

Summary report on the
**Twenty-fourth
intercountry meeting
for directors of
poliovirus laboratories
in the WHO Eastern
Mediterranean Region**

Amman, Jordan
18–20 August 2025



**World Health
Organization**

Eastern Mediterranean Region

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1. Introduction

The twenty-fourth intercountry meeting of directors of poliovirus laboratories in the WHO Eastern Mediterranean Region was convened by the WHO Regional Office for the Eastern Mediterranean in Amman, Jordan, on 18–20 August 2025.

The objectives of the meeting were to:

- review the performance of the regional poliovirus laboratory network;
- discuss new developments in poliovirus diagnostics, including emerging methods and technologies; and
- formulate strategic recommendations to enhance laboratory performance in support of global polio eradication efforts.

The meeting was attended in person by the directors of poliovirus laboratories from Egypt, Jordan, Kuwait, Morocco, Saudi Arabia, Syrian Arab Republic, Sudan and Tunisia. Also present were scientists from: the Medicines and Healthcare Products Regulatory Agency (MHRA), United Kingdom of Great Britain and Northern Ireland; the National Institute of Public Health and the Environment (RIVM), Netherlands (Kingdom of the); and the Kenya Medical Research Institute (KEMRI), Kenya. Staff from WHO headquarters, the WHO Regional Office for South-East Asia and the WHO Regional Office for the Eastern Mediterranean were also in attendance.

The directors of poliovirus laboratories from the Islamic Republic of Iran, Pakistan and Oman, as well as scientists from the Centers for Disease Control and Prevention (CDC), United States of America, joined the meeting virtually.

Dr Hamid Jafari, WHO Regional Director for Polio Eradication, welcomed participants and emphasized the importance of the meeting in advancing polio eradication goals. He expressed appreciation for the

strong performance of the regional laboratory network in delivering timely and accurate results.

Dr Hanan Balkhy, WHO Regional Director for the Eastern Mediterranean, welcomed attendees and reaffirmed WHO's continued commitment to polio eradication. She stressed the critical role of high-quality laboratory work and surveillance in achieving and sustaining eradication efforts across the Region.

Dr Rayad Anwar Al-Shabul, Secretary-General of Epidemiological Affairs at the Ministry of Health, Jordan, welcomed delegates and reaffirmed Jordan's strong commitment to polio eradication. He highlighted the country's continued support in testing samples from the Gaza Strip and Yemen at the National Polio Laboratory in Jordan during critical outbreak periods.

Dr Iman Shankiti, WHO Representative to Jordan, acknowledged the Ministry of Health's leadership and commended the National Polio Laboratory in Jordan for its excellent performance and support to neighbouring countries, reinforcing regional solidarity in the fight against polio.

2. Summary of discussions

Status of polio eradication

Globally, only Afghanistan and Pakistan remain endemic for wild poliovirus type 1 (WPV1), reporting 31 cases in 2025 to date (four in Afghanistan and 27 in Pakistan).

Additionally, 38 countries have experienced outbreaks of circulating vaccine-derived poliovirus (cVDPV), including:

- four countries with circulating vaccine-derived poliovirus type 1 (cVDPV1);
- 36 countries with circulating vaccine-derived poliovirus type 2 (cVDPV2); and
- two countries with circulating vaccine-derived poliovirus type 3 (cVDPV3).

In 2024, there were 464 acute flaccid paralysis (AFP) cases associated with cVDPV: 11 cVDPV1, 448 cVDPV2 and five cVDPV3 cases. In 2025 to date, 150 cVDPV-related AFP cases have been reported, including two cVDPV1, 143 cVDPV2 and five cVDPV3 cases.

In the Eastern Mediterranean Region, ongoing cVDPV outbreaks continue in Djibouti, the occupied Palestinian territory, Somalia, Sudan and Yemen.

Molecular epidemiology of WPV1

WPV1 circulation continued in 2025 following the resurgence of poliovirus cases in 2023–2024. Phylogenetic analyses indicate that WPV1 isolates detected in 2023 belong to the YB3A4A and YB3A4B clusters. Due to the very high intensity of transmission in late 2023 and throughout 2024, the YB3A4A cluster was further subdivided into five subclusters (YB3A4A1–YB3A4A5) and YB3A4B was split into three subclusters (YB3A4B1–YB3A4B3). Among these, YB3A4A3 appeared as the most predominant cluster in 2025. Currently, transmission is mostly concentrated in Karachi and southern Khyber Pakhtunkhwa in Pakistan and in the southern region of Afghanistan, with occasional spillovers to other geographies.

Vaccine-derived polioviruses

Djibouti is experiencing concurrent outbreaks of cVDPV2 and cVDPV1. The cVDPV2 outbreak is genetically linked to cross-border importations from Yemen (YEM-TAI-1), Somalia (SOM-BAN-1) and Ethiopia (ETH-TIG-1), indicating regional virus movement. The cVDPV1 viruses have been detected only through environmental surveillance, between February and May 2025, with nucleotide divergence of 34–42 changes from the Sabin type 1 strain. These viruses are not linked to any known genetic lineage and have been designated as the DJI-DJI-1 emergence.

In the occupied Palestinian territory, cVDPV2 linked to Egypt's EGY-NOR-1 strain was detected in the Gaza Strip in 2024. Despite conflict, transmission was successfully halted with no cases reported for four consecutive months.

The cVDPV2 outbreak in Somalia, ongoing since 2017, is the longest recorded cVDPV2 outbreak globally. Sequencing indicates genetic divergence of up to 84 nucleotide changes from the Sabin type 2 strain. While transmission remains largely confined to south central Somalia, spillover cases have occurred in Ethiopia and Kenya. Most transmission in Somalia is linked to the SOM-BAN-1 emergence. Another distinct emergence, SOM-BAY-1, was detected in December 2023, with the last isolate identified in May 2024, showing 16–23 nucleotide changes from the Sabin strain.

In Sudan, the cVDPV2 emergence known as SUD-RED-1 was first detected in sewage samples from the Red Sea region in 2023, with the last detection in January 2024. SUD-RED-1 was subsequently identified in Egypt and Yemen, indicating cross-border transmission likely driven by population movement. In addition, Sudan reported new cVDPV2 isolates in 2025, genetically linked to viruses from Chad belonging to the

CHA-NDJ-1 emergence group. These isolates showed nucleotide divergence of 10–25 changes, suggesting ongoing transmission and evolution. These detections underscore significant immunity gaps in Sudan and highlight the urgent need to strengthen surveillance systems and enhance vaccination efforts to prevent further spread.

The cVDPV2 outbreak in Yemen, which began in 2021, has caused more than 425 paralytic cases to date and is designated as the YEM-TAI-1 emergence. In addition, the SUD-RED-1 emergence, imported from Sudan in November 2023, is circulating in Yemen, showing nucleotide divergence of up to 27 changes from the Sabin strain. Continued circulation exhibits divergence ranging from 7 to 27 nucleotides, with the latest detection in March 2024. Transmission of cVDPV is primarily confined to northern Yemen, where vaccination response efforts have not yet been implemented.

Immunodeficiency-related vaccine-derived poliovirus surveillance

In the Eastern Mediterranean Region, immunodeficiency-related vaccine-derived poliovirus surveillance (iVDPV) surveillance is being expanded to strengthen detection of chronic excretors. Egypt, the Islamic Republic of Iran, Pakistan and Tunisia have well-established iVDPV surveillance, while Oman and Qatar initiated surveillance in 2025. Across the Region, the iVDPV surveillance system has identified 2025 registered primary immunodeficiency cases and one chronic excreter, an iVDPV3 case from the Islamic Republic of Iran.

Environmental surveillance

Environmental surveillance plays a vital role in polio eradication by detecting silent circulation of both wild and vaccine-derived polioviruses, complementing AFP surveillance. Currently, 17 of the 22 countries and territories of the Eastern Mediterranean Region have

functional environmental surveillance systems, with further expansion underway. These efforts will enhance surveillance sensitivity, thereby enabling earlier virus detection and faster outbreak response.

Nine of the 12 regional poliovirus laboratories have capacity to test environmental samples. Key laboratories, including a newly established facility in Oman, shared insights on testing and operational challenges. The Regional Reference Laboratory in Egypt highlighted VDPV2 detection in the absence of AFP cases, and the Regional Reference Laboratory in Pakistan compared the bag-mediated filtration system (BMFS) with the grab sampling method, noting that grab sampling is operationally simpler and more practical to implement, and that while BMFS offers higher theoretical sensitivity it is more resource-intensive and operationally demanding, so that in practice it is equally sensitive to grab sampling.

Challenges to scaling up environmental surveillance include high laboratory workloads, limited space, staffing shortages and logistical barriers, especially in conflict-affected settings. Despite this, laboratory performance remains strong, supported by WHO through training, technical guidance and on-site mentoring to ensure alignment with Global Polio Eradication Initiative (GPEI) and Global Polio Laboratory Network (GPLN) standards. The need for close coordination between surveillance teams and laboratories, prioritization of critical samples and real-time feedback was emphasized. Continued investment in infrastructure, workforce and supply chains is essential to maintain high-quality environmental surveillance in support of polio eradication.

Polio laboratory network performance

The Eastern Mediterranean Region Polio Laboratory Network (EPLN) continues to demonstrate strong technical capacity and resilience in support of polio eradication. All functional laboratories remain WHO-

accredited, meeting global standards for timely and accurate poliovirus detection and reporting.

Despite increased workloads and operational challenges, the Network maintains high performance in accreditation, quality assurance and timeliness, in alignment with the Global Polio Surveillance Action Plan 2025–2026.

Key laboratories, such as the national polio laboratories in Jordan and Oman and the regional reference laboratories in Egypt and Pakistan, are providing critical cross-border support to conflict-affected settings such as Afghanistan, the Gaza Strip, Sudan and Yemen, thereby ensuring continuity of surveillance during crises. Similarly, KEMRI in Kenya supports countries in both the WHO African and Eastern Mediterranean regions, including Djibouti and Somalia.

This regional collaboration underscores the strength of the EPLN as a unified and responsive system, committed to ensuring that no country is left behind in the global fight to eradicate polio.

Laboratory quality assurance

Annual proficiency testing remains a cornerstone of the EPLN quality assurance framework, ensuring accuracy and consistency across laboratories. Three proficiency testing panels assess performance in virus isolation, intratypic differentiation (ITD)/VDPV screening via real-time reverse transcription-polymerase chain reaction (rRT-PCR), and poliovirus sequencing. The proficiency testing programme is coordinated by WHO in collaboration with global specialized laboratories in the Netherlands (Kingdom of the) and the United States of America. Laboratories also complete a standardized cell sensitivity test as part of the accreditation process.

At the time of reporting, seven of 11 laboratories in the Region had successfully passed the virus isolation proficiency test; four were awaiting panel delivery due to shipping delays. All laboratories participated in ITD/VDPV testing, with 10 passing and the National Polio Laboratory in Jordan awaiting final scores. In the sequencing test, laboratories in Oman, Pakistan and Tunisia achieved scores of 100%, while Egypt and the Islamic Republic of Iran were awaiting panel distribution.

These outcomes reflect the EPLN's strong technical capacity and commitment to continuous improvement, ensuring high-quality, reliable surveillance for poliovirus detection across the Region.

Cell sensitivity

Cell sensitivity testing remains vital for ensuring that cell lines used in poliovirus isolation retain high sensitivity and accuracy. This requires ongoing training, adherence to best practices and strong documentation.

A key challenge is mycoplasma contamination, which can compromise cell performance and virus isolation. Hard to detect and easily spread, contamination can halt laboratory activities, require disposal of stocks and necessitate full decontamination, causing major operational disruptions. To mitigate this risk, polio laboratories have adopted preventive measures such as sourcing certified mycoplasma-free cell lines, limiting passage numbers and conducting regular in-house PCR testing. When contamination occurs, laboratories respond with decontamination procedures, cell line replacement and specimen retesting to ensure data integrity.

These experiences highlight the need for continuous vigilance, sustained investment in diagnostics and cross-network knowledge sharing to maintain reliable poliovirus surveillance.

Polio nucleotide sequence database (PoNS)

The meeting highlighted PoNS as a pivotal tool for strengthening molecular epidemiology and global coordination of poliovirus sequencing data. Developed with input from CDC experts, PoNS offers a centralized and secure platform for uploading, managing and analysing sequence data.

PoNS ensures data accuracy, standardization and integrity, and includes advanced features such as automated phylogenetic tree generation, integration of metadata and support for complex recombinant sequences. Laboratories in Egypt, Pakistan, Oman and other countries expressed readiness to adopt the system, recognizing its value in enhancing cross-border data sharing and outbreak response.

The long-term goal is for PoNS to serve as a global sequencing database, enabling rapid detection of poliovirus globally and reinforcing molecular surveillance as a core pillar of polio eradication.

Research and development of direct detection methods

Direct detection methods – direct detection intratypic differentiation (DD-ITD) and direct detection nanopore sequencing (DDNS) – are being introduced as innovative approaches in poliovirus diagnostics. These techniques bypass the virus isolation step by applying molecular testing directly to stool samples and are currently undergoing validation.

Laboratories in Egypt, Oman and Pakistan are actively involved in validation studies, while Afghanistan and Yemen have begun implementing direct detection workflows alongside standard WHO protocols, supported by continuous monitoring and data review.

Key challenges have been identified, including invalid results from low virus concentrations, RNA extraction difficulties and supply chain issues for reagents. Corrective actions, such as automated extraction systems, optimized protocols and support from developers, have helped to address many of these problems.

While direct detection testing holds significant promise, it was underscored that substantial work is still required before these methods become acceptable and/or recommendable for use within the GPLN.

Participants reaffirmed the need for continued validation, harmonization of protocols and expanded training to accelerate the adoption of direct detection methods across the GPLN, ensuring their consistency and reliability before large-scale roll-out and implementation.

Poliovirus containment

Containment remains essential to preventing the reintroduction of poliovirus from laboratories and other facilities holding infectious or potentially infectious materials. All countries in the Eastern Mediterranean Region have completed initial facility surveys, and most have reported the destruction of nonessential materials.

However, challenges persist, including incomplete data submissions, limited staff awareness, high turnover of national polio containment coordinators and slow adoption of the electronic containment database.

Laboratories were reminded to maintain updated inventories, conduct risk assessments using the 16-element framework and document the destruction of materials. Strengthening biosafety, biosecurity, staff immunization and record-keeping were emphasized as critical for effective risk mitigation.

The meeting participants called for regular annual national surveys, improved data quality and strict adherence to global containment guidelines. Stronger coordination between national polio containment coordinators, national certification committees, national task forces and laboratories will be key to close existing gaps and align with the GPEI's containment strategy.

3. Way forward

Laboratory infrastructure and human resources

1. Laboratories are encouraged to identify suitable national service providers for the maintenance and certification of biosafety cabinets and to communicate any challenges to the regional laboratory coordinator.
2. Poliovirus antibody testing should be conducted for all polio laboratory staff and their immune status against all three poliovirus serotypes documented to determine potential immunization needs. The WHO Regional Office will liaise with CDC for concurrence, and laboratories will submit dried blood spot samples of all staff to CDC in accordance with Guidance Paper 3.

iVDPV surveillance

3. WHO will work with countries that have primary immunodeficiency surveillance to review existing systems and coordination mechanisms and recommend actions to streamline iVDPV surveillance into the poliovirus surveillance system.
4. All countries with established iVDPV surveillance should use WebIFA to streamline data flow.
5. Identified countries should initiate iVDPV surveillance.

Contingency planning

6. WHO headquarters will explore alternative supply sources for ITD and sequencing kits for poliovirus diagnostics and will coordinate with RIVM to finalize a material transfer agreement for the preparation and validation of ITD kits and sequencing primers.

Guidelines and manual

7. The draft of the fifth edition of the laboratory manual will be shared with laboratories for review and to identify any missing information.
8. In-house mycoplasma testing for cell cultures is currently practiced in some laboratories in the African regional network. The Eastern Mediterranean regional laboratory coordinator will liaise with the African regional laboratory coordinator to compile existing practices, protocols, primers and test sensitivity, and WHO headquarters will coordinate and lead the development of standardized operating procedures and tools for mycoplasma testing.

Environmental surveillance

9. The global laboratory coordinator at WHO headquarters will provide quarterly updates on progress in guidelines and frameworks for multi-pathogen detection through environmental surveillance.
10. Grab and BMFS sewage collection methods are equally sensitive. Grab sampling is the recommended method, while BMFS may be used in specific circumstances with concurrence from the Regional Office.
11. Pakistan should discontinue duplicate sampling (grab and BMFS) and adopt grab sampling as the routine standard method, given its ease of collection.

12. The polio programme should continue research and development of more sensitive environmental surveillance methods for the post-eradication era.

Quality assurance

13. The 2025 virus isolation proficiency testing panel is expected to be available by September 2025. The regional laboratory coordinator, in coordination with RIVM and participating laboratories, will review shipment bottlenecks and streamline processes.
14. Laboratories are required to respond promptly to correspondence from RIVM and provide the green light once the necessary documents are secured from the relevant authorities to ensure seamless panel delivery.
15. Laboratories must participate in the 2025 environmental surveillance proficiency testing (ESPT), which will help to identify weaknesses, improve performance and evaluate the consistency of the panel. ESPT will be taken into consideration in the annual accreditation process in the future.

Polio nucleotide sequencing database

16. All sequencing laboratories in the Region have agreed to upload both historic and current VP1 sequences to the PoNS database, together with relevant metadata, which is expected to be operational by September 2025. The WHO Regional Office, in coordination with CDC, will develop a regional roll-out plan including a webinar.

Direct detection

17. EPLN laboratories in Egypt, Oman and Pakistan will continue to support validation of both direct detection methods under

development through parallel testing against the WHO-recommended testing algorithm.

18. Based on the overall results of parallel testing presented by the method developers, there is still substantial work required before these methods become acceptable and/or recommendable for use within the GPLN. A clear communication strategy should be developed to outline the status, challenges, timeline and expectations for rollout of direct detection methods.
19. The Regional Office will coordinate with WHO headquarters to develop a road map for full implementation of these methods in non-GPLN direct detection laboratories once either of the two methods, which are currently under research and development, is accepted or recommended by the GPLN's strategic working group.

Containment

20. All laboratories should conduct risk assessment using the approved risk assessment tool and develop a mitigation plan based on the identified gaps and deficiencies.
21. Laboratories should implement stringent containment measures to prevent and minimize the risk of breaches.
22. As an essential pillar of polio eradication and part of polio containment, laboratories should support and assist national polio containment coordinator activities.

Integration

23. The Regional Office, in coordination with WHO headquarters and laboratories, will develop a framework for the integration of poliovirus laboratories with other laboratories and broader surveillance activities.



World Health Organization
Regional Office for the Eastern Mediterranean
Monazamet El Seha El Alamia Street,
Extension of Abdel Razak El Sanhoury Street
P.O. Box 7608, Nasr City
Cairo 11371, Egypt
www.emro.who.int