Report of the Eighteenth Meeting of the Technical Advisory Group on Polio Eradication for Pakistan (TAG)

MEETING REPORT

ISLAMABAD | PAKISTAN

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polio global eradication initiative

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SHOWCASING **REGIONAL SOLIDARITY** FOR A LASTING **POLIO-FREE WORLD**

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Islamabad, Pakistan
24 – 26 June 2025

Acknowledgement

The Technical Advisory Group (TAG) for Polio Eradication in Afghanistan and Pakistan appreciates the strong commitment of the Government of Pakistan towards polio eradication. The TAG appreciates all Chief Secretaries including Chief Commissioner Islamabad for their oversight and recognizes their engagement and support to the programme. The TAG also appreciates the extraordinary efforts of the national and provincial Emergency Operations Centers.

The TAG acknowledges the extremely challenging conditions in which frontline workers and security personnel are performing their duties, ranging from extreme heat to insecurity, leading to the tragic loss of life in certain incidents, and appreciates their relentless hard work despite difficult circumstances. The TAG underscores that the safety of frontline workers should remain the programme's top priority. The TAG offers its condolences to the families of the frontline workers and security personnel who have lost their lives in the line of duty and honours their sacrifice.

The TAG also wishes to acknowledge support of the Global Polio Eradication Initiative (GPEI) donors and partners: Rotary International, United Nations Children's Fund, Gates Foundation, US Centers for Disease Control and Prevention, Gavi, and World Health Organization.

The TAG appreciates the participation of GPEI partner representatives from Afghanistan. The TAG appreciates the support of the TAG Secretariat for organizing the meeting.

Table of Contents

Acronyms

AFP	Acute flaccid paralysis
AIC	Area-In-Charge
AJK	Azad Jammu and Kashmir
***b*OPV**	Bivalent oral polio vaccine
CDC	Centers for Disease Control and Prevention
C-LQAS	Cluster Lot Quality Assurance Sampling
cVDPV	Circulating vaccine-derived poliovirus
COMVI	Community-led vaccinations initiative
EMR	Eastern Mediterranean Region
EOC	Emergency Operations Centre
EPI	Essential Programme on Immunization
ES	Environmental surveillance
ES+	Positive environmental surveillance sample
FDI	Federal Directorate of Immunization
FFM	Fake finger marking
FLW	Frontline worker
GF	Gates Foundation
GPEI	Global Polio Eradication Initiative
ICM	Intra-campaign monitoring
IPC	Interpersonal communication
IPV	Inactivated polio vaccine
ISD	Integrated service delivery
KP	Khyber Pakhtunkhwa
LPUC	Low-performing union council
LQAS	Lot Quality Assurance Sampling
MMP	Migrant and mobile population
NA	Not available
NEOC	National Emergency Operations Centre
NID	National Immunization Day
ODK	Open Data Kit
OPV	Oral polio vaccine
PCM	Post-campaign monitoring
PEI	Polio Eradication Initiative
PEOC	Provincial Emergency Operations Center
PMC	Persistently missed children
SAGE	Strategic Advisory Group of Experts
SBC	Social behaviour change
SBCC	Social behaviour change communication
SIA	Supplementary immunization activity
SMC	Still missed children
SNID	Subnational Immunization days
South KP	South Khyber Pakhtunkhwa
TAG	Technical Advisory Group
UC	Union council
UNICEF	United Nations Children's Fund
VAPP	Vaccine-associated paralytic poliomyelitis
VfM	Value for money
WHO	World Health Organization
WPV1	Wild poliovirus type 1

Executive Summary

The Technical Advisory Group (TAG) on Eradication of Poliomyelitis in Pakistan was convened from 24 to 26 June 2025 against a backdrop of significant shifts in the global health and funding landscape. Whilst global and regional commitment to polio eradication remains a top priority, the coming period leading to the next low season in early 2026 represents the critical window within the current global strategy, for interrupting poliovirus transmission in the country. If goals are not achieved within this timeframe, loss of donor confidence and declining resources will make the achievement progressively more challenging.

Over the past six months, the programme has made substantial progress across provinces, with considerable efforts undertaken at all levels to implement the TAG's recommendations made in January 2025. However, the epidemiological milestones set at that time have not been achieved (see below), and key operational benchmarks for supplementary immunization activities (SIAs) quality still require further strengthening to ensure consistent campaign access and uniformly high-quality campaigns across the country, particularly in the core poliovirus transmission areas.

The TAG calls for urgent, relentless, sustained and focused efforts to further drive up the basic operational elements that determine programme quality. There is no room for complacency. Failure to implement even small but essential improvements in campaign quality will likely result in failure to meet the national and global eradication goals. With increasing pressure on funding, the programme must seize this opportunity to streamline activities, concentrating only on those evidenced to contribute directly to its core objectives – maximising immunization of children and ensuring interruption of transmission.

Assessment of TAG Epidemiological Milestones set in January 2025

Milestones to be Achieved by June 2025	Achieved (Yes, No)	Assessment	Status
Interrupt transmission in the northern corridor (Peshawar bloc).	No	One of five lineages persists.	
Interrupt transmission in Punjab/Islamabad (Lahore, Rawalpindi/Islamabad).	No	Persistent transmission (Lahore).	
Interrupt transmission in Central Pakistan zone (northern Sindh, southern Punjab, and eastern Balochistan).	No	Re-established transmission in four districts.	
Decreasing frequency of ES detections and number of active lineages in Karachi and Quetta blocs.	No	Persistent circulation in all zones.	
Decreasing frequency of ES detections and number of active lineages in south KP.	No	Expanding transmission and active polio outbreak in south KP.	
Prevent persistence of transmission in any district that detects WPV.	No	Kambar and Mirpurkhas have sustained transmission.	

South Khyber Pakhtunkhwa (south KP) remains a major concern for the entire global polio eradication programme due to continued intense transmission and its role as a major source of virus spread. Since 2018, 41% of all polio cases in Pakistan and 85% of cases in the Khyber Pakhtunkhwa (KP) province have originated from this region, underscoring its central role in sustaining transmission. This emphasizes the urgency to vaccinate all children in this geography.

Planning and action, based on the recommendations set out in this report, are needed today. The programme must work through suggested improvement strategies and ensure the necessary quality of operational fundamentals: faultlessly planned and executed SIAs, with well-trained, supervised vaccinator teams; intensified efforts to strengthen essential immunization particularly in marginalized and access-challenged areas; only rigorously justified exceptions to unified campaign modalities; targeted additional vaccine strategies such as Inactivated Polio Vaccine (IPV); and engaged, informed and open communities.

Continuing transmission coming out of the next low season (October 2025 – March 2026) not only needlessly, puts the life chances of Pakistan's children at risk, but it places the country programme's entire investment – paid, over many decades, in blood, sweat and tears – in potentially fatal jeopardy. And with it, the prospects for a polio-free world.

Epidemiology: The resurgence of poliovirus cases in 2023–2024 appears to have peaked, except in south KP. There have been no polio cases detected from Peshawar (since 2020), and Karachi in 2025, to-date. However, environmental samples remain positive throughout the country reflecting continued and widespread poliovirus transmission, particularly in key geographies including Karachi and Quetta blocs, Lahore and Central Pakistan districts, due to persistent immunity gaps. Lahore now has persistent transmission for 12 months, thus acquiring endemic status. The recent case from a known high-risk district (Diamer, Gilgit Baltistan), linked to virus spread from the Karachi reservoir, reaffirms the critical importance of reliable surveillance and a robust migrant populations strategy. Within a single epidemiological bloc, progress in Pakistan remains tied to what happens across the border in Afghanistan.

In **Khyber Pakhtunkhwa**, south KP remains the pre-eminent threat to eradication – both for Pakistan and the entire global initiative. The conclusion is stark. Progress on access and on high-quality SIAs must be made without delay. This should not, though, imply lesser concern for risk in other geographies, in particular Karachi and Quetta blocs. In accessible areas of south KP (Green Union Councils[1]), there is no real excuse for suboptimal SIAs. In Union Councils (UCs) with access limitations, the community-led vaccinations initiative (COMVI) has enlarged access but must now be developed both in terms of credible monitoring and requisite operational standards of training, microplanning and accountability. In inaccessible (Black UCs), complementary

[1] Green Union Councils in South KP are areas which can implement 3+2 house-to-house campaigns without facing access issues.

activities through the Essential Programme on Immunization (EPI) and ISD need to be intensified alongside relentless efforts to secure access for house-to-house SIAs needed to interrupt wild poliovirus transmission. Peshawar continues to do well but remains vulnerable particularly due to inaccessibility in Khyber.

In **Balochistan**, risk dynamics in Quetta bloc remain exceptionally high, with SIAs and surveillance still below the quality needed. High quality surveillance, analysis, local engagement and action are urgently needed in eastern Balochistan (extended into Central Pakistan) and in bordering districts, with close coordination with the Afghanistan polio programme and with intense attention to migrant and mobile populations (MMPs) and guest children.

In **Sindh**, despite recent relatively high-quality SIAs, and multiple complementary initiatives, wild poliovirus type 1 (WPV1) detections remain widespread across the province. Too many children continue to be missed in Karachi, and Karachi continues to generate risk both within the province and nationally given its historical capacity to amplify and spin out virus across the country, as evidenced by Diamer and Torghar.

In **Punjab**, SIA quality in Lahore is unacceptably low, with a resulting shift to endemic status, for the first time since 2014. In addition, SIA quality has been persistently suboptimal also in **Islamabad**. The recent case in **Gilgit Baltistan** demonstrates the capability of poliovirus to find and exploit any and every gap in programme defences, requiring a strong operational response and fine-tuned surveillance here as well as in **AJK**.

Programme monitoring strategies need to be reviewed and tightened to ensure credibility of SIA quality indicators. Lot quality assurance sampling (LQAS) remains a valid and reliable signal for the programme to evaluate and track SIA quality over time. Considering the important role, it plays, methodology and validation need closer and continuous analysis to ensure continued reliability at this stage of the programme. At the same time, the programme has come to place too much emphasis on only looking at the outcome measures (LQAS passing, still missed children, etc.). These are vital, but insufficient for the programme to understand the programmatic inputs that determine whether a high-quality SIA outcome is achieved. Programme leaders and government officials responsible for programme oversight need to focus much more rigorously on the critical inputs enabling optimal operational quality. In particular, this means: microplanning validation; ensuring quality of frontline vaccinators – the training, capacity and supervisory plan and support which determine the outcome on the doorstep between frontline workers (FLW) and parents; develop metrics to capture this for corrective action, immediately during and between campaigns, including by optimizing use of digital tools for real-time monitoring and follow-up on team performance.

Social and Behavioural Change Communication (SBCC) has evolved a large spread of strategic foci and associated initiatives. There is a critical need – and opportunity – to better leverage, integrate and rationalize these efforts to ensure absolute focus on activities which can be evidenced to directly support SIA outcomes. SBCC should concentrate, beyond individual refusals, on engaging with communities to ensure vaccinators can reach every eligible child, and on supporting improvement in FLW capacity on the doorstep. Systematic use of robust social analyses — triangulated with epidemiological and surveillance data — should directly inform FLW training, supervision and the design of tailored interventions. It is also essential to maintain continuous community engagement during SIA planning and between campaigns, particularly in high-risk areas. At a broader public level, SBCC can drive proactive analysis of misinformation, supporting the development of timely, evidence-based responses. SBCC efforts should be evaluated against measurable outcomes (e.g., improved acceptance and coverage, reduced still missed children, knowledge uptake, etc.), with data-driven course correction.

Over time, the polio workforce has become too large and unwieldy, undermining efficient and **effective performance management.** It is essential, at this juncture, that the programme is both agile and able to optimize the use of all available resources. As implementation of the recent workforce review proceeds, however, care must be taken to minimize or mitigate disruption to frontline workers, especially in the highest risk areas.

In view of continuing widespread poliovirus detections alongside high and rising SIA quality, and the likely contribution of infection among older children with waning immunity in this dynamic, in specific areas of Karachi, Lahore and Peshawar, a campaign using IPV for children four months to 15 years in selected high-risk geographies is warranted – if full analysis of opportunities and risks affirms feasibility. **Expanded age group IPV** should not be viewed as 'the magic bullet' – it is not. But it may provide an additional edge in urban areas with continuing poliovirus transmission and disease detection. It is not a replacement for maximising SIA quality, a proven strategy to interrupt transmission, and must not distract from those efforts.

Progress continues to be made on **essential immunization** and the EPI system with strong commitment and resources allocations by provinces. But progress is very slow, and access and outreach in some critical areas (e.g., Balochistan and south KP) remain inadequate. Improving routine coverage to 80% is fundamental to eradication. Synergy between Polio Eradication Initiative (PEI) and EPI can import the urgency and accountability of polio into the culture of EPI, through prioritized action in focused localities. Integration is the key step in system building, from recruitment to operational planning and monitoring.

The TAG recommends prioritization of SIAs, with an intense vaccination schedule for the next 12 months (National Immunization Days (NIDs) followed by targeted mop-up campaigns followed

by NIDs) to fully capitalize on the opportunity of the low season and end transmission in 2026. This should be complemented by other vaccination opportunities, where feasible.

The **programme's 'roadmap'** to the end of the next low season signals clarity of leadership and of purpose. Its success depends heavily on the detailed development, through inclusive consultation, to identify and guide strategic approaches and actions which will raise operational quality to a level never achieved consistently and uniformly across the country before. It will need continuous, credible monitoring to track impact and modify strategy in real-time, supported by regular interaction with the TAG throughout the roadmap period to help identify problems and find solutions. A high-resolution, milestone-based roadmap is essential to coordinate and monitor progress across all levels of the programme. Success will depend on unwavering commitment of political and administrative leadership at national, provincial, and district levels; efficient strategies; nimble and agile implementation structure; and shared determination of the Government of Pakistan and Global Polio Eradication Initiative (GPEI) partners. Details are described in detailed report below.

The next TAG meeting will be convened in February 2026. The TAG members will be available for interim, ad hoc consultations, to review progress in implementation of the 'roadmap'.

Introduction

The Technical Advisory Group on Eradication of Poliomyelitis (TAG) was convened in Islamabad, Pakistan, from 24 to 26 June 2025, under the auspices of the Regional Director of the World Health Organization (WHO), Eastern Mediterranean Region (EMR) on behalf of EMR Member States and the Global Polio Eradication Initiative (GPEI). The TAG is an independent body that advises and makes recommendations to the relevant authorities in Afghanistan and Pakistan and to the GPEI partners on national polio eradication policies, strategies, and operations.

Global and regional context

The timing of this TAG meeting was especially critical considering the significant shifts in global health financing, with direct consequences on polio eradication efforts and reduced funding for GPEI's extended strategy 2022-29[2]. Partner agencies are undertaking reprioritization and cost-cutting measures and remain committed to sustaining core operations and protecting gains made against polio, despite tightening budgets.

During the 76th World Health Assembly held in Geneva, polio eradication remained a top priority. Member States noted that the world stands at a crossroads. Sustained commitment and strategic investments are essential to ensure polio eradication becomes a reality. At the Assembly, stakeholders were urged to consider innovative financing approaches, through integrating polio into broader health financing instruments, debt swaps, or catalytic investments. Under these circumstances, sustaining confidence directly depends on demonstrating tangible results towards eradication of polio.

Objectives

The objectives of the TAG meeting in June 2025 were to:

- Assess progress towards polio eradication and determine whether the programme in Pakistan is on or off track to interrupt wild poliovirus type 1 (WPV1) transmission by the end of the next low season.
  - Assess progress in each epidemiological zone against the milestones set by the TAG in January 2025.
  - Evaluate the effectiveness of the '2-4-6' strategy in Pakistan against the benchmarks recommended by the TAG in January 2025.
  - Assess operational modalities and discuss strategic adjustments to ensure alignment with eradication goals and fiscal constraints.
- Review the 'roadmap to zero polio' and the supplementary immunization activities (SIAs) schedule for the next 12 months.

[2] In 2024, the Polio Oversight Board (POB) officially extended the GPEI's 2022-2026 Strategy to the end of 2029.

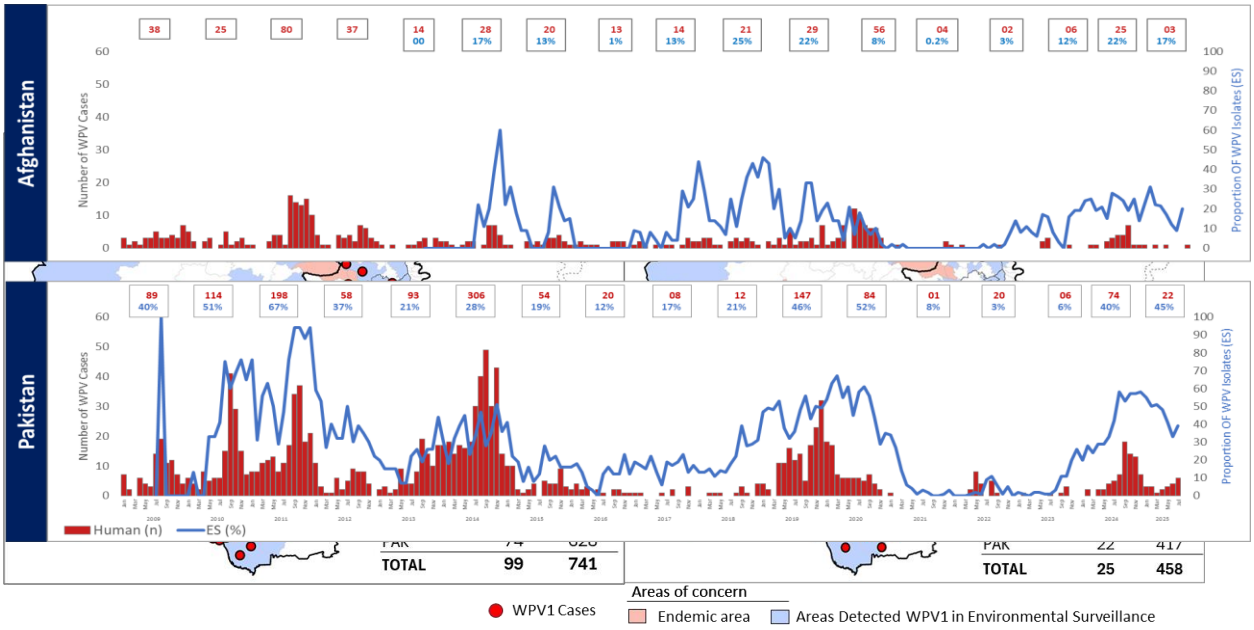
Epidemiological Overview of WPV1

Persistent circulation and widespread detection of WPV1 continued in the joint epidemiological bloc of Afghanistan and Pakistan. Between 1 January and 31 July 2025, Pakistan reported 22 WPV1 cases (Khyber Pakhtunkhwa (KP) 14, Sindh 6, Gilgit Baltistan 1, Punjab 1) and 417 WPV1 positive environmental surveillance samples (ES+) in 79 (out of 159) districts, while Afghanistan reported three polio cases (South Region 1, West Region 2) and 41 ES+ from 10 out of 34 provinces. Figure 1 shows the distribution of polio cases and areas with detection of WPV1 in environmental surveillance (ES) in 2024-25.

Figure 1: WPV1 polio cases in Afghanistan and Pakistan, January 2024 – July 2025

The outbreak starting in 2023 has peaked in 2024 and the WPV1 epidemiological curve shows a steady decline (see Figure 2). However, there is a recent resurgence of poliovirus in south Khyber Pakhtunkhwa (south KP).

Figure 2: WPV1 cases and proportion of ES+ in Afghanistan and Pakistan, January 2009 –July 2025



In early 2025, when the TAG members met in Islamabad in January and in Kabul in February, the TAG recommended a set of benchmarks and milestones, to reverse the epidemiological trends and to restore confidence among regional Member States and international donors, alongside ensuring that GPEI remains on track to achieve a polio-free world within the revised timeline. However, these milestones have not been met in June 2025, as shown in Table 1.

There is progress in Peshawar bloc, with only one out of five lineages persisting. Other endemic zones have ongoing circulation as follows:

- **Karachi bloc** has four lineages of YB3A4A cluster and one lineage of YB3A4B, pointing towards persistent immunity gaps in this area.
- **Quetta bloc** has five different chains of transmission, reflecting continued transmission in the current low season.
- **South KP** has seven transmission chains of YB3A4A cluster. This expansive transmission of WPV1 is due to the immense immunity gap in south KP, warranting serious concern over the persisting challenges in access. South KP remains a major threat to global polio eradication.
- The most significant epidemiological development is the establishment of endemic transmission in **Lahore** district, as this is an area which has not sustained endemic transmission since 2014. Lahore has two distinct transmission chains of YB3A4A, one of which had been persistent for 12 months.

Kambar and Mirpurkhas, Dera Ghazi Khan, Dera Bugti, Loralai, Jacobabad, and Usta Muhammad districts have sustained transmission outside endemic zones.

Table 1: Assessment of milestones set in January 2025

Milestones to be achieved by June 2025	Achieved (Yes, No)	Assessment	Status
Interrupt transmission in the northern corridor (Peshawar bloc).	No	One of five lineages persists.	
Interrupt transmission in Punjab/Islamabad (Lahore, Rawalpindi/Islamabad).	No	Persistent transmission (Lahore).	
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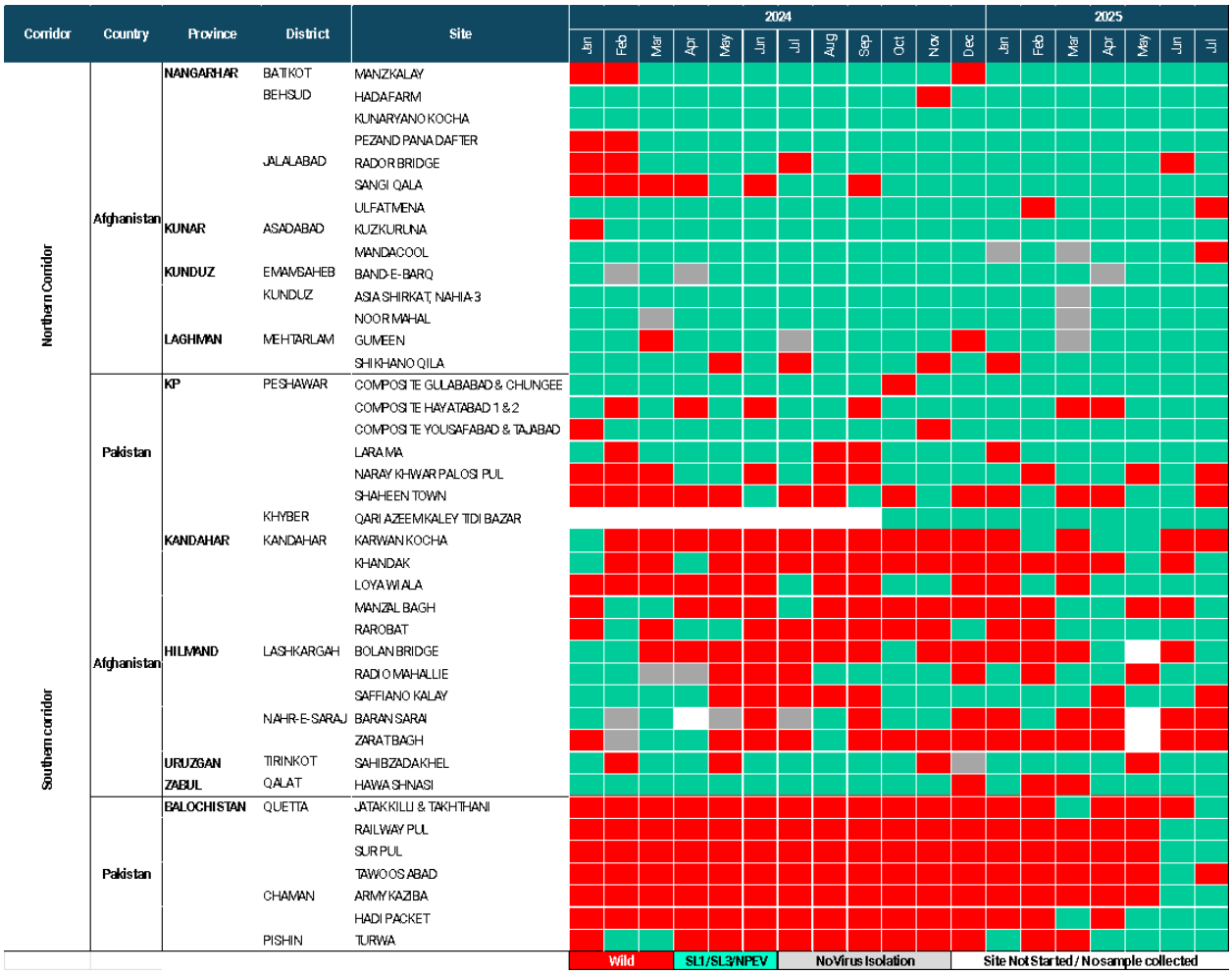
Decreasing frequency of ES detections and number of active lineages in south KP.	No	Expanding transmission and active polio outbreak in south KP.	
Prevent persistence of transmission in any district that detects WPV.	No	Kambar and Mirpurkhas have sustained transmission.	

Overall, there is progressive reduction in the frequency of WPV1 detections in the northern corridor. The southern corridor shows ongoing active cross-border sharing of poliovirus between the Quetta bloc of Pakistan and the South Region of Afghanistan. Table 2 shows the poliovirus detections in ES across the northern and southern corridors. Detailed epidemiological updates will be provided for each province under the relevant sections.

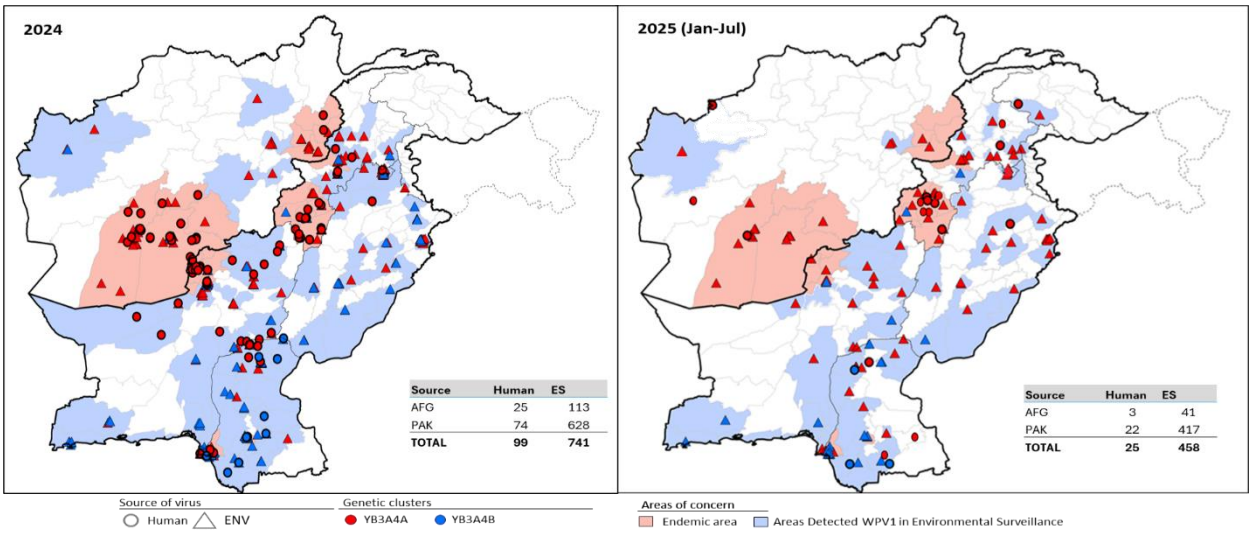
Table 2: WPV1 detections in ES in the northern and southern corridors, January 2024 – July 2025



Repeated detections of orphan and long chain orphan viruses in certain geographies, especially in border areas and Central Pakistan, require a careful review to ensure all subdistricts and subpopulations are included in the surveillance system. A few long chain/orphan viruses in both countries raise suspicion of low-grade circulation, most likely in border areas and moving population.

As of 31 July 2025, there were two genetic clusters circulating in Afghanistan and Pakistan: YB3A4A, detected in both countries and having wider geographical distribution, and YB3A4B, largely restricted to Sindh province (see Figure 3).

Figure 3: WPV1 polio cases and ES+ by genetic cluster in Afghanistan and Pakistan, January 2024 – July 2025



During the TAG meeting, a new genetic clustering was presented by the Regional Reference Laboratory for Polioviruses Pakistan, in collaboration with the Centers for Disease Control and Prevention's (CDC) Global Specialized Polio Lab. The new clustering shows that the genetic diversity of WPV1 has increased from two to eight clusters due to the very high intensity and geographic extent of transmission in late 2023 and through 2024. YB3A4A is split into five clusters and YB3A4B into three clusters. This report features the epidemiological situation according to the previous clustering, which was being adopted at the time of presenting the analyses to the TAG. An overview of the new WPV1 molecular epidemiology is provided in Annex 1.

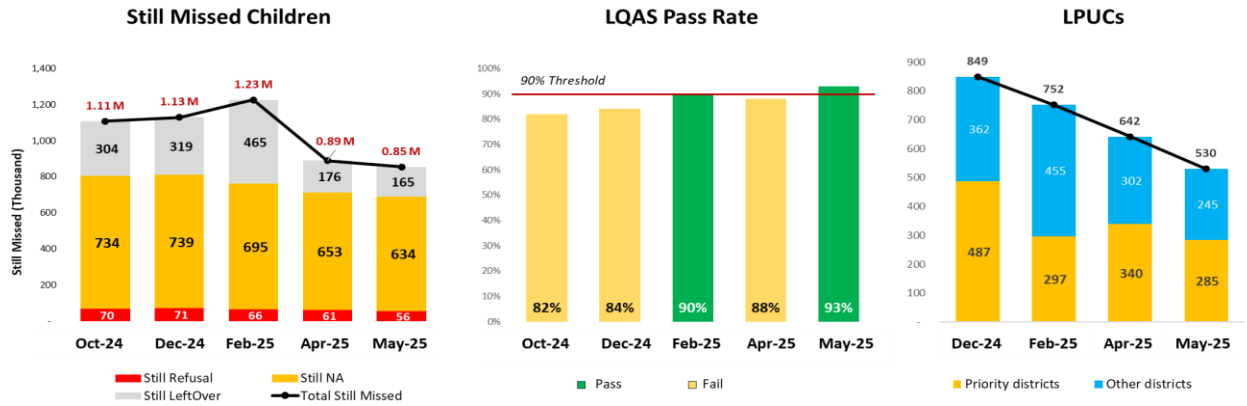
Programme Quality and Operational Overview

Review of the '2-4-6' Strategy

In January 2025, the TAG reviewed the '2-4-6' Strategy and recommended programmatic benchmarks and epidemiological milestones to enhance the quality of SIAs and reverse the current epidemiological trends. These benchmarks and milestones were reviewed in June and the TAG concluded that the programme had demonstrated some progress against the recommended SIA benchmarks, but not all benchmarks have been met. Despite encouraging progress, the epidemiological milestones have also not been achieved. The TAG noted that the future trajectory is dependent on the programme's ability to rigorously implement, review, and adjust its strategies to focus on those with strongest evidence of positive impact.

Data presented by the national and provincial teams on SIA results show progressive improvement in the reduction of still missed children (SMC) at district level, improvement in Lot Quality Assurance Sampling (LQAS) survey pass rates over the last three campaigns, and a decline in the number of low-performing union councils (LPUCs) (see Figure 4). These are encouraging trends. The reduction in SMC is promising and outlines the programme's increased focus on frontline workers' (FLWs') training and additional strategies using digital technology to reach missed children. However, given the pace and scale of the virus transmission, the TAG underscored that the programme still needs to rapidly achieve a level of SIA quality it has not achieved to date – focusing particularly on the highest level of quality in core SIA inputs, specifically around the function of FLWs, as the essential components of a programme ready to interrupt transmission.

Figure 4: Trends of SMCs, LQAS and LPUCs in Pakistan (October 2024 – May 2025)



Use of Lot Quality Assurance Sampling

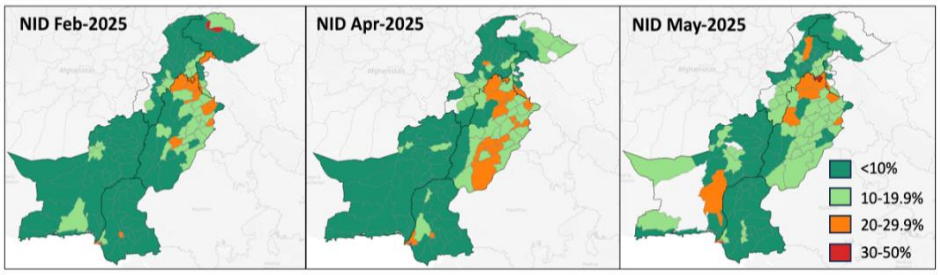
Since its formal adoption in 2009, the GPEI has integrated Cluster LQAS (C-LQAS) as a cornerstone monitoring tool for SIAs [see Annex 2]. This integration has been pivotal in generating more reliable and actionable quality data compared to previous monitoring approaches. Despite its significant benefits, LQAS implementation is not without challenges. These challenges include inherent limitations related to missing children in households at the time of survey, non-respondent households, data interpretation (where classification is prioritized over precise estimation), risk of misclassification, complexities arising from population heterogeneity within defined lots, and various operational hurdles encountered in diverse and often challenging field settings.

In Pakistan, the country team has recognized that up to 30% of a sample (household) may be skipped in a lot (Union Council) despite the statistical underpinning that requires every member of a lot be assessed. Data from the past three campaigns show significant variability in the percentage of non-respondent households (see Figure 5), raising questions on the interpretation

and validity of the LQAS, requiring further review. Factors under review include number of non-respondent or skipped households and the weighted number of missing children.

Nonetheless, despite the limitations, LQAS still remains an indispensable and valid tool for improving outcomes in complex operational settings by enabling timely and targeted resource allocation.

Figure 5: Proportion of non-responsive households, Pakistan (February – May SIAs)



Non-Response Rate (LQAS)	Difference Between Feb & May NIDs
<10%	-20%
10-19.9%	+24%
20-50%	+10%
>50%	*No Considerable difference*
Total Lots	-5%

Recommendations – LQAS

Based on the above, the TAG recommends:

- Conducting a deeper analysis of methodological issues, in particular non-respondent rates.
- Continuing efforts to enhance understanding and refine LQAS methodologies to address the missing children.

Ensuring operational excellence

Post campaign monitoring (PCM) and LQAS results underscore the need for earlier identification and correction of gaps in factors that determine the quality of SIAs (see Figure 6). Intra-campaign monitoring (ICM) is not independent, and data shows discordance between government and partner observations. Clear, credible and coherent data tracking is needed for both input and output SIA performance indicators to ensure optimum programme quality management and delivery.

Structured, continuous assessment of SIA input management is illustrated in Figure 7 below, showing how senior government and programme leadership can and must scrutinise core campaign quality inputs leading to desired outcomes between and during SIA implementation to enable rapid, real-time correction where deficiencies are found.

The TAG concluded that LQAS continues to be a reliable gold standard for assessing trends in campaign quality. The programme has developed a rich data system for monitoring programme performance at the level of outcomes. But an emphasis on outcome measures is insufficient for the programme at this stage. The TAG commended the National Emergency Operations Center (NEOC) for sponsoring a comprehensive monitoring and evaluation review to consolidate this area of work. The review should encompass all phases of the SIAs (end to end processes).

Figure 6: The proportion of unvaccinated children due to operational failures in ICM and LQAS

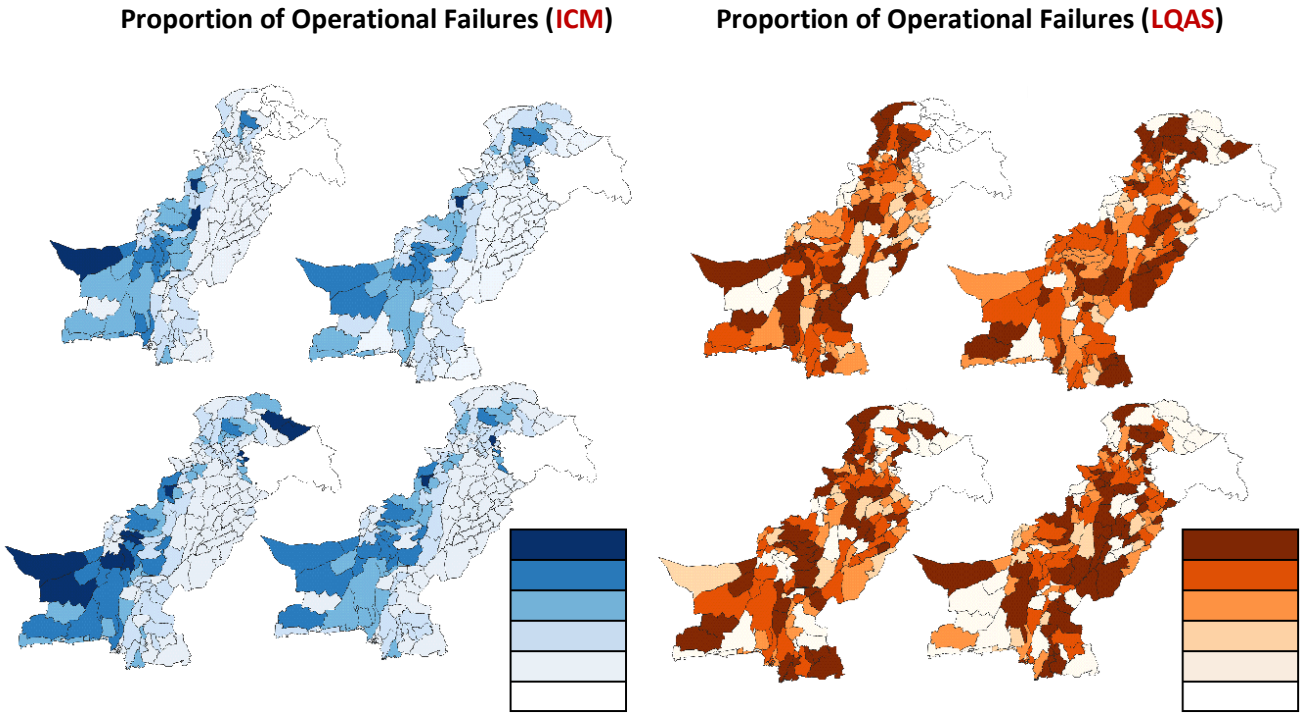
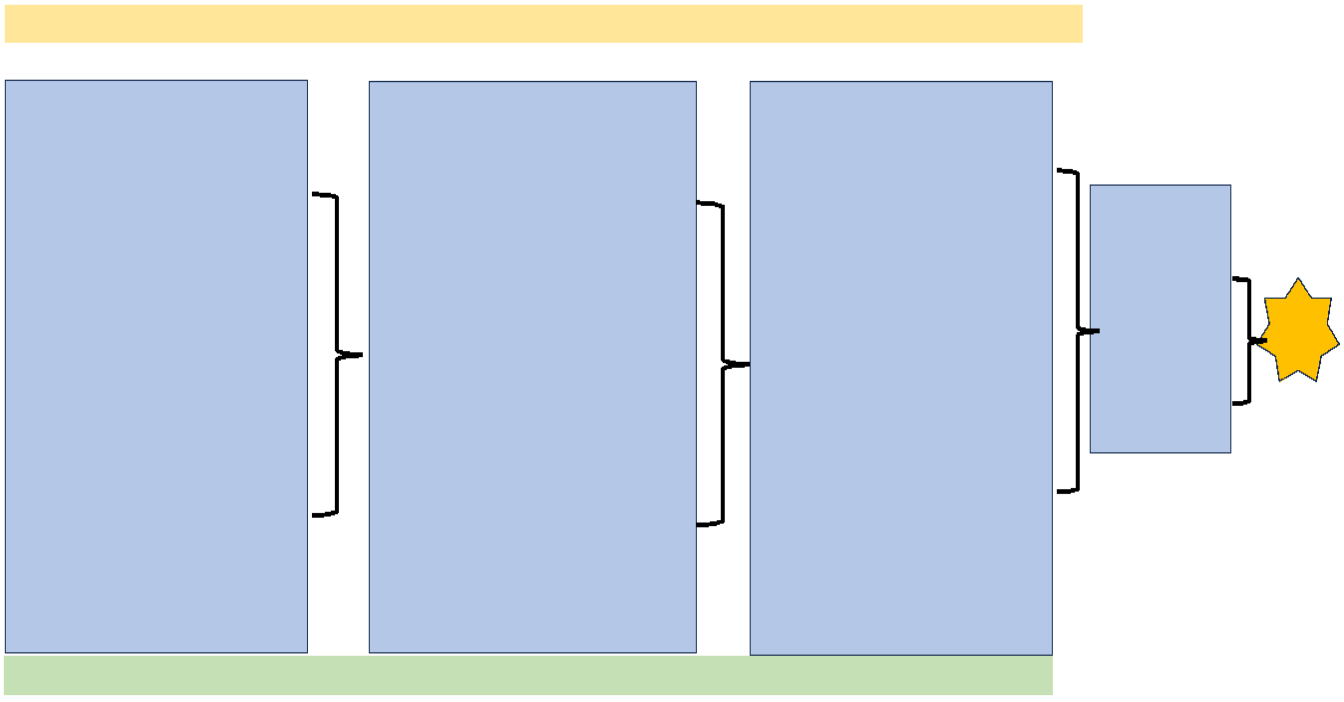


Figure 7: An Example of Input Management of SIAs[3]



[3] NA = Not Available; FFM = Fake Finger Marking; PCM = Post Campaign Monitoring; SBC = Social Behavioural Change.

Recommendations – Operational Excellence

- The TAG endorses plans for comprehensive review and updating of the current monitoring strategies and emphasizes the need for stronger focus on real-time campaign implementation, improving quality of training and supervision, enhanced monitoring of the pre-campaign preparedness with a laser focus on FLWs capacities and performance in different phases of SIA implementation. The TAG recommends that monitoring mechanisms must trigger actionable and timely responses to identified gaps / under-performance to ensure closing operational gaps quickly.
- The TAG recommends creating an independent operational monitoring approach for the high-risk areas, which should have the following features:
    - Deployed through independent third-party in selected high-risk areas.
    - Track a core set of five to eight SIA input indicators. For example: sample microplanning field validation by independent monitors (including migrant and mobile populations (MMPs), guest children); acute attention to FLWs training quality (pre- and post-test results, simulation exercises; and trainers' feedback); percent vaccinators switched prior to campaign; percent trained vaccinators in vaccination teams; interpersonal communication (IPC) skills of vaccinators; correct administration of polio drops; timely payment of FLWs, etc.
    - Link FLWs training and supervisory quality directly to campaign outcomes, specifically coverage of all eligible children in all eligible households in team catchment areas.
    - Use Open Data Kit (ODK) data for real-time monitoring and follow-up on performance of the FLWs.
    - Emergency Operation Centers (EOCs) to further develop their dashboards to include SIA quality input data (as per the recommendation above), uploaded daily to District and Provincial Operations Centers for immediate corrective action before and during campaigns.
    - These data would sit on the dashboard alongside LQAS results, enabling joint analysis of SIA input and outcome quality, with much more rapid implementation of SIA quality fixes identified within campaign days, as well as between campaigns.
    - Develop mechanism for digital payment of vaccinators ensuring payment within 10 days from the end of the SIA.
- While LQAS should continue, given its critical role, methodology and validation need closer and continuous analysis to ensure continued reliability at this stage of the programme. There should be an in-depth analysis of non-respondent data in 2024-25 LQAS data and to establish a threshold for non-response that results in a failed lot, and prompts follow up analysis of programme quality shortfalls, at UC level, to feed into improved SIA preparation for subsequent round.

- Conduct an in-depth analysis of non-responding households in priority UCs to assess the extent to which these non-responses reflect vaccine avoidance, families unwilling to respond to an additional door knock, or genuinely absent households.

Social and Behavioural Change Communication

The TAG recognized a wide variety of social and behavioural change communication (SBCC) strategies, initiatives, and activities. It concluded that there is a need, at this vital juncture, to better leverage, integrate, and streamline current SBCC efforts, ensuring a clear focus on activities that demonstrably support SIA outcomes. Three key areas in which the TAG encouraged stronger, more focused SBCC action were on the use of social analysis to feed directly into better FLW training, supervision and support, between and during rounds; continuous engagement at UC and community levels to optimize household and neighbourhood acceptance of vaccine offer when presented during campaigns; and structured analysis and action on forms and effects of misinformation.

Recommendations - SBCC

- Focus on key factors affecting operational viability and overall programme quality, specifically on helping develop FLWs training and supportive supervision (e.g. from Area In-Charge (AIC) level) and metrics by which FLWs performance,for example IPC skills, can be assessed during campaigns. Existing metrics for assessing vaccinator IPC quality should be reviewed and strengthened to establish more robust measures, which can then be used to demonstrate the impact of IPC training on operational performance.
- SBCC should focus on actions that support the campaign operation to access and vaccinate all eligible children in every household, and to track and vaccinate children missed during SIA days. Systematic use of robust social analysis – triangulated with epidemiological and surveillance data – should directly inform and feed into FLWs training and supervision, and the design of tailored interventions. It is also critical to maintain continuous community engagement during planning and between campaigns especially in high-risk areas.
- The TAG advises the programme to develop a clear, evidence-informed strategy to address misinformation, grounded in root cause analysis to enable timely and effective responses.
- In addition, the TAG emphasizes the importance of maintaining feedback with communities through mechanisms such as online/offline social listening, community dialogues, and other participatory approaches, systematically used to adapt strategies and ensure communication is tailored to local contexts, perceptions, and evolving concerns, thereby reinforcing trust and sustaining demand.
- SBCC strategic action framework should be updated and strengthened to demonstrate the effectiveness of SBCC inputs to core programme outcomes – particularly SIA quality – using measurable indicators such as improved IPC, acceptance and coverage, reduced SMC, and

increased knowledge uptake. This data should guide data-driven course correction, support evaluation of SBCC impact and help ascertain whether resources are being concentrated on the most effective interventions. The goal should be to identify and scale two or three high impact, evidence-based intervention areas that drive SIA success.

- Establish a real-time public website updated monthly of results of poliovirus cases and environmental sampling analogous to that for United States wastewater tracking [https://www.cdc.gov/nwss/rv/COVID19-national-data.html] to enhance community engagement and trust, empower communities to make changes about their own health, and for increased transparency, accountability and trust of the myriad of public health workers.

Integrated Service Delivery (ISD)

The programme has evolved a wide range of activities under integrated service delivery (ISD). These services are delivered in multiple geographies, over multiple timeframes, often with limited direct connection to the programme's core goal (maximised coverage and interruption of transmission). With resource cuts, demonstrating direct value of ISD activities to eradication is essential. Improving health and other services can act as the key 'pull' factor drawing households to accept vaccination to complement 'push' of campaign delivery.

Recommendations - ISD

- There should be an impact evaluation of the ISD activities carried out in the last couple of years, specifically concentrating on whether interventions falling under ISD can be associated with improved local SIA coverage outcome data. Lessons should be documented to revise the current ISD strategy and implementation scope and activities. This should include a complete mapping of potential ISD partner agencies, stakeholders, resources and services and community needs (maternal, newborn, and child health, water, sanitation, and hygiene, nutrition, education, electricity, etc.).
- The federal and provincial governments should convene programme and agencies to strategize a multi-sectoral service delivery model to ensure coordination amongst all service providers (in health and beyond health sectors) and delivery of activities in UCs/districts identified as highest-risk and priority by the programme with the aim of building community trust and ensuring reliance by delivering essential services proactively and equitably.

Provincial Findings and Recommendations

Khyber Pakhtunkhwa

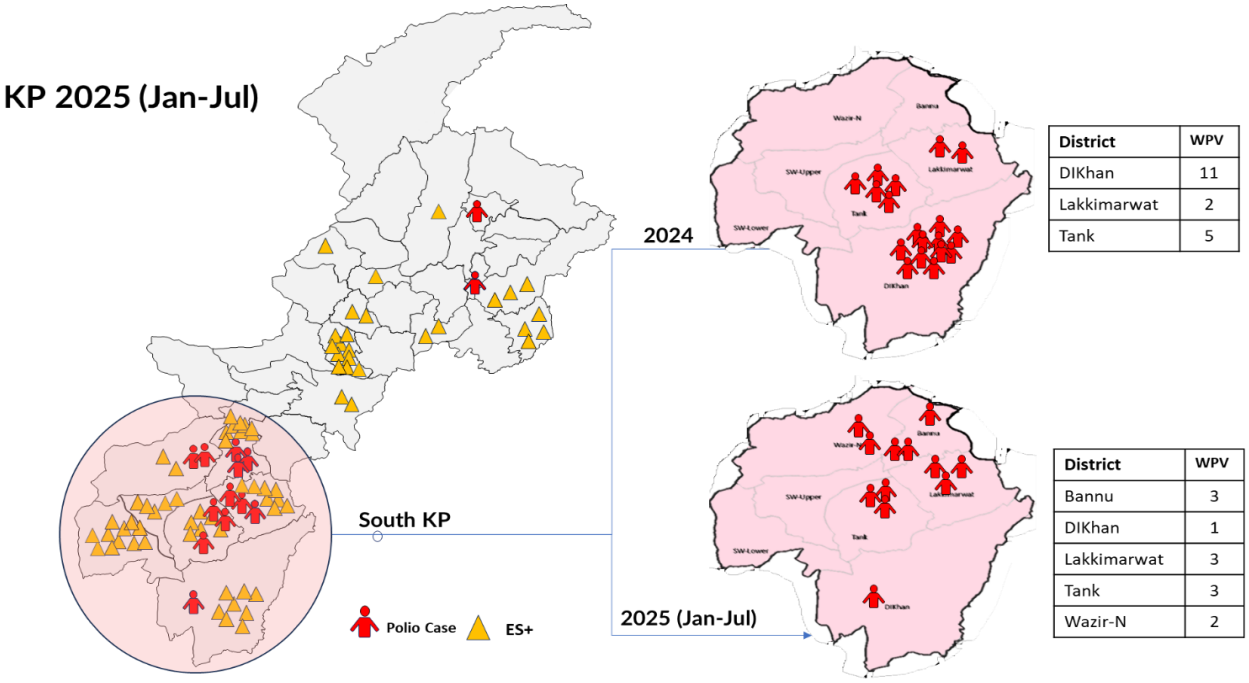
As of 31 July 2025, 14 polio cases have been reported, 12 from south KP and one each from Torghar and Kohistan Lower districts (see Figure 8). Moreover, 76 ES+ were detected across 17 districts. The programme developed a provincial action plan to improve campaign quality and reverse epidemiological trends in KP. The number of SMC has progressively decreased over the past three campaigns, while LQAS pass rates have been consistently above 90%.

South KP

South KP remains the greatest concern for the programme with the most active and expanding transmission of polioviruses, increasing cohort of susceptible children and repeatedly high numbers of missed children due to access constraints and insecurity. Since 2018, 41% of all polio cases in Pakistan and 85% of cases in the KP province have originated from this region.

As of 31 July 2025, 12 polio cases have been reported in 2025 (compared to 18 cases in 2024); three cases each from Tank, Bannu and Lakki Marwat districts, two from North Waziristan and one from DI Khan, as shown in Figure 8. In addition, 49 ES+ samples have been detected to date, from all 13 ES sites in south KP, as shown in Table 3. The characteristics of polio cases show a median age of 17 months and median 3.5 oral polio vaccine (OPV) doses.

Figure 8: WPV1 detections in KP (July 2025) and south KP (January 2024 – July 2025)



District	WPV
DIKhan	11
Lakkimarwat	2
Tank	5

District	WPV
Bannu	3
DIKhan	1
Lakkimarwat	3
Tank	3
Wazir-N	2

Table 3: WPV1 detections in ES+ in south KP, January 2024 – July 2025

District	Site	2024												2025						
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
BANNU	HINJAL & NOORABAD																			
	MUSLIMABAD SOKARI																			
DIKHAN	COMPOSITE BUS STAND & MODC																			
	COMPOSITE SHERPAO & ZAFARABAD																			
	PAROA ADDA																			
LAKKIMRWT	SERAI NAURANG																			
	TUBE WELL GALI																			
TANK	GARA KAUROO KHAN																			
WAZIR-N	HAIDER KHEIL CITY																			
	MIRAN SHAH TOWN																			
WAZIR-S Lower	KONRA CHINA & SPAISHTA																			
	QURESHI MOHALLAH																			
WAZIR-S Upper	MAKEEN MARKET																			

Wild | SL1/SL3/NPEV | No Virus Isolation | Site Not Started / No sample collected

The programme has done a categorization of UCs as per the level of accessibility for the polio programme (see Table 4 and Figure 9). Green UCs (with full access), COMVI UCs (where a special intervention that capitalizes on locally-driven and locally-owned campaign implementation is being adopted), and black UCs (where access is compromised). The TAG appreciated this categorization, as well as the comprehensive overview of the efforts and challenges across the three categories.

Table 4: Categorization of UCs in south KP based on SIA accessibility as of June 2025

Category	Details	UCs (Count)	Under 5 Target (Count)	South KP Target (%)
Green UCs	UCs with 3+2 modality and/or full programmatic access	159	725,386	71%
COMVI UCs	UCs where only community led low security signature campaigns can be conducted	80	207,259	20%
Black UCs	UCs completely inaccessible to the programme	26	95,292	9%

Green UCs: There has been an encouraging increase in areas with 3+2 house-to-house campaigns. However, significant quality gaps remain, and the number of missed children is likely substantially higher considering continued limitations on monitoring.

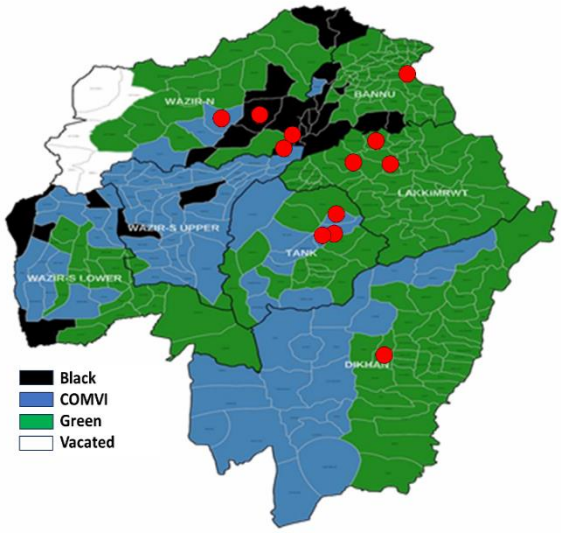
COMVI UCs: COMVI is a promising entry point to communities in the inaccessible areas of south KP. The TAG appreciated the team for this innovative approach with minimal security cover that enabled the first house-to-house SIA in South Waziristan Upper in two and a half years. However, the external monitoring of the vaccination activity was not conducted.

Black UCs: In the black UCs, accessibility remains a significant challenge. A range of ISD and Essential Programme on Immunization (EPI) services are being implemented to reach children.

However, the number of children reached through these activities is modest and not sufficient to build population immunity and stop transmission.

EPI: While the recent joint plan with EPI has led to some improvements in a few UCs of Bannu and DI Khan, a lot more needs to be done for further improvement, prioritizing black UCs. The TAG appreciated the initiative by the Chief Secretary to provide 1,250 vaccinators and resources to improve EPI services. It should be implemented on an emergency footing with black UCs receiving priority.

Figure 9: Categorization of UCs in South KP based on SIA Accessibility, June 2025



Recommendations – South KP

Green UCs:

- Given that the programme now has some access, develop and optimize context-appropriate operational approaches to improve quality and reach of SIAs.
- Develop monitoring mechanisms that are adapted to local challenges and provide reliable information from all areas where 3+2 is being implemented.
- Assess the extent of fake finger marking and other hidden missed children and their root causes, and implement solutions, particularly in Bannu.

COMVI UCs:

- Develop clear criteria for areas that qualify for COMVI and establish an independent inclusion and exclusion mechanism.
- Systematically negotiate and instil key elements of effective SIAs for COMVI, particularly for microplanning, team and supervisor selection, training, monitoring and corrective measures.
- Consider offering at least four opportunities to vaccinate in selected areas through COMVI between now and the end of 2025. These campaigns should include rigorous microplanning, team and supervisor selection and training, and reliable and independent monitoring.
- Four rounds have been implemented without external monitoring. Any subsequent COMVI campaigns should only be implemented when they can be independently monitored.

Black UCs:

- Continue to assess opportunities to implement 3+2 or COMVI.

- Continue efforts to look for influencers for a neutral and low security implementation.
- Enhance efforts for building EPI linked with nutrition services for children where feasible along with expanding existing ISD services.

EPI:

- EPI and PEI staff should partner to develop an emergency plan to rapidly improve EPI coverage and reduce the number of zero-dose children.
- The plan should set time-bound coverage targets, prioritizing high-risk and inaccessible UCs.
- Immunization services should be tightly linked with nutrition services to create demand.
- Recruitment of female vaccinators and nutrition staff must be a priority.
- The Chief Secretary's commitment of resources is an opportunity for all stakeholders to support delivery of EPI and nutrition services beyond the framework of the EPI-PEI Synergy and should be capitalized.

Khyber Pakhtunkhwa (excluding south KP)

As of 31 July 2025, Peshawar bloc detected eight ES+ in 2025 (see Table 5). The frequency of detection of WPV1 isolates has decreased reflecting progress, however, one lineage appears to be persisting, and the bloc remains at risk due to repeated introductions. Moreover, frequent detections of long chain and orphan viruses in ES samples from Peshawar warrant a careful look at the surveillance system in Peshawar and adjoining districts, particularly border districts and MMPs. Regarding SIAs performance, the influencer engagement initiative in Peshawar bloc in the 34 high-risk UCs is yielding encouraging results. Between April and May 2025 campaigns, refusals decreased by 22%, not available (NA) children decreased by 45% and persistently missed children (PMC) decreased by 7%.

Outside Peshawar bloc and south KP, two polio cases and 17 ES+ were detected from eight districts. The cases in Torghar and Kohistan Lower districts reinforce the need for maintaining high routine immunization coverage in all poliovirus transmission-free areas and robust implementation of the MMP strategy by the programme to ensure vaccination of all subpopulations. In addition, the inter-related viruses detected in Hazara division, and a recent orphan virus detected in Mansehra district highlight potential gaps in vaccination and surveillance activities across Hazara division.

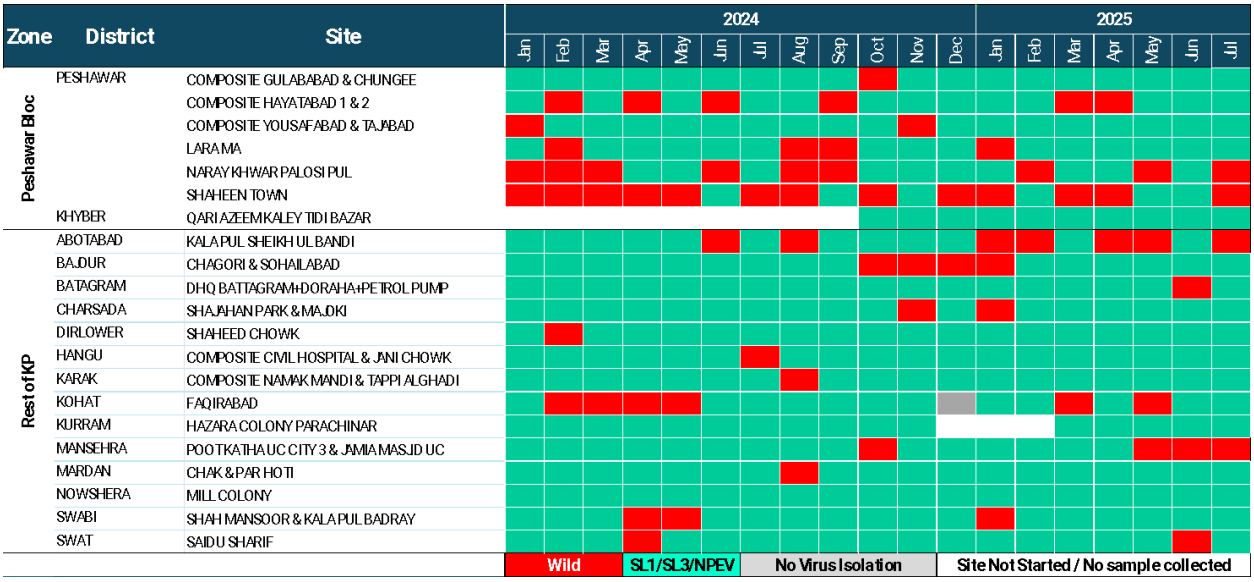
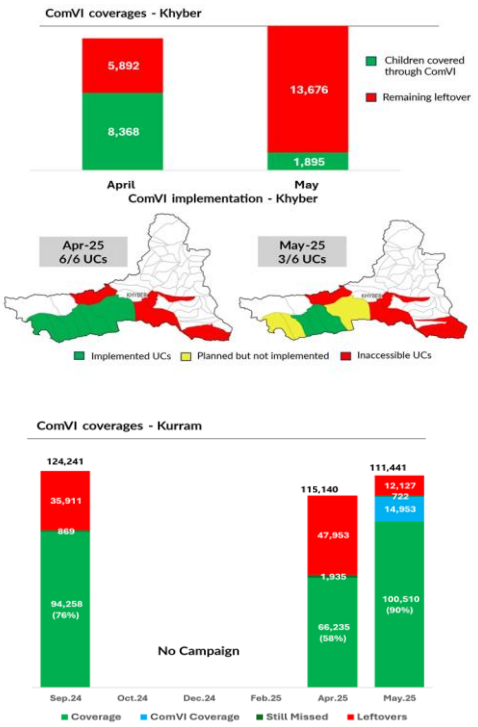


Table 5: WPV1 detections in ES+ in KP (excluding south KP), January 2024 – July 2025

The TAG flagged Hazara division (mainly Abbottabad and Kohistan Upper districts), Khyber and Kurram as well as as geographies of concern. Inaccessibility in Khyber poses a threat to progress in the Peshawar bloc, with 13,676 children were leftover in May campaign due to insecurity across 13 UCs. The programme implemented the COMVI in six UCs of Khyber. In central Kurram, COMVI improved access in 15 union councils in May. However, 12,127 children were still leftover due to inaccessibility, as shown in Figure 10. In addition, Abbottabad and Kohistan Upper (of Hazara division) showed failed LQAS results in February and May NIDs. Collectively, these factors pose a risk to the much-needed progress.

Figure 10: SIA Access in Khyber and Kurram (Districts with COMVI and Leftover Children)



Recommendations – KP (excluding south KP)

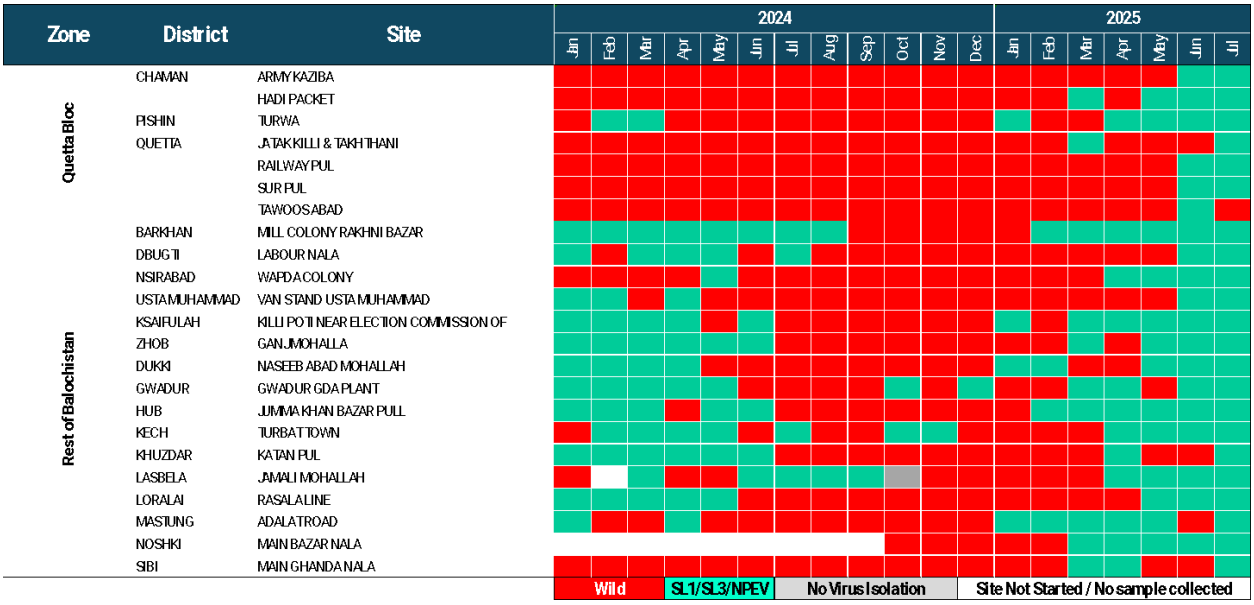
- Establish access in all areas of Khyber and Kurram as soon as possible.

- Current efforts to sustain high quality of SIAs in Peshawar should continue, with particular focus on Shaheen Muslim Town, to ensure interruption of transmission in the bloc.
- SIA operational gaps in Hazara division must be addressed and campaigns monitored closely to ensure timely corrective measures.
- A thorough assessment of surveillance system in Peshawar bloc and Hazara division should be carried out with special focus on subdistricts associated with high-risk MMP subpopulations.

Balochistan

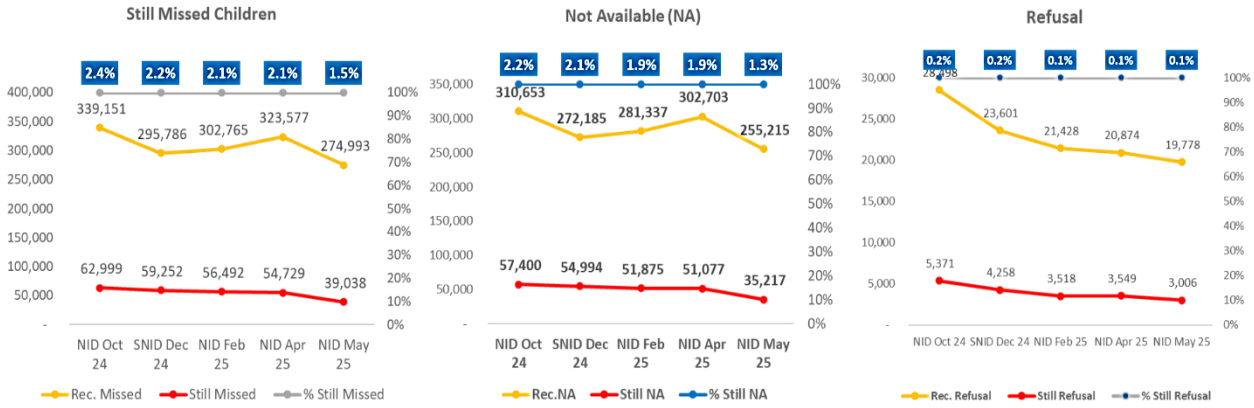
As of the 31 July 2025, Balochistan reported 77 ES+ samples from 19 districts (see Table 6). The last polio case was reported in November 2024. In Quetta bloc, WPV1 transmission has persisted throughout the current low season. There is a decline in the frequency of environmental detections in Balochistan, including Quetta bloc, noting that the re-established transmission in Dera Bugti and Usta Muhammad districts, and the repeated detections in Nasirabad and Zhob division are concerning.

Table 6: WPV1 detections in ES in Balochistan, January 2024 – July 2025



The TAG appreciated the range of interventions deployed to improve SIA quality, noting signs of improvement. While trends of LPUCs, missed children, refusals and NA children show initial signs of improvement as shown in Figure 11, the LQAS data outlines operational gaps. Balochistan was unable to achieve 90% LQAS pass rate in the campaigns.

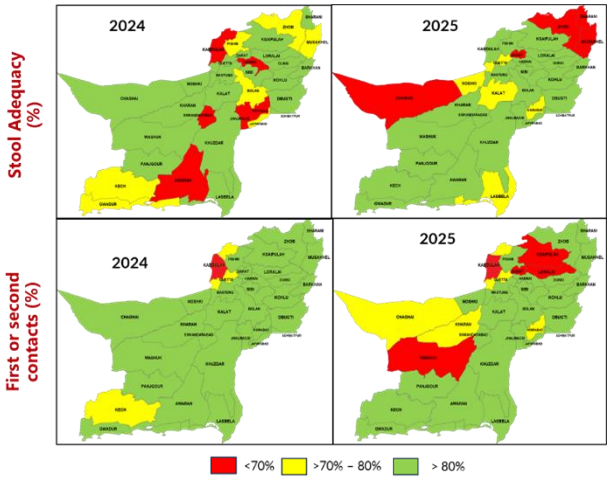
Figure 11: Missed Children, NA, and refusal trends, SIAs September 2024 – May 2025



The TAG noted that SBCC interventions enabled the programme to identify 19,371 hidden children in Balochistan. Furthermore, a range of interventions have been deployed to build trust, address misinformation and reach missed children. Additional activities under ISD and SBCC require a rigorous assessment as the impact on SIA quality has been inconsistent.

The TAG observed that the surveillance system performance at sub-provincial levels is uneven (see Figure 12 for the rate of stool adequacy and proportion of acute Flaccid Paralysis (AFP) cases notified by first two contacts).

Figure 12: Balochistan Stool Adequacy and Notification by First/Second Contact, January 2024 – July 2025



The TAG acknowledges the new investments and emergency push to improve EPI by the Provincial Chief Secretary across all four districts of Quetta bloc and the three surrounding districts in Zhob division to strengthen routine immunization in 7 districts.

Recommendations - Balochistan

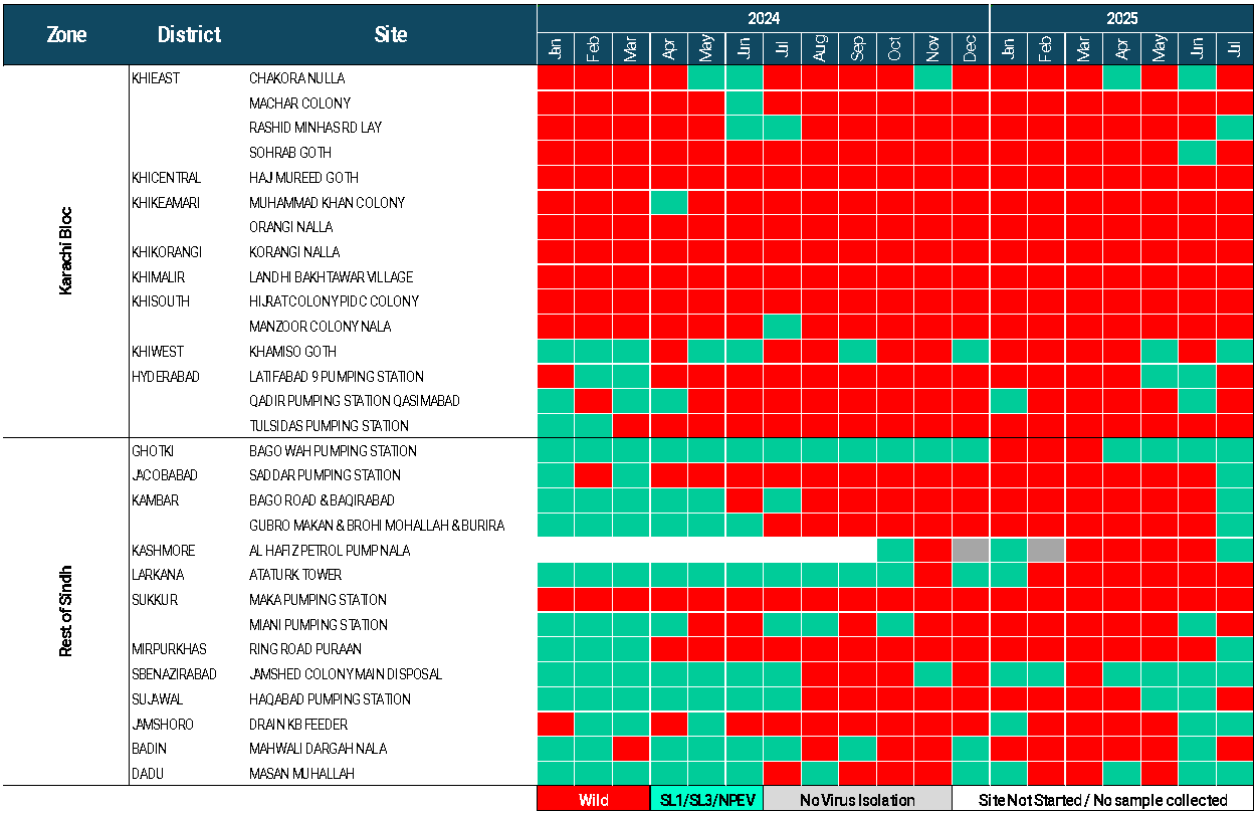
- Continue to improve SIA quality in Quetta bloc.
- Assess operational issues in Dera Bugti, Usta Muhammad, Zhob division and border districts, and address quality issues.
- Ensure investment in SBCC and ISD activities is guided by evidence of positive impact on the programme and develop and consolidate a comprehensive plan for all initiatives by all partners under ISD.

- Identify opportunities to fully support the 7-district emergency EPI implementation under the oversight of the Provincial Chief Secretary.
- For Central Pakistan districts, strengthen interprovincial coordination with Sindh and Punjab, in collaboration with the NEOC.

Sindh

As of 31 July 2025, Sindh reported six WPV1 cases (two in Badin, one each in Kambar, Larkana, Thatta, and Umerkot) and 164 ES+ from 21 districts (see Table 7). Karachi bloc has continuously detected WPV1 in ES in 2025, with no polio cases detected to date, and poses a risk for transmission of virus to other parts of the country as evidenced by the recent polio cases in Diamer and Torghar linked to Karachi.

Table 7: WPV1 detections in ES in Sindh, January 2024 – July 2025



The TAG acknowledged an overall improvement in SIA quality in Sindh and the strong high-level political support for the programme. There has been a notable decline in refusals and improvement in LQAS pass rates. The increased focus on FLW training, safety and support and investments in ensuring a conducive environment for FLWs is fully supported by the health and programme leadership. The programme has also categorized MMPs and deployed tailored

strategies for each category of MMPs. While these are strong indicators of progress, the TAG expressed concern in the number of SMCs, and persistent circulation of WPV1.

Recommendations – Karachi bloc

- Before the September SIA, launch vaccinator/AIC listening roundtables in UCs with >5% NA children,develop strategies to address identified issues and conduct intensive training of vaccinators and supervisors on IPC and operations.
- Around the next NID, conduct an in-depth field based external audit of Karachi SIA operations and strategies led by the GPEI, following the model of the external audit of the East Region in Afghanistan, and in collaboration with the national and provincial EOCs to validate information, understand issues, and refine the strategies accordingly.

Recommendations – Northern Sindh (Central Pakistan districts)

- Continue enhanced supervision by PEOC in northern Sindh (Jacobabad, Kambar, Larkana and Sukkur).
- Conduct synchronized SIAs across all districts.
- Strengthen interprovincial coordination with Balochistan and Punjab, in collaboration with the NEOC.

Punjab and Islamabad

As of 31 July 2025, one polio case was reported in Punjab in 2025 from Mandi Bahauddin district, and 93 ES+ from 17 districts, whereas Islamabad reported 11 ES+ (see Table 8). Lahore has seen persistent transmission for 12 months, and therefore is now classified as endemic. It is also acting as a reservoir since there is spread of virus from Lahore to several districts within and outside the province. Southern Punjab has detected WPV1 from several districts and there is re-established transmission in Dera Ghazi Khan. Islamabad, Multan and Rawalpindi have had repeated detections of viruses due to high population mobility, highlighting the risks associated with population movement.

In Punjab, the programme has diligently continued tracking and validation of SMCs through targeted SBCC interventions in districts with high number of SMCs. The coordination between Islamabad and Rawalpindi has improved and a tracking system for SMCs has been implemented. Lahore reported low campaign quality with consistently high number of SMCs over the last three campaigns, whereas southern Punjab has reported an improvement in campaign quality.

The TAG acknowledged the high coverage of MMPs in Islamabad/Rawalpindi. However, the current FLWs set up for Islamabad is not sufficient and persistent low campaign quality puts the district at risk of re-established transmission following repeated WPV1 introductions.

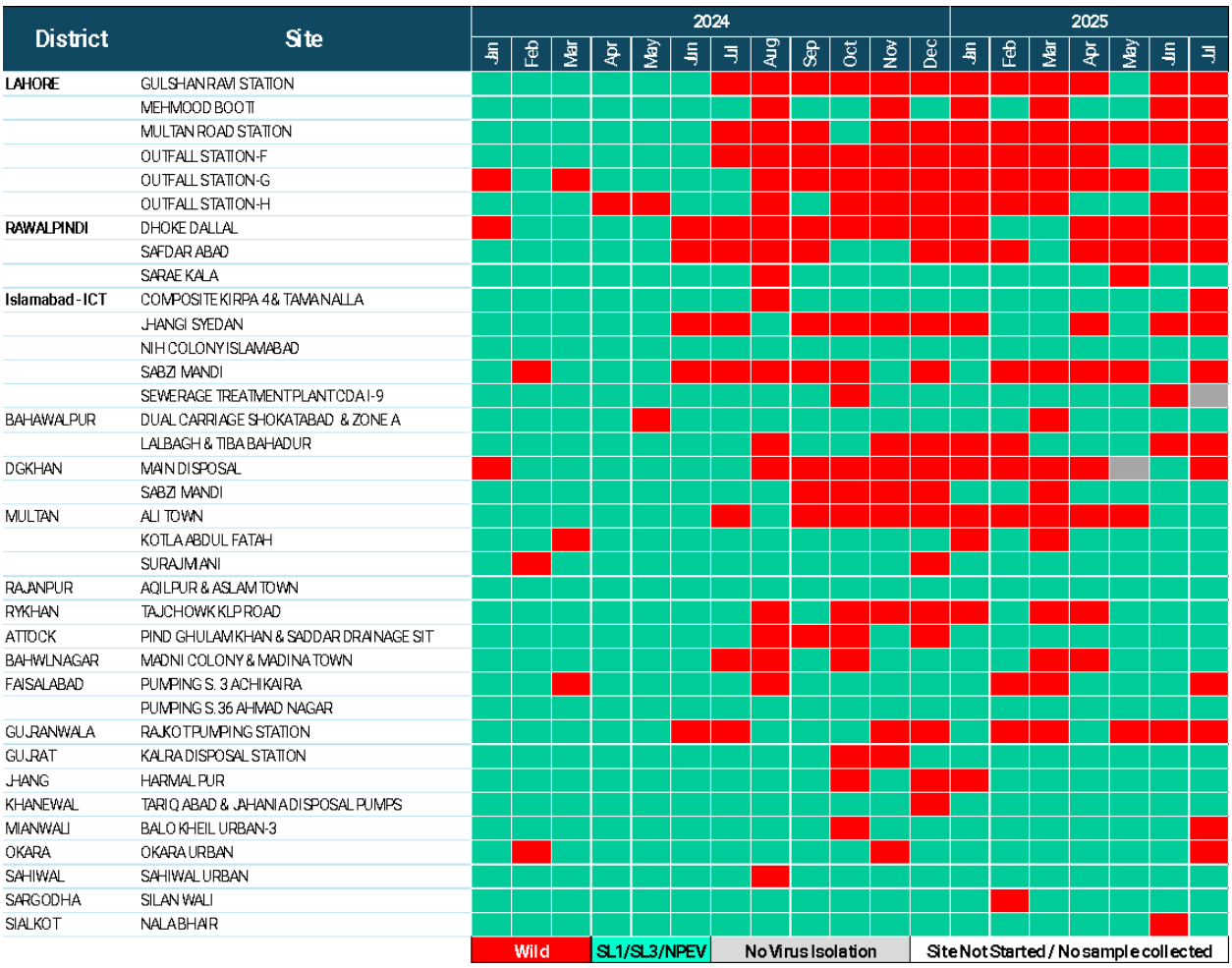
Team support centres have also been upgraded and knowledge assessment of FLWs shows improvement. Punjab has also shown high coverage of zero-dose children in EPI.

Table 8: WPV1 detections in ES in Punjab, January 2024 – July 2025

Recommendations – Punjab and Islamabad

- In Lahore, conduct an analysis before the end of August 2025 to identify the barriers to high campaign quality and develop an activity plan to address these in the SIAs taking place from September to December 2025.
- NEOC and Islamabad teams should work together to develop a durable solution for one-person teams and volunteer FLWs. Additionally, continue close coordination with Rawalpindi.
- Continue focused attention to southern Punjab, rapidly improve SIA quality in DG Khan and Rahim Yar Khan, and strengthen interprovincial coordination with Balochistan and Sindh provinces in collaboration with the NEOC.

Cross-cutting findings and recommendations



Surveillance

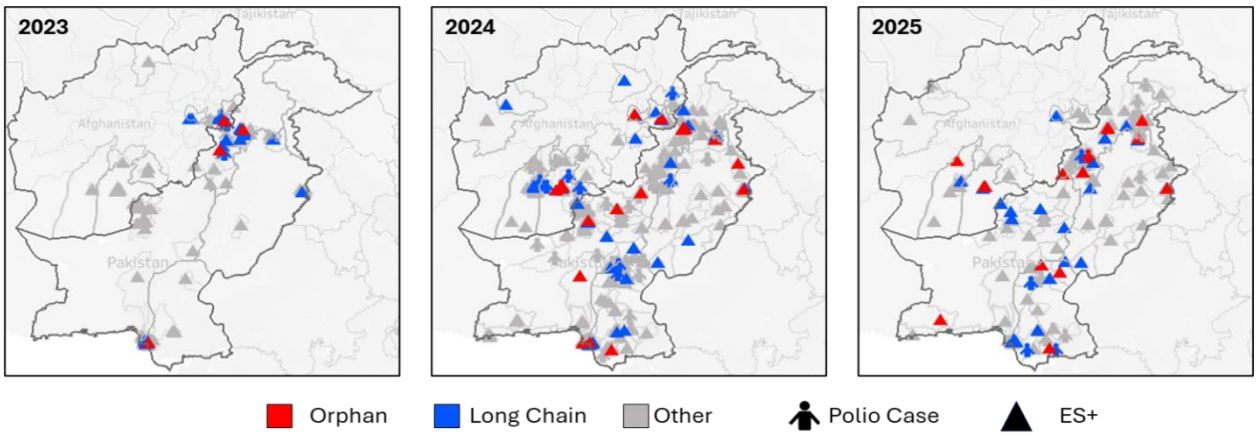
The surveillance system (AFP, ES and laboratory) in Pakistan is consistently reaching the global standards for detecting polioviruses. The non-polio AFP rate is consistently above the global benchmark of 3 per 100,000 in all districts and stool adequacy is above 80%. However, at the subnational level, a few districts mainly in Balochistan that are bordering Afghanistan have low stool adequacy as shown in Figure 13.

The TAG appreciates the performance of the surveillance system and the coordination between field and laboratory surveillance.

The surveillance system has regularly detected orphan and long chain viruses from different geographies as illustrated in Figure 14. The data from the last three years shows 3 orphan and 23 long chain viruses in 2023, 15 orphan and 32 long chain viruses in 2024, and 13 orphan and 26

long chain viruses in 2025 to date. These viruses are widely distributed, however, the detections in Peshawar bloc, south KP, Quetta bloc, and Central Pakistan need further deep dive to identify gaps in the surveillance system.

Figure 14: WPV1 orphan and long-chain viruses, Afghanistan and Pakistan, January 2023 – July 2025



Recommendations - Surveillance

- Conduct field surveillance reviews with presence of external / independent experts are recommended in Khyber Pakhtunkhwa and Balochistan, Central Pakistan, south KP, Peshawar bloc and Hazara division, with priority given to border districts by December 2025. During these reviews, component of SIAs and programme management should be included as well.

Programme Management

The TAG acknowledges the NEOC for pursuing their recommendation made in January 2025 to conduct a review of human resources, since the polio programme had become too large, impeding effective management and diverting scarce resources. The FLW review conducted by the NEOC in May 2025 provided important recommendations to optimize the programme management structures and workforce. This was followed by the Strategy Committee-led review in June 2025, which endorsed the findings of the FLW review and recommended further efficiencies by workload rationalization. Given the current financial constraints, it is essential that Pakistan's polio programme is positioned to adjust to these cuts, while maintaining continuity and quality of operations. The TAG also urges the GPEI partners to ensure deployment of highest quality technical support focusing on the highest risk areas.

Recommendations – Programme Management

- Ensure careful planning and risk management as the programme embarks on streamlining the workforce and optimizing the workload.

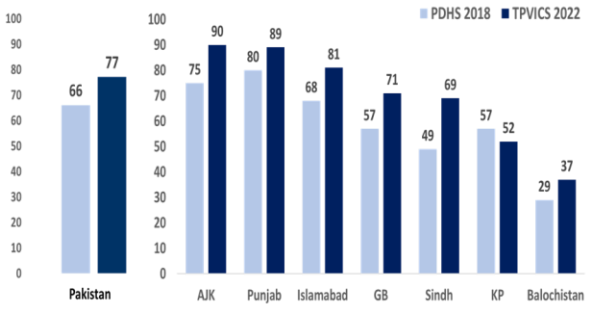
- Proceed now with rightsizing in low-risk areas, removing duplicate and/or non-frontline roles while ensuring transparency with clear criteria, timelines and communication to all stakeholders and preserving frontline capacity and morale in these areas. The programme structure should allow the programme to be agile and efficient to optimize and synergize all available resources.
- Continue CBVs in Peshawar and Khyber and strategize the scale and location of CBV deployment in Sindh and Balochistan to concentrate on the high-risk UCs. Also put in place mechanisms to strengthen the operational management and oversight to reinvigorate CBV performance and impact.
- Where feasible, plan for the absorption of transitioned CBVs into the health workforce (e.g., as Community Health Workers).
- Ensure closer supportive engagement between the programme leadership and the frontline workforce. Prioritize investment in training, motivation, and retention of high-performing staff critical to eradication success.
- Reduce the pressure on ground-level workers for positive results on paper.
- Enhance frequent supportive supervision by the programme leadership.

Routine Immunization

The TAG welcomed the appointment of the new Director General of the Federal Directorate of Immunization (FDI), a development that brought renewed leadership to Pakistan's national immunization programme. The TAG emphasized the need for her full-time appointment, especially as the country navigates complex immunization and eradication challenges.

Encouraging progress has been observed in full immunization coverage across various regions from 2018 to 2022, but progress remains too slow. Punjab, Azad Jammu Kashmir (AJK) and Islamabad have surpassed 90% estimated coverage, while Balochistan, Gilgit Baltistan, KP and Sindh have shown improvement in 2022 compared to their previously reported coverages in 2018 (see Figure 15).

Figure 15: EPI Coverage Trends in Pakistan



Despite these gains, Balochistan and KP continue to lag with less than 60% full immunization coverage. Low coverage contributes significantly to the higher risk of poliovirus infection and other vaccine-preventable diseases.

The TAG also noted improved coordination between EPI and PEI programmes, which is contributing to better coverage of zero-dose children. This coordination has enabled better outreach in hard-to-reach areas, although further acceleration is required to build on this momentum.

Provincial governments have allocated budgets to further support EPI. While this reflects growing political and financial commitment, the overall coverage increased modestly. Of particular concern is the persistently low immunization coverage in high-risk polio reservoir areas, especially in Karachi (East), Quetta Bloc and south KP, where gaps in routine immunization continue to pose a serious threat to polio eradication efforts.

The TAG stressed that although progress in EPI-PEI synergy framework and zero-dose coverage is encouraging, significant efforts and concrete strengthening of practical collaboration between the two programmes are still required to achieve optimal immunization coverage.

Recommendations – Routine Immunization

- Ensure that the Director General FDI is given a full-time mandate with an exclusive focus on the national immunization programme in line with the government's stated health priorities.
- Implement an emergency EPI improvement partnership in Quetta bloc/Zhob division and south KP. This initiative should prioritize improving systemic challenges, such as the availability of a sufficient number of trained female vaccinators, effective cold chain, regular and predictable vaccine supply, and fully functional primary healthcare units that are well supported and effectively monitored. EPI services should be linked with nutrition services which have a much higher community demand than vaccination.
- Develop tailored standard operating procedures for reaching zero-dose coverage in areas that do not have access to the polio community workforce.
- Integrate the planning and monitoring functions of both EPI and PEI in key geographies to enhance coordination, efficiency, and overall programme effectiveness.
- The TAG also reiterates its earlier recommendation for the EPI programme to review and update its population denominators to more accurately assess programme performance and identify true coverage gaps.
- Government of Pakistan to strongly consider the introduction of the hexavalent vaccine, which could help streamline the immunization schedule, reduce missed opportunities, and improve vaccine uptake.

SIAs Schedule

The TAG recommended continuing with large-scale campaigns and synchronization of SIAs with Afghanistan to stop transmission in all provinces simultaneously. The TAG recommended two NIDs and subnational immunization day (SNID) in the second half of 2025 and reassess the SIA schedule for 2026 by the end of the current year. The TAG also recommended to conduct three mop-up campaigns followed by two NIDs between January to June 2026 (see Figure 16). The TAG suggested a separate schedule for south KP campaigns whenever feasible, ideally synchronized with the rest of KP. Moreover, the TAG recommended to add bivalent oral polio vaccine (*b*OPV) to the planned Measles-Rubella campaign planned in November 2025.

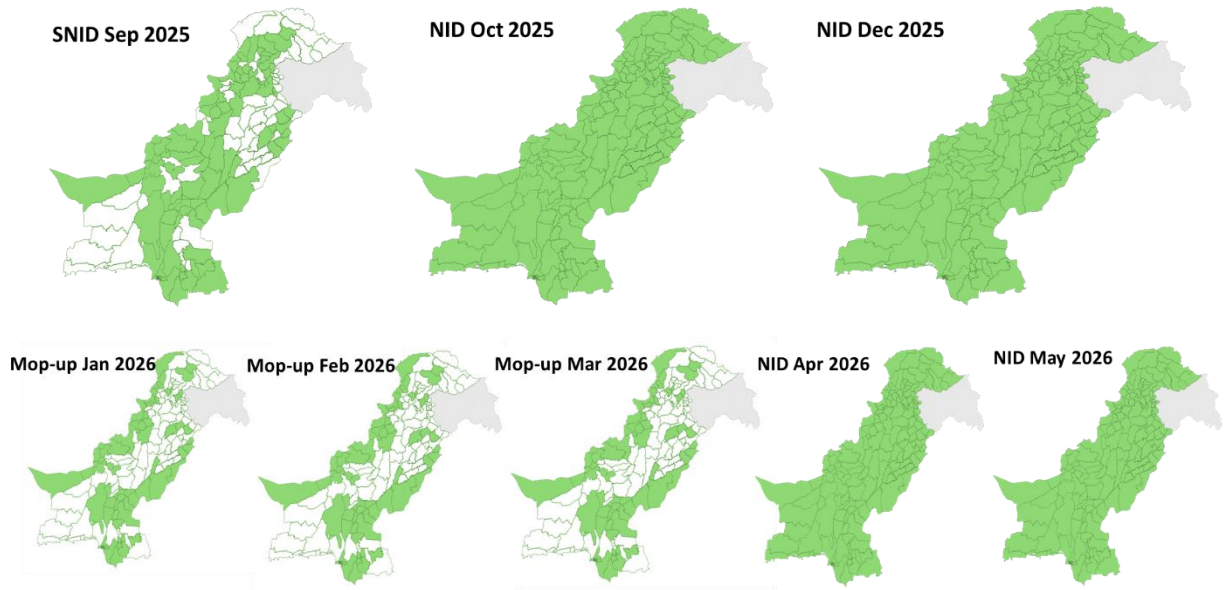


Figure 16: SIA schedule September – December 2025 and January – May 2026, Pakistan

Additional activities to stop polio: Expanded age group vaccination

Despite numerous high quality OPV campaigns, there is persistent widespread polio transmission in the high density and poor sanitation urban areas of Karachi, Lahore, and Peshawar blocs. Likely contributors include low-level persistent infection of older children (5–15 years old) with waning immunity favouring intense transmission. The strategic deployment of IPV in an expanded age group campaign offers a robust and complementary approach to interrupt transmission (see Annex 3). By leveraging IPV's ability to provide strong individual protection against paralysis and, crucially, to boost mucosal immunity among those previously vaccinated with OPV, and thus reduce viral shedding, this strategy can hasten the interruption of transmission in these specific settings. **Expanded age group IPV should not be viewed as 'the magic bullet'** – it is not. But it

may provide an additional edge in dense urban slums with high force of infection and evidence of continuing poliovirus transmission. It is not a replacement for maximizing quality of OPV SIAs, a proven strategy to interrupt transmission, and must not distract from those efforts.

Recommendations – IPV Vaccination

- Assess the need and consider administering a single dose of IPV (full or fractional) to children 4 months to 15 years in very specific UCs of Karachi, Lahore, and Peshawar districts to boost their immunity and complement efforts to interrupt persistent transmission.
- The criteria for selecting UCs in Karachi, Lahore, and Peshawar districts for expanded age group IPV campaign should be mainly based on epidemiological factors associated with high force of poliovirus infection: high population density, high birth rate, and poor sanitation and hygiene.
- Ideally, these campaigns should be implemented as soon as possible and certainly before the end of 2025 to shorten the duration of persistent transmission.
- Prior to embarking on expanded age group campaigns with IPV, thoroughly assess the unique challenges including assessing the community acceptability of this approach, and addressing the logistical complexities and resource requirements, challenges in reaching hard-to-reach populations, and ensuring operational planning and community engagement.
- On the use of IPV elsewhere for children less than 5 years old, the TAG recommended to implement a second round of fractional IPV campaign in Karachi within six months of the first round and to implement the fractional IPV campaign in Quetta Bloc as planned. For the rest of the country, TAG recommended not to conduct large-scale fractional IPV campaigns but to optimize the delivery of IPV through the Big Catch Up.
- The TAG recommended to prioritize populations for IPV delivery, including MMPs, children in WPV1 transmission areas with persistently low routine immunization coverage, and high number of zero dose children, noting that IPV (full or fractional) campaigns should not detract from the quality of OPV SIAs.

Roadmap to Zero Polio (July 2025 June 2026)

The TAG welcomes the ‘Roadmap to Zero Polio’ presented by the national programme. The roadmap provides a starting point for further detailed development and framework, focused on addressing the main hurdles identified under the ‘2-4-6’ roadmap and priority interventions identified to end transmission during the next low season.

The TAG noted that many of the activities in the roadmap are not detailed nor time-bound and requires to be reflected as appropriate to the respective phases. From ‘Phase I’, the TAG urges the programme to focus on simplification of instruments, particularly campaign monitoring and evaluation, enabling the programme to identify suboptimal SIA performance in real-time and course correct. The roadmap's outcome will depend on the quality of operations and quick adjustment to correcting remaining issues and giving flexibility to the provinces to adjust.

Recommendations – Roadmap to Zero Polio

- Ensure inclusive consultations to identify and guide strategic approaches and actions which should result in improvements in operational quality – never achieved before – consistently and uniformly across the country.
- Further the current commitment of political and administrative leadership at national, provincial and district levels to rigorously implement the 'roadmap' till interruption is achieved. This should be manifested through translation of the roadmap into district and UC-level plans adapted to local risks and conditions. This should be aligned with the programmatic milestones (see section on Conclusions) and clear accountability mechanisms.
- Institute a credible monitoring mechanism to track the trajectory of progress in real-time against the epidemiological milestones, set clear benchmarks for SIA and programme management quality, and identify problems and gaps for course corrections.
- There should be a regular 'check-ins': around the end of Phase I (August-September) and subsequently every three months to review progress and adjust the strategy and operational tactics to stay on course. The TAG will be available for joining this critical activity.

Conclusions

From this point, the virological picture in Pakistan can go one of two ways. Either persistent transmission with risk of renewed outbreak going into the next high season, or progressive reduction in detections to the point of sustainable interruption. Which path the country takes is now entirely in the hands of the programme.

- The programme has missed key epidemiological milestones set by the TAG in January 2025. There is persistent transmission of poliovirus at the end of the low season in multiple zones in Pakistan, notwithstanding the fact that there are a few signs of progress. The most noticeable progress is the decreased intensity of local circulation in Peshawar bloc and decreased incidence of poliomyelitis everywhere except in south KP.
- There are signs of progress in SIA quality towards the necessary level. But the programme should go further, and progress must be uniform across the country. The programme has intensified focus on SMCs, but it needs to continue this and expand the focus of operational excellence to include basic elements of the pre- and intra-campaign implementation phases.
- The TAG recommends the following approaches to maximize Pakistan's opportunity to interrupt WPV1 transmission, in order of greatest contribution to the overall objectives:
  1. Maximum immunization in south KP: Highest quality SIAs in all areas regardless of modality, and dramatic intensification of essential immunization.
  2. High-quality SIAs: Multiple SIAs (5-6) that consistently achieve high quality (>90% LQAS) across all core poliovirus reservoir areas through intense focus on the basic elements of the programme and SIA quality inputs; vaccinator team/AIC excellence, high quality microplanning and training, focusing on MMPs, effective community mobilization, and

robust performance monitoring in each of the three phases of SIAs allowing timely course corrections and accountability.

3. Expanded age group IPV: Administration of a single dose of IPV (full or fractional) in older age children (4m-15y) in areas with persistent subclinical WPV1 transmission (Karachi, Lahore, and Peshawar).
4. Intensive strengthening of EPI: Full immunization coverage (>80%) through strengthening the routine immunization system that is delivered by trusted fixed and outreach services in core poliovirus reservoir areas to bolster immunity for interruption of transmission and create conditions to sustain eradication.

- The 'Roadmap to Zero Polio' must be coupled with clearly defined operational and impact evaluation indicators to allow for regular monitoring and course correction of the key elements. The TAG would appreciate a quarterly review and assessment of the progress of the roadmap implementation to ascertain whether the trajectory is in the right direction and course corrections are made, if warranted.
- Following their review, the TAG revised the epidemiological milestones for Pakistan polio programme as follows:

Revised Milestone	Revised Timeline
Interrupt transmission in the northern corridor (**Peshawar bloc**).	**October 2025**
Interrupt transmission in Punjab/Islamabad (**Lahore, Rawalpindi/ Islamabad**).	**December 2025**
Interrupt transmission in **Central Pakistan** zone (northern Sindh, southern Punjab, and eastern Balochistan).	**December 2025**
Interrupt transmission in **Quetta Bloc**.	**December 2025**
Prevent persistence of transmission in **any district** that detects WPV1.	**December 2025**
No persistent lineages in **Karachi bloc** followed by interruption of transmission.	**February 2026**
Decreasing frequency of ES detections and number of active lineages in **south KP.**	**June 2026**

The country team should develop Specific, Measurable, Achievable, Relevant, and Time-bound (SMART) process and outcome indicators aligned with the proposed epidemiological milestones at national, provincial, and district levels in view of specific subdistrict and subpopulation risks. These indicators should be monitored regularly using simple templates in coordination and support of the technical partners.

There can be no doubt that the Pakistan programme has grown in strength and sophistication. But it is not – yet – where it needs to be. If it can leverage the energy and the will to improve the quality of operational delivery above those last few percentage points, to the level where the virus cannot slip through again, 2026 will be a historic year for the nation and for the world. If it cannot – or will not – it will likely not be able to interrupt transmission, exposing itself and the

world to another major polio resurgence in a couple of years and to a future of avoidable cost and pain. The time for action is now.

The TAG advises the Secretariat to reconvene its meeting in February 2026 and arrange any ad hoc virtual meetings as needed. The TAG stresses the need for a review of the Afghanistan programme at the same time, to ensure that there is continued complementary activities in both countries and simultaneous progress for the interruption of WPV1 circulation by June 2026.

Annexes

Annex 1: Molecular Epidemiology of WPV1: Genetic Reclassification, June 2025

The resurgence of WPV1 in the Afghanistan–Pakistan epidemiological bloc since the third quarter of 2023 has driven an expansion in genetic diversity, resulting in the emergence of new genetic clusters. Substantial divergence from two of the three clusters identified in the May 2024 classification (YB3A4A, YB3A4B, and YB3C2—the latter last detected in November 2023) led to an increase in genetic clusters from two to eight. Cluster YB3A4A is now divided into five distinct genetic clusters, and cluster YB3A4B into three, and cluster YB3C2 remained unchanged (see figure A).

Figure A: Genetic Reclassification of WPV1, 2020-2025

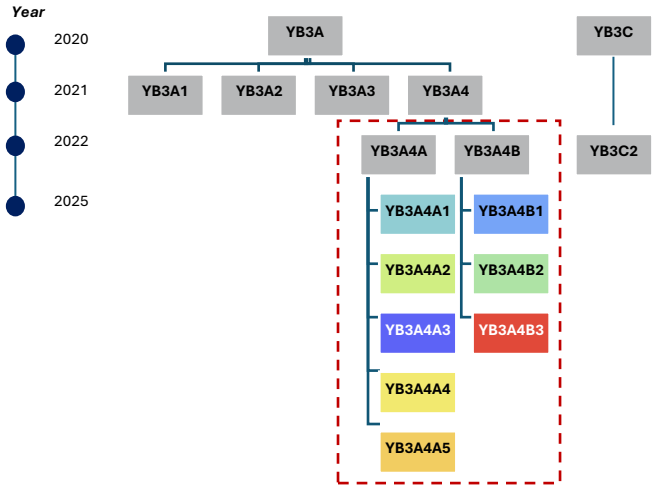
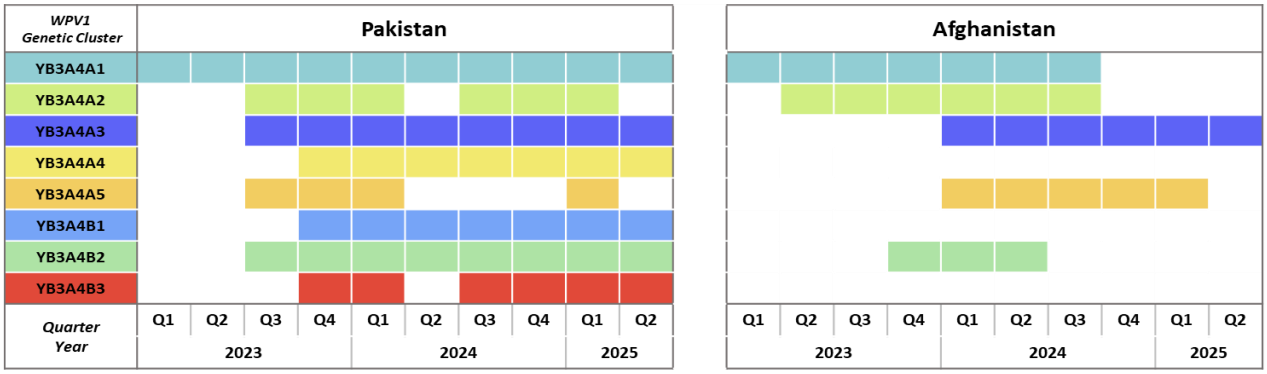
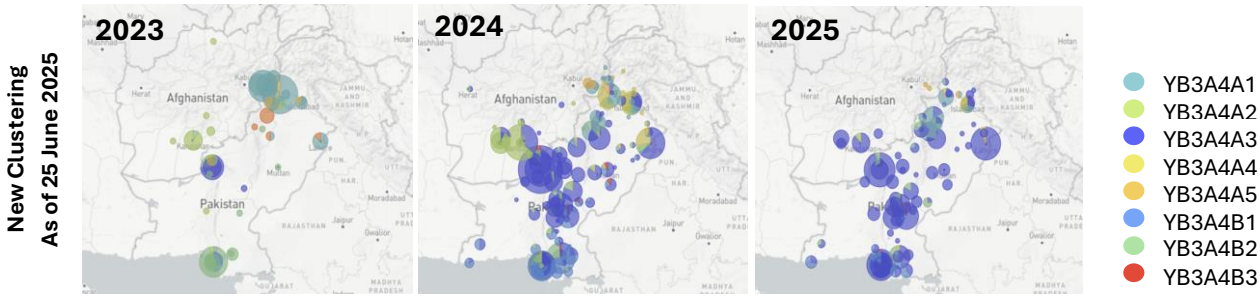


Table A: Evolution of WPV1 genetic clusters, 2023_2025



In 2025, all eight clusters have been detected in Pakistan, and two clusters have been detected in Afghanistan. YB3A4A3 emerged as the leading cluster in both Afghanistan and Pakistan—particularly across the southern corridor, Karachi bloc, and Central Pakistan. It accounted for approximately 85% of WPV1 detections in both countries. Whereas YB3A4A1, is now the second most dominant in 2025, accounting for approximately 10% of WPV1 detections, and remains prevalent particularly in the Peshawar bloc and northern KP. South KP has co-circulation of both dominant clusters (YB3A4A3 and YB3A4A1). See **Figure B** for the retrospective geographic distribution of WPV1 clusters. Three genetic clusters YB3A4A2, YB3A4A4, and YB3A4A5 have consistently declined through 2024 and 2025. Whereas detections of three genetic clusters YB3A4B1, YB3A4B2 and YB3A4B3 (major clusters seen in Karachi bloc in 2023/2024) are on a gradual decline in 2025.

Figure B: Geographic distribution of WPV1 detections with updated genetic clustering



In Peshawar bloc (Peshawar district), cluster YB3A4A1 is seen actively circulating in 2025, with one persistent lineage detected from December 2023 to April 2025. In the East Region of Afghanistan, only cluster YB3A4A5 has been detected since September 2024. This cluster was first detected in the East Region in March 2024.Cluster YB3A4A5 has been circulating in the East Region of Afghanistan for at least 10 months and has not been detected in any other geography

in Afghanistan and Pakistan. On the other hand, cluster YB3A4A1 was last detected in the East Region in July 2024.

In the southern corridor two genetic clusters (YB3A4A2 and YB3A4A3) are predominantly circulating since the start of the outbreak in 2023. Cluster YB3A4A2 was the predominant cluster in the South Region of Afghanistan in previous years and latest isolate from this cluster is detected in March 2025. The other and predominant cluster seen in southern corridor is YB3A4A3. The first isolate from this cluster was detected in October 2023 and is accounting for 91% of all detections (AFP and ES) in Quetta bloc.

Since July 2024, the two genetic clusters (YB3A4A1 and YB3A4A3) were reintroduced in **south KP** and has intensified transmission, with cluster YB3A4A1 detected in all seven districts.

Karachi bloc has had sequential dominance of three genetic clusters throughout the past 2.5 years: YB3A4B2 (from September 2023 to March 2024 – last seen in August 2024), YB3A4B1 (from April to September 2024 – last seen in March 2025), and YB3A4A3 continuing from October 2024 to date. In 2025, 92% of detections (AFP and ES) in Karachi bloc belong to cluster YB3A4A3.

Since the third quarter of 2023, **Central Pakistan** has sustained detection of three genetic clusters (YB3A4A3, YB3A4B2, and YB3A4B1) for 12 months or longer—all of which have continued to be detected through 2025.

Annex 2: Use of LQAS

Lot Quality Assurance Sampling (LQAS) is a statistically robust and operationally feasible methodology, originally conceived for industrial quality control and subsequently adapted with remarkable efficacy for public health applications, notably within the GPEI. Unlike traditional survey methods that aim to construct precise prevalence estimates, LQAS primarily functions to classify defined "lots" (geographical areas or population subgroups) as either meeting or failing to meet predetermined performance thresholds. This classification capability enables the rapid identification of underperforming areas, facilitating timely and targeted interventions.

The genesis of LQAS can be traced back to the 1920s, where it emerged as a statistical method of quality control within industrial production settings (Dodge & Romig, 1929). Initially, LQAS found its application in manufacturing, such as in car factories, where it served to ensure product quality while minimizing costs. The method provided a statistically sound approach to classify an entire production unit, or lot, as either acceptable or rejected by testing only a small, randomly selected subset of products. The process circumvented the time-consuming and expensive process of inspecting every individual item. A critical characteristic that sets LQAS apart from many conventional sampling approaches is its deliberate focus on classification rather than the precise estimation of population parameters or traditional hypothesis testing. This design choice means that while LQAS may yield less detailed information about a population's exact characteristics, it achieves this utility with substantially smaller sample sizes. This inherent efficiency is not a mere side effect but a strategic design choice. The consistent emphasis across various documented applications on LQAS's "smaller sample sizes" and its primary objective of "classification" over "precise estimation" highlights a deliberate and strategic trade-off. This is not a limitation in the sense of a deficiency, but rather a fundamental design feature that prioritizes operational efficiency—manifested through speed and lower cost—and actionable intelligence over granular statistical precision for every single lot. The core value proposition of LQAS resides in its capacity to provide a rapid "go/no-go" decision, which often holds greater significance for programmatic management than knowing the exact given micro-area. This foundational design choice renders LQAS exceptionally well-suited for dynamic, resource-constrained environments, such as public health programmes operating in developing countries or during emergency responses. The method's inherent efficiency, cost-effectiveness, and capacity to provide actionable insights for local-level decision-making have driven its widespread adoption, particularly in public health and international development since the mid-1980s. This transition was driven by the recognition of LQAS's potential for rapid data collection in contexts where routine health surveillance systems were often limited or performed sub-optimally, particularly prevalent in developing countries. In this new domain, the "lot" concept was re-

envisioned to encompass administrative units such as villages, health facility catchment areas, or groups of health workers. The WHO played a pivotal role in legitimizing and promoting LQAS within the public health sphere. In 1991, an international gathering of epidemiologists and statisticians formally acknowledged LQAS as a practical method for rapid health assessment (Lameshow & Taber, 1991) and subsequently recommending its use for surveys to determine child immunization coverage (WHO Global Programme for Vaccines and Immunization, 1996). Monitoring the quality of supplementary immunization activities (SIAs) is a key tool for eradicating polio. Regular monitoring data, however, are often unreliable, showing high coverage levels in virtually all areas, including those with ongoing virus circulation. To address this challenge, C-LQAS has emerged as a fundamental risk management tool (Pezzoli, et al., 2012). Since its formal adoption in 2009, the GPEI has integrated C-LQAS as a cornerstone monitoring tool for SIAs in polio-endemic countries (Brown, et al., 2014). This integration has been pivotal in generating more reliable and actionable quality data compared to previous monitoring approaches. The impact of C-LQAS has been profound, proving instrumental in pinpointing areas with weak immunization performance, guiding focused mop-up campaigns, and optimizing the allocation of scarce resources (Greenland, et al., 2011 and Brown, et al., 2014).

Despite its significant benefits, LQAS implementation is not without challenges. These include inherent limitations related to missing children in household at the time of survey, non-respondent households, data interpretation (where classification is prioritized over precise estimation), risk of misclassification, complexities arising from population heterogeneity within defined lots, and various operational hurdles encountered in diverse and often challenging field settings. In Pakistan, the country team has also recognized that up to 30% of a sample (household) may be skipped in a lot (Union Council) despite the statistical underpinning that require every member of a lot be assessed (Global Polio Eradication Initiative, 2012).

Data from the past three campaigns also shows significant variability in the percentage of non-respondent households. Therefore, the country team has begun to examine a composite LQAS Reflective index that includes whether the Union Council passed based on the traditional cutoff of no more than three unvaccinated eligible children from a pre-specified sample of 60 households PLUS the number of non-respondent or skipped household PLUS the weighted number of missing children.

The major concern with LQAS is that non-respondent households (and missing children within households) may not be missing in random. The most conservative estimation for this missing not at random sampling problem would be to treat all such non-respondent households as failures towards the 3 or less required of 60 to pass a lot.

Alternatively, if we believe the missing failure rate is p% higher, number of failure is x and number of non-respondent households is n, then we can have pass rule as x+p%*60*n/(60+n) <4

Or we can use a more conservative but easier to calculate version by approximating 60/(n+60) as 1 where the rule becomes: x+n*p%<4

The country team can use existing and other sources of data to calculate the proportion of non-vaccination among non-respondent households specific to the union council, tehsil, district, division, bloc, or province level. This approach assumes that the missing children in the counted household are random – or as likely to be unvaccinated as others in the sample – but the missing at random assumption can also be tested for this group by assessing the proportion of non-vaccination among those who are missing at first round but found during subsequent visits.

Despite these limitations, LQAS still remains an indispensable tool for improving outcomes in complex operational settings by enabling timely, targeted resource allocation. The tool is relatively simple to implement, cost-effective, and efficient. While LQAS excels at local-level classification, results from individual lot samples can be combined or aggregated to obtain point estimates for the entire population or larger geographical regions. This aggregation often yields greater precision than methods like the 30-cluster survey, due to the stratified random sampling design inherent in LQAS. The practical outcome of this binary classification (acceptable/unacceptable) remains valuable for programme managers and decision-makers. It should empower them to swiftly identify areas that are either performing adequately or falling below a critical threshold, thereby enabling targeted interventions and the efficient allocation of resources to areas most in need of support.

Recommendation – LQAS Methodology

- Continue efforts to enhance understanding and refine LQAS methodologies to address the missing not at random issue and consider using the composite index to drive operational changes or new criteria besides the cut-off value to pass a Union Council lot.

References

1. Brown, A. E., Okayasu, H., Nzioki, M. M., Waddo, M. Z., Chabot-Couture, G., Quddus, A., Sutter, R. (2014, November). Lot Quality Assurance Sampling to Monitor Supplemental Immunization Activity Quality: An Essential Tool for Improving Performance in Polio Endemic Countries. The Journal of Infectious Diseases, 210(Supplement 1), S333-S340. doi:10.1093/infdis/jit816
2. Dodge, H. F., & Romig, H. G. (1929, October). A method of sampling inspection. The Bell System Technical Journal, 8(4), 613-631. doi: 10.1002/j.1538-7305.1929.tb01240.x5Global Polio Eradication Initiative. (2012). Assessing Vaccination Coverage Levels Using Clustered Lot Quality Assurance Sampling. Field Manual. VERSION EDITED FOR THE GLOBAL POLIO ERADICATION INITIATIVE (GPEI). Retrieved from https://polioeradication.org/wp-content/uploads/2016/09/Assessing-Vaccination-Coverage-Levels-Using-Clustered-LQAS_Apr2012_EN.pdf5Greenland, K., Rondy, M., Chevez, A., Sadozai, N., Gasasira, A., Abanida, E. A., ... Pezzoli, L. (2011, July). Clustered lot quality assurance sampling: a pragmatic tool for timely assessment of

vaccination coverage. Tropical Medicine & International Health, 16(7), 863-868. doi: 10.1111/j.1365-3156.2011.02770.x5Lameshow, S., & Taber, S. (1991). Lot quality assurance sampling: single- and double-sampling plans. World Health Statistics Quarterly, 42(3), 115-132.5Pezzoli, L., Tchiro, R., Dzossa, A. D., Ndjomo, A., Takeu, A., Anya, B., ... Lewis, R. F. (2012). Clustered lot quality assurance sampling: a tool to monitor immunization coverage rapidly during a national yellow fever and polio vaccination campaign in Cameroon, May 2009. Epidemiology and Infection, 140(1), 14-26. doi:10.1017/S0950268811000331 5WHO Global Programme for Vaccines and Immunization. (1996). Monitoring immunization services using the lot quality technique. World Health Organization. Geneva: WHO. Retrieved from https://iris.who.int/handle/10665/63177

Annex 3: Rationale for IPV in Expanded Age Group Campaigns to Interrupt Persistent Polio Transmission

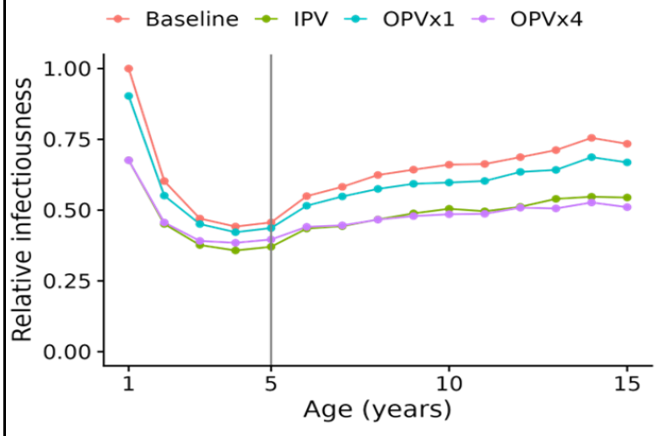
The evolving epidemiology: Role of older children and adults in polio transmission

The traditional focus of polio eradication efforts has primarily been on children under five years old. However, settings with persistent widespread poliovirus transmission, as indicated by environmental surveillance, have changed the epidemiological landscape. Environmental surveillance is a highly sensitive tool that can detect poliovirus circulation for up to five weeks before clinical cases emerge, confirming ongoing transmission even when paralytic cases are not widely reported (Dowdle & Brimingham, 1997). This continued circulation, despite numerous prior OPV supplemental immunization activities (SIAs), points to unaddressed immunity gaps that extend beyond infants and young children and demands a broader perspective and a more nuanced and comprehensive intervention beyond merely increasing the number of OPV doses to young children.

Fundamentally, poliomyelitis can affect individuals of any age, including adults, particularly in areas with low general population immunity (Link-Gelles R, 2022). The risk of developing paralytic poliomyelitis increases with age, and outbreaks in older individuals can lead to devastating outcomes with higher mortality rates, as tragically observed in past outbreaks in countries like the Republic of Congo and Namibia (Patel MK, 2012) (Yusuf, de Wee, Foster, et. al., 2014).

Furthermore, research explicitly demonstrates that older children and adults play a pivotal, often silent, role in perpetuating poliovirus transmission (Mach O, 2014). Even individuals who possess systemic (serum) immunity from prior OPV vaccination, which protects them from paralysis, can experience waning intestinal or mucosal immunity over time (Grassly NC, 2012). This diminished mucosal protection means they can still become infected, multiply the virus in their intestines, and, critically, shed the virus, thereby contributing to its continued circulation. Studies in India, for instance, showed that older children (5-15 years) can shed poliovirus asymptomatically at rates similar to those under five years old, acting

Figure A: OPV vs IPV SIA Impact by Age



Simulated impact of various SIAs on infectiousness, based on SIA history in Peshawar, Pakistan. Infectiousness is defined as the probability of infecting a naïve individual, averaged over the distribution of mucosal immunity in the population (Voorman, Famulare, McCarthhy, Kroiss, $ Lyons, 2022)

as "hidden reservoirs" that perpetuate transmission chains (Mach O, 2014). The presence of asymptomatic carriers who shed the virus for weeks creates a significant challenge for eradication efforts, as they can unknowingly maintain the transmission chain. This dynamic necessitates an expansion of public health strategies to include these older age groups in vaccination campaigns.

Characteristics of Inactivated Poliovirus Vaccine (IPV) and its established use

IPV, also known as the Salk vaccine, is composed of inactivated (killed) poliovirus strains and is administered by intramuscular or intradermal injection. A significant advantage of IPV is its excellent safety profile; being a non-live vaccine, it carries no risk of vaccine-associated paralytic poliomyelitis (VAPP) or the emergence of circulating vaccine-derived polioviruses (cVDPVs). This contrasts sharply with OPV, which, while vital, carries a rare risk of VAPP and can revert to neurovirulence in under-immunized populations, leading to cVDPV outbreaks.

IPV produces robust levels of antibodies in the blood, which effectively prevent the spread of the virus to the central nervous system and offers excellent protection against paralytic disease. While IPV alone induces very low levels of *primary* immunity in the intestine, meaning an IPV-immunized person could still be infected and shed the virus if they have never been exposed to live poliovirus, its role is more nuanced in a population with prior OPV exposure.

Crucially, a substantial body of evidence demonstrates IPV's capacity to significantly *boost* intestinal mucosal immunity among individuals previously immunized with OPV. (Parker, Molodecky, Pons-Salort, O'Reilly, & Grassly, 2015) (Connor, et al., 2022) (Snider, et al., 2023) (Shirreff, Waddo, Vaz, Sutter, & Grassly, 2017) (Fu, 2025). This boosting effect on mucosal immunity is described as being nearly 100% response following an IPV booster and much lower for another OPV booster in those with existing immunity, particularly in older children. Furthermore, recent research suggests IPV may induce some nasal and pharyngeal mucosal immunity, potentially reducing oral-oral transmission (Godin, et al., 2024).

The use of IPV in older children and adolescents is well-established in routine immunization programmes globally. Countries like the United Kingdom routinely include IPV doses for children well into their school years and adolescence, with final routine doses often given at 4-6 years and again around 14-16 years of age (UK Health Security, 2025). In Germany a 4th dose of IPV is suggested as a booster at 9-16 years-old (STIKO, 2025). This demonstrates a deliberate strategy to reinforce and sustain population immunity at critical junctures, particularly as children enter larger social environments like schools where exposure potentially increases. Catch-up campaigns, such as those implemented in London for children aged 1 to 11 years (UK Health Security Agency, 2023), further illustrate the proactive use of IPV to address identified immunity gaps in older age groups. Long-term persistence of immunity, with seroprotective antibody levels

maintained for 10 years post-vaccination, has been demonstrated in youth receiving IPV-containing vaccines (Bottiger, 1990).

There are also precedents for large-scale under 15-year-old catch-up campaigns to address immunity gaps such as in India with a measles/rubella mass campaigns (Murhekar MV, et. al., 2022) and in Lyari Town Karachi, Pakistan, with typhoid conjugate vaccine (Batool R, et. Al., 2023

Rationale for IPV in an expanded age group campaign in a polio endemic country

In a county with persistent widespread transmission despite numerous prior OPV SIAs, the population is likely "OPV-primed" but has failed to interrupt transmission. In this specific scenario, IPV serves as a targeted, complementary intervention rather than a direct replacement for OPV.

The primary rationale for using IPV in an expanded age group campaign is its ability to directly address the ongoing transmission by:

- **Boosting mucosal immunity and reducing viral shedding:** Numerous prior OPV SIAs suggest a significant portion of the population, including older children and adults, would have been "mucosal primed" by previous OPV exposure, in addition to priming following silent infection by WPV. An IPV-based expanded age group campaign strategically targets these OPV-primed individuals to significantly reduce the amount and duration of poliovirus they shed into the environment. This directly contributes to interrupting the faecal-oral transmission cycle, which is essential for addressing the widespread circulation detected by environmental surveillance. This shifts IPV's role from solely individual paralysis protection to a complementary tool that reduces the overall viral load in the environment by limiting shedding from a significant portion of the population.
- **Providing robust individual protection against paralysis:** IPV is highly effective in preventing paralytic disease across all three poliovirus types. In a county with widespread transmission, an expanded age group campaign utilizing IPV ensures robust protection against paralysis for a broader age range, including older children and adults who may have not responded to OPV and as such are at higher risk of severe outcomes.
- **Mitigating OPV limitations and cVDPV risks:** The persistence of transmission despite OPV campaigns often correlates with the emergence of cVDPVs. While OPV remains vital for primary gut immunity and rapid transmission interruption in highly susceptible populations, IPV offers a non-live alternative that can enhance population immunity.
- **Contributing to overall population immunity:** IPV's ability to reduce shedding in OPV-primed individuals, combined with its robust protection against paralysis, increases overall population immunity and reduces the pool of individuals who can contribute to transmission, moving the population closer to the herd immunity threshold required for

eradication. The GPEI endgame strategy explicitly recognizes IPV's role in managing long-term poliovirus risks and strengthening immunization systems.

It is important to note the nuanced application of global guidance regarding IPV. While the Strategic Advisory Group of Experts in immunization (SAGE) recommended against using IPV for campaigns in response to type 2 cVDPV outbreaks in October 2020, citing its limited ability to establish effective intestinal immunity in *never-exposed individuals* and logistical challenges, this recommendation pertains to primary outbreak response where rapid, widespread mucosal immunity is paramount in *naive* populations (World Health Organisation, 2020). The current scenario, however, of *persistent transmission despite numerous prior OPV SIAs*, implies a population that is *not entirely naive* but has *failed to interrupt transmission* with OPV alone. In this specific context, IPV's value lies in its ability to *boost existing immunity* in OPV-primed individuals to reduce shedding and provide robust paralysis protection.

Unique challenges and considerations for an IPV campaign

While the immunological rationale for using IPV in an expanded age group campaign in a setting of persistent transmission is compelling, its implementation presents significant operational considerations and challenges:

- **Logistical complexities and resource requirements:** As an injectable vaccine, IPV requires trained health workers for administration, sterile injection equipment, and strict adherence to proper procedures, introducing greater operational complexity and demanding more human and material resources compared to oral vaccine administration. Large-scale campaigns may also require phased implementation.
- **Challenges in reaching hard-to-reach populations:** The injectable nature of IPV can complicate house-to-house delivery, potentially increasing the risk of missing individuals who are already difficult to access through routine immunization programmes. However, expanded age group campaigns should be planned to achieve high coverage through high-quality detailed microplanning and enhanced social mobilization.
- **Operational planning and community engagement:** Effective implementation requires adapting micro-planning to reach targeted age groups wherever they are most likely to be present, such as schools, markets, universities, and workplaces, and deploying extensive fixed and mobile teams. Context-adapted communication and community engagement strategies are vital to address vaccine hesitancy and ensure high acceptance across all targeted age groups.

References:

3. Batool, R., Qureshi, S., Haq, Z., Yousafzai, M.T., Salam, R.A., Ali, R., Sadaf, T., Ali, M., Qamar, F.N. Coverage survey of typhoid conjugate vaccine among children aged 6 months to 15 years in

4. Bottiger, M. (1990, October). Polio immunity to killed vaccine: an 18-year follow-up. Vaccine, 8(5), 443-445. doi:10.1016/0264-410X(90)90244-G
5. Connor, R. I., Brickley, E. B., Wieland-Alter, W. F., Ackerman, M. E., Weiner, J. A., Modlin, J. F., . . . Wright, P. F. (2022, January). Mucosal immunity to poliovirus. Mucosal Immunity, 15(1), 1-9. doi:10.1038/s41385-021-00428-0
6. Dowdle, W. R., & Birmingham, M. E. (1997, February). The biologic principles of poliovirus eradication. Journal of Infectious Diseases, 175(Supplement 1), S286-92. doi:10.1093/infdis/175.supplement_1.s286. PMID: 9203732
7. Fu, Y. M. (2025, April 23). Poliovirus shedding after sequential immunization of Sabin-strain inactivated polio vaccines and oral attenuated polio vaccines. npj Vaccines, 10(81), 1-12.
8. Godin, A., Connor, R. I., Degefu, H. N., Rosato, P. C., Wieland-Alter, W. F., Axelrod, K. S., . . . Wright, P. F. (2024, November 15). Nasal and Pharyngeal Mucosal Immunity to Poliovirus in Children Following Routine Immunization with Inactivated Polio Vaccine in the United States. Journal of Infectious Diseases, 230(5), e1023-e1020. doi:10.1093/infdis/jiae264
9. Grassly, N. C., J. H. (2012, May 15). Waning intestinal immunity after vaccination with oral poliovirus vaccines in India. Journal of Infectious Diseases, 205(10), 1554-61. doi:10.1093/infdis/jis241
10. Jafari, H., Deshpande, J., Sutter, R., Bahl, S., Verma, H., Ahmad, M., Kunwar, A., Vishwakarma, R., Agarwal, A., Jain, S., Estivariz, C., Sethi, R., Molodecky, N., Grassly, N., Pallansch, M., Chatterjee, A., & Aylward, B. Efficacy of inactivated poliovirus vaccine in India. Science, 2014; 345(6199):922.
11. Link-Gelles, R., L. E. (2022, August 19). Public Health Response to a Case of Paralytic Poliomyelitis in an Unvaccinated Person and Detection of Poliovirus in Wastewater - New York, June-August 2022. MMWR M
12. Morbidity Mortality Weekly Report, 71(33), 1065-1068. doi:10.15585/mmwr.mm7133e2
13. Mach, O., V. H. (2014, November 1). Prevalence of asymptomatic poliovirus infection in older children and adults in northern India: analysis of contact and enhanced community surveillance, 2009. Journal of Infectious Diseases, 210(Suppl 1), S252-8. doi:10.1093/infdis/jit234
14. Murhekar, M.V., Gupta, N., Hasan, A.Z., Kumar, M.S., Kumar, V.S., Prosperi, C., Sapkal, G.N., Thangaraj, J.W.V., Kaduskar, O., Bhatt, V., Deshpande, G.R., Thankappan, U.P., Bansal, A.K., Chauhan, S.L., Grover, G.S., Jain, A.K., Kulkarni, R.N., Sharma, S.K., Chaaithanya, I.K., Kharwal, S., Mishra, S.K., Salvi, N.R., Sharma, S., Sarmah, N.P., Sabarinathan, R., Duraiswamy, A., Rani, D.S., Kanagasabai, K., Lachyan, A., Gawali, P., Kapoor, M., Shrivastava, A.K., Chonker, S.K., Tilekar, B., Tandale, B.V., Ahmad, M., Sangal, L., Winter, A., Mehendale, S.M., Moss, W.J., & Hayford, K. Evaluating the effect of measles and rubella mass vaccination campaigns on seroprevalence in India: a before-and-after cross-sectional household serosurvey in four districts, Parker, E. P., Molodecky, N. A., Pons-Salort, M., O'Reilly, K. M., & Grassly, N. C. (2015, July 9). Impact of inactivated poliovirus on mucosal immunity: implications for the polio eradication endgame. Expert Review of Vaccines, 14(8), 1113-1123. doi:10.1586/14760584.2015.1052800 Patel, M. K., K. M.-N. (2012, November 15). An outbreak of wild poliovirus in the Republic of Congo, 2010-2011. Clinical Infectious Diseases, 55(10), 1291-8. doi:10.1093/cid/cis714 Shirreff, G., Waddo, M. Z., Vaz, R. G., Sutter, R. W., & Grassly, N. C. (2017, February). Estimated Effect of Inactivated Poliovirus Vaccine Campaigns, Nigeria and Pakistan, January 2014–April 2016. Emerging Infectious Diseases, 23(2), 258-263. doi:10.3201/eid2302.161210
15. Snider, C. J., Zaman, K., Wilkinson, A. L., Aziz, A. B., Yunus, M., Haque, W., . . . Anand, A. (2023, September 22). Poliovirus type 1 systemic humoral and intestinal mucosal immunity induced by monovalent oral poliovirus vaccine, fraction
16. l inactivated poliovirus vaccine, and bivalent oral poliovirus vaccine: A randomized controlled trial. Vaccine, 41(41), 6083-6092. doi:10.1016/j.vaccine.2023.08.055

17. STIKO. (2025). RKI-Impfkalender 2025 in English. Retrieved from Recommendations of the Standing Committee on Vaccinations: https://www.rki.de/DE/Themen/Infektionskrankheiten/Impfen/Informationsmaterialien/verschiedene-Sprachen/Impfkalender/Impfkalender_Englisch.pdf?__blob=publicationFile&v=7
18. Sun, L., Wang, S.-f., Zhu, Y.-q., Wang, Y.-f., Zhang, J.-m., Wang, J.-h., . . . Li, Q. (2025, February 20). A real-world based study for immunogenicity and safety for three immunization schedules of polio vaccine. Scientific Reports, 15(1), 6185. doi:10.1038/s41598-025-89852-x
19. UK Health Security. (2025, June 3). Guidance Complete routine immunisation schedule from 1 January 2025. Retrieved from UK Health Security: https://www.gov.uk/government/publications/the-complete-routine-immunisation-schedule/the-complete-routine-immunisation-schedule-from-february-2022
20. UK Health Security Agency. (2023, May 24). Guidance Polio immunisation response in London 2022 to 2023: information for healthcare practitioners. Retrieved from UK Health Security Agency: https://www.gov.uk/government/publications/inactivated-polio-vaccine-ipv-booster information-for-healthcare-practitioners/polio-immunisation-response-in-london-2022-to-2023-information-for-healthcare-practitioners
21. Voorman, A., Famulare, M., McCarthy, K., Kroiss, S., & Lyons, H. Reinfection and WPV1 Evolution, March 17, 2022 slide deck (personal communication A Voorman, July 10, 2025)
22. World Health Organisation. (2020, November 27). Meeting of the Strategic Advisory Group of Experts on Immunization, 5–8 October 2020 – conclusions and recommendations. Weekly Epidemiological Record, 95(48), 585-607. Retrieved from https://www.who.int/publications/i/item/WER9548
23. Yusuf, N., de Wee, R., Foster, N., et al. (2014, November 1). Outbreak of Type 1 Wild Poliovirus Infection in Adults, Namibia, 2006. The Journal of Infectious Diseases, 210(Supplement 1), S353-S360. doi:10.1093/infdis/jiu069

Annex 4: June 2025 TAG Meeting Agenda

Day One - Tuesday, 24 June 2025 Grand Ball Room		
Time	**Session**	
Opening Session		
08:45-9:15	**Welcome and Registration**	
09:15-9:45	**Recitation of Holy Quran** **Introduction of Participants** **Opening Remarks** Chair of the Technical Advisory Group Regional Director WHO EMR Regional Director UNICEF ROSA Prime Minister's Focal Person for Polio Eradication Minister of National Health Services, Regulations and Coordination, Pakistan **Meeting Objectives** **Group Photo**	
09:45-10:00	*Coffee Break*	
Technical Sessions		
10:00-10:45	**Regional Overview of WPV1 Eradication** *Presentation 20 minutes, Discussion 25 minutes*	
10:45-11:45	**Review of Pakistan Polio Eradication Programme** ○ Epidemiological update ○ Improvements and remaining gaps in quality of SIAs since last TAG ○ Trends of missed children ○ Impact of insecurity on access ○ Key challenges and risks *Presentation 30 minutes, Discussion 30 minutes*	
11:45-12:45	**Situation in Punjab** ○ Focus should include core reservoirs and Central Pakistan *Presentation 25 minutes, Discussion 35 minutes*	
12:45-13:30	*Lunch*	
13:30-14:45	**Situation in Balochistan** ○ Focus should include core reservoirs and Central Pakistan *Presentation 30 minutes, Discussion 45 minutes*	
14:45-15:00	*Coffee Break*	

15:00-16:15	**Situation in Sindh** ○ Focus should include core reservoirs and Central Pakistan *Presentation 30 minutes, Discussion 45 minutes*	
16:15-17:00	**Situation in Islamabad, GB, and AJK**	
17:00-18:00	**Special Session to Focus On:** ○ Central Pakistan (30 minutes) ○ Bordering Districts and MMPs (30 minutes)	
Close of the Day		
18:00-20:30	**Meeting of TAG Members**	
Day Two - Wednesday, 25 June 2025 Grand Ball Room		
09:00-10:30	**Situation in KP** ○ Peshawar Bloc (45 minutes) *Presentation 15 minutes, Discussion 30 minutes* ○ Southern KP (45 minutes) *Presentation 15 minutes, Discussion 30 minutes*	
10:30-11:00	**Update on Molecular Epidemiology** *Presentation 15 minutes, Discussion 15 minutes*	
11:00 -11:15	*Coffee Break*	
11:15-11:45	**Session on SBCC:** ○ Summarizing interventions ○ Overview of integrated Strategy - Specific provincial needs to interrupt WPV1 transmission	
11:45-12:30	**Overview of EPI Situation and Update on PEI-EPI Synergy** ○ Follow up on the status of previous TAG recommendations ○ Alignment of EPI-PEI priority geographies ○ Trends of polio zero-dose children *Presentation 20 minutes, Discussion 25 minutes*	
12:30-13:30	**Country Plan for WPV1 Interruption by the Next Low Season**	
13:30-14:30	*Lunch*	

15:00-18:00	**Meeting of TAG Members**	
Close of the Day		
Day Three - Thursday, 26 June 2025 Grand Ball Room		
09:00-17:00	**Meeting of TAG Members**	
17:00-18:00	*Registration and Coffee*	
18:00-19:00	**Recommendations of the Technical Advisory Group**	
19:00-19:05	Comments by Chief Secretary Khyber Pakhtunkhwa	
19:05-19:10	Comments by Chief Secretary Balochistan	
19:10-19:15	Comments by Chief Secretary Sindh	
19:15-19:20	Comments by Chief Secretary Punjab	
19:20-19:25	Comments by Chief Secretary Gilgit Baltistan	
19:25-19:30	Comments by Chief Secretary AJK	
19:30-19:35	Comments by Commissioner Islamabad	
19:35-20:00	Reflections	
20:00-20:30	**Closing Remarks** Partners: CDC GF UNICEF Rotary International GAVI Donor Representative Chair of the Strategy Committee Director Polio, WHO HQ Prime Minister's Focal Person for Polio Eradication Minister of National Health Services Regulations and Coordination, Pakistan Chair of the Technical Advisory Group ***Vote of Thanks***	
20:30-21:30	*Dinner*	

Annex 5: List of Participants

Technical Advisory Group

Dr Jean-Marc Olivé, Chair
Dr Chris Wolff, Member
Dr Sebastian Taylor, Member
Dr Cara Burns, Member
Dr Muhammad Khalid Shafi, Member
Dr Ali Khan, Advisor
Dr Saima Abid, Advisor

Pakistan

Ministry of National Health Services on Regulations & Coordination

H.E. Syed Mustufa Kamal, Federal Minister for Health
Madam Ayesha Raza Farooq, Prime Minister's Focal Person for Polio Eradication

General Headquarters

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Ms Huma Nayab, National Synergy Coordinator
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Ms Melissa Grace Corkum, National Polio Team Leader – UNICEF
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Dr Tamkeen Ghafoor, National NSTOP Coordinator (Acting)
Brig Abul Hassan, National Security Advisor
Dr Nada Taqi, Surveillance Coordinator – WHO
Ms Julianne Birungi, Senior Social Behaviour Change and Communication Manager – UNICEF
Dr Mumtaz Ali Laghari, Deputy NSTOP Team Leader
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Mr Hasnat Malik, EOC Operations Officer
Mr Rashid Satti, PS to PM Focal Person

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Provincial Emergency Operations Center (PEOC) – Sindh

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Ms Mehreen Baloch, ADC - Islamabad
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Ms Salma Tahira, Admin Polio Programme – WHO

GPEI Partnership

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Rotary International

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Centers for Disease Control and Prevention (CDC)

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polio global eradication initiative

UNITED TO END POLIO | SHOWCASING REGIONAL SOLIDARITY FOR A LASTING POLIO-FREE WORLD

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