# COVID-19 transmission across Washington State

Washington State Department of Health
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# SitRep 30: COVID-19 transmission across Washington State

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***Results as of April 6, 2021.***

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*

**Overview:** Current model results based on data through March 25 indicate that COVID-19 transmission is increasing in Washington state.
**Cases:** Overall statewide, case counts are increasing, as well as in four of the five largest counties. Sharp increases in case counts are evident among younger age groups, including ages 10-19, 20-29, 30-39, and 40-49.
**Hospital admissions:** The declines in hospital admissions that were observed through March have flattened among ages 40-49, 70-79 and 80+. Increases that are being observed in hospital admissions in ages 20-29, 30-39, 50-59, and 60-69 should be monitored closely. Declines in hospital beds occupied by COVID-19 patients have flattened.
**Vaccination:** Statewide, vaccination is increasing: over 60% of the 65+ population has been fully vaccinated and on average nearly 60,000 doses are administered per day. However, 25% of the 65+ population has not yet initiated vaccination.
**Variants:** The B.1.1.7 variant, which is more transmissible and poses an increased risk of severe illness, continues to spread across the state. We are estimating 50% of cases will be attributable to the variant of concern B.1.1.7 by mid-April.
**Public health message:** Our current positive individual behaviors can prevent severe disease and illness in our families and communities until everyone has a chance to get vaccinated. This is true now and as variants like B1.1.7 become more prevalent. Together vaccination and following social distancing and masking will help life get back to normal as quickly as possible.

## *Statewide estimates of the effective reproductive number*

Using data from the Washington Disease Reporting System (WDRS) through March 25, we estimate the reproductive number ( $R_e$ ) in Washington state on March 19 was likely between 0.94 and 1.81, with a best estimate of 1.38. We have moved to reporting $R_e$ estimates for the whole state, instead of separately for eastern and western Washington, as trends in $R_e$ have remained largely similar between eastern and western Washington for several months. Uncertainty in the statewide estimate for $R_e$ is smaller than the uncertainty for separate regional estimates and therefore the statewide estimate provides clearer information regarding the current situation when the trends are similar. Despite this, the most recent statewide $R_e$ estimates have large uncertainty because of recent variability in hospital admissions, and the inability to distinguish between a continued flattening or increasing trend in hospital admissions.

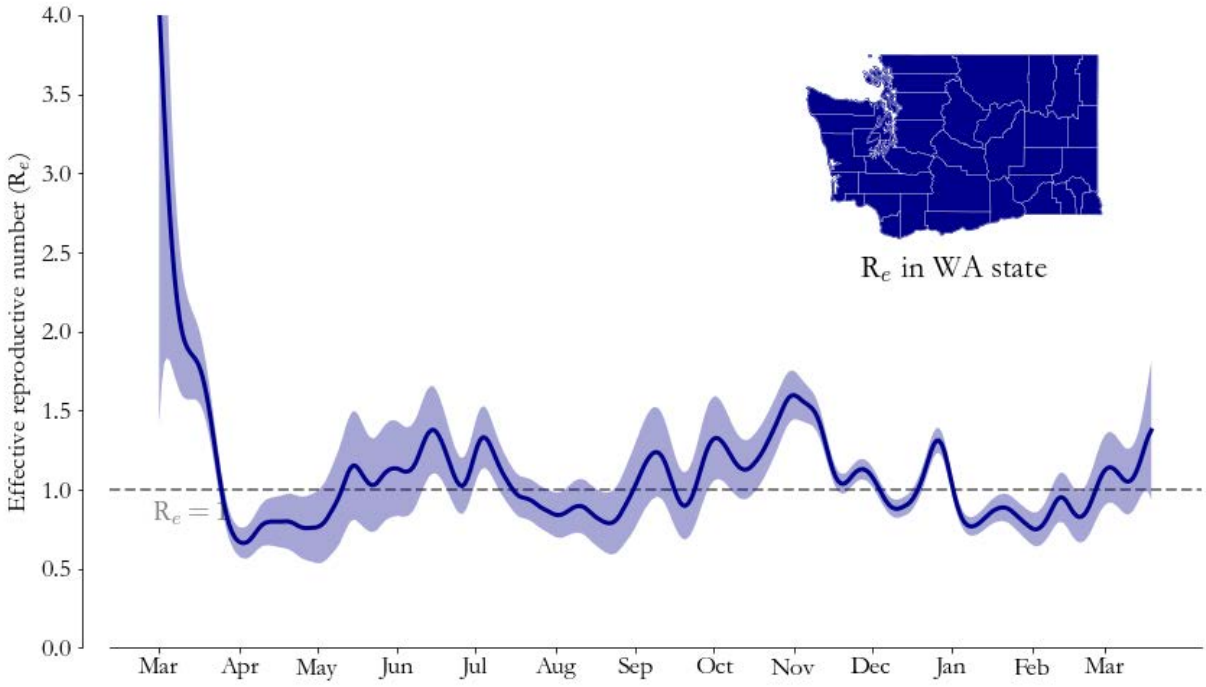


***Figure 1**: estimates for Washington state, with 2 standard deviation error bars. To reduce levels of cases and hospitalizations, $R_e$ needs to maintain a value substantially below 1 for a sustained period of time.*

## *Model-based statewide prevalence*

On March 19, overall prevalence (the percentage of Washington state residents with active COVID-19 infection) in Washington state was likely between 0.10% and 0.16%, with a best estimate of 0.13% (Figure 2). The declines in prevalence that were apparent since early January have flattened since late February.

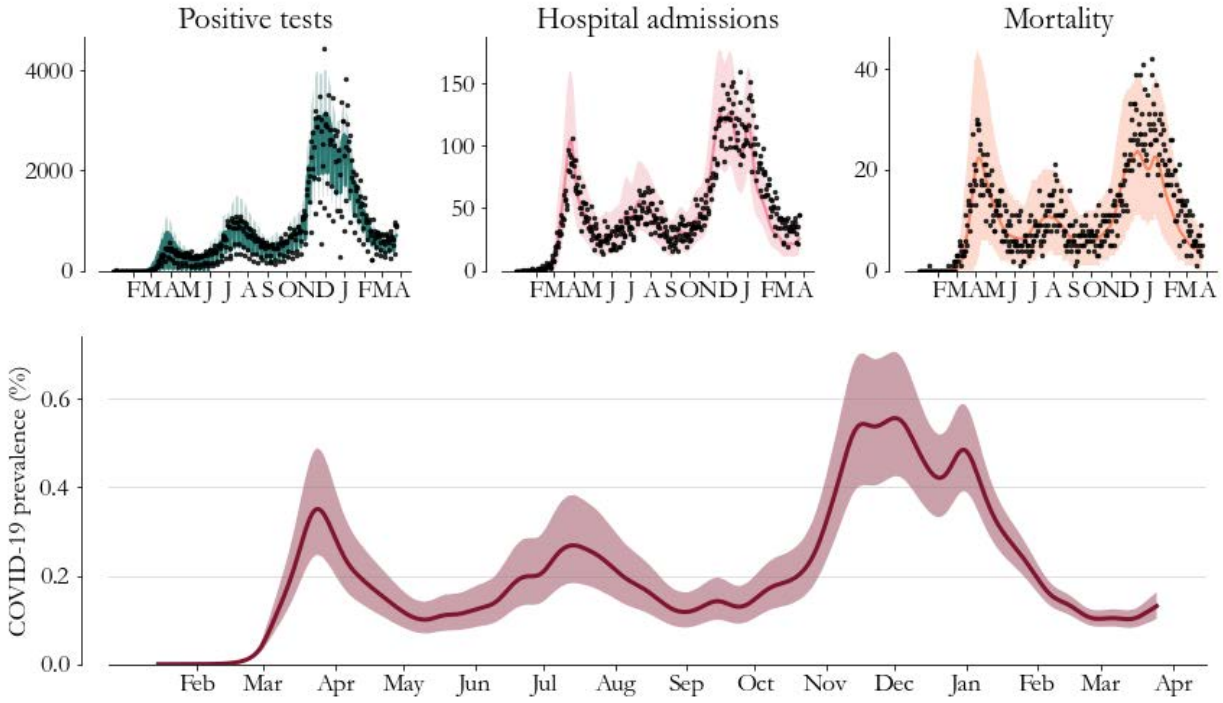


***Figure 2**: Model-based prevalence estimates (bottom, 95% CI shaded) and model fit to cases (top left), hospitalizations (top middle) and deaths (top right) for Washington state. Prevalence is the percentage of Washington state residents with active COVID-19 infection.*

## *Trends in cases, hospital admissions, and deaths*

*Cases*

Across the state, the declines in case counts that started in early January flattened in mid-February, and began increasing in late March (Figure 3). The seven-day rolling average case count increased from 384 cases per day on September 12 to a recent peak of 2910 on January 8, declined to 727 cases per day as of February 15, has been at approximately that level for a month, and has since increased to 915 cases per day as of March 26.

*Hospital admissions*

Hospital admissions have remained flat over the first three weeks of March . The seven-day rolling average of hospital admissions increased from 21 per day on September 4 to a peak of 122 on January 6 and has since declined again to 33 as of March 4, and have flattened near that level as of March 26, although increases are evident in the incomplete data.

*Deaths*

Deaths have continued to decline through early March. The seven-day rolling average of deaths increased from 5 per day on September 12 to a peak of 32 on January 10 and has since declined to 6 as of March 15 (note that there is an earlier cut-off date for deaths because of the additional time it takes for deaths to be verified and entered in the state vital records database).

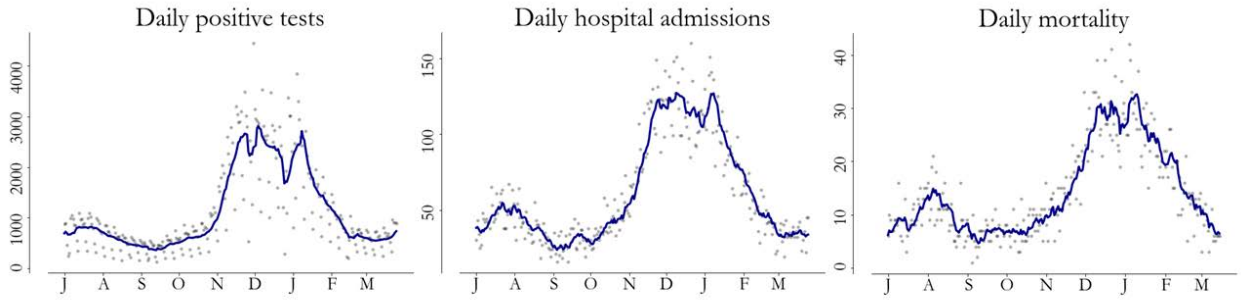


***Figure 3****: Seven-day rolling case counts (left panel), hospital admissions (middle panel) and deaths (right panel) for Washington from July 2020 through March 25 (cases and hospitalizations) and March 15 (deaths) 2021. Because of how confirmed deaths are being reported, we are using an earlier cutoff for the mortality panel.*

## *County-level trends*

Across Washington state, there is some variation in county-level rates: as of March 25, 2 counties had no new cases over the prior two weeks (Columbia, Wahkiakum); 14 counties had 14-day rates of new cases between 100 and 200 per 100,000 people, 2 counties (Kittitas and Whitman) had rates between 200 and 300 per 100,000 (Figure 4). Trends in county-level case counts show some variation, although many counties have begun showing increasing trends:

- In four of the five largest counties (Clark, King, Pierce, Snohomish) case counts have begun to increase. Case counts remain flat in Spokane, though a slight increase is evident in the incomplete data.
- Among medium-sized counties, case counts in Benton, Franklin, Grant, and Yakima have remained flat at October or early November levels. Case counts in Whatcom have also flattened after declining from a spike in late February. Increase in case counts are evident in Cowlitz, Kitsap, Skagit, and Thurston counties.
- Case counts in Whitman continue to decline after a peak in mid-March. All other small counties still have fewer than 10 counts per day, on average, but increases are evident in Chelan, Douglas, and also in the incomplete data for Clallam, Stevens, Lincoln, and San Juan counties.

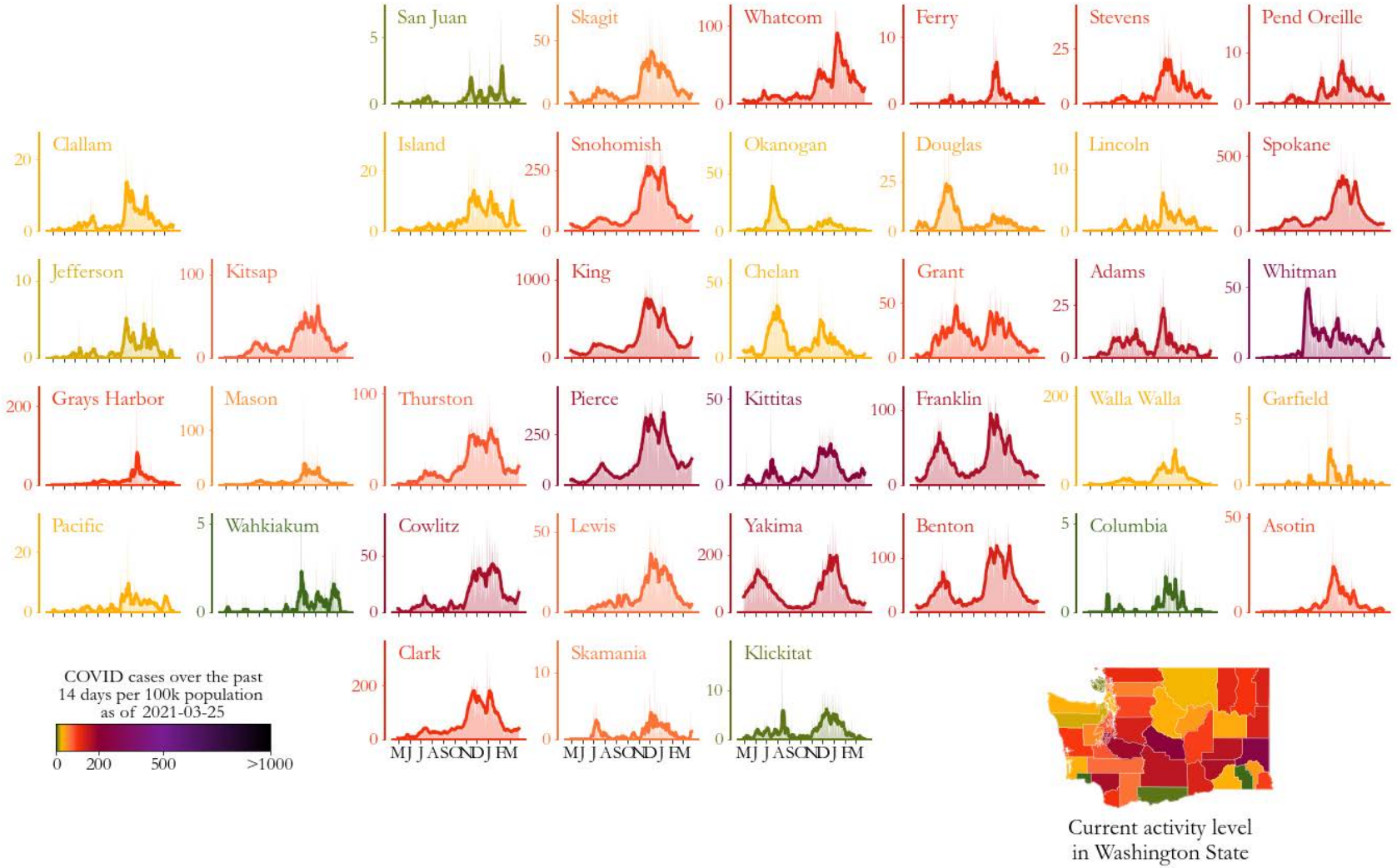


***Figure 4**: Daily COVID-19 positives (shaded areas) and 7-day moving averages (curves) arranged geographically and colored by COVID-19 activity level (total cases from March 12 to March 25 per 100,000 people). Case trends across counties highlight geographic correlations and help us better understand region-level estimates of the transmission rate (see Figure 1).*

## *Trends in cases and hospital admissions by age group*

Across Washington state, the declines in case counts across age groups that began in early January (Figure 5) largely flattened from mid-February to mid-March, and have now started increasing in some age groups. Sharp increases are evident for youths aged 10-19 and adults aged 20-29, 30-39, and 40-49, among whom case counts are highest. Shallower increases are apparent among children aged 0-9 and adults aged 50-59 and 60-69.

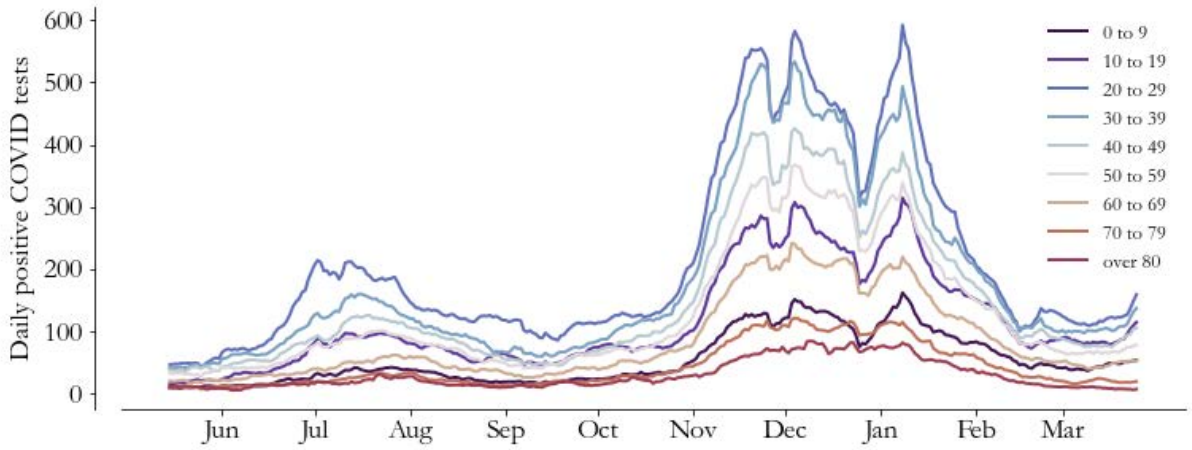


***Figure 5.*** *Seven-day rolling average case counts by 10-year age group across Washington state.*

We expect a more rapid decline in cases over age 60 as the proportion of vaccinated individuals in this age range increases compared to age groups in which a smaller proportion have been vaccinated. This is evident in Figure 6. The top panel shows a smaller proportion of adults 60 and older have tested positive since mid February in comparison to the proportion of the population belonging to this age group. The bottom panel shows that overall testing by age has remained proportional to the population distribution. Conversely, the 20-29 year old age group now accounts for a disproportionately large fraction of cases in comparison to the population fraction for this age group.

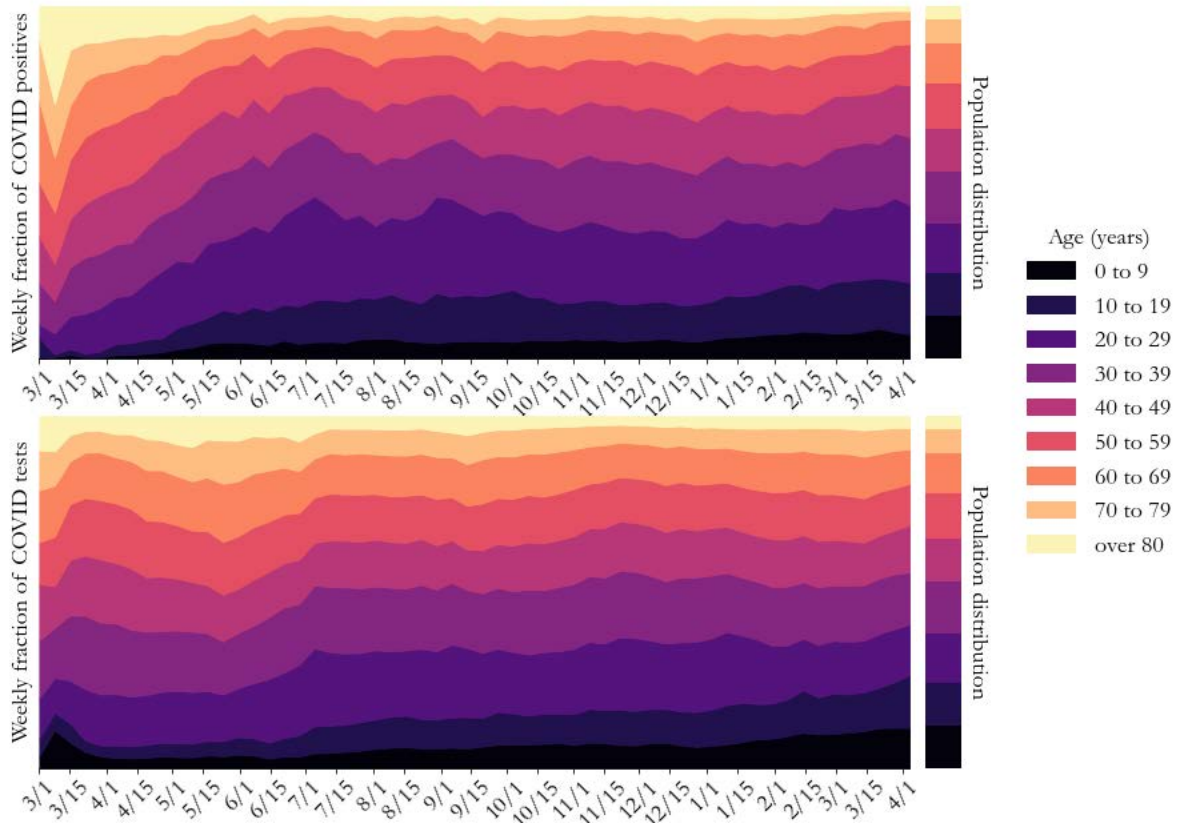


***Figure 6.*** *The top panel of this graph indicates the weekly age distribution of COVID-19 cases and the bottom panel indicates COVID-19 tests. The colors represent 10 year age groups. Earlier in the pandemic, populations over age 60 represented a greater fraction of total COVID-19 cases relative to their fraction of the population as a whole. Over time, the age distribution of cases has shifted towards younger individuals (shown in darker colors). In comparison, the bottom panel indicates that this trend is generally not present in the distribution of tests, which indicates that the age-distribution of the underlying infected population is changing over time.*

Hospital admission rates (admissions per 14-day period per 100,000 population) across Washington state have declined since early January among all age groups. The top panel of Figure 7 shows the highest hospital admission rates and steepest drops in rates since January among the 70-79 and 80 and over age groups (the age groups at greatest risk for severe disease) potentially because those age groups were among the first to be vaccinated. The bottom panel of Figure 7, which shows the rates on a log scale, indicates that declines have been occurring across all age groups since January. However, recent sustained flattening in the declines in the 80 and over and 70-79 year old age group are concerning. Among ages 40-49, an age group which does not have a high proportion of people vaccinated, sustained flattening in hospital admission rates is evident since late February. In addition, slight upticks in hospital admission rates among ages 20-29, 30-39, 50-59, and 60-69 also warrant close observation.

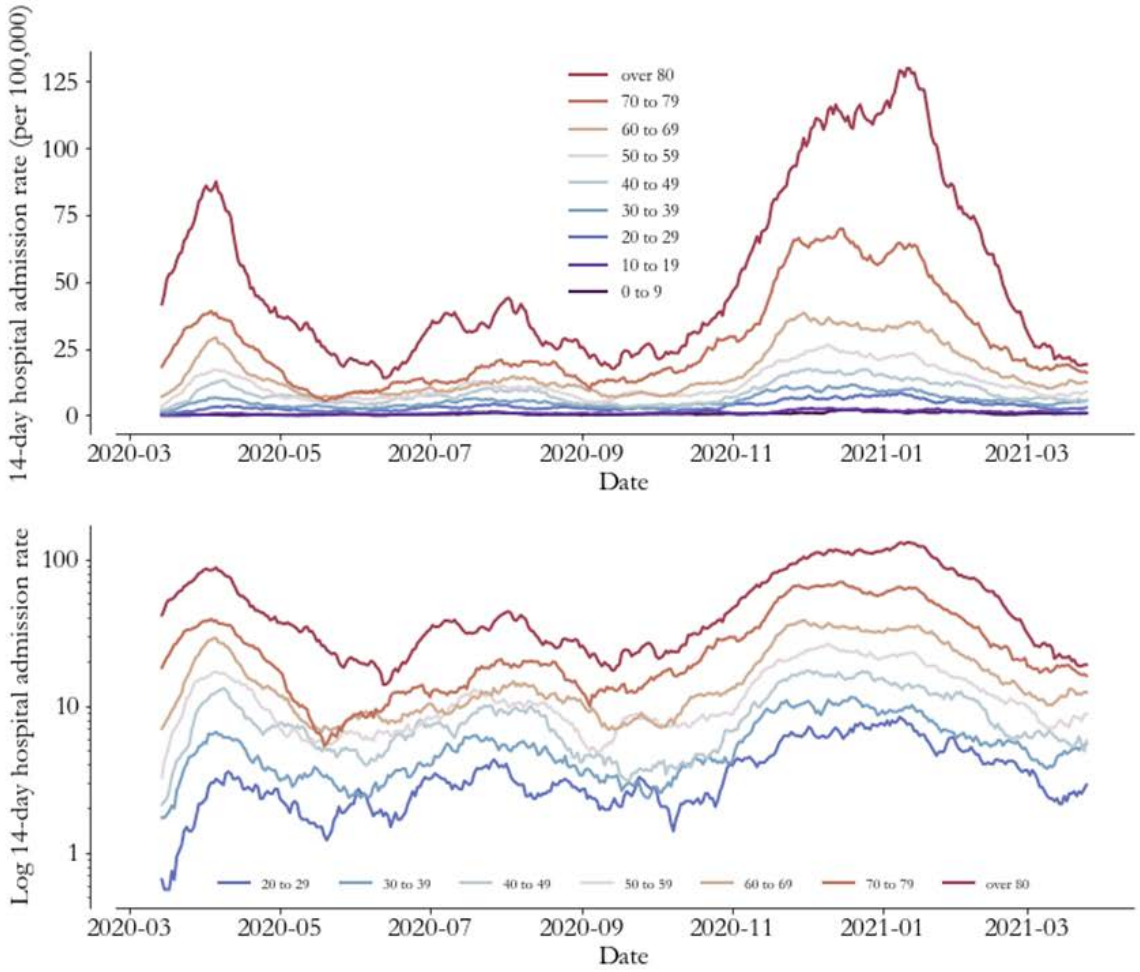


***Figure 7.*** *Statewide 14-day hospital admission rate per 100,000 population by 10-year age group. The top panel shows the rates on a standard numeric scale, and the bottom panel shows the rates on a log scale to be able to better compare the rate of decline between age groups that have large differences in rates.*

In order to assess the impact of vaccination on hospital admission rates among adults aged 60 and over, we compared the declines in hospital admission rates between ages 60 and over and 0-59 after the August peak and after the January peak in hospital admissions. The trend lines in the left panel of Figure 8 show the percent of the August peak for each of the age groups, and those in the right panel show the percent of the January peak admission rates for the two age groups. This figure indicates that the rate of decline after the August peak was faster among those aged 60 and over in comparison to those under age 60, whereas the rate of decline after the January peak was more rapid among the 60 and over age group in comparison to the younger age group. This difference in the rate of decline after the January peak is most likely attributable to the protective effects of vaccination in the 60 and over population, which was among the first groups to be vaccinated.

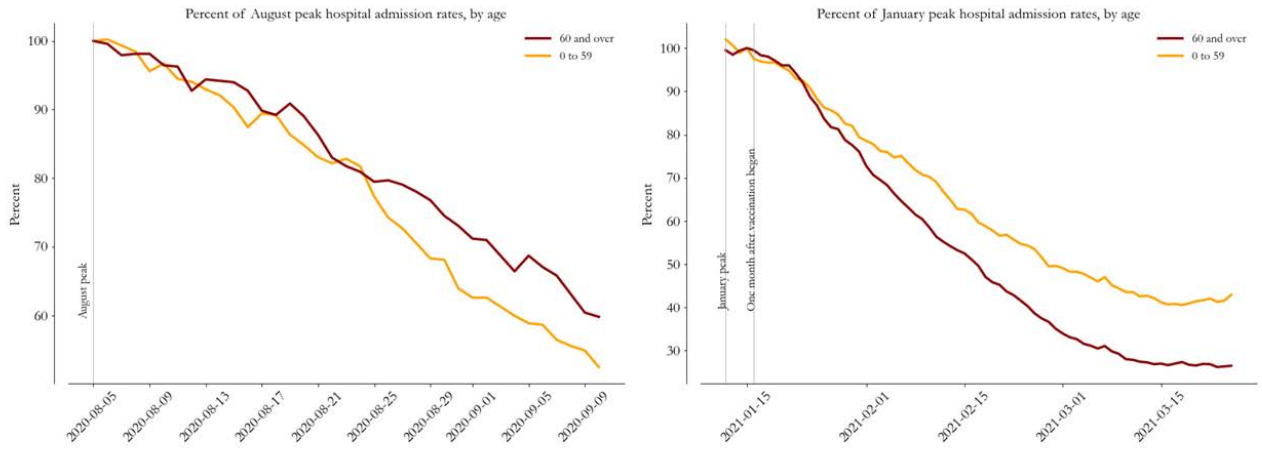


***Figure 8.*** *Comparison of declines in hospital admission rates after August (left panel) and January (right panel) peaks in hospital admissions, between ages 60 and over (dark red line), and ages 0 to 59 (orange line).*

## *Hospital occupancy*

Across the state, the rapid increase in the number of occupied hospital beds that started in early November slowed substantially in early December and remained fairly flat until mid-January. Steady declines occurred until mid-March, after which a flattening or potential uptick is apparent (Figure 9). ICU beds occupied by confirmed or suspected COVID-19 patients increased through early December, flattened thereafter, and declined from January until mid-March, at which point a gradually increasing trend is again evident.

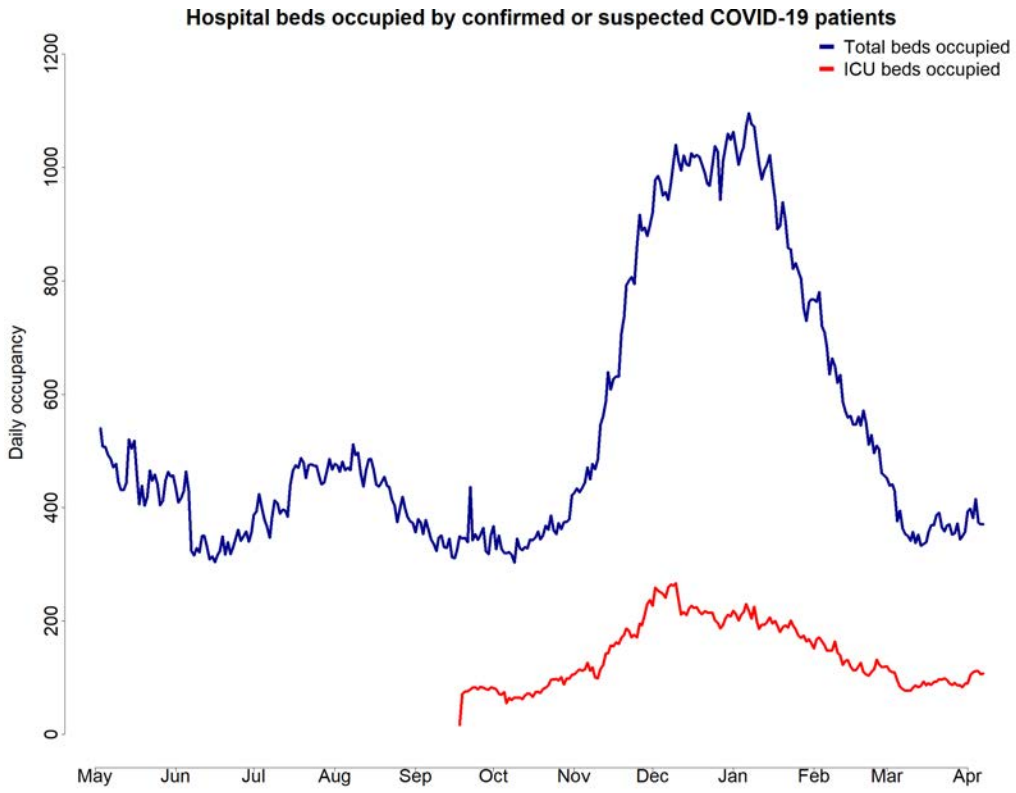


***Figure 9.*** *Total hospital beds and ICU beds occupied by confirmed or suspected COVID-19 patients reported through the WA Health system. Data collection for ICU beds occupied by COVID-19 patients started September 17. Hospital occupancy data has minimal reporting lag, and is shown here using data up to April 3. Both confirmed and suspected cases are included, rather than just confirmed cases, since this best reflects total resources being used. Note that bed occupancy would continue to increase for a period of time even if admissions plateau since patients being treated for COVID-19 generally stay in the hospital for several days.*

## *Implications for public health practice*

Several current data sources point to a worsening current situation statewide. Case counts in four of the five largest counties are increasing, and sharp increases in cases are evident among the younger age groups. Declines in hospital admissions have flattened, and more recent data shows signs of potential increases. Additionally, hospital admission rates among the oldest age groups have stopped declining, and are even showing signs of increasing among some younger age groups. $R_e$ has increased over the past two weeks, and declines in prevalence have flattened. In combination, these trends indicate that the state could be on the cusp of a fourth surge of disease, but the outlook is uncertain due to the continuing race between vaccination and the spread of more transmissible disease variants. Note, too, that future disease trends depend heavily on population behavior, especially continued social distancing and consistent use of masking.

Variants of Concern (VOC) continue to spread across Washington state. Washington state sequences between 5 and 10% of positive specimens, which ranks among the highest percent sequenced in the US. Currently, the B.1.1.7, B.1.427, and B.1.429 VOC comprise the greatest proportion of circulating variants in the state, and among these, the most significant threat is posed by B.1.1.7 due to its greater transmissibility and disease severity. While media reports have suggested B.1.1.7 is more transmissible among children than the ancestral strain of SARS-CoV-2, current scientific evidence for this is not conclusive. Of note, a recent surge in cases in British Columbia, that has impacted younger adult populations, is likely linked to spread of the P.1 VOC.

On a positive note, the rate of vaccination across Washington state has nearly doubled since late February: on February 23, the average number of doses administered daily was 31,203 and by April 3 has increased to 59,600. As of April 3, over 60% of the state's population aged 65 and over has been fully vaccinated, and 20% of the overall population has been fully vaccinated. However, nearly a quarter of the population over age 65 has yet to initiate vaccination, which points to a critical target population for further vaccine outreach.

Continued outreach to frontline workers, such as agricultural and food service workers, as well as other vulnerable populations remains critical to stem the spread of B.1.1.7 across the state. Investigating reasons for low vaccine uptake, including lack of transportation, challenges associated with booking appointments, and vaccine hesitancy is crucial to effective outreach. A recent poll has suggested that overall vaccine acceptance in Washington state is around 88% and has increased since December.

While vaccination is becoming more widespread across the state of Washington, it is critical to remember that the pandemic is not waning. Reducing a potential fourth surge of disease depends not only on vaccination but also on continued adherence to effective masking and social distancing, as well as unvaccinated or incompletely vaccinated people avoiding indoor gatherings.

## *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 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 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 April 4, and to hedge against delays in reporting, we analyze data as recent as March 25 across the state.** This relatively conservative hedge against lags is in response to reports of increasing test delays.
- Estimates of 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 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. The WA DoH wishes to thank IDM for their support in model development and implementation for this report, in particular, Dr. Niket Thakkar, PhD, of IDM, who developed and shared software and programming scripts and provided technical and scientific advice to the WA DoH. 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.
These reports were previously published on the IDM InfoHub. Going forward, as of December, 9, 2020, new reports will be published on the DOH website. IDM will continue to provide technical assistance for the reports, as part of this collaboration.