SitRep 19: COVID-19 transmission across Washington State

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Results as of October 26th 2020.

We are publishing situation reports on a biweekly schedule on Wednesdays to better accommodate news cycles. 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 15, we estimate the effective reproductive number (R_e) in western Washington on October 10 was likely between 0.98 and 1.70, with a best estimate of 1.34. Meanwhile, we estimate that in eastern Washington, R_e was likely between 0.75 and 1.48 on October 10, with a best estimate of 1.12.

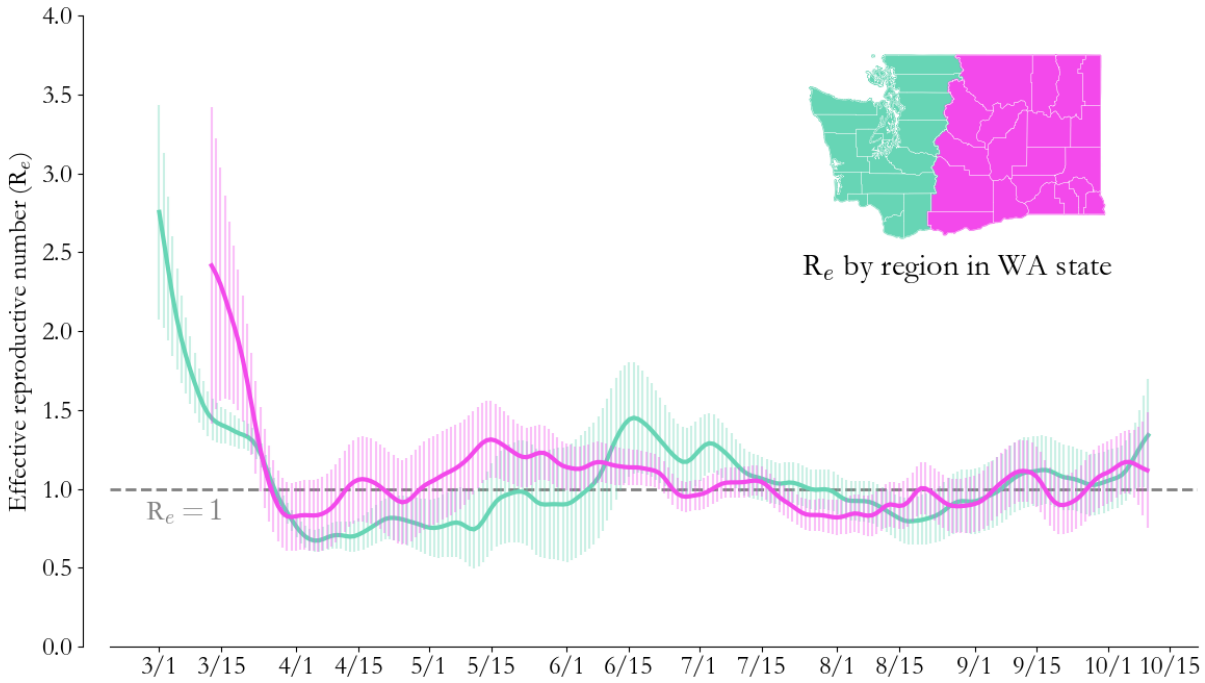

***Figure 1**: R_e estimates for eastern (pink) and western (green) WA, with 2 standard deviation error bars. Our most recent estimates suggest that R_e is highly likely above 1 in western WA as of October 10 and that recent increases in cases and hospitalizations were driven by accelerating transmission. R_e was lower in eastern WA but still likely above 1. In both eastern and western WA our best estimates of R_e have been above one since October 1.*

The 7-day rolling average case count in eastern Washington has increased from 153 cases per day on September 13 to 208 on October 15. Meanwhile, case counts in western Washington have been steadily increasing over the four-week period ending October 15, increasing from a seven-day moving average of 195 cases per day on September 12 to 395 cases on October 15. These growing trends have been mirrored in gradual increases in hospital admissions over this same time period. Hospitalizations have increased from a seven-day rolling average of 8 on October 1 to 13 on October 15. Although some of the

increase in cases through early October is related to increased testing volumes, case counts have increased over the week ending October 15 despite a decrease in testing volumes over that time period in both eastern and western Washington.

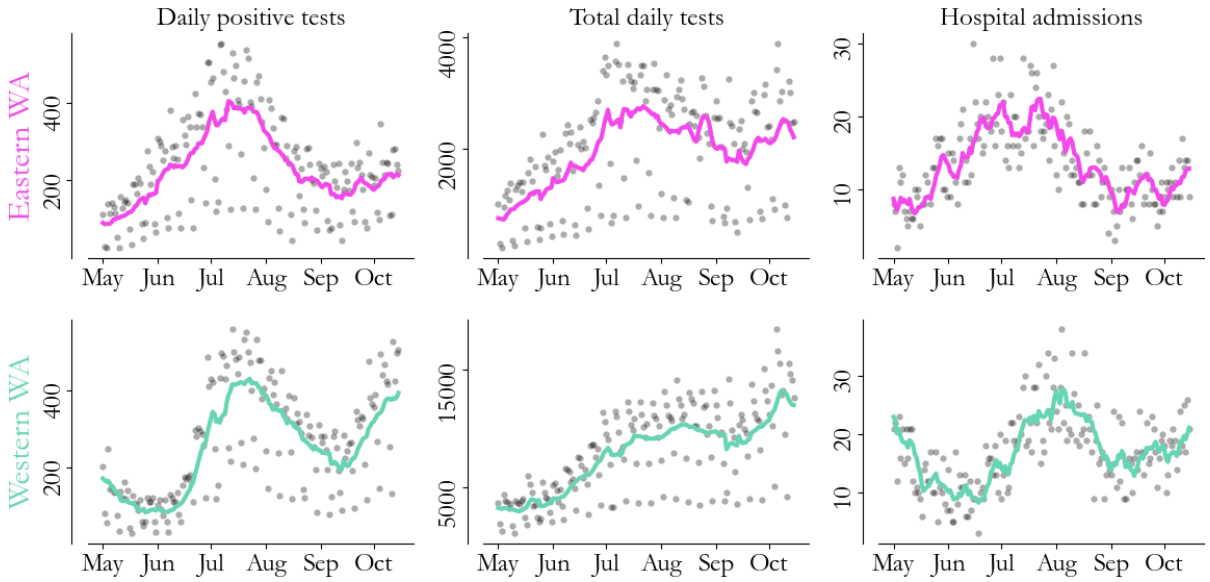

***Figure 2**: Seven-day rolling case counts (left panels), total tests (middle panels) and hospitalizations (right panels) for eastern Washington (top) and western Washington (bottom). Through October 15, recent daily case counts have increased rapidly in western Washington and increased at a slower rate in eastern Washington. Hospitalizations have increased in both regions.*

Details

Growth in cases has been widely distributed across Washington:

- Several larger counties (Clark, Pierce, Snohomish, and Thurston) are seeing steady increases in case counts in the complete data through October 15, with indications that these trends are continuing in the incomplete data after October 15.
- Case counts in King county, which had been increasing steadily through October 7, have subsequently declined. However during this same time period the volume of tests has declined and the test positive rate has increased, from a seven-day rolling average of 2.2% on October 7 to 2.4% on October 15.
- Several smaller counties (Grant, Kittitas, Skagit and Walla Walla) 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 gradually increased from mid-September through October 5, but subsequently plateaued through October 15.
- Case counts in Spokane county, which had seen a steep increase over the three weeks up to September 24, have been flat through October 15.
- 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 are currently occurring across all age groups.
- Case counts in Yakima county continue to stay flat.
- Other counties continue to have low numbers of cases.

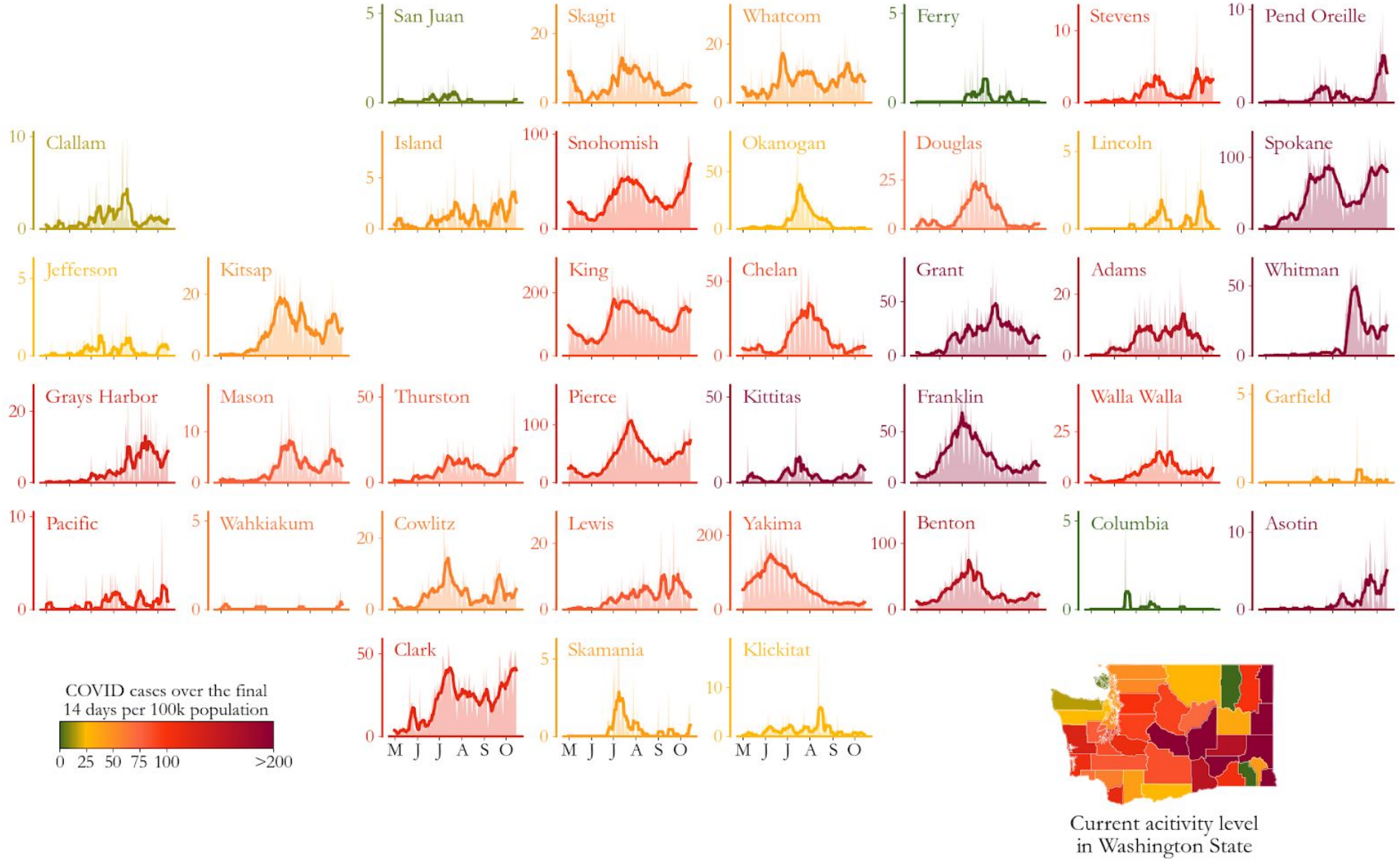

***Figure 3**: Daily COVID-19 positives (shaded areas) and 7-day moving averages (curves) arranged geographically and colored by COVID-19 activity level (total cases from October 2 to 15 per 100,000 people). Case trends across counties highlight geographic correlations and help us better understand region-level estimates of the transmission rate (see Figure 1). With R_e likely above 1 in both eastern and western WA, case counts are increasing in a number of counties across the state. Moreover, with sustained transmission throughout September and the first half of October, COVID-19 activity levels are generally high.*

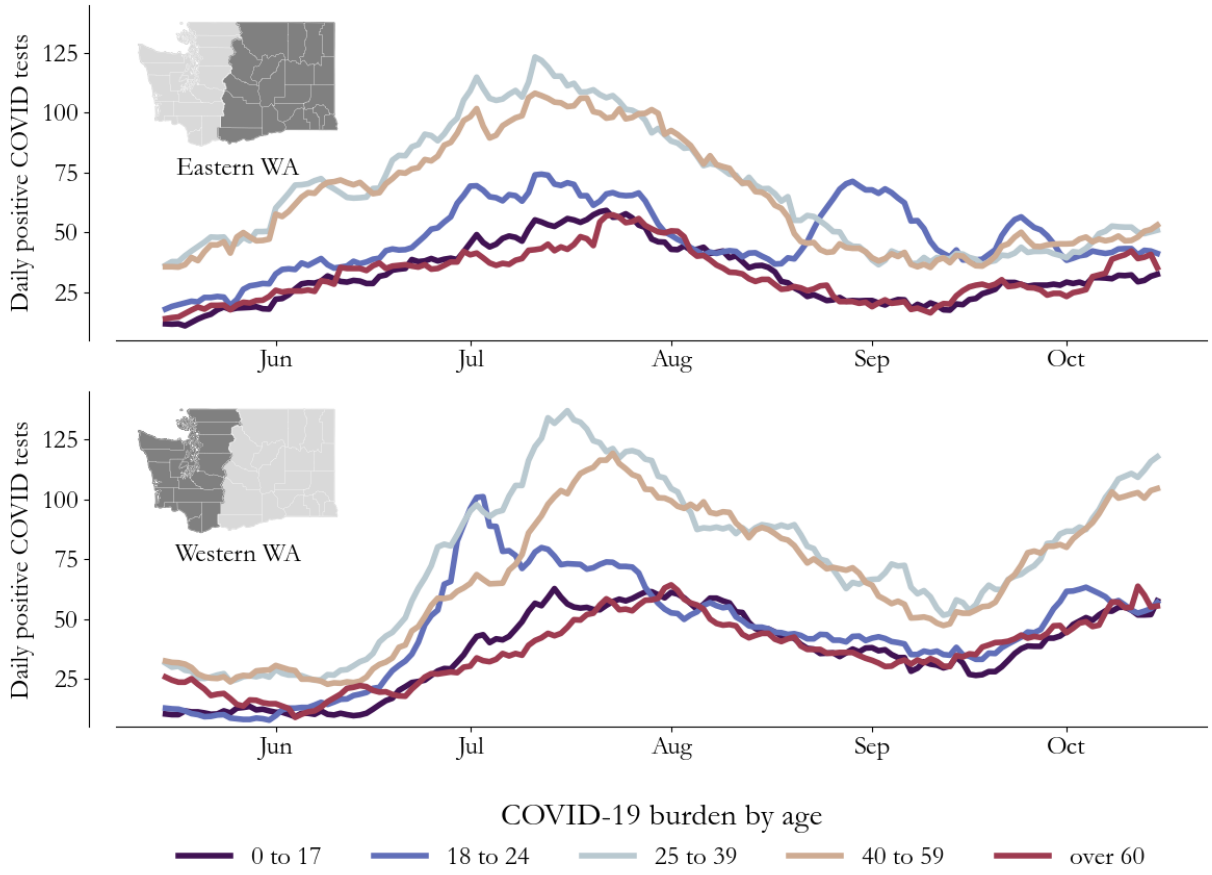

Figure 4. *Seven-day rolling average case counts by age group for eastern Washington (top) and western Washington (bottom) showing that increasing trends are widely distributed across age groups.*

In eastern Washington cases have been rising across age groups, although at a slower rate than in western Washington. However the test positive rate is considerably higher in eastern Washington (seven-day rolling average test positive rate of 9.6% on October 15) than in western Washington (3.3%) and the per capita case rate in eastern Washington (181.1 per 100,000 individuals) remains double that of western Washington (91.2 per 100,000 individuals). 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.

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. Growth in cases is particularly pronounced in the 25 to 39 and 40 to 59 age groups. Rising trends in older age groups (red lines in Figure 4) are particularly concerning, since the likelihood of severe outcomes grows significantly with age.

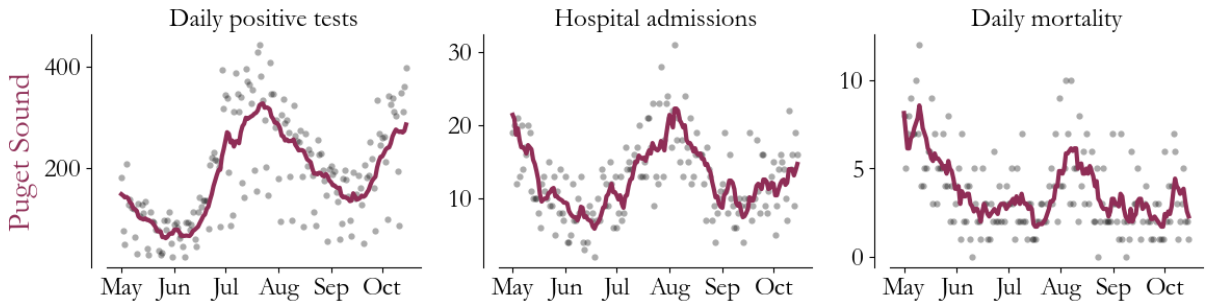

Figure 5. *Seven-day rolling average case counts (left), hospitalizations (middle) and deaths (right) for the Puget Sound region.*

Rises in case counts and hospitalizations are particularly pronounced in the Puget Sound region (Snohomish, King and Pierce counties) (Figure 5), and the case rate is higher in the Puget Sound region (98.9 cases per 100,000 individuals) compared to the rest of western Washington (75.7 cases per 100,000 individuals). These increases are occurring across age groups indicating a general rise in the intensity of the epidemic in the Puget Sound region. Increases in cases and hospitalizations in those over 60 is particularly concerning. This increase is counter to the trend being seen in many areas of the United States where rises in cases are most pronounced in rural areas.

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 both eastern and western Washington. The majority of cases in Washington State are not known to be linked to high-profile outbreaks, and outbreak investigation data shows we have active outbreaks associated with multiple types of social activity, including education, dining out, workplaces, and gatherings both at places of worship and at home. Survey data collected in Whatcom county by Western Washington University confirms what many of us have experienced personally, that we are less adherent to masking and distancing policies when we are with our friends and family, in places where we either feel safe or feel peer pressure. Lapses in masking or physical distancing in any setting increases the likelihood of disease transmission. Thus it's important for all of us to mask and distance anytime we are with anyone outside our immediate household, even if it feels awkward. Asymptomatic and pre-symptomatic transmission of SARS-CoV-2 means that individuals are unwittingly transmitting the virus. The chance that at least one individual in a gathering has an asymptomatic or pre-symptomatic infection increases rapidly with the number of individuals present. Moreover, as the weather cools and we spend more time indoors, transmission risk is heightened when our gatherings are in poorly ventilated spaces. For these reasons, we all need to support each other in continued efforts to mask up, stay at least 6 feet apart and increase ventilation.

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 25, and to hedge against delays in reporting, we analyze data up to October 15 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.