CI) of infections are ultimately tested positive and reported. For detailed information on how these estimates are generated, see our [technical report](#).*

Coarsely, if we assume a total protester population of 60,000 (based on [this estimate](#) from a recent, large event), then we would expect 92 (35 to 195 95% CI) to be actively infected based on our estimated prevalence. With 16.4% of infections reported, we would expect 15 (6 to 32 95% CI) of those infections to test positive within the first infection generation after the protests. As a result, we expect protest related transmission to be a small fraction of cases at this time, and we cannot say with certainty if efforts to mitigate transmission at protests were or were not effective. Future testing data may give us insight into onward transmission from the protests and the associated effect on overall transmission rates in the county.