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Disparities in COVID-19 Vaccination Rates across Racial and Ethnic Minority Groups in the United States

KEY POINTS

- As of March 3, 2021, 38 states and the District of Columbia reported race or ethnicity for individuals who have received at least one dose of the COVID-19 vaccine. Although nearly half of vaccinations have unknown race or ethnicity in national data, data completeness for states in this brief ranges from 67% to 99%.
- Across all reporting states, a lower proportion of the Black and Hispanic populations have been vaccinated compared to the non-Hispanic White population.
- The percentage of vaccinated people who are Black or Hispanic is lower than expected given the racial and ethnic demographics of healthcare workers, essential workers, and people over age 65.
- Vaccine accessibility issues, including challenges with vaccine scheduling, transportation and other concerns, likely contribute to lower vaccination rates in Black and Hispanic populations.

INTRODUCTION

The COVID-19 pandemic has exacerbated existing health disparities and has had a disproportionate impact on racial and ethnic minority groups in the United States.[1] In particular, Black, Hispanic, American Indian and Alaska Native, and Native Hawaiian or Pacific Islander populations have all experienced higher rates of infections, hospitalizations, and deaths due to COVID-19 relative to non-Hispanic White populations,[2,3] as well as higher rates of excess deaths during the pandemic.[4] Although disparities have not been evident for Asian populations in national data, disparities in infection, hospitalization, and death rates for Asian and Asian sub-

[1] In this brief, the term racial and ethnic minority group refers to Black, Hispanic, Asian, American Indian and Alaska Native, and Native Hawaiian or Pacific Islander populations in the U.S.

[2] Disparities in rates of COVID-19 infection, hospitalization, and death by race and ethnicity. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. November 10, 2020.

[3] Simmons A, Chappel A, Kolbe AR, Bush L, and Sommers BD. Health Disparities by Race and Ethnicity During the COVID-19 Pandemic: Current Evidence and Policy Approaches. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. March 16, 2021.

[4] Rossen LM, Branum AM, Ahmad FB, Sutton P, Anderson RN. Excess Deaths Associated with COVID-19, by Age and Race and Ethnicity — United States, January 26–October 3, 2020. MMWR Morb Mortal Wkly Rep 2020;69:1522–1527. DOI: http://dx.doi.org/10.15585/mmwr.mm6942e2.

populations are evident in state or local data.[5,6] The COVID-19 vaccines that have been developed and received emergency use authorization (EUA) are highly safe and effective and as a result have the potential to reduce disparities in COVID-19 cases, hospitalizations, and deaths across racial and ethnic minority populations. Due to the disproportionate impact that COVID-19 has had on these populations, it is essential to ensure that the COVID-19 vaccine is distributed equitably across racial and ethnic minority populations.

The Advisory Committee on Immunization Practices (ACIP) recommendations for vaccine prioritization were developed and subsequently adopted by the Centers for Disease Control and Prevention (CDC) to ensure that those at highest risk of exposure and/or more severe illness were among the first to become eligible to be vaccinated.[7] Although ACIP recommendations do not explicitly address equity for racial or ethnic minority populations, these high-priority groups may also overlap with certain racial and ethnic groups based on their higher prevalence in the essential workforce or higher rates of certain comorbidities. Some states have developed specific plans to ensure equitable distribution of the vaccine to racial and ethnic minority populations.[8] Additionally, the CDC and Health Resources and Services Administration (HRSA) have launched a program to directly allocate vaccine doses to federally qualified health centers, with a focus on ensuring equity in vaccine distribution.[9]

Particular areas of focus to ensure equitable distribution to racial and ethnic minority populations have included combating vaccine hesitancy and ensuring fair and equal access to vaccination appointments. While COVID-19 vaccine hesitancy has decreased overall in recent months, rates of COVID-19 vaccine hesitancy are still higher for Black Americans than any other minority group,[10,11] in part due to historical as well as present-day medical malpractice and inequalities.[12,13] Vaccine accessibility issues range from the location of vaccination sites[14] and transportation to vaccination sites to the complex vaccine scheduling and registration process.[15] Disparities in vaccination rates due to accessibility issues have been particularly stark in cities where a disproportionate

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[5] Moore JT, Ricaldi JN, Rose CE, et al. Disparities in Incidence of COVID-19 Among Underrepresented Racial/Ethnic Groups in Counties Identified as Hotspots During June 5–18, 2020 — 22 States, February–June 2020. MMWR 2020;69:1122–1126.

[6] Marcello RK, Dolle J, Tariq A, Kaur S, Wong L, Curcio J et al. Disaggregating Asian Race Reveals COVID19 Disparities among Asian Americans at New York City's Public Hospital System. medRxiv. 2020. doi:10.1101/2020.11.23.20233155

[7] Dooling K, Marin M, Wallace M, et al. The Advisory Committee on Immunization Practices' Updated Interim Recommendation for Allocation of COVID-19 Vaccine — United States, December 2020. MMWR Morb Mortal Wkly Rep 2021;69:1657-1660. DOI: http://dx.doi.org/10.15585/mmwr.mm695152e2

[8] The Brookings Institution. Getting the COVID-19 vaccine: Progress, and equity questions for the next phase. Accessed at https://www.brookings.edu/blog/fixgov/2021/03/04/getting-the-covid-19-vaccine-progress-and-equity-questions-for-the-next-phase/

[9] HRSA. Ensuring equity in COVID-19 vaccine distribution. Accessed at https://www.hrsa.gov/coronavirus/health-center-program

[10] Kaiser Family Foundation. KFF COVID-19 Vaccine Monitor: February 2021. Accessed at https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-february-2021/

[11] Pew Research. Growing share of Americans say they plan to get a COVID-19 vaccine – or already have. Accessed at https://www.pewresearch.org/science/2021/03/05/growing-share-of-americans-say-they-plan-to-get-a-covid-19-vaccine-or-already-have/

[12] Time. Fueled by a history of mistreatment, Black Americans distrust the new COVID-19 vaccines. Accessed at https://time.com/5925074/black-americans-covid-19-vaccine-distrust/

[13] Los Angeles Times. It's not Tuskegee. Current medical racism fuels Black American's vaccine hesitancy. Accessed at https://www.latimes.com/science/story/2021-03-25/current-medical-racism-not-tuskegee-expls-vaccine-hesitancy-among-black-americans

[14] NPR. Across the South, COVID-19 Vaccine Sites Missing from Black and Hispanic Neighborhoods. Accessed at https://www.npr.org/2021/02/05/962946721/across-the-south-covid-19-vaccine-sites-missing-from-black-and-hispanic-neighbor

[15] FiveThirtyEight. The reason Black Americans are getting vaccinated at a much slower rate is not because they're reluctant. Accessed at https://fivethirtyeight.com/features/why-fewer-black-americans-are-getting-the-covid-19-vaccine-no-its-not-hesitancy/

number of vaccines have been distributed to more affluent zip codes with lower minority populations.[16,17,18] This brief aims to summarize the existing state of COVID-19 vaccination data, identify where disparities are occurring, and explore factors that may influence disparities in vaccination rates for racial and ethnic minority groups.

METHODS

This brief uses two metrics to describe vaccinations by race and ethnicity. **Vaccine coverage describes the proportion of a given population that has received at least one dose of the COVID-19 vaccine**. For example, if a state has administered 10,000 vaccines to Black residents and there are 100,000 Black residents in the state, the vaccine coverage for the Black population would be 10% (10,000/100,000). Vaccine coverage accounts for the population size of each group and therefore can be used to compare the vaccination rates of different racial and ethnic groups. In order to evaluate whether equitable vaccine coverage has been achieved across all racial and ethnic groups, the vaccine coverage of racial and ethnic minority groups was compared to the non-Hispanic White population using a ratio (non-Hispanic White vaccine coverage divided by minority population vaccine coverage). The total population by race and ethnicity in each state was obtained from 2019 1-year American Community Survey (ACS) estimates. **The second metric used in this brief is the proportion of the vaccinated population that belongs to a given population**. For example, if a state has vaccinated 10,000 people, of which 1,000 are Black, then 10% of the vaccinated population are Black. This metric is population size dependent and therefore can be used to compare the demographics of vaccine recipients with the demographics of a population of interest (i.e., healthcare workers).

The number of vaccinated individuals in each state by race and ethnicity was obtained from state department of health websites on March 3, 2021. These data represent total vaccines administered as of between February 25, 2021 and March 3, 2021, depending on the frequency with which states update their publicly available data. At the time of data collection, no state was reporting vaccinations with the one-dose Johnson & Johnson vaccine; therefore, all data reported in this brief represent two-dose regimens with the Pfizer-BioNTech or Moderna vaccines. While the majority of states presented race or ethnicity data for individuals who had received at least one dose of the COVID-19 vaccine, a few states (Delaware, Illinois, Iowa, and Nevada) reported race or ethnicity for total administered doses. This means that people who have received both doses are double-counted in these four states. An additional four states (New Mexico, North Dakota, Vermont, and Wisconsin) reported vaccine coverage by race or ethnicity using the vaccine coverage metric described in the previous paragraph, but did not provide breakdowns of demographics by vaccines administered. These states are included in analysis of vaccine coverage, but omitted from analysis of share of vaccinations received.

For the purposes of comparing the racial and ethnic demographics of the vaccinated population to the racial and ethnic demographics of vaccine priority groups, three non-overlapping cohorts were identified: adults over the age of 65, healthcare workers under the age of 65, and non-healthcare essential workers under the age of 65. Race and ethnicity demographics for the non-institutionalized population over age 65 was obtained from the 2019 1-year ACS Public Use Microdata. Estimates of the population over age 65 do not include residents of

[16] The New York Times. New ZIP code data reflects disparities in N.Y.C.'s vaccination effort, officials say. Accessed at https://www.nytimes.com/2021/02/16/nyregion/nyc-covid-vaccine-zip-codes.html

[17] Los Angeles Times. New map shows deep inequities in L.A.'s COVID-19 vaccine rollout. Accessed at https://www.latimes.com/projects/la-covid-vaccine-racial-disparities-by-neighborhood-map/

[18] DCist. Black D.C. Residents Say They Want The COVID-19 Vaccine. But the Barriers to Access Are Many. Accessed at https://dcist.com/story/21/01/27/black-dc-residents-want-coronavirus-vaccine-but-lack-access/

long-term care facilities. However, vaccinations of long-term care residents represent a relatively small percentage of all vaccinations and are not expected to significantly skew the results of this analysis.

Estimates of race and ethnicity for healthcare workers were obtained from the Current Population Survey Annual Social and Economic Supplement (March 2020).[19] A respondent was considered to be a healthcare worker if the main job they held during the previous week fell into one of the following categories: offices of physicians, dentists, chiropractors, optometrists, or other health practitioners; outpatient care centers; home health care services; other health care services; general medical and surgical hospitals and specialty (except psychiatric and substance abuse) hospitals; psychiatric and substance use hospitals; nursing care facilities; and residential care facilities without nursing. These industries corresponded to Census codes 7970-8180, 8191, 8192, 8270, and 8290.[20] Only individuals under age 65 were included in these estimates of healthcare workers in order to prevent overlaps with the demographics for individuals over age 65.

Estimates of race and ethnicity for non-healthcare essential workers were also obtained from the Current Population Survey Annual Social and Economic Supplement (March 2020).[21] A respondent was considered to be a non-healthcare essential worker if the main job they held during the previous week fell into the essential worker industries and occupations outlined by the Cybersecurity and Infrastructure Security Agency (CISA),[22] excluding those captured by the healthcare worker codes listed above. These industries and occupations include frontline essential workers such as first responders, educators, and food and agriculture workers, as well as other essential workers defined in Phase 1b and Phase 1c of the ACIP recommended vaccine phases.[23] Only individuals under age 65 were included in estimates of essential workers in order to prevent overlaps with the demographics for individuals over age 65.

RESULTS

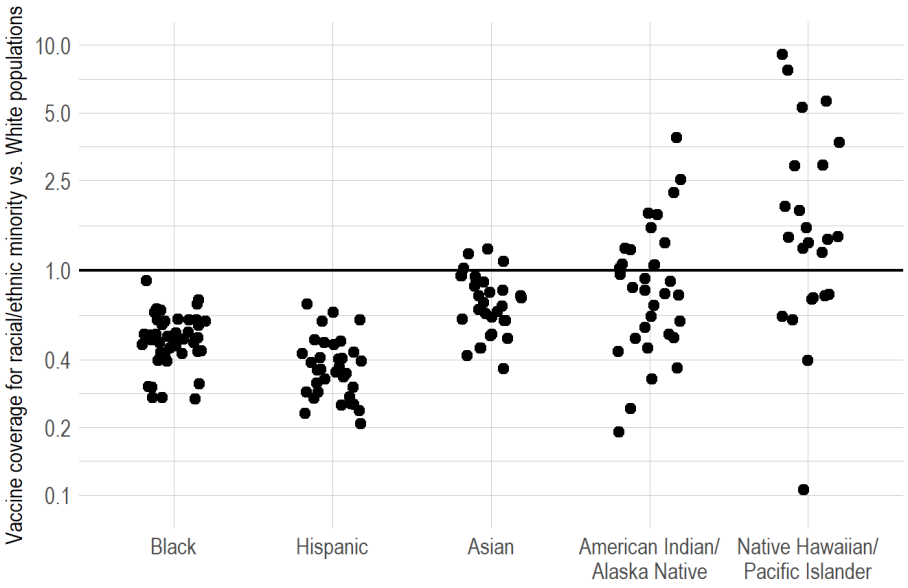
Vaccination rates by race and ethnicity

As of March 3, 2021, 38 states and the District of Columbia reported race for vaccinated individuals. Of these, 33 states also reported ethnicity. Although national data from CDC as of March 9, 2021 is missing race or ethnicity for approximately 46.8% of vaccinated individuals,[24] the completeness of demographic data from state departments of health is higher and reflects the between-state variation in data collection and reporting. Nearly all vaccinations have associated race or ethnicity data in North Carolina (99.5%), whereas only 61.7% of vaccinations have associated race or ethnicity data in Michigan (Appendix Figure 1). On average, states have associated race or ethnicity data for 83.5% of vaccinated people. Two states (Nevada and New York) provided race or ethnicity as a percentage of vaccinations with known race or ethnicity and did not provide the number of vaccinations with unknown race or ethnicity.

[19] U.S. Census Bureau. Current Population Survey. Accessed at https://www.census.gov/programs-surveys/cps.html
[20] Current Population Survey: 2020 Annual Social and Economic (ASEC) Supplement. Appendix A – Industry Classification. Accessed at https://www2.census.gov/programs-surveys/cps/techdocs/cpsmar20.pdf
[21] U.S. Census Bureau. Current Population Survey. Accessed at https://www.census.gov/programs-surveys/cps.html
[22] CDC. Identify Essential Workers for Public Health Data Collection and Analysis. Accessed at https://www.cdc.gov/niosh/topics/coding/essentialworkers/default.html
[23] CDC. Interim List of Categories of Essential Workers Mapped to Standardized Industry Codes and Titles. https://www.cdc.gov/vaccines/covid-19/categories-essential-workers.html
[24] CDC. COVID Data Tracker: Demographic Characteristics of People Receiving COVID-19 Vaccinations in the United States. Accessed at https://covid.cdc.gov/covid-data-tracker/#vaccination-demographic

Vaccine coverage of the Black and Hispanic populations was consistently lower than vaccine coverage of the non-Hispanic White population in each state (Figure 1). On average, vaccine coverage was approximately 2.1 and 2.9 times higher for the White population relative to the Black and Hispanic populations, respectively. Fewer states reported vaccination data for Asian, American Indian/Alaska Native, and Native Hawaiian/Pacific Islander populations. Vaccine coverage for the Asian population tended to be lower than the non-Hispanic White population, but some states had near-equal vaccine coverage between Asian and White populations. Vaccine coverage for American Indian/Alaska Native and Native Hawaiian/Pacific Islander populations had larger variation, likely due to the smaller population sizes in many states (i.e., small numbers of vaccinations can result in large shifts in the coverage of the population). However, these data indicate that vaccine distribution has been more equitable between some groups than others. While disparities are evident in all reporting states for both the Black and Hispanic populations, some states achieved greater equity particularly for the American Indian/Alaska Native and Native Hawaiian/Pacific Islander populations. For the American Indian/Alaska Native population, these successes may be due in part to the targeted vaccine rollout strategy executed by the Indian Health Service.[25] This result highlights the importance of identifying and learning from successful approaches to achieve vaccine equity across vulnerable populations. However, due to the consistent disparities observed for vaccine coverage of the Black and Hispanic populations across all states, the remainder of the brief will focus on vaccination rates for Black and Hispanic populations.

Figure 1: State-level Vaccine Coverage of Racial and Ethnic Groups Relative to non-Hispanic Whites.



Notes: Vaccine coverage for racial and ethnic minority populations presented as a ratio of vaccine coverage for the minority population over the vaccine coverage for the non-Hispanic White population. Each point represents a single state. A value of 1 indicates equal vaccine coverage for the minority population and the non-Hispanic White population. Values greater than 1 indicate that a larger share of the minority population has been vaccinated compared to the non-Hispanic White population; values lower than 1 indicate that a larger share of the non-Hispanic White population has been vaccinated compared to the minority population. For states that reported data on ethnicity separately from race, the ratio was calculated as the coverage of the Hispanic population relative to the coverage of the non-Hispanic population. Eight states that combined data for Asian and Native Hawaiian/Pacific Islander are excluded in this figure.

[25] The Pew Charitable Trusts. In Hard-Hit Indian Country, Tribes Rapidly Roll Out Vaccines. Accessed at https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2021/02/09/in-hard-hit-indian-country-tribes-rapidly-roll-out-vaccines

Due to the phased distribution of vaccines, vaccination demographics are not necessarily expected to align with the demographics of the state.[26] For example, the population over age 65 tends to be more White than the general population. However, healthcare and other essential workers include a large number of people in racial and ethnic minority groups. Nationally, 18% of healthcare workers and 15% of all essential workers are Black; 13% of healthcare workers and 21% of all essential workers are Hispanic.[27] Differences in occupational risk have been cited as one potential reason for the disproportionate impact of COVID-19 on racial and ethnic minority populations.[28] When combining the expected racial and ethnic demographics for people over 65, healthcare workers under age 65, and essential workers under age 65, Black and Hispanic people make up a lower than expected percentage of the total number of vaccinated people (Figure 2). When looking at each of these groups individually, the gap between share of vaccinated and share of population is smallest when looking only at adults over the age of 65 (Appendix Figure 2); however, vaccinations for Black and Hispanic populations still lag behind what would be expected if overall vaccination rates were driven primarily by the demographics of the 65+ population. The gaps are most significant for healthcare and other essential workers, where racial and ethnic minority groups make up a considerable fraction of the workforce in many states (Appendix Figures 3 and 4).

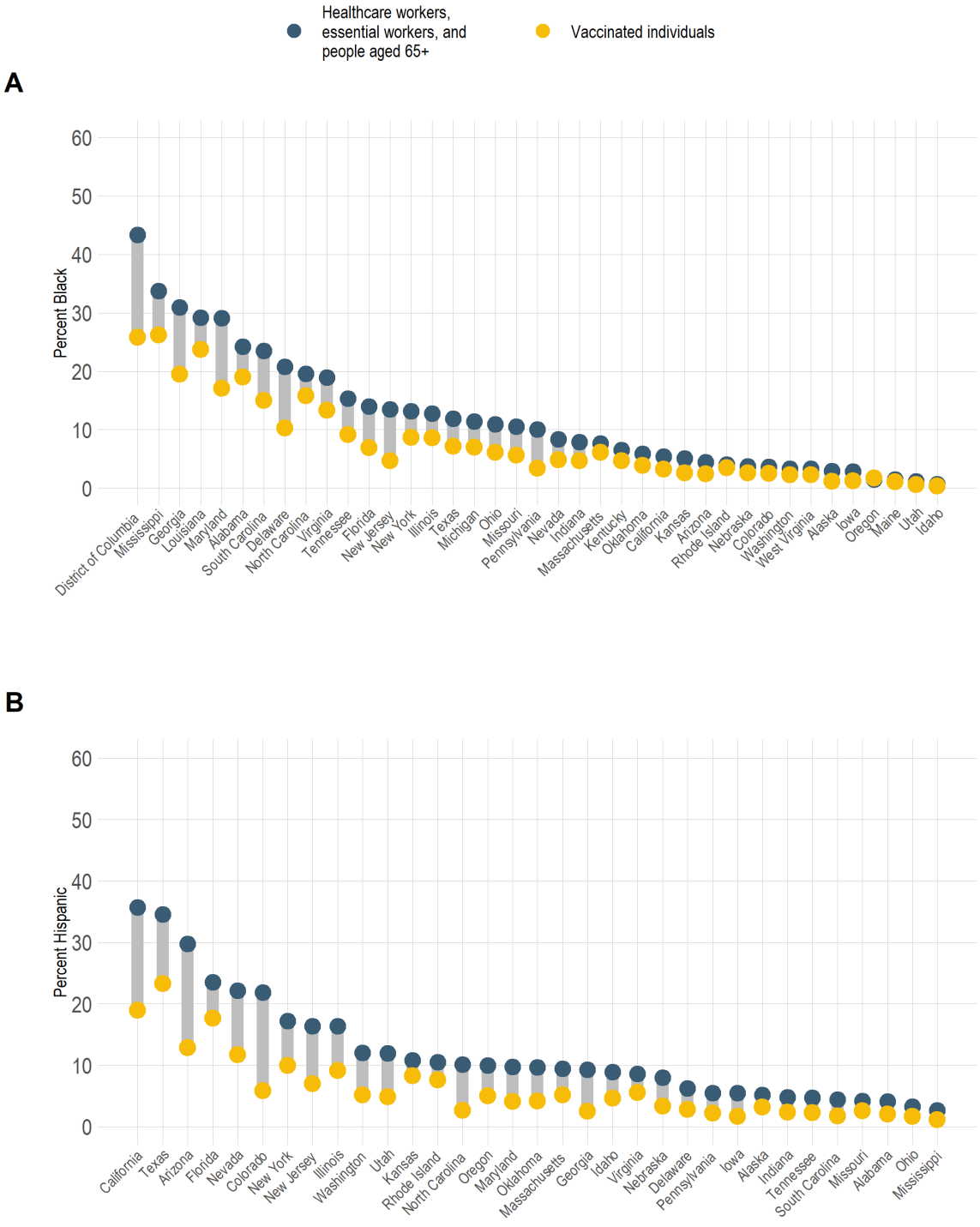
Together, these data indicate that Black and Hispanic populations consistently make up a disproportionately lower share of the vaccinated population than White or non-Hispanic populations, and Black and Hispanic populations are also being vaccinated at a lower rate than expected given their prevalence in priority vaccination groups.

[26] Painter EM, Ussery EN, Patel A, et al. Demographic Characteristics of Persons Vaccinated During the First Month of the COVID-19 Vaccination Program — United States, December 14, 2020–January 14, 2021. MMWR Morb Mortal Wkly Rep 2021;70:174–177. DOI: http://dx.doi.org/10.15585/mmwr.mm7005e1

[27] Economic Policy Institute. Who are essential workers? A comprehensive look at their wages, demographics, and unionization rates. Accessed at https://www.epi.org/blog/who-are-essential-workers-a-comprehensive-look-at-their-wages-demographics-and-unionization-rates/

[28] CDC. Health Equity Considerations and Racial and Ethnic Minority Groups. Accessed at https://www.cdc.gov/coronavirus/2019-ncov/community/health-equity/race-ethnicity.html

Figure 2: Percent Black or Hispanic in Combined Priority Groups versus Vaccinated Population



Notes: Demographic data for healthcare workers, essential workers, and people over age 65 in each state were combined to estimate the percent of this combined population that is Black (A) or Hispanic (B) (represented by blue dot). This point represents the percentage of vaccinations that would be expected to be given to Black or Hispanic individuals if vaccines were administered equally across race and ethnicity among these three priority groups. The yellow dot represents the percentage of vaccinated individuals in a given state that are Black or Hispanic. States are ordered by the size of the Black or Hispanic population in the combined priority group. Not all states report vaccination rates for Hispanic populations; as a result, some states shown in (A) are not present in (B).

Role of vaccine hesitancy and accessibility in driving vaccination disparities

Two main explanations have emerged for disparities in vaccination rates among Black and Hispanic populations in the early rollout of the COVID-19 vaccine: vaccine hesitancy and accessibility. Vaccine hesitancy among racial and ethnic populations, particularly Black and Hispanic Americans, has been a significant concern for COVID-19 vaccines. Although COVID-19 vaccine enthusiasm has increased across racial and ethnic groups since the COVID-19 vaccine rollout began in December, the percent of Black adults who say they either have already been vaccinated or will as soon as possible is lower than White adults (41% vs. 61% in February 2021).[29] Black and Hispanic adults were more likely than White adults to say that they plan to "wait and see" how the COVID-19 vaccine works for other people.[30]

Data from the U.S. Census Bureau's Household Pulse Survey has shown decreases in vaccine hesitancy across racial and ethnic groups since the vaccine rollout began in December. When evaluating data from three relevant time points representing early February, late February, and early March, there was no consistent relationship observed between the coverage of the Black or Hispanic population and the rate of vaccine hesitancy in that population. Specifically, using data from the U.S. Census Bureau's Household Pulse Survey (Week 26: March 3 – March 15),[31] which represents hesitancy perspectives at the end of the data collection period, the percentage of Black or Hispanic respondents in a state who responded that they probably will not or definitely will not receive a COVID-19 vaccine was not significantly correlated with vaccine coverage of the Black or Hispanic population at the state level (Figure 3). Therefore, while vaccine hesitancy has frequently been cited as a driver of disparities in vaccination rates by race and ethnicity[32], attitudes toward the COVID-19 vaccines in early March 2021 cannot explain the observed variation in vaccine coverage for Black and Hispanic populations at the same time.

Compounding vaccine hesitancy for Black and Hispanic populations are the challenges associated with actually getting a vaccine. States have approached vaccine distribution in different ways, in terms of prioritization of who can be vaccinated, public information about COVID-19 vaccination, as well as where and when eligible residents can schedule vaccine appointments, being inconsistent and sometimes challenging to find.[33] One survey in January 2021 showed that Black and Hispanic adults were more likely than White adults to report that they did not have enough information about when and where they can receive a COVID-19 vaccine.[34] This information gap represents a first critical issue in vaccine accessibility for Black and Hispanic populations. Even when people have this information, however, scheduling vaccination appointments is another significant challenge. As of mid-February 2021, relatively few states operated a centralized system for residents to register for and schedule appointments to be vaccinated.[35] In many states, residents had to navigate multiple different online scheduling platforms to find a site with vaccine availability. Furthermore, relatively few states offered

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[29] Kaiser Family Foundation. KFF COVID-19 Vaccine Monitor: February 2021. Accessed at https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-february-2021/

[30] Kaiser Family Foundation. KFF COVID-19 Vaccine Monitor: February 2021. Accessed at https://www.kff.org/coronavirus-covid-19/poll-finding/kff-covid-19-vaccine-monitor-february-2021/

[31] U.S. Census Bureau. Week 26 Household Pulse Survey: March 3 – March 15. Accessed at https://www.census.gov/data/tables/2021/demo/hhp/hhp25.html

[32] Corbie-Smith G. Vaccine Hesitancy Is a Scapegoat for Structural Racism. JAMA Health Forum. Published online March 25, 2021. doi:10.1001/jamahealthforum.2021.0434

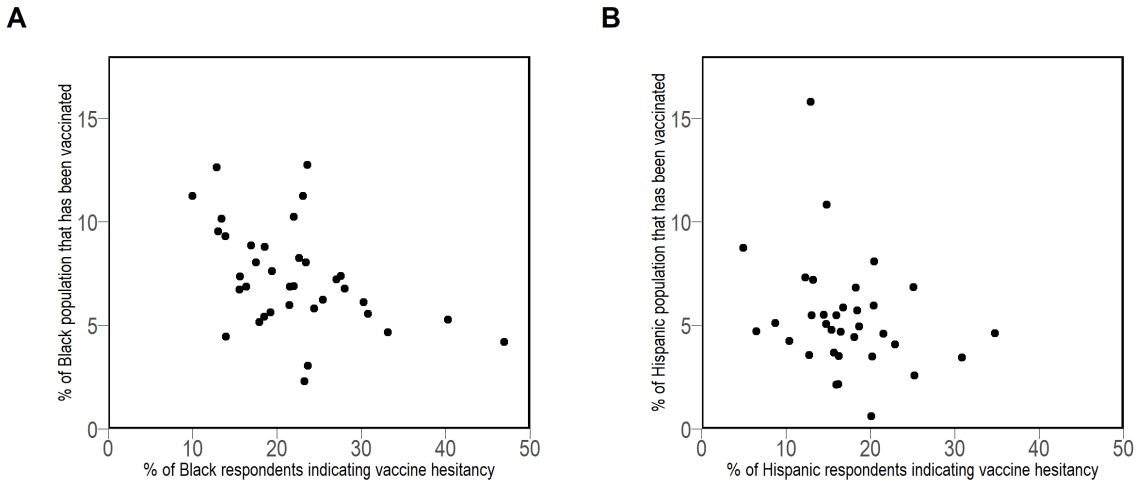
[33] Kolbe, A. Factors influencing variation between states in efficiency of COVID-19 vaccine administration. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. April 2021. Accessed at https://aspe.hhs.gov/pdf-report/covid-19-vaccine-administration

[34] Kaiser Family Foundation. KFF COVID-19 Vaccine Monitor: January 2021. Accessed at https://www.kff.org/coronavirus-covid-19/report/kff-covid-19-vaccine-monitor-january-2021/

[35] Kolbe, A. Factors influencing variation between states in efficiency of COVID-19 vaccine administration. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. April 2021. Accessed at https://aspe.hhs.gov/pdf-report/covid-19-vaccine-administration

phone assistance for vaccine scheduling. The complexity of the vaccine scheduling system is a significant barrier for people without computer or Internet access or those who are less comfortable with technology. Searching for and scheduling vaccination appointments favors those with time to dedicate to the effort and who have the flexibility to take time off work or travel long distances. Additionally, transportation to vaccination sites may present a barrier to getting vaccinated, particularly for older adults, people with disabilities, and low-income people. These challenges may disproportionately impact Black and Hispanic Americans, who are less likely to have a computer or Internet access in their home than non-Hispanic Whites or Asians,[36] and who make up disproportionate numbers of essential workers[37] that may not have the flexibility to take time off work to travel to vaccination sites.

Figure 3: Vaccine Coverage versus Vaccine Hesitancy for Black and Hispanic Populations



Notes: Vaccine coverage of the Black (A) and Hispanic (B) populations at the state level relative to vaccine hesitancy in those same populations at the state level as measured by the U.S. Census Bureau's Household Pulse Survey. Points represent individual states. Respondents were considered vaccine hesitant if they indicated that they probably will not or definitely will not receive a COVID-19 vaccine. Simple linear regression showed no significant correlation between vaccine coverage and vaccine hesitancy in either the Black or Hispanic population.

A recent ASPE issue brief highlighted the wide array of approaches states have taken to distribute their allotted vaccine doses.[38] As of mid-February 2021, the percentage of the population eligible to receive a vaccine in a given state varied from 20% to over 60%. States with the highest percentage of the population currently eligible to receive a vaccine had expanded eligibility to include adults with comorbidities. However, at the same time, no state had vaccinated over 21% of their population, which meant demand far exceeded supply, even assuming some vaccine eligible people were not actively seeking to be vaccinated. In some states, this led to significant technical issues with vaccine scheduling and registration.[39] Compounding this issue is the fact that in some of these states with expanded eligibility, residents of neighboring states with stricter vaccine eligibility

[36] The U.S. Census Bureau. The Digital Divide: Percentage of Households by Broadband Internet Subscription, Computer Type, Race and Hispanic Origin. Accessed at https://www.census.gov/library/visualizations/2017/comm/internet.html

[37] Rho, H., Brown, H., and Fremstad, S. (2020). A Basic Demographic Profile of Workers in Frontline Industries. Center for Economic and Policy Research, Washington, D.C. https://cepr.net/wp-content/uploads/2020/04/2020-04-Frontline-Workers.pdf

[38] Kolbe, A. Factors influencing variation between states in efficiency of COVID-19 vaccine administration. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. April 2021. Accessed at https://aspe.hhs.gov/pdf-report/covid-19-vaccine-administration

[39] Stat News. Vaccine registration technology is failing. Here's how the Biden administration could fix it. Accessed at https://www.statnews.com/2021/01/14/covid19-vaccines-technology-registration-websites/

requirements were crossing borders to receive a vaccine.[40] This level of demand exacerbates the accessibility issues discussed above, making navigating websites and scheduling platforms even more complicated and time-consuming.

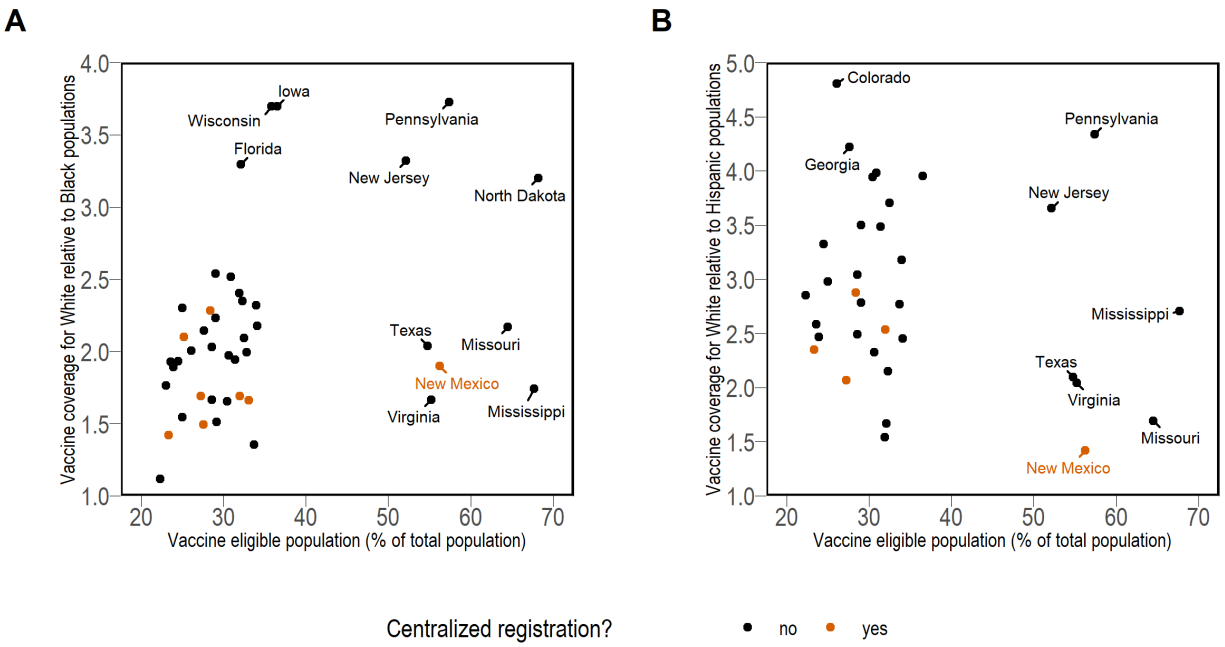
Across all states reporting race and ethnicity for COVID-19 vaccinations, there was a weak relationship between the size of the eligible population and disparities in terms of vaccine coverage rates for Black populations relative to non-Hispanic White populations (Figure 4A). In other words, states with a larger vaccine-eligible population tended to have larger disparities in vaccine coverage rates (slope = 0.017, R-squared = 0.11, p-value = 0.02). Even among states with more restrictive eligibility (i.e., <50% of population currently eligible), a greater vaccine eligible population was associated with greater disparities (slope = 0.079, R-squared = 0.29, p-value = 0.00095) This suggests that even relatively small differences in the vaccine eligible population may increase demand for vaccines and exacerbate disparities. Among the six states with the highest disparities for coverage of the Black population, all had higher than the median vaccine eligible populations (median across all states = 30.9), and three also had vaccine eligible populations >50% (Pennsylvania, New Jersey, and North Dakota). However, not all states with large vaccine eligible populations had large disparities: five states (Mississippi, Missouri, New Mexico, Texas, and Virginia) with >50% vaccine eligible populations had similar disparities for Black vaccination rates (range: 1.7 – 2.2) as states with lower vaccine eligible populations. This suggests that larger vaccine eligible populations may influence vaccination disparities in some states, but disparities in vaccination rates are likely influenced, at least in part, by factors other than the vaccine eligible population.

Interestingly, there was no statistically significant relationship between the size of the vaccine eligible population and disparities for Hispanic populations (Figure 4B). However, among states with >50% vaccine eligible population, states clustered in the same patterns as observed for disparities in Black populations (higher disparities in Pennsylvania and New Jersey; lower disparities in Mississippi, Missouri, New Mexico, Texas, and Virginia). This suggests that there may be state-specific policies or programs associated with higher or lower vaccine coverage across racial and ethnic populations. For example, states with centralized scheduling systems[41] tended to have lower disparities for both Black and Hispanic vaccination rates, which suggests that simplifying the vaccine scheduling system may result in more equitable outcomes. However, given the relatively small number of states that offered centralized registration at the time of data collection, additional research is necessary to evaluate the impact of centralized vaccine scheduling systems on achieving equity in vaccine distribution.

[40] The New York Times. Can't get a shot? Thousands of 'Vaccine Hunters' are crossing state borders to get theirs. Accessed at https://www.nytimes.com/2021/02/04/us/covid-vaccines-crossing-states.html

[41] States with centralized vaccine registration and scheduling systems were identified through state websites and media sources, as previously described (see Footnote 34). States that had a central system for state-run sites only (such as mass vaccination sites) were not considered to have centralized vaccine registration.

Figure 4: Relative Vaccine Coverage versus Vaccine Eligible Population



Notes: The ratio of vaccine coverage was calculated for non-Hispanic White populations relative to Black (A) and Hispanic (B) populations. The vaccine eligible population is calculated as a percent of the total population, and represents eligibility criteria as of mid-February 2021. Points represent individual states. A value of 1 for the ratio of vaccine coverage would indicate that equal shares of the White and Black/Hispanic populations have been vaccinated; a value of 2 indicates that Whites have been vaccinated at twice the rate as the minority group. Data points are colored based on whether the state had a centralized registration system for COVID-19 vaccines as of mid-February 2021. States with the largest disparities and the highest vaccine eligible population are labeled. Not all states report vaccination rates for Hispanic populations; as a result, some states shown in (A) are not present in (B).

DATA LIMITATIONS

Data completeness is a considerable limitation when interpreting racial and ethnic disparities among vaccinated individuals across the country. In general, vaccine coverage as a share of the population likely underestimates true vaccine coverage, due to large numbers of vaccinations reported without associated race or ethnicity in many states. Additionally, when comparing the percentage of vaccines that have been administered by race or ethnicity, the analysis in this brief inherently assumes that the vaccinations with no associated race or ethnicity information have a similar demographic composition as the vaccinations with associated race. However, if race and ethnicity reporting is lower for a specific minority group, this may result in an underestimation of the true numbers of vaccinations in these populations. Several states reported race and ethnicity for all doses administered, rather than individuals vaccinated; therefore, data from these states (Delaware, Illinois, Iowa, and Nevada) may not reflect the actual demographics of vaccinated individuals in the state and should be interpreted with caution.

Race and ethnicity data for long-term care facility residents are not readily available at the state level; therefore, this population is excluded from the analysis in this brief. Approximately 2 million residents of long-term care

facility residents have been vaccinated as of March 2021, making up around 3% of all vaccinated individuals.[42] By excluding this population, we may have over- or under-estimated the number of Black and Hispanic individuals that are expected to have received a vaccination based on membership in vaccination priority groups (Figure 2). However, given that this group represents a relatively small proportion of all vaccinations at this time and the size of the observed disparities, we expect that disparities would persist even with these additional data.

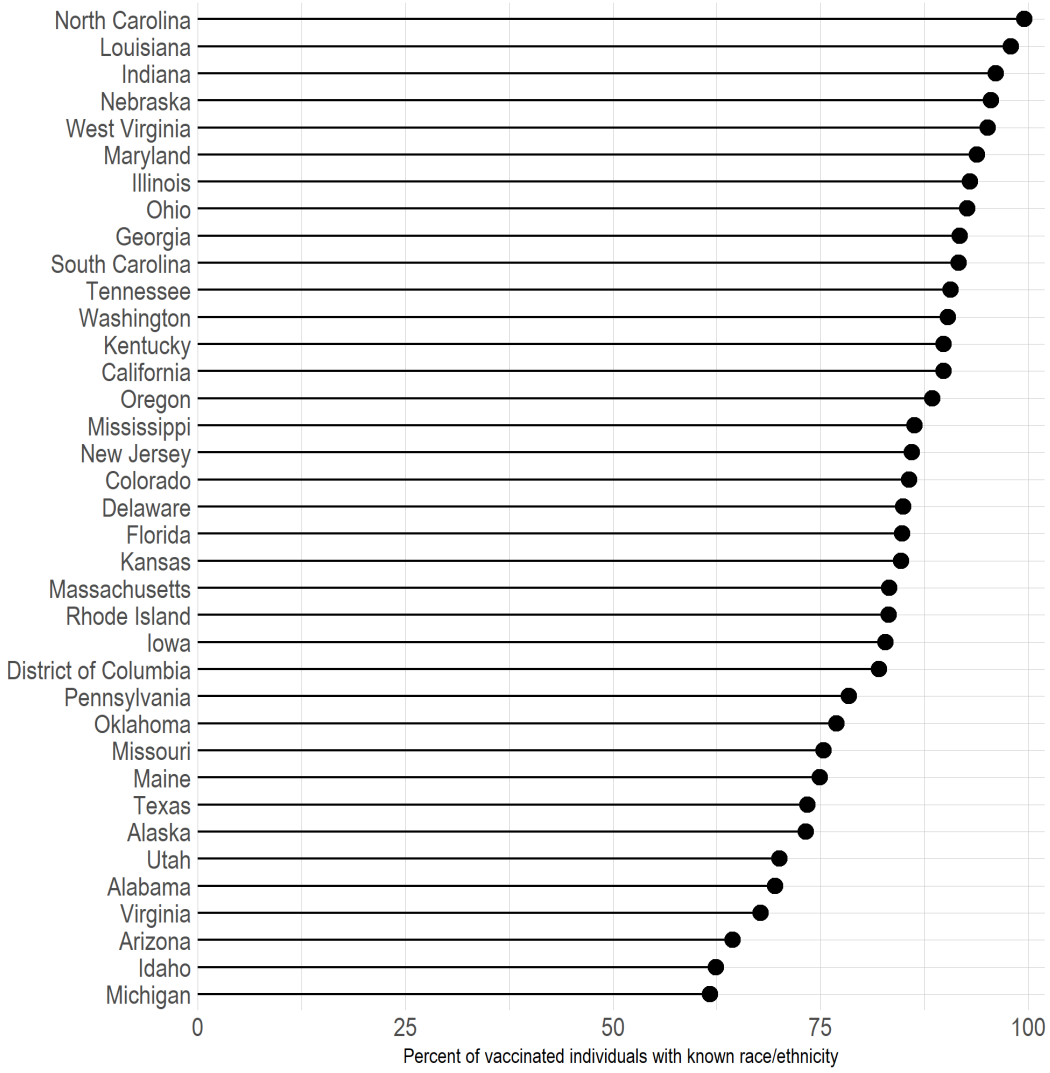
CONCLUSIONS

The majority of U.S. states are currently reporting at least some race or ethnicity data for COVID-19 vaccinations. Among those reporting states, Black and Hispanic populations have consistently received a lower share of the vaccine by population compared to White populations. When evaluating the membership of Black and Hispanic individuals in the vaccine priority groups of healthcare workers, essential workers, and adults over the age of 65, fewer vaccines have been administered to Black and Hispanic individuals than would be expected. These findings highlight the importance of continued tracking of vaccinations by race and ethnicity, and suggest that more work is necessary to ensure equitable distribution of the vaccine among racial and ethnic minority populations. Vaccine hesitancy does not appear to be a driver of disparities, but vaccine accessibility issues likely contribute to lower vaccination rates in Black and Hispanic populations. Identifying strategies to improve accessibility for vaccine registration and scheduling is critical, especially as vaccine supply continues to grow and more people will become eligible to receive a vaccination.

[42] CDC. COVID Data Tracker: Federal Pharmacy Partnership for Long-Term Care (LTC) Program.

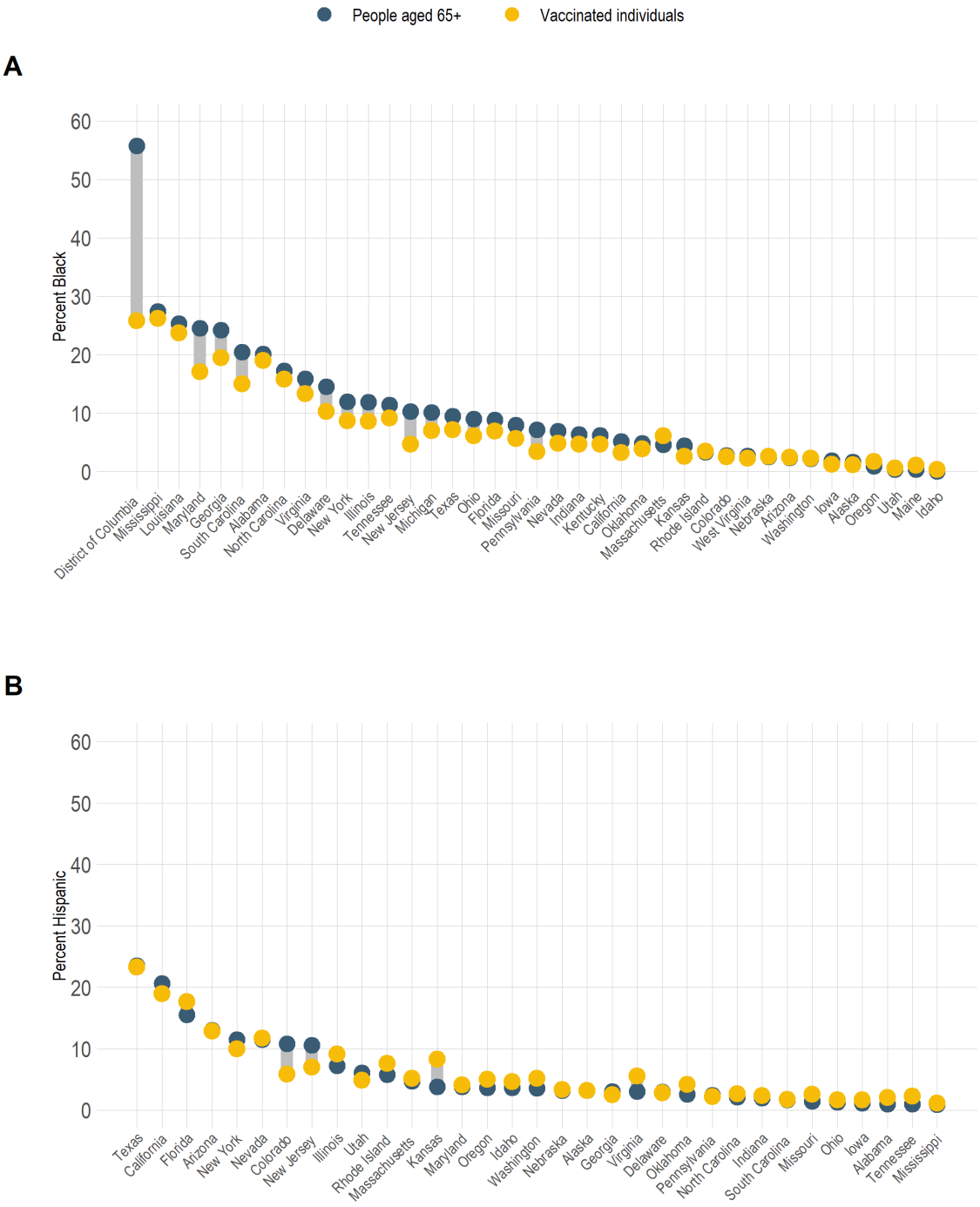
Appendix

Appendix Figure 1: Percent of Vaccinated Individuals with Known Race or Ethnicity, by State



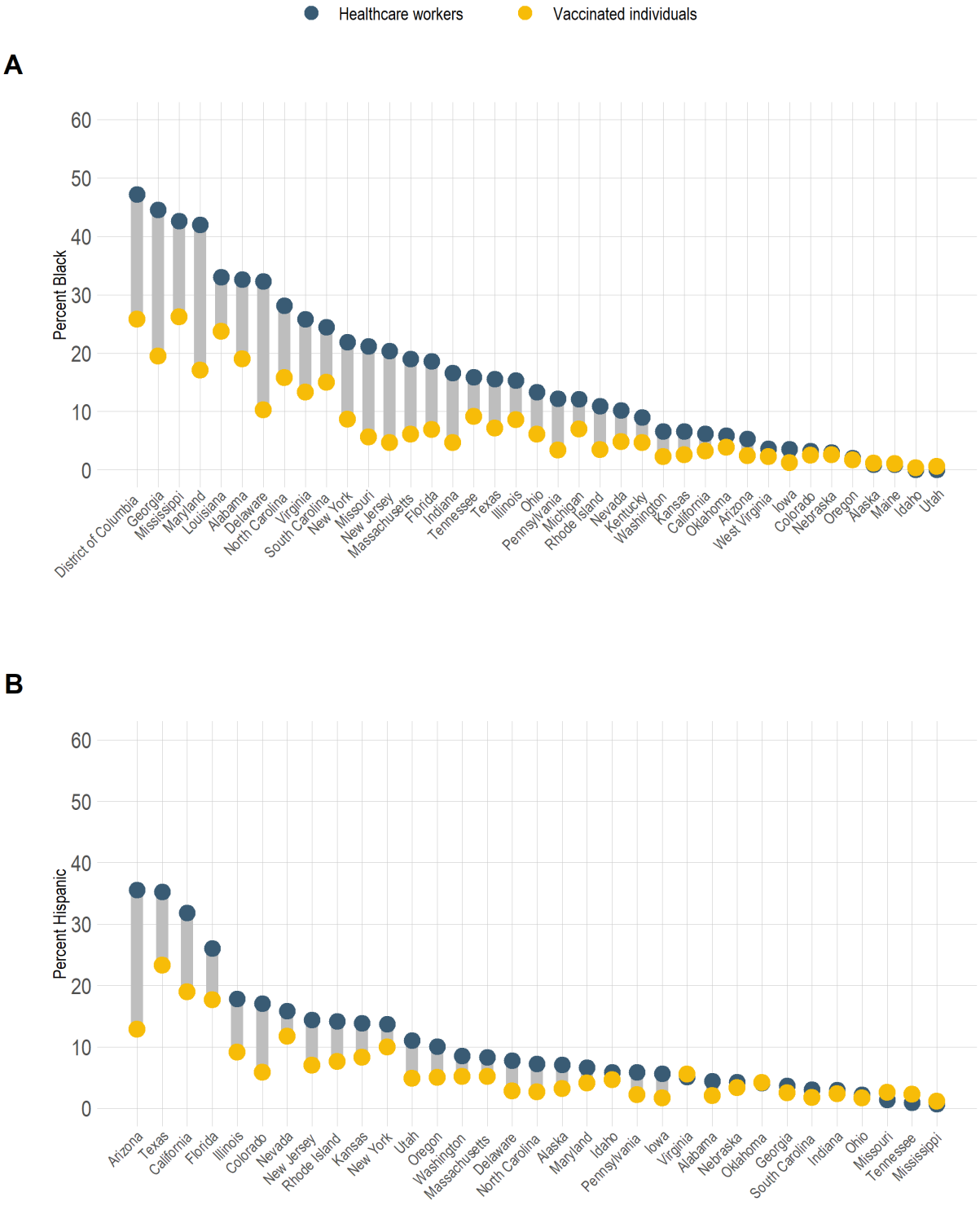
Notes: Nevada and New York do not report the percent of vaccinated individuals with unknown race or ethnicity and are excluded from this figure.

Appendix Figure 2: Percent Black or Hispanic in Age 65+ Population versus Vaccinated Population



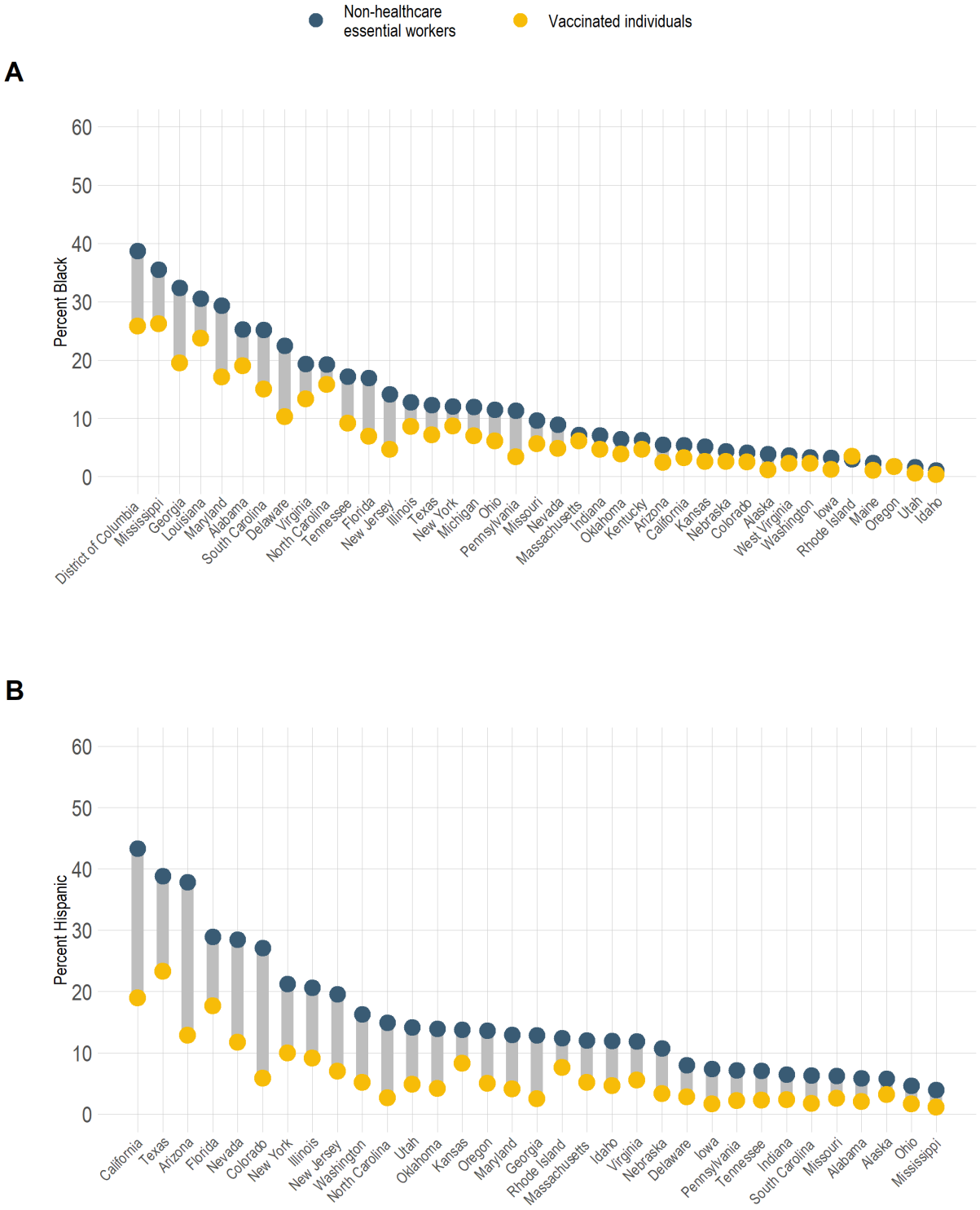
Notes: Blue dots represent the percent of the population over age 65 that is Black (A) or Hispanic (B). The yellow dot represents the percentage of vaccinated individuals in a given state that are Black or Hispanic. States are ordered by the size of the Black or Hispanic population in age 65+ population. Not all states report vaccination rates for Hispanic populations; as a result, some states shown in (A) are not present in (B).

Appendix Figure 3: Percent Black or Hispanic in Healthcare Workforce versus Vaccinated Population



Notes: Blue dots represent the percent of healthcare workforce (under age 65) that is Black (A) or Hispanic (B). The yellow dot represents the percentage of vaccinated individuals in a given state that are Black or Hispanic. States are ordered by the size of the Black or Hispanic population in the healthcare workforce. Not all states report vaccination rates for Hispanic populations; as a result, some states shown in (A) are not present in (B).

Appendix Figure 4: Percent Black or Hispanic in the Non-Healthcare Essential Workforce versus Vaccinated Population



Notes: Blue dots represent the percent of the non-healthcare essential workforce (under age 65) that is Black (A) or Hispanic (B). The yellow dot represents the percentage of vaccinated individuals in a given state that are Black or Hispanic. States are ordered by the size of the Black or Hispanic population in the non-healthcare essential workforce. Not all states report vaccination rates for Hispanic populations; as a result, some states shown in (A) are not present in (B).

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