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Surveillance To Track Progress Toward Polio Eradication — Worldwide, 2022–2023

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Abstract

The reliable and timely detection of poliovirus cases through surveillance for acute flaccid paralysis (AFP), supplemented by environmental surveillance of sewage samples, is a critical component of the polio eradication program. Since 1988, the number of polio cases caused by wild poliovirus (WPV) has declined by >99.9%, and eradication of WPV serotypes 2 and 3 has been certified; only serotype 1 (WPV1) continues to circulate, and transmission remains endemic in Afghanistan and Pakistan. This surveillance update evaluated indicators from AFP surveillance, environmental surveillance for polioviruses, and Global Polio Laboratory Network performance data provided by 28 priority countries for the program during 2022–2023. No WPV1 cases have been detected outside of Afghanistan and Pakistan since August 2022, when an importation into Malawi and Mozambique resulted in an outbreak during 2021–2022. During 2022–2023, among 28 priority countries, 20 (71.4%) met national AFP surveillance indicator targets, and the number of environmental surveillance sites increased. However, low national rates of reported AFP cases in priority countries in 2023 might have resulted from surveillance reporting lags; substantial national and subnational AFP surveillance gaps persist. Maintaining high-quality surveillance is critical to achieving the goal of global polio eradication. Monitoring surveillance indicators is important to identifying gaps and guiding surveillance-strengthening activities, particularly in countries at high risk for poliovirus circulation.

Introduction

Since the Global Polio Eradication Initiative (GPEI) was established in 1988, the number of wild poliovirus (WPV) cases has declined by >99.9%, and WPV serotypes 2 and 3 have been declared eradicated (*1*). By the end of 2023, WPV type 1 (WPV1) transmission remained endemic only in Afghanistan and Pakistan (*2*,*3*). However, during 2021–2022, Malawi and Mozambique reported nine WPV1 cases caused by a virus genetically linked to cases from Pakistan (last paralysis onset date on August 10, 2022) (*4*,*5*). In areas with low polio vaccination coverage, prolonged circulation of vaccine-derived polioviruses (VDPV) can result in their reversion to neurovirulence. Infection with these circulating VDPVs (cVDPVs) can cause paralysis and polio outbreaks; cVDPV outbreaks have been detected in 42 countries (*6*).

Polioviruses are detected primarily through surveillance for acute flaccid paralysis (AFP), confirmed through stool specimen testing. Environmental surveillance (ES), the systematic sampling of sewage and testing for the presence of poliovirus, supplements AFP surveillance by detecting poliovirus circulation independent of confirmed paralytic polio cases. This

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report updates previous reports (*7*,*8*) to describe polio surveillance performance during 2022–2023 in 28 priority countries (i.e., those deemed to be at high risk for poliovirus transmission because of ongoing surveillance gaps and vulnerability to poliovirus circulation).*

Methods

Data Sources

Data analyzed in this study were obtained from 1) the World Health Organization (WHO) Polio Information System as of March 11, 2024, and 2) the Global Polio Laboratory Network (GPLN) as of January 31, 2024. These data are the property of the individual countries, and data access was provided through the GPEI Data Sharing Agreement.

Acute Flaccid Paralysis and Environmental Surveillance

AFP surveillance quality was assessed for 28 priority countries both at the national level and at 511 first administrative subnational (i.e., state or province) level using two performance indicators: 1) the nonpolio AFP (NPAFP) rate† (an NPAFP rate of two or more NPAFP cases per 100,000 persons aged <15 years indicates AFP surveillance is sufficiently sensitive to detect circulating poliovirus), and 2) stool adequacy (two stools collected within 14 days of paralysis onset, ≥24 hours apart, and received by a WHO-accredited laboratory via reverse cold chain and in good condition)§ with a target of ≥80% adequate stool specimens collected from AFP patients. ES site sensitivity to detect poliovirus is assessed by the annual enterovirus isolation rate, defined as the percentage of specimens with enterovirus detected, with a target of ≥50%.

* Priority countries were included if they were deemed at high risk for poliovirus transmission in a country risk assessment exercise because of ongoing gaps in surveillance and vulnerability to poliovirus circulation, as described in the WHO Global Polio Surveillance Action Plan, 2022–2024 (https://polioeradication.org/wp-content/uploads/2022/05/GPSAP-2022-2024-EN.pdf). The priority countries are updated every year. The 2023 priority countries include the following: *African Region* (21): Angola, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea, Ethiopia, Kenya, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, South Sudan, Tanzania, Zambia, and Zimbabwe; *Eastern Mediterranean Region* (five): Afghanistan, Pakistan, Somalia, Sudan, and Yemen; *South-East Asia Region* (one): Indonesia; *Western Pacific Region* (one): Papua New Guinea.

† The number of NPAFP cases per 100,000 children aged <15 years per year. NPAFP cases are cases of AFP determined not to be polio upon further case investigation and stool testing. The threshold of two or more NPAFP cases indicating that AFP surveillance is sufficiently sensitive to detect circulating polio is based on a background rate of AFP due to etiologies other than polioviruses. The NPAFP rate is difficult to interpret when the population aged <15 years is below 100,000.

§ Two stool specimens that are collected from patients with AFP within 14 days of paralysis onset, ≥24 hours apart, and received in good condition (i.e., without leakage or desiccation) by a WHO-accredited laboratory via reverse cold chain (a transportation and storage method designed to keep samples at recommended temperatures from collection through arrival at the laboratory).

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Global Polio Laboratory Network

The GPLN consists of 144 WHO-accredited laboratories in the six WHO regions, monitored through a standardized quality assurance program of annual onsite audits and proficiency testing (*9*). All 144 GPLN laboratories are responsible for isolating polioviruses; 134 conduct intratypic differentiation to identify WPV, VDPV, and Sabin (oral poliovirus vaccine) polioviruses; 28 laboratories conduct genomic sequencing.

Analysis

R software (version 4.3.1; R Foundation) was used to conduct all analyses. All administrative boundaries, as well as the disputed borders, and the lakes within the disputed areas dataset were sourced from the WHO and GPEI administrative boundary project (https://polioboundaries-who.hub.arcgis.com/). This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[¶]

Results

Acute Flaccid Paralysis

Surveillance indicators and detected cases were assessed in 28 priority countries during 2022–2023 (Table 1). Priority countries include 21 in the African region, five in the Eastern Mediterranean region, and one each in the South-East Asia and Western Pacific regions.

African Region. Among the 21 priority countries in the WHO African Region (AFR), 18 (85.7%) met both surveillance indicator targets nationally in 2023, compared with 17 (81%) in 2022. In 2023, all countries met the NPAFP rate target of two or more NPAFP cases per 100,000 persons aged <15 years.

In 2022 and 2023, 70.8% of 356 and 75.8% of 355 subnational regions, respectively, met both targets. Eleven countries reported that ≥80% of subnational regions met both indicators in 2023 (Figure) compared with nine countries in 2022.

Eight WPV1 cases were detected in 2022 linked to one reported imported WPV1 case with onset in 2021; no WPV1 cases were reported in 2023. The number of VDPV cases decreased from 690 (192 cVDPV type 1 [cVDPV1] and 498 cVDPV type 2 [cVDPV2]) in 2022 to 471 (133 cVDPV1 and 338 cVDPV2) in 2023.

Eastern Mediterranean Region. Among the five priority countries in the WHO Eastern Mediterranean Region (EMR), all met both national surveillance indicator targets in 2022, and four met targets in 2023. Whereas 87.4% of subnational areas across the entire region met both indicator targets in 2022, the percentage declined to 80.4% in 2023. As of the reporting date, 11 WPV1 and 15 cVDPV2 cases were reported in 2023 compared with 22 and 166, respectively, in 2022.

South-East Asia Region. The WHO South-East Asia Region (SEAR) includes one priority country (Indonesia). At the national level, the NPAFP rate increased from 3.5 to 5.8 cases per 100,000; the percentage of stool samples that were adequate did not meet the indicator in either 2022 or 2023. Indonesia reported six cVDPV2 cases in 2023 compared with one case in 2022.

Western Pacific Region. The WHO Western Pacific Region includes one priority country (Papua New Guinea); neither national surveillance indicator target was met during this assessment period. No poliovirus was detected in Papua New Guinea during 2022–2023.

Environmental Surveillance

In 2023, 27 (96.4%) of the 28 priority countries[**] had at least one ES site reporting. In priority countries in AFR, the number of ES sites decreased 2%, from 386 in 2022 to 378 in 2023; however, the proportion of sites meeting the enterovirus sensitivity target increased 41%, from 41.7% to 58.8%. In 2022 and 2023, ≥80% of sites in 18 and 19 countries, respectively, met the ≥50% enterovirus isolation rate target.

The number of ES sites in EMR increased 134%, from 244 in 2022 to 571 in 2023; this increase was driven by Pakistan, which added 308 new ES sites in 2023. However, only 133 (26.7%) of all ES sites in Pakistan reported five or more collections in 2023. In Somalia and Sudan, the proportion of sites meeting the sensitivity indicator declined from 100% to 35.3% and from 85.7% to 60%, respectively.

In Indonesia, the only priority country evaluated in SEAR, the number of ES sites decreased from 16 in 2022 to 12 in 2023. However, the proportion of sites that met the sensitivity indicator increased from 25% in 2022 to 45.5% in 2023.

Global Polio Laboratory Network

In 2023, the GPLN tested 233,437 stool specimens collected from patients with AFP (Table 2). All WHO regions except the Region of the Americas met the timeliness target for viral isolation (results reported for ≥80% of specimens ≤14 days after receipt of specimen). All regions met the timeliness indicator for reporting (results reported for ≥80% of specimens within 7 days of receipt of isolates in the laboratory).

In genetic sequencing performed during 2022–2023, the South Asia genotype was the only circulating WPV1 isolated

[¶] 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.

[**] No ES sites were reported from Papua New Guinea during 2022–2023.

TABLE 1. National and subnational acute flaccid paralysis surveillance performance indicators and number of confirmed wild poliovirus and circulating vaccine-derived poliovirus cases, by country — 28 priority countries, World Health Organization African, Eastern Mediterranean, South-East Asia, and Western Pacific regions, 2022 and 2023*

Year/WHO region/ Country	No. of AFP cases (all ages)	Regional/ National NPAFP rate†	%				No. of confirmed cases	
			Subnational areas with NPAFP rate of two or more cases§	Regional/National no. of AFP cases with adequate stool specimens¶	Subnational areas with ≥80% adequate stool specimens§,¶	Subnational areas meeting both indicators§,¶,**	WPV cases	cVDPV cases (type 1, type 2)††
2022								
AFR (N = 21)	**27,786**	**7.1**	**N/A**	**90.6**	**N/A**	**N/A**	**8**	**690 (192, 498)**
Angola	386	2.4	66.7	89.6	83.3	75.9	—§§	—
Botswana	32	3.5	45.8	78.1	33.3	24.5	—	—
Burkina Faso	1,260	12.4	100.0	93.0	100.0	100.0	—	—
Burundi	128	2.1	50.0	87.5	77.8	37.1	—	1 (0, 1)
Cameroon	852	7.1	100.0	81.9	60.0	62.1	—	3 (0, 3)
CAR	215	7.6	100.0	86.0	57.1	64.9	—	6 (0, 6)
Chad	1,254	14.3	100.0	82.1	52.2	52.4	—	44 (0, 44)
DRC	4,577	8.6	100.0	85.8	61.5	61.0	—	523 (150, 373)
Equatorial Guinea	388	6.7	100.0	88.9	100.0	100.0	—	—
Ethiopia	1,606	3.2	90.9	93.0	90.9	92.8	—	1 (0, 1)
Kenya	653	3.2	85.1	87.0	76.6	70.0	—	—
Madagascar	646	5.4	100.0	95.2	100.0	100.0	—	16 (16, 0)
Malawi	481	5.1	100.0	71.7	25.0	0.1	—	4 (4, 0)
Mali	562	5.3	100.0	87.2	90.9	99.5	—	2 (0, 2)
Mozambique	929	5.9	100.0	74.5	18.2	15.7	8	26 (22, 4)
Niger	991	7.6	100.0	87.8	75.0	74.3	—	16 (0, 16)
Nigeria	10,247	10.8	100.0	96.7	100.0	100.0	—	48 (0, 48)
South Sudan	557	11.4	100.0	93.9	100.0	100.0	—	—
Tanzania	1,283	4.5	93.5	98.1	100.0	98.6	—	—
Zambia	390	4.3	100.0	65.9	10.0	18.7	—	—
Zimbabwe	349	5.1	100.0	90.8	90.0	90.6	—	—
EMR (N = 5)	**26,786**	**18.3**	**N/A**	**87.0**	**N/A**	**N/A**	**22**	**166 (0, 166)**
Afghanistan	5,370	30.2	100.0	94.4	100.0	100.0	2	—
Pakistan	19,033	22.0	85.7	84.9	100.0	100.0	20	—
Somalia	356	4.2	90.5	97.2	95.2	96.7	—	5 (0, 5)
Sudan	650	3.4	100.0	97.1	94.4	98.1	—	1 (0, 1)
Yemen	1,377	9.1	100.0	81.0	60.9	59.7	—	160 (0, 160)
SEAR (N = 1)	**2,412**	**3.5**	**N/A**	**73.7**	**N/A**	**N/A**	**—**	**1 (0, 1)**
Indonesia	2,412	3.5	73.5	73.7	26.5	20.1	—	1 (0, 1)
WPR (N = 1)	**63**	**1.8**	**N/A**	**65.1**	**N/A**	**N/A**	**—**	**—**
Papua New Guinea	63	1.8	22.7	65.1	40.9	7.5	—	—
2023								
AFR (N = 21)	**31,325**	**7.8**	**N/A**	**91.4**	**N/A**	**N/A**	**—**	**492 (133, 359)**
Angola	482	2.7	77.8	84.6	72.2	77.9	—	—
Botswana	42	3.7	45.8	73.8	37.5	29.3	—	—
Burkina Faso	1,126	10.8	100.0	94.3	100.0	100.0	—	2 (0, 2)
Burundi	174	2.7	72.2	82.2	61.1	35.4	—	1 (0, 1)
Cameroon	855	7.0	100.0	87.6	80.0	87.9	—	—
CAR	209	6.8	100.0	80.9	57.1	63.3	—	15 (0, 15)
Chad	1,497	16.6	95.7	87.4	78.3	84.6	—	55 (0, 55)
DRC	4,674	9.1	100.0	83.3	69.2	69.1	—	223 (105, 118)
Equatorial Guinea	581	8.8	100.0	85.4	87.5	91.2	—	47 (0, 47)
Ethiopia	1,449	2.8	90.9	94.5	90.9	99.2	—	—
Kenya	693	3.2	83.0	88.0	70.2	64.3	—	8 (0, 8)
Madagascar	1,424	11.0	100.0	90.6	100.0	100.0	—	24 (24, 0)
Malawi	554	5.9	100.0	90.1	100.0	100.0	—	—
Mali	991	8.8	100.0	91.9	90.9	99.1	—	16 (0, 16)
Mozambique	676	4.2	100.0	81.5	72.7	77.7	—	5 (4, 1)
Niger	752	5.6	100.0	76.9	50.0	23.9	—	2 (0, 2)
Nigeria	12,020	12.4	100.0	97.3	100.0	100.0	—	87 (0, 87)
South Sudan	554	11.1	100.0	95.7	100.0	100.0	—	2 (0, 2)
Tanzania	1,551	5.2	100.0	97.0	100.0	100.0	—	3 (0, 3)
Zambia	682	6.6	100.0	79.2	70.0	71.0	—	1 (0, 1)
Zimbabwe	339	4.7	100.0	87.9	80.0	82.0	—	1 (0, 1)

See table footnotes the next page.

TABLE 1. (*Continued*) National and subnational acute flaccid paralysis surveillance performance indicators and number of confirmed wild poliovirus and circulating vaccine-derived poliovirus cases, by country — 28 priority countries, World Health Organization African, Eastern Mediterranean, South-East Asia, and Western Pacific regions, 2022 and 2023*

Year/WHO region/ Country	No. of AFP cases (all ages)	Regional/ National NPAFP rate†	%				No. of confirmed cases	
			Subnational areas with NPAFP rate of two or more cases§	Regional/ national no. of AFP cases with adequate stool specimens¶	Subnational areas with ≥80% adequate stool specimens§,¶	Subnational areas meeting both indicators§,¶,**	WPV cases§§	cVDPV cases (type 1, type 2)††
EMR (N = 5)	**27,794**	**18.6**	**N/A**	**86.1**	**N/A**	**N/A**	**11**	**15 (0, 15)**
Afghanistan	5,852	32.3	100.0	94.0	100.0	100.0	5	—
Pakistan	19,714	22.3	85.7	83.9	85.7	98.7	6	—
Somalia	424	4.9	100.0	93.4	95.0	98.4	—	8 (0, 8)
Sudan	473	2.0	77.8	75.3	44.4	10.7	—	—
Yemen	1,331	9.4	100.0	84.2	87.0	83.1	—	7 (0, 7)
SEAR (N = 1)	**4,362**	**5.8**	**N/A**	**73.3**	**N/A**	**N/A**	**—**	**6 (0, 6)**
Indonesia	4,362	5.8	79.4	73.3	20.6	20.3	—	6 (0, 6)
WPR (N = 1)	**61**	**1.3**	**N/A**	**54.1**	**N/A**	**N/A**	**—**	**—**
Papua New Guinea	61	1.3	18.2	54.1	22.7	4.4	—	—

Abbreviations: AFP = acute flaccid paralysis; AFR = African Region; CAR = Central African Republic; cVDPV = circulating vaccine-derived poliovirus; DRC = Democratic Republic of the Congo; EMR = Eastern Mediterranean Region; N/A = not applicable; NPAFP = nonpolio acute flaccid paralysis; SEAR = South-East Asia Region; WHO = World Health Organization; WPR = Western Pacific Region; WPV = wild poliovirus.

* Data as of March 11, 2024.

† Per 100,000 persons aged <15 years per year.

§ For all subnational areas regardless of population size.

¶ Surveillance targets are two or more NPAFP cases per 100,000 persons aged <15 years per year and ≥80% of persons with AFP having two stool specimens collected within 14 days of paralysis onset and ≥24 hours apart and received in good condition (i.e., without leakage or desiccation) by a WHO-accredited laboratory via reverse cold chain (storing and transporting samples at recommended temperatures from the point of collection to the laboratory).

** Percentage of the country's population aged <15 years living in subnational areas that met both surveillance indicators (NPAFP rates of two or more per 100,000 persons aged <15 years per year and ≥80% of AFP cases with adequate specimens).

†† https://polioeradication.org/wp-content/uploads/2016/09/Reporting-and-Classification-of-VDPVs_Aug2016_EN.pdf

§§ Dashes indicate that no confirmed cases were found.

from 42 persons with AFP (30 in 2022 and 12 in 2023) in the two countries with endemic WPV1 transmission (Afghanistan and Pakistan) (*2*,*3*) and one person with AFP from Mozambique (*5*). In Pakistan, all 2022–2023 isolates were related to the YB3A genetic cluster (i.e., groups of polioviruses sharing ≥95% sequence identity in the region coding the viral capsid protein VP1) except three isolates in 2023, which were related to genetic cluster YB3C. In Afghanistan, all isolates were related to the YB3A genetic cluster. In Mozambique, eight WPV1 polio cases in 2022 were linked to the YC2 genetic cluster; no new WPV1 cases were detected in 2023. During the reporting period, cluster YB3A was detected in ES samples from Afghanistan and clusters YB3A and YB3C in ES samples from Pakistan; five ES detections (four in Pakistan and one in Afghanistan) were orphan viruses (i.e., isolates with ≥1.5% nucleotide divergence of the VP1-coding region from known isolates), indicating that virus circulation was prolonged.

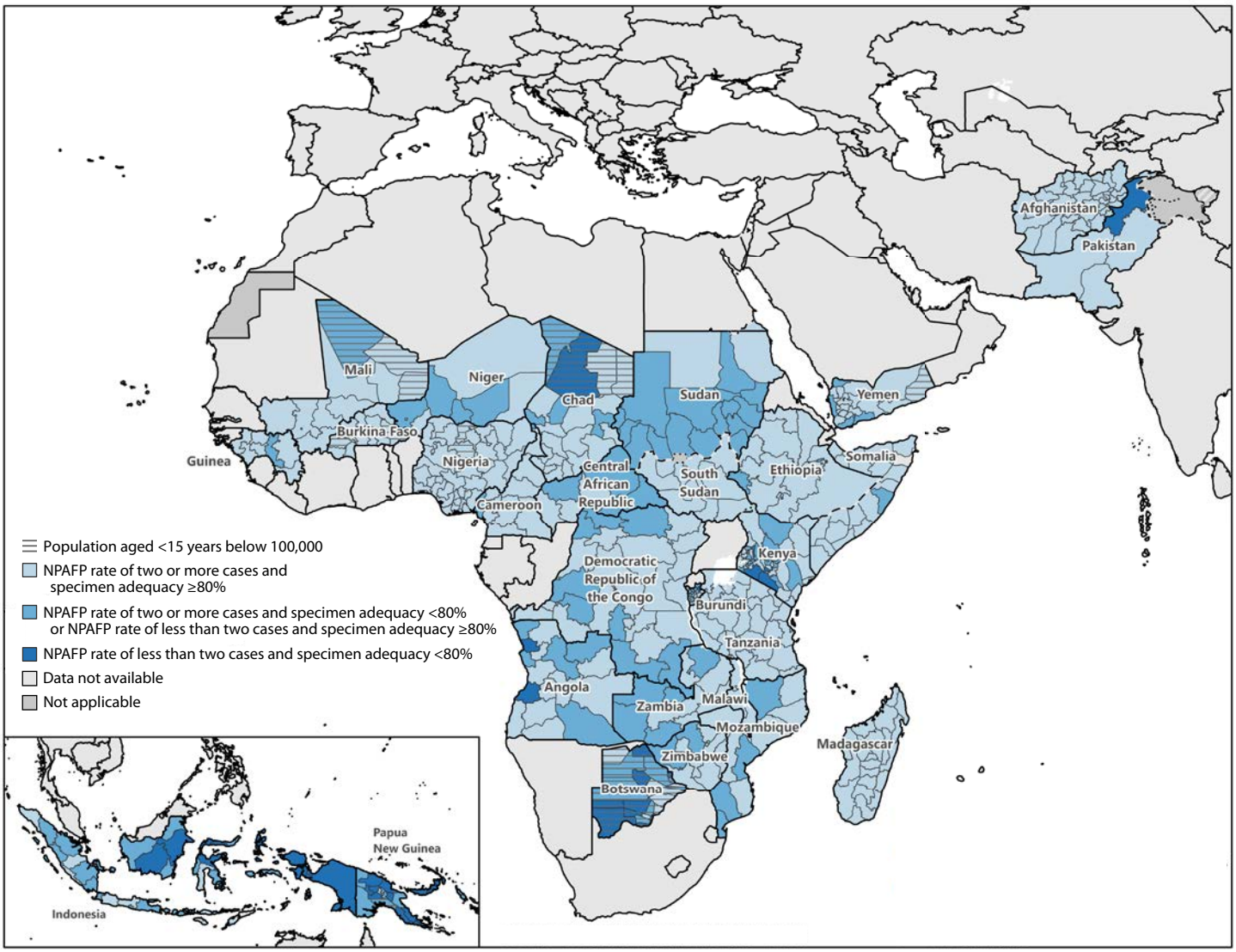
In the 28 priority countries during 2022–2023, viruses from 37 cVDPV emergence groups (those not linked to any other outbreak, including seven cVDPV1 and 30 cVDPV2 emergence groups) were isolated from 1,320 AFP patients and 607 ES samples. The number of cVDPV1 emergence groups decreased from seven in 2022 to four in 2023. The number of cVDPV2 emergence groups increased from 18 in 2022 to 22 emergence groups in 2023.

Discussion

Among 28 polio priority countries assessed during the 2022–2023 surveillance evaluation period, 20 (71.4%) met national AFP surveillance targets, and the total number of ES sites increased. Although the overall number of ES sites increased in EMR, Somalia and Sudan reported large decreases in the proportion of sites meeting the 50% enterovirus detection surveillance sensitivity indicator. The national NPAFP rate decreased in 14 of the 28 priority countries in 2023; Papua New Guinea did not meet the NPAFP target. Similarly, the percentages of adequate stool samples from persons with AFP declined in 15 (53.5%) priority countries; Botswana, Indonesia, Niger, Papua New Guinea, and Sudan did not reach target indicators.

The detection of imported WPV1 in Malawi and Mozambique in 2021–2022 highlights the importance of outbreak response in strengthening surveillance systems (*4*,*5*). Response to the 2021 WPV1 importation included Malawi, Mozambique, Tanzania, Zambia, and Zimbabwe. All response countries met the NPAFP rate target in 2023. Zambia reported a stool adequacy rate just below the target; however, the proportion of AFP cases with adequate specimens increased from 65.9% in 2022 to 79.2% in 2023. All subnational areas in Mozambique met the NPAFP target in 2022 and 2023, and the proportion of subnational regions meeting the stool adequacy target improved from 18.2% to 72.7% in 2023.

FIGURE. Combined performance indicators for the quality of acute flaccid paralysis surveillance*,† in subnational areas of 28 priority countries§,¶ — World Health Organization African, Eastern Mediterranean, South-East Asia, and Western Pacific regions, 2023**



Abbreviations: AFP = acute flaccid paralysis; NPAFP = nonpolio acute flaccid paralysis; WHO = World Health Organization.

* The number of NPAFP cases per 100,000 children aged <15 years per year. NPAFP cases are cases of AFP determined not to be polio upon further case investigation and stool testing. The threshold of two or more NPAFP cases indicating that AFP surveillance is sufficiently sensitive to detect circulating polio is based on a background rate of AFP due to etiologies other than polioviruses.

† Surveillance targets are two or more NPAFP cases per 100,000 persons aged <15 years per year and ≥80% of persons with AFP having two stool specimens collected within 14 days of paralysis onset, ≥24 hours apart, and received in good condition (i.e., without leakage or desiccation) by a WHO-accredited laboratory via reverse cold chain (storing and transporting samples at recommended temperatures from the point of collection to the laboratory).

§ The 2023 priority countries include the following: *African Region* (21): Angola, Botswana, Burkina Faso, Burundi, Cameroon, Central African Republic, Chad, Democratic Republic of the Congo, Ethiopia, Equatorial Guinea, Kenya, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, South Sudan, Tanzania, Zambia, and Zimbabwe; *Eastern Mediterranean Region* (five): Afghanistan, Pakistan, Somalia, Sudan, and Yemen; *South-East Asia Region* (one): Indonesia; *Western Pacific Region* (one): Papua New Guinea.

¶ NPAFP rate is difficult to interpret when the population aged <15 years is below 100,000.

** Dotted and dashed lines on maps represent approximate border lines for which there might not yet be full agreement.

Limitations

The findings in this report are subject to at least three limitations. First, metrics collected for this analysis can take weeks or months to be uploaded to the surveillance system and be available for analysis. Thus, whereas decreases in overall case numbers are encouraging, these trends might be affected by incomplete data resulting from surveillance lags. Second, performance measures reported at regional and national levels can

TABLE 2. Number of poliovirus isolates from stool specimens of persons with acute flaccid paralysis and timing of results, by World Health Organization region — worldwide, 2022 and 2023[*,†]

WHO region/ Year	No. of specimens	No. of poliovirus isolates			% of on time[††] poliovirus isolation test results	% ITD results	
		Wild[§]	Sabin[¶]	cVDPV[**]		Within 7 days of receipt at laboratory[§§]	Within 60 days of paralysis onset[¶¶]
Africa							
2022	53,961	8	3,065	453	86	85	83
2023	72,543	0	397	538	88	92	94
Americas							
2022	1,858	0	7	2	74	100	67
2023	1,826	0	2	0	72	100	100
Eastern Mediterranean							
2022	57,364	32	1,331	277	75	88	82
2023	76,322	19	2,033	9	92	100	79
European							
2022	2,980	0	22	2	79	91	91
2023	2,910	0	33	4	83	97	*92*
South-East Asia							
2022	67,118	0	1,067	2	96	98	93
2023	67,100	0	783	10	94	95	96
Western Pacific							
2022	10,664	0	32	0	98	100	100
2023	12,736	0	140	0	97	99	90
Total[††]							
2022*	**193,945**	**40**	**5,524**	**736**	**87**	**88**	**85**
2023**	**233,437**	**19**	**3,388**	**561**	**91**	**97**	**86**

Abbreviations: AFP = acute flaccid paralysis; cVDPV = circulating vaccine-derived poliovirus; ITD = intratypic differentiation; VDPV = vaccine-derived poliovirus; VP1 = poliovirus capsid viral protein 1; WHO = World Health Organization; WPV = wild poliovirus.

* Data for 2023 received from WHO regions during January 15–31, 2024.

† Data for 2022 current as of January 31, 2023.

§ Number of AFP cases with WPV isolates.

¶ Either 1) concordant Sabin-like results in ITD test and VDPV screening, or 2) ≤1% VP1 nucleotide sequence difference compared with Sabin vaccine virus (≤0.6% for type 2).

** For poliovirus types 1 and 3, 10 or more VP1 nucleotide differences from the respective poliovirus; for poliovirus type 2, six or more VP1 nucleotide differences from Sabin type 2 poliovirus.

†† Results reported within 14 days of receipt of specimen.

§§ Results of ITD reported within 7 days of receipt of isolate.

¶¶ For percentage of poliovirus isolation results on time, percentage of ITD results within 7 days of receipt at laboratory and within 60 days of paralysis onset. Total represents weighted mean percentage of regional performance.

obscure variation at lower administrative levels. Large populations residing in hard-to-reach areas might not be accessed by the surveillance system, which could affect the performance indicators and their interpretation. Finally, meeting performance indicators does not by itself ensure strong surveillance unless field activities are well supervised, and staff members are well trained.

Implications for Public Health Practice

High-quality surveillance is crucial for the timely detection of circulating polioviruses and the rapid activation of outbreak response vaccination activities to stop transmission. Countries must monitor surveillance indicators to identify gaps and enhance the sensitivity and timeliness of surveillance activities through supportive supervision and training to guide progress toward the goal of global polio eradication.

Summary

What is already known about this topic?

The primary means for detecting poliovirus is through surveillance for acute flaccid paralysis (AFP), supplemented by environmental surveillance of sewage samples.

What is added by this report?

During 2022–2023, among 28 priority countries experiencing or at high risk for poliovirus transmission, 20 (71.4%) met national AFP surveillance indicator targets, and the number of environmental surveillance sites in priority countries increased. However, substantial national and subnational AFP surveillance gaps persist.

What are the implications for public health practice?

Maintaining high-quality surveillance is critical to achieving the goal of global polio eradication. Monitoring surveillance indicators is important to identifying gaps and guiding surveillance strengthening activities, particularly in countries at high risk for poliovirus circulation.

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Federal Retail Pharmacy Program Contributions to Bivalent mRNA COVID-19 Vaccinations Across Sociodemographic Characteristics — United States, September 1, 2022–September 30, 2023

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Abstract

The Federal Retail Pharmacy Program (FRPP) facilitated integration of pharmacies as partners in national efforts to scale up vaccination capacity during the COVID-19 pandemic emergency response. To evaluate FRPP's contribution to vaccination efforts across various sociodemographic groups, data on COVID-19 bivalent mRNA vaccine doses administered during September 1, 2022–September 30, 2023, were evaluated from two sources: 1) FRPP data reported directly to CDC and 2) jurisdictional immunization information systems data reported to CDC from all 50 states, the District of Columbia, U.S. territories, and freely associated states. Among 59.8 million COVID-19 bivalent vaccine doses administered in the United States during this period, 40.5 million (67.7%) were administered by FRPP partners. The proportion of COVID-19 bivalent doses administered by FRPP partners ranged from 5.9% among children aged 6 months–4 years to 70.6% among adults aged 18–49 years. Among some racial and ethnic minority groups (e.g., Hispanic or Latino, non-Hispanic Black or African American, non-Hispanic Native Hawaiian or other Pacific Islander, and non-Hispanic Asian persons), ≥45% of COVID-19 bivalent vaccine doses were administered by FRPP partners. Further, in urban and rural areas, FRPP partners administered 81.6% and 60.0% of bivalent vaccine doses, respectively. The FRPP partnership administered approximately two thirds of all bivalent COVID-19 vaccine doses in the United States and provided vaccine access for persons across a wide range of sociodemographic groups, demonstrating that this program could serve as a model to address vaccination services needs for routine vaccines and to provide health services in other public health emergencies.

Introduction

Approximately 90% of U.S. residents live within 5 miles (8 km) of a community pharmacy, making pharmacies a highly accessible health care resource, particularly among low-income communities (*1*). Understanding the role that pharmacies played during the COVID-19 response is important for future public health planning. The Federal Retail Pharmacy Program (FRPP), a collaboration between the federal government, U.S. states and territories, and 21 national pharmacy chains and independent pharmacy networks, was established to ensure broad access to COVID-19 vaccines (*2*). Since February 11, 2021, participating pharmacies have provided access to COVID-19 vaccines across all 50 states, the District of Columbia (D.C.), U.S. territories, and freely associated states (*2*). On September 1, 2022, CDC recommended COVID-19 bivalent boosters for persons aged ≥12 years (*3*). On October 12, 2022, the recommendation was expanded to include children aged 5–11 years, and on December 9, 2022, children aged 6 months–4 years (*3*). COVID-19 mRNA bivalent vaccine doses reported to CDC by FRPP partners and all bivalent vaccine doses administered in the United States during September 1, 2022–September 30, 2023, were assessed across sociodemographic groups to learn more about FRPP's contribution to COVID-19 bivalent vaccination.

Methods

The proportion of COVID-19 bivalent vaccine doses administered in the United States by FRPP partners was calculated using two independent data sources: 1) FRPP bivalent dose administration data reported directly to CDC and 2) all-provider (i.e., FRPP and non-FRPP vaccine providers) data on bivalent vaccine dose administration submitted to each jurisdiction's immunization information system,* which were then

* Providers were required by CDC to document COVID-19 vaccination in their medical records within 24 hours of administration and in their jurisdiction's immunization information system (IIS) within 72 hours of administration during the public health emergency. IISs are confidential, computerized, population-based systems that collect and consolidate vaccination data from providers in 64 public health jurisdictions and can be used to track vaccines administered across multiple provider types and measure vaccination coverage. The 64 jurisdictions comprise the 50 U.S. States, eight U.S. territories and freely associated states (i.e., American Samoa, Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, Palau, Puerto Rico, and the U.S. Virgin Islands), and six local jurisdictions (Chicago, Illinois; Houston, Texas; New York, New York; Philadelphia, Pennsylvania; San Antonio, Texas; and Washington, D.C.).

submitted to CDC by each jurisdiction,[†,§] for doses administered from September 1, 2022 (the date CDC first issued the recommendation for COVID-19 bivalent vaccination for persons aged ≥12 years) (*3*), through September 30, 2023. Data were analyzed across six age cohorts (6 months–4 years, and 5–11, 12–17, 18–49, 50–64, and ≥65 years), sex, seven categories of race and ethnicity (Hispanic or Latino, non-Hispanic American Indian or Alaska Native [AI/AN], non-Hispanic Asian [Asian], non-Hispanic Black or African American, non-Hispanic Native Hawaiian or other Pacific Islander, non-Hispanic other [other], and non-Hispanic White [White]), and urban-rural classification,[¶,**] based on the county where the vaccine dose was administered. Data were analyzed using Microsoft SQL Server Management Studio (version 18; Microsoft) and are descriptive in nature. This activity was reviewed by CDC, deemed not research, and was conducted consistent with applicable federal law and CDC policy.[††]

Results

Approximately 59.8 million bivalent COVID-19 doses were administered in the United States during September 1, 2022–September 30, 2023, including 40.5 million (67.7%) doses administered by FRPP partners. A total of 694 records were excluded from the FRPP database and 113 from the all-provider database because age data were invalid.

By age group, the highest percentage of COVID-19 bivalent doses administered by FRPP partners was to persons aged 18–49 years (70.6%), and the lowest was to children aged 6 months–4 years (5.9%) (Table 1). More than two thirds of males (66.9%) and females (68.6%) were vaccinated through FRPP partners. By racial and ethnic group, the highest proportions of bivalent COVID-19 doses administered by FRPP partners were among Asian (60.2%) and White persons (56.2%), and the lowest proportions were among AI/AN persons (21.9%) and persons of other races (22.3%). The percentage of doses administered to persons with unknown race and ethnicity was higher in the FRPP data (29.4%) than in the all-provider data (10.9%).

Among the full analytic sample of 59 distinct jurisdictions, all but five (American Samoa, Northern Mariana Islands, Federated States of Micronesia, Marshall Islands, and Palau) had FRPP partners. Among the 54 jurisdictions with FRPP partners, at least one half of bivalent COVID-19 vaccine doses were administered by FRPP partners in 42 (77.8%) jurisdictions. Among the 52 jurisdictions with urban designated areas and the 48 jurisdictions with rural designated areas, the

TABLE 1. Percentage of COVID-19 bivalent vaccinations administered by Federal Retail Pharmacy Program partners and recipient sex, age group, and race and ethnicity — United States, September 1, 2022–September 30, 2023

Characteristic	No. of bivalent vaccine doses administered by all providers	No. of bivalent vaccine doses administered by FRPP partners (%)
Total bivalent doses*	**59,776,140**	**40,458,857 (67.7)**
Sex†		
Female	32,608,792	22,377,327 (68.6)
Male	27,010,446	18,071,154 (66.9)
Age group		
6 mos–4 yrs	600,238	35,114 (5.9)
5–11 yrs	1,752,601	588,776 (33.6)
12–17 yrs	2,141,050	1,158,364 (54.1)
18–49 yrs	15,791,006	11,144,137 (70.6)
50–64 yrs	13,765,721	9,709,461 (70.5)
≥65 yrs	25,725,524	17,823,005 (69.3)
Race and ethnicity[§,¶]		
AI/AN	459,135	100,393 (21.9)
Asian	4,481,430	2,697,529 (60.2)
Black or African American	4,198,748	1,946,903 (46.4)
NH/OPI	134,374	74,571 (55.5)
White	35,294,990	19,826,869 (56.2)
Hispanic or Latino	5,874,775	3,267,637 (55.6)
Other race, NH	2,836,832	632,645 (22.3)

Abbreviations: AI/AN = American Indian or Alaska Native; FRPP = Federal Retail Pharmacy Program; NH = non-Hispanic; NH/OPI = Native Hawaiian or other Pacific Islander.

* A total of 694 records in the FRPP database and 113 in the all-provider database were excluded because of invalid age.

† The sex of the recipient was unknown for 10,376 (0.03%) bivalent vaccine dose recipients reported in the FRPP data and 156,902 (0.26%) recipients reported in the all-provider data.

§ The race and ethnicity of the recipient was unknown for 11,912,310 (29.4%) FRPP dose recipients and 6,495,856 (10.9%) of all-provider dose recipients.

¶ Persons of Hispanic or Latino (Hispanic) origin might be of any race but are categorized as Hispanic; all racial groups are non-Hispanic.

† Although there are a total of 64 IIS jurisdictions, the analytic sample for this report only includes 59 distinct jurisdictions because of local jurisdictional data (i.e., Chicago, Houston, New York City, Philadelphia, and San Antonio) being included within their respective state's data.

§ Bivalent vaccine dose administration data from Idaho and Texas (from persons aged<18 years) were not reported to CDC through their IISs; instead, these jurisdictions submitted their data on bivalent vaccine doses administered using aggregate table shells aligned with the all-provider data for inclusion in the overall data.

¶ The 2013 National Center for Health Statistics (NCHS) urban-rural classification scheme (https://www.cdc.gov/nchs/data_access/urban_rural.htm) was used to classify counties where bivalent COVID-19 vaccine doses were administered in urban and rural categories. Urban counties were defined by combining four of these six categories (large central metropolitan, large fringe metropolitan, medium metropolitan, and small metropolitan), and rural counties were defined based on two categories (micropolitan and noncore). Records with missing administration counties and those lacking NCHS designations were excluded from the urban-rural analyses.

** The overall analytic sample for this analysis was 59 jurisdictions; however, seven U.S. territories and freely associated states (i.e., American Samoa, Northern Mariana Islands, Federated States of Micronesia, Guam, Marshall Islands, Palau, and the U.S. Virgin Islands) lacked urban-rural county level designations. Among the remaining jurisdictions, all 52 contained urban-designated areas; however, four jurisdictions (D.C., Delaware, New Jersey, and Rhode Island) had no rural designations, leaving only 48 jurisdictions represented in the final rural analyses.

†† 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.

proportion of bivalent doses administered by FRPP partners was higher among urban areas (81.6%) compared with rural areas (60.0%) (Table 2). FRPP pharmacies administered ≥50% of bivalent doses in 45 of 52 (86.5%) jurisdictions' urban designated counties and 33 of 48 (68.8%) jurisdictions' rural designated counties.

Discussion

During September 1, 2022–September 30, 2023, FRPP partners administered 40.5 million bivalent COVID-19 doses, representing more than two thirds (67.7%) of all bivalent COVID-19 doses administered across the United States and its territories and freely associated states. In comparison, previous data show that FRPP partners administered 45% of monovalent doses during February 11, 2021–January 31, 2022 (*2*). Factors that might have contributed to the higher proportion of bivalent compared with monovalent COVID-19 vaccines doses administered by FRPP partners include a higher level of awareness of COVID-19 vaccine availability at pharmacies, ease of accessibility (e.g., extended hours of operation, walk-in and scheduled appointments, and geographically convenient locations), and fewer COVID-19 mass vaccination clinics during this period compared with the time when the original monovalent vaccine first became available (*2*). Although FRPP partners were effective in making COVID-19 vaccines widely accessible, differences in use of FRPP partner vaccination services was observed across age groups, racial and ethnic groups, sex, and urbanicity.

Despite the availability of COVID-19 vaccines through FRPP partners and from other vaccine providers, overall U.S. bivalent vaccination coverage was substantially lower than that of completed monovalent primary COVID-19 vaccination series. Data from CDC's COVID Data Tracker reveal that as of May 11, 2023 (the end date of the public health emergency), 17% of the U.S. population had received the bivalent vaccine,[§§] compared with 69.5% who had completed a primary series. Among persons considering bivalent vaccination, commonly reported barriers to receipt of bivalent COVID-19 vaccine have included being too busy or forgetting to get vaccinated and having concerns related to side effects, whereas the main concerns reported by persons reporting no intent to receive a bivalent vaccine were more often related to trust, belief that vaccination was not necessary, and concerns about safety. However, the results of surveys conducted in March and April 2023 indicate that fewer than 5% of respondents reported access issues of time or costs as concerns, suggesting that access was not a substantial contributor to low vaccination rates (*4*).

[§§] https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total

TABLE 2. Percentage of COVID-19 bivalent vaccine doses administered by Federal Retail Pharmacy Program partners in urban and rural settings — United States, September 1, 2022–September 30, 2023

NCHS designation*	No. of bivalent vaccine doses administered by all providers	No. of bivalent vaccine doses administered by FRPP partners within geographic designations (%)
Total bivalent doses administered†	**59,776,140**	**40,458,857 (67.7)**
Records excluded§,¶	8,943,617	64,371
Total analytic sample	50,832,523	40,394,486 (79.5)
Administration setting		
Urban	45,848,867	37,404,942 (81.6)
Rural	4,983,656	2,989,544 (60.0)

Abbreviations: FRPP = Federal Retail Pharmacy Program; NCHS = National Center for Health Statistics.

* The 2013 NCHS urban-rural classification scheme (https://www.cdc.gov/nchs/data_access/urban_rural.htm) was used to classify counties where bivalent doses were administered into urban and rural categories. Urban counties were defined by combining four of these six categories (large central metropolitan, large fringe metropolitan, medium metropolitan, and small metropolitan), and rural counties were defined based on two categories (micropolitan and noncore).

† A total of 694 records in the FRPP data and 113 records reported in the all-provider data were excluded because of invalid reported age.

§ A total of 0.2% of records in FRPP data, and 15% of all-provider data were excluded because of missing county or no NCHS designation.

¶ Although the overall analytic sample for this analysis was 59 jurisdictions, seven U.S. territories and freely associated states (i.e., American Samoa, Northern Mariana Islands, Federated States of Micronesia, Guam, the Marshall Islands, Palau, and the U.S. Virgin Islands) lacked urban-rural county-level designations. Among the remaining jurisdictions, all 52 contained urban designated areas; however, four jurisdictions (Delaware, District of Columbia, New Jersey, and Rhode Island) had no rural designations, leaving only 48 jurisdictions represented in the final rural analyses.

FRPP vaccinations were reported for all evaluated demographic groups, including all age groups. However, FRPP partners administered the highest proportion of bivalent vaccine doses to adults, with similar percentages of doses administered to adults in all age groups (range = 69.3%–70.6%). FRPP partners administered a lower proportion of bivalent doses to children aged 5–11 years (33.6%) and 6 months–4 years (5.9%). This difference in percentages of doses administered to adult and pediatric recipients is not unexpected: historically, more adults than children have received annual influenza vaccination at pharmacies (*5*). Surveys conducted during September 2021 found that parents reported a higher level of trust when vaccinating their child at their regular clinic (63%), compared with vaccination at 1) a local pharmacy (34%), 2) a clinic different from their regular one (30%), 3) school with the parent present (25%), 4) temporary mass vaccination clinic (25%), and 5) school without the parent present (15%) (*6*). Pharmacy administration of COVID-19 vaccination to children was possible in part because of the Public Readiness and Preparedness Act, which lowered the age at which children could be vaccinated at pharmacies to 3 years in all states, making COVID-19 vaccination accessible for some age groups not

Summary

What is already known about this topic?

Pharmacies participating in the Federal Retail Pharmacy Program (FRPP) served as integral partners in national efforts to scale up vaccination capacity during the COVID-19 pandemic emergency response.

What is added by this report?

Among 59.8 million COVID-19 bivalent vaccine doses administered in the United States during September 1, 2022–September 30, 2023, 40.5 million (67.7%) were administered by FRPP partners. In urban and rural areas, FRPP partners administered 81.6% and 60.0% of bivalent vaccine doses, respectively.

What are the implications for public health practice?

FRPP partnerships were critical in ensuring access to bivalent COVID-19 vaccination services in the United States and could serve as a model to address vaccination services needs for routine vaccines and during future responses to vaccine-preventable disease emergencies.

typically vaccinated at pharmacies in many states (*7*). Although FRPP helped during this public health emergency, pediatricians, health departments and federally qualified health centers were needed to ensure that young children had adequate access to COVID-19 vaccines.

FRPPs administered a large proportion of COVID-19 bivalent doses to most racial and ethnic groups. However, the proportion was lower for AI/AN persons, a group that might have relied more on Indian Health Service facilities or other vaccine providers.

The FRPPs' contribution to COVID-19 bivalent doses was higher among urban than rural counties. Possible reasons for this difference are the potential higher accessibility of pharmacies in urban areas, as well as the fact that independent pharmacies in rural areas might have been less likely to partner with the FRPP. In addition, factors such as the availability of bivalent COVID-19 vaccines in primary care settings or other settings could have affected the proportion of COVID-19 bivalent doses administered by FRPP partners located in urban versus rural areas (*8*,*9*). Further evaluations are needed to understand the factors contributing to differences in pharmacy provider vaccination among urban and rural residents.

Limitations

The findings in this report are subject to at least four limitations. First, COVID-19 vaccination coverage estimates were not possible using data from this analysis because unique persons vaccinated could not be identified. Second, the age groups used to describe COVID-19 vaccination among younger children include those aged 6 months–4 years. However, FRPP data only include vaccinated children aged ≥3 years, unlike the all-provider data, which included vaccinations administered to children and infants as young as age 6 months. Third, the higher number and percentage of records with race and ethnicity reported as unknown in the FRPP data compared with those in the all-provider data might have resulted in less accurate representation and potential underestimation of FRPP contributions for some racial and ethnic groups. Finally, the National Center for Health Statistics Urban-Rural Classification was developed in 2013, and the urban-rural designations used likely affected these analyses. Several counties classified as rural in 2013 might no longer be rural. In addition, a larger percentage of records were removed from the all-provider data (15.0%) than from the FRPP data (0.2%) because of the lack of matching urban–rural classification. Both factors might have skewed the overall pharmacy contribution, particularly in examining the percentage of urban and rural doses administered by FRPP partners.

Implications for Public Health Practice

FRPP partners were critical in ensuring access to bivalent COVID-19 vaccination services throughout the United States. This partnership could serve as a model to address vaccination services needs for administration of routinely recommended vaccines and potential future responses to vaccine-preventable disease emergencies. Further strategies to support improvement in race and ethnicity data collection and reporting, particularly in pharmacy settings, are needed to help guide public health practices. Although the public health emergency has ended, the need to ensure that the U.S. population has equitable access to all recommended vaccines, including COVID-19 vaccines, remains. FRPP demonstrated that partnering with pharmacies, in addition to other vaccine providers, can help accelerate vaccine access provision across the United States and address other potential infectious diseases-related public health emergencies.

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Notice to Readers

Change in Publication Date of QuickStats

Effective this issue, *MMWR* will publish QuickStats on a bimonthly basis, in the first and third issues of each month. QuickStats will continue to present concise data from CDC's National Center for Health Statistics on a wide range of timely and important health topics. To supplement QuickStats, a detailed table will be posted in CDC Stacks and linked to each QuickStats.

Erratum

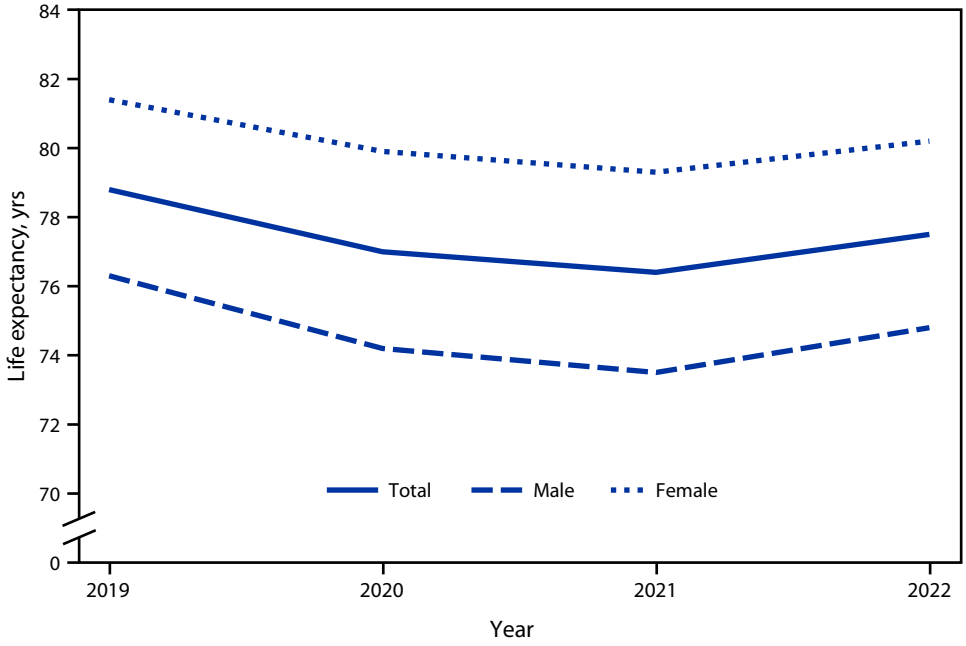
Vol. 71, No. 19

In the report, "Notes from the Field: Trends in Gabapentin Detection and Involvement in Drug Overdose Deaths — 23 States and the District of Columbia, 2019–2020," on page 664, in the fifth paragraph, the first sentence should have read, "The percentage of deaths **with gabapentin detected that were opioid-involved** remained consistently high, ranging from 85% to 90%."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Life Expectancy at Birth, by Sex — United States, 2019–2022



Life expectancy at birth for the U.S. population in 2022 was 77.5 years, an increase from 76.4 years in 2021. Although life expectancy rose in 2022 for the first time since the COVID-19 pandemic began, it remains lower compared with prepandemic life expectancy in 2019 (78.8 years). This pattern was similar for males and females.

Supplementary Table: https://stacks.cdc.gov/view/cdc/151563

Sources: National Vital Statistics System, United States Life Tables, 2021 (https://www.cdc.gov/nchs/data/nvsr/nvsr72/nvsr72-12.pdf); Mortality in the United States, 2022 (https://www.cdc.gov/nchs/products/databriefs/db492.htm).

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