

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.

*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.

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%.

[†]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.