

# COVID-19 epidemic shifts younger while inequalities grow wider in Washington State

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## *What do we already know?*

COVID-19 cases have continued to grow in Washington State in June. However, the highest transmission areas within the state [have changed](#) over time. This may reflect changing age and racial demographics of the people most at risk for disease. This change has been observed in [other locations](#) around the country.

## *What does this report add?*

In this report, we use data from the [Washington Disease Reporting System](#) to examine the age and race of COVID-19 cases and deaths in Washington over time. **We found that cases have recently been shifting to younger age groups.** People under age 35 represented 22% of cases in January to March, and by May/June represented 46% of cases. Conversely, people over age 75 represented 16% of cases in March, and by May/June represented 6% of cases. **Cases are also increasingly concentrated in Hispanic people**, who, while making up 13% of Washington's population, have accounted for 58% of COVID-19 cases with known race and ethnicity since the beginning of May. **On a per-capita basis, non-Hispanic Native Hawaiian people or Other Pacific Islanders now have the highest risk of disease.**

**While the overall number of cases have recently been increasing, COVID-19 deaths have been decreasing. This is likely primarily driven by the caseload shifting to younger people**, who have a substantially lower COVID-19 mortality risk. Testing proportions by age have remained fairly consistent over time, which reinforces the conclusion of a true shift in the epidemic to a younger population.

## *What are the implications for public health practice?*

**Hispanic people and other people of color, particularly younger people, are at higher risk of infections for several reasons, including living in larger households, limited access to healthcare, and work providing essential services.** As the epidemic is moving more definitively into these populations, public health interventions need to be tailored specifically to these risk factors.

## Executive summary

As the COVID-19 epidemic has progressed in the United States, more states are reporting shifts in cases to younger people and more people of color. For example in Baltimore, the test positivity rate [for Latino patients was 42.6% compared to 8.8% rate for white patients](#). Similarly, in Minnesota, [Black, Asian and Hispanic residents run disproportionate risks](#) related to COVID-19. At the same time, nationwide, [young people are accounting for more COVID-19 infections](#).

In Washington state, cases have recently been shifting to younger age groups. People under age 35 represented 22% of cases in January to March, and by May/June represented 46% of cases. Conversely, people over age 75 represented 16% of cases in March, and by May/June represented 6% of cases. **A growing burden of cases is now concentrated in Hispanic people, who, while making up 13% of Washington's population, have accounted for 58% of COVID-19 cases with known race and ethnicity since the beginning of May.** As a proportion of population, Hispanics, Non-Hispanic Native Hawaiian or other Pacific Islanders (NHPI), and Non-Hispanic American Indian or Native Alaskans (AINA) in Washington state have large and growing epidemics. On a per capita basis, Hispanic people were 14 times more likely to become a case and NHPI were 17 times more likely to become a case compared to White people during May through June. **While there has been and should be a focus on the growing epidemic in the Hispanic community, it is important to note that per capita rates among NHPI has been even higher.**

This shift to younger age groups is likely due to several contributing factors. First, younger Hispanic people and other people of color may be at higher risk of infections [for several reasons](#), including living in [larger households](#), having poorer access to [healthcare](#), [working](#) in essential services, and having underlying [health conditions](#). Additionally, older people are more likely to strictly adhere to distancing guidelines because public health guidance has included people over age 65 as high-risk individuals who need to isolate more than others. In future reports, we aim to quantify the impact of these risk factors on the epidemiological dynamics of COVID-19 in Washington state. It is also conceivable that the epidemic has not changed, but testing patterns have shifted to capture more young and Hispanic people. However, **the distribution of tests by age has changed little over time**; therefore, this is likely not a major contributing factor to the observed case distribution.

**While the overall number of cases have recently been increasing, COVID-19 deaths have been decreasing. This is likely primarily driven by the caseload shifting to younger people, who have substantially lower mortality risk from COVID-19 infection.** The age distribution of testing has remained relatively constant while cases have shifted younger. This indicates the observed shift to younger ages is not primarily driven by an increase in testing. Finally, it is conceivable that the infection fatality rate is improving as hospital treatments for those with COVID-19 are improving. Because hospital capacity has been available in Washington throughout the epidemic, this is likely not a major driver. But the data do not rule out modest reductions in the infection fatality ratio due to increased understanding of clinical practice and availability of treatments.

**The groups with higher COVID-19 burden in June are largely the same groups that have been overburdened throughout the epidemic, but the disparities among groups are widening.** Unequal baseline risk in a subgroup exposed to a non-linear growth process will yield growing inequalities in outcomes. We are observing those growing inequalities now. The ability or inability to mitigate those risks over time is another form of inequality.

This report has many limitations as discussed below. Of key importance, we are dramatically oversimplifying both the categorization of race/ethnicity and the ways racism affects the health of the

diverse people in Washington. For data analysis purposes, we have categorized each person by a single mutually exclusive race/ethnicity category which aligns both with DOH and Census reporting. This overlooks the unique experiences of multi-racial people, as well as the diverse cultural backgrounds of people within a racial group. Additionally, many of the correlations and conclusions with race in this report are a result of a complex network of interactions between racism, health care, and economic opportunity that exist in Washington and throughout the US. We believe examining racial demographics of the epidemic is an important step towards understanding and informing strategies to mitigate risk of disease. However, these results should be considered in the context of the entire health system, which struggles with systemic racism.

## Key inputs, assumptions, and limitations of our approach

We used data provided by Washington State Department of Health through the [Washington Disease Reporting System](#) (WDRS) with information on age and race/ethnicity.

- Data compiled through June 21, 2020. For analyses that depend on the number of cases to be complete, we kept data through June 16th in order to hedge against delays in reporting.
- Of 28,617 total cases, race/ethnicity data was complete for 71.9%, and age data was complete for all but 34 cases.
- Of 1274 total deaths, race/ethnicity data was complete for 97.2%, and age data was complete for all deaths.
- Case rates as shown are crude, not age-adjusted.
- Date used was date of specimen collection.

We also use population estimates from the [2018 U.S. Census](#) by age and race/ethnicity at the state and county. We defined race/ethnicity according to the [Census definitions](#) of Hispanic, non-Hispanic White, non-Hispanic Black or African American, non-Hispanic American Indian or Alaska Native, non-Hispanic Asian, and non-Hispanic Native Hawaiian or Other Pacific Islander. In this report, we use language reflecting these categories though we recognize that many of these terms are not without drawbacks and fail to capture the nuance of race.

There are several limitations to the data sources and methods used in this analysis.

- Where population denominators are used, they likely underestimate the population in several groups. Of particular importance for this analysis, the population of seasonal and migratory workers, who tend to be Hispanic people in Washington, may be underestimated and therefore inflate per capita rates for Hispanic people.
- The WDRS data is missing race/ethnicity for 28.1% of cases and 2.8% of deaths. When comparing composition of cases and deaths by race, we assume these are missing at random and use cases or deaths with known race/ethnicity as the denominator.
- Most of the results we discuss are state-wide. Heterogeneity within the state is not well represented, and disparities may manifest differently in different regions of the state. This is especially true since, from April to June, case counts decreased substantially in the Puget Sound region (King, Snohomish, and Pierce counties) while they increased substantially Yakima and Benton-Franklin, trend upward in Spokane, and otherwise vary stochastically around the state.

- WDRS data are provided with race and ethnicity as a combined, mutually exclusive category. In this dataset, Hispanic people of all races are combined into one category. This means we are unable to examine racial differences within the overall group of Hispanic people, and we are unable to account for differences in individual experience due to multi-ethnicities or cultural backgrounds. This analysis represents a very coarse view, and it is important to understand that within these very broad racial categories there is significant heterogeneity among risk profiles.

## The COVID-19 epidemic in Washington has been moving toward younger people and more people of color

Overall in Washington, 10% of cases have been among people over age 75, compared to 8% among people age 65-74, 14% among people age 55-64, 16% among people age 45-54, 17% among people age 35-44, 28% among people age 18-35, and 6% among people under age 18. Of all cases, 31% have been among Hispanic people, 26% among non-Hispanic white people, 2% among non-Hispanic NHPI, 1% among non-Hispanic AIAN, 4% among non-Hispanic Black people, and 4% among non-Hispanic Asian people, and 3% among those identifying as non-Hispanic Multiracial or Other Race. 28% of cases were missing Race data.

When comparing these distributions to population distributions, it is clear there are substantial inequalities in the burden of COVID-19 cases across race and ethnicity in Washington state have been growing. These trends are summarized in Figure 1a, which compares relative burden -- cases relative to population representation in each group -- in the early period of the epidemic (January to March), in April, and to the most recent period May and June. A ratio of one for any given race/ethnicity grouping indicates a caseload in that group which is commensurate with the population in that group. Thus, a ratio higher than one indicates over-representation in caseload (more cases than expected based on population distribution) while a ratio of less than one indicates an under-representation in caseload relative to other groups (fewer cases than expected based on population distribution).

During the beginning of the epidemic, in the January to March time period, the distribution of cases was closer to the population distribution of the state, with no group showing a ratio of less than 0.5 or more than 1.5. However, even at the beginning of the epidemic, some inequality between groups was already observed, with increased cases for Hispanic people, non-Hispanic Native Hawaiian people or Other Pacific Islanders (NHPI), and non-Hispanic Black people, while non-Hispanic White people had a lower relative caseload (Figure 1a). Hispanic people, while making up 13% of Washington's population, have accounted for 58% of COVID-19 cases with known race and ethnicity since the beginning of May, compared to non-Hispanic White people, who account for 68% of Washington state's population and only 23% of the cases with known race since May. By May/June, non-Hispanic White people had a ratio as low as nearly 1/4, while Hispanic people and NHPI had ratios of greater than 4— and on a per capita basis, Hispanic people were 14 times more likely to become a case and NHPI were 17 times more likely to become a case compared to White people during May through June.

Non-Hispanic Asian people have shown a similar trajectory to non-Hispanic White people. Non-Hispanic Black people appeared to have an increasing relative caseload during April, but rates among this group

have declined in the most recent period. Despite this, during May and the first half of June (through June 16th) there were 131 cases per 100,000 among non-Hispanic Black people, and 39 per 100,000 among non-Hispanic White people. The recent decline in cases in Black people (Figure 2) is counter to [observed trends](#) in other parts of the country. This is largely driven by region: the majority of Black people in Washington state live in the Puget Sound region (King, Pierce and Snohomish county represent over 80% of Washington's Black residents). The downward trend in cases among Black people has mirrored [trends in these counties](#), implying that the reduction in cases has been positively affected by regional progress in reducing transmission.

Relative caseload has also been increasing among non-Hispanic American Indian or Alaska Natives (AIAN), and has increased from 0.5, the most under-represented caseload to above one in the most recent time period. Figure 2 shows these trends by race/ethnicity groupings in more granular detail. The epidemic has recently been large and growing among Hispanic, NHPI, and AIAN groups, while shrinking amongst all other groups. While there has been focus on the growing epidemic in the Hispanic community, it is important to note that per capita rates among NHPI has recently been even higher (531 per 100,000 and 670 per 100,000 respectively, during the period May 1 through June 16).

There has also been a marked shift in cases away from older to younger people. Figure 1b shows the same case-representativeness ratios for age groups. Very early in the epidemic, cases were much more concentrated in older individuals as testing was limited to the most severe cases. During March, those under 35, and particularly those under 18 (not shown; ratio of 0.05), were under-represented in the caseload burden. While under-18s are still highly under-represented with a ratio of 0.37 in May/June, those between 18 and 35 now have a ratio of 1.66 (Figure 1b). 35 to 54 year olds have also seen relatively increasing caseloads, while those older than 55 have seen a large relative decline in their caseloads in the months since the epidemic began.

### Change in relative burden of COVID-19 cases among racial/ethnic groups within communities in WA state

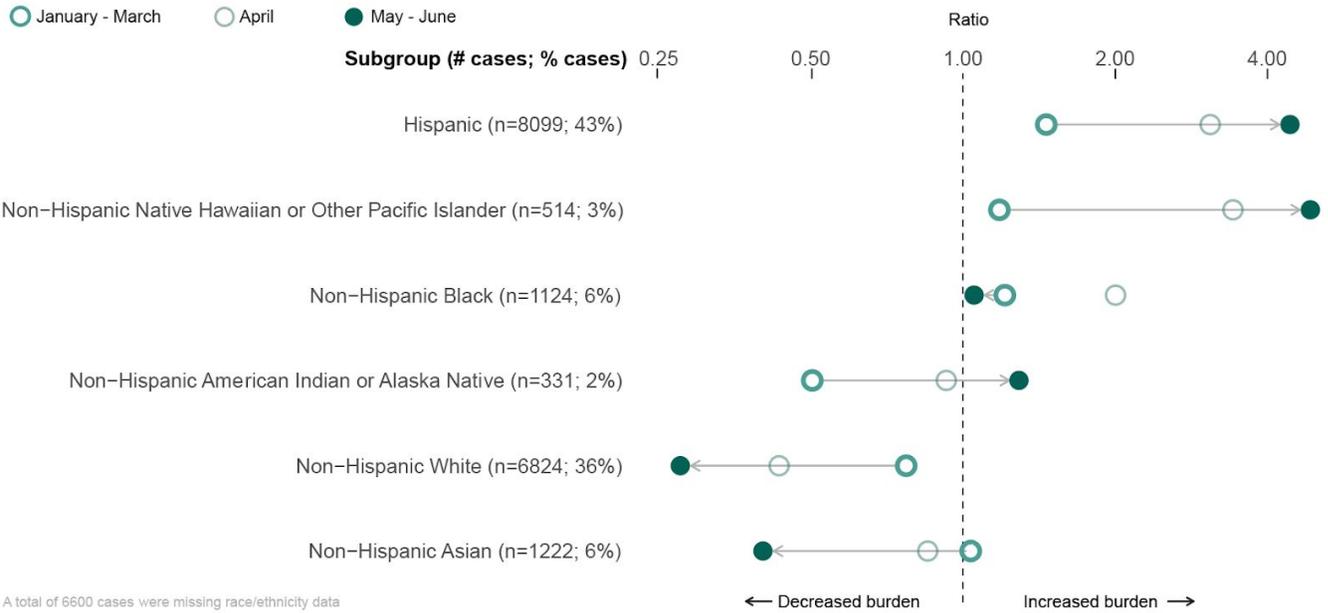


Figure 1a. Illustration of burden of COVID-19 among racial/ethnic groups in WA state relative to their representation in the state’s population over three time points. A ratio of 1 means the % of COVID-19 cases within a particular racial or ethnic subgroup is equal to racial and ethnic composition of WA state; a ratio of higher than 1 indicates more COVID-19 cases than expected for a subgroup, while a ratio less than 1 indicates fewer COVID-19 cases than expected for a subgroup.

### Change in relative burden of COVID-19 cases among age groups in WA state

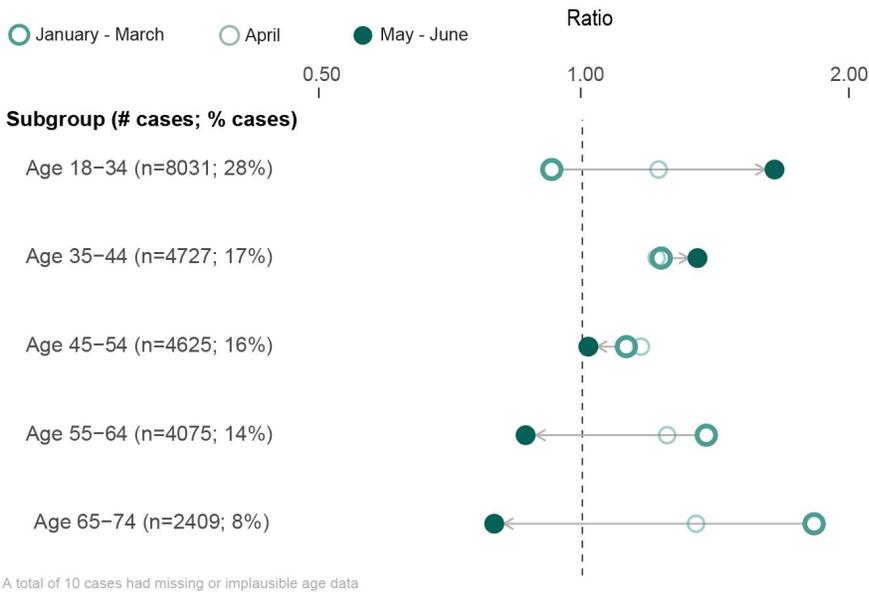


Figure 1b. Illustration of burden of COVID-19 among age groups in WA state relative to their representation in the state’s population over three time points. A ratio of 1 means the % of COVID-19 cases within a particular age bracket is equal to the age group’s composition of WA state; a ratio of higher than 1 indicates more COVID-19

cases than expected for a subgroup, while a ratio less than 1 indicates fewer COVID-19 cases than expected for a subgroup.

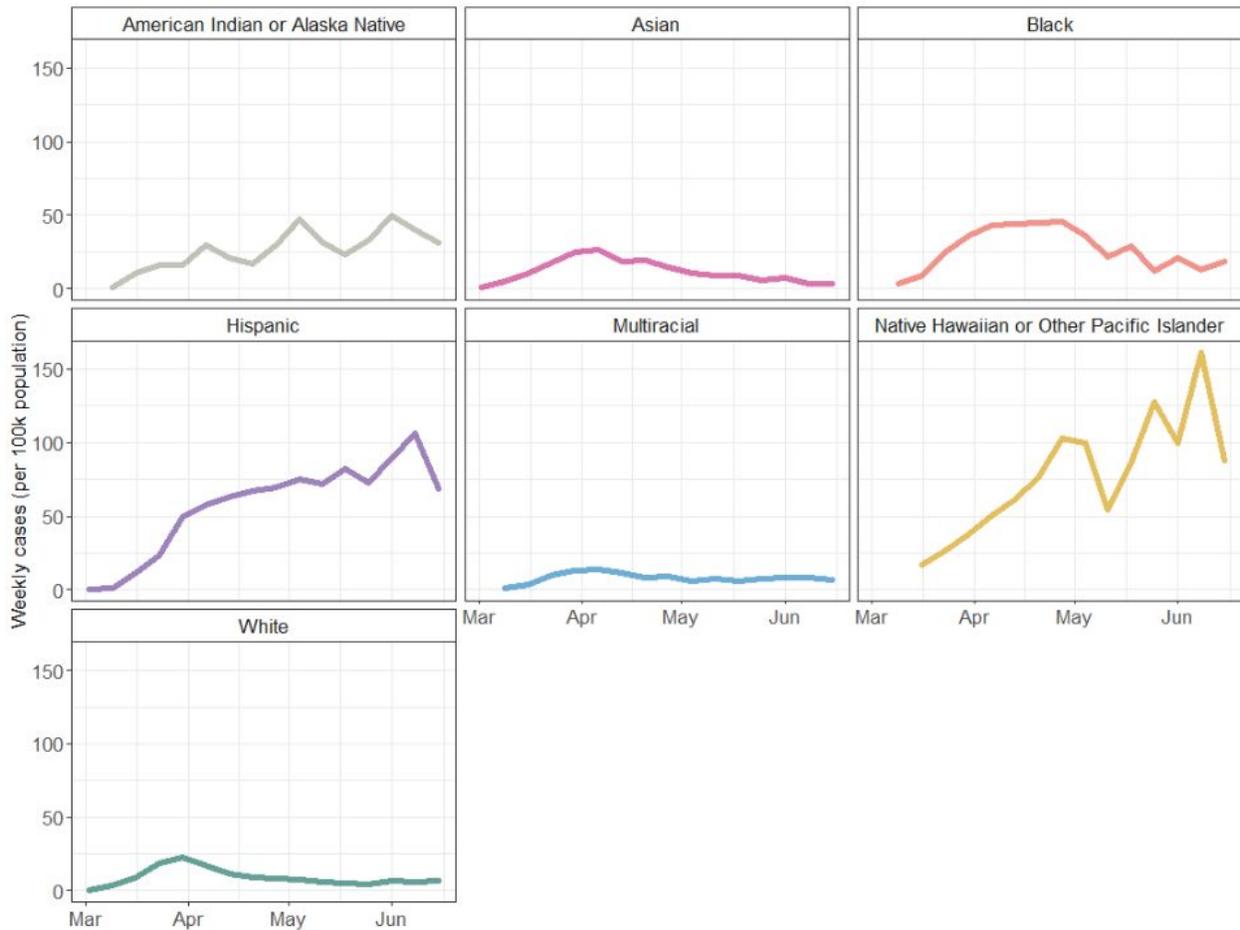


Figure 2: Weekly cases per capita over time for each race/ethnicity subgroup in Washington. Cases have recently been increasing for Hispanic people, American Indian or Alaskan Native people, and Native Hawaiian or other Pacific Islander people, while cases have been decreasing for White people, Asian people, Black people, and multiracial. All groups are mutually exclusive, such that all categories except for Hispanic are non-Hispanic ethnicity.

### **Burden has recently been growing fastest in younger Hispanic people, but age has been decreasing in all racial groups**

People under age 35 represented 22% of cases in January to March, and by May and June represented 46% of cases. Alternatively, people over age 75 represented 16% of cases in January to March, and by May/June represented 6% of cases. While cases have shifted younger among all race/ethnicity groupings, many of the new younger cases are those among Hispanic people (Figure 3). The shift toward younger cases is evident by the mass of the histogram moving leftward, both overall and within each racial group. Hispanic people now make up 58% of cases with known race/ethnicity (bars on the right of histograms, Figure 3). For Hispanic people and people of other non-White racial groups, cases have recently been increasing overall and shifting younger. For non-Hispanic White people, cases have

recently been shifting younger, but decreasing overall in number. It is important to note that about a third of cases are not associated with a known race/ethnicity grouping. Even if all the unknown cases are non-Hispanic White people, Hispanic people would still be significantly overrepresented in recent cases.



Figure 3. Case and death distributions across age for three time periods. Bars are colored by simplified race/ethnicity categories, showing Hispanic, non-Hispanic White, all others, and those with unknown race, allowing us to better understand the interaction between age and race. Distribution of population across Washington state population in the bottom panel. Bars on the right of each histogram show the marginal proportion of cases by race/ethnicity grouping, showing that these younger Hispanics now make up the majority of cases.

The shift toward younger ages is likely due to higher adherence to distancing recommendations among older people. People over age 65 have been categorized as high risk individuals and have been informed that distancing is more important for them than it may be for younger individuals. Additionally, we are likely seeing a shift toward Hispanic people and other people of color more broadly, and since these populations tend to be younger, this manifests in younger cases. These groups may be at higher risk of infections for [several reasons](#), including living in larger households, having poorer access to healthcare, working in “essential services”, having underlying health conditions that makes them a large at-risk community (diabetes, obesity, and high blood pressure), and being less likely to seek out medical assistance and only as a last resort. As an alternate interpretation, is it conceivable that the trend toward younger cases is reflective of improved testing. However, the top two panels of Figure 4 suggest that this is not the case, as the proportion of tests by age group has remained relatively steady in the past months, while the distribution of cases has skewed significantly younger.

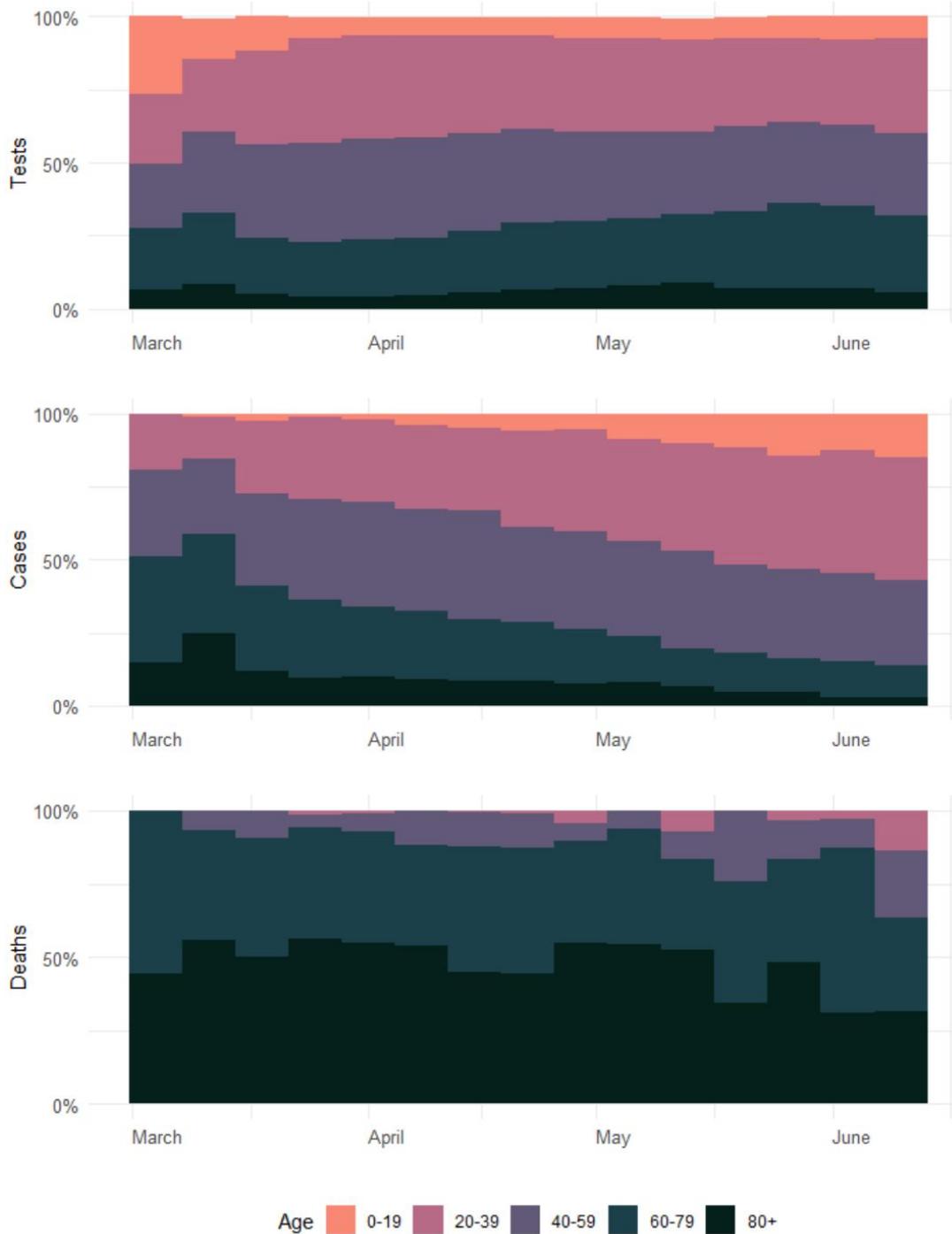


Figure 4. Proportions of COVID-19 tests (top), cases (middle), and deaths (bottom) in each age group from March through June. While the age distribution of tests has remained fairly consistent, the age distribution of cases has shifted significantly to younger age groups. The age distribution of deaths has also shifted slightly to younger age groups, though to a much lesser extent than cases.

## Cases have recently been increasing and shifting to younger age groups while deaths decrease

While the overall number of cases have recently been increasing, we are simultaneously seeing a decrease in the overall number of deaths (Figure 3). In January to March, there were 569 deaths with 53% people aged 80 and older, compared to 478 in April (49 % age 80+) and 227 in May-June (44 % age 80+). The racial distribution has changed slightly, with 74%, 69%, and 63 % non-Hispanic White people dying in January-March, April, and May-June, respectively (Figure 3). The age distribution, if anything, has shifted slightly younger, as shown in the bottom panel of Figure 4. The age distribution of deaths mirrors this trend in cases towards younger age groups (Figure 4), though the trend is much more modest.

The decrease in deaths both overall and relative to cases is likely due to the shift towards cases in a younger population. Young people are less likely to develop severe disease and die from the disease (in other words, have a lower infection-fatality ratio (IFR)), therefore as cases shift towards a younger population, we see a decrease in deaths even as cases increase. The much lower case fatality rate in younger people, combined with the delay from case reporting to death, means we would expect to see limited change in deaths as the epidemic shifts younger.

There are other potential explanations for this discrepancy in trends between cases and deaths. First, one can imagine that the true distribution of cases may not have changed, and we are only detecting more cases in the younger and more Hispanic population due to increased testing. As shown in the top panel of Figure 4, the proportion of tests by age is fairly consistent over time. This indicates that we are observing a true shift in the epidemic to a younger population, rather than just a shift in testing.

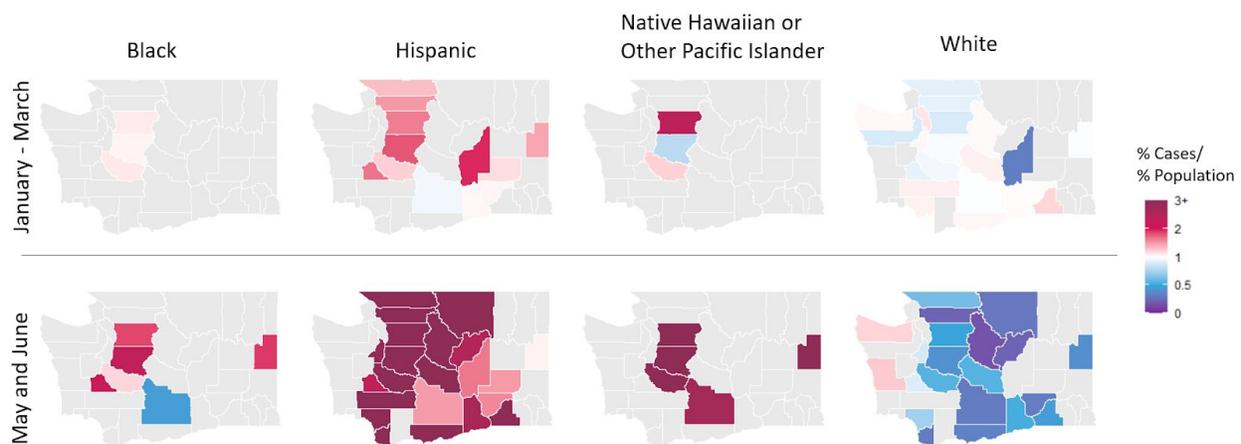
An alternative explanation may be that the IFR is improving over time due to better treatment options and clinical practice. This may be the case in particular for regions where hospital systems were overwhelmed and cases needing hospitalization exceeded capacity. In those locations, as cases decreased and a higher fraction of severe patients could receive supportive care, case fatality rates likely decreased. However, hospital capacity in Washington remained available throughout the epidemic, therefore this is unlikely a driver of decreasing mortality. It is also conceivable that infection fatality ratio has decreased due to increased understanding and availability of treatment options. There are no approved or highly effective therapies for severe COVID-19 at this time, but increased use of new treatment options such as [remdesvir](#) and [proning](#) may be improving fatality rates over time.

It's important to note that the trend of decreasing deaths is not definitive. It will not continue indefinitely if increasing incidence in younger ages drives increased transmission. This would certainly drive a resurgence of cases in older ages groups who are at higher risk of death.

## Increasing risk for people of color is consistent in most counties

As discussed above, the demographics of the epidemic have been shifting toward higher burden amongst people of color. This same trend exists within counties. For the Hispanic population, from the beginning of the epidemic through March, cases were overburdened relative to population size in

several counties (Figure 5, top left). For both Hispanic and non-Hispanic White populations, the ratio of percent of cases to percent of population remained closer to one during this early period. By May and June, the ratio of percent of cases to percent of population for Hispanic people was above 2.0 in 23 counties (of 28 with cases among Hispanic people), and the ratio of percent of cases to percent of population for non-Hispanic white people was below 0.5 in 17 counties (of 34 counties with cases among non-Hispanic Whites) (Figure 5, right). Similar patterns of increasing relative burden exist for non-Hispanic Black, American Indian or Alaska Native, and Native Hawaiian or Pacific Islander populations, and Asian populations (not shown) are showing similarly decreased burden to non-Hispanic Whites. This demonstrates that the shift to overburdened populations of people of color and under-burdened non-Hispanic White and Asian populations has been observed almost ubiquitously statewide.



*Figure 5. In each county, the ratio of percent of cases among race/ethnicity groups divided by the percent of the population in each group. A ratio of one implies that the caseload is commensurate with the population in that group. Thus, a ratio higher than one represents over-representation in caseload (more cases than expected based on population distribution) while a ratio of less than one represents an under-representation in caseload (fewer cases than expected based on population distribution). In January-March (left) we see ratios in many counties close to 1. In May-June (right), we see ratios much higher than 1 for Hispanic people in most counties, and ratios much lower than one for non-Hispanic White people in most counties. Counties with 5 or fewer cases for each group during the time period are masked (grey).*

## Shift in racial demographics of cases is representing other sociodemographic factors

We have focused above on disparities in case burden by race/ethnicity and age groups. However, it is important to recognize that race/ethnicity is highly correlated with socioeconomic status, employment, or other demographic factors. For example, we know that Hispanic people are more likely to be employed in positions that can not be done [from home](#), therefore necessarily putting themselves at higher risk for transmission, while also being [disproportionately uninsured](#), and therefore having less access to health care.

We cannot determine race/ethnicity trends in testing directly from test data, because the race of people who test negative is generally not recorded. However, we are able to look at testing trends overall by

examining trends in testing facilities that we believe represent different subpopulations. We are able to see this, for example, in King County, when we look at the types of testing facilities where people are being diagnosed (Figure 6). We have recently been seeing test positivity rates drop more slowly in community health centers, which offer lower cost services and may serve communities with higher proportions of Hispanic, Asian, and Black people.

As we think about how and where to reach populations at higher risk of disease with mitigation interventions, these clinic locations can be a starting point. As our work continues, we will focus on these at-risk populations to identify which types of risks may be increasing transmission.

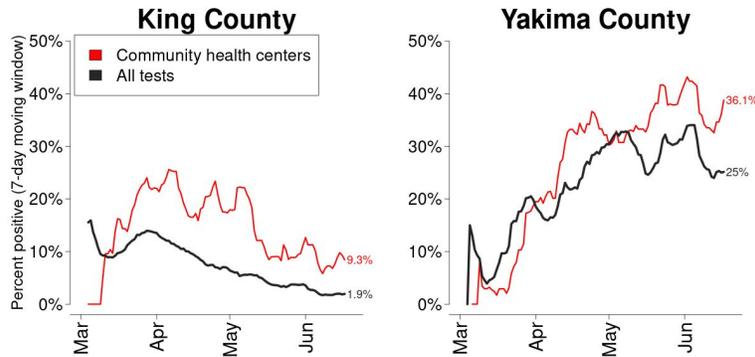


Figure 6. Percent of tests that are positive in King and Yakima Counties. The black lines summarize all tests in the county, and the red lines include only tests from community health clinics. In King County, the community health clinics that reported the most testing are Sea Mar Community Health Centers, Neighborcare Health, HealthPoint, and ICHS (not in order), while in Yakima the clinics with the largest number of tests are Yakima Neighborhood Health Services and the Yakima Valley Farm Workers Clinic.

## Conclusions

As the COVID-19 epidemic has progressed in Washington, younger people have recently been representing more and more of the burden of cases. Very early in the epidemic, cases were much more concentrated in older individuals as testing was limited to the most severe cases. During March, those under 35, and particularly under-18, were under-represented in the caseload. While under-18s are still highly under-represented, those under age 35 now represent 46% of the cases while those over age 75 represent only 6% of cases. While the average age of COVID-19 cases have decreased in all racial groups, there has been a particularly high and growing burden among younger Hispanic people and NHPI. **On a per capita basis, Hispanic people were 14 times more likely to become a case and NHPI were 17 times more likely to become a case compared to White people in May/June.**

This shift in the demographics of the COVID-19 case burden likely reflects several underlying drivers in combination. First, younger Hispanic people and other people of color likely have increased risk of transmission for several reasons, including living in larger households, having poorer access to healthcare, working essential services, and having underlying health conditions. Second, older people are more likely [than young people](#) to strictly adhere to distancing guidelines. It is conceivable that this shift was driven by increased testing in younger people, but trends in age groups of testing over time demonstrates little change, indicating this is unlikely to be a driver of demographic shift in the epidemic.

The groups with higher COVID-19 burden in June are largely the same groups that have been overburdened throughout the epidemic, but the **disparities among groups are widening**. Unequal

baseline risk in a subgroup exposed to a non-linear growth process will yield growing inequalities in outcomes. We are observing those growing inequalities now. The ability or lack thereof to mitigate those risks over time is another form of inequality.

As the COVID-19 epidemic continues in Washington, it's important to look closely at who is at risk for disease. As we see growing risk in communities of color, we need to identify the factors that place these individuals at higher risk, such as employment and housing settings, so that we can prioritize mitigation interventions accordingly. Public health practitioners should use this information to focus on how to effectively communicate with and aid specific populations. As case counts grow in communities of color, this epidemic is magnifying the existing disparities in health and healthcare overall in the U.S. People of color tend to be at [higher risk](#) for acute and chronic disease and have shorter life expectancies. Although public health researchers have described these disparities and their basis in systemic racism for decades, the COVID-19 epidemic is acutely exposing these issues and bringing them to the forefront of public policy to an extent we have not seen in the past. Public health responses can themselves shape epidemics in ways that exacerbate inequalities. As this epidemic progresses, measures must be formulated with *equity* in mind—sensitive to [needs](#) and abilities of those at most risk. The acute needs of people of color to address COVID-19 risks gives us an opportunity to decrease systematic barriers to health and racism in the healthcare system. Now is the time to capitalize on the resources being marshaled to address the pandemic in a way that improves the health of people of color in Washington state now and into the future.