SitRep 16: COVID-19 transmission across Washington State

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Results as of September 15th 2020.

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 of current situation

Using data from the Washington Disease Reporting System (WDRS) through September 4, we estimate the effective reproductive number (R_e) in western Washington on August 29 is likely between 0.56 and 1.59, with a best estimate of 1.07. Meanwhile, we estimate that in eastern WA, R_e was likely between 0.50 and 1.37 on August 29, with a best estimate of 0.94.

Overall case counts in western WA continue to decrease, however this decrease is not uniform across regions, with decreases slowing or reversing in some regions. In eastern WA the decrease in cases has plateaued, primarily driven by the increases observed in Whitman county, which are occurring predominantly in college age individuals.
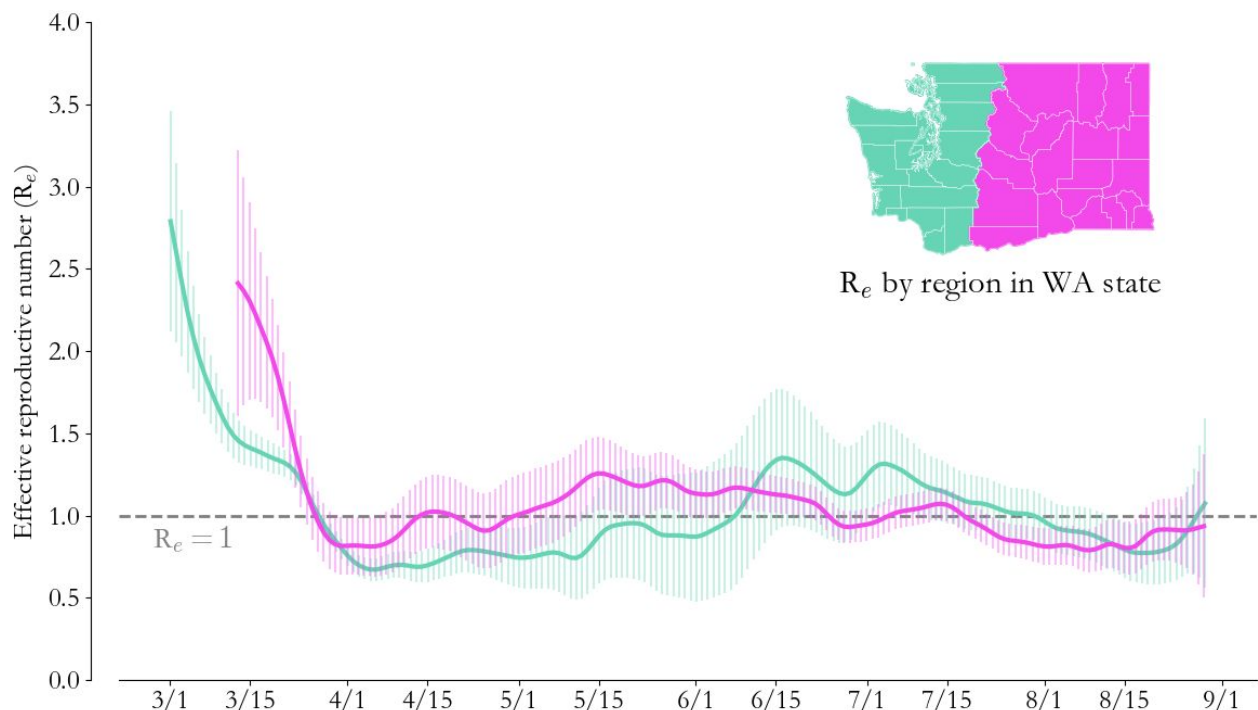
Figure 1: R_e *estimates for eastern (pink) and western (green) WA, with 2 standard deviation error bars. Our most recent estimates suggest that R_e is likely above 1 in western WA as of August 29, and slightly below 1 in eastern WA. For details on how these estimates are generated, see our* technical report.

Details

Although overall cases continue to decrease in western Washington, this decrease has slowed or stopped in some regions (Snohomish, Pierce, Clark and Whatcom counties) and Lewis county has seen recent increases in cases in the community, followed by an outbreak within a rehabilitation and care center. The predominant driver of the recent plateau in case numbers in eastern Washington is the increase in cases in Whitman county associated with college age individuals. However recent decreases in other regions have plateaued (Benton, Franklin, Spokane and Grant counties), and case counts in Adams county are increasing. Overall trends in cases in eastern and western Washington also differ by age.
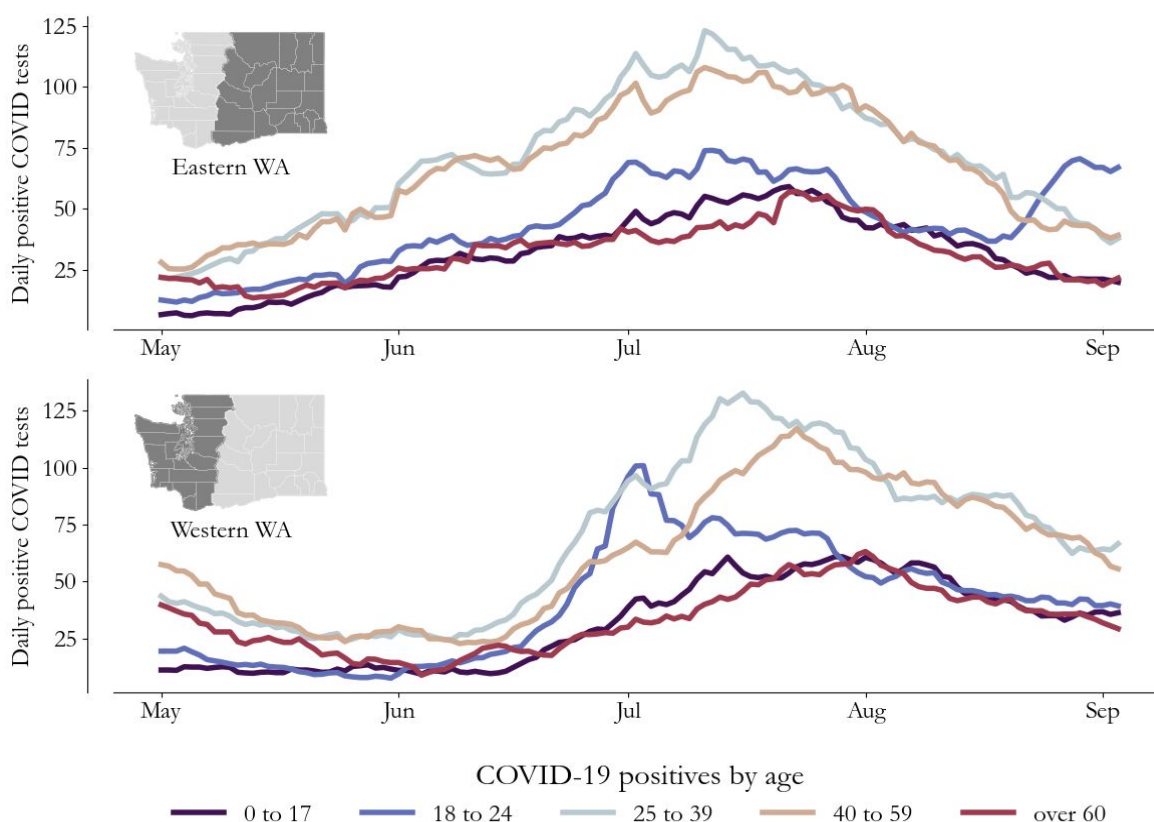

Figure 2. Seven day rolling average case counts by age group in eastern (top) and western (bottom) Washington. The recent marked increase in cases in those ages 18 to 24 (blue) in eastern Washington is driven by the outbreak in Whitman county. In June increases in this age group in western Washington were a leading indicator of increases in older age groups that occurred in July, raising cause for concern. More recently, in western Washington there are moderate increases in cases in those ages 0 to 17 and 25 to 39.

Implications for public health practice

While we continue to observe overall declining case counts across the state, there are concerning patterns in those under 40, and in selected regions. Overall population susceptibility remains high, with a substantial majority of the population lacking immunity to COVID-19. The situation in Whitman county illustrates how rapidly COVID-19 can spread when social distancing and mask wearing is not practiced. The situation in Lewis county illustrates that we are still susceptible to community outbreaks spreading to vulnerable populations.

County level data shows that cases are declining in the majority of counties. We continue to observe increasing case counts in Whitman county, associated with the recent outbreak among WSU students. Case counts are also rising in Lewis county associated with an outbreak at a rehabilitation center.
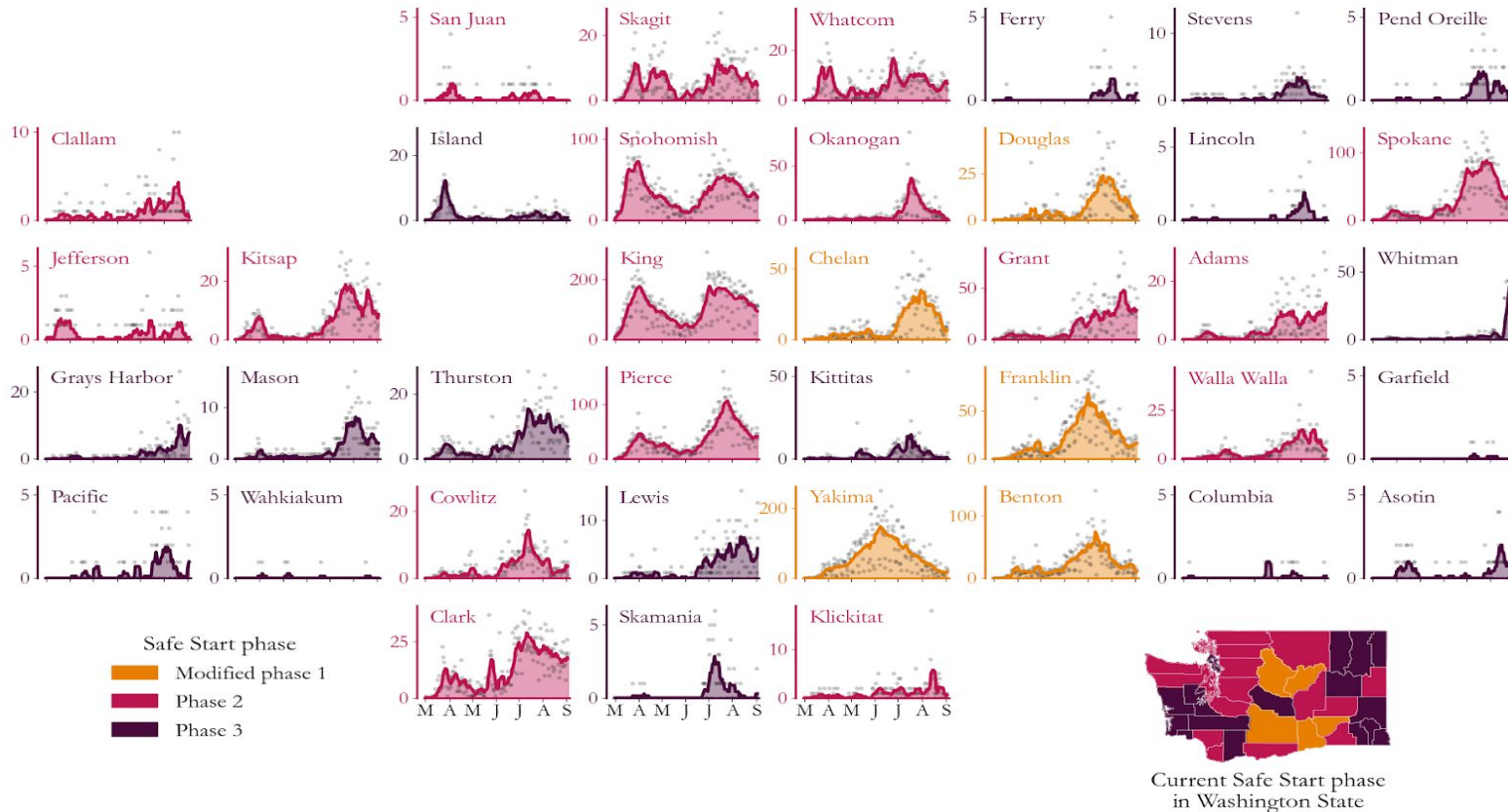
Figure 3: Daily COVID-19 positives (dots) and 7-day moving averages (curves) arranged geographically and colored by Safe Start phase as of August 28. Case trends across counties highlight geographic correlations, and help us better understand region-level estimates of the transmission rate (see Figure 1). This week, we see decreasing case counts in the majority of counties with the notable exception of Snohomish, Pierce, Clark, Whatcom and Lewis counties in western Washington and Benton, Franklin, Spokane, Grant, Adams and Whitman counties in eastern Washington.

Key inputs, assumptions, and limitations of the IDM 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 September 13, and to hedge against delays in reporting, we analyze data up to September 3 across the state.** 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.