SitRep 14: COVID-19 transmission across Washington State

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Results as of August 28 2020 10 a.m. Incidence data through August 17 2020.

From week to week, we highlight 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.

Summary and highlights

Data from the Washington Disease Reporting System (WDRS) through August 24 shows an overall plateau and potentially slight decline in cases. As a result, we find in both eastern and western Washington that R_e is still hovering around 1. We estimate that in western WA, R_e was likely between 0.50 and 1.21 on August 17, with a best estimate of 0.86 (down from the estimate of 0.97 in our last report). In eastern WA, our best estimate is that R_e on August 14 was likely between 0.65 and 1.18, with a best estimate of 0.91 (down from the estimate of 0.98 in our last report). More time will tell if the downward trend of the estimated transmission rate in western WA is real.

The trends seen in eastern and western Washington are made up of a mix of different patterns across the state with some counties plateauing (e.g., King), some decreasing (e.g., Yakima), and others increasing (e.g., Grant).

The continued high susceptibility to COVID-19 is reflected in recent known outbreaks in Walla Walla County (Washington State Penitentiary), in Whitman County (among off campus college students), and in Kitsap County (within hospital) -- the data from these will be reflected in future reports due to a lag in reporting. In addition, statewide mortality has been fairly stable for the past 3 weeks with an average of 10-15 deaths per day.

Implications for public health practice

The decrease in cases we continue to see in some counties remains encouraging. However, this is tempered by the plateaus and upticks in cases in other counties. Taking King County as one example, a continued plateau of cases will not be enough to safely open schools as case counts in the current situation are too high relative to guidelines. As of August 15, according to the WA State COVID-19 Risk Assessment Dashboard, 4 counties have low, 15 counties have moderate, and 20 counties have high COVID-19 activity. In addition, recent outbreaks are likely to lead to wider community spread as has been seen with previous outbreaks. Finally, with 10-15 deaths per day across the state, if we remain in this current pattern, Washington will experience approximately 1,250-1,875 additional COVID-19 deaths by the end of 2020. With the roughly 1,870 deaths that have already occured, this would likely make COVID-19 a top five cause of death in Washington this year.

Limiting the size and frequency of gatherings, wearing masks, and keeping physical distance from others where possible remain the most effective ways to limit COVID-19 transmission. To reduce transmission, high compliance with masking and distancing policies and anticipating and rapidly containing outbreaks remain extremely important to continue to prevent further uncontained outbreaks.

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. 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 to estimating R_e and its assumptions and limitations, see the most recent technical report on the modeling methods. The estimates this week and going forward use the updated method in that report, which results in some statistically-insignificant retrospective changes to R_e relative to our previous 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, hospitalization, and death data compiled on August 24th , and to hedge against delays in reporting, we analyze data up to August 17 in western Washington and August 14 in eastern Washington.** This relatively conservative hedge against lags is in response to reports of increasing test delays.
- 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.**
- 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.
- 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 are not addressed herein.

Collaboration notes

The Institute for Disease Modeling (IDM), Microsoft AI For Health, the University of Washington, and the Fred Hutchinson Cancer Research Center are working with WA DoH 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 WA DoH 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.

We estimate that the effective reproductive numbers in eastern and western Washington have remained close to 1 since mid July. The downward trend noted last week may have continued but more time is needed to assess.

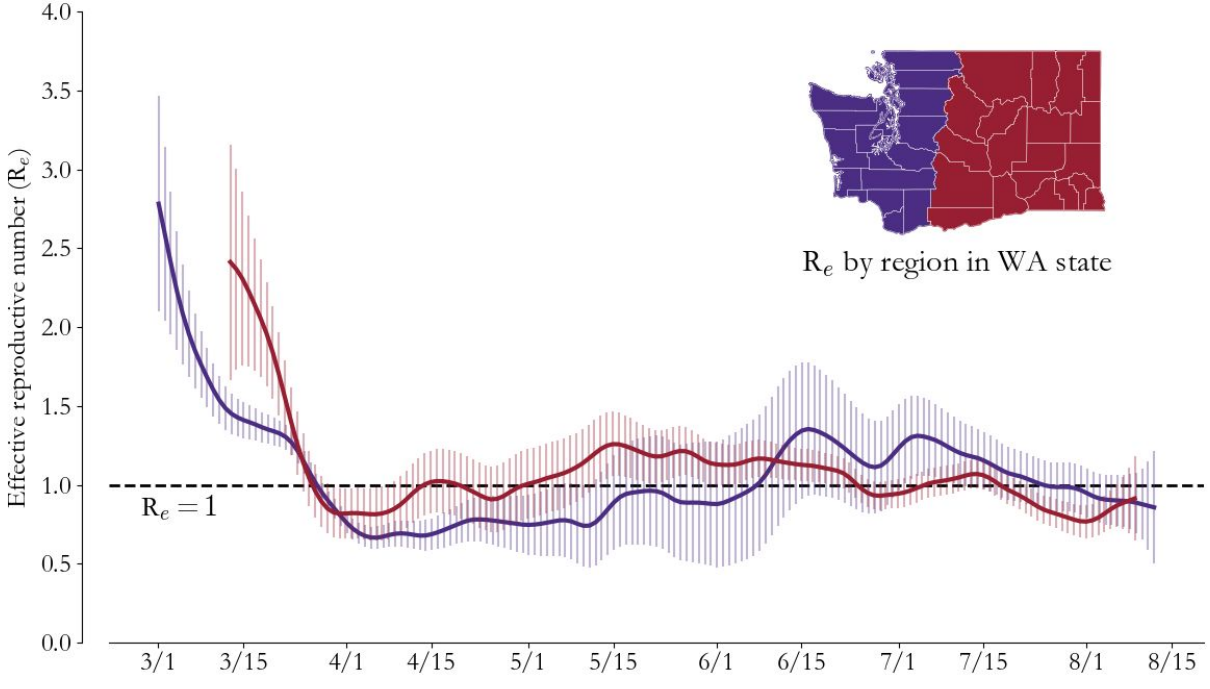

***Figure 1**: The effective reproductive number is estimated for eastern (red) and western (purple) WA, with the 95% confidence interval shaded. Our estimates suggest that R_e is near 1 in both eastern and western WA, and the trend shows possible declines following the statewide masking mandates in late-June and more recent gathering restrictions. The estimates this week and going forward use the improved inference method published here, and this is responsible for the statistically-insignificant retrospective changes in this figure relative to last week.*

Effective reproductive numbers near 1 since July in both eastern and western Washington suggests that the prevalence of active COVID-19 infections is roughly constant overall. Visualizing the case data at county-level shows that this state-wide plateau is made up of a variety of county-level trends.

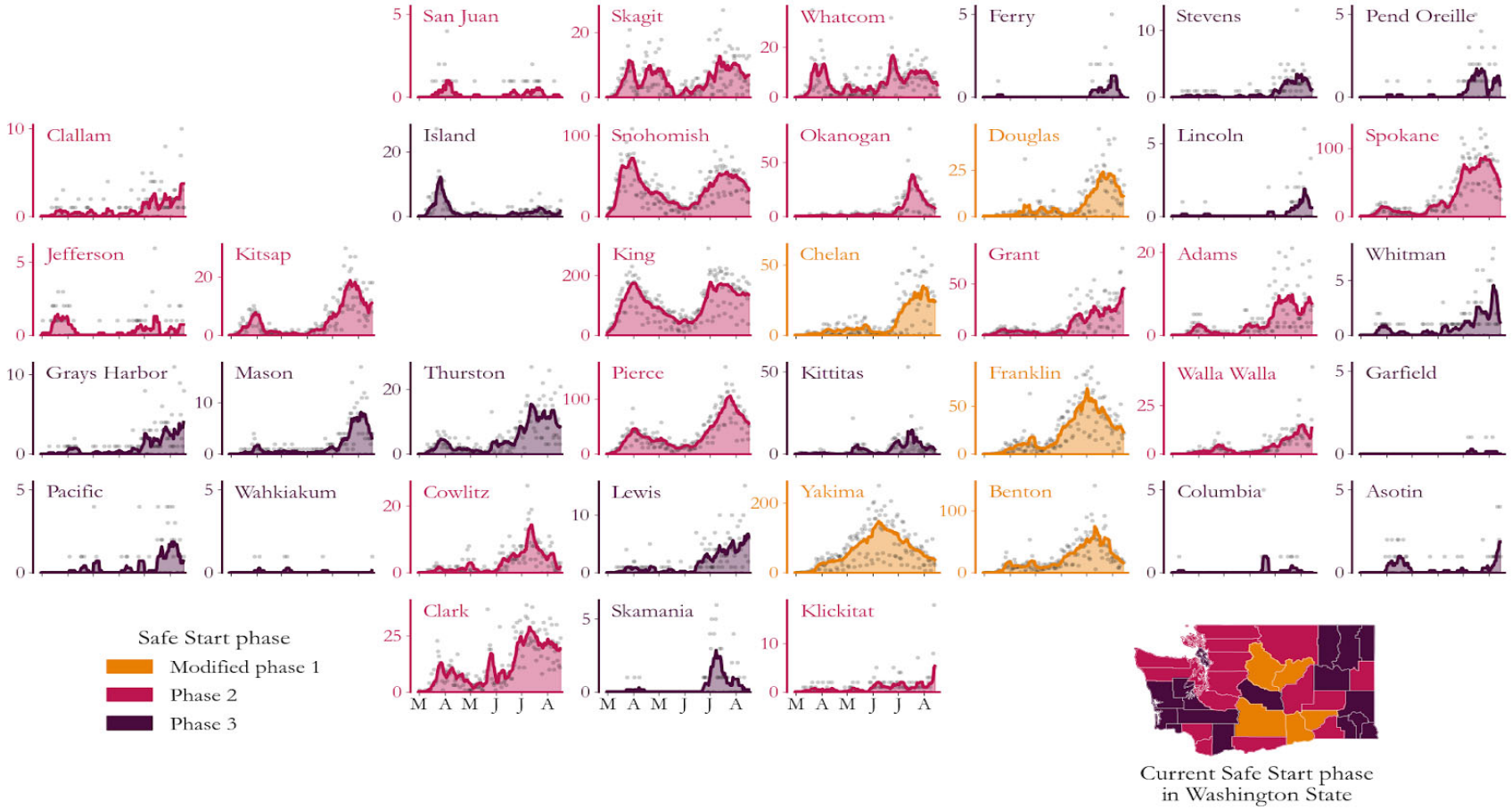

***Figure 2**: Daily COVID-19 positives (dots) and 7-day moving averages (curves) arranged geographically and colored by [Safe Start phase] as of August 27. Case trends across counties highlight geographic correlations, and help us better understand region-level estimates of the transmission rate (see Figure 1). This week, we see a wide variety of trends. For example, cases are roughly constant in King and Clark, decreasing in Yakima, Benton, Franklin, and Pierce, and increasing in Grant, Lewis, and Walla Walla.*

Case, hospitalization, and mortality data from King, Yakima, and Grant counties further illustrate the degree of heterogeneity in the state. Recent trends of plateau, decline, or growth in cases are mirrored in new hospitalizations and deaths, with clear signals of growth despite small numbers in the relatively low-population Grant County.

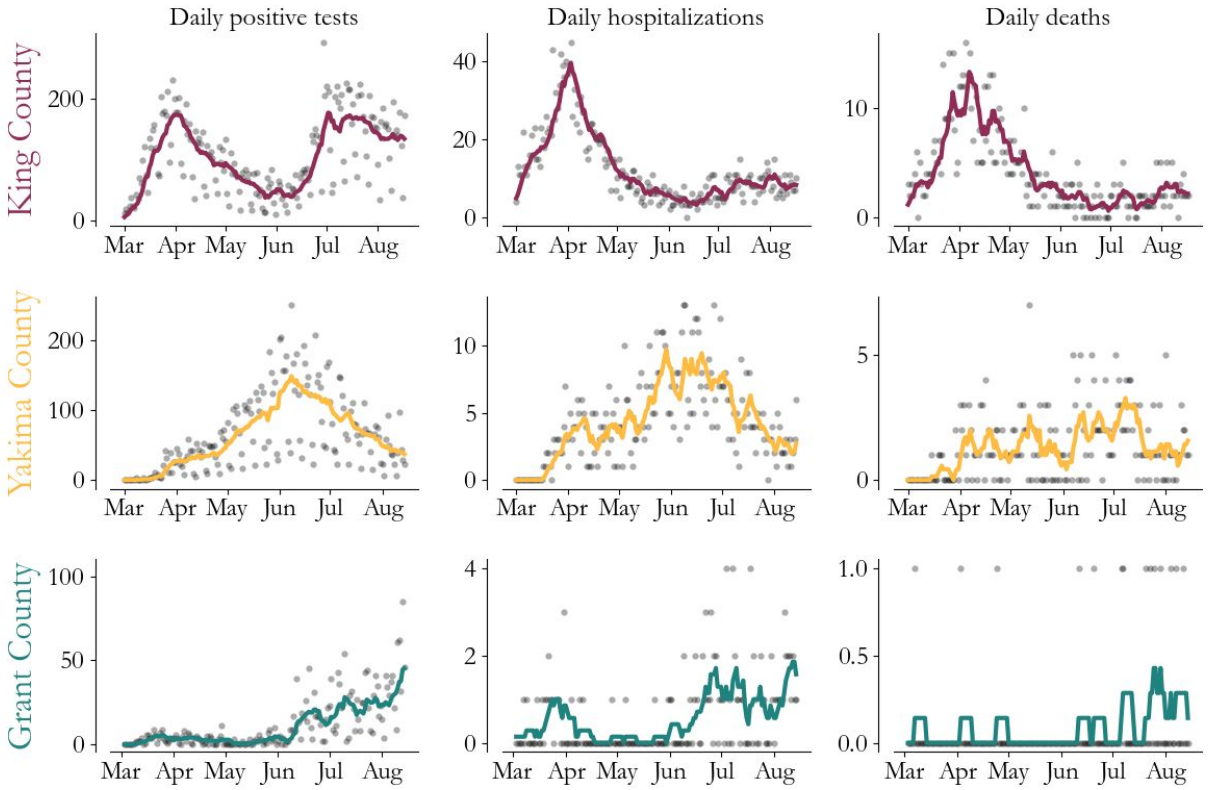

Figure 3: *Trends (7-day moving averages in color) in cases (dots, first column), hospitalizations (dots, middle column), and deaths (dots, thirds column) for King (purple), Yakima (yellow), and Grant (green). Examples of the mixture of patterns of cases leading to statewide reproductive numbers near 1. Some counties are in a plateau (King), some are decreasing (Yakima) and some are increasing (Grant). Trends in cases are generally a leading indicator of trends in severe outcomes. As a result, we expect this divergence to persist in the near future.*

Statewide COVID-19 mortality remains fairly stable in the past 3 weeks, with approximately 10-15 deaths per day. If this pattern continues, Washington state will experience about 1,250-1,875 additional deaths by the end of 2020. With the roughly 1,870 COVID-19 deaths that have already occured this year, this will likely make COVID-19 a leading cause of mortality in Washington.

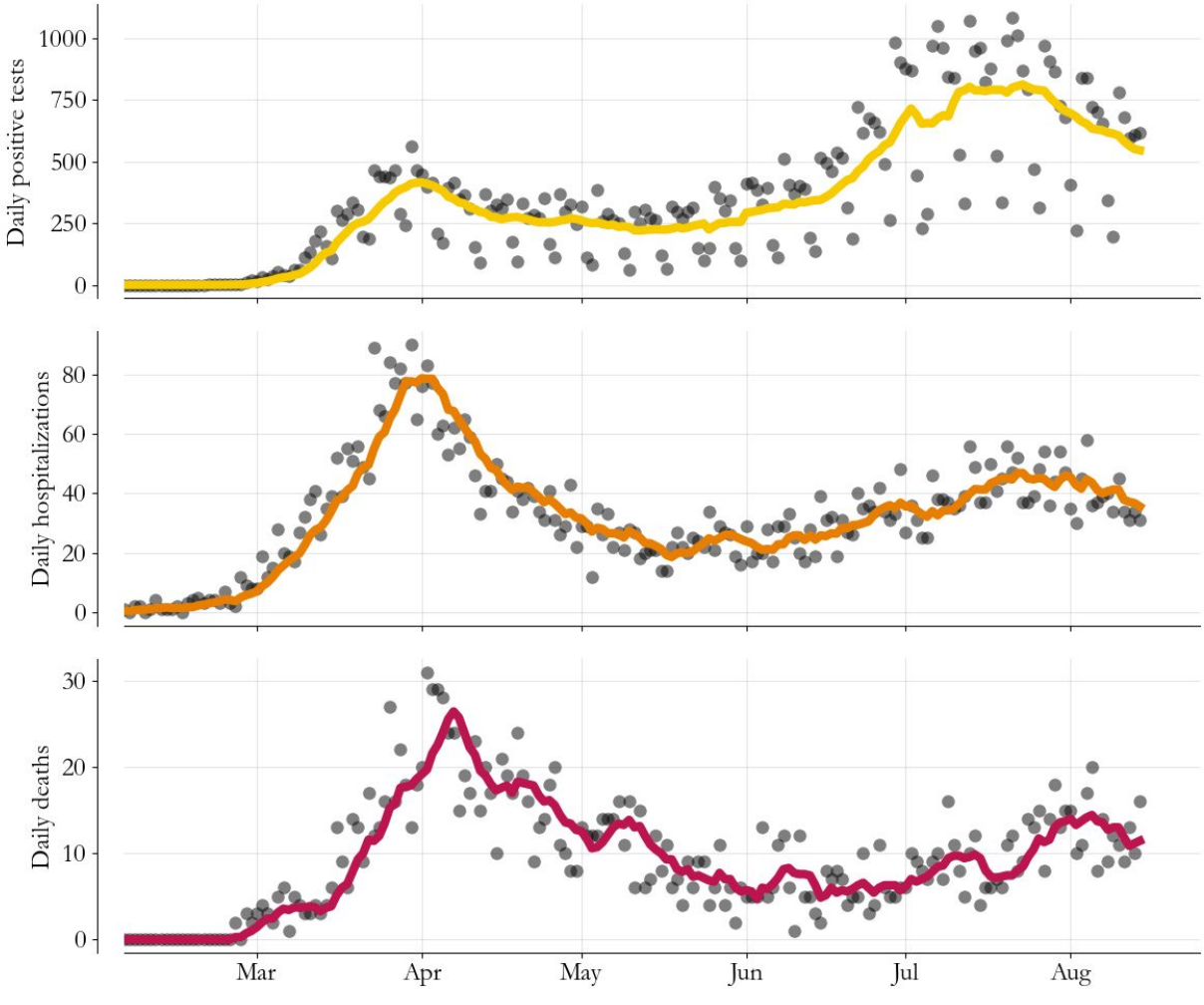

***Figure 4**: Trends (7-day moving averages in color) in Washington state's daily COVID-19 cases (dots, top), hospital admissions (dots, middle), and deaths (dots, bottom). The slight decline in cases is encouraging, and we will soon know with more certainty if that decline pushes the effective reproductive number confidently below 1. As it is, daily COVID-19 mortality has plateaued at unsustainable levels, with 10 to 15 deaths per day in Washington.*