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Measles — United States, January 1, 2020–March 28, 2024

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Abstract

Measles is a highly infectious febrile rash illness and was declared eliminated in the United States in 2000. However, measles importations continue to occur, and U.S. measles elimination status was threatened in 2019 as the result of two prolonged outbreaks among undervaccinated communities in New York and New York City. To assess U.S. measles elimination status after the 2019 outbreaks and to provide context to understand more recent increases in measles cases, CDC analyzed epidemiologic and laboratory surveillance data and the performance of the U.S. measles surveillance system after these outbreaks. During January 1, 2020–March 28, 2024, CDC was notified of 338 confirmed measles cases; 97 (29%) of these cases occurred during the first quarter of 2024, representing a more than seventeenfold increase over the mean number of cases reported during the first quarter of 2020–2023. Among the 338 reported cases, the median patient age was 3 years (range = 0–64 years); 309 (91%) patients were unvaccinated or had unknown vaccination status, and 336 case investigations included information on ≥80% of critical surveillance indicators. During 2020–2023, the longest transmission chain lasted 63 days. As of the end of 2023, because of the absence of sustained measles virus transmission for 12 consecutive months in the presence of a well-performing surveillance system, U.S. measles elimination status was maintained. Risk for widespread U.S. measles transmission remains low because of high population immunity. However, because of the increase in cases during the first quarter of 2024, additional activities are needed to increase U.S. routine measles, mumps, and rubella vaccination coverage, especially among close-knit and undervaccinated communities. These activities include encouraging vaccination before international travel and rapidly investigating suspected measles cases.

Introduction

Measles is a highly infectious acute, febrile rash illness with a >90% secondary attack rate among susceptible contacts (*1*). High national 2-dose coverage with the measles, mumps, and rubella (MMR) vaccine led to the declaration of U.S. measles elimination* in 2000 (*2*). However, this elimination status was threatened in 2019 because of two prolonged outbreaks among undervaccinated communities in New York and New York City; these outbreaks accounted for 29% of all reported cases during 2001–2019 (*2*). To assess U.S. measles elimination status after the 2019 outbreaks and to provide context for understanding

* Elimination is defined as the absence of endemic measles virus transmission in a defined geographic area for ≥12 months in the presence of a well-performing surveillance system.

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more recent increases in measles cases in 2024,[†] CDC assessed the epidemiologic and laboratory-based surveillance of measles in the United States and the performance of the U.S. measles surveillance system during January 1, 2020–March 28, 2024.

Methods

Reporting and Classification of Measles Cases

Confirmed measles cases[§] (*1*) are reported to CDC by state health departments through the National Notifiable Disease Surveillance System and directly (by email or telephone) to the National Center for Immunization and Respiratory Diseases. Measles cases are classified by the Council of State and Territorial Epidemiologists as import-associated if they were internationally imported, epidemiologically linked to an imported case, or had viral genetic evidence of an imported measles genotype (*1*); cases with no epidemiologic or virologic link to an imported case are classified as having an unknown source (*1*). For this analysis, unique sequences were defined as those differing by at least one nucleotide in the N-450 sequence (the 450 nucleotides encoding the carboxyl-terminal 150 nucleoprotein amino acids) based on the standard World Health Organization (WHO) recommendations for describing sequence variants[¶] (*3*). Unvaccinated patients were classified as eligible for vaccination if they were not vaccinated according to Advisory Committee on Immunization Practices recommendations (*4*). A well-performing surveillance system was defined as one with ≥80% of cases meeting each of the following three criteria: classified as import-associated, reported with complete information on at least eight of 10 critical surveillance indicators (i.e., place of residence, sex, age, occurrence of fever and rash, date of rash onset, vaccination status, travel history, hospitalization, transmission setting, and whether the case was outbreak-related) (*5*), and laboratory-confirmed.

Assessment of Chains of Transmission

Cases were classified into chains of transmission on the basis of known epidemiologic linkages: isolated (single) cases, two-case chains (two epidemiologically linked cases), and outbreaks (three or more epidemiologically linked cases). The potential for missed cases within two-case chains and outbreaks was assessed by measuring the interval between measles rash onset dates in each chain; chains with more than one maximum incubation period (21 days) between cases could indicate a missing case in the chain. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[**]

[†] https://emergency.cdc.gov/han/2024/han00504.asp

[§] A confirmed measles case was defined as an acute febrile rash illness with laboratory confirmation or direct epidemiologic linkage to a laboratory-confirmed case. Laboratory confirmation was defined as detection of measles virus–specific nucleic acid from a clinical specimen using real-time reverse transcription–polymerase chain reaction or a positive serologic test for measles immunoglobulin M antibody.

[¶] Genotyping was performed at CDC and at the Vaccine Preventable Disease Reference Centers of the Association of Public Health Laboratories.

[**] 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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Results

Reported Measles Cases and Outbreaks

CDC was notified of 338 confirmed measles cases with rash onset during January 1, 2020–March 28, 2024 (Figure); cases occurred in 30 jurisdictions. During 2020, 12 of 13 cases preceded the commencement of COVID-19 mitigation efforts in March 2020. Among the 170 cases reported during 2021 and 2022, 133 (78%) were associated with distinct outbreaks: 47 (96%) of 49 cases in 2021 occurred among Afghan evacuees temporarily housed at U.S. military bases during Operation Allies Welcome, and 86 (71%) of 121 cases in 2022 were associated with an outbreak in central Ohio. During 2023, 28 (48%) of 58 cases were associated with four outbreaks. As of March 28, 2024, a total of 97 cases have been reported in 2024, representing 29% of all 338 measles cases reported during January 1, 2020–March 28, 2024, and more than a seventeenfold increase over the mean number of cases reported during the first quarter of 2020–2023 (five cases).

Characteristics of Reported Measles Cases

The median patient age was 3 years (range = 0–64 years); more than one half of cases (191; 58%) occurred in persons aged 16 months–19 years (Table). Overall, 309 (91%) patients were unvaccinated (68%) or had unknown vaccination status (23%); 29 (9%) had previously received ≥1 MMR vaccine dose. Among the 309 cases among unvaccinated persons or persons with unknown vaccination status, 259 (84%) patients were eligible for vaccination, 40 (13%) were aged 6–11 months and therefore not recommended for routine MMR vaccination, and 10 (3%) were ineligible for MMR because they were aged <6 months.[††] Among 155 (46%) hospitalized measles patients, 109 (70%) cases occurred in persons aged <5 years; 142 (92%) hospitalized patients were unvaccinated or had unknown vaccination status. No measles-associated deaths were reported to CDC.

Imported Measles Cases

Among all 338 cases, 326 (96%) were associated with an importation; 12 (4%) had an unknown source. Among the 326 import-associated cases, 200 (61%) occurred among U.S. residents who were eligible for vaccination but who were unvaccinated or whose vaccination status was unknown. Among 93 (28%) measles cases that were directly imported from other countries, 34 (37%) occurred in foreign visitors, and 59 (63%) occurred in U.S. residents, 53 (90%) of whom were eligible for vaccination but were unvaccinated or whose vaccination status was unknown. One (2%) case in a U.S. resident occurred in a person too young for vaccination, two (3%) in persons who had previously received 1 MMR vaccine dose, and three (5%) in persons who had previously received 2 MMR vaccine doses. The most common source for internationally imported cases during the study period were the Eastern Mediterranean (48) and African (24) WHO regions. During the first quarter of 2024, a total of six internationally imported cases were reported from the European and South-East Asia WHO regions, representing a 50% increase over the mean number of importations from these regions during 2020–2023 (mean of two importations per year from each region).

[††] MMR vaccine is not licensed for use in persons aged <6 months.

FIGURE. Confirmed measles cases, by month of rash onset (N = 338) — United States, January 1, 2020–March 28, 2024

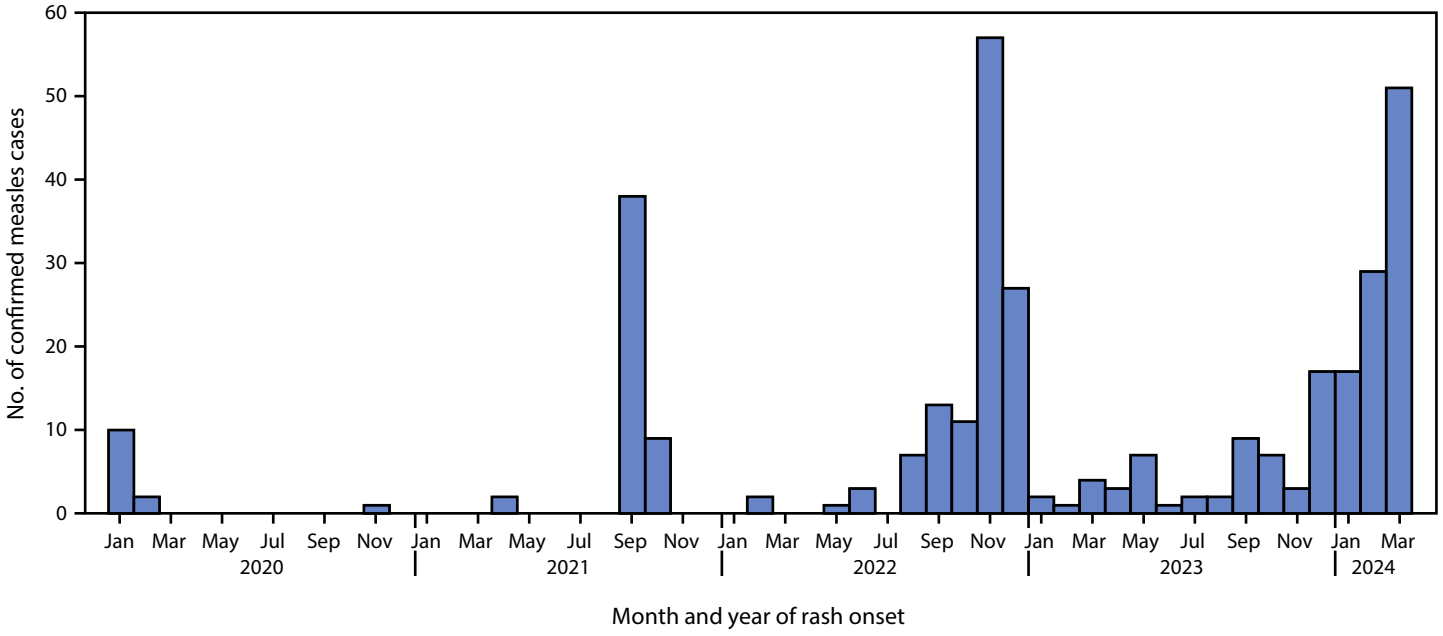

TABLE. Epidemiologic and laboratory characteristics of reported measles cases — United States, January 1, 2020–March 28, 2024

Characteristic	No. (%), by year						
	Total	2020	2021	2022	2023	2020–2023	2024
Total measles cases	**338**	**13**	**49**	**121**	**58**	**241**	**97**
Age group							
0–5 mos	**10 (3)**	0 (—)	5 (10)	0 (—)	0 (—)	5 (2)	5 (5)
6–11 mos	**57 (17)**	0 (—)	11 (22)	26 (21)	6 (10)	43 (18)	14 (14)
12–15 mos	**29 (9)**	1 (8)	5 (10)	13 (11)	3 (5)	22 (9)	7 (7)
16 mos–4 yrs	**106 (31)**	2 (15)	13 (27)	52 (43)	15 (26)	82 (34)	24 (25)
5–19 yrs	**85 (25)**	2 (15)	12 (24)	29 (24)	20 (34)	63 (26)	22 (23)
20–49 yrs	**47 (14)**	8 (62)	3 (6)	1 (1)	14 (24)	26 (11)	21 (22)
≥50 yrs	**4 (1)**	0 (—)	0 (—)	0 (—)	0 (—)	0 (—)	4 (4)
Vaccination status							
Unvaccinated	**230 (68)**	5 (38)	8 (16)	118 (98)	42 (72)	173 (72)	57 (59)
Unknown	**79 (23)**	5 (38)	40 (82)	1 (1)	10 (17)	56 (23)	23 (24)
Vaccinated, 1 dose	**17 (5)**	0 (—)	0 (—)	1 (1)	4 (7)	5 (2)	12 (12)
Vaccinated, 2 doses	**12 (4)**	3 (23)	1 (2)	1 (1)	2 (3)	7 (3)	5 (5)
Import-associated cases	**326 (96)**	12 (92)	48 (98)	121 (100)	53 (91)	234 (97)	60 (94)
International importation*	**93 (28)**	7 (54)	21 (43)	23 (19)	23 (40)	74 (31)	19 (20)
Import-linked†	**65 (19)**	4 (31)	18 (37)	11 (9)	19 (33)	52 (22)	13 (13)
Imported-virus or imported-virus–linked§	**168 (50)**	1 (8)	9 (18)	87 (72)	11 (19)	108 (45)	60 (62)
Unknown source cases¶	**12 (4)**	1 (8)	1 (2)	0 (—)	5 (9)	7 (3)	5 (5)
Source WHO region for internationally imported cases**							
Eastern Mediterranean	**48 (52)**	3 (43)	21 (100)	9 (39)	4 (17)	37 (50)	11 (58)
African	**24 (26)**	0 (—)	0 (—)	18 (78)	5 (22)	23 (31)	1 (5)
European	**11 (12)**	1 (14)	0 (—)	0 (—)	7 (30)	8 (11)	3 (16)
South-East Asia	**11 (12)**	0 (—)	0 (—)	0 (—)	8 (35)	8 (11)	3 (16)
Americas	**2 (2)**	2 (29)	0 (—)	0 (—)	0 (—)	2 (3)	0 (—)
Western Pacific	**2 (2)**	1 (14)	0 (—)	0 (—)	0 (—)	1 (1)	1 (5)
≥80% of 10 critical variables reported††	**336 (99)**	13 (100)	48 (98)	121 (100)	58 (100)	240 (100)	96 (99)
Laboratory findings							
Laboratory confirmed	**314 (93)**	13 (100)	48 (98)	109 (90)	53 (91)	223 (93)	91 (94)
IgM-positive only	**16 (5)**	2 (15)	0 (—)	4 (4)	5 (9)	11 (5)	5 (5)
rRT-PCR–positive§§	**298 (95)**	11 (85)	48 (100)	105 (96)	48 (91)	212 (95)	86 (95)
rRT-PCR–positive with genotyping completed	**221 (74)**	9 (82)	45 (94)	96 (91)	32 (67)	182 (86)	39 (45)
No. of transmission chains							
Total	**92**	**9**	**7**	**15**	**31**	**62**	**30**
Isolated cases¶¶	**62 (67)**	8 (89)	2 (29)	9 (60)	24 (77)	43 (69)	19 (63)
Two-case chains¶¶	**10 (11)**	0 (—)	2 (29)	1 (7)	3 (10)	6 (10)	4 (13)
Outbreaks (three or more cases)¶¶	**20 (22)**	1 (11)	3 (43)	5 (33)	4 (13)	13 (21)	7 (23)

Abbreviations: IgM = immunoglobulin M; rRT-PCR = real-time reverse transcription–polymerase chain reaction; WHO = World Health Organization.

* A case resulting from exposure to measles virus outside the United States as evidenced by at least some of the exposure period (7–21 days before rash onset) occurring outside the United States and rash onset occurring within 21 days of entering the United States without known exposure to measles during that time.

† A case in a transmission chain epidemiologically linked to an internationally imported case.

§ A case for which an epidemiologic link to an internationally imported case was not identified, but for which viral sequence data indicate an imported measles genotype (i.e., a genotype that is not detected in the United States with a pattern indicative of endemic transmission).

¶ A case for which an epidemiologic or virologic link to importation or to endemic transmission within the United States cannot be established after a thorough investigation.

** Percentage is percentage of international importations. Four cases among persons who traveled to both the Eastern Mediterranean and African regions and one case in a person who traveled to both the Eastern Mediterranean and European regions were counted twice.

†† Place of residence, sex, age or date of birth, fever and rash, date of rash onset, vaccination status, travel history, hospitalization, transmission setting, and whether the case was outbreak related.

§§ Includes 65 cases among patients who received both positive rRT-PCR and positive IgM results.

¶¶ Percentage is percentage of total chains.

Surveillance Quality Indicators

Overall, all but two of the 338 case investigations included information on ≥80% of the critical surveillance indicators; those two case investigations included information on 70% of critical surveillance indicators. Date of first case report to a health department was available for 219 (65%) case investigations; 127 (58%) cases were reported to health departments on or before the day of rash onset (IQR = 4 days before to 3 days after). Overall, 314 (93%) measles cases were laboratory confirmed, including 16 (5%) by immunoglobulin M (serologic) testing alone and 298 (95%) by real-time reverse transcription–polymerase chain reaction (rRT-PCR). Among 298 rRT-PCR–positive specimens, 221 (74%) were successfully genotyped: 177 (80%) were genotype B3, and 44 (20%)

Summary

What is already known about this topic?

Although endemic U.S. measles was declared eliminated in 2000, measles importations continue to occur. Prolonged outbreaks during 2019 threatened the U.S. measles elimination status.

What is added by this report?

During January 1, 2020–March 28, 2024, a total of 338 U.S. measles cases were reported; 29% of these cases occurred during the first quarter of 2024, almost all in persons who were unvaccinated or whose vaccination status was unknown. As of the end of 2023, U.S. measles elimination status was maintained.

What are the implications for public health practice?

Risk for widespread U.S. measles transmission remains low because of high population immunity. Enhanced efforts are needed to increase routine U.S. vaccination coverage, encourage vaccination before international travel, identify communities at risk for measles transmission, and rapidly investigate suspected measles cases to reduce cases and complications of measles.

were genotype D8. Twenty-two distinct sequence identifiers (DSIds) (*3*) for genotype B3 and 13 DSIds for genotype D8 were detected (Supplementary Figure, https://stacks.cdc.gov/view/cdc/152776). The longest period of detection for any DSId was 15 weeks (DSId 8346).

Chains of Transmission

The 338 measles cases were categorized into 92 transmission chains (Table); 62 (67%) were isolated cases, 10 (11%) were two-case chains, and 20 (22%) were outbreaks of three or more cases. Seven (35%) of 20 outbreaks occurred during 2024.[§§] The median outbreak size was six cases (range = three–86 cases) and median duration of transmission was 20 days (range = 6–63 days). Among the 30 two-case chains and outbreaks, more than one maximum incubation period (21 days) did not elapse between any two cases.

Discussion

Because of the absence of endemic measles virus transmission for 12 consecutive months in the presence of a well-performing surveillance system, as of the end of 2023, measles elimination has been maintained in the United States. U.S. measles elimination reduces the number of cases, deaths, and costs that would occur if endemic measles transmission were reestablished. Investigation of almost all U.S. measles cases reported since January 2020 were import-associated, included complete information on critical surveillance variables, were laboratory-confirmed by rRT-PCR, and underwent genotyping; these findings indicate that the U.S. measles surveillance system is performing well. A variety of transmission chain sizes were detected, including isolated cases, suggesting that sustained measles transmission would be rapidly detected. However, the rapid increase in the number of reported measles cases during the first quarter of 2024 represents a renewed threat to elimination.

Most measles importations were cases among persons traveling to and from countries in the Eastern Mediterranean and African WHO regions; these regions experienced the highest reported measles incidence among all WHO regions during 2021–2022 (*6*). During November 2022–October 2023, the number of countries reporting large or disruptive outbreaks increased by 123%, from 22 to 49. Global estimates suggest that first-dose measles vaccination coverage had declined from 86% in 2019 to 83% in 2022, leaving almost 22 million children aged <1 year susceptible to measles (*6*).

As has been the case in previous postelimination years (*7*), most imported measles cases occurred among unvaccinated U.S. residents. Increasing global measles incidence and decreasing vaccination coverage will increase the risk for importations into U.S. communities, as has been observed during the first quarter of 2024, further supporting CDC's recommendation for persons to receive MMR vaccine before international travel (*4*).

Maintaining high national and local MMR vaccination coverage remains central to sustaining measles elimination. Risk for widespread U.S. measles transmission remains low because of high population immunity; however, national 2-dose MMR vaccination coverage has remained below the Healthy People 2030 target of 95% (the estimated population-level immunity necessary to prevent sustained measles transmission) (*8*) for 3 consecutive years, leaving approximately 250,000 kindergarten children susceptible to measles each year (*9*). Furthermore, 2-dose MMR vaccination coverage estimates in 12 states and the District of Columbia were <90%, and during the 2022–23 school year, exemption rates among kindergarten children exceeded 5% in 10 states (*9*). Clusters of unvaccinated persons placed communities at risk for large outbreaks, as occurred during the central Ohio outbreak in 2022: 94% of measles patients were unvaccinated and 42% were hospitalized (*10*). Monitoring MMR vaccination coverage at county and zip code levels could help public health agencies identify undervaccinated communities for targeted interventions to improve vaccination coverage while preparing for possible measles outbreaks. As of March 28, 2024, a total of 97 confirmed measles cases have been reported in the United States in 2024, compared with a mean of five cases during the first quarter of each year during 2020–2023. Similar to cases reported during 2020–2023, most cases reported during 2024 occurred among

[§§] At the time of this report, six measles outbreaks have ended, and one outbreak is ongoing. A measles outbreak is considered to be over when no new cases have been identified during two incubation periods (42 days) since the rash onset in the last outbreak-related case.

patients aged <20 years who were unvaccinated or whose vaccination status was unknown, and were associated with an importation. Rapid detection of cases, prompt implementation of control measures, and maintenance of high national measles vaccination coverage, including improving coverage in undervaccinated populations, is essential to preventing measles and its complications and to maintaining U.S. elimination status.

Limitations

The findings in this report are subject to at least three limitations. First, importations might have been underreported: 4% of reported cases during the study period had no known source. Second, case investigations resulting in discarded measles cases (i.e., a diagnosis of measles excluded) are not nationally reportable, which limits the ability to directly evaluate the sensitivity of measles case investigations. However, surveillance remains sufficiently sensitive to detect isolated cases and outbreaks, and robust molecular epidemiology provides further evidence supporting the absence of sustained measles transmission in the United States. Finally, the date of first case report to a health department was not available for 35% of case investigations.

Implications for Public Health Practice

The U.S. measles elimination status will continue to be threatened by global increases in measles incidence and decreases in global, national, and local measles vaccination coverage. Because of high population immunity, the risk of widespread measles transmission in the United States remains low; however, efforts are needed to increase routine MMR vaccination coverage, encourage vaccination before international travel, identify communities at risk for measles transmission, and rapidly investigate suspected measles cases to maintain elimination.

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State Medicaid Coverage for Tobacco Cessation Treatments and Barriers to Accessing Treatments — United States, 2018–2022

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Abstract

The prevalence of cigarette smoking among U.S. adults enrolled in Medicaid is higher than among adults with private insurance; more than one in five adults enrolled in Medicaid smokes cigarettes. Smoking cessation reduces the risk for smoking-related disease and death. Effective treatments for smoking cessation are available, and comprehensive, barrier-free insurance coverage of these treatments can increase cessation. However, Medicaid treatment coverage and treatment access barriers vary by state. The American Lung Association collected and analyzed state-level information regarding coverage for nine tobacco cessation treatments and seven access barriers for standard Medicaid enrollees. As of December 31, 2022, a total of 20 state Medicaid programs provided comprehensive coverage (all nine treatments), an increase from 15 as of December 31, 2018. Only three states had zero access barriers, an increase from two; all three also had comprehensive coverage. Although states continue to improve smoking cessation treatment coverage and decrease access barriers for standard Medicaid enrollees, coverage gaps and access barriers remain in many states. State Medicaid programs can improve the health of enrollees who smoke and potentially reduce health care expenditures by providing barrier-free coverage of all evidence-based cessation treatments and by promoting this coverage to enrollees and providers.

Introduction

Although the prevalence of cigarette smoking among U.S. adults has been declining for decades (reaching 11.5% in 2021), tobacco-related disparities persist among population groups (*1*). In 2021, smoking prevalence among adults enrolled in Medicaid (21.5%) was higher than it was among adults with private insurance (8.6%) (*1*). In addition, although interest in quitting and quit attempts are similar among adults enrolled in Medicaid and those with private insurance, successful cessation prevalence is lower among those enrolled in Medicaid (*2*). The high prevalence of smoking in this population not only contributes to a substantial health burden for this population but also to the cost of health care. Smoking-attributable health care spending was $225 billion in 2014, more than one half of which was paid by Medicare and Medicaid (*3*).

Effective treatments for smoking cessation include seven Food and Drug Administration (FDA)–approved medications* as well as individual, group, and telephone counseling (*4*). The U.S. Surgeon General has concluded that "insurance coverage for smoking cessation treatment that is comprehensive, barrier-free, and widely promoted increases the use of these treatment services, leads to higher rates of successful quitting, and is cost-effective" (*4*). Although states are required to provide Medicaid expansion† enrollees with coverage for all tobacco cessation treatments,§ coverage for standard (i.e., traditional) Medicaid enrollees varies. Standard Medicaid enrollees are persons enrolled in Medicaid under traditional Medicaid eligibility criteria (e.g., low-income pregnant women, children, and persons with a disability), as opposed to Group XIII, or expansion, eligibility. Nationwide, approximately 80% of Medicaid enrollees are covered under standard Medicaid.¶ To assess cessation coverage policies among Medicaid programs, the American Lung Association collects state-level** information regarding coverage for nine tobacco cessation treatments†† and seven access barriers§§ for standard Medicaid enrollees.

* These include five nicotine replacement therapies (nicotine patch, gum, lozenge, nasal spray, and oral inhaler) and two non-nicotine medications (bupropion and varenicline).

† Medicaid expansion, also known as Group XIII eligibility, provides Medicaid coverage to persons ineligible for standard Medicaid who have an income ≤138% of the federal poverty level. Medicaid expansion was created by the Patient Protection and Affordable Care Act and implemented in 2014. https://www.healthcare.gov/medicaid-chip/getting-medicaid-chip/

§ The Patient Protection and Affordable Care Act (ACA) requires Medicaid expansion plans to cover treatment given an "A" or "B" grade by the U.S. Preventive Services Task Force without cost-sharing (https://www.congress.gov/111/plaws/publ148/PLAW-111publ148.pdf). Tobacco cessation currently receives an "A" grade (https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/tobacco-use-in-adults-and-pregnant-women-counseling-and-interventions) and is included in the ACA requirement (https://www.cms.gov/cciio/resources/fact-sheets-and-faqs/aca_implementation_faqs19). Currently, this requirement is being legally challenged. https://www.kff.org/womens-health-policy/issue-brief/explaining-litigation-challenging-the-acas-preventive-services-requirements-braidwood-management-inc-v-becerra/

¶ https://www.kff.org/medicaid/issue-brief/medicaid-expansion-enrollment-and-spending-leading-up-to-the-covid-19-pandemic/

** The term "states" includes DC.

†† Treatments include seven FDA-approved smoking cessation medications and two types of counseling (individual and group). Telephone counseling was not examined because it is available free to callers (including Medicaid enrollees) via state quitlines in all 50 states and DC.

§§ Barriers to treatment include requirements for copayment, prior authorization, counseling for medications, and stepped care therapy, and limits on the duration and number (both annual and lifetime) of covered quit attempts. A barrier was considered to be in place if it existed for any of the nine assessed cessation treatments.

Methods

During January 1, 2019, to December 31, 2022, the American Lung Association compiled data regarding state Medicaid tobacco cessation coverage from state Medicaid websites, Medicaid managed care plan member websites, provider websites, handbooks, policy manuals, plan formularies, preferred drug lists, Medicaid state plan amendments, regulations, and laws.¶¶ Analysts contacted personnel from state Medicaid agencies, state health departments, or other state government agencies to verify the information collected, retrieve missing documents, and reconcile discrepancies. Information provided by state personnel was considered accurate. As previously published, comprehensive coverage was defined as coverage of all nine assessed treatments (*5*). Barrier-free coverage was defined as having none of the seven assessed treatment access barriers. Summary statistics were generated and compared with data previously reported through December 31, 2018 (*5*). This activity was reviewed by CDC, deemed research not involving human subjects, and was conducted consistent with applicable federal law and CDC policy.***

¶¶ Information on state Medicaid cessation coverage compiled by the American Lung Association is available in the CDC State Activities Tracking and Evaluation (STATE) System. Some data presented in this report differ from data available in the STATE System because of differences in coding rules, categories, and reporting periods. https://www.cdc.gov/statesystem

*** 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.

Results

Coverage of Tobacco Cessation Treatment

As of December 31, 2022, all 50 states and the District of Columbia (DC) covered at least one cessation treatment for all standard Medicaid enrollees, which had not changed since December 31, 2018. As of December 2022, a total of 21 states covered both individual and group counseling for all standard Medicaid enrollees, an increase from 16 states in December 2018 (Table 1). Forty-three states covered all seven medications as of December 2022, an increase from 36 in December 2018 (Table 2).

TABLE 1. Coverage of tobacco cessation counseling for standard Medicaid enrollees,* by state† — United States, 2018§ and 2022¶

	Coverage and year			
	Individual counseling		Group counseling	
State	2018	2022	2018	2022
Alabama	P	P	No	No
Alaska	Yes	Yes	No	No
Arizona	P	V	No	V
Arkansas	Yes	Yes	No	No
California	Yes	Yes	Yes	Yes
Colorado	Yes	Yes	Yes	Yes
Connecticut	Yes	Yes	Yes	Yes
Delaware	Yes	Yes	No	Yes
District of Columbia	Yes	Yes	No	No
Florida	V	Yes	V	V
Georgia	Yes	V	V	V
Hawaii	Yes	Yes	V	V
Idaho	Yes	Yes	No	No
Illinois	V	Yes	No	Yes
Indiana	Yes	Yes	Yes	Yes
Iowa	V	V	V	No
Kansas	Yes	Yes	Yes	Yes
Kentucky	Yes	Yes	Yes	Yes
Louisiana	Yes	P	V	V
Maine	Yes	Yes	Yes	Yes
Maryland	Yes	V	No	V
Massachusetts	Yes	Yes	Yes	Yes
Michigan	Yes	Yes	V	No
Minnesota	Yes	Yes	Yes	Yes
Mississippi	P	P	V	No
Missouri	Yes	Yes	Yes	Yes
Montana	Yes	Yes	No	No
Nebraska	Yes	Yes	V	No
Nevada	V	Yes	V	No
New Hampshire	Yes	V	V	No
New Jersey	V	V	V	V
New Mexico	V	V	V	V
New York	Yes	Yes	Yes	Yes
North Carolina	Yes	Yes	No	V
North Dakota	P	Yes	No	Yes
Ohio	Yes	Yes	Yes	Yes
Oklahoma	Yes	Yes	No	No
Oregon	Yes	Yes	Yes	Yes
Pennsylvania	Yes	Yes	V	Yes
Rhode Island	Yes	Yes	Yes	Yes
South Carolina	Yes	Yes	Yes	Yes
South Dakota	P	Yes	No	No
Tennessee	V	V	No	V
Texas	V	Yes	V	V
Utah	Yes	Yes	P	V
Vermont	Yes	Yes	No	No
Virginia	V	Yes	V	Yes
Washington	V	P	No	No
West Virginia	Yes	Yes	V	No
Wisconsin	Yes	Yes	Yes	Yes
Wyoming	Yes	Yes	No	No
Totals				
Yes	**36**	**39**	**16**	**21**
No	**0**	**0**	**18**	**18**
V	**10**	**8**	**16**	**12**
P	**5**	**4**	**1**	**0**

Abbreviations: P = pregnant; V = varied coverage.

* "Yes" indicates treatment is covered for all standard Medicaid enrollees; "No" indicates treatment is not covered for any standard Medicaid enrollee; "V" indicates treatment coverage varies, with treatment covered for some, but not all, standard Medicaid enrollees; and "P" indicates treatment is covered for pregnant women only.

† Includes the District of Columbia.

§ As of December 31, 2018.

¶ As of December 31, 2022.

TABLE 2. Coverage of tobacco cessation medications for standard Medicaid enrollees,* by state† — United States, 2018§ and 2022¶

	Coverage and year													
	Nicotine patch		Nicotine gum		Nicotine lozenge		Nicotine nasal spray		Nicotine oral inhaler		Bupropion		Varenicline	
State	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022
Alabama	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Alaska	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Arizona	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Arkansas	Yes	Yes	Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes
California	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Colorado	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Connecticut	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Delaware	Yes	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	V	Yes	V
District of Columbia	Yes	Yes	Yes	Yes	Yes	Yes	V	V	V	V	Yes	Yes	V	Yes
Florida	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes
Georgia	Yes	Yes	Yes	Yes	Yes	Yes	V	V	V	V	Yes	V	V	V
Hawaii	Yes	Yes	Yes	Yes	V	V	V	V	V	V	Yes	Yes	Yes	Yes
Idaho	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Illinois	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	Yes	Yes	V	Yes
Indiana	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Iowa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kansas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kentucky	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Louisiana	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	Yes	Yes	V	Yes
Maine	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Maryland	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Massachusetts	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Michigan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Minnesota	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mississippi	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Missouri	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Montana	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nebraska	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Nevada	Yes	Yes	Yes	Yes	Yes	Yes	V	V	Yes	V	Yes	Yes	Yes	V
New Hampshire	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
New Jersey	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	Yes	Yes	Yes	Yes
New Mexico	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	Yes	Yes	Yes	Yes
New York	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	Yes	Yes	Yes	Yes
North Carolina	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
North Dakota	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ohio	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Oklahoma	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Oregon	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pennsylvania	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	Yes	Yes	Yes	Yes
Rhode Island	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Carolina	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
South Dakota	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Tennessee	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Texas	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Utah	Yes	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	Yes	Yes	Yes
Vermont	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Virginia	Yes	Yes	Yes	Yes	V	Yes	V	Yes	V	Yes	Yes	Yes	Yes	Yes
Washington	Yes	Yes	Yes	Yes	Yes	Yes	V	Yes	V	Yes	Yes	Yes	V	Yes
West Virginia	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wisconsin	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wyoming	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Totals														
Yes	**50**	**50**	**50**	**50**	**47**	**49**	**37**	**43**	**37**	**43**	**51**	**49**	**46**	**48**
No	**1**	**1**	**1**	**1**	**2**	**1**	**3**	**2**	**3**	**2**	**0**	**0**	**0**	**0**
V	**0**	**0**	**0**	**0**	**2**	**1**	**11**	**6**	**11**	**6**	**0**	**2**	**5**	**3**

Abbreviation: V = varied coverage.

* "Yes" indicates treatment is covered for all standard Medicaid enrollees; "No" indicates treatment is not covered for any standard Medicaid enrollee; and "V" indicates treatment coverage varies, with treatment covered for some, but not all, standard Medicaid enrollees.

† Includes the District of Columbia.

§ As of December 31, 2018.

¶ As of December 31, 2022.

Two states (Delaware and Utah), which had covered all seven medications for all standard enrollees in 2018, no longer did so as of 2022 (four medications in Delaware and two medications in Utah changed from being covered for all standard enrollees to being covered for only some standard enrollees). All 15 states that had provided comprehensive coverage as of December 2018 maintained that coverage through December 2022. Five states (Illinois, New York, North Dakota, Pennsylvania, and Virginia) added comprehensive coverage during the study period.

Treatment Access Barriers

During December 2018–December 2022, the number of states with a treatment access barrier decreased for all seven barriers. For example, the number of states not requiring copayments increased from 28 to 39. However, some barriers continue to be common. As of December 2022, the three most common barriers (that apply to all or some standard Medicaid enrollees) were duration limits (39 states; 76%), annual limits on the number of covered quit attempts (35; 69%), and requirement for prior authorization (30; 59%) (Table 3). These

TABLE 3. Barriers* to coverage for tobacco cessation treatments for standard Medicaid enrollees,† by state§ — United States, 2018¶ and 2022**

	Coverage barrier and year													
	Copayments required		Prior authorization required		Counseling required for medications		Stepped care therapy		Limits on duration		Annual limit on quit attempts		Lifetime limit on quit attempts	
State	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022
Alabama	No	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No
Alaska	Yes	Yes	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Arizona	No	V	No	No	No	V	No	No	Yes	Yes	Yes	V	No	No
Arkansas	No	No	Yes	Yes	Yes	Yes	No	No	V	No	Yes	No	No	No
California	No	No	V	V	No	No	No	No	V	V	V	V	No	No
Colorado	No	No	No	No	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No
Connecticut	No	No	Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	No	No
Delaware	No	No	V	V	V	V	V	V	V	V	V	V	No	No
District of Columbia	V	No	V	V	No	No	No	No	V	No	V	No	No	No
Florida	V	No	No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Georgia	V	Yes	V	V	No	V	No	V	Yes	V	Yes	V	No	No
Hawaii	No	No	V	V	Yes	V	V	No	V	Yes	Yes	Yes	No	No
Idaho	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	No
Illinois	V	No	V	No	No	No	V	No	V	V	V	V	No	No
Indiana	Yes	No	V	No	Yes	Yes	V	V	Yes	V	Yes	V	No	No
Iowa	No	No	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	No
Kansas	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Kentucky	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Louisiana	V	No	V	Yes	No	Yes	No	Yes	V	Yes	V	Yes	No	No
Maine	No	No	Yes	Yes	No	No	Yes	Yes	No	No	No	No	No	No
Maryland	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	No	No
Massachusetts	Yes	No	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Michigan	No	No	No	V	No	No	No	No	V	V	No	V	No	No
Minnesota	No	No	V	Yes	No	No	No	No	V	No	No	No	No	No
Mississippi	V	V	Yes	No	No	No	No	No	No	V	Yes	No	No	No
Missouri	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Montana	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	No
Nebraska	V	V	Yes	V	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No
Nevada	No	No	V	V	No	No	No	No	Yes	V	V	No	No	No
New Hampshire	V	No	V	V	V	No	V	V	V	V	V	V	No	No
New Jersey	V	No	No	No	No	No	No	No	V	No	V	NA	No	No
New Mexico	V	No	V	No	V	No	No	No	V	V	Yes	V	No	No
New York	V	V	No	V	No	No	No	No	No	No	No	No	No	No
North Carolina	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes	No	No
North Dakota	Yes	No	Yes	No	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Ohio	No	No	V	No	No	V	V	No	V	V	V	Yes	No	No
Oklahoma	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	No	No
Oregon	No	No	Yes	V	No	No	No	V	Yes	Yes	Yes	V	No	No
Pennsylvania	V	No	V	Yes	No	No	V	No	V	Yes	V	Yes	No	No
Rhode Island	No	No	V	V	V	No	No	V	V	V	No	V	No	No
South Carolina	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No
South Dakota	Yes	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No
Tennessee	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	V	No
Texas	No	No	Yes	Yes	No	No	Yes	Yes	V	No	V	V	No	No
Utah	Yes	V	V	V	V	V	V	V	V	V	Yes	V	No	No
Vermont	No	No	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No
Virginia	V	No	V	No	No	No	V	No	No	Yes	No	No	No	No

See table footnotes on the next page.

TABLE 3. (*Continued*) Barriers* to coverage for tobacco cessation treatments for standard Medicaid enrollees,† by state§ — United States, 2018¶ and 2022**

	Coverage barrier and year													
	Copayments required		Prior authorization required		Counseling required for medications		Stepped care therapy		Limits on duration		Annual limit on quit attempts		Lifetime limit on quit attempts	
State	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022	2018	2022
Washington	No	No	V	Yes	V	No	V	No	V	No	V	Yes	V	No
West Virginia	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	V
Wisconsin	Yes	No	No	No	No	No	No	No	Yes	No	No	No	No	No
Wyoming	Yes	V	No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No
Totals														
Yes	**10**	**6**	**17**	**17**	**9**	**5**	**11**	**10**	**26**	**26**	**25**	**22**	**0**	**0**
No	**28**	**39**	**16**	**21**	**36**	**40**	**30**	**34**	**7**	**12**	**14**	**15**	**49**	**50**
V	**13**	**6**	**18**	**13**	**6**	**6**	**10**	**7**	**18**	**13**	**12**	**13**	**2**	**1**
NA	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**

Abbreviations: NA = not available; V = varied coverage.
* Barriers apply to one or more cessation treatments.
† "Yes" indicates a barrier applies to all standard Medicaid enrollees; "No" indicates a barrier does not apply to any standard Medicaid enrollee; and "V" indicates a barrier applies to some, but not all, standard Medicaid enrollees.
§ Includes the District of Columbia.
¶ As of December 31, 2018.
** As of December 31, 2022.

Summary

What is already known about this topic?

More than one in five adults enrolled in Medicaid smokes cigarettes. Comprehensive, barrier-free insurance coverage of tobacco cessation treatments can increase smoking cessation.

What is added by this report?

From 2018 to 2022, the number of states with comprehensive Medicaid coverage of tobacco cessation treatment increased from 15 to 20; states with no treatment access barriers increased from two to three. Coverage gaps and access barriers remain in many states.

What are the implications for public health practice?

State Medicaid programs can improve the health of enrollees who smoke and potentially reduce health care expenditures by providing barrier-free coverage of all evidence-based tobacco cessation treatments and promoting this coverage to enrollees and providers.

three barriers were also the most common in December 2018. As of December 2022, only three states (Kentucky, Missouri, and Wisconsin) provided barrier-free coverage, an increase from two (Kentucky and Missouri) in December 2018. All three of these states provided comprehensive coverage.

Discussion

During 2018–2022, states continued to add coverage of tobacco cessation treatments and to remove treatment access barriers for standard Medicaid enrollees. However, coverage gaps and access barriers remain in many states. Although the number of states with comprehensive coverage increased from 15 in 2018 to 20 in 2022, this increase falls short of the Healthy People 2030 target of all 50 states and DC.††† In 2022, only three states provided coverage without any barriers. Increasing cessation coverage and decreasing barriers increases access to effective treatments that can increase the likelihood of successful quitting and improve health outcomes for persons who smoke (*4*).

The increase in the number of states with comprehensive treatment coverage and without barriers is likely related to state legislative actions. For example, Ohio passed legislation in 2020 requiring the state Medicaid program to cover a comprehensive cessation benefit with minimal barriers; Illinois passed similar legislation in 2021.§§§ These laws not only improve coverage and removed barriers, but also ensure that managed care plans will maintain this level of coverage in the future, even if new carriers are selected via competitive state bidding processes.

Laws like those passed in Ohio and Illinois can also help standardize tobacco cessation benefits across plans within a state. In the absence of such laws, treatment coverage and barriers can vary within a state's Medicaid program, potentially limiting treatment access. Different Medicaid-managed care plans within a state can set different coverage policies. Consistent comprehensive coverage of tobacco cessation treatments with minimal barriers has the potential to increase standard Medicaid enrollees' access to treatments and minimize confusion for both enrollees and providers.

††† https://health.gov/healthypeople/objectives-and-data/browse-objectives/tobacco-use/increase-medicaid-coverage-evidence-based-treatment-help-people-quit-using-tobacco-tu-16

§§§ https://www.legislature.ohio.gov/legislation/133/hb11; https://www.ilga.gov/legislation/BillStatus.asp?DocNum=2294&GAID=16&DocTypeID=SB&SessionID=110&GA=102

Improved cessation treatment coverage observed in this study might also be related to some states[¶¶¶] implementing Medicaid expansion during the study period (*6*). Many state Medicaid programs provide the same coverage for standard and expansion enrollees (*7*). Since states are required to provide expansion enrollees with coverage of all cessation treatments, consistency of coverage between standard and expansion plans might result in improvements in coverage for standard enrollees. Medicaid expansion has been shown to support cessation; states that have implemented Medicaid expansion have witnessed an increase in smoking cessation among lower-income adults (*8*,*9*). Opportunities remain for all states to improve coverage and increase promotion of available tobacco cessation benefits to encourage and support successful quitting.

This study demonstrates continued progress in decreasing tobacco cessation treatment access barriers for standard Medicaid enrollees. The biggest improvement in barrier removal was for copayments, with a nearly one third increase in the number of states without copayment requirements. One potential contributor to this change was enactment of the Families First Coronavirus Response Act (FFCRA),[****] which increased the federal share of Medicaid spending by 6.2% with the requirement that states limit new cost-sharing for Medicaid enrollees. Continued monitoring of treatment access barriers remains important, particularly because the FFCRA maintenance of effort requirement, which limited cost-sharing, ended in 2023.[††††] How this change in policy might affect access barriers for cessation treatments is unknown.

Limitations

The findings in this report are subject to at least two limitations. First, Medicaid-managed care plans can change with little notice and can vary widely between plans, which can make determining up-to-date coverage challenging. Second, information provided by state personnel could not be verified, potentially resulting in data misclassification.

Implications for Public Health Practice

More than one in five adults enrolled in Medicaid smoke cigarettes (*1*). Increasing comprehensive, barrier-free tobacco cessation insurance coverage for the more than 48 million adults enrolled in Medicaid[§§§§] has the potential to reduce tobacco-related disparities in this population by increasing access to and usage of treatments that help persons quit smoking (*4*). By providing barrier-free coverage of all evidence-based tobacco cessation treatments, and promoting this coverage to enrollees and providers, state Medicaid programs can improve the health of enrollees who smoke and potentially reduce health care expenditures.

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[¶¶¶] During the study period, Medicaid expansion occurred in Maine and Virginia (2019); Idaho, Nebraska, and Utah (2020); and Missouri and Oklahoma (2021).

[****] The Centers for Medicare & Medicaid Services has issued guidance to states on implementing this provision (https://www.medicaid.gov/state-resource-center/downloads/covid-19-faqs.pdf). The FFCRA included a maintenance of effort requirement, meaning that states could not disenroll persons from Medicaid or impose new cost-sharing for Medicaid enrollees while the federal Medicaid payment was increased by 6.2%. www.congress.gov/116/plaws/publ127/PLAW-116publ127.pdf

[††††] https://www.medicaid.gov/federal-policy-guidance/downloads/sho23002.pdf

[§§§§] Includes both standard and expansion Medicaid enrollees. https://www.medicaid.gov/sites/default/files/2023-03/December-2022-medicaid-chip-enrollment-trend-snapshot.pdf

COVID-19 Vaccination Coverage — World Health Organization African Region, 2021–2023

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Abstract

With the availability of authorized COVID-19 vaccines in early 2021, vaccination became an effective tool to reduce COVID-19–associated morbidity and mortality. Initially, the World Health Organization (WHO) set an ambitious target to vaccinate 70% of the global population by mid-2022. However, in July 2022, WHO recommended that all countries, including those in the African Region, prioritize COVID-19 vaccination of high-risk groups, including older adults and health care workers, to have the greatest impact on morbidity and mortality. As of December 31, 2023, approximately 860 million doses of COVID-19 vaccine had been delivered to countries in the African Region, and 646 million doses had been administered. Cumulatively, 38% of the African Region's population had received ≥1 dose, 32% had completed a primary series, and 21% had received ≥1 booster dose. Cumulative total population coverage with ≥1 dose ranged by country from 0.3% to 89%. Coverage with the primary series among older age groups was 52% (range among countries = 15%–96%); primary series coverage among health care workers was 48% (range = 13%–99%). Although the COVID-19 public health emergency of international concern was declared over in May 2023, current WHO recommendations reinforce the need to vaccinate priority populations at highest risk for severe COVID-19 disease and death and build more sustainable programs by integrating COVID-19 vaccination into primary health care, strengthening immunization across the life course, and improving pandemic preparedness.

Introduction

With the authorization and availability of highly effective COVID-19 vaccines by early 2021, vaccination became an effective tool to reduce COVID-19–associated morbidity and mortality worldwide. During 2021–2023, the COVID-19 Vaccines Global Access (COVAX), a global, multilateral initiative led jointly by Gavi, the Vaccine Alliance, the Coalition for Epidemic Preparedness Innovations, and the World Health Organization (WHO) in partnership with UNICEF, was established to ensure COVID-19 vaccine equity (*1*). To support the COVAX mission, increase population immunity, protect health systems, and facilitate economic recovery from the pandemic, WHO announced ambitious targets to administer a primary COVID-19 vaccination series to 10% of the total global population by the end of 2021 and 70% by mid-2022 (*2*). However, disparities in access to COVID-19 vaccines for low-income countries existed worldwide until the end of 2021, and a supply sufficient for effective rollout in the WHO African Region was therefore delayed until early 2022 (*3*). In July 2022, WHO recommended that all countries redirect efforts and focus on vaccinating priority populations, including health care workers, older adults (persons aged ≥50 years), and other high-risk groups (e.g., pregnant women, persons with comorbidities, and those with immunocompromising conditions) (*4*). This report provides an update on the progress made in COVID-19 vaccination in the African Region during 2021–2023.

Methods

Data Sources

The WHO African Region includes 47 of the 54 countries on the African continent[†] with a total population of 1.2 billion based on individual country estimates (2023). Countries were requested to report weekly on the number of COVID-19 vaccine doses received from all sources and the number of doses administered. These data were compiled in the African Region regional database. Data from the regional database on COVID-19 vaccination during March 17, 2021–December 31, 2023, were used to assess COVID-19 vaccine supply and vaccination coverage among the total population[§] and among high-priority groups.

[*] These authors contributed equally to this report.

[†] The WHO African Region includes the following countries: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Eswatini, Ethiopia, Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Republic of the Congo, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Tanzania, The Gambia, Togo, Uganda, Zambia, and Zimbabwe.

[§] The total population for each country was used as the denominator for vaccination coverage calculations. However, the eligible population for COVID-19 vaccination (the numerator for vaccination coverage calculations) differed among countries; most countries targeted persons aged ≥16 or ≥18 years, but some countries vaccinated persons aged ≥5 years.

Data Analysis

Vaccination coverage by country was calculated by dividing the number of persons who received a single dose or a complete primary series by the total population. Regional vaccination coverage was calculated by dividing the total number of persons who received a single dose or completed the primary series by the sum of the total population of every country in the region. Completion of primary series was defined as receipt of 1 or 2 doses depending on the vaccine product.[¶] Booster doses were defined as any additional dose received among those who had completed the primary vaccination series, and booster dose coverage was calculated by dividing the number of persons who received ≥1 booster dose by the population who had completed a primary series. High-priority groups, as outlined by the WHO Strategic Advisory Group of Experts (SAGE) Roadmap for prioritizing use of COVID-19 vaccines, are groups for whom vaccines are of highest importance to reduce severe disease and death (*5*). The denominators for the total number of health care workers and older persons were reported individually by each country. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[**]

Results

Vaccine Supply

Because of global supply constraints in 2021, initial COVID-19 vaccine supply in the African Region was low, and vaccination was delayed. Ghana and Côte d'Ivoire were the first countries to receive small shipments of COVID-19 vaccine from COVAX in February and March 2021 (*6*). Availability began to improve in July; 321 million doses were received in the African Region during 2021, 449 million in 2022, and 90 million during 2023, for a cumulative total of 860 million doses (Table 1). Sixty-four percent of doses were acquired through the COVAX Facility, 15% by the African Union's African Vaccine Acquisition Trust, 18% through bilateral agreements, and 2% through direct purchase from the manufacturer.

Population Vaccination Coverage

By the end of 2023, 46 of the 47 countries[††] in the African Region were delivering COVID-19 vaccination, and 646 million doses had been administered. Cumulatively, 440 million (37%) persons had received ≥1 dose (Figure). Cumulative primary series coverage increased from 7% in 2021 to 26% in 2022 and 32% in 2023. Cumulative total population coverage with ≥1 dose ranged by country from 0.3% to 89%. Coverage with ≥1 COVID-19 vaccine dose exceeded 70% in eight countries (Botswana, Cabo Verde, Liberia, Mauritius, Mozambique, Rwanda, Seychelles, and Sierra Leone; range = 72%–89%) (Table 2). Among these, Liberia, Mauritius, Rwanda, and Seychelles also achieved primary series coverage of ≥70% (range = 78%–86%). Conversely, 29 (62%) countries reported primary series coverage for the total population of <40%. Among the 40 countries reporting data on COVID-19 booster dose vaccination, coverage was 21%, varying widely among countries. Nine countries (Chad, Eswatini, Ghana, Mauritius, Namibia, Rwanda, Senegal, Seychelles, and Zimbabwe) achieved COVID-19 booster dose coverage of ≥40% of their total populations (range = 41%–81%).

Priority Population Vaccination Coverage

By the end of 2023, among the 23 countries reporting vaccination by high-risk population group, 48% of health care workers had completed the primary vaccination series; coverage with the primary series was ≥70% (range = 71%–99%) in 11 countries (Benin, Botswana, Comoros, Ghana, Guinea, Guinea-Bissau, Liberia, Mozambique, Rwanda, Sierra Leone, and Togo). Among 22 countries reporting data on older populations, primary series coverage was 52%. Only Cabo Verde and Ethiopia achieved coverage of ≥70% in this group. Coverage estimates among pregnant women and persons with comorbidities, including those with immunocompromising conditions, were unavailable because of incomplete reporting on these population categories.

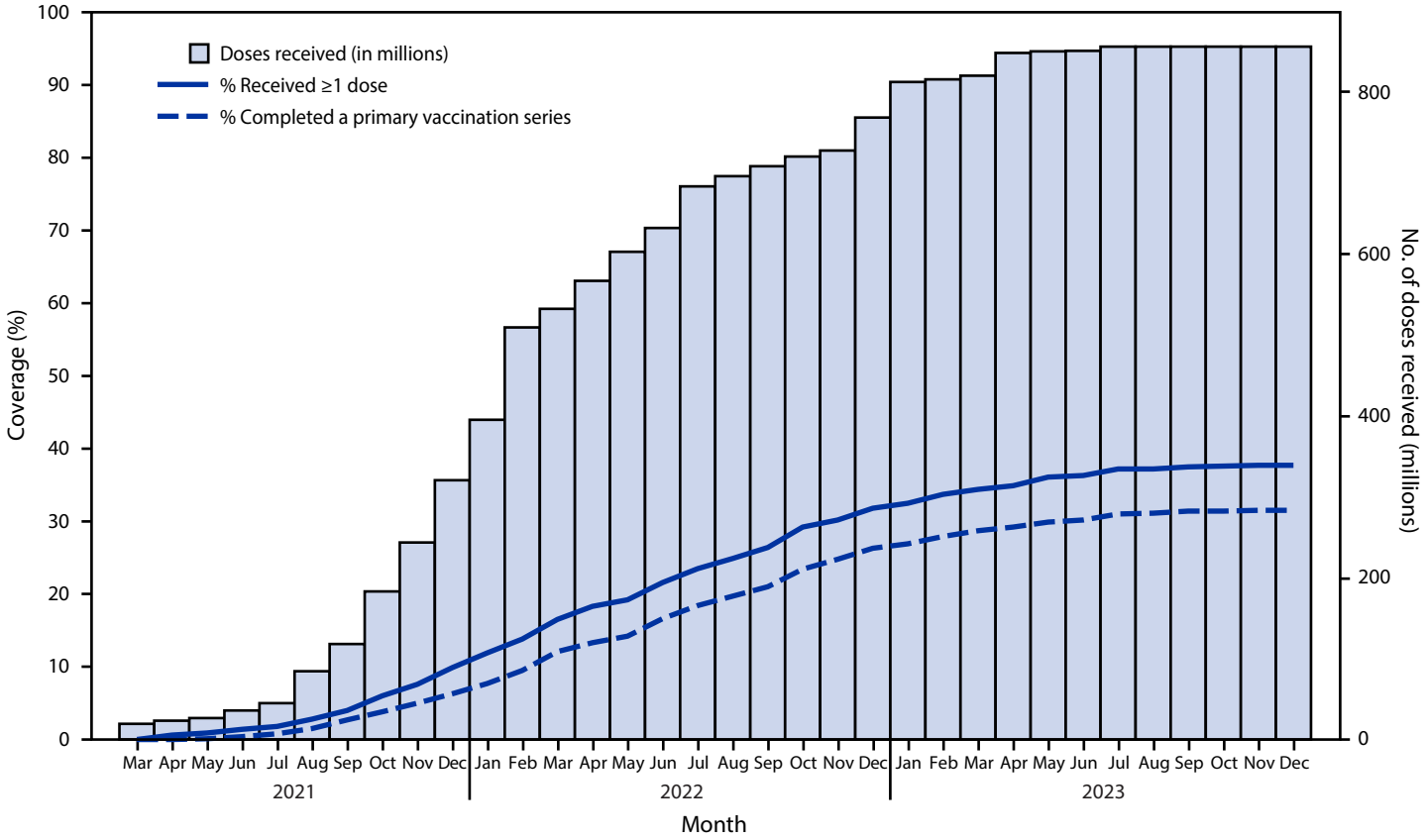
TABLE 1. COVID-19 vaccine doses received and primary series vaccination coverage — 47 World Health Organization African Region countries, 2021–2023

Year	Total no. of doses received (millions)	% Total vaccination coverage* (n = 46 countries)	% Vaccination coverage among older age groups[†] (n = 22 countries)	% Vaccination coverage among health care workers
2021	**321**	7	NA	NA
2022	**449**	26	38	42[§]
2023	**90**	32	52	48[¶]

Abbreviation: NA = not available.
* The total population for each country was used as the denominator for vaccination coverage calculations. However, the eligible population for COVID-19 vaccination differed among countries; most countries targeted persons aged ≥16 or ≥18 years, but some countries vaccinated persons aged ≥5 years.
† Older age group definition varies by country, but aged ≥50 years.
§ N = 29 countries.
¶ N = 23 countries.

¶ Primary series is defined as 1 dose of the Janssen (Jcovden) or Sputnik V/Light vaccines or 2 doses of AstraZeneca/Oxford or Serum Institute of India formulations (Vaxzevria and Covishield), Bharat Biotech (Covaxin), Moderna (Spikevax), Pfizer-BioNTech (Comirnaty), Sinopharm (Covilo), or Sinovac (CoronaVac) vaccines.
** 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.
†† Eritrea did not provide COVID-19 vaccines during 2021–2023.

FIGURE. Cumulative number of COVID-19 vaccine doses received and cumulative ≥1-dose and primary series coverage among the total population,* by month — World Health Organization African Region, 2021–2023



* The total population for each country was used as the denominator for vaccination coverage calculations. However, the eligible population for COVID-19 vaccination differed among countries; most countries targeted persons aged ≥16 or ≥18 years, but some countries vaccinated persons aged ≥5 years.

Discussion

Despite the improved supply of COVID-19 vaccine starting by late 2021, coverage in the African Region increased slowly. Regional coverage with a primary series reached 32% in 2023, with 38% of the population receiving ≥1 dose. Among the subset of countries that reported coverage for high-risk groups, 48% of health care workers and 52% of older adults received a primary series. Variation in coverage among countries was substantial. Four (9%) of the 47 countries in the region achieved the WHO target of 70% primary series coverage in the total population in 2022 (Liberia, Mauritius, Rwanda, and Seychelles); 29 (62%) countries reported primary series total population coverage <40%. Eritrea has not introduced COVID-19 vaccines, and Burundi delayed introduction in the general population and focused on vaccination of health care workers.

Several reasons likely account for low coverage with COVID-19 vaccines, including limited political commitment, logistical challenges, low perceived risk of COVID-19 illness, and variation in vaccine confidence and demand (*3*). Country immunization program capacity varies widely across the African Region. Challenges include weak public health infrastructure, limited number of trained personnel, and lack of sustainable funding to implement vaccination programs, exacerbated by competing priorities, including other disease outbreaks and endemic diseases as well as economic and political instability. The total population for each country was used as the denominator for vaccination coverage calculations. However, the eligible population for COVID-19 vaccination differed among countries; most countries targeted persons aged ≥16 or ≥18 years, but some countries vaccinated persons aged ≥5 years. In countries with large populations aged <18 years, meeting coverage targets was not possible (*7*).

Vaccination of high-priority groups remains critical for optimizing the impact of COVID-19 vaccines (*4*). Morbidity and mortality are highest among older adults and those with comorbidities (*5*), yet only two countries in the African Region have achieved >70% coverage among older age groups. The low coverage emphasizes the importance of targeted approaches to generate demand and address population concerns and of new delivery strategies to reach high-priority groups.

In May 2023, the public health emergency of international concern was officially declared over by WHO (*8*). In October

TABLE 2. Cumulative COVID-19 vaccination coverage, by total population* and high-priority groups† — World Health Organization African Region, March 2021–December 2023

Subregion	Country	At least 1 dose,* %	Primary series,* %	Booster dose, %	Health care workers, %	Older age groups,§ %
West Africa	Benin	28.7	21.3	NR	86.5	34.7
	Burkina Faso	27.4	23.6	0.1	86.3	NR
	Cabo Verde	72.6	62.8	0.2	NR	82.9
	Côte d'Ivoire	49.4	44.3	25.8	64.5	NR
	Ghana	43.7	34.0	44.6	80.5	41.7
	Guinea	65.7	44.1	7.3	NR	38.2
	Guinea-Bissau	36.5	26.7	13.9	90.7	NR
	Liberia	83.9	80.2	0.1	97.0	44.7
	Mali	20.6	17.2	NR	NR	50.5
	Mauritania	48.1	35.2	24.9	NR	NR
	Niger	25.5	22.4	NR	57.9	19.2
	Nigeria	43.3	37.5	21.1	32.9	NR
	Senegal	15.1	8.7	46.8	NR	39.5
	Sierra Leone	75.3	65.8	24.2	86.4	61.0
	The Gambia	25.5	20.4	10.0	NR	15.2
	Togo	28.3	19.5	27.5	88.1	NR
Central Africa	Angola	50.0	29.0	31.9	NR	NR
	Cameroon	13.5	11.5	25.1	NR	29.9
	Central African Republic	45.5	43.5	14.7	NR	24.2
	Chad	28.7	28.0	80.5	NR	41.1
	Democratic Republic of the Congo	14.3	12.1	NR	48.2	61.6
	Equatorial Guinea	16.5	13.1	2.1	70.5	NR
	Gabon	14.0	11.6	1.0	45.4	NR
	Republic of the Congo	12.0	11.3	NR	NR	NR
	Sao Tome and Principe	64.0	51.1	30.9	NR	NR
East and southern Africa	Algeria	17.7	14.7	8.9	NR	NR
	Botswana	79.2	67.5	30.7	NR	NR
	Burundi	0.3	0.3	0.9	12.9	NR
	Comoros	53.5	48.4	NR	72.9	NR
	Eritrea	NR	NR	NR	NR	NR
	Eswatini	45.3	36.8	42.0	NR	NR
	Ethiopia	49.0	40.7	13.7	57.0	96.3
	Kenya	27.9	21.4	18.0	53.3	51.0
	Lesotho	48.8	45.2	19.0	NR	NR
	Madagascar	9.3	9.1	6.4	56.2	15.8
	Malawi	28.1	22.2	29.2	NR	47.8
	Mauritius	88.8	86.0	60.1	NR	NR
	Mozambique	72.3	67.5	10.9	73.3	NR
	Namibia	24.7	21.6	54.2	58.4	29.6
	Rwanda	81.4	77.8	40.6	99.4	NR
	Seychelles	83.1	78.5	53.8	NR	NR
	South Africa	40.8	35.4	21.0	NR	67.0
	South Sudan	31.6	31.2	12.0	NR	NR
	Tanzania	56.2	52.5	NR	68.8	61.0
	Uganda	45.3	29.5	5.9	NR	37.8
	Zambia	61.8	48.3	15.5	NR	NR
	Zimbabwe	46.0	34.6	40.6	NR	NR

Abbreviations: NR = not reported; SAGE = Strategic Advisory Group of Experts on Immunization; WHO = World Health Organization.

* The total population for each country was used as the denominator for vaccination coverage calculations. However, the eligible population for COVID-19 vaccination differed among countries; most countries targeted persons aged ≥16 or ≥18 years, but some countries vaccinated persons aged ≥5 years.

† High-priority groups as defined by the WHO SAGE roadmap for COVID-19 vaccination; data were not available for all specified groups.

§ Older age group definition varies from country to country, but aged ≥50 years.

2023, SAGE recommended using a simplified primary vaccination series of a single dose of any COVID-19 vaccine and updated recommendations on revaccination for high-priority groups (*5*). SAGE recommended the continued prioritization of high-risk groups as described in the updated SAGE roadmap *(5)*. The recommendations also reinforced the need for sustainable programs and COVID-19 vaccination integration into primary health care and other relevant services. The aim was to optimize resources and build sustainable immunization delivery platforms throughout the life course in alignment with the Immunization Agenda 2030 goals (*9*).

In November 2023, the Regional Immunization Technical Advisory Group for the African Region endorsed the SAGE recommendations, encouraging countries to continue COVID-19 vaccination as aligned with national priorities (*10*). Many countries in the African Region are integrating COVID-19 vaccination into their routine health services and exploring new entry points for vaccinating high-priority populations as part of primary care and other relevant services, including through multiantigen periodic intensified routine immunization activities.

Limitations

The findings in this report are subject to at least three limitations. First, immunization coverage estimates are based primarily on administrative data, which might contain inaccuracies resulting from errors in recording doses administered or in population estimates. Second, although reporting is highly encouraged, in 2023, many countries stopped reporting COVID-19 vaccination data because of competing priorities. In addition, fewer than one half of the countries are reporting doses administered among high-priority groups, including doses for health care workers and older persons. Finally, population estimates for high-priority groups are available only in some countries in the African Region, making assessing coverage challenging.

Implications for Public Health Practice

The African Region has low COVID-19 vaccination coverage. Community engagement is needed to better understand drivers of vaccine confidence and develop more targeted strategies to improve vaccine demand (*4*). Integration of COVID-19 vaccination into routine immunization and primary health care services would help build sustainability and support recovery of routine immunization services (*9*). Strengthening adult immunization platforms would contribute to pandemic preparedness and global disease prevention goals (*4*). To protect vulnerable populations and prevent additional COVID-19 morbidity and mortality in the African Region, progress must continue to be made in vaccination of priority populations at highest risk for disease.

Summary

What is already known about this topic?

The World Health Organization African Region did not receive enough COVID-19 vaccine doses to vaccinate everyone for whom vaccination was recommended and lagged behind other regions.

What is added by this report?

During 2021–2023, the cumulative number of COVID-19 vaccine doses received in the African Region increased from 321 million to 860 million, and 646 million doses were administered. Cumulative total population coverage with ≥1 dose ranged by country from 0.3% to 89%. By the end of 2023, coverage with a primary COVID-19 vaccination series increased from 7% to 32% for the total population, and increased to 52% among older age groups and to 48% among health care workers in a subset of countries in the African Region.

What are the implications for public health practice?

Additional outreach is needed to increase COVID-19 vaccination coverage among priority high-risk populations. Integrating COVID-19 vaccination into routine immunization and primary health care services could strengthen adult vaccination platforms and improve pandemic preparedness.

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Infections Associated with Medtronic Duet External Ventricular Drains — Rhode Island Hospital, Providence, Rhode Island, January 2023–January 2024

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Abstract

External ventricular drains (EVDs) are medical devices that are inserted into the ventricles of the brain to drain excess fluid, manage intracranial hypertension, monitor intracranial pressure, and administer medications. Unintentional disconnections and breaks or fractures (breaks) of EVDs or associated drainage system components can result in cerebrospinal fluid (CSF) leakage and increased risk for EVD-associated infections. After replacement of Integra Life Sciences EVD systems with Medtronic Duet EVD systems at Rhode Island Hospital in mid-September 2023, a threefold increase was observed in the prevalence of positive CSF cultures, from 2.8 per 1,000 days with an EVD in place (EVD days) during January–September 2023 to 11.4 per 1,000 EVD days during October 2023–January 2024 (rate ratio [RR] = 5.7; 95% CI = 1.5–22.0; p = 0.01) and an eightfold increase in the prevalence of infections, from 0.7 to 6.5 per 1,000 EVD days (RR = 9.8; 95% CI = 1.1–87.3; p = 0.04). An investigation by Rhode Island Hospital Infection Control during December 2023–January 2024 identified frequent reports of disconnections and breaks of the Medtronic Duet EVD system. A search of the Food and Drug Administration Manufacturer and User Facility Device Experience database identified 326 reports nationwide of disconnection and breaks of components of the Duet EVD system, including 175 during 2023. A Medical Product Safety Network report was filed. The Duet EVD product was ultimately recalled in January 2024, citing disconnections of the EVD system and reports of CSF leakage and infection. Given the widespread use of EVD systems by neurosurgery centers and the risk for EVD-associated infections, a strategy for future consideration by hospital infection prevention and control programs might be inclusion of EVD-associated infections in hospital surveillance programs to rapidly identify increases in these events and determine factors related to such infections to prevent additional infections.

Introduction

External ventricular drains (EVDs) are devices placed into the ventricles of the brain to drain excess fluid (e.g., cerebral spinal fluid [CSF] and blood), manage intracranial hypertension, monitor intracranial pressure, and administer medications (*1*). An EVD system consists of multiple components including a drain (the EVD); connecting tubing, stopcocks, transducer, and monitor; leveling manifold; and a CSF collecting reservoir (*2*). Approximately 25,000 EVDs are placed annually, making EVD insertion among the most common and important lifesaving neurosurgical procedures performed in the United States (*3*). Unintentional disconnections and breaks or fractures (breaks) of the EVD or the connecting drainage system tubing can result in CSF leakage and contamination of the EVD system, increasing the risk for EVD-associated infections, including meningitis and ventriculitis (*4*,*5*).

Rhode Island Hospital, a large academic hospital in Providence, Rhode Island designated as a level 1 trauma center, performs surveillance for EVD-associated infections using the National Healthcare Safety Network (NHSN) definition of patients with infection (i.e., meningitis or ventriculitis) and EVDs in situ for >48 hours (*6*). CSF specimens are collected from patients with EVDs in place at the discretion of the neurosurgery or neurocritical care unit (NCCU) teams, most frequently when a patient is symptomatic or if providers have concerns about possible infection. All CSF specimens with organisms identified on Gram stain or culture (positive CSF culture) trigger an alert to the Infection Control Team, which determines if the case meets criteria for an EVD-associated infection. Although a positive CSF culture is the initial requirement to meet criteria for a confirmed EVD infection, a patient with a positive CSF culture would not meet criteria for a confirmed EVD-associated infection if all the following four conditions are present 1) a positive CSF culture with a common commensal organism, 2) no symptoms consistent with meningitis or ventriculitis, 3) determination by the clinical team that the patient does not clinically have meningitis or ventriculitis, and 4) the patient did not receive dedicated treatment for meningitis or ventriculitis. Alternatively, if the positive CSF culture could be attributed to a noncentral nervous system primary source infection, the patient would meet the criteria.

In mid-September 2023, the emergency department and NCCU at Rhode Island Hospital replaced the Integra Life Sciences EVD system with the Medtronic Duet EVD system because of limitations in availability of the Integra Life Sciences product; hospital operating rooms continued to use Integra Life Sciences EVD systems. This report describes investigation of a cluster of positive CSF cultures and confirmed EVD-associated infections identified at Rhode Island Hospital after the switch to the Medtronic Duet EVD system. The hospital's Institutional

Review Board has determined that outbreak investigations are nonresearch and fall under the authority of infection control.*

Investigation and Results

During January–September 2023, over 1,498 days with an EVD in place (EVD days), four patients with EVDs, including one with a confirmed infection, had positive CSF cultures† (2.8 positive cultures and 0.7 infections per 1,000 EVD days) (Table). During October 1, 2023–January 10, 2024, over 614 EVD days, seven patients had positive CSF cultures, including four with confirmed EVD infections (11.4 positive cultures and 6.5 infections per 1,000 EVD days), representing an approximate threefold increase in positive CSF cultures (rate ratio [RR] = 5.7; 95% CI = 1.5–22.0; p = 0.01) and an eightfold increase in the prevalence of infections (RR = 9.8; 95% CI = 1.1– 87.3; p = 0.04) after transition to the Medtronic Duet EVD system§ (*7*,*8*).

CSF cultures of specimens obtained from seven patients during October 2023–January 2024 were positive for bacterial growth; five of these cultures grew coagulase-negative staphylococci, one grew *viridans group streptococci*, and another grew *Streptococcus gordonii*, *Streptococcus salivarius*, and *Rothia* species. Six of these seven patients had received Medtronic Duet EVD systems, and one had received an Integra Life Sciences EVD system. The patient who received the Integra Life Sciences EVD had their EVD placed in the operating room; all patients who received the Medtronic EVDs had them placed in either the emergency department or NCCU.

As part of the investigation, information was collected about the providers who cared for the patient (including their level of training) and hospital locations occupied by affected patients or where they were provided care. Specimen collection procedures, infection control practices, and the data from the hospital's adverse events reporting system (SafetyNet) were also reviewed.

Investigation of Staff Members and Hospital Locations

No common health care providers (including surgeons, house officers, nursing staff members, and staff members who inserted the EVDs or collected EVD cultures) or geographic locations or units were shared by all seven patients. Further, no recent changes were identified in procedures for collecting or processing CSF specimens or in Rhode Island Hospital's EVD infection prevention program.

* Rhode Island Hospital is managed by Lifespan Health System, and Lifespan's Institutional Review Board (IRB) has determined that outbreak investigations are critically time sensitive and crucial for direct patient care. Infectious disease outbreak investigations at Rhode Island Hospital fall under the purview and authority of infection control, and IRB human subjects review is not required.

† For the purposes of surveillance for infections resulting from EVD placement at Rhode Island Hospital, CSF cultures that were positive at the time of EVD insertion, within 48 hours of EVD insertion, or were positive but attributable to another source of infection, were not included in this analysis.

§ The RR for infectious events observed (positive CSF cultures and confirmed infections meeting NHSN criteria) was based on the total device days of observation using the exact Poisson method. The p-values were obtained using the chi-square statistic.

TABLE. Positive cerebrospinal fluid cultures and confirmed infections in patients with external ventricular drains — Rhode Island Hospital, Providence, Rhode Island, January 2023–January 2024*

Month/Year	No. of EVD events with positive CSF cultures	No. of events meeting NHSN infection criteria†	EVD days§	Positive CSF culture rate¶	EVD-associated infection rate**
Total (Jan–Oct 2023)	**3**	**1**	**1,498**	**2.8**	**0.7**
Jan 2023	0	0	238	—	—
Feb 2023	0	0	152	—	—
Mar 2023	1	0	204	4.9	—
Apr 2023	0	0	194	—	—
May 2023	1	0	169	5.9	—
Jun 2023	0	0	173	—	—
Jul 2023	0	0	121	—	—
Aug 2023	0	0	136	—	—
Sep 2023††	1	1	111	9.0	9.0
Total (Oct 2023–Jan 2024)	**7**	**4**	**614**	**11.4**	**6.5**
Oct 2023	0	0	131	—	—
Nov 2023	2	0	177	11.3	—
Dec 2023	4	3	201	19.9	14.9
Jan 2024*	1	1	105	8.8	8.8

Abbreviations: CSF = cerebrospinal fluid; ED = emergency department; EVD = external ventricular drain; NCCU = neurocritical care unit; NHSN = National Healthcare Safety Network.

* Through January 10, 2024.

† EVD-associated infections were determined using the NHSN surveillance definition of infection (i.e., meningitis or ventriculitis) for patients with an EVD in situ for >48 hours.

§ EVD days are calculated as the sum of the total number of days an EVD is in place for each patient admitted to Rhode Island Hospital who received an EVD.

¶ Number of positive CSF cultures per 1,000 EVD days.

** Number of EVD infections per 1,000 EVD days.

†† Medtronic Duet EVD systems were introduced in NCCU and ED the week of September 11, 2023. The positive cultures and infections noted in September 2023 were confirmed to have occurred before the transition to the Medtronic Duet EVD systems.

Interviews with neurosurgeons and NCCU staff members revealed reports of frequent unintentional disconnections and breaks of the Medtronic Duet EVDs tubing, which had not been observed with the Integra Life Sciences EVD system that was previously used at Rhode Island Hospital. Staff members reported that these events consisted of the collecting tubing disconnecting from the patient-line stopcock connectors (Figure). When this issue was identified, nursing staff members, neurosurgeons, and NCCU providers were notified to report these events in SafetyNet, the Rhode Island Hospital adverse event reporting system, to track these occurrences. No issues with staff member training related to the device, improper use of the device by staff members, or any other staff-related issues were identified.

Review of SafetyNet Data

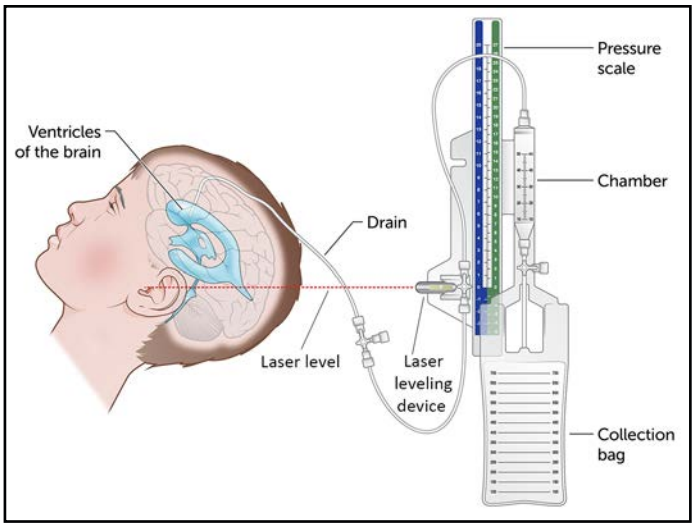
Review of the Rhode Island Hospital SafetyNet data found no reports of improper use of the Medtronic EVD system and no reports of adverse events related to EVD systems before the switch to the Medtronic Duet EVD system in September 2023; however, after transitioning to the Medtronic EVD system, nine EVD-related adverse events were reported in SafetyNet, all related to disconnections or breaks of Medtronic Duet EVDs. A search of the Food and Drug Administration (FDA) Manufacturer and User Facility Device Experience (MAUDE) database using the search term "Medtronic Duet" identified 326 medical device reports involving malfunction of the Medtronic Duet EVD system, including 175 (54%) reports during 2023, 120 (69%) of which were for disconnection of components of the EVD system, and 23 (13%) of which were breaks in the EVD system[¶] (*9*).

Public Health Response

Because of concern that the increase in observed positive CSF cultures and EVD-associated infections at Rhode Island Hospital could be related to disconnections and breaks of components in the Medtronic Duet EVD system, Rhode Island Hospital stopped placing new Medtronic Duet EVDs in patients in early January 2024 and transitioned to an alternative product. Patients who already had Medtronic EVDs in place at the time of these findings had their EVDs maintained until removal was clinically indicated or warranted. Rhode Island hospital also filed individual FDA Medical Product Safety Network reports for each of the confirmed EVD infections observed after transitioning to the Medtronic product on January 9, 12, 24, and 31, 2024. On January 24, 2024, Medtronic issued a voluntary recall of the Duet EVD system

[¶] The initial search results from the MAUDE database were screened, and non-Medtronic Duet devices and entries were eliminated from the analysis.

FIGURE. Components of an external ventricular drain system



Source: The Royal Children's Hospital, Melbourne, Australia; republished with permission.

products, citing the potential for catheter disconnection from the patient-line stopcock connectors, and noting that disconnections at the stopcock connection in the affected Duet EVD system might occur at any point along the patient line or tubing (*10*) (Figure). Information in the recall notice indicated that cases of associated CSF leakage and infection had been reported.

Discussion

Routine surveillance at Rhode Island Hospital identified a cluster of positive EVD-associated CSF cultures and infections after a transition to the Medtronic Duet EVD system. An investigation of cases identified at Rhode Island Hospital identified frequent reports by staff members of disconnections and breaks in the Medtronic Duet EVD system tubing, and numerous reports of similar events were identified in the FDA MAUDE database. Based on these findings and the known risk for infectious complications associated with unintentional disconnections and breaks in EVD systems, investigators hypothesized that the increased number of positive CSF cultures and confirmed infections observed at Rhode Island Hospital were related to disconnections and breaks in Medtronic Duet EVD systems. Based on the potential for catheter disconnection from the patient-line stopcock connectors and reports of CSF leakage and infection, the Medtronic Duet EVDs was recalled by Medtronic Neurosurgery in January 2024 and classified as a Class I recall, the most serious type of recall, by the FDA. These findings have national implications, because Medtronic is among the largest suppliers of EVD systems in the United States, and the Duet EVD system is frequently used in hospitals across North America.

Summary

What is already known about this topic?

External ventricular drain (EVD) insertion is a common neurosurgical procedure. Disconnections and breaks of EVD catheters or connecting drainage system components result in cerebrospinal fluid (CSF) leakage and increased risk for EVD-associated infections.

What is added by this report?

Investigation of a hospital cluster of positive CSF cultures and EVD-associated infections identified frequent disconnections and breaks of Medtronic Duet EVD systems in September 2023, after a change to this system from the system previously used.

What are the implications for public health practice?

The Medtronic Duet product was recalled in January 2024. This investigation highlights the importance of hospital infection prevention and control programs in identifying, responding to, and preventing health care–associated infections.

This investigation highlights the importance of both hospital infection surveillance programs and national reporting databases, such as the MAUDE database, for identifying and quickly responding to infectious outbreaks. Health care institutions in the United States are required to perform surveillance for numerous infections; however, surveillance for EVD-associated infections is not mandated by U.S. regulatory agencies. Given the potential for EVD-associated infections to result in prolonged intensive care unit and hospital length of stay, increased morbidity, and increased health care costs, this is an area for further exploration by hospital infection prevention and control programs.

Limitations

The findings in this report are subject to at least three limitations. First, this investigation was conducted at a single center and consisted of a short follow-up period of approximately 6 weeks. Despite this limitation and the relatively small number of events observed, this analysis identified a statistically significant increase in positive CSF cultures and confirmed EVD infections after replacement of Integra Life Sciences EVD systems with Medtronic Duet EVD systems in mid-September 2023. The numerous reports of disconnections and breaks in components of the Medtronic Duet EVD in the FDA MAUDE database and the decision to recall the Duet EVD system product indicate that the issues identified in this investigation were not limited to Rhode Island Hospital. Second, although this report offers data from an investigation at Rhode Island Hospital and from the MAUDE database suggesting an association between the Medtronic Duet EVD system and a resulting increase in infectious complications, these findings do not definitively prove that the observed increase in positive CSF cultures and confirmed infections were caused by malfunctions of the Medtronic Duet EVDs that resulted in disconnections and breaks of its components. Finally, CSF samples are only collected at the discretion of the NCCU and neurosurgery teams. This limitation might have led to an underestimation of the number of patients affected by issues with the Medtronic Duet product and an underestimation of patients with positive CSF cultures because not every patient who sustained an EVD disconnection or break event would have become clinically ill or had CSF cultures collected.

Implications for Public Health Practice

This investigation highlights the importance of hospital infection prevention and control programs in effective identification and response to clusters or outbreaks of health care–associated infections. Conducting surveillance for EVD-associated infections is not currently mandated by U.S. regulatory agencies. However, given the widespread use of EVD systems by neurosurgery centers and the risk for EVD-associated infections, a strategy for future consideration by hospital infection prevention and control programs might be inclusion of EVD-associated infections in hospital surveillance programs to rapidly identify and determine factors related to such infections to prevent additional infections.

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Assessment of Risk for Sudden Cardiac Death Among Adolescents and Young Adults After Receipt of COVID-19 Vaccine — Oregon, June 2021–December 2022

Juventila Liko, MD[1]; Paul R. Cieslak, MD[1]

Abstract

COVID-19 vaccination has been associated with myocarditis in adolescents and young adults, and concerns have been raised about possible vaccine-related cardiac fatalities in this age group. In April 2021, cases of myocarditis after COVID-19 vaccination, particularly among young male vaccine recipients, were reported to the Vaccine Adverse Event Reporting System. To assess this possibility, investigators searched death certificates for Oregon residents aged 16–30 years who died during June 2021–December 2022 for cardiac or undetermined causes of death. For identified decedents, records in Oregon's immunization information system were reviewed for documentation of mRNA COVID-19 vaccination received ≤100 days before death. Among 1,292 identified deaths, COVID-19 was cited as the cause for 30. For 101 others, a cardiac cause of death could not be excluded; among these decedents, immunization information system records were available for 88, three of whom had received an mRNA COVID-19 vaccination within 100 days of death. Of 40 deaths that occurred among persons who had received an mRNA COVID-19 vaccine dose, three occurred ≤100 days after vaccination. Two of these deaths were attributed to chronic underlying conditions; the cause was undetermined for one. No death certificate attributed death to vaccination. These data do not support an association between receipt of mRNA COVID-19 vaccine and sudden cardiac death among previously healthy young persons. COVID-19 vaccination is recommended for all persons aged ≥6 months to prevent COVID-19 and complications, including death.

Introduction

In December 2020, the Food and Drug Administration authorized two COVID-19 mRNA vaccines for use in the United States. Early vaccine supplies were prioritized for health care personnel and long-term care facility residents, with phased vaccination of other persons, beginning with those who were older or had high-risk medical conditions, and concluding with healthy younger persons (*1*). In Oregon, healthy persons aged ≥16 years became eligible for COVID-19 vaccination on April 19, 2021. In April 2021, reports of myocarditis after COVID-19 vaccination, particularly among young male vaccine recipients, began to appear.*,† Investigators in Israel estimated that the risk for myocarditis associated with receipt of mRNA COVID-19 vaccine was 2.13 per 100,000 among vaccine recipients, and was highest among adolescents and young adult males (10.69 per 100,000) (*2*). Published accounts suggest that postvaccination myocarditis is typically mild and associated with good outcomes after brief hospitalization (*3*,*4*). As of July 17, 2023, no fatal cases of myocarditis in Oregon had been reported to the federal Vaccine Adverse Event Reporting System (VAERS); however, because VAERS is a passive reporting system, adverse events after vaccination are likely underestimated. In late 2022, reports of sudden deaths among previously healthy young athletes, with suggested attribution to COVID-19 vaccination, appeared in the lay press§ and then in the medical literature (*5*,*6*). To ascertain whether young persons in Oregon might be dying from cardiac causes shortly after having received a COVID-19 vaccine dose, Oregon death certificate data were reviewed.

Methods

Data Sources

Oregon law requires that a certificate of death be completed for each death in Oregon. Oregon's vital records system abides by CDC's National Center for Health Statistics' data-quality standards¶, including extensive quality-assurance review. An independent source of data for assessing the completeness of death certificate reporting is not available. Data on Oregon resident deaths occurring outside the state are also collected through interstate exchange agreements. The ALERT Immunization Information System (IIS) is Oregon's statewide and lifespan immunization registry. During the COVID-19 pandemic, reporting of all COVID-19 vaccinations to ALERT IIS was mandated in Oregon.

Data Analysis

To ascertain the occurrence of sudden cardiac deaths among adolescents or young adults that might plausibly be attributed to recent COVID-19 vaccination, investigators searched the Oregon death certificate database to identify persons aged 16–30 years who died during June 1, 2021–December 31, 2022 with "sudden death," "arrhythmia," "dysrhythmia,"

* www.cdc.gov/vaccines/acip/work-groups-vast/report-2021-05-17.html
† https://www.cdc.gov/vaccines/acip/meetings/downloads/slides-2021-06/04-COVID-Lee-508.pdf
§ https://www.nytimes.com/2022/01/28/technology/covid-vaccines-misinformation.html
¶ https://www.oregon.gov/oha/PH/BirthDeathCertificates/VitalStatistics/death/Pages/index.aspx

"asystole," "cardiac arrest," "myocarditis," "congestive heart failure," "unknown," "undetermined," or "pending" cited among the immediate or four possible entries for underlying causes of death and other significant conditions contributing to death. Among the subset of decedents for whom death from a cardiac cause could not be ruled out by accompanying information in the death certificate database, records of mRNA COVID-19 vaccination within 100 days (*7*) before the date of death were retrieved from ALERT(IIS. Findings were stratified by sex. This activity was reviewed by the Oregon Health Authority, deemed not research, and was conducted consistent with applicable federal law and Oregon Health Authority policy.**

** 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.

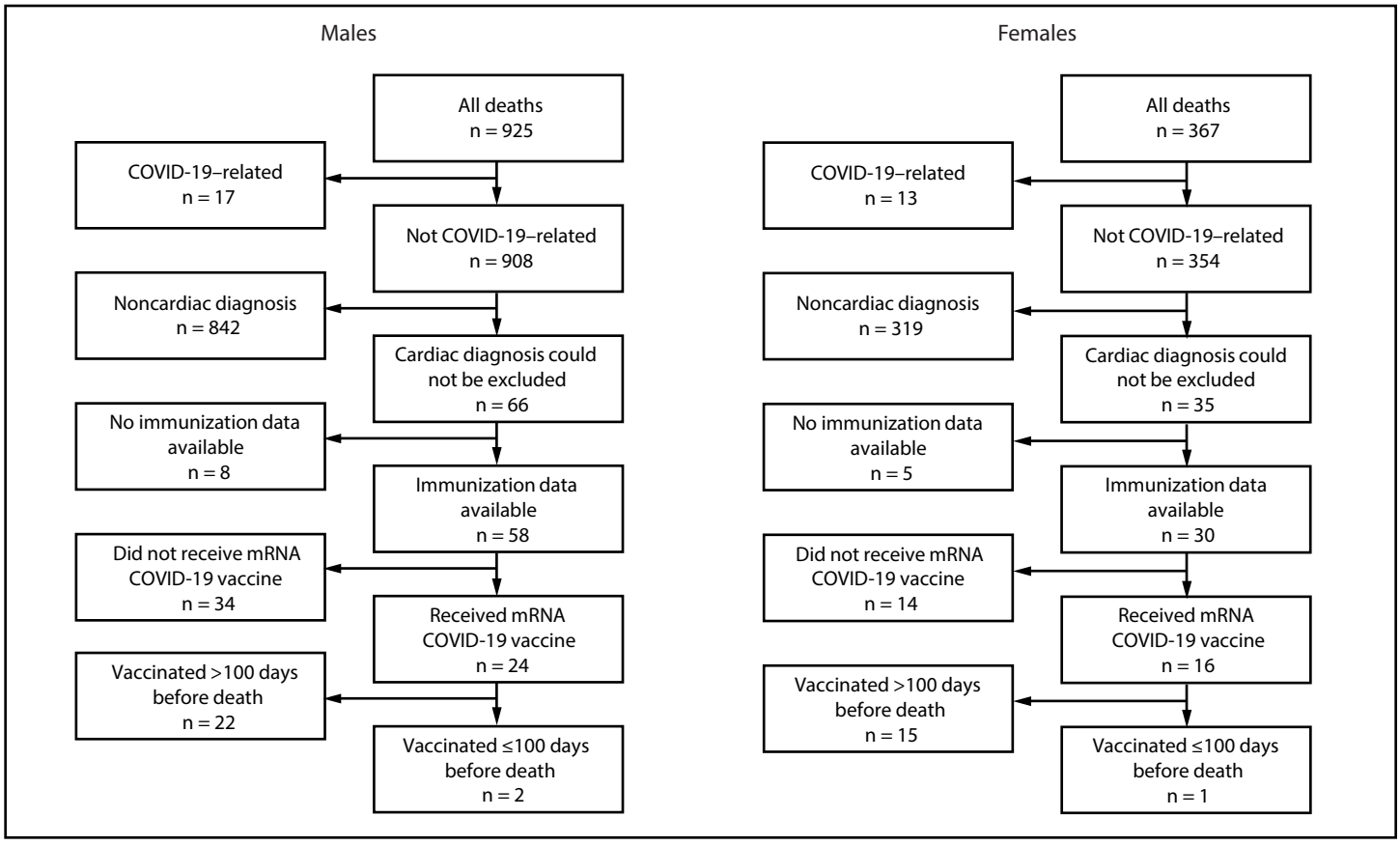
Results

In Oregon, during June 2021–December 2022, a total of 1,292 deaths among persons aged 16–30 years were identified. These decedents included 925 (72%) males and 367 (28%) females (Figure).

Male Decedents

Among the 925 male decedents, no death certificate listed vaccination either as the immediate or as a contributing cause of death. Overall, 17 (2%) deaths among males were attributed to COVID-19. Death certificates cited noncardiac causes of death or other conditions contributing to death for 842 (91%) of the male decedents. Among the remaining 66 (7%) male decedents, excluding a cardiac cause of death based on the death certificate was not possible. Among these 66 decedents,

FIGURE. Deaths* among persons aged 16–30 years, by sex, cause of death,† and mRNA COVID-19 vaccination status§,¶, (N = 1,292) — Oregon, June 2021–December 2022**



* Coded on the death certificate as sudden death, arrhythmia, dysrhythmia, asystole, cardiac arrest, myocarditis, congestive heart failure, unknown, undetermined, or pending.
† Cardiac versus noncardiac.
§ Six of the 34 males who did not receive mRNA COVID-19 vaccine received Janssen (Johnson & Johnson) vaccine.
¶ An alternative plausible cause of death was identified for one of the males who had been vaccinated ≤100 days before death. After review of death certificate and medical examiner findings, an adverse event from COVID-19 vaccination could neither be confirmed nor excluded as the cause for the other decedent.
** The only female decedent vaccinated ≤100 days before death was vaccinated 4 days before death. The manner of death was recorded as natural, and the immediate cause was "undetermined" as a consequence of chronic respiratory failure with hypoxia due to mitral stenosis.

Summary

What is already known about this topic?

In April 2021, cases of myocarditis after COVID-19 vaccination, particularly among young male vaccine recipients, were reported to the Vaccine Adverse Event Reporting System.

What is added by this report?

To determine risk for sudden cardiac death among adolescents and young adults after COVID-19 vaccination, investigators examined June 2021–December 2022 Oregon death certificate data for decedents aged 16–30 years. Of 40 deaths that occurred among persons who had received an mRNA COVID-19 vaccine dose, three occurred ≤100 days after vaccination. Among these, two occurred in persons with underlying illness, and one decedent had an undetermined cause of death.

What are the implications for public health practice?

The data do not support an association of COVID-19 vaccination with sudden cardiac death among previously healthy young persons. COVID-19 vaccination is recommended for all persons aged ≥6 months to prevent COVID-19 and complications, including death.

IIS vaccination records were available for 58 (88%); receipt of at least one mRNA COVID-19 vaccination was recorded for 24 (41%).

Among the 24 male decedents with an mRNA COVID-19 vaccination record in IIS, two (8%) died within 100 days of having received the vaccine. The first death was recorded as having occurred in a natural manner 21 days after COVID-19 vaccination. The immediate cause of death noted on the death certificate was congestive heart failure attributed to hypertension; other significant conditions included morbid obesity, type 2 diabetes, and obstructive sleep apnea. The second decedent had received a COVID-19 vaccine dose 45 days before the date of death; the cause of death was recorded as "undetermined natural cause." Toxicology results were negative for alcohol, cannabinoids, methamphetamine, and opiates; aripiprazole, ritalinic acid, and trazodone were detected. Follow-up with the medical examiner could neither confirm nor exclude a vaccine-associated adverse event as a cause of death for this decedent.

Female Decedents

Among the 367 female decedents, no death certificate listed vaccination as either the immediate or a contributing cause of death. Thirteen (4%) deaths were attributed to COVID-19. Noncardiac causes were recorded on the death certificates for 319 (87%) decedents. Among the remaining 35 (10%) female decedents, IIS records for 30 (86%) were identified, 16 (53%) of whom had documentation of receipt of at least 1 mRNA COVID-19 vaccine dose. Only one of these deaths occurred within 100 days of having received an mRNA COVID-19 vaccine dose; the decedent died 4 days after COVID-19 vaccination. The manner of death was recorded as natural, and the immediate cause was listed as undetermined but as a consequence of chronic respiratory failure with hypoxia attributed to mitral stenosis.

Discussion

Electronic health record data from 40 U.S. health care systems during January 2021–January 2022, showed that the risk for cardiac complications was significantly higher after COVID-19 infection than after mRNA COVID-19 vaccination among persons aged ≥5 years (*8*). Data from CDC's National Center for Health Statistics show a background mortality rate from diseases of the heart among Oregonians aged 15–34 years of 2.9 and 4.1 deaths per 100,000, during 2019 and 2021, respectively. Although the rate was higher during the pandemic year of 2021, myocarditis remained an infrequent cause of death among persons in this age group.[††] Detection of a small difference in mortality rate from myocarditis would require a larger sample size.

In this study of 1,292 deaths among Oregon residents aged 16–30 years during June 2021–December 2022, none could definitively be attributed to cardiac causes within 100 days of receipt of an mRNA COVID-19 vaccine dose; one male died from undetermined causes 45 days after receipt of a COVID-19 vaccine. During May 1, 2021–December 31, 2022, a total of 979,289 doses of COVID-19 vaccines were administered to Oregonians aged 16–30 years (unpublished data, ALERT IIS, 2024.)

During the same period, COVID-19 was cited as the cause of death for 30 Oregon residents in this age group. Among these 30 decedents, ALERT IIS had records for 22 (73%), only three of whom had received any COVID-19 vaccination. Studies have shown significant reductions in COVID-19–related mortality among vaccinated persons; during the first 2 years of COVID-19 vaccine availability in the United States, vaccination prevented an estimated 18.5 million hospitalizations and 3.2 million deaths (*9*).

Limitations

The findings in this report are subject to at least two limitations. First, this report cannot exclude the possibility of vaccine-associated cardiac deaths >100 days after COVID-19 vaccine administration. However, published data indicate that potential adverse events associated with vaccinations tend to occur within 42 days of vaccine receipt (*10*). Second, small population size made it less likely that Oregon would see a rare event such as sudden cardiac death among adolescents and young adults.

[††] https://wonder.cdc.gov/ucd-icd10-expanded.html (Accessed February 12, 2024).

Implications for Public Health Practice

These data do not support an association between receipt of mRNA COVID-19 vaccine and sudden cardiac death among previously healthy young persons. COVID-19 vaccination is recommended for all persons aged ≥6 months to prevent COVID-19 and complications, including death.

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Notes from the Field

Neonatal Salmonellosis Associated with Backyard Poultry — Oregon, November 2023

Stephen G. Ladd-Wilson, MS[1]; Karen Yeargain[2]; Samuel P. Myoda, PhD[3]; Mansour Samadpour, PhD[3]; Karim Morey, MS[4]; Paul R. Cieslak, MD[1]

Outbreaks of salmonellosis (infection with non-typhoidal *Salmonella*) involving young children associated with keeping backyard poultry,* including descriptions of high-risk practices such as keeping poultry inside households and kissing birds, have been well documented (*1*). During 2023 (as of October 19), backyard poultry–associated salmonellosis outbreaks were reported to CDC from 48 States and Puerto Rico; these outbreaks accounted for 1,072 cases of illness, including 247 hospitalizations (*2*). Several of these outbreaks involved multiple states and included serotypes Braenderup, Enteritidis, Indiana, Infantis, Mbandaka, and Typhimurium (*3*). During a salmonellosis outbreak investigation across multiple states (A. Lodato, CDC, unpublished data, 2023), the Oregon Health Authority, in collaboration with a local health department, investigated a case of salmonellosis in a newborn whose parents had kept backyard poultry. This activity was deemed to be routine public health surveillance by the Public Health Division of the Oregon Health Authority and did not require human subjects review.

Investigation and Outcomes

The Oregon patient was an exclusively breastfed male newborn who was born during October 2023 at hospital A, approximately 150 miles (241 km) from the parents' home. The *Salmonella* Thompson whole genome sequencing (WGS) pattern of the isolate from the patient matched that of the unpublished outbreak strain. The newborn was discharged with his mother to a relative's home the day after his birth. Four days later, he was readmitted to hospital B with bloody stools and lethargy, at which time a stool sample was collected for analysis and subsequently tested positive for *S.* Thompson; the WGS pattern matched the unpublished outbreak strain. Neither parent had been symptomatic, and neither had received a diagnosis of salmonellosis. The baby's father, who tended the family's backyard poultry approximately 150 miles (241 km) away, had been present at hospital A during the child's birth and stayed with the child and the child's mother at the relative's home through the time of illness onset. The newborn had not traveled to the home where the backyard poultry were kept during the interval from his birth until his hospital admission. Twenty-seven days after this admission, nine environmental samples from the chicken bedding in the family's backyard poultry coop (where the child's father also had had contact) and one cloacal sample from a chicken were collected. The samples were sent to the Institute for Environmental Health Laboratories in Seattle, Washington, for *Salmonella* spp. serotyping and WGS analyses. Two of the environmental samples matched the newborn's isolate within three single nucleotide polymorphisms†: clinical PNUSAS396258, and environmental CFSAN1435603 and CFSAN1435604. Samples were not collected from the parents.

Preliminary Conclusions and Actions

The mechanism by which this newborn was exposed to this strain of *Salmonella* is not known. The newborn's family had recently started keeping backyard poultry, having purchased the chicks in September 2023, approximately 1 month before the child's birth. It is possible that one of the parents was asymptomatically shedding the organism and exposed the newborn during or after birth; alternatively, the organism might have been carried from the backyard farm to the newborn by fomites.

This case of neonatal salmonellosis linked to environmental isolates from a backyard poultry coop to which the newborn had not been directly exposed highlights the importance of hygiene when tending backyard poultry, especially when persons at risk for exposure are newborns and young infants whose intestinal flora and immune systems are still developing (*4*,*5*). In addition to adhering to recommended hygiene practices (*2*), families contemplating raising backyard poultry should consider the potential risk to newborns and young infants living in the household. To better understand the breadth of backyard poultry–associated salmonellosis outbreaks, state and local public health officials can conduct detailed epidemiologic inquiry around potential backyard poultry exposures, not limited to those where the patient lives, and perform follow-up environmental testing where indicated.

* https://www.cdc.gov/healthypets/pets/farm-animals/backyard-poultry.html

† https://www.ncbi.nlm.nih.gov/

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Summary

What is already known about this topic?

Salmonellosis outbreaks associated with backyard poultry involving young children have been well documented.

What is added by this report?

A case of backyard poultry–associated salmonellosis was identified in a newborn who was infected during the first week of life, despite living >150 miles (>241 km) from the location of the backyard flock, suggesting that even in the absence of direct exposure, backyard poultry might present a risk for salmonellosis to newborns and infants via fomites.

What are the implications for public health practice?

Investigation of salmonellosis outbreaks should include detailed epidemiologic inquiry regarding any potential backyard poultry exposures and follow-up environmental testing where indicated. Families with newborns and infants should be aware of the potential risks associated with owning backyard poultry.

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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