SitRep 18: COVID-19 transmission across Washington State

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Results as of October 12th 2020.

Moving forward, we will be publishing situation reports on Wednesdays to better accommodate news cycles. At the same time, we are changing to a biweekly schedule. If, on an off week, we identify a time-sensitive feature in the data, we will produce an updated report that week to ensure that changes in the situation are reported quickly.

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 October 2, we estimate the effective reproductive number (R_e) in western Washington on September 27 was likely between 0.70 and 1.55, with a best estimate of 1.12. Meanwhile, we estimate that in eastern Washington, R_e was likely between 0.51 and 1.36 on September 27, with a best estimate of 0.94.

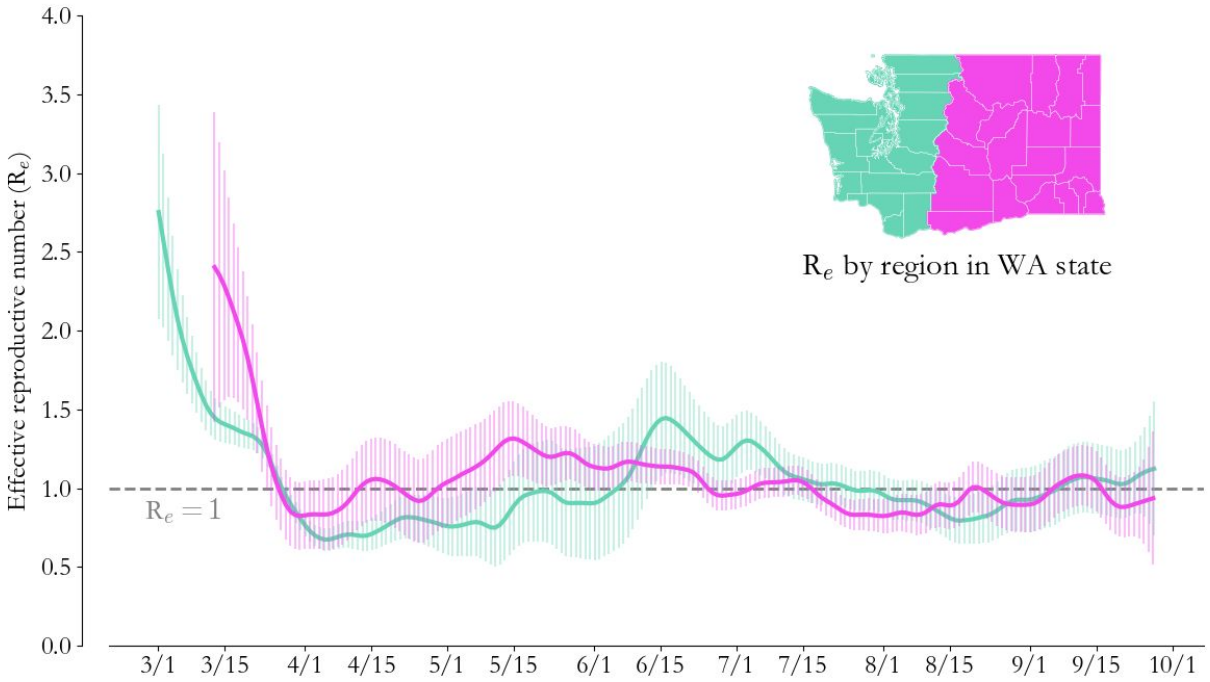

***Figure 1**: R_e estimates for eastern (pink) and western (green) WA, with 2 standard deviation error bars. Our most recent estimates suggest that R_e was likely above 1 in western WA throughout September and that recent increases in cases and hospitalizations were driven by accelerating transmission. In eastern WA, while R_e was most recently below 1, oscillations above and below 1 in September emphasize the precariousness of transmission mitigation efforts.*

Case counts in western Washington have been steadily increasing over the three week period ending October 2, and these growing trends have been mirrored in gradual increases in hospital admissions throughout September. In western Washington the 7 day rolling average case count increased from a recent low of 194 on September 12 to 307 on October 2. Meanwhile, the 7 day rolling average case

count in eastern Washington has decreased over the week ending October 2 from a recent high of 203 on September 24 to 181 on October 2. That said, increases and decreases in both cases and hospitalizations over the course of September illustrate that eastern Washington is in a precarious position, where localized lapses in behaviors to reduce transmission can rapidly reverse decreasing trends in cases and potentially lead to increases in COVID-19 mortality.

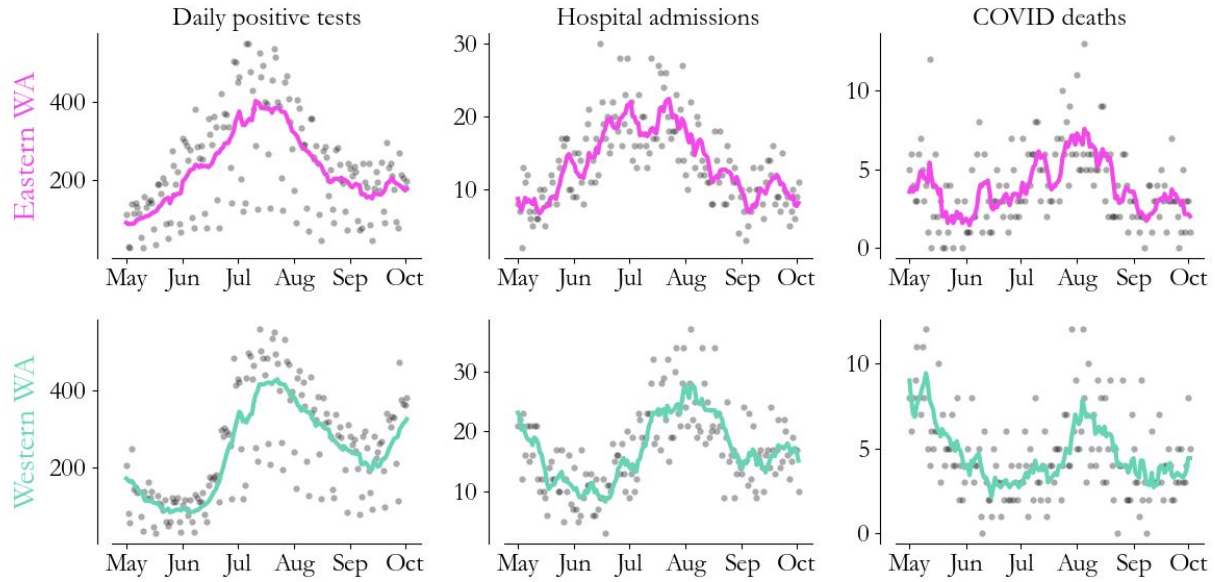

Figure 2*: Seven day rolling case counts (left panels), hospital admissions (middle panels) and deaths (right panels) for eastern Washington (top) and western Washington (bottom). Through October 2, recent daily case counts and hospital admissions have accelerated in western Washington and have very slightly decelerated in eastern Washington.*

Details

Growth in cases has been widely distributed across Washington:

- Several larger counties (Clark, King, Kitsap, Pierce, Snohomish, and Thurston) are seeing steady increases in case counts in the complete data through October 2, with indications that most of these trends are continuing in the incomplete data (the exception being Kitsap) after October 2.
- Several smaller counties (Lewis, Mason, Pend Oreille, and Skagit) have clear increases in recent case counts, however the total numbers of recent cases in these counties remains low.
- Case counts in Benton and Franklin counties are seeing gradual but steady increases.
- Spokane county, which had seen a steep increase in cases over the three weeks to September 24, may have reached a plateau.
- Recent case counts in Whitman county are fluctuating, although at lower numbers than the peak in early September. While September's peak was largely confined to college aged students, cases in Whitman's older population are increasing in the incomplete data after October 2.
- Cases in Yakima county continue to stay flat.
- Grant and Grays Harbor counties are seeing steady declines in cases. Whatcom is starting to see decreases in the week ending October 2.
- Other counties have low numbers of cases with no indication of increasing case counts.

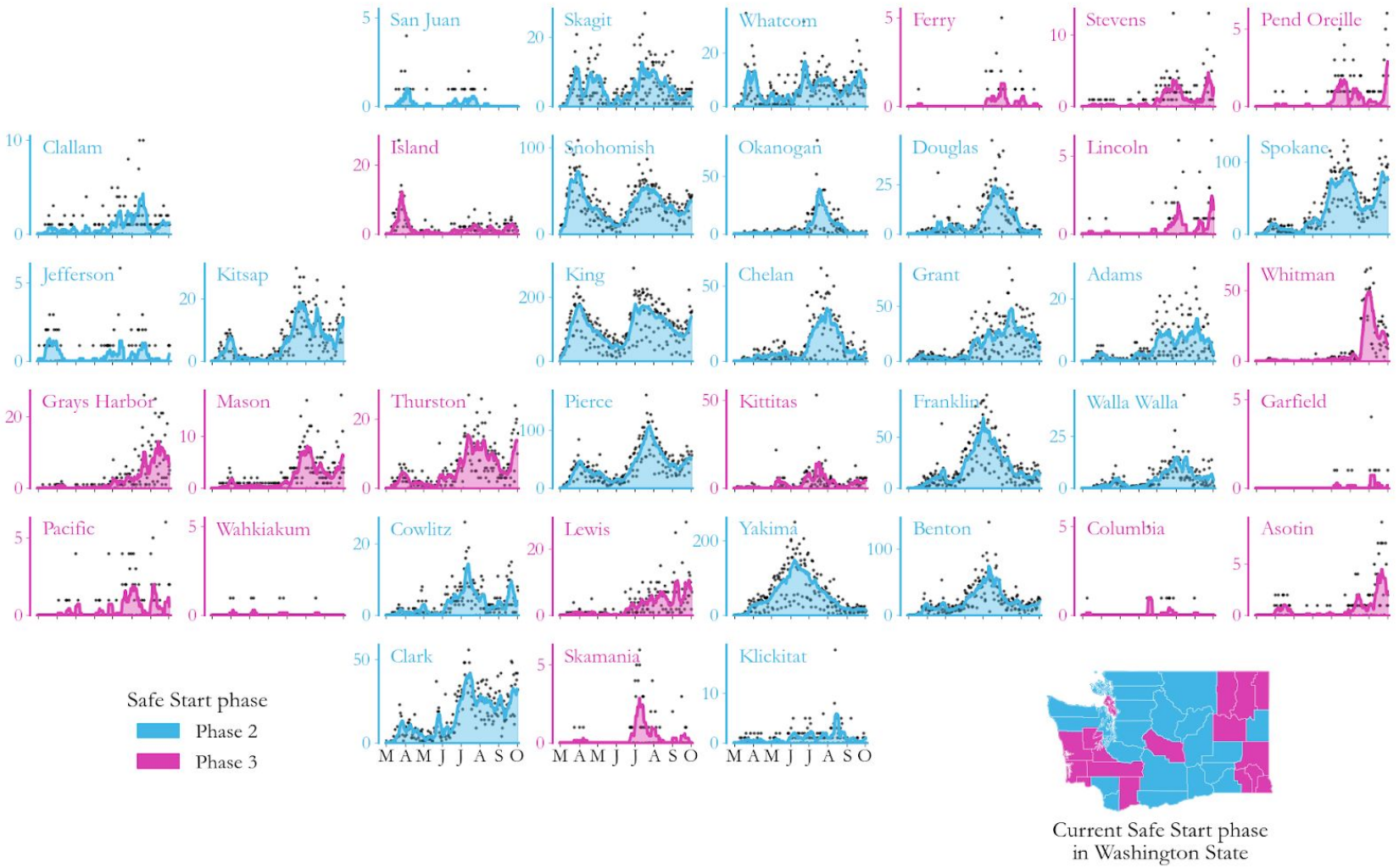

***Figure 3**: Daily COVID-19 positives (dots) and 7-day moving averages (curves) arranged geographically and colored by [Safe Start phase] as of October 2. Case trends across counties highlight geographic correlations, and help us better understand region-level estimates of the transmission rate (see Figure 1). With R_e drifting above and below 1 in eastern WA and likely above 1 in western WA, case counts are increasing in a number of counties across the state.*

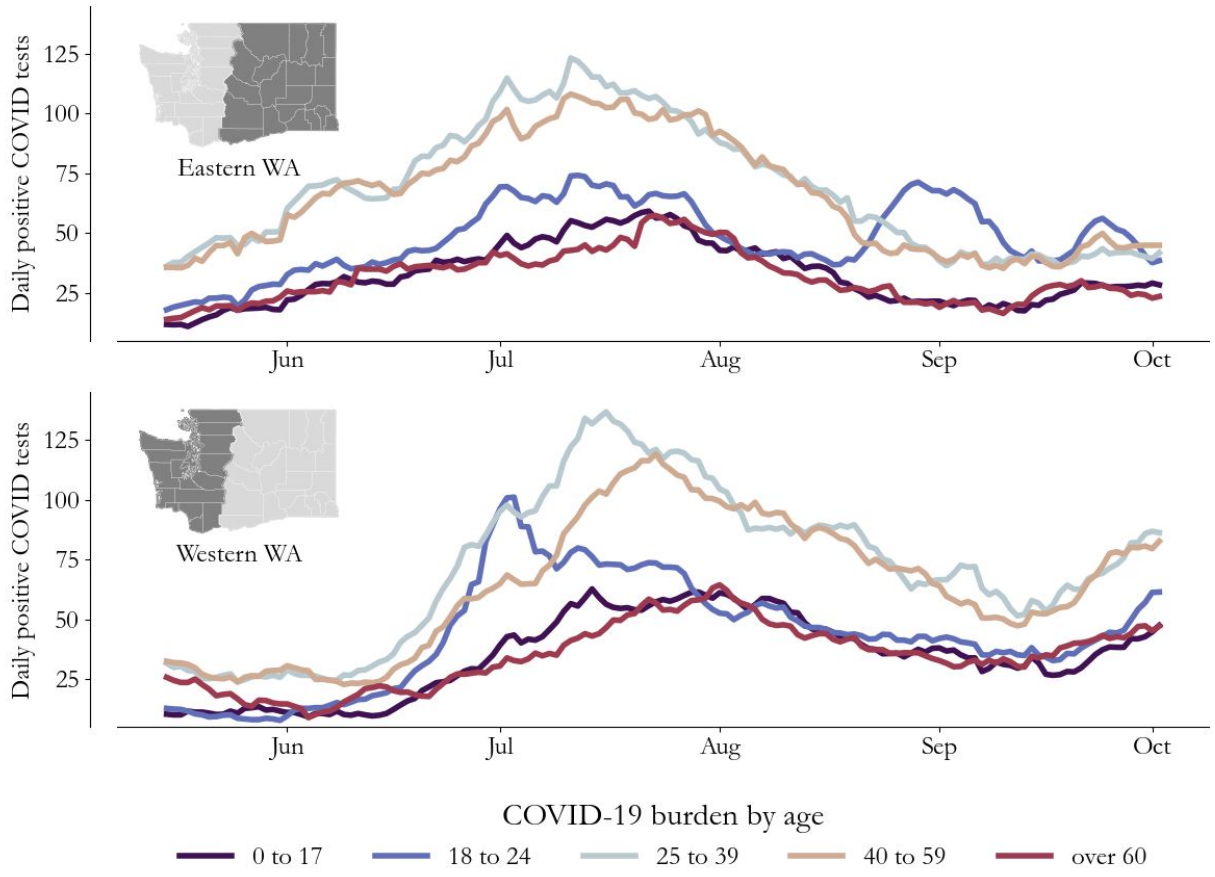

Figure 4. *Seven day rolling average case counts by age group for eastern Washington (top) and western Washington (bottom). In the east, two recent increases in cases occurred in college-aged individuals (blue line) in mid August and mid September. While cases have decreased in this age group over the week ending October 2, the increases are similar to college-aged rises in western WA that occurred in late June, which were a leading indicator of increases across age groups. More recently in western Washington, increasing trends are widely distributed across age groups.*

Although the number of tests (positive or negative) conducted in western Washington has been rising over the three weeks ending October 2, the number of cases has been rising faster, with the seven day test positive rate increasing from 2.3% on September 12 to 3.1% on October 2. On top of being widely distributed geographically, case counts in western Washington have been increasing in all age groups since mid September. This suggests that no single transmission route is driving rising trends, and COVID-19 burden is widely dispersed across the population. Rising trends in older age groups (red lines in bottom graph of Figure 4) are particularly concerning, since the likelihood of severe outcomes grows significantly with age.

In eastern Washington both the number of tests conducted and the test positive rate have stayed flat since September 24. However the test positive rate is considerably higher in eastern Washington (seven day rolling average test positive rate of 8.8% on October 2) than in western Washington (3.2%) and the per capita case rate in eastern Washington is double that of western Washington. The high test positive rate and higher per capita case rates, taken together with an R_e estimate of around one, indicates that the situation in eastern Washington remains precarious.

Daily hospitalizations in western Washington have seen gradual growth from a 7 day rolling average of 13 cases on September 14 to 18 cases on September 26. We expect this number to increase as the time between specimen collection and hospitalization is generally longer than the reporting lag for case counts. Per capita daily hospitalization rates are higher in eastern Washington (6.1 hospitalizations per million population) than in western washington (3.0 hospitalizations per million population)

Implications for public health practice

The parallel increase in cases among all age groups and across multiple counties indicates a generalized rise in the intensity of the epidemic in western Washington in September. The majority of cases in Washington State are not known to be linked to high-profile outbreaks such as those associated with university settings at Washington State University and the University of Washington. Cases known to be associated with known outbreaks represent a small fraction of all cases, and the number of investigated non-household outbreaks has not been increasing. In western Washington it is possible we are seeing the beginnings of a seasonal effect due to both changes in indoor gathering behavior and possibly poorly understood weather-related factors. Absent significant reductions in indoor transmission risks, universal masking, and close adherence to gathering restrictions, this current pattern is likely to continue and possibly accelerate if weather-related factors, not controllable by behavior, prove significant. Recent decreases in eastern Washington are related to reversals of the increasing numbers rather than a sustained downward trend.

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 October 12, and to hedge against delays in reporting, we analyze data up to October 2 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 support for 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. Modeling and analysis for the report are led by WA DoH and are based on models developed by IDM and advanced by Microsoft to better represent the state. 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 and to support WA DoH in its public health mission. This collaboration and its outputs will continue to evolve as scientific frontiers and policy needs change over time.