



Anticipating COVID-19 Vaccination Challenges through Flu Vaccination Patterns

Disparities in flu vaccination rates highlight communities at risk of falling through the cracks

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SUMMARY

This brief analyzes adult flu vaccination rates for California and the United States, serving as a proxy to anticipate the challenges faced by a widespread COVID-19 vaccination campaign. To identify disparities, it examines differences across demographics and measures of health and health care access.

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Introduction

More than a year after the emergence of novel coronavirus SARS-CoV-2, the world continues to grapple with the devastating toll. In the United States alone, hundreds of thousands have died of coronavirus disease 2019 (COVID-19), and millions more have been sickened by the virus.¹ The ensuing crisis also has spread beyond the immediate health impact, causing tens of millions of job losses, shuttering schools across dozens of states, and imposing myriad other consequences.²

Since the early days of the pandemic, conventional wisdom held that vaccination against the coronavirus offered the greatest prospect for ending the crisis. Medical researchers around the globe have worked at breakneck pace to develop vaccines in record time. Even after approval of the first safe and effective vaccines, the challenges of implementing a massive national vaccination campaign will be daunting. In the U.S., the success of a largescale vaccination program faces substantial hurdles, including vaccine skepticism and distrust of the health care system. However, the nation's experience with existing vaccines can provide clues about the challenges to a widespread COVID-19 vaccination program.

Using data from the U.S. Centers for Disease Control and Prevention's (CDC) Behavioral Risk Factor Surveillance System (BRFSS) survey, this issue brief analyzes flu vaccination rates among California and U.S. adults (age 18 and older) as a proxy to identify population subgroups that may be harder to reach with a COVID-19 vaccine. The analysis examines findings by key demographics and measures of health and health care access.³

Background

While vaccines can protect individuals from infectious diseases, the ability for vaccination to end the COVID-19 pandemic hinges on the concept of population immunity (also known as "herd immunity"). To reach population immunity, a sufficient share of the population must be vaccinated or otherwise immune (e.g., through prior infection), denying a virus or other pathogen the ability to effectively spread from person to person.

While the exact vaccination rate to achieve population immunity against COVID-19 is not yet clear, experts generally anticipate needing an immunity rate of 70 percent or more in order to end the pandemic.⁴ Achieving that 70 percent rate among the U.S. population through vaccination alone would require vaccinating more than 230 million people, including about 180 million adults.⁵ In California, that minimum 70 percent rate in the state's population of roughly 40 million would equate to nearly 28 million people, including almost 22 million adults.⁶

During the pandemic, various surveys have found substantial skepticism and hesitance to obtain a hypothetical COVID-19 vaccine. For example, one survey conducted by the Pew Research Center in September 2020 found that only 51 percent of people would "definitely" or "probably" get a vaccine, while 49 percent would "definitely" or "probably" not get a vaccine.⁷

And those rates sometimes varied widely across demographic groups. For instance, Asians reported the highest rate willingness to be vaccinated, with 72 percent reporting they would definitely or probably get a vaccine, while Blacks reported the lowest willingness to be vaccinated, at 32 percent.

Another serious challenge to conducting a rapid, widespread vaccination campaign is the fact that many people in the U.S. have weak ties to the health care system that will be responsible for dispensing a COVID-19 vaccine. For instance, with an uninsurance rate of 9.2 percent in 2019, the U.S. had nearly 30 million people without health insurance, including more than 25 million adults.⁸ The challenges of vaccinating the uninsured will vary widely across the states, however. With its determined implementation of the Affordable Care Act's coverage expansions, California had a lower uninsurance rate of 7.7 percent in 2019—still about 3 million people, including more than 2.6 million adults.⁹ However, some states face even greater hurdles in vaccinating many people without close ties to the health care system, with state uninsurance rates reaching as high as 18.4 percent in Texas.¹⁰

It is unclear how many people who voice reluctance may ultimately accept a vaccine when actually presented with the opportunity, and how successful efforts to reach people without strong existing ties to the health care system may ultimately be. But the United States' experience with existing vaccines, such as the flu vaccine, can provide clues to the anticipated challenges of a widespread COVID-19 vaccination scheme.

While not perfect, flu vaccination rates may provide the closest proxy for understanding the difficulties facing a vaccination program to inoculate as much of the U.S. population as possible against COVID-19. Most modern vaccines are provided primarily to children—such as vaccines against polio; diphtheria, tetanus and pertussis; and measles, mumps and rubella—but the influenza vaccine is aimed at both children and adults, and the U.S. Centers for Disease Control and Prevention (CDC) recommends the vaccine for nearly everyone at least 6 months old, including the same adults who will need a COVID-19 vaccine.¹¹

Key Findings

This issue brief examined flu vaccination rates across multiple years for adults from the 50 states and the District of Columbia, including by several demographic categories and by indicators of health and health care access for California and the U.S. Among the key findings were:

CHALLENGE IN ACHIEVING POPULATION IMMUNITY

Flu vaccination rates consistently fall far short of the minimum anticipated rate (i.e., 70 percent) expected to be needed to reach population immunity against COVID-19, illustrating the need for any COVID-19 vaccination program to dramatically outperform flu vaccination efforts.

The overall U.S. adult flu vaccination rate was only 38.7 percent, roughly half the anticipated minimum rate for population immunity.

Even the highest observed flu vaccination rate—59.1 percent among U.S. elderly—fell short of the minimum 70 percent population immunity target.

AMONG THE STATES

Flu vaccination rates ranged significantly across the states, from a high of 45.4 percent in North Carolina to a low of 32.7 percent in Nevada.

California's flu vaccination rate was 37.7 percent, which was significantly lower than the U.S. rate of 38.7 percent and the 18th lowest among the states.

Across subgroups, California generally tracked the same patterns at the U.S. However, like the total population rate, California subgroup vaccination rates were sometimes significantly lower than U.S. counterpart rates.

BY DEMOGRAPHICS

In California and the U.S., the highest flu vaccination rates were found among Asian and Pacific Islanders, and Whites. American Indians and Alaska Natives, Blacks, and Latinos had the lowest rates.

Flu vaccination rates ranged widely by age, with younger adults (age 18-39) reporting only half the rate of elderly adults (age 65 and older).

Vaccination rates increased with income, such that people with the lowest incomes (less than \$25,000) reported the lowest flu vaccination rates, while those with the highest incomes (\$75,000 or more) reported the highest rates.

BY HEALTH AND HEALTH CARE ACCESS

People with a chronic health condition reported higher rates of flu vaccination (about half of these people) than those without a chronic condition (about one-third of these people).

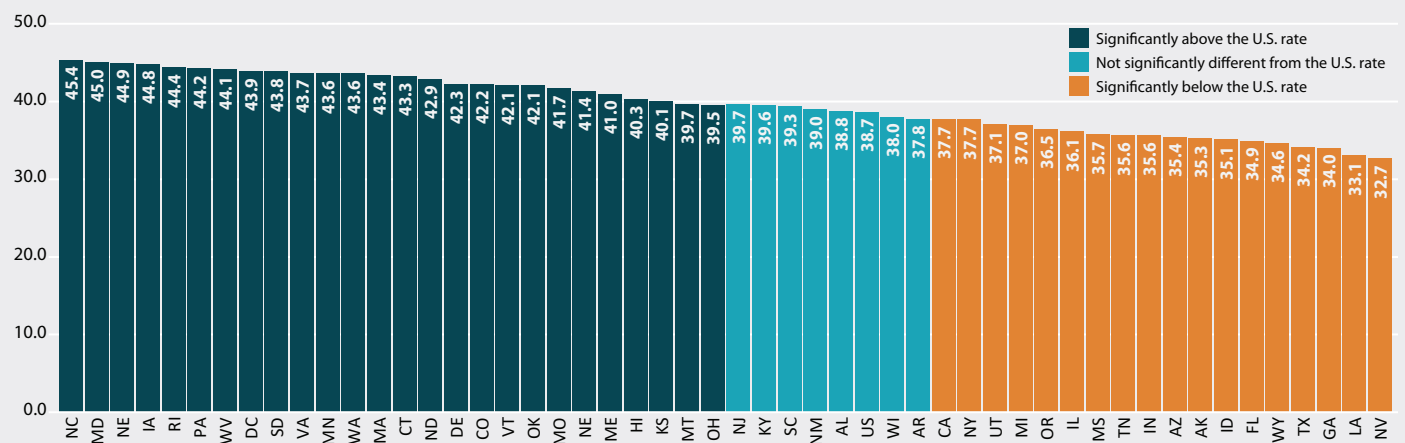
Flu vaccination rates among the uninsured were less than half the rate among people with health insurance.

Most children received an annual flu vaccine in recent years, with a rate of approximately 63 percent for the 2018-2019 flu season, according to CDC estimates.¹² But those same annual data consistently show that less than half of adults get vaccinated against flu, with a rate of about 45 percent for the 2018-2019 flu season—far less than the anticipated necessary threshold for achieving population immunity against COVID-19. Our analysis will delve deeper into this issue, illustrating that flu vaccination rates fall short of the levels expected to be needed in order to end the coronavirus pandemic across every state and every subgroup—even those with the highest flu vaccination rates, such as the elderly.

Flu vaccination by state

At the U.S. level, 38.7 percent of adults (age 18 and older) reported having received a flu vaccine during the three-year time period we examined. However, state flu vaccination rates ranged from a low of 32.7 percent in Nevada to a high of 45.4 percent in North Carolina (Figure 1).

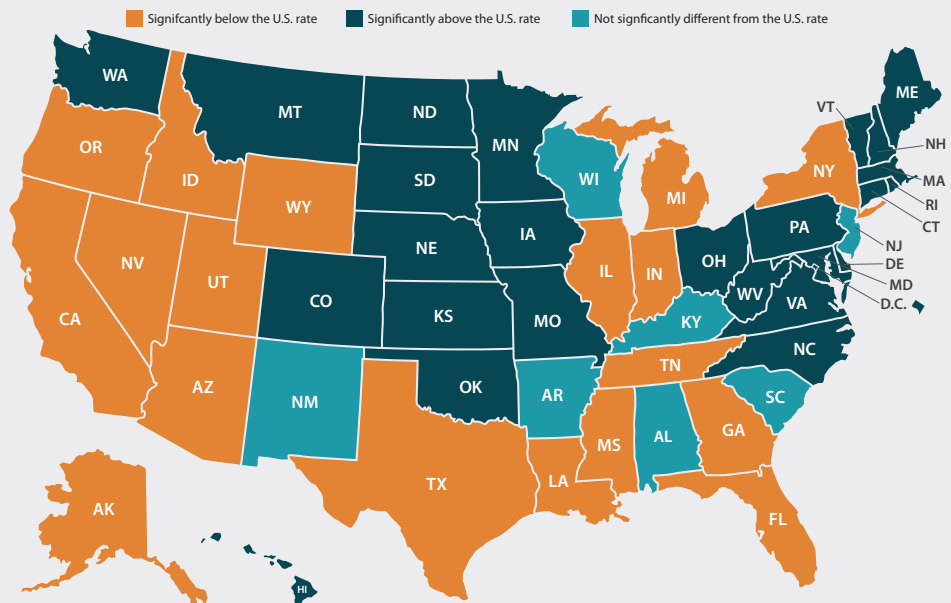
Figure 1. U.S. Adult flu vaccination rates by state



Source: SHADAC analysis of 2017-2019 Behavior Risk Factor Surveillance System (BRFSS) data.

In California, 37.7 percent of adults reported receiving a flu vaccine, which was the 18th lowest vaccination rate among the states. While California’s flu vaccination rate was only one percentage point lower than the U.S. rate of 38.7 percent, that difference was statistically significant. A map of state flu vaccination rates for adults shows that each of California’s bordering states also have rates significantly lower than the U.S., including Nevada at 32.7 percent, Arizona at 35.4 percent and Oregon at 36.5 percent (Figure 2).

Figure 2. Adult flu vaccination rates, state compared to U.S.



Source: SHADAC analysis of 2017-2019 Behavioral Risk Factor Surveillance System (BRFSS) Data.

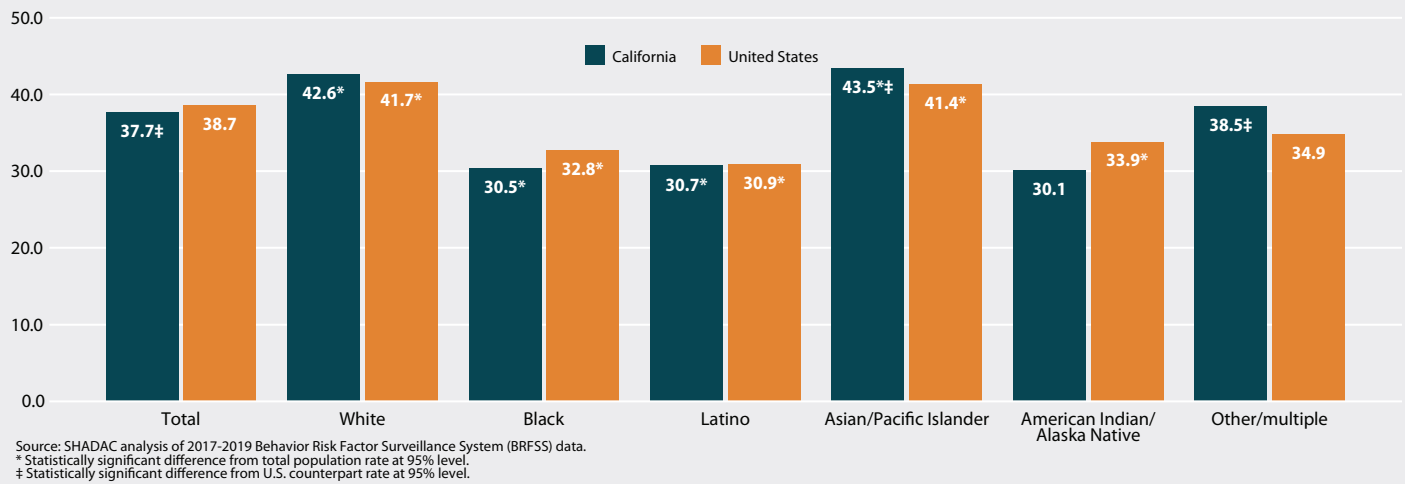
Flu vaccination by race/ethnicity

Examining adult flu vaccine rates by race and ethnicity highlights a clear pattern in both the U.S. and California: Higher vaccination rates are found among Asians and Pacific Islanders, and Whites; while American Indians and Alaska Natives, Blacks, and Latinos report lower vaccination rates. This is especially concerning due to data that show, nationally and in California, groups with low flu vaccination rates (e.g., Blacks and Latinos) have experienced a disproportionate burden of COVID-19, such as higher rates of positive tests and higher death rates.^{13,14}

In California and the United States, American Indians and Alaska Native, Black, and Latino adults reported the lowest flu vaccination rates.

In California, Asians and Pacific Islanders reported the highest flu vaccination rate, at 43.5 percent, and Whites reported the second-highest rate, at 42.6 percent (Figure 3). Both rates were significantly higher than California’s total population rate of 37.7 percent. Blacks and Latinos reported similarly low flu vaccination rates, at 30.5 percent and 30.7 percent, respectively—both of which were significantly lower than the state’s total population rate.

Figure 3. Adult flu vaccination rates by race/ethnicity, California and U.S.



American Indians and Alaska Natives reported the lowest flu vaccination rate, at 30.1 percent, although their rate wasn’t significantly different than California’s total population rate. People reporting other or multiple races reported a flu vaccination rate of 38.5 percent, which also was not significantly different from the state’s total population rate.

The U.S. generally mirrored the same pattern as California. Asian and Pacific Islanders, and Whites reported the highest vaccination rates, at 41.4 percent and 41.7 percent, which were significantly higher than the total population rate of 38.7 percent. Blacks and Latinos again had among the lowest vaccination rates for the U.S., at 32.8 percent and 30.9 percent, respectively, which were significantly lower than the total population rate.

Like in California, the U.S. flu vaccination rate for American Indians and Alaska Natives was among the lowest, at 33.9 percent. In the case of the U.S., that lower rate for American Indians and Alaska Natives was significantly different from the total population rate. But unlike California, U.S. adults reporting multiple or other races reported one of the lowest flu vaccine rates, which was significantly lower than the total population rate at 34.9 percent.

These disparities in flu vaccination rates likely reflect multiple factors, particularly inequitable access to health care, and trust in the health care system may also play a key role.¹⁵ Multiple recent surveys have found that Blacks and Latinos are less likely to trust in the safety of a vaccine or be willing to receive it.¹⁶ That includes preliminary results from the California Health Interview Survey (CHIS), which reports higher rates of hesitance to receive a COVID-19 vaccine by Black and Latino residents of the state.¹⁷

Commonly cited reasons for distrust of a potential COVID-19 vaccine are historical and contemporary experiences of abuse and discrimination by the health care system. For instance, the U.S. Public Health Service conducted the notorious “Tuskegee Study of Untreated Syphilis in the Negro Male” over multiple decades during the 20th century, withholding treatment for syphilis from hundreds of Black men without their knowledge or consent.^{18,19}

In recent years, studies have documented continued experiences of pervasive discrimination and maltreatment, such as racial bias in health care professionals’ treatment of pain for Black people, and negative health outcomes, including persistently higher pregnancy-related death rates among American Indian and Alaska Native women and Black women.^{20,21,22,23} Because of experientially and historically grounded skepticism of health care, achieving effective COVID-19 vaccination rates among racial and ethnic groups with low flu vaccination rates will require developing newfound trust.

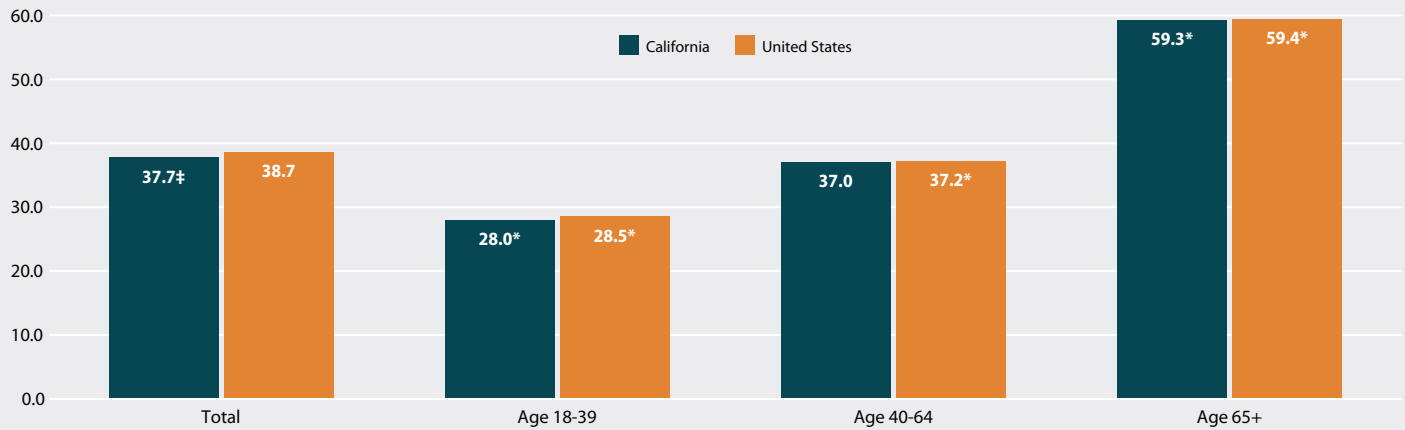
Flu vaccination by age

Among adults, both California and the U.S. reflect identical patterns in flu vaccination rates: Younger adults report the lowest flu vaccination rates, and rates of vaccination increase with age. Among elderly adults, most report having been vaccinated against flu. In some ways, this pattern could be encouraging because those at greatest risk for death or other complications from COVID-19 appear more apt to get a vaccine.^{24,25} However, it also reinforces concerns that younger adults, who are a lower risk for serious complications from COVID-19, may shun a vaccine—harming overall efforts to achieve population immunity.

Though elderly adults’ flu vaccination rates were double those of younger adults, they still fall short of COVID-19 vaccine targets.

In California, 28.0 percent of younger adults age 18-39 report being vaccinated for flu, which is significantly lower than the state’s total population rate of 37.7 percent (Figure 4). Among California adults age 40-64, 37.0 percent reported being vaccinated against flu, which was not significantly different from the total population rate. Elderly Californians, meanwhile, reported the highest rate of flu vaccination, at 59.3 percent, which was significantly higher than the total population rate.

Figure 4. Adult flu vaccination rates by age, California and U.S.



Source: SHADAC analysis of 2017-2019 Behavior Risk Factor Surveillance System (BRFSS) data.
 * Statistically significant difference from total population rate at 95% level.
 ‡ Statistically significant difference from U.S. counterpart rate at 95% level.

The U.S. rates of flu vaccination by age were nearly identical to the California rates. At 28.5 percent, younger adults age 18-39 had the lowest flu vaccination rate, which was significantly lower than the total U.S. population rate of 38.7 percent. Adults age 40-64 reported a rate of 37.2 percent, which was slightly but still significantly lower than the total U.S. population rate. Elderly adults in the U.S. again reported the highest flu vaccination rate, at 59.4 percent, which was significantly higher than the total population rate.

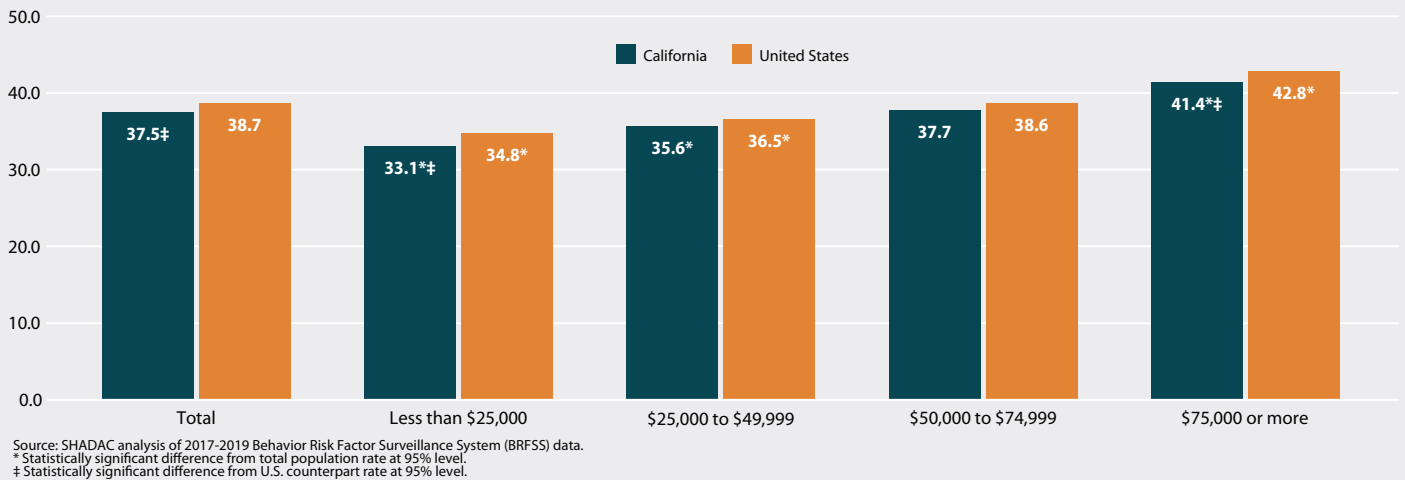
Flu vaccination by income

In both California and the U.S., flu vaccination rates increased along with income, such that people with the lowest incomes (below \$25,000) also reported the lowest flu vaccination rates, while people with the highest incomes (\$75,000 or more) reported the highest vaccination rates. There is common concern that the health of people with lower incomes could be at greater risk during the pandemic due to numerous factors, such as having “essential” jobs (e.g., grocery store clerks, food production, etc.) that require them to risk potential exposure, and facing greater barriers to health care. Evidence also suggests that individuals and communities with lower incomes may experience a greater health burden from COVID-19.^{26,27,28,29,30,31,32,33,34} The findings in this analysis again suggest that people at potentially higher risk for disease and serious health consequences—those with lower incomes, in this case—may simultaneously be more difficult to reach through a COVID-19 vaccination effort.

In California, 33.1 percent of adults with incomes less than \$25,000 reported being vaccinated against flu, which was significantly lower than the rate for the total California population of 37.5 percent (Figure 5).³⁵ Adults with slightly higher incomes of \$25,000 to \$49,999 also reported a flu vaccination rate (35.6 percent) that was significantly lower than the total population rate. By contrast, California adults with incomes of \$75,000 or more reported a flu vaccination rate of 41.4 percent, which was significantly higher than the total population rate. Those with incomes \$50,000 to \$74,999 reported a flu vaccination rate of 37.7 percent, which was not significantly different than the total population rate.

The pattern of flu vaccination rates by income for the U.S. was similar to California's. Adults with incomes less than \$25,000 reported the lowest flu vaccination rate (34.8 percent), followed by those with slightly higher incomes of \$25,000 to \$49,999 (36.5 percent), both of which were significantly lower than the total U.S. population rate of 38.7 percent. Adults with incomes of \$50,000 to \$74,999 reported a flu vaccination rate of 38.6 percent, which was not significantly different from the total population rate. Adults with the highest incomes of \$75,000 or more, also reported the highest flu vaccination rate (42.8 percent), which was significantly higher than the total population rate.

Figure 5. Adult flu vaccination rates by income, California and U.S.

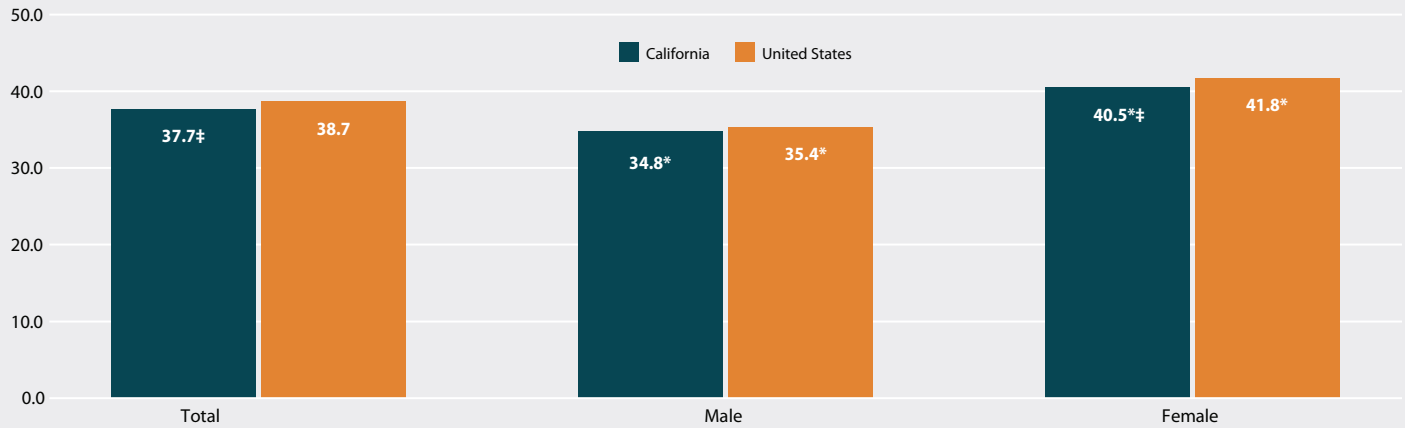


Flu vaccination by gender

Data for both the U.S. and California show that females and males have roughly similar rates of COVID-19 diagnoses, but males are disproportionately likely to die from the disease.^{36,37} The findings from our analysis seem to compound this challenge, with males reporting flu vaccination rates that are lower than their female counterparts.

For both California and the U.S., females had higher flu vaccination rates than males. In California, males reported a flu vaccination rate of 34.8 percent, which was significantly lower than the total California population rate of 37.7 percent, while females' rate of 40.5 percent was significantly higher than the total population rate (Figure 6). In the U.S., males reported a flu vaccination rate of 35.4 percent, which was significantly lower than the total U.S. population rate, while females' rate of 41.8 percent was significantly higher than the total population rate.

Figure 6. Adult flu vaccination rates by gender, California and U.S.



Source: SHADAC analysis of 2017-2019 Behavior Risk Factor Surveillance System (BRFSS) data.
 * Statistically significant difference from total population rate at 95% level.
 ‡ Statistically significant difference from U.S. counterpart rate at 95% level.

Flu vaccination by health insurance coverage

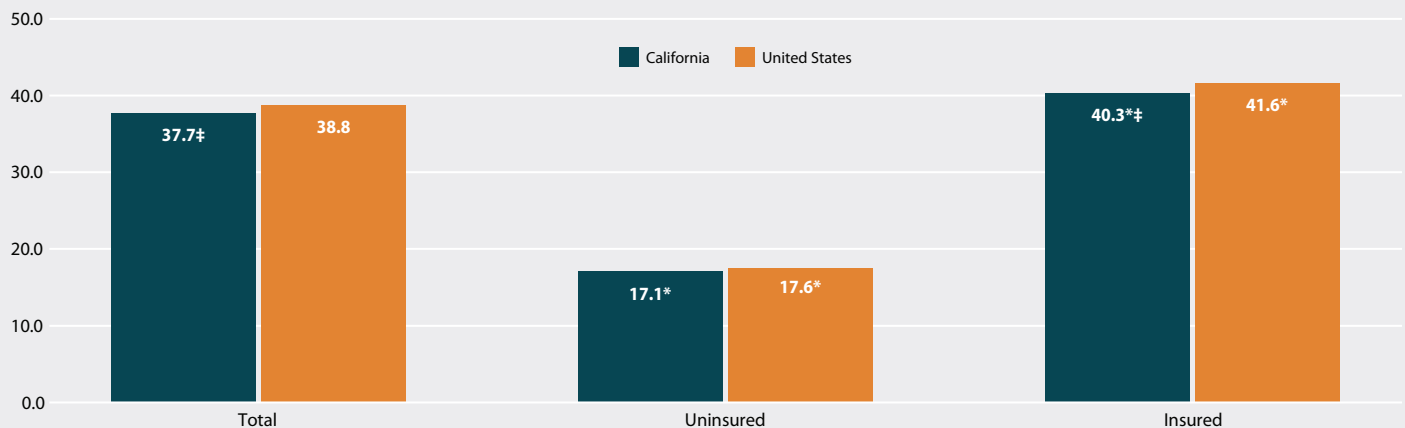
While the prior sections examined variation in flu vaccination rates across demographic groups, the following sections look at differences in vaccination rates by two characteristics that specifically relate to people’s health and health care access. Beginning with health insurance coverage, our analysis found that California and U.S. flu vaccination rates among those with insurance were more than double the rates among the uninsured.

Flu vaccination rates among California and U.S. adults with health insurance were more than double the rates for the uninsured.

In California, 17.1 percent of uninsured adults reported getting a flu vaccine, which was significantly lower than the total California population rate of 37.7 percent (Figure 7). Among adults with health insurance, 40.3 percent reported having a flu vaccination, which was significantly higher than the total population.

The pattern was similar for the U.S., with 17.6 percent of uninsured adults reporting a flu vaccination, which was significantly lower than the total U.S. population rate. Among U.S. adults with health insurance, 41.6 percent reported having a flu vaccine, which was significantly higher than the total population rate.

Figure 7. Adult flu vaccination rates by health insurance coverage, California and U.S.



Source: SHADAC analysis of 2017-2019 Behavior Risk Factor Surveillance System (BRFSS) data.
 * Statistically significant difference from total population rate at 95% level.
 ‡ Statistically significant difference from U.S. counterpart rate at 95% level.

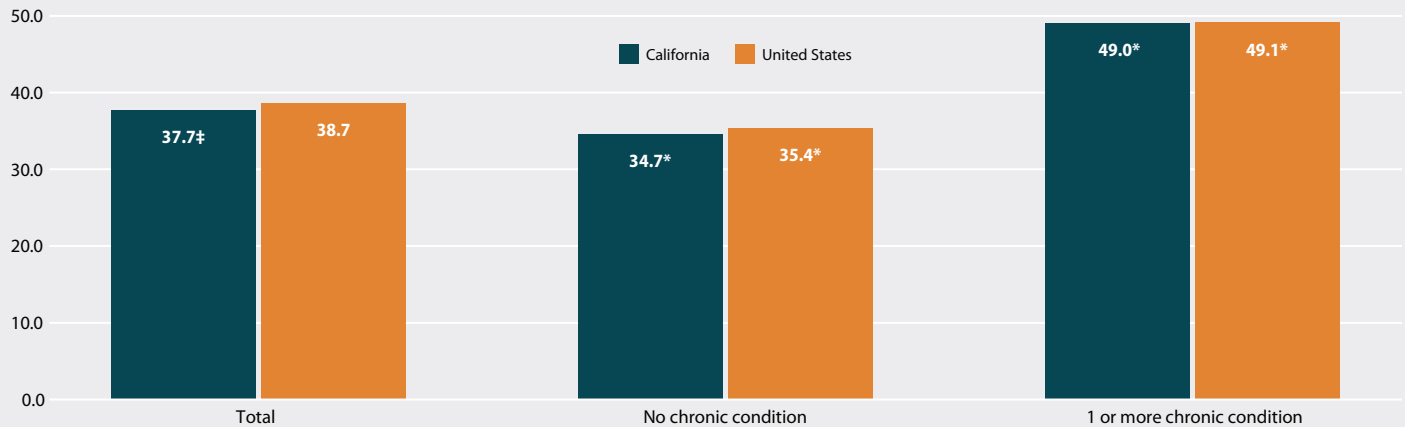
Flu vaccination by chronic health conditions

Our analysis also examined flu vaccination rates by whether or not individuals reported having a chronic health condition, such as diabetes, cardiovascular disease and asthma. This measure is important for multiple reasons. First, people with chronic health conditions have a higher risk of death or serious complications if they develop COVID-19, so vaccination of these individuals is particularly important.³⁸ Second, having a chronic health condition serves as another proxy measure for individuals’ connections to the health care system, since people with chronic health conditions typically require regular, ongoing medical attention to manage their conditions.

In California and the U.S., flu vaccination patterns by whether or not people had chronic health conditions were the same: Adults with chronic health conditions were significantly more likely to report having a flu vaccination than the total population, while flu vaccination rates for people without chronic health conditions were slightly but significantly lower than the total population.

For California, roughly half of adults with chronic health conditions reported having a flu vaccination (49.0 percent), which was significantly higher than California’s total population rate of 37.7 percent (Figure 8). In contrast, only 34.7 percent of California adults without a chronic condition reported being vaccinated against flu, which was significantly lower than the total population rate. The pattern was essentially identical for the U.S., with 49.1 percent of adults with chronic health conditions reporting a flu vaccination, while 35.4 percent of those without a chronic health condition reported a flu vaccination—both of which were significantly different from the total U.S. population rate of 38.7 percent.

Figure 8. Adult flu vaccination rates by chronic health condition, California and U.S.



Source: SHADAC analysis of 2017-2019 Behavior Risk Factor Surveillance System (BRFSS) data.
 ‡ Statistically significant difference from total population rate at 95% level.
 * Statistically significant difference from U.S. counterpart rate at 95% level.

Conclusion and discussion

While not a perfect analog for COVID-19, flu vaccination is probably the best available proxy to predict the challenges the U.S. and states face in a widespread COVID-19 vaccination campaign. Among our most concerning findings is how severely flu vaccination rates fall short of the 70 percent minimum rate expected to achieve population immunity against COVID-19. With a national flu vaccination rate of 38.7 percent among adults—roughly half the population immunity target—the U.S. will need to dramatically outperform flu vaccination rates to end the pandemic. Our analysis also found that flu vaccination rates vary widely across the state and among adults, both by demographic subgroups and by individuals’ health and health care access. This may help to identify which groups may be hardest to reach with a COVID-19 vaccine, to help craft strategies and guide outreach to ensure the greatest equity and effectiveness in vaccinating the populations of states and the U.S. against the coronavirus.

Our findings of flu vaccination rates by race and ethnicity demonstrate that some groups of people—especially American Indians and Alaska Natives, Blacks, and Latinos—are at risk of under-vaccination compared to the total population. Closing those disparities for a COVID-19 vaccine will almost certainly require concerted outreach efforts fashioned specifically for those communities, as well as strategies to develop trust among groups that have been marginalized and harmed by the U.S. health care system. Our measures of health care access also represented stark disparities in vaccination rates. For instance, we found that people with health insurance had flu vaccination rates that were more than double the rates for the uninsured. Because people without insurance often have limited or tenuous ties to the health care system through which vaccines typically are administered, this suggests a COVID-19 vaccination program—beyond ensuring no- or low-cost access to the vaccine for the

uninsured—needs to find ways to reach people who typically are underserved.

Other important findings are that younger adults have much lower flu vaccination rates than older adults, suggesting that a successful COVID-19 vaccination campaign may need to take concerted efforts to encourage younger adults to get vaccinated. But flu vaccination data also demonstrate cause for concern among the elderly, whose flu vaccination rate—despite being the highest—still falls short of population immunity targets. Findings showing that people with lower incomes also had the lowest flu vaccination rates indicates that a COVID-19 vaccination campaign would benefit from distinct focus on low-income communities, which appear at risk of falling through the cracks. Flu vaccination rates among people with chronic health conditions, who generally face greater risks for serious complications of COVID-19 infection, also hint toward a nuanced situation. While it is encouraging that adults with chronic conditions have higher rates of flu vaccination, their rate still falls short of COVID-19 vaccination targets. And combined with evidence that males are less likely to take precautions against the virus, such as wearing recommended face masks, a lower flu vaccination rates among males suggests that public health officials would be well-advised to consider ways to specifically communicate and encourage males to get vaccinated.³⁹

Ultimately, this analysis of flu vaccination rates among U.S. and California adults highlights two overarching points: First, an effective and equitable COVID-19 vaccination campaign must be designed with the recognition that U.S. and state populations are not monoliths but instead are comprised of many segments, some of which will be more challenging to reach and are likely to require targeted efforts. Second, when examining lackluster flu vaccination rates as a surrogate, the U.S. and states face a serious challenge in achieving population immunity against COVID-19 and ending the pandemic, even before considering the unique challenges posed by some COVID-19 vaccines, such as requiring multiple doses spaced weeks apart.

Endnotes

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