Please note: This report has been corrected.

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COVID-19 Vaccination Coverage Among Insured Persons Aged ≥16 Years, by Race/Ethnicity and Other Selected Characteristics — Eight Integrated Health Care Organizations, United States, December 14, 2020–May 15, 2021

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COVID-19 vaccination is critical to ending the COVID-19 pandemic. Members of minority racial and ethnic groups have experienced disproportionate COVID-19–associated morbidity and mortality (*1*); however, COVID-19 vaccination coverage is lower in these groups (*2*). CDC used data from CDC's Vaccine Safety Datalink (VSD)* to assess disparities in vaccination coverage among persons aged ≥16 years by race and ethnicity during December 14, 2020–May 15, 2021. Measures of coverage included receipt of ≥1 COVID-19 vaccine dose (i.e., receipt of the first dose of the Pfizer-BioNTech or Moderna COVID-19 vaccines or 1 dose of the Janssen COVID-19 vaccine [Johnson & Johnson]) and full vaccination (receipt of 2 doses of the Pfizer-BioNTech or Moderna COVID-19 vaccines or 1 dose of Janssen COVID-19 vaccine). Among 9.6 million persons aged ≥16 years enrolled in VSD during December 14, 2020–May 15, 2021, ≥1-dose coverage was 48.3%, and 38.3% were fully vaccinated. As of May 15, 2021, coverage with ≥1 dose was lower among non-Hispanic Black (Black) and Hispanic persons (40.7% and 41.1%, respectively) than it was among non-Hispanic White (White) persons (54.6%). Coverage was highest among non-Hispanic Asian (Asian) persons (57.4%). Coverage with ≥1 dose was higher among persons with certain medical conditions that place them at higher risk for severe COVID-19 (high-risk conditions) (63.8%) than it was among persons without such conditions (41.5%) and was higher among persons who had not had COVID-19 (48.8%) than it was among those who had (42.4%). Persons aged 18–24 years had the lowest ≥1-dose coverage (28.7%) among all age groups. Continued monitoring of vaccination coverage and efforts to improve equity in coverage are critical, especially among populations disproportionately affected by COVID-19.

VSD is a collaboration between CDC's Immunization Safety Office and eight integrated health care organizations in six U.S. states.† VSD captures information on COVID-19 vaccine doses administered, regardless of where they are received, based on an automated search within the organizations' facilities (outpatient and inpatient records) and external systems (e.g., health insurance claims and state or local immunization

* https://www.cdc.gov/vaccines/covid-19/info-by-product/clinical-considerations.htmlhttps://www.cdc.gov/vaccinesafety/ensuringsafety/monitoring/vsd/

† The eight participating VSD health care organizations are located in California (two sites), Colorado (two sites), Minnesota, Oregon, Wisconsin, and Washington, and monitor vaccine safety among 11.6 million insured persons. One additional site (in Massachusetts) provides subject matter expertise on vaccine safety research and surveillance.

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information systems). VSD data on administered COVID-19 vaccine doses were captured from December 14, 2020, when the Pfizer-BioNTech vaccine received Emergency Use Authorization in the United States,[§] through May 15, 2021. Data were reported to CDC weekly beginning January 9, 2021. The analysis excluded 561 persons aged 16–17 years who received Janssen or Moderna vaccine, because persons in this age group were eligible for the Pfizer-BioNTech vaccine only during the study period.

Coverage with ≥1 COVID-19 vaccine dose was defined as the proportion of persons who received a first dose of Pfizer-BioNTech or Moderna COVID-19 vaccine, or 1 dose of Janssen COVID-19 vaccine. Full vaccination was defined as receipt of 2 doses of Pfizer-BioNTech or Moderna COVID-19 vaccine or 1 dose of Janssen COVID-19 vaccine. Coverage was estimated for persons who received ≥1 dose and persons who were fully vaccinated by racial or ethnic minority groups, age, sex, presence of a high-risk condition,[¶] and COVID-19 illness history. Data on race and ethnicity were available for 88.3% of the VSD population; data on age, sex, high-risk condition, and history of COVID-19 illness were 100% complete. COVID-19 illness history was defined using an internal *International Classification of Diseases, Tenth Revision, Clinical Modification* (ICD-10-CM) diagnosis code indicating that the person had COVID-19[**] or a positive laboratory test result before vaccination. All analyses were performed using SAS (version 9.4; SAS Institute), and data were a census of all persons in the population (i.e., VSD); therefore, statistical tests were not performed to assess differences between groups. Absolute differences in coverage were calculated using White persons as the reference group (coverage among racial/ethnic group of interest minus coverage among White persons). This activity was reviewed by CDC and VSD sites and was conducted consistent with applicable federal law and CDC policy.[††]

During December 14, 2020–May 15, 2021, 9.6 million persons aged ≥16 years were continuously enrolled in VSD. The VSD population was 41.2% White, 6.5% Black, 24.2% Hispanic, 12.1% Asian, 3.3% non-Hispanic multiple or other race, 0.6% non-Hispanic Native Hawaiian or

§ As of May 2021, all adults aged ≥18 years can receive any of the three COVID-19 vaccines available in the United States via Emergency Use Authorization from the Food and Drug Administration, including Pfizer-BioNTech, Moderna, and Janssen (Johnson & Johnson); persons aged 16–17 years are eligible to receive the Pfizer-BioNTech COVID-19 vaccine.

¶ All patients' records from outpatient and inpatient settings are screened by automated records review and chart review for underlying medical conditions that increase the risk for severe COVID-19, using ICD-10 codes. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html

** A combination of ICD-10 COVID-19 codes and internal medical diagnostics codes were used to identify persons with a history of COVID-19. Patient records were also screened for positive laboratory test results indicating COVID-19 before receipt of vaccination. The new ICD-10-CM code came into effect April 1, 2020. https://www.cdc.gov/nchs/data/icd/Announcement-New-ICD-code-for-coronavirus-3-18-2020.pdf

†† 45 C.F.R. part 46.102(l)(2), 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

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Other Pacific Islander, 0.3% non-Hispanic American Indian or Alaskan Native (AI/AN); race or ethnicity were unknown for 11.7%. By May 15, 2021, 48.3% of persons aged ≥16 years had received ≥1 COVID-19 vaccine dose, and 38.3% were fully vaccinated.

Coverage with ≥1 COVID-19 vaccine dose was highest among Asian (57.4%) and White persons (54.6%) and lowest among Hispanic (41.1%) and Black persons (40.7%) (Table). Similar racial/ethnic variations were observed among fully vaccinated persons. Coverage with ≥1 dose increased weekly for all racial/ethnic minority groups during December 14, 2020–May 15, 2021 (Figure 1). Coverage as of Feb 13, 2021 was 8.2% for Hispanic persons, 9.3% for Black persons and 15.5% for Asian persons, while coverage as of May 15, 2021 was 41.1%, 40.7%, and 57.4% respectively. The absolute difference in coverage between White persons and all minority racial/ethnic groups generally increased over time, except Asian persons (Figure 1). The absolute percentage point difference in coverage between Black and White persons and between Hispanic and White persons increased over the study period from 6% (Black persons) and 8% (Hispanic persons) as of February 13, 2021 to 14% for both Black and Hispanic persons as of May 15, 2021.

Coverage with ≥1 dose was highest among persons aged ≥75 years (76.5%) and decreased with age; coverage was 28.7% among persons aged 18–24 years and 29.6% among those aged 16–17 years. Coverage with ≥1 dose was higher among females (50.8%) than among males (45.5%) (Table). Coverage among women was higher than that among men stratified by age, except among those aged ≥75 years (Supplementary Table 1, https://stacks.cdc.gov/view/cdc/107670). Coverage with ≥1 dose was higher among persons with high-risk conditions

TABLE. COVID-19 vaccination coverage among persons aged ≥16 years, by selected characteristics — Vaccine Safety Datalink, December 14, 2020–May 15, 2021

Characteristic	No. (%)*		
	VSD population	≥1 dose coverage†	Full vaccination coverage§
Total	**9,568,149 (100)**	**4,624,351 (48.3)**	**3,660,284 (38.3)**
Age group, yrs			
16–17	280,213 (2.9)	82,976 (29.6)	37,358 (13.3)
18–24	1,010,815 (10.6)	289,898 (28.7)	172,108 (17.0)
25–34	1,677,206 (17.5)	604,382 (36.0)	425,934 (25.4)
35–49	2,413,431 (25.2)	1,056,291 (43.8)	783,432 (32.5)
50–64	2,325,211 (24.3)	1,264,761 (54.4)	1,021,656 (43.9)
65–74	1,135,965 (11.9)	771,078 (67.9)	702,066 (61.8)
≥75	725,308 (7.6)	554,965 (76.5)	517,730 (71.4)
Race/Ethnicity			
White, non-Hispanic	3,942,027 (41.2)	2,153,286 (54.6)	1,779,948 (45.2)
Black, non-Hispanic	624,406 (6.5)	253,995 (40.7)	199,948 (32.0)
Hispanic/Latino	2,318,498 (24.2)	952,925 (41.1)	714,304 (30.8)
Asian, non-Hispanic	1,162,154 (12.1)	667,064 (57.4)	526,417 (45.3)
AI/AN, non-Hispanic	29,888 (0.3)	14,071 (47.1)	11,041 (36.9)
NH/PI, non-Hispanic	57,925 (0.6)	27,941 (48.2)	21,728 (37.5)
Multiple or other, non-Hispanic	312,524 (3.3)	153,614 (49.2)	119,954 (38.4)
Unknown	1,120,727 (11.7)	401,455 (35.8)	286,944 (25.6)
Sex			
Female	5,036,074 (52.6)	2,560,407 (50.8)	2,063,085 (41.0)
Male	4,532,075 (47.4)	2,063,944 (45.5)	1,597,199 (35.2)
High risk for COVID-19 disease¶			
No	6,624,221 (69.2)	2,746,712 (41.5)	2,031,841 (30.7)
Yes	2,943,928 (30.8)	1,877,639 (63.8)	1,628,443 (55.3)
History of COVID-19 disease**			
No	8,802,463 (92.0)	4,299,610 (48.8)	3,421,532 (38.9)
Yes	765,686 (8.0)	324,741 (42.4)	238,752 (31.2)

Abbreviations: AI/AN = American Indian or Alaska Native; ICD-10-CM = *International Classification of Diseases, Tenth Revision, Clinical Modification*; NH/PI = Native Hawaiian or Pacific Islander; VSD = Vaccine Safety Datalink.

* Percentages might not sum to expected values because of rounding.

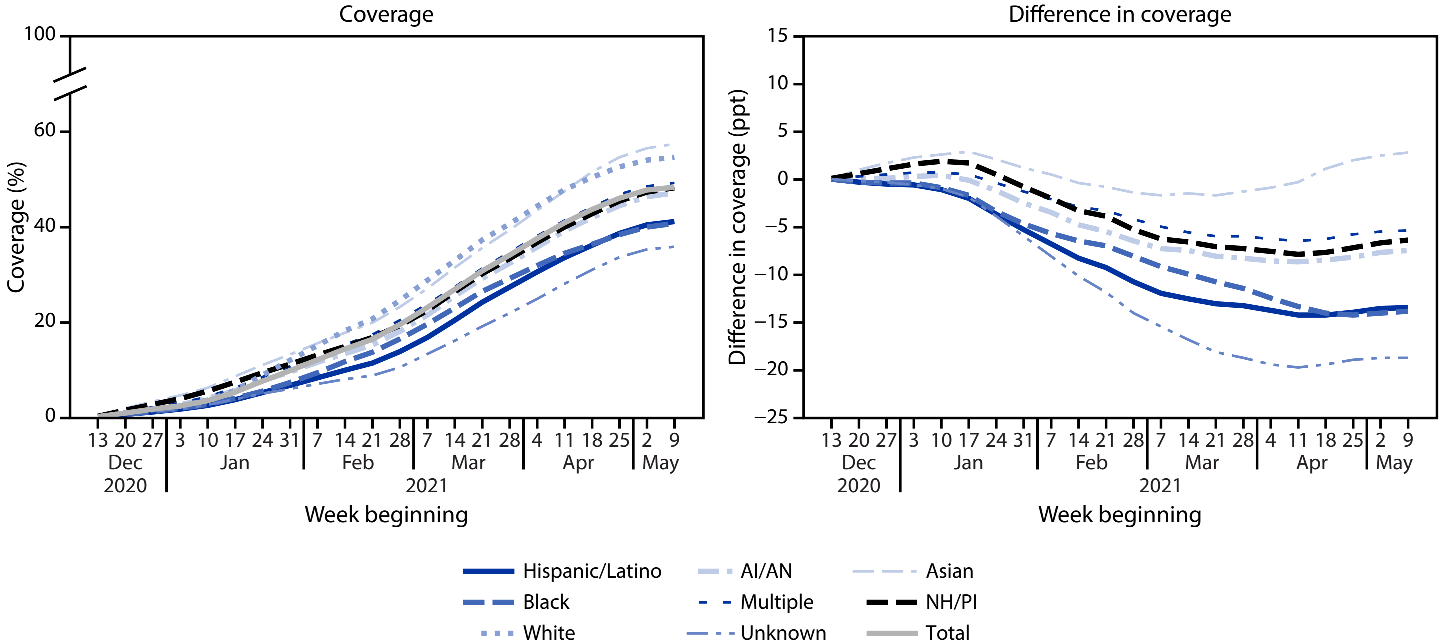
† At least 1 dose of COVID-19 vaccine is defined either as the first of 2 doses of Pfizer-BioNTech or Moderna vaccines, or 1 dose of the Janssen (Johnson & Johnson) vaccine from December 14, 2020–May 15, 2021.

§ Fully vaccinated is defined as receipt of both first and second dose of Pfizer-BioNTech or Moderna vaccines or receipt of 1 dose of Janssen (Johnson & Johnson) vaccine during December 14, 2020–May 15, 2021.

¶ All patients' records from the outpatient and inpatient settings are screened (automated records review and chart review) for underlying medical conditions that increase the risk of severe COVID-19 illness using ICD-10-CM codes. https://www.cdc.gov/coronavirus/2019-ncov/need-extra-precautions/people-with-medical-conditions.html

** A combination of ICD-10 COVID-19 codes and internal medical diagnostics codes was used to identify persons with a history of COVID-19 illness. Patient records were also screened for positive laboratory tests for COVID-19 illness before receipt of vaccination. The new ICD-10-CM code came into effect on April 1, 2020. https://www.cdc.gov/nchs/data/icd/Announcement-New-ICD-code-for-coronavirus-3-18-2020.pdf

FIGURE 1. COVID-19 vaccination coverage* and difference in vaccination coverage† among persons aged ≥16 years, by race/ethnicity§ and week — Vaccine Safety Datalink, United States, December 14, 2020–May 15, 2021



Abbreviations: AI/AN = American Indian or Alaska Native; NH = non-Hispanic; NH/PI = Native Hawaiian or Pacific Islander; ppt = percentage point.

* At least 1 dose of COVID-19 vaccine is defined either as the first of 2 doses of Pfizer-BioNTech or Moderna vaccines, or a single dose of Janssen (Johnson & Johnson) vaccine during December 14, 2020–May 15, 2021.

† Ppt difference in coverage from that in the White population (race/ethnicity coverage – NH, White coverage).

§ Hispanic persons could be of any race. Black, White, Asian, AI/AN, NH/PI, and multiracial persons were non-Hispanic.

(63.8%) than among persons without these conditions (41.5%), and among persons with no history of COVID-19 (48.8%) than among those with a history of COVID-19 (42.4%) (Table). Full vaccination coverage patterns were similar to ≥1-dose coverage by age, sex, high-risk conditions status, and history of COVID-19.

Asian persons had the highest coverage overall and among those with a high-risk condition (68.6%) or a history of COVID-19 illness (56.4%) (Figure 2). Among persons with and without high-risk conditions, Black persons had the lowest ≥1-dose coverage (55.6% and 30.4%, respectively).

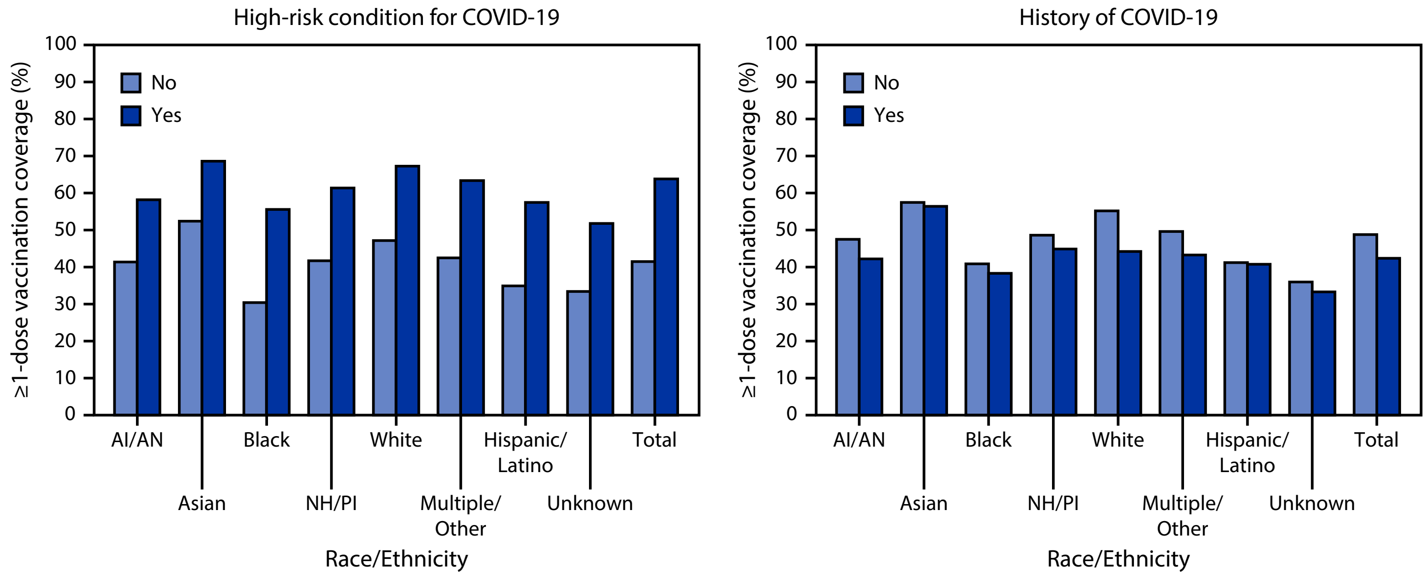
Among persons aged ≥75 years, Black and Hispanic persons had similar ≥1-dose coverage to that of White and Asian persons; among younger age groups, ≥1-dose coverage among Black and Hispanic persons was lower than that among White and Asian persons (Supplementary Table 2, https://stacks.cdc.gov/view/cdc/107671). Variations in coverage were also observed by age (Supplementary Table 1, https://stacks.cdc.gov/view/cdc/107670) and vaccine type (Supplementary Table 3, https://stacks.cdc.gov/view/cdc/107672).

Discussion

Among 9.6 million persons in the eight integrated health care organizations from six states included in the VSD, 48.3% of those aged ≥16 years had received ≥1 COVID-19 vaccine dose as of May 15, 2021, and 38.3% were fully vaccinated; cumulative ≥1-dose coverage increased steadily during the study period for all racial and ethnic minority groups during December 14, 2020–May 15, 2021. In the VSD population, ≥1-dose COVID-19 vaccination coverage among Asian and White persons was highest, and coverage among Hispanic and Black persons was lowest. This disparity has persisted and, generally, increased since December 2020, despite increasing vaccine availability and improved outreach efforts (*2*). Continued monitoring of vaccination coverage and efforts to improve equity in coverage are critical, especially among populations disproportionately affected by COVID-19. These efforts could include identifying and addressing potential barriers to access and improving vaccine acceptance, particularly among Hispanic and Black persons (*3*).

Coverage with ≥1 COVID-19 vaccine dose was higher among persons with a high-risk condition. This might be because such persons were prioritized for earlier allocation of COVID-19 vaccine. Persons with a history of COVID-19 had lower coverage than did persons who had not had COVID-19. This might indicate that these persons waited for some time after illness before seeking vaccination, or that they believed they might not need vaccination after recovering from COVID-19 (*4*).

FIGURE 2. Coverage with ≥1 dose of COVID-19 vaccine* among persons aged ≥16 years, by race/ethnicity† and having a high-risk condition for severe COVID-19 or history of COVID-19§,¶ — Vaccine Safety Datalink, United States, December 14, 2020–May 15, 2021



Abbreviations: AI/AN = American Indian or Alaska Native; ICD-10 = *International Classification of Diseases, Tenth Revision*; NH/PI = Native Hawaiian or Pacific Islander.
* At least 1 dose of COVID-19 vaccine is defined either as the first of 2 doses of Pfizer-BioNTech or Moderna vaccines, or 1 dose of Janssen (Johnson & Johnson) vaccine during December 14, 2020–May 15, 2021.
† Hispanic persons could be of any race. Black, White, Asian, AI/AN, NH/PI, and multiracial persons were non-Hispanic.
§ All patients' records from the outpatient and inpatient settings are screened (automated records review and chart review) for underlying medical conditions that increase the risk of severe COVID-19 using ICD-10 codes.
¶ Medical diagnostic codes were used to identify persons with a history of COVID-19 illness. Patient records were also screened for positive lab tests for COVID-19 illness before vaccination. The new ICD-10-Clinical Modification code went into effect on April 1, 2020. https://www.cdc.gov/nchs/data/icd/Announcement-New-ICDcode-for-coronavirus-3-18-2020.pdf

Vaccination coverage increased with increasing age. Coverage was highest among older adults, likely because of earlier vaccine prioritization among this population compared with younger adults (*5*). Coverage with ≥1 COVID-19 vaccine dose was lowest among adults aged 18–24 years and among adolescents aged 16–17 years, for whom the only authorized COVID-19 vaccine is Pfizer-BioNTech. Persons aged 16–17 years are still generally under parental supervision, including with regard to medical and health decisions, which might have contributed to the higher coverage in this age group compared with that in those aged 18–24 years. Ensuring that vaccination is accessible and available in places where persons live and work could improve coverage, particularly among younger adults (*6*).

The findings in this report are subject to at least three limitations. First, because VSD collects data in six states within eight integrated health care organizations, these findings might not be generalizable to the U.S. population. However, previous research indicates that VSD estimates align closely with those from the U.S. population in many important demographic characteristics, including sex and racial/ethnic distributions (*7*). Second, vaccination coverage in the VSD population could be underestimated if vaccination status was not captured or identified for some persons who received vaccinations outside participating systems or state registry catchment areas. Finally, VSD data on race and ethnicity are 88.3% complete, which could limit interpretation of results.

Summary

What is already known about this topic?

Non-Hispanic Black and Hispanic persons experience higher COVID-19–associated morbidity and mortality, yet COVID-19 vaccination coverage is lower in these groups.

What is added by this report?

As of May 15, 2021, 48.3% of persons identified in CDC's Vaccine Safety Datalink aged ≥16 years had received ≥1 COVID-19 vaccine dose and 38.3% were fully vaccinated. Coverage with ≥1 dose was lower among non-Hispanic Black (40.7%) and Hispanic persons (41.1%) than among non-Hispanic White persons (54.6%); coverage was highest (57.4%) among non-Hispanic Asian persons.

What are the implications for public health practice?

Continued monitoring of vaccination coverage and efforts to improve equity in vaccination coverage are critical, especially among populations disproportionately affected by COVID-19.

COVID-19 vaccination coverage in the integrated health systems that comprise VSD is continuing to increase for all racial/ethnic groups, and coverage is higher among persons with medical conditions that place them at higher risk for severe

COVID-19. However, racial and ethnic minority groups, including Black and Hispanic persons, continue to have lower coverage, and these gaps appear to have widened over time. Although vaccines are provided at no cost, persons who have economic challenges or language barriers, lack government-issued identification, or who face challenges because of distance or transportation to a vaccination site might experience barriers to vaccination (*8*). Efforts to address vaccine misinformation, barriers to access, and insufficient vaccine confidence, coupled with strategies to prioritize equity, could help increase coverage and reduce COVID-19 incidence, especially among populations disproportionately affected by the pandemic.

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COVID-19 Vaccine Administration, by Race and Ethnicity — North Carolina, December 14, 2020–April 6, 2021

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COVID-19 has disproportionately affected non-Hispanic Black or African American (Black) and Hispanic persons in the United States (*1*,*2*). In North Carolina during January–September 2020, deaths from COVID-19 were 1.6 times higher among Black persons than among non-Hispanic White persons (*3*), and the rate of COVID-19 cases among Hispanic persons was 2.3 times higher than that among non-Hispanic persons (*4*). During December 14, 2020–April 6, 2021, the North Carolina Department of Health and Human Services (NCDHHS) monitored the proportion of Black and Hispanic persons* aged ≥16 years who received COVID-19 vaccinations, relative to the population proportions of these groups. On January 14, 2021, NCDHHS implemented a multipronged strategy to prioritize COVID-19 vaccinations among Black and Hispanic persons. This included mapping communities with larger population proportions of persons aged ≥65 years among these groups, increasing vaccine allocations to providers serving these communities, setting expectations that the share of vaccines administered to Black and Hispanic persons matched or exceeded population proportions, and facilitating community partnerships. From December 14, 2020–January 3, 2021 to March 29–April 6, 2021, the proportion of vaccines administered to Black persons increased from 9.2% to 18.7%, and the proportion administered to Hispanic persons increased from 3.9% to 9.9%, approaching the population proportion aged ≥16 years of these groups (22.3% and 8.0%, respectively). Vaccinating communities most affected by COVID-19 is a national priority (*5*). Public health officials could use U.S. Census tract-level mapping to guide vaccine allocation, promote shared accountability for equitable distribution of COVID-19 vaccines with vaccine providers through data sharing, and facilitate community partnerships to support vaccine access and promote equity in vaccine uptake.

On January 14, 2021, NCDHHS adopted an equity-promoting vaccination strategy that included both per capita and equity-based vaccine allocation, shared accountability, and community partnerships. Approximately 20% of COVID-19 vaccine doses were set aside for allocation informed by mapping. NCDHHS mapped the proportion of Black and Hispanic populations aged ≥65 years, by U.S. Census Bureau tracts using ArcGIS (version 10.8.1; Esri), and overlayed vaccine provider locations, including Federally Qualified Health Centers (FQHCs).† During February 1–21, 2021, North Carolina received 359,225 (76.3%) of 470,825 mRNA COVID-19 vaccine first dose allocations, distributed to all 100 counties across the state proportional to the total population; 111,600 (23.7%) were directed to census tracts with the highest population proportion of Black, Hispanic, or American Indian or Alaska Native (AI/AN) persons aged ≥65 years. During February 22–March 22, 2021, maps were updated weekly to identify census tracts in which a larger proportion of Black, Hispanic, or AI/AN persons aged ≥65 years remained unvaccinated.§ Based on this mapping and vaccine supplies, the decision was made to allocate 20,800 additional doses per week for these census tracts. Doses allocated based on mapping were directed to vaccine providers with geographic proximity to priority census tracts or vaccine providers who served Black or Hispanic populations, such as FQHC.

NCDHHS advised vaccine providers about administering doses to match or exceed their local population proportion of Black and Hispanic persons aged ≥16 years to promote shared accountability with providers for equitable distribution of COVID-19 vaccines (Table). NCDHHS required that vaccine providers report race and ethnicity for each vaccine recipient and provided performance reports twice per month showing the provider-specific vaccine administration to each racial and ethnic group aged ≥16 years relative to population proportions. Statewide and county-specific vaccination data were also published on a dashboard, by race and ethnicity.¶ In addition, NCDHHS facilitated two or three meetings per week with providers to exchange best practices and provided tailored coaching on implementing these practices. Community partnerships were facilitated with vaccine providers and trusted messengers in faith- and community-based organizations to support vaccine access. For example, NCDHHS created vaccination and communications toolkits for community-based organizations

* Race and ethnicity were self-reported by vaccinated persons and recorded by health care providers in the NCDHHS COVID-19 Vaccination Management System (CVMS). Race and ethnicity were analyzed separately. Black persons were those who identified as being of Black race regardless of ethnicity. Hispanic persons were those who identified as being of Hispanic ethnicity regardless of race.

† Census tract-level population data were from the U.S. Census Bureau American Community Survey (2019 5-year estimates). North Carolina health care provider locations were from CVMS and the Federal Retail Pharmacy Program.

§ Based on data from CVMS.

¶ https://covid19.ncdhhs.gov/dashboard/vaccinations

TABLE. Ten strategies recommended by North Carolina Department of Health and Human Services to promote equitable distribution of vaccines, by domain — North Carolina, December 14, 2020–April 6, 2021

Domain	Strategy
Tailor efforts	1. Hold appointment slots for underserved populations. For example, reserve 40 out of 100 appointments based on community demographics to ensure these slots are filled with patients from underrepresented communities first. Note this on waiting lists or create different waiting lists to allow for this prioritization. Preferentially reach out to patients from underrepresented communities and schedule these slots before opening appointments to the general population.
	2. Partner with subsidized housing organizations and offer on-site vaccination events with appointments planned and scheduled with housing partner.
	3. Partner with trusted messengers in faith and other community organizations, including those that cater to seniors.*
Mitigate barriers to accessing web-based scheduling systems	4. Print and prepopulate event tickets with time and date of vaccine slot; distribute in person to groups who meet the priority criteria; allow them to transfer their ticket to someone else who meets criteria in their place.
	5. Ask partner organization to assist with scheduling appointments, conducting targeted outreach via phone or in person. If working with one partner or more, allow each partner organization to reserve a set number of slots to fill with prioritized populations.
	6. Educate partners to serve as "vaccine ambassadors" to conduct outreach and let eligible groups know how to sign up for a vaccine appointment.
Mitigate physical and perceived barriers	7. Host vaccination event at a location that is easy to access through public transportation and familiar to participants.
	8. When registering participants, ask how the person intends to travel to the site and help arrange and/or subsidize transport, if needed.
	9. Extend vaccine event hours to the evenings and weekends to accommodate persons who are unable to take time off from work or those requiring transport from family members.
	10. Do not request photo identification or proof of residency to be vaccinated or to schedule an appointment. The need for an identification card might be a barrier for many populations, including older adults, immigrants, and persons experiencing homelessness.

* Examples include Meals on Wheels, local offices or councils on aging, Association for Home & Hospice Care of North Carolina, LATIN-19, AME Zion Church, North Carolina Rural Coalition Fighting COVID-19, and Rural Forward NC.

that included checklists, presentations, and testimonials. NCDHHS also distributed a list of organizations interested in supporting vaccination events to vaccine providers.** This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.††

During December 14, 2020–April 6, 2021, the number and percentage of vaccine doses allocated based on mapping were calculated. The number and proportion of vaccinated persons were calculated by race and ethnicity with corresponding 95% confidence intervals (CIs). The focus of this analysis was on Black and Hispanic populations.§§ For each week during December 14, 2020–April 6, 2021, the proportions of vaccinated persons aged ≥16 years who were Black or Hispanic were compared with the population proportions of Black and Hispanic persons aged ≥16 years statewide, by county and provider type (e.g., FQHC).¶¶ Changes over time were assessed by testing differences in proportions (z-statistic).

Among 3,185,750 COVID-19 vaccine doses allocated by NCDHHS during December 14, 2020–April 6, 2021, 226,900 (7.1%) were allocations based on mapping that were directed to 324 vaccine providers in 80 counties, including 83 FQHC (Figure 1). FQHC received 37,900 (16.7%) equity-based allocations.

During December 14, 2020–April 6, 2021, a total of 2,815,774 persons aged ≥16 years received ≥1 vaccine dose in North Carolina;*** race was missing for 1.9%, and ethnicity was missing for 3.7% of vaccine recipients. Overall, 17.2% (95% CI = 17.1%–17.2%) and 5.6% (95% CI = 5.6%–5.6%) of vaccines were administered to Black and Hispanic persons, respectively. From December 14, 2020–January 3, 2021 to March 29–April 6, 2021, the proportion of vaccines administered to Black persons increased from 9.2% (95% CI = 9.1%–9.4%) to 18.7% (95% CI = 18.6%–18.9%) ($p<0.001$); during the same period, the proportion of vaccines administered to Hispanic persons increased from 3.9% (95% CI = 3.8%–4.0%) to 9.9% (95% CI = 9.8%–10.0%) ($p<0.001$) (Figure 2). During December 14, 2020–January 4, 2021, vaccination rates per 10,000 population aged ≥16 years were 66.2 and 72.6 for Black and Hispanic persons, respectively; during March 29–April 6, 2021, rates were 708.8 and 502.5 for Black and Hispanic persons, respectively. Among 57 counties that received vaccine allocations based on equity mapping, the proportion of Black persons vaccinated was equal to or higher

** Current versions of toolkits are available in English and Spanish online at Supporting North Carolina's Vaccination Efforts Toolkit for Partner Organizations (https://covid19.ncdhhs.gov/media/1482/download) and COVID-19 Vaccine Communications Toolkit (https://covid19.ncdhhs.gov/vaccines/covid-19-vaccine-communications-toolkit).

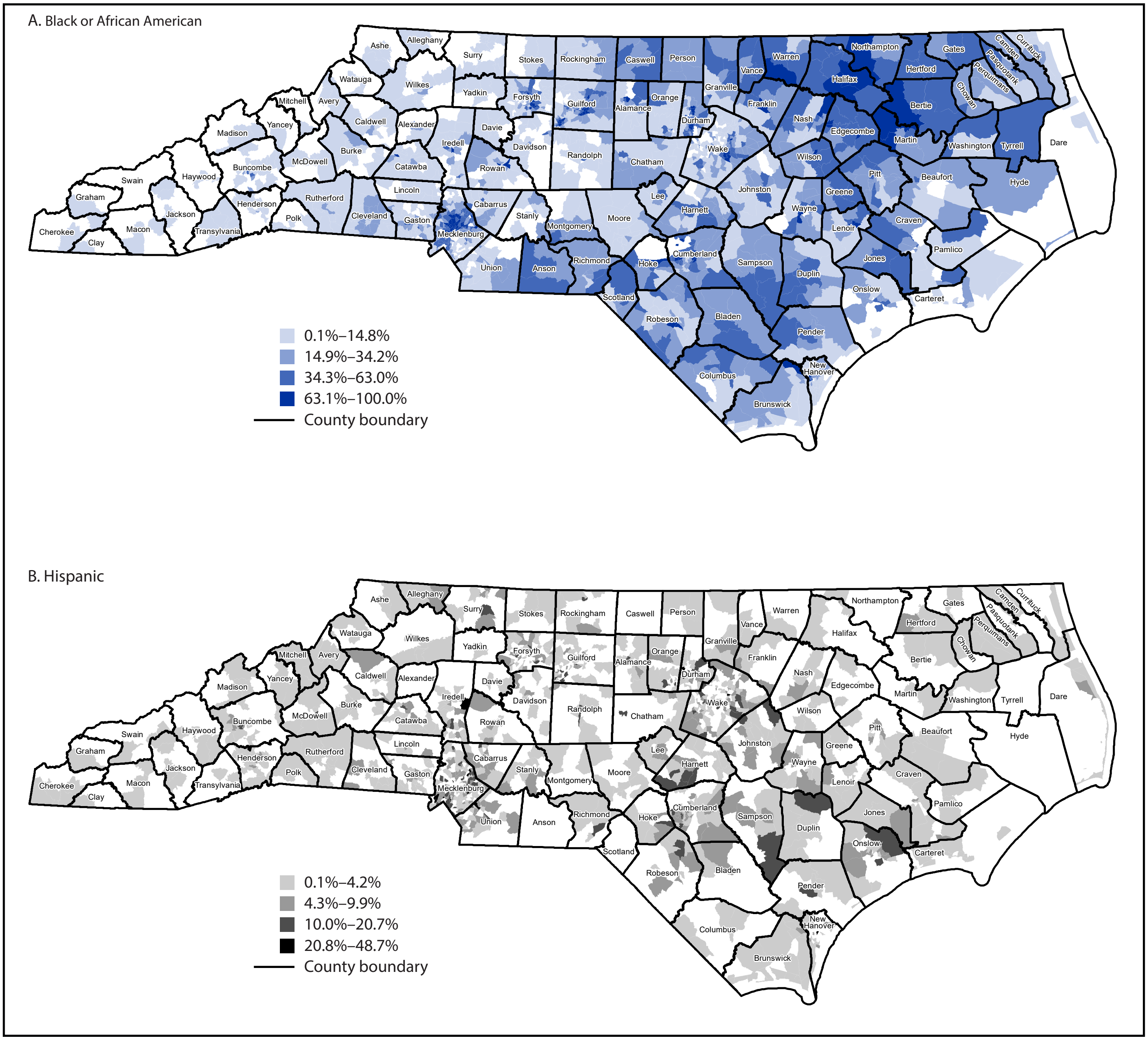
†† 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

§§ Data on AI/AN were not analyzed in this report because many vaccines were administered by the Indian Health Service, which was outside of NCDHHS purview. Asian or Pacific Islander (A/PI) persons were not the focus of the NCDHHS strategy because the proportion of persons vaccinated who were A/PI persons was at least equal to the population proportion in North Carolina from the start of vaccine rollout.

¶¶ Statewide population estimates were 2019 Bridged-Race Population estimates from the National Center for Health Statistics. https://wonder.cdc.gov/bridged-race-v2019.html

*** This report does not include vaccinations administered by federal vaccine providers, such as the Veterans Administration or the Indian Health Service.

FIGURE 1. Proportion of Black or African American (A) and Hispanic (B) persons aged ≥65 years, by U.S. Census tract* — North Carolina, 2019†



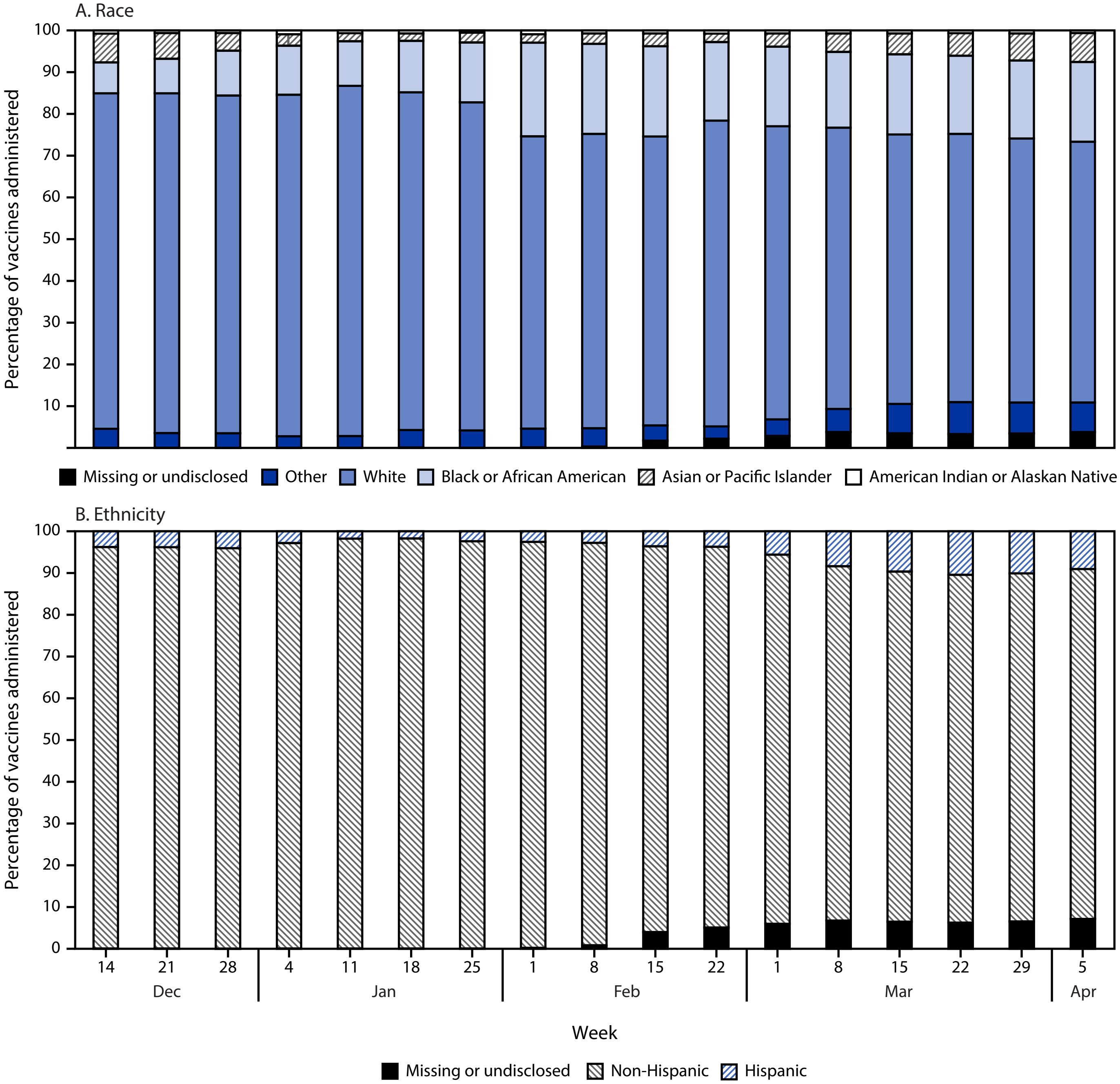
* County boundaries are approximate.
† Data from U.S. Census Bureau American Community Survey (2019 5-year estimates).

than that of the Black population proportion in 11 (19.3%) counties, and equal to or higher than that of the Hispanic population proportion in five (8.8%) counties. By provider type, the proportion of persons who were Black or Hispanic vaccinated by FQHC providers exceeded their county population proportions by 6.5%, whereas non-FQHC providers under-vaccinated these groups by 2.5%.

Discussion

During December 14, 2020–April 6, 2021, implementation of a vaccine equity strategy coincided with a near doubling in the proportion of vaccine doses administered to Black persons aged ≥16 years in North Carolina, approaching parity with the population proportion of Black persons. The share of vaccine doses administered to Hispanic persons doubled during this

FIGURE 2. Percentage of COVID-19 vaccine doses (n = 2,815,774) administered, by race (A) and ethnicity (B)* and week† — North Carolina, December 14, 2020–April 6, 2021



* Race and ethnicity self-reported by vaccinated persons and recorded by vaccine providers in the North Carolina COVID-19 Vaccination Management System. Data include all persons aged ≥16 years.
† "Apr 5" week was 2 days (April 5–6, 2021); all other weeks were 7 days.

period. The combination of strategies that might have helped promote vaccination among Black and Hispanic communities in North Carolina included mapping, promoting shared accountability with providers for equitable vaccine distribution through public dashboards and individualized performance reporting, and building partnerships to support vaccine access. Cumulative disparities in vaccine distribution among Black and Hispanic persons in North Carolina reflect similar disparities across the United States, which result in part from structural inequities that have affected health care access and trust in health care by these communities (*6*,*7*).

Mapping first focused on identifying the locations of residences of eligible Black and Hispanic persons aged ≥65 years and was then updated to focus on areas of lowest vaccination coverage among these groups. Mapping required complete data on race and ethnicity of vaccinated persons. After implementation of biweekly performance reporting for vaccine providers, North Carolina achieved a level of high completeness of race and ethnicity data, missing information for 5.1% of vaccination recipients (*3*) compared with 42.8% nationwide (*8*). Performance reporting also supported shared accountability by enabling providers to compare their performance, which might have motivated improvement. Finally, NCDHHS recognized the central role of partnerships with FQHC and community-based organizations in earning trust among Black and Hispanic communities. FQHC administered vaccines more equitably compared with other provider types. Community-based organizations, often in partnership with NCDHHS, hosted webinars to share vaccine information and listen to community needs.

NCDHHS continues to build on the strategy outlined in this report. On April 26, 2021, NCDHHS published a map of census tract-level vaccination coverage among persons aged ≥12 years[†††] and Social Vulnerability Index[§§§] (Supplementary Figure, https://stacks.cdc.gov/view/cdc/107719).[¶¶¶] As of April 2021, state-contracted providers continue to establish vaccination clinics in census tracts with high social vulnerability indices and low vaccination coverage, and partners use the map to identify areas for conducting outreach. NCDHHS supports door-to-door health education and community mobilization through Healthier Together,[****] a public-private partnership to increase vaccination coverage. Over 400 community health workers (>30% of whom are Spanish bilingual) provide culturally sensitive programming and support vaccination events.

The findings in this report are subject to at least four limitations. First, this ecological study did not include a comparison group, and observed changes cannot be attributed to the strategies implemented. Second, not all dimensions of vaccine equity were addressed. For example, vaccine recipient income and occupation were not recorded, which precluded assessments for these aspects of equity and socioeconomic status. Third, vaccination administration by race and ethnicity was not publicly tracked separately among persons aged ≥65 years, who were the focus of mapping strategies given their earlier eligibility and higher risk for severe COVID-19–related outcomes. Finally, this report does not describe all local equity-promoting strategies pursued by vaccine providers.

Equitable COVID-19 vaccination is critical to addressing the disproportionate incidence of COVID-19 among Black and Hispanic communities that are economically and socially marginalized (*1*,*9*). Multiple approaches are warranted to promote equitable distribution of vaccines (*10*). To prioritize equitable COVID-19 vaccinations among Black and Hispanic communities, NCDHHS used mapping, promoted shared accountability with providers for equity, and facilitated partnerships with community organizations to support vaccine access. These strategies could also be considered by public health officials in other states and communities to further increase equity in COVID-19 vaccine distribution and coverage, including among racial and ethnic populations disproportionately affected by COVID-19.

Summary

What is already known about this topic?

COVID-19 has disproportionately affected Black or African American and Hispanic communities.

What is added by this report?

Among persons vaccinated during March 29–April 6, 2021, compared with December 14, 2020–January 3, 2021, in North Carolina, the proportion who were Black nearly doubled, and the share of vaccine doses administered to Hispanic persons doubled during this period, approaching the proportion of the state population for these groups aged ≥16 years.

What are the implications for public health practice?

To promote equitable vaccination coverage, public health officials could consider using U.S. Census tract-level mapping to guide vaccine allocation, promote shared accountability for equitable distribution of vaccines with providers through data sharing, and facilitate community partnerships to support vaccine access.

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††† Vaccination coverage was defined as the percentage of persons aged ≥12 years who were fully vaccinated (i.e., had received all recommended doses of a COVID-19 vaccine).

§§§ The CDC Social Vulnerability Index ranks census tracts according to 15 social factors (indicators). This metric helps to identify communities that might need additional support during emergencies, including the COVID-19 pandemic. https://www.atsdr.cdc.gov/placeandhealth/svi/documentation/SVI_documentation_2018.html

¶¶¶ https://nc.maps.arcgis.com/apps/webappviewer/index.html?id=31df85b470ad49809445a2d83e80d269

**** https://covid19.ncdhhs.gov/vaccines/nc-vaccine-strategy/healthier-together-health-equity-action-network

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Acceptability of Adolescent COVID-19 Vaccination Among Adolescents and Parents of Adolescents — United States, April 15–23, 2021

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On May 10, 2021, the Food and Drug Administration (FDA) expanded its Emergency Use Authorization for the Pfizer-BioNTech COVID-19 vaccine to include adolescents aged 12–15 years; this authorization was followed by interim recommendations from the Advisory Committee on Immunization Practices (ACIP) for the vaccine among this age group (*1*). Using data from nonprobability–based Internet panel surveys administered by the Healthcare and Public Perceptions of Immunizations (HaPPI) Survey Collaborative, the acceptability of adolescent COVID-19 vaccination and self-reported factors increasing vaccination intent were assessed among independently recruited samples of 985 adolescents aged 13–17 years and 1,022 parents and guardians (parents) of adolescents aged 12–17 years during April 15–April 23, 2021, prior to vaccine authorization for this age group. Approximately one quarter (27.6%) of parents whose adolescents were already vaccine-eligible (i.e., aged 16–17 years) reported their adolescent had received ≥1 COVID-19 vaccine dose, similar to the proportion reported by vaccine-eligible adolescents aged 16–17 years (26.1%). However, vaccine receipt reported by parents of adolescents differed across demographic groups; parents identifying as female or Hispanic, or who had an education lower than a bachelor's degree reported the lowest adolescent COVID-19 vaccination receipt. Among parents of unvaccinated adolescents aged 12–17 years, 55.5% reported they would "definitely" or "probably" have their adolescent receive a COVID-19 vaccination. Among unvaccinated adolescents aged 13–17 years, 51.7% reported they would "definitely" or "probably" receive a COVID-19 vaccination. Obtaining more information about adolescent COVID-19 vaccine safety and efficacy, as well as school COVID-19 vaccination requirements, were the most commonly reported factors that would increase vaccination intentions among both parents and adolescents. Federal, state, and local health officials and primary care professionals were the most trusted sources of COVID-19 vaccine information among both groups. Efforts focusing on clearly communicating to the public the benefits and safety of COVID-19 vaccination for adolescents, particularly by health care professionals, could help increase confidence in adolescent COVID-19 vaccine and vaccination coverage.

The HaPPI Survey Collaborative is part of a cooperative agreement between CDC and researchers at the University of Iowa and the RAND Corporation to survey health care professionals and the U.S. public on vaccine-related issues. Surveys to assess the acceptability of adolescent COVID-19 vaccination were administered during April 15–23, 2021, to U.S. adolescents aged 13–17 years and parents of U.S. adolescents aged 12–17 years using a nonprobability–based, independently recruited (i.e., nondyadic) Internet panel (Qualtrics, LLC).* Adolescents aged 13–17 years (rather than those aged 12–17 years) were surveyed because, under federal online privacy rules, after obtaining parental consent to join the panel, they can complete panel surveys without further parental consent (*2*). Sampling quotas by age, gender, and race and Hispanic ethnicity were used to reduce potential sampling bias.† Among the 1,457 parents and 1,927 adolescents screened, 1,129 parents (77.5%) and 1,143 adolescents (59.3%) agreed to participate in the study. Among those agreeing to participate, 105 parents and 138 adolescents were excluded for providing low quality responses.§ The final samples included 1,022 parents (90.5% completion rate) and 985 adolescents (87.1% completion rate).

Among both adolescents and parents of adolescents, primary measures were self-reported COVID-19 vaccination (receipt of ≥1 dose) for adolescents aged 16–17 years and COVID-19 vaccination intentions for unvaccinated adolescents aged 12–17 years. Secondary measures were potential factors to increase vaccination intentions among respondents not reporting definite intent for adolescent vaccination, and trusted vaccination locations and information sources. Chi-square analyses were conducted to test for group differences using Stata (version 14.2; StataCorp, LLC).¶ To account for multiple

* https://osf.io/nq94h/?view_only = ea1a744cc8a343b59bfa31f8ec1ae4fc

† Sampling quotas were used by age group, gender, and race and Hispanic ethnicity. For age group, the quota included 40% of adolescents aged 12–15 years (parent sample)/13–15 years (adolescent sample), 40% aged 16–17 years, and 20% not specified. Parents were able to report whether they had adolescents in both age groups. For gender, the quota included: 40% identifying as male, 40% identifying as female, and 20% not specified. For race and Hispanic ethnicity, the quota included 62.3% non-Hispanic White, 12.4% non-Hispanic Black, 17.3% Hispanic, and 8.0% Other race/ethnicity.

§ Low-quality responses included completing the survey too rapidly and exiting the survey before completion, and also included adolescents aged 12–15 years who indicated they had already received the COVID-19 vaccine.

¶ Analyses with weights to correct for potential biases in the distribution of adolescents and parents of adolescents across U.S. Census regions were also conducted. The unweighted and weighted analyses produced similar results. Therefore, unweighted results are reported for simplicity.

comparisons, p-values ≤0.003 were considered statistically significant. This survey was reviewed and approved by the University of Iowa Institutional Review Board.**

Among parents with adolescents aged 16–17 years, 27.6% reported that their adolescent had received ≥1 COVID-19 vaccine dose (Table). Parent-reported adolescent receipt of a COVID-19 vaccine differed significantly when examined by parents' gender, level of education, and race/ethnicity. Specifically, parents who identified as female, Hispanic, or who had less than a bachelor's degree reported the lowest adolescent COVID-19 vaccination receipt. Among parents with unvaccinated adolescents aged 12–17 years, 55.5% reported that they "definitely will" or "probably will" have their adolescent child receive a COVID-19 vaccination. Parent-reported intent for their adolescent to receive a COVID-19 vaccination was

** 45 C.F.R. part 46; 21 C.F.R. part 56.

TABLE. Reported adolescent COVID-19 vaccine uptake and intentions among U.S. parents and guardians (parents) of adolescents aged 12–17 years and adolescents aged 13–17 years, by respondent characteristics — United States, April 15–23, 2021

Respondent group/Characteristic	No.	% (95% CI)	COVID-19 vaccine receipt* for adolescents aged 16–17 years (95% CI)	Parental COVID-19 vaccination intentions† for unvaccinated adolescents aged 12–17 years (or intentions† of adolescents aged 13–17 years) (95% CI)
Parents of adolescents aged 12–17 yrs				
Total	**1,022**	**100**	**27.6 (23.6–31.9)**	**55.5 (51.9–59.0)**
Adolescent age group, yrs§				
12–15	737	72.1 (69.3–74.8)	N/A	53.7 (46.8–60.5)
16–17	452	44.2 (41.2–47.9)	27.6 (23.6–31.9)	56.1 (52.0–60.2)
p-value	—	—	—	0.550
Respondent gender				
Male	524	51.3 (48.2–54.3)	35.2 (29.0–42.0)	63.0 (57.8–68.0)
Female	493	48.2 (45.2–51.4)	20.6 (15.9–26.2)	49.3 (44.5–54.1)
Transgender or other gender identity	5	0.5 (0.2–1.2)	—¶	—¶
p-value	—	—	0.001**	<0.001**
Respondent race/ethnicity				
White, non-Hispanic	650	63.6 (60.6–66.5)	33.0 (27.7–38.7)	57.5 (52.9–62.0)
Black, non-Hispanic	129	12.6 (10.8–14.8)	25.4 (15.9–38.1)	49.1 (39.6–58.6)
Hispanic	173	16.9 (14.7–19.3)	11.0 (5.8–19.9)	53.3 (45.3–61.1)
Other, non-Hispanic	70	6.9 (5.5–8.6)	26.7 (13.7–45.4)	57.4 (43.9–69.9)
p-value	—	—	0.001**	0.409
Education††				
≤High school	181	17.7 (15.4–20.1)	22.1 (14.5–32.2)	40.5 (33.0–48.5)
Some college	258	25.2 (22.6–28.0)	16.9 (11.3–24.6)	47.4 (40.9–53.9)
≥Bachelor's degree	583	57.1 (54.0–60.1)	35.0 (29.2–41.3)	66.2 (61.3–70.8)
p-value	—	—	0.001**	p<0.001**
Urbanicity§§				
Metropolitan	897	87.9 (85.8–89.8)	28.8 (24.5–33.4)	57.0 (53.2–60.7)
Micropolitan	65	6.4 (5.0–8.1)	21.9 (10.7–39.7)	38.5 (26.2–52.4)
Small town/Rural	58	5.7 (4.4–7.3)	16.7 (6.2–37.5)	53.1 (39.1–66.6)
p-value	—	—	0.329	0.033
U.S. Census region				
Northeast	205	20.1 (17.8–22.7)	37.9 (28.7–48.1)	66.4 (58.2–73.8)
Midwest	195	19.1(16.7–21.6)	26.3 (18.4–36.1)	46.9 (39.0–55.1)
South	400	39.2 (36.3–42.3)	26.3 (20.0–33.7)	50.8 (45.2–56.4)
West	221	21.7 (19.2–24.2)	21.0 (14.1–30.2)	62.4 (54.8–69.3)
p-value	—	—	0.059	0.001**
Adolescents aged 13–17 yrs				
Total	**985**	**100**	**26.1 (22.7–29.8)**	**51.7 (48.3–55.1)**
Adolescent age group, yrs§				
13–15	398	40.4 (37.4–43.5)	N/A	54.5 (49.6–59.4)
16–17	587	59.6 (56.5–62.6)	26.1 (22.7–29.8)	49.1 (44.4–53.8)
p-value	—	—	—	0.116
Respondent gender				
Male	358	36.4 (33.6–39.7)	23.7 (18.5–29.9)	49.5 (43.9–55.1)
Female	580	58.9 (55.6–61.8)	27.8 (23.3–32.7)	50.5 (46.1–55.0)
Transgender or other gender identity	47	4.8 (3.5–6.2)	—¶	—¶
p-value	—	—	0.286	0.783

See table footnotes on the next page.

significantly lower among female (49.3%) than among male (63.0%) parents and among those having less than a bachelor's degree or living in the Midwest or South Census regions.[††]

Among adolescent respondents aged 16–17 years, 26.1% reported that they had received ≥1 COVID-19 vaccine dose. Among unvaccinated adolescents aged 13–17 years, 51.7% reported they "definitely will" or "probably will" receive a COVID-19 vaccination. Adolescent-reported COVID-19 vaccination receipt and intention to be vaccinated were similar across demographic groups.

Among 511 of 766 (66.7%) parents of unvaccinated adolescents who did not indicate that they "definitely will get the vaccine" for their adolescent, the most commonly reported factors that would increase intent for adolescent COVID-19 vaccination were having more information about safety (16.3%) and efficacy (13.4%) of COVID-19 vaccines for adolescents and having vaccination be a school requirement (13.2%) (Figure 1). Similarly, among 705 of 832 (84.7%) unvaccinated adolescents who did not indicate that they "definitely will get the vaccine," the most commonly reported factors that would increase vaccination intent were more information about safety (21.7%) and efficacy (17.6%) of COVID-19 vaccines for adolescents and that vaccination be a school requirement (23.9%). Other potential factors that might increase vaccination selected by a relatively large proportion of adolescents included preventing the spread of COVID-19 to family and friends (17.1%), allowing resumption of or increase in social activities (15.5%), or traveling (14.5%). Very few parents (9.9%) or adolescents (8.9%) selected a COVID-19 vaccine recommendation by a health care professional as a factor that would increase vaccination intentions.

Parents of unvaccinated adolescents and unvaccinated adolescents reported feeling most comfortable with vaccination occurring at the adolescent's usual doctor's office or clinic (66.6% and 76.5%, respectively). At least one quarter

[††] Midwest U.S. Census region: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. South U.S. Census region: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia.

TABLE. (*Continued*) Reported adolescent COVID-19 vaccine uptake and intentions among U.S. parents and guardians (parents) of adolescents aged 12–17 years and adolescents aged 13–17 years, by respondent characteristics — United States, April 15–23, 2021

Respondent group/Characteristic	No.	% (95% CI)	COVID-19 vaccine receipt* for adolescents aged 16–17 years (95% CI)	Parental COVID-19 vaccination intentions† for unvaccinated adolescents aged 12–17 years (or intentions† of adolescents aged 13–17 years) (95% CI)
Respondent race/ethnicity				
White, non-Hispanic	625	63.5 (60.4–66.5)	24.8 (20.4–29.9)	52.0 (47.8–56.2)
Black, non-Hispanic	130	13.2 (11.1–15.4)	19.8 (12.8–29.3)	42.9 (34.0–52.2)
Hispanic	180	18.3 (16.0–20.9)	31.2 (24.1–39.4)	51.5 (43.1–59.8)
Other, non-Hispanic	50	5.1 (3.9–6.8)	32.4 (19.3–49.1)	73.7 (57.4–85.4)
p-value	—	—	0.185	0.012
Urbanicity[§§]				
Metropolitan	838	86.9 (84.6–88.9)	26.9 (23.2–31.0)	53.3 (49.6–57.0)
Micropolitan	76	7.9 (6.4–9.8)	18.2 (9.3–32.6)	42.6 (31.4–54.7)
Small town/Rural	50	5.2 (4.0–6.8)	28.6 (14.8–48.0)	40.5 (26.7–55.9)
p-value	—	—	0.433	0.078
U.S. Census region[¶¶]				
Northeast	188	19.2 (17.1–22.1)	24.8 (17.6–33.6)	61.3 (53.5–68.5)
Midwest	217	22.1 (19.4–24.7)	23.5 (16.7–32.0)	46.6 (39.5–53.7)
South	362	36.9 (34.1–40.2)	24.8 (19.6–30.8)	46.7 (41.2–52.4)
West	213	21.7 (19.0–24.2)	32.5 (24.9–41.2)	57.6 (50.0–64.8)
p-value	—	—	0.332	0.004

Abbreviations: CI = confidence interval; N/A = not applicable.

* Reporting receipt of ≥1 COVID-19 vaccine dose. Reported proportions might not sum to 100% because of rounding.

† Percentage of respondents indicating the unvaccinated adolescent aged 12–17 years "definitely will get a vaccine" or "probably will get a vaccine." This question was asked of 766 parents who reported having an unvaccinated adolescent aged 12–17 years and 832 adolescents aged 13–17 years who reported being unvaccinated. Reported proportions might not sum to 100% because of rounding.

§ Parents could indicate that they had adolescents in one or both age groups.

¶ Value had a relative standard error of ≥30%, indicating an unstable estimate that should not be reported. Statistical comparisons by gender include only respondents identifying as male or female.

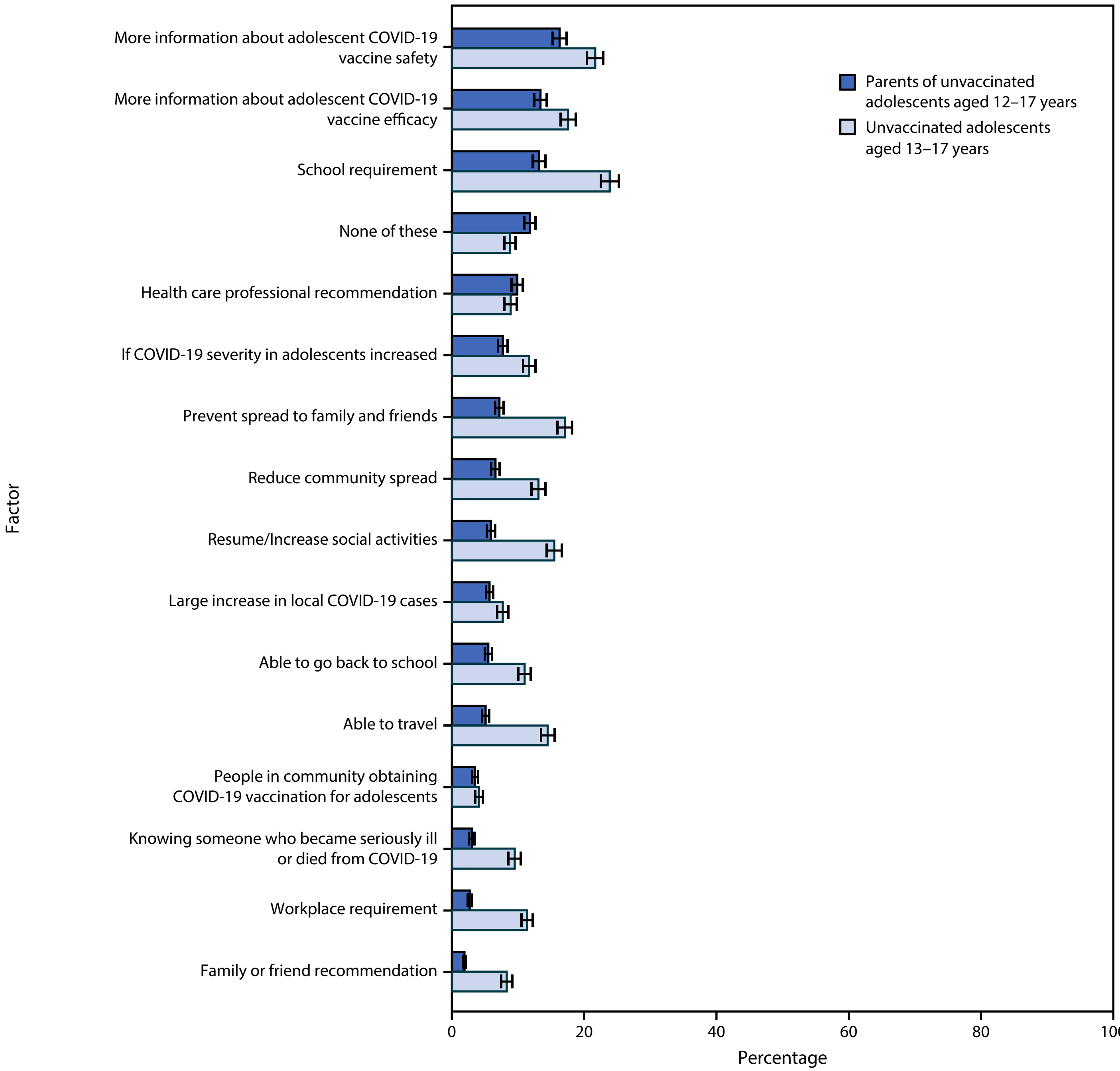
** Indicates a significant group difference based on chi-square analysis with p≤0.003 (adjusted for multiple comparisons: 0.05/16 = 0.003).

†† Education level not applicable to adolescents.

§§ Categories created by collapsing across zip code–based Rural-Urban Commuting Area codes from the U.S. Department of Agriculture Economic Research Service.

¶¶ *Northeast*: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

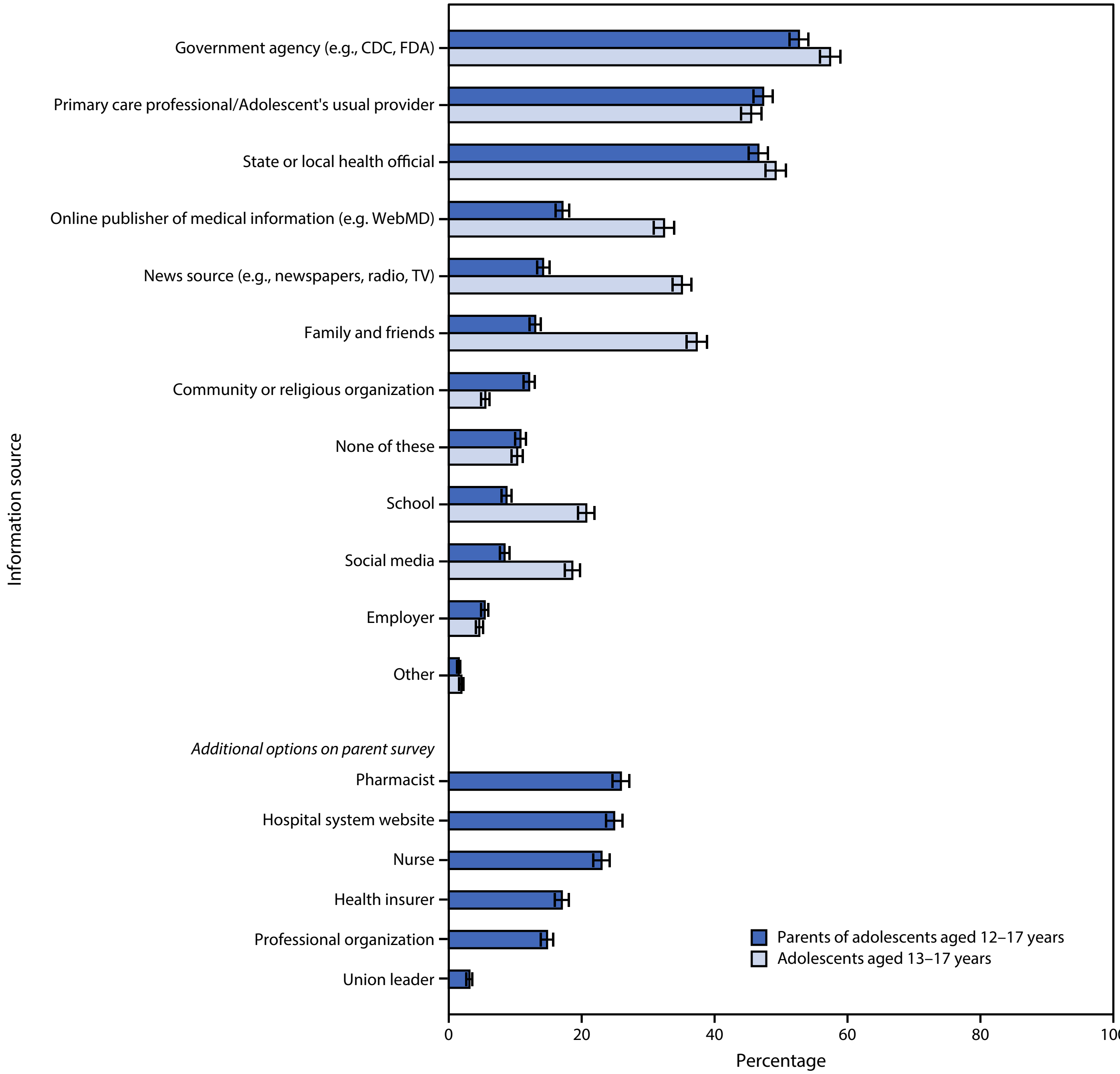
FIGURE 1. Factors that would increase adolescent COVID-19 vaccination intent according to U.S. parents and guardians (parents) of unvaccinated adolescents aged 12–17 years and unvaccinated adolescents aged 13–17 years who did not indicate definite intent to receive the vaccine* — United States, April 15–23, 2021



* Error bars indicate +/- 1 standard error.

of parents of unvaccinated adolescents and one quarter of unvaccinated adolescents also reported being comfortable with vaccination at a local pharmacy (37.1% and 39.9%, respectively), a doctor's office or clinic other than the usual one (32.2% and 31.8%), temporary indoor vaccination clinics (28.2% and 25.3%), or at school with a parent or caregiver present (26.1% and 30.2%). Approximately one half of parents of adolescents and one half of adolescents reported government agencies including CDC and FDA (53.1% and 57.8%, respectively), primary care professionals (47.3% and 45.7%), and state or local health officials (46.6% and 49.4%, respectively) as trusted sources of COVID-19 vaccine information (Figure 2).

FIGURE 2. Trusted COVID-19 vaccine information sources according to U.S. parents and guardians (parents) of adolescents aged 12–17 years and adolescents aged 13–17 years* — United States, April 15–23, 2021



Abbreviations: FDA = Food and Drug Administration; TV = television.
* Error bars indicate +/- 1 standard error.

Discussion

Nonprobability–based surveys conducted just before the expanded availability of the Pfizer-BioNTech vaccine to adolescents aged 12–15 years found that approximately one half of unvaccinated adolescents and parents of unvaccinated adolescents reported not intending for or being uncertain about whether the adolescent would receive a COVID-19 vaccination. Female parents, those with lower educational attainment, and those living in the Midwest or South Census regions had lower intentions to have their unvaccinated adolescent receive a COVID-19 vaccination.

Summary

What is already known about this topic?

Pfizer-BioNTech's COVID-19 vaccine was authorized by the Food and Drug Administration and recommended by the Advisory Committee on Immunization Practices in May 2021 for adolescents aged 12–15 years.

What is added by this report?

In April 2021, 52% of unvaccinated adolescents aged 13–17 years and 56% of parents of unvaccinated adolescents aged 12–17 years reported intent for adolescent COVID-19 vaccination. The most common factors that would increase vaccination intent were receiving more information about adolescent COVID-19 vaccine safety and efficacy.

What are the implications for public health practice?

Efforts focusing on effectively communicating the benefits and safety of COVID-19 vaccination for adolescents to the public could help increase adolescent COVID-19 vaccine confidence and vaccination coverage.

Most adolescents and parents reported being comfortable with adolescent COVID-19 vaccination occurring at the adolescent's usual doctor's office or clinic. However, other possible vaccination locations, such as local pharmacies or temporary indoor vaccination clinics, were also acceptable to many parents and adolescents. Public health officials at federal, state, and local levels and primary care professionals were the most trusted sources of information about COVID-19 vaccines. Having more information about adolescent COVID-19 vaccine safety and vaccine efficacy were among the most frequently selected factors that parents and adolescents reported would increase adolescent COVID-19 vaccination intent. Although few adolescents and parents of adolescents reported that a health care professional recommendation would increase their intent for adolescent COVID-19 vaccination, health care professionals were one of the most trusted sources of COVID-19 vaccine information. Given that a health care professional's recommendation is one of the strongest predictors of vaccination in general (*3*), public health officials and primary care professionals can emphasize adolescent COVID-19 vaccine safety and efficacy in discussions with the public to help increase COVID-19 vaccination intent and coverage among adolescents.

The findings in this report are subject to at least three limitations. First, a nonprobability, quota-based sample was used, which increases the potential for bias and limits generalizability (*4*). For example, U.S. adolescents whose parents allow them to join Internet panels might be different from U.S. adolescents overall; however, the increased autonomy afforded by parents to these adolescents might also extend to medical decisions, potentially providing unique insights into factors affecting self-directed adolescent COVID-19 vaccination compared with parent-directed vaccination. Second, the surveys were administered online and only available in English, which could yield underrepresentation of U.S. residents without Internet access or those who have limited English proficiency. Finally, although statistical testing was conducted, small sample sizes in some demographic subgroups might limit the ability to provide estimates or compare findings, and the underlying sample might be subject to biases that cannot be quantified. These surveys were conducted before FDA authorization of COVID-19 vaccine for younger adolescents; parental and adolescent intent related to adolescent COVID-19 vaccination might differ now that vaccination is authorized.

As of July 6, 2021, approximately 8.3 million adolescents aged 12–17 years had received ≥1 dose of a COVID-19 vaccine (*5*). However, nearly one half of the unvaccinated adolescents and parents of unvaccinated adolescents in the current study indicated they were "unsure about," "probably will not," or "definitely will not" receive or have their adolescent child receive a COVID-19 vaccination. Given that having more information on adolescent COVID-19 vaccine safety and efficacy were primary factors identified by parents and adolescents as increasing vaccination intent, relaying this information to the public, particularly by public health officials and health care professionals, could help increase COVID-19 vaccine confidence, acceptance, and coverage among adolescents. In addition, efforts to enhance adolescent COVID-19 vaccination outreach to groups with lower reported adolescent COVID-19 vaccination intent might increase vaccine confidence and coverage among adolescents in the United States. Outreach and communication efforts should consider that adolescents might have different COVID-19-related risk perceptions, information needs, and messaging preferences than do adults (*6*). Efforts to increase vaccination coverage for adolescents will likely intensify prior to school reopening and could be adapted based on additional research to help determine how to communicate the benefits and safety of adolescent COVID-19 vaccination most effectively to adolescents and their parents.

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SARS-CoV-2 B.1.617.2 (Delta) Variant COVID-19 Outbreak Associated with a Gymnastics Facility — Oklahoma, April–May 2021

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On July 9, 2021, this report was posted as an MMWR *Early Release on the* MMWR *website (https://www.cdc.gov/mmwr).*

The B.1.617.2 (Delta) variant of SARS-CoV-2, the virus that causes COVID-19, was identified in India in late 2020 and has subsequently been detected in approximately 60 countries (*1*). The B.1.617.2 variant has a potentially higher rate of transmission than other variants (*2*). During May 12–18, 2021, the Oklahoma State Department of Health (OSDH) Acute Disease Service (ADS) was notified by the OSDH Public Health Laboratory (PHL) of 21 SARS-CoV-2 B.1.617.2 specimens temporally and geographically clustered in central Oklahoma. Public health surveillance data indicated that these cases were associated with a local gymnastics facility (facility A). OSDH ADS and local health department staff members reinterviewed persons with B.1.617.2 variant–positive laboratory results and conducted contact tracing. Forty-seven COVID-19 cases (age range = 5–58 years), including 21 laboratory-confirmed B.1.617.2 variant and 26 epidemiologically linked cases, were associated with this outbreak during April 15–May 3, 2021. Cases occurred among 10 of 16 gymnast cohorts* and three staff members; secondary cases occurred in seven (33%) of 26 interviewed households with outbreak-associated cases. The overall facility and household attack rates were 20% and 53%, respectively. Forty (85%) persons with outbreak-associated COVID-19 had never received any COVID-19 vaccine doses (unvaccinated); three (6%) had received 1 dose of Moderna or Pfizer-BioNTech ≥14 days before a positive test result but had not received the second dose (partially vaccinated); four persons (9%) had received 2 doses of Moderna or Pfizer-BioNTech or a single dose of Janssen (Johnson & Johnson) vaccine ≥14 days before a positive test result (fully vaccinated). These findings suggest that the B.1.617.2 variant is highly transmissible in indoor sports settings and within households. Multicomponent prevention strategies including vaccination remain important to reduce the spread of SARS-CoV-2, including among persons participating in indoor sports† and their contacts.

Investigation and Findings

As of April 15, 2021, one Oklahoma resident with B.1.617.2 variant infection had been identified. During May 12–18, 2021, OSDH ADS received notification from OSDH PHL of 21 B.1.617.2 variant COVID-19 cases identified through virologic surveillance amplicon sequencing (*3*). Review of public health surveillance and investigation data revealed temporal and geographic clustering in central Oklahoma, and facility A was identified as a likely exposure site. OSDH ADS and local health department staff members reinterviewed persons with B.1.617.2 variant–positive laboratory results to verify exposure source, identified other settings with potential exposures, and conducted contact tracing. An outbreak-associated case was defined as 1) identification of the B.1.617.2 variant based on amplicon sequencing in a person with COVID-19 with an epidemiologic link to facility A, or 2) a COVID-19 case meeting the Council of State and Territorial Epidemiologists definition§ of a confirmed or probable case epidemiologically linked to a B.1.617.2 variant outbreak-associated case. Exposed contacts were defined as cohort members and staff members attending facility A during April 1–May 3 and household contacts of persons with outbreak-associated COVID-19.

To identify epidemiologically linked cases, contacts, and events where transmission might have occurred, OSDH ADS obtained a roster of gymnasts and staff members from facility A and a training and gymnastics meet schedule. The roster was compared against Oklahoma's COVID-19 surveillance data to identify additional cases. The meet schedule was used to identify potential transmission settings, including other gymnastics facilities. Four Oklahoma patients with outbreak-associated COVID-19 attended two out-of-state regional gymnastics meets (April 15–18 and April 23–26) during their infectious period (Figure). OSDH ADS staff members used publicly available third-party websites listing gymnastics meet results to identify other potential exposures and cases within Oklahoma. The participant lists for Oklahoma gymnastics facilities obtained from the third-party websites were compared with Oklahoma's COVID-19 surveillance data to ascertain whether secondary spread occurred at the two regional gymnastics meets. The COVID-19 immunization status of cases and contacts were verified using the state immunization registry. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.¶

* A cohort is a group of gymnasts grouped by skill level and gender of which there were 16 in facility A. Each cohort had a designated practice schedule and had limited interaction with other cohorts within facility A.

† https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/playing-sports.html

§ The Council of State and Territorial Epidemiologists COVID-19 Interim Case Definition, approved August 5, 2020, should be referenced for confirmatory and presumptive laboratory evidence definitions as well as confirmed and probable case classification definitions. https://ndc.services.cdc.gov/case-definitions/coronavirus-disease-2019-2020-08-05/

¶ 45 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

Facility A Outbreak-Associated Cases

As of May 27, 2021, 47 COVID-19 cases associated with facility A were identified among 23 gymnasts, three staff members, and 21 of their household contacts. Among the 47 outbreak-associated cases, all 21 (45%) specimens available for sequencing were identified as B.1.617.2 variants. The facility A index case (gymnast) was identified on April 15, and cases occurred through May 3 (Figure). The median patient age was 14 years (range = 5–58 years) (Table 1). Approximately one half of cases occurred in females and two thirds in non-Hispanic White persons. Among all 47 cases, two adult patients were hospitalized (both unvaccinated and epidemiologically linked); one required intensive care. Review of meet schedules did not identify an exposure source outside facility A that explained the distribution of cases. Secondary spread was not identified among Oklahoma gymnasts participating at either regional gymnastics meet. No patient reported international travel in the 14 days preceding symptom onset (or date of specimen collection among presymptomatic and asymptomatic persons).

COVID-19 Vaccine Age-Eligibility and Vaccination Status

Among 194 identified exposed persons,** 74 (38%) were age-eligible to receive a COVID-19 vaccination by April 15, when the outbreak began. Among these vaccine-eligible persons, 17 (23%) were fully vaccinated, including four (9%) mildly symptomatic, of the 47 persons with outbreak-associated COVID-19; three had received Moderna vaccine and one Pfizer-BioNTech. Of the remaining 43 persons with outbreak-associated COVID-19, 40 (85%) were unvaccinated, and three (6%) were partially vaccinated; 27 (63%) were not age-eligible for vaccination when the outbreak began.

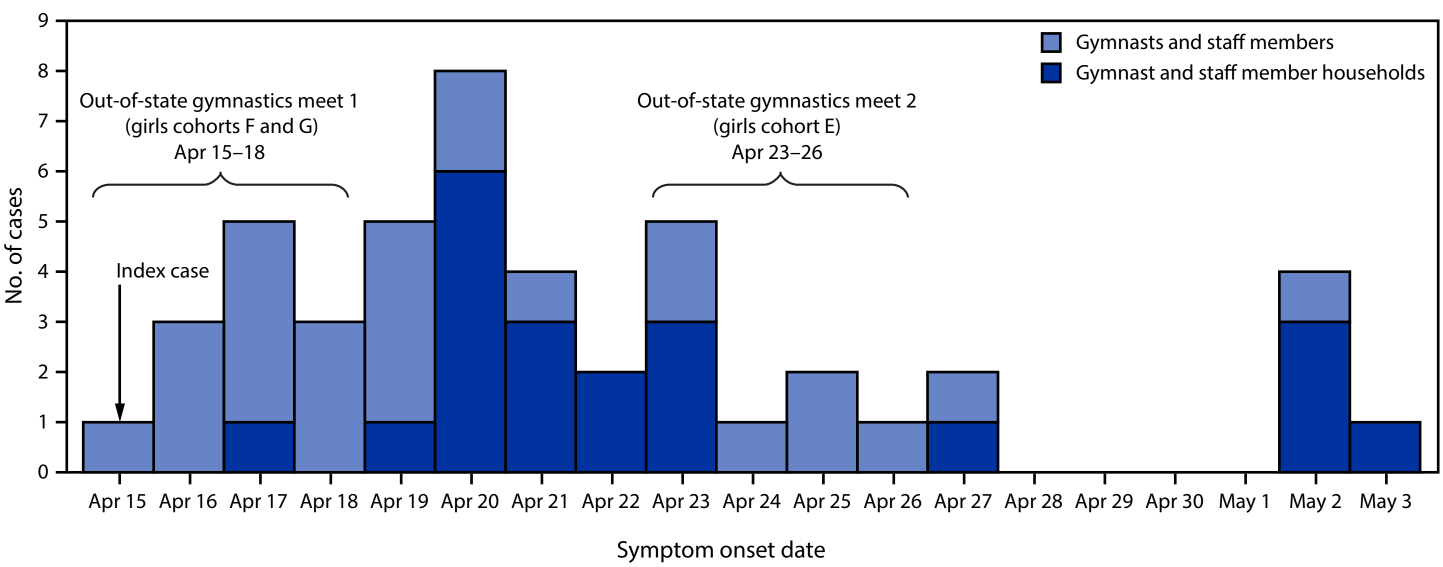
B.1.617.2 Variant Transmission Summary

During April 15–May 3, 2021, COVID-19 cases occurred in 10 of 16 cohorts, including four of nine male cohorts and six of seven female cohorts, and three staff members. Among cohorts with identified cases, attack rates ranged from 8% to 60% (Table 2) (median = 32% overall; 42% [male]; 20% [female]). Among 26 identified households with cases, five (19%) were lost to follow-up, and no secondary cases were reported from 14 (54%). Among seven households with known secondary transmission, attack rates ranged from 80% to 100%. The overall facility-associated attack rate among 194 exposed persons was 24%, including 26 of 133 (20%) gymnasts and staff members and 42 of 80 (53%) household contacts.

Several potential risk factors for transmission were identified through household interviews and direct observations at facility A, including nonadherence to recommended quarantine and testing guidance; delayed recognition of infection because of mild symptoms or attribution of symptoms to other causes; not using masks among active participants, coupled with increased respiration during active sport participation (further, facility A policy was that all persons not actively participating wear masks, but this policy was not always observed); poor facility ventilation; staff members training multiple cohorts; low COVID-19 vaccination coverage among participants

** Exposed persons were defined as gymnast cohorts and staff members identified as attending facility A along with any household contacts of outbreak cases.

FIGURE. Symptom onset date* of COVID-19 cases associated with a SARS-CoV-2 B.1.617.2 (Delta) variant outbreak at gymnastics facility A (N = 47) — Oklahoma, April 15–May 3, 2021



* Or date of specimen collection, for asymptomatic or presymptomatic cases.

TABLE 1. Characteristics of gymnastics facility A–associated COVID-19 cases caused by SARS-CoV-2 variant B.1.617.2 (Delta) (N = 47) — Oklahoma, April–May 2021

Characteristic	No. (%)
Case category	
Gymnast	23 (49)
Staff member	3 (6)
Household contact	21 (45)
Age group, yrs	
Median (range)	14 (5–58)
<12	11 (23)
12–19	20 (43)
20–49	12 (26)
≥50	4 (9)
Sex	
Female	25 (53)
Male	22 (47)
Race/Ethnicity	
White, non-Hispanic	32 (68)
Outcome	
Total hospitalized	2 (4)
Intensive care unit	1 (2)
Vaccination status	
Unvaccinated*	40 (85)
Partially vaccinated†	3 (6)
Fully vaccinated§	4 (9)

* No COVID-19 vaccine doses received.
† Receipt of 1 dose of Moderna or Pfizer-BioNTech vaccine ≥14 days before a positive SARS-CoV-2 test result, but not the second dose.
§ Receipt of 2 doses of Moderna or Pfizer-BioNTech vaccine or a single dose of Janssen vaccine ≥14 days before a positive SARS-CoV-2 test result.

TABLE 2. COVID-19 attack rates among gymnasts, staff members, and household contacts associated with a SARS-CoV-2 B.1.617.2 (Delta) variant outbreak at facility A — Oklahoma, April 15–May 3, 2021

Group	Total no. exposed*	No. of outbreak cases,† attack rate (%)
Overall	**194**	**47 (24.2)**
Gymnasts§ and staff members	133	26 (19.5)
Girls	64	13 (20.3)
Girls cohort A	12	0 (—)
Girls cohort B	13	3 (23.1)
Girls cohort C	6	1 (16.7)
Girls cohort D	3	1 (33.3)
Girls cohort E	10	6 (60.0)
Girls cohort F	8	1 (12.5)
Girls cohort G	12	1 (8.3)
Boys	58	10 (17.2)
Boys cohort A	12	0 (—)
Boys cohort B	10	0 (—)
Boys cohort C	6	3 (50.0)
Boys cohort D	1	0 (—)
Boys cohort E	3	1 (33.3)
Boys cohort F	6	3 (50.0)
Boys cohort G	10	3 (30.0)
Boys cohort H	1	0 (—)
Boys cohort I	9	0 (—)
Staff members	11	3 (27.3)
Household contacts¶	80	42 (52.5)

* Exposed persons were defined as gymnast cohorts and staff members identified as attending facility A, along with any household contacts of outbreak cases.
† An outbreak-associated case was defined as 1) identification of the B.1.617.2 variant based on amplicon sequencing in a person with COVID-19 with an epidemiologic link to facility A or 2) having epidemiologic linkage to a B.1.617.2 variant outbreak-associated case and classified as a confirmed or probable case per the Council of State and Territorial Epidemiologists COVID-19 Interim Case Definition, approved August 5, 2020. https://ndc.services.cdc.gov/case-definitions/coronavirus-disease-2019-2020-08-05/
§ A cohort is a group of gymnasts grouped by skill level and gender of which there were 16 in facility A. Each cohort had a designated practice schedule and had limited interaction with other cohorts within facility A.
¶ Household contacts include both outbreak-associated cases and exposed contacts from 21 of the 26 interviewed households. The remaining five households and outbreak-associated cases lost to follow-up were excluded from these numbers. Secondary cases were not identified in 14 of 21 interviewed households.

Summary

What is already known about this topic?

The SARS-CoV-2 B.1.617.2 (Delta) variant emerged in India and is currently widespread. Evidence suggests that it is potentially more transmissible than other variants.

What is added by this report?

During April 15–May 3, 2021, 47 COVID-19 cases were linked to a gymnastics facility, including 21 laboratory-confirmed B.1.617.2 cases and 26 epidemiologically linked cases. The overall facility and household attack rates were 20% and 53%, respectively.

What are the implications for public health practice?

The B.1.617.2 variant is highly transmissible in indoor sports settings and households, which might lead to increased attack rates. Multicomponent prevention strategies including vaccination remain important to reduce the spread of SARS-CoV-2 among persons participating in indoor sports and their contacts.

(partly related to age eligibility); inadequate cleaning of high-touch surfaces between participant use; and overlapping cohort practice times, facilitating transmission between cohorts. The facility attempted to mitigate transmission by temporarily excluding cohorts with cases and requiring a negative test or 10-day quarantine before return. Other facility A mitigation measures were restricting locker room access, physical distancing in personal belonging storage area, and physical distancing when cohorts moved between practice locations.

Public Health Response

On May 18, Epi-X, CDC's Epidemic Information Exchange, was used to notify other states with gymnasts present at the two regional gymnastics meets of the potential exposure risk. A letter was distributed to facility A staff members and parents of gymnasts to notify them of the outbreak and to provide public health information regarding COVID-19. On-site testing and vaccination clinics offered to gymnasts, staff members, and household members at the facility resulted in one person being tested and nine vaccinated.

Discussion

The primary case in this outbreak likely occurred in one or more staff members or gymnasts with undetected SARS-CoV-2 infection during April 1–13, 2021. Review of other potential exposure sources, including gymnastics meets, did not explain the case distribution among cohorts early in the outbreak because a limited number of cohorts participated in meets during this period.

Among the 47 outbreak-associated cases, sequencing of virus from the 21 patients with available specimens identified the B.1.617.2 (Delta) variant in all 21. Emerging evidence suggests that attack rates for the B.1.617.2 variant are potentially higher than are those for other variants of concern, including the B.1.1.7 (Alpha) variant (*2,4*). The 20% attack rate among exposed gymnasts and staff members in this outbreak was consistent with attack rates previously reported among persons in other high-risk activities (*5–7*), demonstrating that this variant is easily transmissible in high-risk settings with suboptimal adherence to recommended disease control measures. Further, household attack rates in this outbreak (53%) were higher than reported secondary attack rates associated with other SARS-CoV-2 lineages (17%)[††] (*8*).

The findings in this report are subject to at least six limitations. First, interviews were only conducted with patients with reported positive SARS-CoV-2 test results associated with facility A. Other gymnasts and staff members who were exposed to patients from the facility and who might have had asymptomatic or mildly symptomatic infections were not interviewed or tested, which could have led to underascertainment of cases. Second, the number of cases might be underestimated if cases were not reported to the state surveillance system. Third, voluntary interviews and persons lost to follow-up or who refused to be interviewed could have resulted in underreporting of contacts, contact details, and patient details. Fourth, lags in reporting of state immunization registry data might have resulted in incomplete vaccination ascertainment. Fifth, amplicon sequencing was completed for fewer than one half of outbreak cases. Finally, vaccine effectiveness could not be calculated because of an inability to interview all persons associated with the outbreak and incomplete state immunization registry data.

These findings suggest that the B.1.617.2 variant is highly transmissible in indoor sports settings and households, which might lead to higher attack rates among exposed persons. Although the actual effectiveness of COVID-19 vaccines against the B.1.617.2 variant is not known at this time, current evidence indicates that vaccines approved under Emergency Use Authorization in the United States are effective against the variant. All eligible persons, including athletes and athletic staff members, should receive COVID-19 vaccination, especially those engaging in strenuous sports with limited ability to maintain physical distancing (*9*). In addition, multicomponent prevention strategies (e.g., testing, symptom monitoring, and other setting-specific measures) remain important to reduce SARS-CoV-2 transmission among persons participating in indoor sports and their contacts.

[††] http://medrxiv.org/lookup/doi/10.1101/2021.04.23.21255515

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Erratum

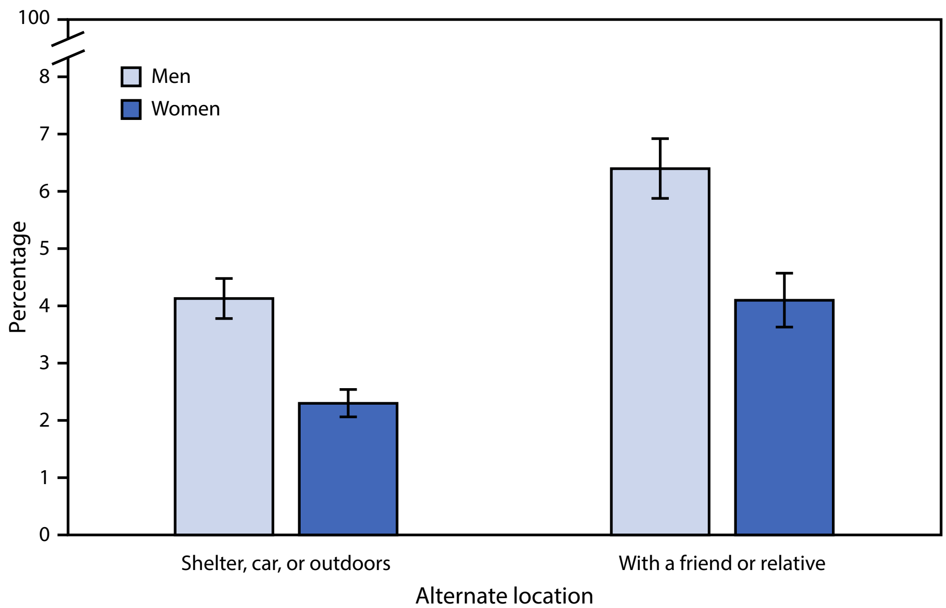
Vol. 70, No. 18

In the report "Emergency Department Visits and Hospitalizations for Selected Nonfatal Injuries Among Adults Aged ≥65 Years — United States, 2018," on page 663, in the first paragraph, the third complete sentence should have read, "Rates of ED visits for unintentional fall injuries per 100,000 persons increased with age, from 2,678 among adults aged 65–**74** years to 4,900 among adults aged 75–84 years and 9,867 among adults aged ≥85 years."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage*,† of Men and Women Aged 25–49 Years Who Spent at Least One Night in the Past 12 Months at an Alternate Location Because They Did Not Have a Permanent Place To Stay, by Type of Location§ — National Survey of Family Growth, United States, 2017–2019



* With 95% confidence intervals indicated with error bars.

† Estimates are based on interviews of the U.S. household population for sample adults aged 25–49 years at the time of interview.

§ Based on the responses to the following questions asked of all respondents, "In the last 12 months, was there ever a time when you did not have a permanent place to stay and had to stay at least overnight in a location such as a shelter, a car or someplace outdoors?"; "In the last 12 months, was there ever a time when you did not have a permanent place to stay and had to stay at least overnight with a friend or relative?"

Among adults aged 25–49 years, a higher percentage of men (4.1%) than women (2.3%) stayed at least overnight in a shelter or car or outdoors in the past 12 months because they did not have a permanent place to stay. A higher percentage of men (6.4%) than women (4.1%) stayed at least overnight with a friend or relative in the past year. Among both men and women, the percentage who stayed at least overnight with a friend or relative was higher than the percentage who stayed at least overnight in a shelter or car or outdoors.

Source: National Survey of Family Growth, 2017–2019. https://www.cdc.gov/nchs/nsfg/index.htm

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