Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Weekly / Vol. 72 / No. 1
January 6, 2023

Racial and Ethnic Differences in COVID-19 Vaccination Coverage Among Children and Adolescents Aged 5–17 Years and Parental Intent to Vaccinate Their Children — National Immunization Survey–Child COVID Module, United States, December 2020–September 2022

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Some racial and ethnic groups are at increased risk for COVID-19 and associated hospitalization and death because of systemic and structural inequities contributing to higher prevalences of high-risk conditions and increased exposure (*1*). Vaccination is the most effective prevention intervention against COVID-19–related morbidity and mortality*; ensuring more equitable vaccine access is a public health priority. Differences in adult COVID-19 vaccination coverage by race and ethnicity have been previously reported (*2*,*3*), but similar information for children and adolescents is limited (*4*,*5*). CDC analyzed data from the National Immunization Survey–Child COVID Module (NIS-CCM) to describe racial and ethnic differences in vaccination status, parental intent to vaccinate their child, and behavioral and social drivers of vaccination among children and adolescents aged 5–17 years. By August 31, 2022, approximately one third (33.2%) of children aged 5–11 years, more than one half (59.0%) of children and adolescents aged 12–15 years, and more than two thirds (68.6%) of adolescents aged 16–17 years had received ≥1 COVID-19 vaccine dose. Vaccination coverage was highest among non-Hispanic Asian (Asian) children and adolescents, ranging from 63.4% among those aged 5–11 years to 91.8% among those aged 16–17 years. Coverage was next highest among Hispanic or Latino (Hispanic) children and adolescents (34.5%–77.3%). Coverage was similar for non-Hispanic Black or African American (Black), non-Hispanic White (White), and non-Hispanic other race† or multiple race (other/multiple race) children and adolescents aged 12–15 and 16–17 years. Among children aged 5–11 years, coverage among Black children was lower than that among Hispanic, Asian, and other/multiple race children. Enhanced public health efforts are needed to increase COVID-19 vaccination coverage for all children and adolescents. To address disparities in child and adolescent COVID-19 vaccination coverage, vaccination providers and trusted messengers should provide culturally

* CDC's Advisory Committee on Immunization Practices (ACIP) issued an interim recommendation for use of the Pfizer-BioNTech COVID-19 vaccine for persons aged ≥16 years on December 12, 2020, 12–15 years on May 12, 2021, and 5–11 years on November 2, 2021. ACIP recommended use of an additional homologous primary dose of Pfizer-BioNTech vaccine after an initial series in immunocompromised persons aged ≥12 years on August 13, 2021. ACIP recommended monovalent booster doses for persons aged 16–17 years on December 9, 2021, 12–15 years on January 5, 2022, and 5–11 years on May 19, 2022.

† Race and ethnicity of the child or adolescent were reported by the parent or guardian and were available for all study participants. Asian, Black, White, or other/multiple race children and adolescents were reported by the parent or guardian to be non-Hispanic. Other/multiple race children and adolescents had more than one race category selected, or were identified as American Indian or Alaska Native, or Native Hawaiian or other Pacific Islander. Hispanic children and adolescents might be of any race.

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relevant information and vaccine recommendations and build a higher level of trust among those groups with lower coverage.

NIS-CCM is a nationally representative random-digit–dialed mobile telephone survey of households with children and adolescents aged 6 months–17 years. NIS-CCM interview data collected from 94,838 respondents during September 26, 2021–September 30, 2022,[§] were used to assess racial and ethnic differences in COVID-19 vaccination coverage, parental intent to vaccinate, and behavioral and social drivers of vaccination among children and adolescents aged 5–17 years. Survey respondents were those who reported being knowledgeable about the child's or adolescent's vaccination status (parent). Interviews with parents of an unvaccinated child or adolescent, or a child or adolescent who received ≥1 COVID-19 vaccine dose[¶] during December 2020–September 2022 were included. White persons were designated as the referent group for most racial and ethnic comparisons because this group has the largest population size and the most social advantage (*6*).

Kaplan-Meier estimation methods were used to calculate cumulative ≥1-dose COVID-19 vaccination coverage as of August 31, 2022.[**] First-dose vaccination month and year were hot deck imputed[††] for 20.2% of children and adolescents with parent-reported vaccination but without a vaccination date (*7*). Differences in ≥1-dose coverage were assessed by race and ethnicity and stratified by sociodemographic subgroups. Pairwise comparisons were conducted to assess differences in ≥1-dose estimates for all races and ethnicities. Survey data during July 1–September 30, 2022,[§§] (26,961) were pooled to calculate proportions of children and adolescents who 1) were unvaccinated, but parental intent to vaccinate was ascertained, 2) initiated COVID-19 vaccination (received ≥1 dose), 3) completed the primary series (received ≥2 doses),

[§] Respondents interviewed during September 26, 2021–September 30, 2022, were included; month and year of vaccination occurred during December 2020–September 2022.

[¶] Assessed by response to the question, "Has [child's name] received at least one dose of a COVID-19 vaccine?" Month and year of first dose was assessed by asking, "During what month and year did [child's name] receive [his/her] first COVID-19 vaccine?"

[**] Kaplan-Meier estimation methods were used to calculate estimated cumulative vaccination coverage as of the end of each month from December 2020 through August 2022 using data from interviews conducted during September 26, 2021–September 30, 2022, in which the event was defined as the month and year of receipt of first dose of COVID-19 vaccine and was censored by date of interview. Vaccination status was assigned as of the end of the month before the interview.

[††] Data were imputed using hot deck imputation (replacing missing values with observed values from a respondent with similar characteristics) from donor pools matched for month of interview, age group, region, and race and ethnicity.

[§§] Interview data were restricted to the previous 3 months (July 1–September 30, 2022) to provide the most current assessment of vaccination coverage, parental intent, and behavioral and social drivers of vaccination. Estimates of vaccination coverage represent the cumulative percentage of children and adolescents vaccinated as of approximately the midpoint of this interview period (mid-August 2022), and estimates of coverage with ≥1 dose might differ from the Kaplan-Meier estimates as of August 31, 2022.

The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Report title]. MMWR Morb Mortal Wkly Rep 2023;72:[inclusive page numbers].

4) received a monovalent booster (≥3 doses),[¶¶] or 5) had an assessment of behavioral and social drivers of vaccination.[***] For all analyses, p-values <0.05 were considered statistically significant. Analyses were performed using SAS (version 9.4; SAS Institute) and SAS-callable SUDAAN (version 11.0.3; Research Triangle Institute). Survey weights were used to adjust to the noninstitutionalized U.S. population of children and adolescents and to calibrate to CDC vaccine administration data. The cumulative Council of American Survey Research Organizations (CASRO) response rate[†††] was 18.1%. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.[§§§]

By August 31, 2022, 33.2%, 59.0%, and 68.6% of persons aged 5–11, 12–15, and 16–17 years, respectively, had received ≥1 COVID-19 vaccine dose (Table 1). Coverage among Asian persons was higher than that among persons of other races and ethnicities, ranging from 63.4% (aged 5–11 years) to 91.8% (16–17 years), followed by Hispanic persons, with coverage ranging from 34.5% to 77.3% (Figure). Coverage was similar for Black, White, and other/multiple race persons aged 12–15 and 16–17 years. Coverage in Black children aged 5–11 years was 4.0 to 33.6 percentage points lower than that among Asian, Hispanic, and other/multiple race children of the same age (Supplementary Table 1, https://stacks.cdc.gov/view/cdc/122810).

Coverage with ≥1 COVID-19 vaccine dose by August 31, 2022, was higher among children and adolescents aged 12–17 years, those whose mothers had obtained a college degree, who lived in a household with yearly income ≥$75,000, who always or often wore a mask in public during the previous 7 days, and who had received ≥1 influenza vaccine dose (Table 1). Coverage among Asian and Hispanic children and adolescents was higher in most sociodemographic subgroups compared with coverage among White children and adolescents. Black, White, and other/multiple race children and adolescents had the largest variation in coverage by sociodemographic and behavioral characteristics.

Data collected during July 1–September 30, 2022, indicate that overall, 47.2% of children and adolescents received ≥1 COVID-19 vaccine dose; 43.3% completed the primary series (≥2 doses) (Table 2). Among children and adolescents aged 5–17 years, primary series coverage was highest among Asian persons. Monovalent booster dose coverage was low overall (14.7%) and was highest among Asian children and adolescents (22.4%) and lowest among Black children and adolescents (9.3%). Parents of White children and adolescents of all ages reported the highest level of reluctance[¶¶¶] (40.3%) to have their child vaccinated.

Parents of vaccinated children and adolescents reported high levels of confidence in the importance (93.1%) and safety (78.8%) of vaccination overall and by race and ethnicity (Supplementary Table 2, https://stacks.cdc.gov/view/cdc/122811). Confidence in vaccine importance remained high (76.7%), but confidence in vaccine safety was considerably lower (40.2%) among parents of unvaccinated children and adolescents who might get their child vaccinated (reachable children[****]). Parents of reluctant and reachable children and adolescents reported substantially lower percentages of friends and family had vaccinated their children and adolescents (reflection of social norms) (6.4%–21.2%) and reported having received a provider recommendation (27.9%–35.9%) for vaccination compared with parents of vaccinated children (72.9% and 61.8%, respectively). The magnitude of these differences was similar by race and ethnicity.

Overall, reluctant parents expressed less favorable attitudes and opinions regarding vaccination than did parents of vaccinated and unvaccinated but reachable children. Among all reluctant parents, those of Black and Hispanic children and adolescents reported the highest levels of concern about their child getting COVID-19 and expressed the most confidence in the importance of the vaccine.

Discussion

COVID-19 vaccination coverage was low among children and adolescents aged 5–17 years overall, but highest among Asian and Hispanic children and adolescents. By August 31, 2022, Asian children and adolescents had substantially higher coverage than did all other children and adolescents overall and when stratified by factors associated with lower coverage for all children and adolescents, indicating a willingness across demographic and behavioral characteristics in this population to receive vaccination. During July 1–September 30, 2022,

[¶¶] Information on whether the child or adolescent was immunocompromised was not ascertained in NIS-CCM; thus, booster dose coverage estimates might include immunocompromised children and adolescents who received 3 primary COVID-19 vaccine doses.

[***] Assessed by responses to six questions covering 1) concern about the child or adolescent getting COVID-19, 2) confidence in COVID-19 vaccine safety, 3) confidence in COVID-19 vaccine importance, 4) percentage of friends and family who had vaccinated their children (social norms), 5) health care provider recommendation for COVID-19 vaccination, and 6) school COVID-19 vaccination requirements. https://www.cdc.gov/vaccines/imz-managers/nis/downloads/NIS-CCM-Questionnaire-Q3-2022.pdf

[†††] The CASRO response rate is the product of three rates: 1) the proportion of telephone numbers that can be identified as either for business or residence (resolution rate), 2) the proportion of qualified households that complete the screening process (screening rate), and 3) the proportion of contacted eligible households for which a completed interview is obtained (cooperation rate).

[§§§] 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.

[¶¶¶] Unvaccinated children and adolescents whose parents responded that they definitely or probably will not vaccinate their child (reluctant).

[****] Unvaccinated children and adolescents whose parents responded that they definitely, probably will, or are unsure if they will vaccinate their child (reachable).

TABLE 1. COVID–19 vaccination coverage with ≥1 dose as of August 31, 2022, among children and adolescents aged 5–17 years, by race and ethnicity* and demographic characteristics — National Immunization Survey–Child COVID Module, United States, September 26, 2021–September 30, 2022

Characteristic	Respondent distribution		Vaccinated,† weighted % (95% CI)					
	Unweighted no.	Weighted %§ (95% CI)	Total (N = 94,838)	Asian (n = 4,962)	Black or African American (n = 10,103)	Hispanic or Latino (n = 19,805)	White (Ref)¶ (n = 51,606)	Other or multiple race (n = 8,362)
Total	**94,838**	**100.0**	**47.1 (46.5–47.7)**	**75.2 (72.3–78.0)****	**43.1 (41.4–44.8)****	**49.1 (47.7–50.5)****	**45.0 (44.2–45.8)**	**48.3 (46.0–50.6)****
Age group, yrs								
5–11 (Ref)	59,502	52.9 (52.4–53.5)	**33.2 (32.5–33.9)**	63.4 (59.3–67.5)**	29.8 (28.0–31.7)	34.5 (32.9–36.2)**	31.2 (30.3–32.0)	33.8 (31.2–36.6)
12–15	26,652	31.4 (30.9–32.0)	**59.0 (57.9–60.2)††**	89.2 (85.3–92.5)**,††	56.6 (53.3–60.0)††	63.9 (61.3–66.5)**,††	55.5 (54.0–57.1)††	58.6 (54.4–62.8)††
16–17	8,684	15.6 (15.2–16.1)	**68.6 (66.8–70.5)††**	91.8 (84.4–96.6)**,††	65.5 (60.0–71.0)††	77.3 (72.8–81.5)**,††	64.6 (62.3–66.9)††	67.8 (60.8–74.7)††
Sex								
Female	45,380	48.9 (48.3–49.4)	**48.1 (47.2–49.0)††**	75.9 (71.9–79.8)**	42.9 (40.6–45.3)**	49.9 (47.9–52.0)**	46.5 (45.3–47.6)††	47.6 (44.3–51.0)
Male (Ref)	48,974	51.1 (50.6–51.7)	**46.1 (45.2–46.9)**	74.3 (70.2–78.3)**	43.1 (40.8–45.5)	48.2 (46.2–50.1)**	43.7 (42.6–44.7)	48.7 (45.5–52.0)**
Mother's highest education level								
College degree or higher (Ref)	48,451	37.2 (36.6–37.7)	**63.6 (62.7–64.6)**	83.4 (80.3–86.3)**	55.4 (52.3–58.5)**	66.2 (63.6–68.7)**	62.0 (60.9–63.2)	70.6 (67.0–74.2)**
Some college	22,949	30.9 (30.3–31.4)	**38.8 (37.8–39.9)††**	66.2 (58.1–74.2)**,††	40.4 (37.7–43.3)**,††	44.2 (41.8–46.7)**,††	34.8 (33.4–36.2)††	40.1 (36.6–43.9)**,††
High school or equivalent	15,714	20.5 (20.0–21.0)	**35.5 (34.2–36.9)††**	68.9 (59.9–77.5)**,††	37.1 (33.7–40.7)**,††	43.0 (40.3–45.8)**,††	28.3 (26.7–30.0)††	34.2 (29.5–39.4)**,††
Less than high school	4,958	11.4 (11.0–11.9)	**39.0 (36.6–41.4)††**	NR§§	29.4 (24.4–35.2)††	46.6 (43.1–50.4)**,††	25.1 (22.2–28.3)††	36.5 (27.9–46.8)**,††
Poverty status and household income								
Above poverty, ≥$75,000 (Ref)	43,645	39.7 (39.1–40.2)	**55.8 (54.8–56.7)**	82.3 (77.6–86.4)**	53.4 (50.2–56.6)	56.9 (54.5–59.4)**	53.5 (52.4–54.7)	62.4 (58.8–66.0)**
Above poverty, <$75,000	21,269	24.9 (24.4–25.4)	**39.3 (38.1–40.5)††**	62.6 (55.3–69.9)**,††	39.8 (36.9–42.8)**,††	47.6 (44.9–50.4)**,††	32.8 (31.3–34.4)††	34.8 (30.9–39.0)††
Below poverty	8,965	13.2 (12.8–13.6)	**38.2 (36.3–40.1)††**	NR§§	34.0 (30.2–38.1)**,††	46.5 (43.1–50.0)**,††	28.0 (25.4–30.7)††	34.0 (28.1–40.8)††
Unknown income	20,959	22.2 (21.7–22.7)	**45.5 (44.2–46.8)††**	75.9 (71.1–80.4)**	41.8 (38.5–45.3)††	43.4 (40.5–46.3)††	44.2 (42.5–45.9)††	47.8 (42.9–52.9)††
Health insurance								
Other insurance (Ref)	65,506	63.4 (62.9–64.0)	**51.8 (51.0–52.6)**	79.6 (76.3–82.7)**	48.2 (45.8–50.6)	51.1 (49.2–53.1)	50.4 (49.5–51.3)	55.9 (52.9–59.0)**
Any Medicaid	21,601	32.1 (31.5–32.6)	**40.2 (39.1–41.4)††**	69.1 (62.0–76.0)**,††	38.4 (36.0–41.0)**,††	48.4 (46.1–50.8)**	32.5 (31.0–34.1)††	36.5 (32.8–40.4)††
Uninsured	3,458	4.5 (4.2–4.7)	**34.6 (31.3–38.1)††**	NR§§	34.8 (26.8–44.2)††	38.5 (32.9–44.6)**,††	25.3 (21.3–29.9)††	NR§§
Urbanicity¶¶								
MSA, principal city (Ref)	29,633	32.6 (32.0–33.1)	**52.1 (51.0–53.3)**	74.2 (69.6–78.6)**	42.3 (39.9–44.9)**	52.7 (50.4–55.1)	53.7 (52.0–55.3)	53.3 (49.2–57.4)
MSA, nonprincipal city	45,475	53.5 (52.9–54.1)	**47.8 (47.0–48.7)††**	77.1 (73.4–80.7)**	43.8 (41.4–46.2)**	45.6 (43.7–47.7)††	47.6 (46.5–48.6)††	48.7 (45.5–52.0)
Non-MSA	14,688	13.9 (13.5–14.3)	**29.7 (28.4–31.1)††**	NR§§	43.4 (37.5–49.7)**	35.0 (31.0–39.3)**,††	26.3 (24.9–27.8)††	35.6 (31.0–40.8)**,††
U.S. Census Bureau region***								
Northeast (Ref)	18,269	15.2 (14.9–15.5)	**57.7 (56.3–59.1)**	82.4 (76.8–87.4)**	45.3 (41.4–49.3)**	53.4 (50.2–56.6)**	60.4 (58.6–62.2)	52.9 (47.5–58.6)**
Midwest	18,223	21.3 (20.9–21.6)	**40.4 (39.2–41.6)††**	66.3 (58.9–73.5)**,††	36.8 (33.1–40.9)††	40.7 (37.4–44.2)††	40.4 (39.0–41.9)††	37.1 (32.9–41.7)††
South	34,023	38.6 (38.2–39.1)	**42.3 (41.4–43.2)††**	71.2 (65.9–76.2)**,††	45.0 (42.9–47.2)**	45.6 (43.4–47.8)**,††	38.5 (37.3–39.7)††	40.4 (37.2–43.9)††
West	19,281	24.9 (24.4–25.4)	**52.2 (50.7–53.7)††**	76.8 (71.6–81.7)**	39.0 (32.9–45.7)**	49.7 (47.2–52.4)	50.9 (48.9–52.9)††	60.7 (56.2–65.2)**,††
SVI of county of residence†††								
Low (Ref)	31,027	28.0 (27.6–28.5)	**51.6 (50.6–52.7)**	77.6 (72.3–82.5)**	48.5 (44.6–52.6)	48.5 (45.6–51.4)	51.5 (50.2–52.7)	48.6 (44.8–52.6)
Moderate	31,119	37.3 (36.8–37.9)	**47.2 (46.1–48.2)††**	77.9 (73.5–82.0)**	44.9 (42.1–47.8)	48.5 (45.9–51.2)**	44.4 (43.1–45.7)††	50.7 (47.0–54.6)**
High	24,156	34.6 (34.1–35.2)	**44.1 (43.0–45.3)††**	70.3 (63.3–77.0)**	40.5 (38.0–43.1)††	49.0 (46.8–51.3)**	39.0 (37.4–40.6)††	46.1 (41.8–50.7)**

See table footnotes on the next page.

overall and among all racial and ethnic groups, most children and adolescents who initiated a primary COVID-19 vaccination series also completed the primary series, an encouraging sign of COVID-19 vaccine access and acceptance among parents who intend to vaccinate, but efforts are needed to achieve much higher coverage levels for all children and adolescents.

Lower coverage with ≥1 COVID-19 vaccine dose associated with some demographic and behavioral characteristics point to opportunities to improve coverage. Frequent mask use in public and receipt of influenza vaccine were associated with higher COVID-19 vaccination coverage among all children and adolescents; however, among Black and Hispanic children and adolescents with these characteristics, the increase in coverage was smaller. Less than one half of parents of Black and Hispanic children and adolescents had confidence in COVID-19 vaccine safety, which might indicate reluctance to be vaccinated among a population receptive to other public health behaviors. During July 1–September 30, 2022, large proportions of Hispanic and Black children and adolescents were unvaccinated but reachable (26% and 29%, respectively), suggesting that coverage might increase over time with strengthened public health interventions. A higher proportion of parents of other/multiple race and White children and adolescents were reluctant to vaccinate their child (36% and 40%, respectively) than were considered reachable (15%), suggesting potential difficulty achieving high vaccination coverage among these children and adolescents.

Implementation of evidence-based practices described in CDC's COVID-19 Vaccination Field Guide†††† could help increase vaccine coverage. Community members should serve as trusted messengers to advocate for vaccination among parents of unvaccinated children and adolescents and should deliver tailored messages to strengthen confidence in vaccine safety and

†††† https://www.cdc.gov/vaccines/covid-19/downloads/vaccination-strategies.pdf

TABLE 1. (*Continued*) COVID–19 vaccination coverage with ≥1 dose as of August 31, 2022, among children and adolescents aged 5–17 years, by race and ethnicity* and demographic characteristics — National Immunization Survey–Child COVID Module, United States, September 26, 2021–September 30, 2022

Characteristic	Respondent distribution		Vaccinated,† weighted % (95% CI)					
	Unweighted no.	Weighted %§ (95% CI)	Total (N = 94,838)	Asian (n = 4,962)	Black or African American (n = 10,103)	Hispanic or Latino (n = 19,805)	White (Ref)¶ (n = 51,606)	Other or multiple race (n = 8,362)
Mask-wearing in indoor public spaces during previous 7 days								
Always/Often wore mask (Ref)	49,336	51.0 (50.4–51.6)	**56.3 (55.3–57.3)**	77.4 (73.9–80.8)**	45.0 (43.0–47.1)**	54.8 (52.8–56.8)**	60.1 (58.6–61.6)	57.8 (54.5–61.1)
Sometimes/Rarely/ Never wore mask	44,475	49.0 (48.4–49.6)	**38.8 (38.0–39.6)††**	70.7 (65.5–75.7)**,††	38.4 (35.5–41.5)††	40.9 (38.8–43.0)**,††	37.1 (36.2–38.1)††	38.1 (35.0–41.4)††
Influenza vaccination status since July 1, 2021§§§								
≥1 dose influenza vaccine (Ref)	34,630	43.0 (42.3–43.7)	**63.4 (62.4–64.5)**	83.6 (79.6–87.2)**	53.9 (50.9–57.1)**	61.3 (58.9–63.6)**	64.6 (63.3–66.0)	65.8 (62.2–69.3)
Did not receive influenza vaccine	31,596	57.0 (56.3–57.7)	**32.2 (31.4–33.1)††**	55.3 (49.6–61.1)**,††	31.9 (29.7–34.3)††	36.6 (34.6–38.6)**,††	29.4 (28.3–30.5)††	31.2 (28.2–34.4)††
Child/Adolescent ever had COVID–19								
No (Ref)	61,551	63.4 (62.9–64.0)	**50.2 (49.4–51.0)**	75.8 (72.2–79.1)**	43.2 (41.2–45.2)**	51.2 (49.4–53.0)	49.4 (48.4–50.4)	52.2 (49.3–55.2)
Yes	32,310	36.6 (36.0–37.1)	**42.3 (41.3–43.3)††**	74.1 (68.8–79.0)**	42.9 (39.9–46.0)**	45.7 (43.4–48.0)**,††	38.9 (37.7–40.2)††	42.7 (39.0–46.5)††
Mental health of child/adolescent								
Excellent, very good, or good (Ref)	88,245	92.2 (91.9–92.5)	**46.6 (46.0–47.2)**	76.3 (73.4–79.1)**	42.8 (41.1–44.5)	48.4 (46.9–49.8)**	44.3 (43.5–45.1)	48.5 (46.1–50.9)**
Fair or poor	6,056	7.8 (7.5–8.1)	**53.3 (50.8–55.8)††**	NR§§	47.2 (40.5–54.5)	57.9 (51.1–64.9)††	53.9 (50.9–57.0)††	47.0 (39.8–54.8)

Abbreviations: MSA = metropolitan statistical area; NR = not reported; Ref = referent group; SVI = Social Vulnerability Index.

* Race and ethnicity were reported by the parent or guardian. Children and adolescents identified as Asian, Black or African American, White, or other or multiple races were reported by the parent or guardian as non-Hispanic. Children and adolescents identified as being of other or multiple races had more than one race category selected, or were identified as American Indian or Alaska Native, or Native Hawaiian or other Pacific Islander. Children and adolescents identified as Hispanic might be of any race.

† Cumulative percentage vaccinated with ≥1 dose was estimated using Kaplan Meier survival analysis techniques with the event defined as the month and year of vaccination and the censoring variable defined as the date of interview.

§ Column percentages might not sum to 100 because of rounding.

¶ White persons were designated as the Ref for racial and ethnic comparisons because this group has the largest population size and the most social advantage. https://pubmed.ncbi.nlm.nih.gov/26599027/

** Statistically significant (p<0.05) difference compared with the indicated Ref (column) level (White).

†† Statistically significant (p<0.05) difference compared with the indicated Ref (row) level.

§§ Estimates were suppressed because they did not meet standards for data reliability (CI >20, relative SE >30, or sample size <30).

¶¶ Urbanicity was determined from household reported city and county of residence and was grouped into three categories: MSA principal city, MSA nonprincipal city, and non-MSA. MSA and MSA principal city were as defined by the U.S. Census Bureau (https://www.census.gov/programs-surveys/metro-micro.html). Non-MSA areas include urban populations not located within an MSA and completely rural areas.

*** https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf

††† Categorization of National Immunization Survey–Child COVID Module data into an SVI level was based on zip code of residence reported by the respondent. https://www.atsdr.cdc.gov/placeandhealth/svi/index.html

§§§ Data on receipt of influenza vaccine were collected via interviews conducted during October 1, 2021–June 30, 2022.

importance. Provider recommendation is an impactful driver of vaccination (*8*). A multifaceted approach with community collaboration and provider recommendation are essential to increasing childhood COVID-19 vaccination coverage.

The findings in this report are subject to at least five limitations. First, the survey response rate was low (18.1%). Data were weighted to account for household and provider nonresponse and for households without telephones and weighted to the COVID-19 vaccine administration data (≥1 doses) reported by jurisdictions to CDC. However, some bias might remain. Second, child and adolescent COVID-19 vaccination receipt was parent-reported and might be subject to recall or social desirability biases. However, limited recall bias is expected because of the recency of COVID-19 vaccination recommendations. Third, small sample sizes were available for American Indian or Alaska Native and for Native Hawaiian or other Pacific Islander children and adolescents; therefore, these data were aggregated in the other/multiple race category. Fourth, aggregated racial and ethnic data might

Summary

What is already known about this topic?

Some racial and ethnic groups are at increased risk for COVID-19–associated morbidity and mortality because of systemic and structural inequities. Vaccination is effective in preventing severe COVID-19–related outcomes.

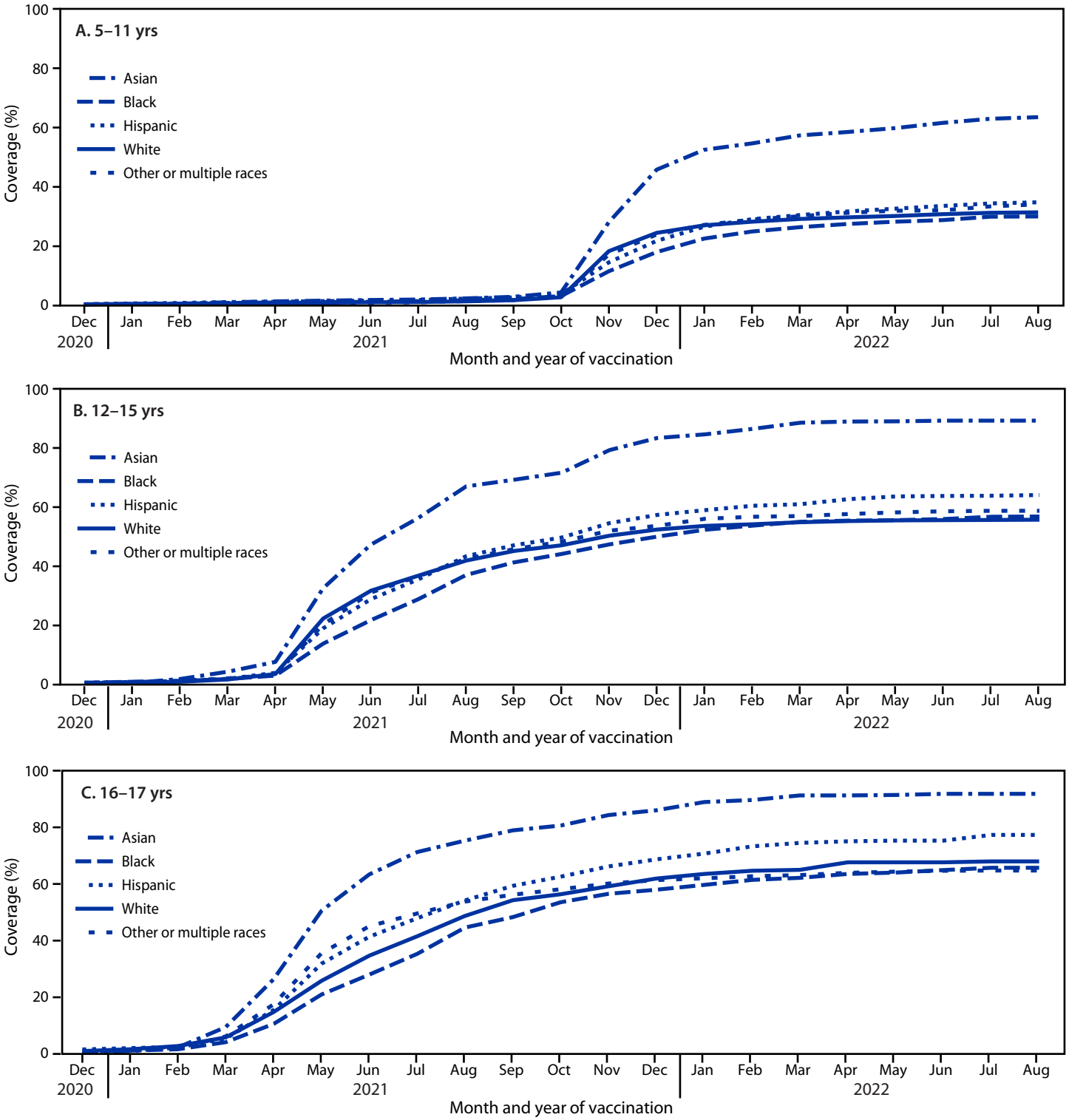
What is added by this report?

Among children and adolescents aged 5–17 years, ≥1-dose COVID-19 vaccination coverage was low overall, but highest among Asian and Hispanic or Latino children and adolescents. Parental intent to vaccinate their child varied by the child's age, race, and ethnicity. Parents of unvaccinated children and adolescents reported low confidence in vaccine safety, and a low percentage reported receipt of a provider vaccination recommendation.

What are the implications for public health practice?

To increase overall coverage and address disparities in child and adolescent COVID-19 vaccination coverage, providers and trusted messengers should provide culturally relevant information and vaccine recommendations.

FIGURE. COVID-19 vaccination coverage estimates,* by race and ethnicity,† among persons aged 5–11 years (A), 12–15 years (B), and 16–17 years (C) during December 2020–August 2022 — National Immunization Survey–Child COVID Module, United States, September 26, 2021–September 30, 2022



Abbreviations: Black = Black or African American; Hispanic = Hispanic or Latino.

* ≥1 dose coverage; Kaplan-Meier survival analysis was used to estimate vaccination coverage based on the month and year of first dose receipt; estimates reflect the cumulative percentage vaccinated as of the end of each month.

† Race and ethnicity were reported by the parent or guardian. Children and adolescents identified as Asian, Black, White, or other or multiple races were reported by the parent or guardian as non-Hispanic. Children and adolescents identified as being of other or multiple races had more than one race category selected or were identified as American Indian or Alaska Native, or Native Hawaiian or other Pacific Islander. Children and adolescents identified as Hispanic might be of any race.

TABLE 2. COVID-19 vaccination status among children and adolescents aged 5–17 years, and parental intent to vaccinate their children, by race and ethnicity* — National Immunization Survey–Child COVID Module, United States, July 1–September 30, 2022

	Weighted % (95% CI)				
	Vaccinated, doses received			Unvaccinated, parents' intent	
Age group and race/ethnicity	Vaccinated ≥1 dose†	Primary series ≥2 doses	Booster, monovalent ≥3 doses	Definitely, probably, or unsure if will get child/ adolescent vaccinated	Definitely or probably will not get child/ adolescent vaccinated
All, 5–17 yrs	**47.2 (46.1–48.3)**	**43.3 (42.2–44.4)**	**14.7 (13.9–15.5)**	**19.5 (18.5–20.4)**	**33.4 (32.3–34.5)**
Asian	73.4 (68.4–77.8)§	69.3 (64.3–73.9)§	22.4 (18.3–27.0)§	14.9 (11.6–19.0)	11.7 (8.5–15.8)§
Black or African American	44.7 (41.6–47.8)	39.1 (36.2–42.1)	9.3 (7.8–11.1)§	28.9 (26.0–32.0)§	26.4 (23.5–29.5)§
Hispanic or Latino	49.0 (46.6–51.4)§	43.5 (41.2–45.9)	13.4 (11.9–15.0)§	26.2 (24.0–28.5)§	24.8 (22.7–27.1)§
White (Ref)¶	45.0 (43.5–46.5)	42.3 (40.9–43.8)	15.9 (14.9–17.0)	14.8 (13.6–15.9)	40.3 (38.7–41.8)
Other or multiple race	49.0 (44.8–53.3)	45.4 (41.2–49.7)	16.4 (13.3–20.1)	14.6 (12.1–17.5)	36.4 (32.3–40.7)
5–11 yrs	34.1 (33.0–35.3)	29.7 (28.6–30.8)	5.5 (5.0–6.0)	25.3 (24.1–26.6)	40.6 (39.2–41.9)
Asian	63.5 (57.3–69.2)§	57.1 (51.1–62.9)§	10.9 (8.0–14.7)§	20.2 (15.7–25.6)	16.3 (11.8–22.0)§
Black or African American	32.7 (29.6–35.9)	27.3 (24.4–30.3)	4.5 (3.4–5.8)§	36.3 (32.6–40.1)§	31.1 (27.5–34.8)§
Hispanic or Latino	35.2 (32.6–37.8)§	28.8 (26.5–31.2)	4.6 (3.7–5.7)§	33.3 (30.5–36.3)§	31.5 (28.7–34.4)§
White (Ref)¶	32.0 (30.5–33.5)	29.0 (27.5–30.4)	6.0 (5.3–6.7)	19.1 (17.5–20.7)	49.0 (47.1–50.8)
Other or multiple race	33.0 (28.8–37.4)	28.8 (24.9–33.1)	5.0 (3.7–6.7)	19.7 (16.3–23.7)	47.3 (42.3–52.4)
12–15 yrs	58.2 (56.0–60.5)	55.1 (52.8–57.3)	21.8 (20.1–23.5)	14.9 (13.2–16.7)	26.9 (24.8–29.1)
Asian	87.3 (78.6–92.8)§	86.6 (77.9–92.2)§	33.7 (24.6–44.3)§	8.2 (3.7–17.0)	4.5 (2.1–9.5)§
Black or African American	58.2 (51.4–64.7)	53.1 (46.5–59.6)	15.2 (11.6–19.6)§	20.0 (15.1–26.0)§	21.7 (16.2–28.5)§
Hispanic or Latino	61.8 (56.9–66.4)§	57.8 (52.9–62.5)	20.7 (17.5–24.3)	20.8 (16.9–25.3)§	17.5 (13.9–21.6)§
White (Ref)¶	54.5 (51.5–57.5)	52.2 (49.2–55.2)	22.4 (20.2–24.8)	12.0 (10.1–14.4)	33.5 (30.5–36.5)
Other or multiple race	62.0 (53.6–69.7)	57.5 (49.2–65.5)	26.1 (19.4–34.2)	10.0 (6.4–15.4)	28.0 (20.9–36.4)
16–17 yrs	68.8 (65.3–72.1)	65.6 (62.1–68.9)	31.3 (28.5–34.3)	9.0 (7.0–11.4)	22.2 (19.3–25.6)
Asian	87.3 (66.1–96.1)§	86.2 (65.9–95.3)§	46.7 (31.3–62.8)	6.2 (1.2–26.3)	6.4 (1.1–29.8)§
Black or African American	66.4 (55.5–75.8)	59.5 (48.9–69.2)	17.5 (11.9–25.2)§	16.7 (10.0–26.6)§	16.9 (9.8–27.6)§
Hispanic or Latino	75.0 (66.7–81.8)§	70.4 (62.1–77.6)	32.3 (26.0–39.3)	9.8 (5.6–16.4)	15.2 (9.8–23.0)§
White (Ref)¶	65.8 (61.1–70.1)	63.5 (58.9–67.9)	33.5 (29.7–37.5)	7.0 (4.8–10.1)	27.2 (23.1–31.7)
Other or multiple race	68.6 (55.8–79.0)	67.9 (55.2–78.3)	29.1 (19.5–41.1)	9.3 (4.4–18.7)	22.1 (13.1–34.9)

Abbreviation: Ref = referent group.

* Race and ethnicity were reported by the parent or guardian. Children and adolescents identified as Asian, Black or African American, White, or other or multiple races were reported by the parent or guardian as non-Hispanic. Children and adolescents identified as being of other or multiple races had more than one race category selected, or were identified as American Indian or Alaska Native, or Native Hawaiian or other Pacific Islander. Children and adolescents identified as Hispanic might be of any race.

† Proportions of children and adolescents who received ≥1 dose COVID-19 vaccine based on July–September 2022 interview data might not match Kaplan-Meier vaccination coverage estimates, which use more months of data (September 26, 2021–September 30, 2022) and a different analytic method.

§ Statistically significant (p<0.05) difference compared with White persons.

¶ White persons were designated as the Ref for racial and ethnic comparisons because this group has the largest population size and the most social advantage. https://pubmed.ncbi.nlm.nih.gov/26599027/

obscure differences in coverage that are apparent in disaggregated subgroups (*9*). Data on racial and ethnic subgroups were collected, but the sample size was inadequate to analyze the disaggregated data. Finally, reporting of month and year of vaccination was incomplete for one fifth of children and adolescents who were reported to be vaccinated, requiring imputation of missing dates.

Public health efforts to increase coverage with the primary COVID-19 vaccination series in all age groups and the bivalent COVID-19 booster dose[§§§§] among eligible persons should continue. These efforts should be tailored to differences in parental intent, behavioral and social drivers of vaccination, and by the child's or adolescent's age, race, and ethnicity. Programs should provide culturally relevant information and employ evidence-based strategies, including tailored messages delivered by trusted messengers and strong recommendations from vaccination providers, to increase vaccine confidence and coverage among all groups, and to eliminate the disparities for those with lower vaccination coverage.

Acknowledgments

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All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

§§§§ As of December 9, 2022, persons aged ≥6 months are recommended to receive a bivalent booster dose, even if they already received a monovalent booster dose. https://www.cdc.gov/coronavirus/2019-ncov/vaccines/stay-up-to-date.html

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Mpox Cases Among Cisgender Women and Pregnant Persons — United States, May 11–November 7, 2022

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Monkeypox (mpox) cases in the 2022 outbreak have primarily occurred among adult gay, bisexual, and other men who have sex with men (MSM); however, other populations have also been affected (*1*). To date, data on mpox in cisgender women and pregnant persons have been limited. Understanding transmission in these populations is critical for mpox prevention. In addition, among pregnant persons, *Monkeypox virus* can be transmitted to the fetus during pregnancy or to the neonate through close contact during or after birth (*2*–*5*). Adverse pregnancy outcomes, including spontaneous abortion and stillbirth, have been reported in previous mpox outbreaks (*3*). During May 11–November 7, 2022, CDC and U.S. jurisdictional health departments identified mpox in 769 cisgender women aged ≥15 years, representing 2.7% of all reported mpox cases.[†] Among cases with available data, 44% occurred in cisgender women who were non-Hispanic Black or African American (Black), 25% who were non-Hispanic White (White), and 23% who were Hispanic or Latino (Hispanic). Among cisgender women with available data, 73% reported sexual activity or close intimate contact as the likely route of exposure, with mpox lesions most frequently reported on the legs, arms, and genitals. Twenty-three mpox cases were reported in persons who were pregnant or recently pregnant[§]; all identified as cisgender women based on the mpox case report form.[¶] Four pregnant persons required hospitalization for mpox. Eleven pregnant persons received tecovirimat, and no adverse reactions were reported. Continued studies on mpox transmission risks in populations less commonly affected during the outbreak, including cisgender women and pregnant persons, are important to assess and understand the impact of mpox on sexual, reproductive, and overall health.

Data on confirmed and probable cases of mpox are electronically reported as part of national case surveillance through a standardized case report form or the National Notifiable Diseases Surveillance System.[**] Data are collected by health departments and include demographic characteristics, possible exposure routes, and signs and symptoms. CDC analyzed case report data for probable or confirmed[††] cases among cisgender women aged ≥15 years and pregnant persons during May 11–November 7, 2022. In addition, CDC identified all persons with mpox reported to CDC through national case surveillance and clinical consultations who were pregnant or recently pregnant regardless of gender identity. Detailed data regarding maternal and neonatal outcomes were obtained through enhanced pregnancy surveillance.[§§] Statistical analyses were conducted using SAS statistical software (version 9.4; SAS Institute) and restricted to cases with available data. This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.[¶¶]

Cases Among Cisgender Women

During May 11–November 7, 2022, a total of 769 cases of mpox among cisgender women, including 23 (3%) who were pregnant, were reported by 42 public health jurisdictions (Table 1). The median age was 32 years (IQR = 25–40 years). Among the 717 (93%) cisgender women with information on race and ethnicity, 313 (44%) were Black, 182 (25%) were White, and 167 (23%) were Hispanic. Among 463 (60%) cisgender women with information on recent sexual behaviors, 329 (71%) reported recent sexual activity or close intimate contact,[***] including 296 (90%) who had recent

[*] These authors contributed equally to this report.
[†] https://www.cdc.gov/poxvirus/monkeypox/response/2022/demographics.html (Accessed November 7, 2022).
[§] Recently pregnant persons had confirmed or probable *Monkeypox virus* infection within 21 days of delivery.
[¶] https://www.cdc.gov/poxvirus/monkeypox/health-departments/case-reporting.html
[**] https://www.cdc.gov/nndss/index.html
[††] https://www.cdc.gov/poxvirus/monkeypox/clinicians/case-definition.html
[§§] Enhanced pregnancy surveillance data were collected through direct communication with jurisdictions, under an Assurance of Confidentiality, leveraging existing mother-baby linked surveillance. https://www.cdc.gov/ncbddd/set-net/index.html
[¶¶] 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.
[***] Defined as any sex or close intimate contact during the 3 weeks before symptom onset.

TABLE 1. Characteristics of cisgender women with mpox, by current or recent* pregnancy status — United States, May 11–November 7, 2022†

Characteristic (no. with available information)	No. (%)§ of cisgender women with mpox		
	All	Not currently or recently pregnant	Currently or recently pregnant
Total (769)¶	**769 (100.0)**	**746 (97.0)**	**23 (3.0)**
Gender identity (769)			
Cisgender woman	**769 (100.0)**	746 (100.0)	23 (100.0)
Age (765)			
Median, yrs (IQR) (range)	**32 (25–40) (15–89)**	32 (25–40) (15–89)	28.5 (23–32) (20–35)
Missing	**4**	4	0
Race and ethnicity (717)	**717 (100.0)**	**696 (93.3)**	**21 (91.3)**
American Indian or Alaska Native, non-Hispanic	**4 (0.6)**	4 (0.6)	0 (—)
Asian, non-Hispanic	**18 (2.5)**	18 (2.6)	0 (—)
Black or African American, non-Hispanic	**313 (43.7)**	298 (42.8)	15 (71.4)
Hispanic or Latino	**167 (23.3)**	165 (23.7)	2 (9.5)
Native Hawaiian or other Pacific Islander, non-Hispanic	**1 (0.1)**	1 (0.1)	0 (—)
White, non-Hispanic	**182 (25.4)**	179 (25.7)	3 (14.3)
Multiple races, non-Hispanic	**10 (1.4)**	10 (1.4)	0 (—)
Other race, non-Hispanic	**22 (3.1)**	21 (3.0)	1 (4.8)
Missing	**52**	50	2
Recent sexual partners (463)**	**463 (100.0)**	**446 (60.0)**	**17 (73.9)**
Had a recent sexual partner	**329 (71.1)**	317 (71.1)	12 (70.6)
Gender of recent sexual partners††			
Cisgender man	**296 (90.0)**	284 (89.6)	12 (100.0)
Cisgender woman	**18 (5.5)**	18 (5.7)	0 (—)
Transgender man	**2 (0.6)**	2 (0.6)	0 (—)
Transgender woman	**0 (—)**	0 (—)	0 (—)
Other gender identity	**2 (0.6)**	2 (0.6)	0 (—)
Exposure (73)§§	**73 (100.0)**	**61 (8.2)**	**12 (52.2)**
Sexual or intimate	**53 (72.6)**	44 (72.1)	9 (75.0)
Household or caregiving	**16 (21.9)**	13 (21.3)	3 (25.0)
Shared food, utensils, or dishes	**12 (18.2)**	12 (19.7)	0 (—)
Shared towels or bedding	**16 (24.2)**	16 (26.2)	0 (—)
Shared transportation	**10 (15.2)**	10 (16.4)	0 (—)
Face-to-face	**14 (21.2)**	14 (23.0)	0 (—)
Shared bathrooms	**15 (22.7)**	15 (24.6)	0 (—)
Other	**16 (24.2)**	16 (26.2)	0 (—)
Health conditions			
Immunocompromised (excluding HIV) (378)¶¶	**35 (9.3)**	34 (9.3)***	1 (7.1)†††
HIV infection (173)	**13 (7.5)**	13 (8.1)§§§	0 (—)¶¶¶

Abbreviation: mpox = monkeypox.

* Recently pregnant persons had confirmed or probable mpox infection within 21 days of delivery.
† Data as of November 9, 2022.
§ Percentages calculated using nonmissing data.
¶ Information on pregnant and recently pregnant persons was gathered by the national surveillance form, clinical consultation, and enhanced pregnancy surveillance.
** Sexual partner during the 3 weeks before symptom onset.
†† Percentage of those who had a sexual partner during the 3 weeks before symptom onset.
§§ Exposures are not mutually exclusive.
¶¶ Immunocompromising conditions include diseases (e.g., diabetes, lupus, organ transplants, stem cell transplants, and cancer) or certain medicines (e.g., chemotherapy, biologic therapies, and steroids).
*** Percentage among the 364 cisgender women who are not currently or recently pregnant with data available on any known immunocompromising conditions.
††† Percentage among the 14 pregnant or recently pregnant persons with data available on any known immunocompromising conditions.
§§§ Percentage among the 161 cisgender women who are not currently or recently pregnant with data available on HIV status.
¶¶¶ Percentage among the 12 pregnant or recently pregnant persons with data available on HIV status.

sexual contact with a cisgender man and 18 (6%) who had recent sexual contact with a cisgender woman. Among the 18 patients who had recent sexual contact with a woman, 12 also had a recent male sex partner. Of the 73 cisgender women who had complete exposure data, 53 (73%) reported recent sexual or intimate contact as the likely route of exposure. Among the 16 who reported household contact or caregiving as the likely route of exposure, five reported recent sexual or intimate contact. Among the 378 cisgender women with available data on immunocompromising conditions, 35 (9%) reported any known immunocompromising condition other than HIV infection. Information on HIV status was available for 173 cisgender women, 13 (8%) of whom had HIV infection; no cisgender women with HIV infection were pregnant.

Among all cisgender women with mpox and available data, the most frequently reported signs and symptoms were rash (93%), headache (54%), pruritis (57%), malaise (54%), fever (49%), and chills (49%) (Table 2). Among 376 (49%) cisgender women with data on rash location, rash was most frequently reported on the legs (48%), arms (47%), genitals (36%), and trunk (33%); 50 (16%) reported rash in one region, 63 (20%) in two regions, 57 (18%) in three regions, and 140 (45%) in four or more regions. Rash location was similar when comparing cisgender women who reported recent sexual exposure with those who did not.

Cases in Currently and Recently Pregnant Persons

During May 11–November 7, 2022, 23 cases of mpox were reported during pregnancy (21) or within 3 weeks of pregnancy (two); all pregnant and recently pregnant persons with mpox identified as cisgender women on the mpox case report form[†††] (Table 1). Among 12 currently or recently pregnant persons with available exposure data, nine reported sexual contact and three reported household contact. Among 10 cases in pregnant persons with information on trimester of infection, three occurred during the first, four during the second, and three during the third trimester (Table 3). Rash was present in all persons. Genital lesions were reported by four currently or recently pregnant persons; none reported genital lesions near the time of delivery.

Eleven (48%) pregnant persons received tecovirimat (administered during all trimesters of pregnancy); no medication-related adverse events were reported. Four pregnant persons were hospitalized related to symptoms from *Monkeypox virus* infection (pain control and treatment of superimposed cellulitis) and remained pregnant at discharge. No pregnant person required intensive care, intubation, or unplanned delivery. None of the pregnant persons received vaccinia immune globulin intravenous (VIGIV) for treatment. Of the 21 persons who received an mpox diagnosis during pregnancy, three have reported outcomes, including two full-term deliveries without complications (including no transmission to the infant) and one spontaneous abortion at 11 weeks' gestation. Two pregnant persons experienced mpox symptoms within 3 days after delivery; their newborns developed lesions within 1 week of their symptom onset. Both newborns received oral tecovirimat within 48 hours of developing lesions and were treated for 10–14 days; one received VIGIV. Both newborns responded to treatment, appeared to be in good health, and were discharged home.

One recently pregnant person who was breastfeeding developed lesions 4 days postpartum, including under the breast; this person's newborn developed symptoms with lesions on the face and chest 6 days later. Two other cisgender women who were not pregnant or recently pregnant were breastfeeding at the time of mpox diagnosis. One woman's infant was exposed to a symptomatic household contact; she experienced symptoms 2 weeks after the infant's diagnosis. The second woman received an mpox diagnosis following an occupational exposure; breast milk samples from this person were tested and were negative for *Monkeypox virus* DNA by polymerase chain reaction testing.[§§§]

Discussion

Monkeypox virus infections in cisgender women during May 11–November 7 constituted <3% of total U.S. cases. Consistent with disparities observed overall during the ongoing mpox epidemic, the proportion of Black and Hispanic women with mpox was higher than the proportion of Black and Hispanic women in the U.S. population (*6*). This finding is similar to disparities among mpox cases in the United States overall and underscores the continued need for public health efforts to provide education on prevention of mpox and ensure equitable access to mpox vaccination, testing, and treatment.

Sex or close intimate contact within 3 weeks of symptom onset was reported by nearly three quarters of cisgender women with mpox, and genital lesions were frequently reported, suggesting sexual exposure as a likely primary route of transmission. Obstetrician-gynecologists and other providers should consider mpox when examining new genital, oral, or breast lesions. Patient education regarding risks for transmission of *Monkeypox virus* and other sexually transmitted infections should be provided.

Genital lesions in pregnant persons pose a risk for *Monkeypox virus* transmission to the fetus during vaginal delivery.[¶¶¶] A thorough skin and mucosal (e.g., anal, vaginal, and oral) examination for mpox lesions should be performed in persons with possible mpox near the time of delivery to identify lesions of which they might be unaware. When mpox lesions, including genital lesions, are present, shared decision-making should be considered when discussing route of delivery. Because there might be an increased risk for severe disease in newborns, breastfeeding should be temporarily delayed until criteria for discontinuing isolation have been met (lesions have resolved, the scabs have fallen off, and a fresh layer of intact skin has formed).[****]

[†††] CDC recognizes that not all pregnant persons are cisgender women. However, in the study, all cases of mpox in pregnant persons, recently pregnant persons, and breastfeeding persons occurred in persons who identified as cisgender women based on the mpox case report form.

[§§§] This breastfeeding mother was a health care worker who cared for a symptomatic patient. She later developed atypical features of mpox.

[¶¶¶] https://www.cdc.gov/poxvirus/monkeypox/about/science-behind-transmission.html

[****] https://www.cdc.gov/poxvirus/monkeypox/clinicians/pregnancy.html#contact-breastfeeding

TABLE 2. Signs and symptoms and rash sites among all cisgender women with mpox (N = 769) — United States, May 11–November 7, 2022*

Characteristic	Presence or absence of signs or symptoms, no. (%)†			No. missing (% of total sample)
	Present	Absent	Unknown	
Sign or symptom				
Rash	376 (92.6)	17 (4.2)	13 (3.2)	363 (47.2)
Headache	182 (54.3)	122 (36.4)	31 (9.3)	434 (56.4)
Malaise	176 (53.5)	115 (35.0)	38 (11.6)	440 (57.2)
Fever	165 (48.5)	139 (40.9)	36 (10.6)	429 (55.8)
Chills	162 (49.2)	135 (41.0)	32 (9.7)	440 (57.2)
Pruritis	164 (56.8)	91 (31.5)	34 (11.8)	480 (62.4)
Myalgia	142 (45.1)	142 (45.1)	31 (9.8)	454 (59.0)
Enlarged lymph nodes	137 (41.8)	153 (46.7)	38 (11.6)	441 (57.3)
Vomiting or nausea	63 (24.3)	161 (62.2)	35 (13.5)	510 (66.3)
Abdominal pain	57 (19.2)	198 (66.7)	42 (14.1)	472 (61.4)
Rectal pain	39 (12.8)	229 (74.8)	38 (12.4)	463 (60.2)
Tenesmus	22 (8.5)	199 (76.8)	38 (14.7)	510 (66.3)
Conjunctivitis	14 (5.7)	199 (80.2)	35 (14.1)	521 (67.8)
Pus or blood in stools	12 (4.6)	210 (80.5)	39 (14.9)	508 (66.1)
Rectal bleeding	11 (3.7)	246 (82.8)	40 (13.5)	472 (61.4)
Proctitis	8 (3.3)	185 (76.5)	49 (20.3)	527 (68.5)
Rash site§				
Legs	182 (48.4)	NA	NA	NA
Arms	178 (47.3)			
Trunk	125 (33.2)			
Genitals	137 (36.4)			
Face	116 (30.9)			
Palms	81 (21.5)			
Head	79 (21.0)			
Hand	73 (19.4)			
Neck	54 (14.4)			
Mouth	57 (15.2)			
Perianal	53 (14.1)			
Soles	44 (11.7)			
Other	100 (26.6)			

Abbreviation: NA = not applicable.
* Data as of November 9, 2022.
† Percentages calculated using nonmissing data.
§ Percentages among the 376 cisgender women who reported experiencing rash.

Clinicians caring for cisgender women and pregnant persons should become familiar with clinical considerations for the prevention, diagnosis, and treatment of mpox[††††] and should provide pre- and postexposure prophylaxis if indicated. Vaccination with JYNNEOS should be provided to eligible persons, including those who are pregnant or breastfeeding, and providers should discuss vaccination risks and benefits.[§§§§]

The findings in this report are subject to at least three limitations. First, data for some variables such as exposure risk and HIV status were frequently missing (≤92%). Thus, these data might not represent the characteristics of the overall sample. Second, the small sample size of currently and recently pregnant persons with mpox might limit the generalizability of outcomes. Finally, additional time is needed for pregnancy completion to describe outcomes among all cases of mpox during pregnancy.

Cases of mpox have occurred primarily among adult gay, bisexual, and other MSM during the current outbreak; however, any person, including cisgender women, can also acquire infection. Public health efforts should include more emphasis on cisgender women who might be at increased risk for exposure. In addition, although most reported cases of mpox in pregnant persons have been managed in the outpatient setting, some persons might require hospitalization, and there is a risk for perinatal transmission. To mitigate this risk, pregnant, recently pregnant, and breastfeeding persons should be offered prophylaxis or treatment if indicated. Continued collection of information is critical to evaluating the risk for transmission, informing infection prevention and control, and assessing the impact of mpox on the sexual, reproductive, and overall health of cisgender women. In addition, collection of longitudinal data among pregnant persons and their infants is critical to understanding the effects of mpox on maternal and neonatal outcomes. CDC, in collaboration with health departments,

†††† https://www.cdc.gov/poxvirus/monkeypox/clinicians/pregnancy.html
§§§§ https://www.cdc.gov/poxvirus/monkeypox/interim-considerations/jynneos-vaccine.html

TABLE 3. Characteristics of currently and recently pregnant persons* with mpox (N = 23) — United States, May 11–November 7, 2022

Characteristic	No. (%)†
Currently pregnant	21 (91.3)
Recently pregnant	2 (8.7)
Pregnancy trimester when *Monkeypox virus* infection occurred (10)	
First	3 (30.0)
Second	4 (40.0)
Third	3 (30.0)
Missing	11
Sign or symptom§	
Fever	6 (26.1)
Rash	23 (100.0)
Genital or breast lesions	4 (17.4)
Myalgia	2 (8.7)
Pruritis	6 (26.1)
Lymphadenopathy	3 (13.0)
Disease severity	
Hospitalized	
Yes	4 (17.4)
No	19 (82.6)
Admitted to ICU	0 (—)
Mpox-directed therapy¶	
Tecovirimat (oral or IV)	11 (47.8)
VIGIV	0 (—)
Postexposure prophylaxis	
Received JYNNEOS	0 (—)

Abbreviations: ICU = intensive care unit; IV = intravenous; mpox = monkeypox; VIGIV= vaccinia immune globulin intravenous.
* Recently pregnant persons had confirmed or probable *Monkeypox virus* infection within 21 days of delivery.
† Percentages calculated among nonmissing values.
§ Signs and symptoms are not mutually exclusive.
¶ Two women who received tecovirimat also received other treatments (e.g., acyclovir or antibiotics).

will continue to follow cases in pregnant and recently pregnant persons and provide updates as data become available.

Summary

What is already known about this topic?

Data from the ongoing monkeypox (mpox) outbreak on cases in cisgender women and in pregnancy are limited.

What is added by this report?

Among 769 mpox cases reported among U.S. cisgender women, Black or African American and Hispanic or Latino women were disproportionately affected. Most cisgender women reported recent sexual activity with men. Twenty-three cases among pregnant or recently pregnant persons were reported and all recovered. Four pregnant persons were hospitalized for mpox, and tecovirimat was tolerated with no adverse reactions.

What are the implications for public health practice?

Continued monitoring of mpox risk in cisgender women and during pregnancy is critical to assessing the impacts of mpox on sexual, reproductive, and overall health and to better understand perinatal outcomes.

Acknowledgments

Mpox response teams from state and local health departments; hospital and clinical providers involved in CDC clinical consultations; Suzanne Newton, Ruth Stefanos, CDC; Thandiwe Bobb, Georgia Department of Public Health; Kay Hooshmand, Chase Israel, Claire Park, Jasmine Sharma, Los Angeles County Department of Public Health; mpox case investigation and response staff members at Acute Communicable Disease Control Program and Community Field Services Division, Los Angeles County Department of Public Health; Marcie Babcock, Victor Cruz, Minnesota Department of Health; Jennifer MacFarquhar, CDC Career Epidemiology Field Officer, North Carolina Department of Health and Human Services; Karen Alroy, Ellen Lee, New York City Department of Health and Mental Hygiene; Lisa McHugh, W. Gina Pang, Nottasorn Plipate, Kumar Nalluswami, Arlene Seid, Pennsylvania Department of Health; Lenore Asbel, Aasta Mehta, Ayomide Sokale, Philadelphia Department of Public Health; Division of Disease Control Response Team, Philadelphia Department of Public Health; Hospital Obstetrics/Gynecology and Infectious Disease Partners, Philadelphia, Pennsylvania; Public Health - Seattle & King County Communicable Disease Investigations Team; Liz Harris, Robertson Nash, Pamela Talley, Tennessee Department of Health; Nicholas Hysmith, LeBonheur Children's Hospital; Sandra Castejon-Ramirez, St. Jude Children's Research Hospital, LeBonheur Children's Hospital.

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All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflicts of interest were disclosed.

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Erratum

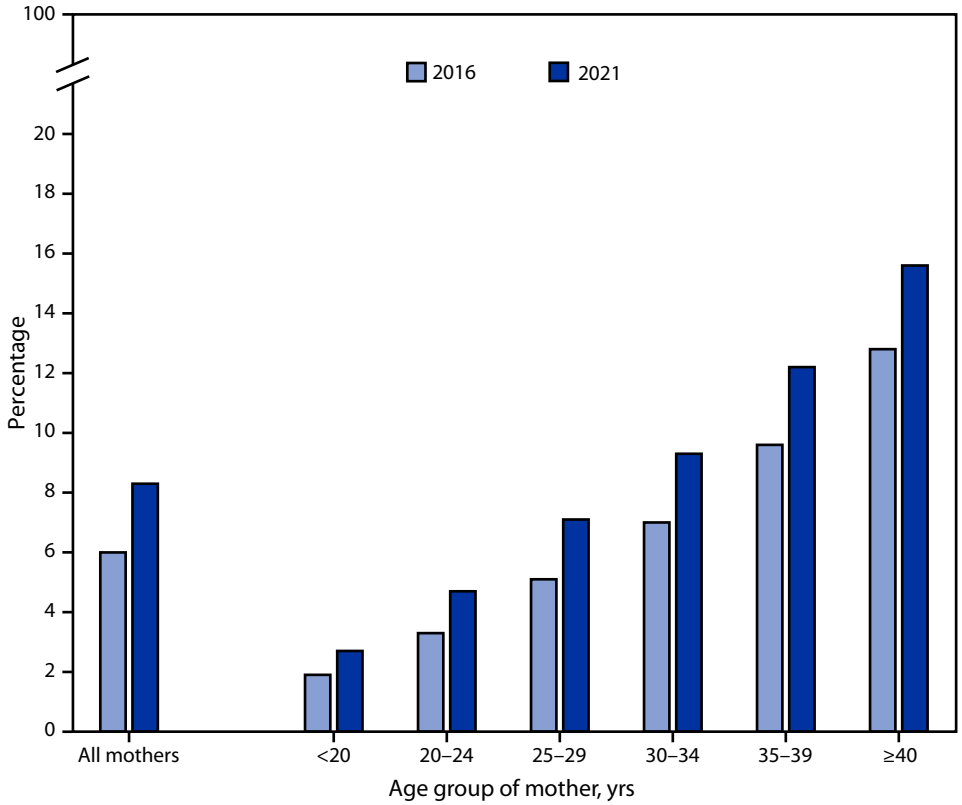
Vol. 71, No. 46

In the report "Measles, Mumps, Rubella Vaccine (PRIORIX): Recommendations of the Advisory Committee on Immunization Practices — United States, 2022," on page 1465, the second sentence of the first footnote should have read, "In addition, **measles postexposure prophylaxis is an off-label indicated use for PRIORIX; measles postexposure prophylaxis is an on-label indicated use for M-M-R II**."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Mothers with Gestational Diabetes,* by Maternal Age — National Vital Statistics System, United States, 2016 and 2021



* Diabetes diagnosed during the pregnancy as reported on the birth certificate. National information on gestational diabetes became available for the first time in 2016 and might be underreported.

The percentage of mothers giving birth who received a diagnosis of diabetes during pregnancy (gestational diabetes) increased from 6.0% in 2016 to 8.3% in 2021. Increases in gestational diabetes were seen in each maternal age group, and rates rose steadily with maternal age; in 2021, the rate for mothers aged ≥40 years (15.6%) was nearly six times as high as the rate for mothers aged <20 years (2.7%).

Source: National Center for Health Statistics, National Vital Statistics System, Natality Data. https://www.cdc.gov/nchs/nvss/births.htm

Reported by: Joyce A. Martin, jcm9@cdc.gov, 301-458-4362; Elizabeth C. W. Gregory.

For more information on this topic, CDC recommends the following link: https://www.cdc.gov/pregnancy/diabetes.html

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ISSN: 0149-2195 (Print)