POLIO GLOBAL ERADICATION INITIATIVE

Global Polio Surveillance Action Plan, 2018-2020

EVERY LAST CHILD

WHO/POLIO/19.10

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Table of Contents

Acronyms and abbreviations

ACS	Active case search
AFP	Acute flaccid paralysis
AFR	African region
AFRO	African Regional Office
AVADAR	Auto-visual acute flaccid paralysis detection and reporting
bOPV	Bivalent oral poliovirus vaccine
CBS	Community-based surveillance
CDC	U.S. Centers for Disease Control and Prevention
CIF	Case investigation form
CSR	Community Surveillance and Response
cVDPV2	Circulating vaccine-derived poliovirus type 2
cVDPV3	Circulating vaccine-derived poliovirus type 3
CVPDV	Circulating vaccine-derived poliovirus
DEM	Digital elevation map
DRC	The Democratic Republic of the Congo
EMR	Eastern Mediterranean region
EMRO	Eastern Mediterranean Regional Office
ERC	Expert review committee
ES	Environmental surveillance
ESIWG	Environmental Surveillance and Implementation Working Group
e-surv	Electronic surveillance
EWARN	Early Warning Alert and Response Network
GIS	Geographic information system
GPEI	Global Polio Eradication Initiative
GPLN	Global Polio Laboratory Network
GPSAP	Global Polio Surveillance Action Plan
IDP	Internally displaced population
IDSR	Integrated Disease Surveillance and Response
IFA	Information for Action
IOM	International Organization for Migration
ISS	Integrated Supportive Supervision
IST	Intercountry Support Team
ITD	Intratypic differentiation
iVDPV	immunodeficiency-association vaccine-derived poliovirus
mOPV	Monovalent oral poliovirus vaccine
NEAP	National Emergency Action Plan
NGO	Nongovernmental organization
NPAFP	Non-polio acute flaccid paralysis
NPEV	Non-polio enterovirus
OCHA	The Office for the Coordination of Humanitarian Affairs
ODK	Open data kit
OPV	Oral poliovirus vaccine
PCS	Post-Certification Strategy
PESEP	Polio Environmental Surveillance Expansion Plan
PID	Primary immunodeficiency disorder
POLIS	Polio Information System
PONS	Poliovirus Nucleotide Sequencing database
RW	Residual weakness
SEAR	South-East Asia Region
SIA	Supplementary immunization activity
SMS	Short message service
STOP	Stop Transmission of Polio programme
STT	Surveillance Task Team
tOPV	Trivalent oral poliovirus vaccine
TAG	Technical Advisory Group
UNDP	United Nations Development Programmes
UNHCR	The Office of the United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
VDPV	Vaccine-derived poliovirus
VPD	Vaccine-preventable disease
WHO	World Health Organization
WPR	Western Pacific region
WPV	Wild poliovirus
WPV1	Wild poliovirus type 1

Tables and figures

Tables

Figures

Executive summary

As the eradication of wild poliovirus (WPV) comes within grasp, essential activities required to interrupt transmission and maintain a polio-free world become even more critical. This is especially true of surveillance, which detects the presence of the virus wherever it persists – in the last endemic countries and in countries and regions that, due to weakened health systems or gaps in immunization, have experienced outbreaks of vaccine-derived polioviruses (VDPVs). Through the time-tested gold standard of detecting and investigating cases of acute flaccid paralysis (AFP) to more recent developments testing environmental samples from sewage collection sites, surveillance is a multi-pronged tool used to surface information of paramount importance as the Global Polio Eradication Initiative (GPEI) works to close all remaining gaps and rid the world of polio.

The last mile toward eradication has been characterized by steep challenges. The primary challenge has been a lack of access in conflict-affected or security-compromised areas, in hard-to-reach geographies, or in other areas where a lack of community acceptance due to cultural, social, or religious norms have rendered some populations inaccessible to the programme. As the GPEI adjusts to meet these challenges in the field, it faces the operational challenge of synthesizing and analyzing an increasing amount of data across different sources which, if they are not fully interoperable and shareable through Polio Information Systems (POLIS), can lead to missed opportunities for action. The Global Polio Laboratory Network (GPLN) also faces challenges, as the expansion of environmental surveillance (ES) and the introduction of supplemental strategies such as AFP contact sampling have increased the volume of stool and sewage samples in need of testing to achieve sufficient sensitivity to confirm the interruption of transmission. Overall, a lack of supportive supervision and effective monitoring can contribute to these difficulties in the field and in laboratories. Additionally, the GPEI faces distinct operational challenges that arise as multi-disciplinary, multi-agency, in-country and remote teams come together to coordinate and collaborate as one team under one roof.

The purpose of the *Global Polio Surveillance Action Plan* (GPSAP) is to support endemic, outbreak, and high-risk countries in evaluating and increasing the sensitivity of their surveillance systems; to share supplemental strategies that may help in closing gaps in detecting polioviruses, including strategies for immunodeficiency-associated vaccine-derived polioviruses (iVDPVs); to strengthen coordination across surveillance field teams, the GPLN, and POLIS; and to scaffold activities across each area of work in order to leverage a more effective, efficient programme and document zero cases worldwide.

The GPSAP is organized into six mutually-supportive objectives:

1. Attain or maintain AFP surveillance systems sensitive enough to detect all WPV transmission and to provide evidence supporting the interruption of transmission
2. Implement a global ES network expansive enough to contribute to the timely detection of polioviruses
3. Establish a surveillance system to detect polioviruses among patients with primary immunodeficiency disorders (PIDs)
4. Ensure the GPLN maintains flexibility and capacity to accommodate evolving programme needs
5. Increase efficiency in collecting, managing, validating, and using data for action

6. Enhance effectiveness of surveillance programme operations, management, and budget processes

The GPSAP outlines activities and indicators for each objective that will be conducted at the global, regional, and country levels for all priority countries. The Action Plan will be in effect from the end of 2018 until 2020, at which point the plan will be re-evaluated to capture new developments within poliovirus surveillance, to reflect changes to policy and global recommendations for polio vaccine use, to incorporate antiviral treatments that are anticipated to come to market in the next term, and to report on the latest progress and any challenges that remain.

The Action Plan has been developed by the Surveillance Task Team (STT) alongside current and forthcoming surveillance plans. Most immediately, the GPSAP follows the *Polio Environmental Surveillance Expansion Plan* (PESEP), developed in 2015 by the GPLN and the Environmental Surveillance and Implementation Working Group (ESIWG) to rollout an expansion of country ES collection sites. It also follows the development of strategies for implementing surveillance in hard-to-reach areas and populations, with a special focus on high-risk mobile populations. Four additional plans are anticipated following the publication of the GPSAP: (1) a guidance document for poliovirus surveillance among PID patients; (2) a *Global Field Poliovirus Surveillance Guide* to be developed by the World Health Organization (WHO); (3) a *Communication for Polio Surveillance* toolkit to support the efficacy of AFP surveillance among healthcare providers; and (4) a GPLN-specific action plan that will be focused on aligning laboratory structure and functions with programme needs during the endgame and beyond the global certification of eradication, to secure the gains of the programme through surveillance activities that will be maintained to protect a polio-free world.

Printed 04 February 2019; updated 07 May 2019

Introduction

Surveillance for detecting the transmission of poliovirus is critical to reach global polio eradication, as high-quality surveillance permits the timely detection of poliovirus transmission due to wild poliovirus (WPV), vaccine-derived polioviruses (VDPVs), and Sabin-like viruses.

The key surveillance system recommended to detect transmission of poliovirus has been and will remain surveillance for cases of acute flaccid paralysis (AFP). Environmental surveillance (ES) has been introduced by the Global Polio Eradication Initiative (GPEI) to compliment AFP surveillance and it has proven useful in detecting transmission of polioviruses in specific settings. The development of a third surveillance system is currently underway to address the prolonged excretion of polioviruses by a subset of immunocompromised individuals. These surveillance strategies for detecting poliovirus among patients with primary immunodeficiency disorders (PIDs) are being established to identify immunodeficiency-associated vaccine-derived poliovirus (iVDPV), which represents an emerging risk as eradication comes within grasp.

Taken altogether, these three surveillance systems are essential operations – from the country level to the global level and across the entire GPEI, referred to within this document as the 'programme.' Furthermore, not only are all three systems necessary as a multi-pronged strategy to achieve eradication, but their success in detecting the virus requires both a well-functioning global laboratory network for confirmatory testing and a comprehensive polio information system to permit ready access to data from the various sources.

Purpose

The purpose of the *Global Polio Surveillance Action Plan* (GPSAP) is primarily to outline surveillance strategies and activities for countries to attain or maintain a surveillance system sensitive enough to detect the circulation of any polioviruses. It is also intended to strengthen coordination between the GPEI's surveillance systems, the Global Polio Laboratory Network (GPLN), Polio Information Systems (POLIS), and the management of global, regional, and country surveillance teams. Although the surveillance strategies and activities contained in the GPSAP are specifically designed to build capacities within endemic, outbreak, and high-risk countries, they are relevant to all countries (Figure 1).

While this document is focused on ensuring high-quality surveillance to detect WPV and meet the criteria for global certification, the strategies are also relevant for the detection of VPDVs and Sabin-like viruses. These strategies will increase in importance beyond eradication and should be considered integral to Goal Three (Detect and Respond) of the *Post-Certification Strategy* (PCS).[1] Over time, surveillance strategies will evolve based on the needs of priority countries. As such the GPSAP will be a living document, updated to reflect changes as the world approaches global certification and enters a new era focused on protecting the gains of the polio eradication programme.

[1] World Health Organization. Global Polio Eradication Initiative. Polio Post-Certification Strategy. April 2018. (http://polioeradication.org/polio-today/preparing-for-a-polio-free-world/transition-planning/polio-post-certification-strategy) Accessed on 14 June 2018.

Objectives

There are six mutually-supportive objectives of the GPSAP:

1. Attain or maintain AFP surveillance systems sensitive enough to detect all WPV and VDPV transmission and to provide evidence supporting the interruption of transmission
2. Implement a global ES network that is expansive enough to contribute to the timely detection of polioviruses
3. Establish a surveillance system to detect polioviruses among patients with primary immunodeficiency disorders (PIDs)
4. Ensure the Global Polio Laboratory Network (GPLN) maintains the flexibility and capacity to accommodate the evolving needs of the programme
5. Increase efficiency in collecting, managing, validating, and using data for action
6. Enhance effectiveness of surveillance programme operations, management, and budget processes

Audience

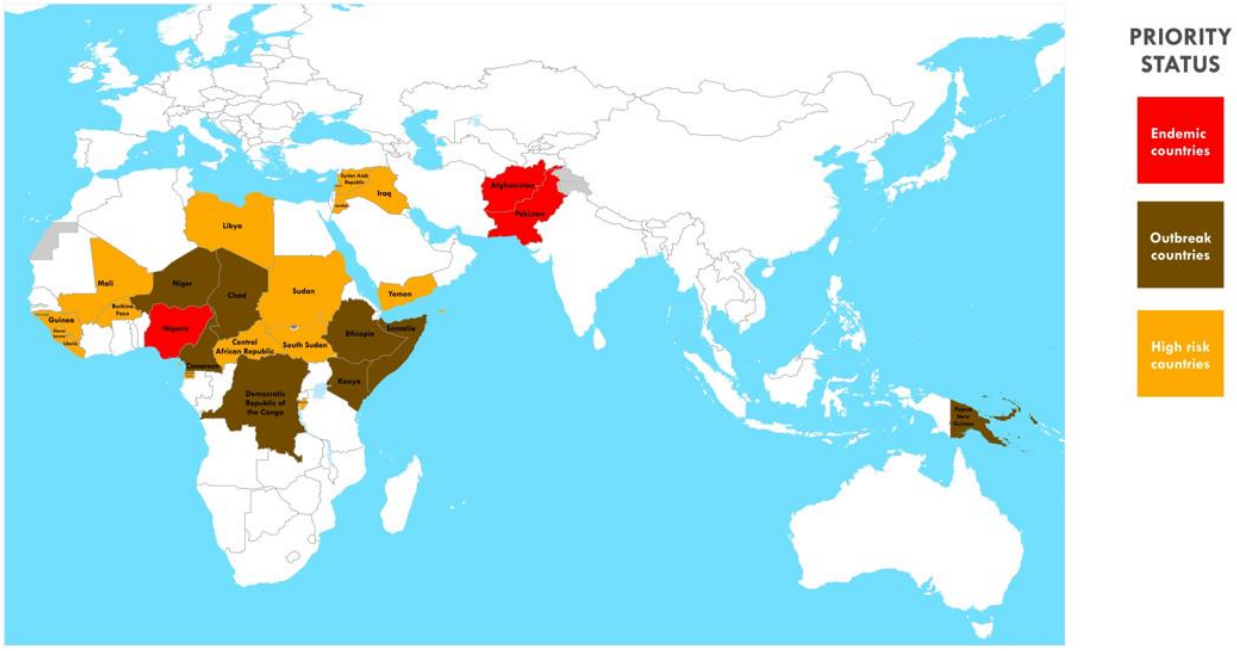
This Action Plan is intended for use by individuals and organizations involved in polio eradication efforts. As such, potential users include: national polio and immunization programme managers and staff; WHO and UNICEF country and regional focal points for polio eradication and immunization efforts; polio eradication and immunization technical advisory bodies; and partners supporting the GPEI.

Geographic areas of focus

The purpose and objectives of the GPSAP are global in nature; however, considering the relatively focused geographic areas of concern for WPV and the emerging risks associated with VDPV outbreaks, the Action Plan will primarily focus on countries that meet the following criteria:

- Countries endemic for WPV type 1 (WPV1)
- Countries affected by a WPV or circulating vaccine-derived polio (cVDPV) outbreak.
- Other high-risk countries identified through multiple inputs that include: WHO's Eastern Mediterranean Regional Office (EMRO) and African Regional Office (AFRO) risk assessments, AFRO's Surveillance Strengthening Initiative (SSI), and the surveillance prioritization assessment developed by the GPEI Surveillance Task Team (STT). Countries identified through these assessments have persistent gaps in surveillance and are chronically vulnerable to poliovirus transmission.

Figure 1. Geographic areas of focus for implementation of the Global Polio Surveillance Action Plan*



**The map and corresponding list of countries will be formally reviewed and updated every six months or as necessary following the detection of a new outbreak.*

The following 28 countries highlighted in Figure 1 represent priority countries due to ongoing or high risk for poliovirus transmission and limited country capacity to adequately address those risks (Table A).

Table A. Priority countries, November 2018*

Priority group*	WHO Region	List of countries
Endemic	AFR	Nigeria
	EMR	Afghanistan, Pakistan
Outbreak	AFR	**Lake Chad Basin** (Chad, Cameroon, Niger), **Horn of Africa** (Kenya, Ethiopia), Democratic Republic of Congo
	EMR	**Horn of Africa** (Somalia)
	WPR	Papua New Guinea
High-risk	AFR	**West Africa** (Guinea, Sierra Leone, Liberia, Burkina Faso, Mali, Guinea Bissau), **Central Africa** (Central African Republic, Equatorial Guinea, Burundi), **Horn of Africa** (South Sudan)
	EMR	**Middle East** (Iraq, Jordan, Lebanon, Syria), **Horn of Africa** (Djibouti, Yemen, Sudan), **North Africa** (Libya)

AFR = African region; EMR = Eastern Mediterranean region; WPR = Western Pacific region

**The list will be formally reviewed and updated every six months or as necessary following the detection of a new outbreak. For the latest priority countries, please go to www.polioeradication.org*

As this list of priority countries is expected to change as outbreaks are detected or closed, or as other critical risks to or gaps in surveillance are identified, the GPSAP will evolve to reflect changes in the field and will therefore be a living Action Plan.

Challenges in achieving sensitive polio surveillance

Despite historical success in polio surveillance, several challenges remain to reaching global certification of WPV eradication and ultimately achieving a polio-free world. At present and for the purposes of this Action Plan, the most pressing challenges are: (1) populations and areas missed by surveillance, (2) data not analyzed and used for action, (3) weak supervision and monitoring, and (4) the increasing risk and importance of detecting individuals shedding iVDPV.

Detailed country reviews have identified pockets of populations, particularly in security-compromised areas which were persistently missed by surveillance efforts. The inset box highlights the issue of conflict and security that rendered Borno, Nigeria inaccessible to the programme in 2016. Populations in Syria, Iraq, Yemen, and many other countries must contend with similar challenges posed by a lack of personal security and safety that impacts both the mobility of people living within these areas and field staff who cannot reach these areas for immunization or surveillance-related activities. Other populations, such as those in parts of South Sudan and the Democratic Republic of the Congo (DRC), are difficult to reach due to geographic barriers and logistical issues related to transportation. Additionally, because AFP surveillance is predominantly facility-based through a network of healthcare providers sensitized to the signs and symptoms of poliomyelitis, populations that do not seek care in health facilities are more likely to be missed. This includes: nomadic and mobile populations; refugee and internally displaced populations (IDPs); those served by private or military healthcare services; and the urban poor and others who (for cultural, political, or other reasons) choose not to access health care.

Ensuring that these populations are captured by polio surveillance and that the programme can access areas that are hard-to-reach or affected by conflict will require specially tailored approaches.

Prolonged, undetected WPV1 transmission in Borno, Nigeria

Over the last decade, Nigeria has achieved and maintained AFP surveillance indicators well above globally set standards. In September 2015, following a period of more than one year with no reports of WPV and high performing surveillance indicators, Nigeria was successfully removed from the list of endemic countries by the World Health Organization (WHO). However, in August 2016, two years after the last reported case of WPV1, two new cases of WPV1 were reported from internally displaced populations (IDPs) in Borno State. Genetic sequencing indicated that these cases were closely related to a 2011 WPV1 virus. The emergence of these two cases indicated prolonged circulation of WPV1 that went undetected because the area was inaccessible to the programme. A surveillance review in 2016 concluded that at least half of the settlements in the state had been inaccessible since 2014 due to restricted population movement and a lack of a cellular network for mobile phone communications to support immunization and surveillance efforts.

The effectiveness of the programme in encountering these and other challenges will always come down to a skilled, trained, and motivated workforce, which is the backbone of polio surveillance. Supportive supervision and monitoring are essential if the world is ever to reach eradication. Maintaining routine

supervision and monitoring amidst competing priorities and heavy workloads is the first line of defense against faltering surveillance systems. However, declines in supportive supervision and monitoring have resulted in ineffective and inefficient implementation of surveillance activities. One way to reduce these barriers to performance is to ensure this workforce has sufficient funds to maintain activities over time.

AFP surveillance data collected through innovative mobile data collection tools on active surveillance visits, as well as through community-based surveillance (CBS) methods, provides extensive information that can be used to identify problems or weaknesses with surveillance procedures and processes, data quality (i.e., accuracy and completeness), and supervision. These data sets can help directly target areas in need of intervention – and when multiple data sources are viewed together, they provide a broader, more holistic view that can uncover new potential solutions and innovations. Yet when these data sources are not routinely analyzed by subnational or national staff, the programme misses opportunities to make changes or course correct to hasten the interruption of poliovirus transmission locally and globally. While challenges are to be expected in implementing surveillance in conflict-affected areas, surveillance reviews conducted in accessible or partially-accessible areas have also identified concerns about the quality of case detection and investigation.

Finally, there is increasing recognition of the need of a third surveillance system to detect iVDPVs. Because AFP surveillance cannot detect immunocompromised patients who excrete polioviruses but are asymptomatic, and environmental surveillance cannot identify the source of an iVDPV, a surveillance system that understands primary immunodeficiency disorders (PIDs) and the health-seeking behaviors of PID patients will need to be established to identify those at the highest risk of shedding iVDPVs.

Objective 1. Enhancing AFP surveillance in all priority countries

Enhancing sensitivity of AFP surveillance in all priority countries		
Main objective	Major activities	Key performance indicators
Attain or maintain AFP surveillance systems sensitive enough to detect all WPV transmission and to provide evidence supporting interruption of transmission	1. Detect, investigate, and validate all AFP cases	• All priority countries meet WHO regional surveillance indictors standards at the administrative 2 level
	2. Conduct critical reviews of surveillance processes and surveillance data for action	• External surveillance reviews performed for at least eight priority countries
	3. Facilitate a skilled workforce	• Updated Field Surveillance Guide developed
	4. Increase AFP surveillance awareness	• Communication training toolkit published
Monitored by WHO HQ, Regional and Country offices, Sub-regional partners		

Background

Since the 1988 World Health Assembly resolution that declared a commitment to the global eradication of polio, the key strategy recommended to detect transmission of poliovirus has been surveillance for AFP cases. Theoretically, countries should be able to detect any individual with suspected AFP from any segment of the population through active and passive AFP surveillance (i.e. AFP surveillance conducted through active visits by surveillance teams to health facilities or passively through reports from sensitized healthcare providers). Maintaining high-quality AFP surveillance is critical to achieving a system that is sensitive enough to detect poliovirus anywhere in a country. Yet in practice, challenges detract from sufficiently sensitivity in AFP surveillance because: (1) AFP surveillance itself does not operate effectively; (2) the programme is unable to routinely access or reach special populations with AFP surveillance; (3) the broader health infrastructure is too weak or non-existent to support AFP surveillance; or (4) in polio-free countries, attention to and funding for AFP surveillance is declining.

The difficult reality is that, in the last mile to eradication, there are no simple or easy solutions to address surveillance gaps. A multi-pronged, holistic approach tailored to the context of each country is necessary; however, to do this, countries must first identify and understand the limitations of their AFP surveillance system to implement effective strategies to address them (see Annex 2, Auditing of AFP surveillance). The following activities can help country teams focus on critical improvements to strengthen the sensitivity of their AFP surveillance systems.

Activity 1. Detect, investigate, and validate all AFP cases

The primary mechanism for enhancing the detection, investigation, and validation of AFP cases will be through a specific focus on improving active surveillance and investing in enhancements to passive surveillance. Priority countries will undertake a targeted auditing exercise to assess AFP surveillance

performance (see Annex 2). Information from the auditing exercises will be translated into a surveillance action plan to address identified gaps. At all times, the goal will be to foster local capacity and enhance the basics of AFP surveillance.

Of importance to enhancing AFP surveillance is first understanding and mapping inaccessible areas (due to conflict and insecurity) that prevent or limit the ability of AFP surveillance to be conducted. These blinds spots are a threat to polio eradication efforts as they undermine a precise understanding of ongoing virus transmission and hinder the programme's ability to confidently conclude when virus transmission has ceased. The detection of WPV1 in Borno State in 2016, almost a year after Nigeria was declared polio-free, highlights this vulnerability. To better understand these blind spots, efforts are underway to estimate the number of children who are not reached by AFP surveillance or supplemental activities.

In areas with inaccessible populations as well as other special populations (see Annex 3), improvements focused only on the existing surveillance system will be insufficient to address observed challenges. Therefore, special steps to enhance capacity to detect AFP cases will be taken. Activities such as ad hoc AFP active case searches (see Annex 4) will be used in parallel with other strategies to strengthen AFP surveillance. In addition, chronic obstacles to AFP detection as a result of weak or non-existent health infrastructure will be addressed through activities such as the targeted implementation of CBS (see Annex 5) and the use of innovations (see Annex 6).

When individuals with AFP are detected, thorough investigations are not always completed, thereby hampering the ability to identify poliovirus as the cause of illness. Such incomplete investigations include limiting case investigations to those identified within 60 days of paralysis onset instead of the recommended six months, and not routinely conducting AFP contact sampling for inadequate AFP cases (see Annex 7). Validation quality of AFP case investigations (i.e., ensure accuracy of collected information) also varies by country and may not be conducted in a manner to obtain reliable and accurate data. In some settings, case validation is completed by the original investigator, which provides limited benefit in correcting errors in the original investigation. Discrepant information between the original investigation and case validation may be identified but is not regularly used to define corrective action, such as resensitization of interviewing techniques and data collection (e.g., clinical aspects of AFP), or to correct erroneous AFP surveillance data.

Activity 2. Conduct critical reviews of surveillance processes and data for action

Poor data quality, management, and analysis hinder the ability of the GPEI to accurately assess the current status of eradication and appropriately direct policies and activities. Incomplete, falsified, and outdated data are just a few issues that have been identified. Data management issues include a lack of regular data cleaning and a lack of final classification of AFP cases despite availability of laboratory results. Furthermore, data analyses vary within and across countries. While monitoring of non-polio acute flaccid paralysis (NPAFP) rates and stool adequacy is routine, regular review of other surveillance indicators such as timeliness may not be systematic. Moreover, analysis of AFP surveillance data at the

operational level is not routinely conducted, thus leading to missed opportunities for immediate corrective actions.

In addition, innovative approaches for looking at the data beyond the surveillance indicators are necessary to overcome the current challenges to surveillance (see Annex 8). These innovative approaches include identifying potential data integrity issues. The 2016 detection of WPV1 in Borno, Nigeria – despite high AFP surveillance indicators indicating high sensitivity and specificity – point to the need to examine AFP surveillance more critically and in conjunction with other data sources, such as conflict and accessibility data and geocodes of AFP cases, to identify potential blind spots (see Annex 9).

The use of multiple data sources that provide visibility into AFP surveillance sensitivity "beyond the indicators" is critical to inform global and regional partners as they allocate finite regional and global human and technical resources to countries. A country prioritization algorithm was developed to guide global and regional resources for direct country support by combining AFP surveillance indicators with possible data quality issues, the risk of virus transmission, and knowledge of country capacity to mitigate risks. Findings from these analyses are also used to inform external desk and field AFP surveillance reviews. External reviews provide an opportunity to better understand and directly support efforts to improve surveillance at the national and subnational level.

Activity 3. Facilitate a skilled workforce

Recognizing the challenges to AFP surveillance, an updated *Global Field Polio Surveillance Guide* will be developed for adoption by regional, sub-regional, and country-level partners by early 2019. The guide will address many of the implementation-level details on detection, reporting, investigation, and validation that should be performed in a standardized and systematic manner across countries. The guide will be used to inform country-specific AFP surveillance improvement action plans.

At a time when the number of polio cases in countries is declining, ensuring a knowledgeable and skilled workforce is a priority for the success of AFP surveillance. Having a skilled workforce entails periodic trainings of new staff and refresher trainings for existing staff, as well as systematic, supportive supervision for hands-on learning. In addition, visits to AFP surveillance reporting sites for any purpose (e.g., active surveillance visit, field review) should be an opportunity for quick resensitization, regardless of recent or future trainings. The availability of an updated *Global Field Polio Surveillance Guide* will be used to inform these trainings and ensure activities are performed in a standardized and systematic manner, reflecting the most currently recommended procedures in the last mile to eradication.

The availability of qualified individuals to supplement the current workforce is also a challenge, especially in endemic or outbreak areas where there is a struggle to keep up with the needs of the programme to effectively interrupt WPV or cVDPV transmission. While it is preferable and optimal to have staff from local or nearby communities, countries can benefit from reassigning surveillance officers from different geographic areas within the country or from identifying surveillance expertise externally

to support national and subnational level activities (e.g., the Stop Transmission of Polio [STOP] programme, GPEI consultants, and national consultants).

Activity 4. Increase AFP awareness

The ability to detect poliovirus transmission hinges on the awareness of healthcare providers, reporting sites, and the community of the signs and symptoms of AFP. While trainings in a more structured learning environment may be optimal for healthcare providers and reporting sites, simple ongoing measures such as supportive supervision and distribution of job aids can help maintain high awareness. Furthermore, periodic feedback to reporting sites on the status of AFP surveillance in country can help staff stay engaged by seeing their contribution to the larger eradication effort.

For a holistic approach to maintaining high levels of awareness, efforts to increase AFP awareness among healthcare providers and reporting networks should be pursued in parallel with activities targeting communities. Many communication tools from the United Nations Children's Fund (UNICEF) and WHO country offices and other GPEI partners are already available for use in countries. The creation of a *Communication for Polio Surveillance* toolkit would help to make messaging consistent across users about what polio is, the signs and symptoms of AFP, and how to report or seek care for AFP. This is especially important for populations that are ethnic, linguistic, or religious minorities within the larger community.

Tasks to enhance AFP surveillance in all priority countries

From 2018 to 2020, the programme will focus on the following tasks. Further details of tasks are available in referenced Annexes.

Activity 1. Detect, investigate and validate all AFP cases

- Review and publish an annual surveillance status report.
- Countries to conduct a thorough audit of their AFP surveillance system and map activities to identify gaps, especially those associated with high-risk, access-compromised, and/or hard-to-reach populations (see Annex 2, Auditing of AFP surveillance).
- Based on results from the AFP surveillance audit, countries will develop specific action plans to address gaps identified with support from the regional and/or sub-regional partners.
- Using results from the AFP surveillance audit, countries will develop guidelines to support implementation of the actions plans and share with regions for review.
- Enhance active surveillance in all priority countries through the establishment of mechanisms to verify active surveillance. The programme will ensure the broad use of electronic monitoring tools, signed physical logbooks, and frequent supervisory field support visits.
- Improve passive surveillance by enhancing the utility of the existing country-level surveillance infrastructure, including the Integrated Disease Surveillance and Response (IDSR) systems, Early Warning Alert and Response (EWARN) systems, and Community Surveillance and Response (CSR) systems. "Zero-reporting" will be encouraged to ensure the presence of a robust passive

surveillance system. Four priority countries identified by WHO endemic regional offices (AFRO and EMRO) will be selected for accelerated support.

Activity 2. Critically review surveillance processes and data for action

- Countries to perform regular data analyses of all data collected as part of AFP surveillance activities (see Annex 8, Improving Data Quality and Analysis, and Annex 9, Special Monitoring and Evaluation Activities). To identify blind spots within the country, data are to be analysed in conjunction with other data sources, such as conflict and inaccessible areas and population movement. Data should be analysed by staff at the national-level, and national-level staff should support analyses by staff at subnational levels.
- Develop and routinely update maps of possible poliovirus transmission blind spots in the AFRO and EMRO regions. This includes mapping conflict areas and incorporating accessibility data at the lowest subnational level possible.
- Conduct a biannual surveillance prioritization assessment to identify priority countries for targeting and supporting surveillance improvement. The assessment is based on an initial data-driven approach that is updated with guidance from WHO's endemic regional offices (AFRO and EMRO).
- Guidelines for conducting surveillance reviews will be developed to ensure that high-quality reviews will identify gaps or issues that will need to be addressed during the review, such as the need for immediate training.
- Conduct external desk or field reviews in at least eight countries per year. The goal will be to assess the surveillance performance of countries at the national level and simultaneously help to directly address gaps. Sub-regional partners and countries will be encouraged to perform regular targeted surveillance reviews at the subnational level that also includes supportive measures with corrective action to address identified gaps.
- Evaluate the performance, or need for, CBS in areas that are potential blind spots in endemic and outbreak countries, as well as areas bordering these countries.

Activity 3. Facilitate a skilled workforce

- WHO to revise and disseminate an updated *Global Field Polio Surveillance Guide*.
- Based on the revised *Global Field Polio Surveillance Guide,* regional and country surveillance guidance documents will be updated to promote standardization across regions and countries and to improve the quality of available job aids.
- Continue to fast-track the development and implementation of trainings and training materials for AFP surveillance in priority countries.
- Change the paradigm of surveillance reviews from a "review and share recommendations system" to a "review and support system." Following each surveillance review, reviewers and selected staff will be required to provide specific supportive supervision to help address capacity gaps.
- Identify or maintain a dedicated surveillance coordinator for the Lake Chad countries, the DRC, the Horn of Africa Coordination Office, and Somalia.
- Deploy qualified, experienced international staff as long-term support to focus on surveillance strengthening in outbreak-affected countries.

- Review and restructure deployment of international consultants, STOP officers, and/or national staff to ensure balanced use of globally-available resources.

Activity 4. Increase AFP awareness

- To enhance the quality and range of available products in multiple languages, explore potential collaboration with WHO's Communication Team and UNICEF on the development, packaging, and availability (through electronic means) of a *Communication for Polio Surveillance* toolkit.
- Make the toolkit and other communication materials specific to polio surveillance available on the GPEI website.

Table B. Monitoring of activities for Objective 1 (AFP surveillance sensitivity)

Objective 1. Attain or maintain AFP surveillance systems sensitive enough to detect all WPV transmission and to provide evidence supporting the interruption of transmission			
Activities	**Global**	**Regions/sub-regions**	**Priority countries**
1. Detect, investigate, and validate all AFP cases	• Annual surveillance status report published	• Four countries selected and provided accelerated support for enhancing passive surveillance including IDSR, EWARN, and CSR	• Annual audit of AFP surveillance • Action plans with strategies to address gaps available • Guidelines to implement strategies available • Electronic tools available for monitoring active surveillance visits
2. Conduct critical review of both surveillance processes and surveillance data for action	• Country prioritization for surveillance available twice a year • Guidelines for conducting surveillance reviews published	• Polio transmission blind spot maps published twice a year • Field or desk review carried out in at least eight countries per year • Report of CBS (or completed evaluation report) available for identified blind spot areas in the region	• AFP surveillance report including blind spot analyses and maps available twice a year • At least two targeted subnational surveillance reviews carried out per year
3. Facilitate a skilled workforce	• Updated Global Field Polio Surveillance Guide distributed • Materials for surveillance trainings and training facilitators available	• Regional and country-specific surveillance guides published, adapted from the global guide • Training implemented in the DRC, Somalia, and select high-risk countries (Lake Chad Region) • Documentation of supportive supervision activities completed to ensure implementation of recommendations from surveillance reviews • Surveillance coordinator for key countries/regions maintained through 2020 • Roster of qualified international and national staff available and documentation of deployments	
4. Increase AFP surveillance awareness	• *Communication for Polio Surveillance* toolkit posted on GPEI website for use by countries		

Objective 2. Expand environmental surveillance (ES) network

Expand ES Network		
Main objective	Major activities	Key performance indicators
A global ES network that is expansive enough to contribute to the timely detection of polioviruses	1. Improve the quality and sensitivity of existing network	• 100% of sites collect at least one sample every month
	2. Expand the ES network to new towns, cities, and countries	• Increase in the number of countries implementing ES sites by at least five priority countries
	3. Review existing guidance document and develop concise field operational guidelines with core indicators	• Compatible ES systems and standardized ES data across the programme
Monitored by WHO HQ, Regional and Country offices, and Sub-regional partners		

Background

Environmental surveillance (ES) for poliovirus is the routine collection and testing of environmental (sewage) samples from designated locations draining large target populations. ES supplements AFP surveillance by providing information on the presence and spatial scale of poliovirus transmission.

As a surveillance system, it has been in use for more than 70 years.[2] In the pre-vaccine era in the United States, ES was used to monitor virus circulation in major cities. In the past 30 years, ES has detected and monitored the re-introduction of WPV in polio-free countries such as Finland, the Netherlands, and Israel, and in some cases ES has detected the presence of the virus without a single confirmed WPV case. ES has also led to early detection of the new emergence of VDPVs. Because of its utility in providing confidence for the interruption of circulation, ES has been used to document the elimination of WPV in Egypt and India. In recent years, ES has been particularly useful in improving the overall sensitivity of the polio surveillance system in countries where an extensive network of ES has been established (see Annex 10, Environmental Surveillance). While countries endemic for WPV have been at the forefront of the use of ES, in the context of the evolving global risk for circulating VDPV type 2 (cVDPV2) following the cessation of trivalent oral poliovirus vaccine (tOPV), ES could potentially become even more valuable beyond endemic countries.

[2] For a historical survey on environmental surveillance and its achievements within the programme, see GPEI, Guidelines on Environmental Surveillance for Detection of Poliovirus. Working Draft March 2015. http://polioeradication.org/wp-content/uploads/2016/07/GPLN_GuidelinesES_April2015.pdf. Accessed on 15 June 2018

Activity 1. Improve the quality and sensitivity of existing network

Conditions at ES sampling sites vary from place to place and, as a result, the potential yield and epidemiological significance of these sites also varies. ES sites are ideally placed in areas with convergent sewage networks, where sampling can be done at inlets to sewage treatment plants, pumping stations, or other major sewage collectors that cover a population of approximately 100,000 to 300,000. ES sites are usually few in number and cover a small target population; therefore, the absence of a positive ES sample does not indicate the absence of poliovirus circulation in the country. The interpretation of positive ES sample results varies depending on whether the AFP surveillance system also detects cases. For both positive and negative results, the interpretation should account for the epidemiological context. Interpretation of the results requires careful, site-by-site review and analysis by epidemiologists and virologists intimately familiar with the country's AFP surveillance performance, demographic characteristics, type-specific immunity level, migration and other movement patterns of the population living in and around the drainage zone.

Responsibility for field management (e.g., sample collection, shipment and transport) cannot be disconnected from AFP surveillance activities, especially when the responsibility for ES lies outside the Ministry of Health. At all levels, field surveillance teams should be made responsible for the day-to-day running of ES activities following initial rollout. As much as possible, AFP surveillance focal points need to be engaged in ensuring ES activities are carried out, as it is a critical polio surveillance activity.

The selection and operationalization of new sites shall always remain contingent on agreement from the nationally responsible laboratory or with a regional reference laboratory, if such capacity is not available in the country.

Why is ES sensitivity sometimes higher than AFP surveillance?

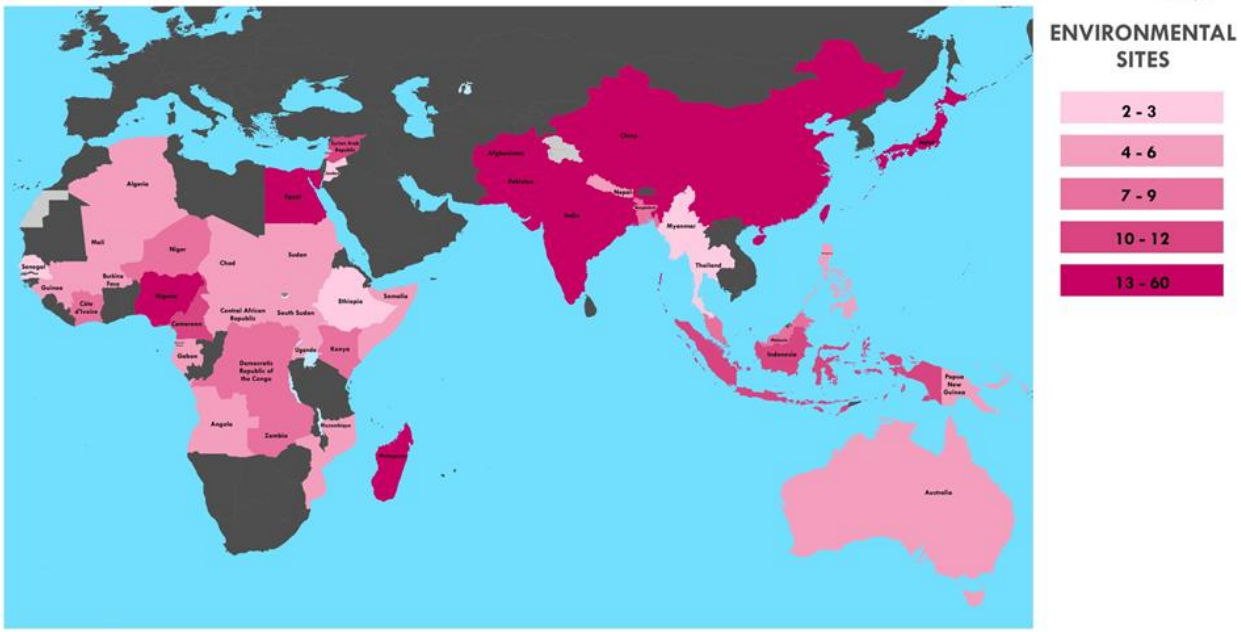
In countries with mature ES networks (as indicated by multiple ES sites), ES sensitivity has been higher than AFP surveillance. This is due to the low case-to-infection ratio for paralytic polio which ranges in fully susceptible populations from 1:200 to 1:1900 according to WPV type. With increasing population immunity, the case-to-infection ratio declines further. As all infected persons (regardless of symptomology) shed poliovirus, the probability of detecting poliovirus circulation by ES is better than AFP.

Activity 2. Expand the ES network to new towns, cities, and countries

In recognition of the increasing value of ES, the GPEI through the Environmental Surveillance and Implementation Working Group (ESIWG) and the Global Polio Laboratory Network (GPLN), launched the *Polio Environmental Surveillance Expansion Plan (PESEP)* in 2015. The GPEI has since expanded the ES network to new priority countries and priority cities and towns (see Figure 2), and this expansion will continue through 2019. Although substantial progress has been made in implementing the PESEP, several countries that were originally targeted for expansion have yet to start ES. Principle barriers to the complete implementation of the PESEP have been insecurity, lack of complete buy-in from relevant governments, lack of consensus at different levels within the GPEI, and rapid risk evolution. The primary aim for this objective remains the full realization of the approved PESEP.

As the current poliovirus epidemiology evolves, especially in the context of post-tOPV switch and emergence of VDPV, the demand for ES increases. As setting up ES in all countries is not feasible in the short-term, innovative approaches such as time-limited, ad hoc ES are being investigated (see Annex 10, ad hoc ES in security-compromised areas).

Figure 2. Status of environmental surveillance in AFR, EMR, SEAR and WPR, 2018*



**Countries labelled in the figure represent both GPEI-funded and self-funded ES programmes.*
Source: World Health Organization, updated 30 January 2019

Activity 3. Review existing guidance documents and develop concise field operational guidelines with core indicators

Although progress has been made in terms of expansion of the ES network, challenges have been observed with regard to timely sample collection and shipment in a number of countries. Furthermore, the sensitivity of ES sites cannot be currently assessed due to the lack of standardized ES performance indicators. As the GPEI continues to invest in the expansion of the network, it is critical that the quality and sensitivity of the network be improved. The ESIWG has developed substantial guidance documents to help regional and country teams to implement ES.

Data management strategies have yet to catch up with the Expansion Plan. With the expansion of ES, countries had to set up data collection and storage tools to manage their data. This has led to the use of MS Excel workbooks and MS PowerPoint slide decks as the primary mechanisms for the recording and producing visualization of ES data at the country, sub-regional, and regional levels. These are not harmonized across countries and limit analysis capabilities.

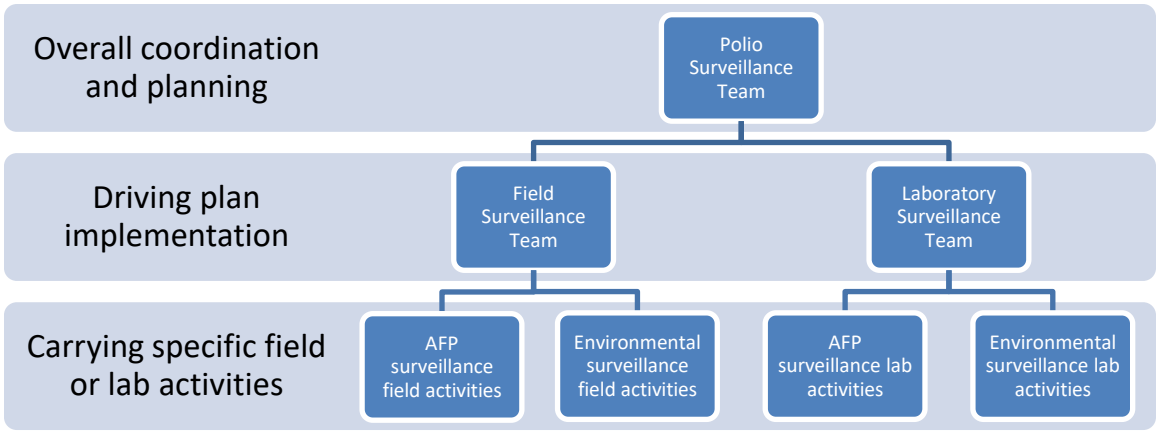
Tasks to expand the ES network

From 2018 to 2020, the programme will focus on the following tasks. Further details of tasks are available in referenced Annexes.

Activity 1. Improve the quality and sensitivity of the existing ES network

- Streamline field operational management of ES to ensure full engagement of and responsibility by the field surveillance program within countries for the field component of ES surveillance (Figure 3).
    - In priority regions and all priority countries, all day-to-day management of ES field operations to shift from the lab focal person to the field surveillance focal person.
    - Train a cadre of field epidemiologist/field surveillance officers to carry out field assessments in areas targeted for ES expansion.
- Review the performance of currently operational sites by conducting a desk review of the performance of ES in priority countries
    - For selected countries with underperforming ES sites, a field review of the national ES system will be conducted with the aim of ensuring that procedures for selection of sites, specimen collection, packaging, and shipment are being adhered to.

Figure 3. Operational framework for a streamlined management of polio surveillance



Activity 2. Expand the ES network to new towns, cities, and countries

- With appropriate adjustments for priority country lists, fully implement the PESEP. Review challenges faced in different regions, sub-regions, and countries.
    - Develop a revised timetable outlining planned activities by region.
    - Carry out reviews on the progress of implementation on a semi-annual basis.
    - Focus on countries originally recommended for ES surveillance but where ES has not been established to date. WHO regions will accelerate the expansion of ES to priority countries.
    - In priority countries which currently have limited ES networks, WHO regions will explore expanding the ES network to new population centres.

  - In endemic countries, the programme will implement the ES network expansion (if any) outlined within the National Emergency Action Plan (NEAP) and approved by the appropriate Technical Advisory Groups (TAGs).
- Explore the possibility of expanding already established ES networks in outbreak countries and epidemiologically contiguous zones of neighbouring countries. Syria, Iraq, DRC, Tanzania, Uganda, Burundi, Kenya, and Turkey will be considered priority countries for expanding ES surveillance.
- Explore the potential use of ad hoc ES in selected areas of concern, such as countries in the Lake Chad basin, the Horn of Africa, and the Great Lakes region of Africa (See Annex 11, Ad hoc environmental surveillance in access-compromised areas).

Activity 3. Developing concise field operation guidelines with core indicators

- The STT to set strategic guidance by developing a new action plan for 2020 – 2023, in close collaboration with the ESIWG.
- Include in the *Global Field Poliovirus Surveillance Guide* a simplified guide that focuses on ES site selection, sample collection, and sample packaging and transport, as well as core criteria for ES monitoring and evaluation.
- Develop and finalize a set of indicators for the sufficient ES coverage and quality of ES sites

Table C. Monitoring of activities for Objective 2 (ES Expansion)

Objective 2. A global ES network that is expansive enough to contribute to the timely detection of WPV and VDPVs			
Activity	**Global**	**Regions/sub-regions**	**Priority countries**
1. Improve the quality and sensitivity of existing network	• Guidance on implementing desk review and field review of the performance of ES • Develop training materials for site field assessments	• Desk review of the performance of existing ES network • Targeted field review of ES sites with detected gaps • Train regional and country staff to carry out field assessments for ES	• Field surveillance officer is responsible for ES operations in all high-risk countries • Performance indicators are monitored, and corrective action taken • Desk review of the performance of ES carried out in all high-risk countries (if necessary, a field review)
2. Expand the ES network to new towns, cities, and countries	• Monitor progress of ES expansion quarterly	• Regions to develop revised timetable for ES activities	• PESEP fully implemented with appropriate adjustments for priority country lists • Exploration of potential use of ad hoc ES sampling in Lake Chad basin, the Horn of Africa, and the Great Lakes region of Africa
3. Developing concise field operation guidelines with core indicators	• Include details of ES in the field guidelines • Develop standardized performance indicators for all countries • Standardised ES information management system in use across countries	• Report on standardized performance indicators for all ES sites by country	• Report on standardized performance indicators for all ES sites

Objective 3. Establish surveillance to detect polioviruses among patients with primary immunodeficiency disorders (PIDs)

Establishing Poliovirus Surveillance for PID patients		
Main objective	**Major activities**	**Key performance indicators**
Detect PID patients excreting poliovirus	1. Develop guidance for identification of persons with PID excreting poliovirus (including those without paralysis)	• Distributed *Guidelines for implementing poliovirus surveillance for primary immunodeficiency disorders (PIDs)*
	2. Establish a data management system for poliovirus surveillance among PID patients	• Number of targeted countries with PID data management system deployed
	3. Identify countries at a high risk for iVDPV	• Number of countries with plans to roll out poliovirus surveillance among PID patients
	4. Support implementation of poliovirus surveillance in high-risk countries	• Number of countries with functioning poliovirus surveillance among PID patients
	5. Facilitate use of antiviral drugs to interrupt poliovirus shedding among identified excretors	• 80% eligible PID patients identified as excreting poliovirus are placed on therapy within eight weeks
Monitored by WHO HQ, WHO Regional and Sub-regional offices, and global partners		

Background

Individuals with primary immunodeficiency disorders (PIDs), especially those with disorders affecting the B-cell system, are at increased risk of prolonged replication and excretion of polioviruses and the development of paralytic illness.[3] Continuous replication of the attenuated viruses from oral polio vaccine (OPV) increases the risk of vaccine viruses mutating and reacquiring neurovirulence and transmission characteristics similar to WPV. When this occurs, the resultant poliovirus is referred to as immunodeficiency-associated vaccine-derived poliovirus (iVDPV). The reacquired neurovirulence and transmissibility of an iVDPV poses an individual risk through the development of paralytic infection among PID patients. There is also a broader risk of establishing community transmission that could seed a polio outbreak in areas with low population immunity.

Activity 1. Develop guidance for poliovirus surveillance among PID patients

Currently there is no routine surveillance to detect poliovirus excretors among PID patients. While AFP surveillance can detect PID patients excreting poliovirus who present with AFP, it is unlikely to detect excretors who do not present with paralysis. To mitigate the individual and community risk posed by iVDPV, it is important to identify those PID patients excreting polioviruses and provide both effective patient treatment and appropriate public health response. Feasibility studies were established in Egypt,

[3] Li L, Ivanova O, Driss N, Tiongco-Recto M, da Silva R, Shahmahmoodi S, et al. Poliovirus excretion among persons with primary immune deficiency disorders: summary of a seven-country study series. *J Infect Dis.* 2014 Nov 1;210 Suppl 1:S368-72.

Tunisia, and elsewhere to investigate the possible surveillance strategies. Based on the lessons learned, guidance for broader implementation of surveillance is now being developed.

Activity 2 Establish a data management system for poliovirus surveillance among PID patients

Data collected for poliovirus surveillance among PID patients will need to be available through WHO's Polio Information System (POLIS). Initial planning and development of a data information system at the national level that is interoperable with POLIS will be key to ensure data can be uploaded and used in POLIS. Standard forms for data collection will be made available for each country office to adapt as they collect information on each case, their contacts, and follow-up visits, as required.

Activity 3. Identify countries at high risk for iVDPV

Not all countries are at equal risk for iVDPV as the prevalence of PID varies considerably from country to country. A country risk profile is based on several factors including prevalence of PID, consanguineous marriages, country-income level as a surrogate for healthcare infrastructure and public utilities (e.g., water and sanitation), and projected population immunity levels to poliovirus. A ranking of countries at risk for iVDPV is currently being developed. The country risk profiles will be used to identify countries for the introduction of poliovirus surveillance among PID patients. Country risk profiles will change over time, particularly following the withdrawal of OPV over the next five to ten years.

Activity 4. Support implementation of poliovirus surveillance among PID patients in high-risk countries

Poliovirus surveillance among PID patients will be a new activity in the overall efforts to conduct surveillance for polio and may prove challenging for the programme as some proposed activities may not tap into existing polio surveillance infrastructure – such as a new group of medical specialists (i.e., immunologists) and resources (i.e., immunology resources, PID registries). Guidance and support from the global, regional, and sub-regional partners will be needed at the national level to ensure implementation is effective and to troubleshoot any unforeseen or unexpected obstacles. Experience from poliovirus surveillance implementation among PID patients in the first set of countries will be used to inform further expansion of PID surveillance to high-risk countries in the regions.

Surveillance for poliovirus among patients with primary immunodeficiency disorders

In anticipation of the availability of finalized, standardized guidance for surveillance for poliovirus among patients with primary immunodeficiency disorders (PIDs), countries can take the following preparatory steps.

- Sensitize immunologists to the risk poliovirus poses to PID patients and their families and communities.
- Notify immunologists of the availability of compassionate antiviral treatment for those excreting poliovirus.
- Develop a roster of immunology centres within the country.
- Develop a list of large tertiary care hospitals (private and public) that may diagnose and treat PID patients.
- When an iVDPV case is identified through the AFP surveillance system, ensure that case investigation is conducted and specimens from contacts collected according to protocol (per outbreak response guidelines).

Activity 5. Facilitate use of antiviral drugs in PID patients excreting poliovirus

While there are currently no antiviral drugs registered for the treatment of individuals shedding poliovirus, monotherapy with pocapavir is available for compassionate use and should be considered for PID patients excreting poliovirus. The development is ongoing for a combination therapy of pocapavir (capsid inhibitor) and V-7404 (3C protease inhibitor). WHO Headquarters and the Taskforce for Global Health may facilitate the emergency use of pocapavir in these patients in coordination with the relevant authorities in the country.

Tasks for PID surveillance

From the end of 2018 to 2020, the PID working group together with programme experts will focus on the following tasks.

Activity 1. Develop guidance for PID surveillance

- Using data and lessons learned from feasibility studies, agree on approach for screening PID patients for poliovirus.
- The PID working group will draft global guidance for implementing poliovirus surveillance among patients with primary immunodeficiency disorders that can be modified by regions and countries.
- Guidelines will be finalized with input from subject matter experts, the laboratory network, and the global data management team to insure integration.
- Support adaptation of guidelines at the regional level.

Activity 2. Establish a data management system for PID

- Agree on core data that should be collected and develop forms for data collection that can be adapted for country use.
- Establish a PID data management system that is integrated within POLIS and link the data to lab, ES, and AFP database.
- WHO HQ to develop/generate routine data analysis and reports that can be produced by the country and region.

Activity 3. Identify countries at a high risk for iVDPV

- Complete the algorithm to identify countries at a high risk for iVDPV, using observed prevalence and advanced risk model.
- Develop a list of countries that could begin surveillance based on a number of factors (such as country readiness, previous experience, within the region, etc.) and prioritize with regions to begin surveillance in no less than three countries per year.

Activity 4. Support implementation of PID surveillance in high-risk countries

- Support countries to customize the guidelines.
- Regions and pilot countries to develop plans for surveillance that include human and financial resources to support the rollout and maintenance of the PID surveillance system.
- Implement PID surveillance in at least three countries per year considered to be at a particularly high risk for iVDPV (as per country risk ranking).
- Communicate with Ministries of Health on the importance of PID surveillance.

- Support countries in identifying immunology and care facilities for screening.
- Integrate continuous monitoring and assessment of pilot countries to use results and lessons learned to update and improve surveillance activities.

Activity 5. Facilitate use of antiviral drugs in identified PID patients excreting poliovirus

- Brief country Ministries of Health and regulatory authorities on the compassionate use of antiviral therapy.
- Country teams should work with regulatory authorities on a process for approval for the compassionate use of antiviral therapy should a patient be identified.
- WHO Headquarters and the Task Force for Global Health facilitate the availability of antiviral drugs for compassionate use in identified PID patients excreting poliovirus.

Table D. Monitoring of activities for Objective 3 (Establishment of PID surveillance)

Objective 3. Establish a surveillance system to detect polioviruses associated with patients with primary immunodeficiency disorders (PIDs)			
Activity	**Global**	**Regions/sub-regions**	**Priority countries**
1. Develop guidance for PID surveillance	• PID surveillance guidelines available and distributed in 2019	• Adapt guidelines for use in at least 3 countries by 2020	• Guidelines adapted for identified countries
2. Establish a data management system for PID surveillance	• PID data management system developed and integrated within POLIS	• Regional and country database modified for PID surveillance • Data management training for pilot countries	• All pilot countries are using customized system • Routine sharing of data with region
3. Identify countries at a high risk for iVDPV	• Update risk model	• Develop list of countries for phased implementation of PID surveillance	
4. Support implementation of PID surveillance in high-risk countries	• Develop global plan for the phased rollout of the PID surveillance	• Develop regional plan • Support pilot countries to develop implementation plans	• Plans rolled out in pilot countries
5. Facilitate use of antiviral drugs	• Provide updates to regions on the development of antiviral drugs • Coordinate the access to antiviral drugs for identified patients	• All pilot countries are brief on the use of compassionate use of antiviral drugs	• All countries have a plan for expedited use of antiviral drugs

Objective 4. Maintain the capacity and efficiency of the Global Polio Laboratory Network

Ensure GPLN Capacity and Efficiency		
Main objective	Major activities	Key performance indicators
Ensure the Global Polio Laboratory Network maintains its capacity and flexibility to process surveillance specimens and accommodate the evolving needs of the programme	1. Maintain processing capacity and develop where needed.	• Timeliness, completeness, and accuracy of stools and sewage specimens testing exceed standard indicators. • On-site lab assessment within two weeks of an outbreak being confirmed for all new outbreak countries.
	2. Develop contingency planning	• Contingency planning for the laboratory is documented in the national plan for surveillance in all high-risk countries.
	3. Organize regular coordination forum for lab and field staff	• Number of coordination meetings conducted per year between surveillance and lab staff
Monitored by WHO HQ in coordination with Regional offices and GPLN members		

Background

The success of the GPEI depends heavily on the coordinated work of the laboratory and the field surveillance program. While the laboratory oversees processing and testing specimens, the field programme has a direct responsibility to collect, handle, and transport specimens to the laboratory. Both the laboratory and field programme must work hand-in-hand to ensure timely and accurate testing of all specimens. The information from laboratory testing not only provides confirmation of the type of poliovirus infection but also molecular data that informs the programme on critical features indicative of geographic movement, on progress towards stopping transmission, on the viruses' closest virologic relative, and on any gaps in surveillance performance.

The Global Polio Laboratory Network (GPLN) consists of 146 polio laboratories in 92 countries across the six WHO regions of the world. These global, regional, and national polio-specific laboratories follow WHO-recommended procedures for detecting and characterizing polioviruses from AFP case stool and sewage samples collected from the environment. This is done through (1) poliovirus isolation, (2) intratypic differentiation (ITD) of isolated polioviruses, and, (3) sequencing of non-Sabin-like and ITD-discordant viruses to determine if they are WPV, Sabin (vaccine) polioviruses, or VDPV.[4] There is a set quality assurance programme which includes annual proficiency and accreditation of the polio laboratories by WHO.

[4] WHO Polio Laboratory Manual 4th edition (2004). http://polioeradication.org/wp-content/uploads/2017/05/Polio_Lab_Manual04.pdf. Accessed on 15 June 2018

It is important to note that the GPLN is currently developing a GPLN-specific plan of action, centred on alignment of GPLN structure and functions with endgame and post-certification era needs. This action plan addresses only the aspects of coordination and cooperation between the laboratory and field surveillance activities.

Activity 1. Maintain processing capacity

As the programme approaches eradication, the need for a highly sensitive surveillance system which allows no poliovirus to remain undetected becomes more pressing. This overriding programme goal has led to an increased number of specimens being collected. As a result, the number of samples processed through the GPLN has been increasing every year. The GPLN processed more than 10,500 sewage samples and over 225,000 stool samples from AFP cases and their contacts in 2017 – a 3% increase compared to the previous year. Of these stool samples, 94% had the results reported within 14 days of receipt. For those positive for poliovirus, 91% and 92% had ITD and sequencing results reported within seven days of isolate receipt, respectively.

It is essential for the GPLN to retain its capacity to cope with sudden and large variations in workload without compromising the quality of its work. Within the GPLN, a provision for a minimum of 20% increase in the workload at each laboratory is included in annual planning; however, this percentage should be increased in laboratories serving priority countries, in close collaboration with the programme and based on the results of risk assessments performed for these countries.

Activity 2. Develop contingency plans

Developments in field surveillance, including expansion of community-based surveillance (see Annex 5) and introduction of ES (see Objective 2), have resulted in increased laboratory workloads that need to be adequately resourced. Depending on the epidemiology and the documented polio risk, the programme will implement additional surveillance activities that may result in a surge in the number of specimens reaching the laboratory, while the expectations of quality and timeliness of specimen processing remain unchanged.

Once an outbreak is declared, a significant increase in laboratory workload generally occurs as the programme intensifies all surveillance activities, such as expanding ES, conducting targeted healthy children stool surveys (see Annex 11), and initiating systematic AFP case contact sampling in outbreak areas (see Annex 7). In addition, the AFP surveillance systems in the outbreak country and in neighbouring countries are put on high alert, generally resulting in a major increase in AFP case notifications, and thus an increase in stool collections.

If there is not a very close coordination and cooperation between the laboratory and the field surveillance before and during such a rapid and sudden increase in specimens, the programme will face serious challenges, including a backlog in specimens for testing and a delay in poliovirus isolation and

characterization. This situation may even lead to cross-contamination between stool samples.[5] In addition, in many countries the logistics of transporting specimens from the field to the laboratory can be very complex, especially when the laboratory servicing the country is physically located in a different country. Ensuring that specimens arrive at the laboratory in a timely fashion and in good condition has proved very challenging and remains largely outside the programme's control.

The GPLN has proven capacity to redistribute the unplanned excess workload within the network laboratories. Therefore, it is important that every programme explore alternative mechanisms and routing of samples in coordination with the WHO regional office and the GPLN. National action plans should include such dispositions.

Activity 3: Organize regular coordination forums for laboratory and field staff

Close integration between field surveillance and laboratory activities is essential. In general, the polio eradication programme would benefit from better communication between the laboratory and the immunization program, particularly between field surveillance and laboratory staff.

Most surveillance activities have a direct impact on laboratory workload. The results of laboratory testing in turn impact programmatic action. Indeed, all available virologic, genetic, and epidemiological data is essential to discussing programmatic actions. It is also essential to harmonize data in a single database and ensure that: (1) laboratory results (including information on quality of specimens) are communicated back to the surveillance programme; and (2) results of field investigations are communicated back to the laboratory. For example, contact sampling needs to be carried out for AFP cases for which stool samples are judged to be in poor condition upon receipt by the laboratory (see Annex 9, AFP Contact Sampling) and investigation reports can help in interpreting laboratory results and prioritizing samples to be tested.

In addition, it is essential to have regular data reconciliation between the laboratory and epidemiology AFP case-based databases to ensure completeness of information, as well as timely final classification of cases.

Tasks for maintaining the Global Polio Laboratory Network

From 2018 to 2020, the programme is expected to focus on the following tasks.

Activity 1: Maintain processing capacity

- Laboratories serving priority countries must continue to document the laboratory's current staffing, workspace, and supplies and readjust as required.
- Laboratories serving priority countries will project expected requirements for the upcoming year based on the expected workload increase associated with all polio-related surveillance activities. This

[5] Report of the 2016 Informal Consultation of the GPLN. (http://polioeradication.org/wp-content/uploads/2017/03/GPLN_Meeting_recommendations_2016.pdf) Accessed on 15 June 2018.

activity should be carried out with input from field surveillance programme staff and a buffer capacity should be considered.

Activity 2: Develop contingency plans

- National surveillance programmes and attached laboratories, with the support of the regional office, will develop a contingency plan for timely shipment and testing of samples to include, but not be limited to, the following:
    - Identifying alternative routes to transport specimens to the laboratory in case the original logistical arrangements are not feasible.
    - Identifying regional and global back-up laboratories if the national/primary laboratory cannot cope with demand, including surge capacity to cope with specimens originating from ES.
- Regional lab coordinator, with the support of the GPLN, will ensure that contingency measures are in place at the regional level by conducting the following tasks:
    - Building surge capacity at the regional level either through a pool of skilled staff that can be deployed at short notice and/or through identifying a 'large capacity' laboratory that can take on additional work at short notice.
    - Performing laboratory assessments within two weeks of an outbreak being confirmed. This permits an evaluation of any potential bottlenecks in the receipt and processing of specimens as well as in the reporting of specimen results. At that time, solutions to any difficulties identified or foreseen should be proposed.

Activity 3: Organize regular coordination forums for laboratory and field staff

- Country surveillance officers and their laboratory counterparts will conduct and document routine coordination meetings between laboratory and surveillance teams. This coordination forum should be documented and reported in country situation reports.

Table E. Monitoring of activities for Objective 4 (GPLN flexibility and capacity)

Objective 4. Ensure the Global Polio Laboratory Network (GPLN) maintains the flexibility and capacity to accommodate the evolving needs of the programme			
Activity	**Global**	**Regions/sub-regions**	**Priority countries**
1. Maintain processing capacity			• Laboratories serving priority countries document current staffing, workplace, and supplies; readjust as required • Project and submit expected requirements with buffer
2. Develop contingency plans		• Regional office to identify back up plan for specimen testing for priority countries	• Alternative transport routes identified
	• Develop a roster of skilled staff identified for rapid deployment if necessary • Laboratory assessment conducted within two weeks of outbreak being declared		
3. Organize regular coordination forums for laboratory and field staff			• Regular coordination meetings between the surveillance lab team held and documented

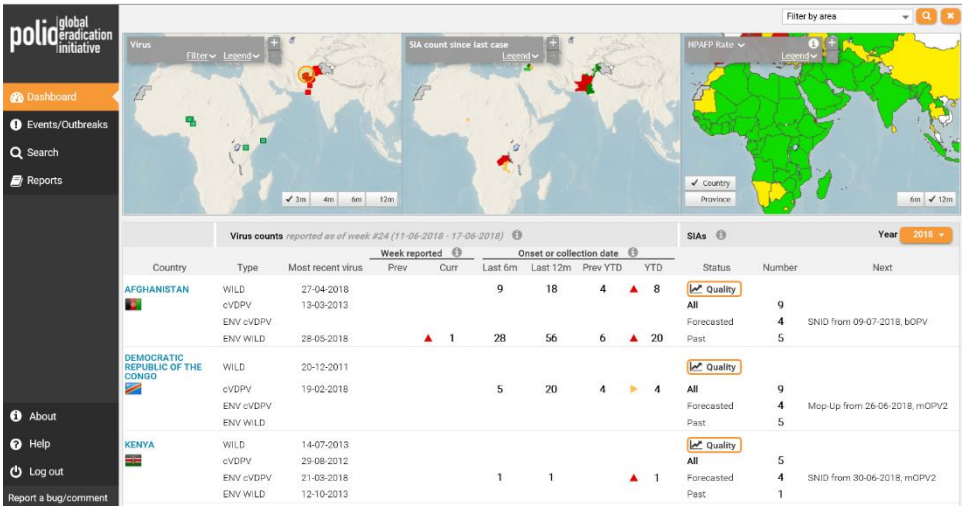
Objective 5. Increase efficiency of Polio Information Systems

Increase Efficiency of Polio Information Systems		
Main objective	Major activities	Key performance indicators
Increase reliability and efficiency in collecting, managing, validating, and using data for action	1. Convene a regular coordination forum on knowledge of and best practices in polio information technology	• One set of reference data and indicators/definitions in use for GPEI
	2. Document and integrate polio information systems	• Systems are compatible, and data standardized across the programme
	3. Expand the systematic documentation and validation of data on active surveillance visits and location of AFP cases	• All priority countries have a system in place for monitoring and validating active surveillance visits. • >80% of AFP cases are geocoded in priority countries
Monitored by WHO HQ, Regional offices, Intercountry support teams, and GPEI partners		

Background

Data from countries are sent to WHO Regional Offices and then uploaded in WHO's Polio Information System (POLIS). POLIS was designed to harmonize, consolidate, perform quality checks, and perform analyses of data from AFP surveillance, environmental surveillance, supplemental immunization activities (SIAs), and laboratory testing. The compilation of these data in POLIS results in a central repository that permits access to standardized data, analyses, and outputs that are readily available to countries and WHO Regional Offices, as well as to a wider spectrum of users such as GPEI partners. Outputs include country profiles as they relate to polio eradication, tables, maps, line lists (Figure 4), and other graphics.

Figure 4. Dashboard of the Polio Information System (POLIS)



Source: POLIS. accessed on 13 June 2018

Activity 1. Convene a regular coordination forum on knowledge of and best practices in polio information technology

Good surveillance indicators are not always equivalent to good surveillance. Looking to the basics of surveillance – a well-trained team conducting surveillance activities and, where necessary, innovating to enhance timely reporting – yields a more holistic understanding that encompasses overall processes to assess surveillance performance. As a result, such assessments go 'beyond the indicators' to critically examine all available data, including process indicators (e.g., timeliness measure indicators) or immunity measures (e.g., independent monitoring, AFP case dose history, etc.), and extent of participation in the AFP surveillance network.

Being able to quickly collect and process reliable surveillance data is vital to the GPEI. Countries are rapidly adopting new technologies such as short message service (SMS)-based AFP reporting, or the free and open-source software open data kit (ODK) for documenting surveillance visits. The use of new technologies is a valuable tool to document in a reliable manner what is and what is not being done. However, countries and regions are moving at different speeds with regard to the introduction and use of these technologies and would benefit from 'cross fertilization' through the sharing of experiences and guidance.

Activity 2. Document and integrate polio information systems

Country programmes and regions are introducing new technologies, such as mobile data collection, some of which have been used for special populations. This mobile electronic-based data information system is critical for countries to routinely and efficiently monitor surveillance performance in near real-time. It is of paramount importance that the many new technologies and systems put in place are able to 'talk' to each other, and that data collected can be compiled and linked regardless of the original data collection tool.

Activity 3. Expand the systematic documentation and validation of data on active surveillance visits and location of AFP cases and ES sites

Documenting and validating (with a time and geographic location stamp) the conduct of active AFP surveillance visits is important. Such documentation will be essential during country-level assessments for polio-free status. In the African region, E-surveillance (e-surv) and Integrated Supportive Supervision (ISS) are now in use in 42 countries – an achievement which is allowing the programme to better monitor both surveillance and process indicators. However, this expansion is not uniform and not all districts or provinces within those countries are being monitored. Other WHO regions and countries rely on paper documentation, which prohibits both a time/geographic location stamp and validation. Furthermore, those data are not systematically reported to central level, nor are they systematically analyzed.

Another challenge is the exact location of AFP cases reported. Collecting this data has been very useful in, for example, outbreak and conflict settings where it has helped the programme to better understand the exact location of polio cases and, by extension, the possible spread and route of the virus. It also gives some indications on whether the surveillance system is functioning in access-compromised areas, or if AFP cases distribution is coherent with population density. Although the programme has been

promoting the use of geo-localization of AFP cases, this is not yet common practices. In January to August 2018, only 44% of AFP cases had geo-coordinates in EMR and AFR (7% and 52%, respectively); Out of 68 countries in those two regions, 19 (28%) countries collect this data routinely (eight out of 22 in EMR and 11 out of 46 in AFR).

Tasks to increase efficiency of Polio Information Systems

From 2018 to 2020, the programme will focus on the following tasks. Further details of tasks are available in referenced Annexes.

Activity 1. Convene a regular coordination forum on knowledge of and best practices in polio information technology

- Establish a forum for experience-sharing and coordination among POLIS specialists with representation from each region with the purpose of (1) exchanging and learning from each other, (2) discussing the main issues each region is facing in term of new technologies and information systems, and (3) harmonizing the guidance offered by regional offices to countries.

Activity 2. Integrate polio information systems

- Conduct an inventory of available in-country/regional polio data systems and, where appropriate, ensure integration of systems – i.e., integrate regional SIA data systems and develop POLIS interface with e-surv/ISS, auto-visual AFP detection and reporting (AVADAR), and/or endemic countries' dashboards.
- Train all WHO regional offices and AFRO Intercountry Support Team (IST) offices on the key features of POLIS, including:
  - How to upload regional AFP, ES, and possibly SIA data directly into POLIS (regional offices only)
  - Cross-verify environmental surveillance site details and characteristics and ensure POLIS is up-to-date
  - Encourage the direct management of regional reference data in POLIS (e.g., population and geographic data) by regional offices, as well as the use of standard definitions and indicators. This will allow for timely updating of information and enhanced data accuracy.
- Starting with the endemic countries and one IST within AFRO, prepare the ground for the long-term success and legacy of the AFP surveillance system by shifting away from the archaic Information for Action (IFA) system to a new IFA system.
- Link the CDC's Poliovirus Nucleotide Sequencing (PONS) database with the laboratory information within POLIS.
- Develop a PID/iVDPV data management system under the POLIS umbrella.

Activity 3. Expand the systematic documentation and validation of data on active surveillance visits and location of AFP cases

- Review and develop/expand a system for documenting and validating active AFP surveillance visits for priority countries.

- Country surveillance officers must ensure that all AFP cases are geocoded. In those countries that have security challenges, geocoding of AFP cases can be done after the case has been reported – using proxy measures or using an advance address matching algorithm.

Table F. Monitoring of activities for Objective 5 (POLIS efficiency)

Objective 5. Increase efficiency in collecting, managing, validating, and using data for action			
Activities	**Global**	**Regions**	**Priority countries**
1. Coordinate knowledge of and best practices in polio information technology	• Convene at least one coordination forum on polio information technology		
2. Integrate polio information systems	• Inventory of available in-country/regional data systems completed • Single source of reference data for all polio data systems is established	• All WHO regional and IST staff trained in the use of POLIS	
3. Expand documentation and validation of data			• System for documenting and validating active surveillance visits is developed and fully implemented in selected priority countries • All AFP cases are geocoded

Objective 6. Enhance Management and Oversight

Enhance Management and Oversight		
Main objective	Major activities	Key performance indicators
Enhance effectiveness of surveillance programme operations, management, and budget processes	1. Develop multiyear surveillance plans	• Number of priority countries with multiyear surveillance plans
	2. Develop realistic surveillance budgets for each country	• Number of priority countries completing bottom-up budgeting
	3. Map and manage human resources - surveillance staff engaged in AFP, ES, and other surveillance infrastructure (government and partner staff and vacancies)	• Number of priority countries completing HR infrastructure mapping
	4. Monitor performance and track implementation of recommendations	• Biannual updates on surveillance performance
	5. Transition management	• Number of countries with integrated surveillance systems
Monitored by WHO HQ, Regional offices, and Sub-regional partners, and other partners		

Background

GPEI management and oversight will require managers of surveillance programmes to provide support for oversight and control of the administration of human and financial resources at the global, regional, and country levels. This will require managers to be conversant with all aspects of the programme.

Activity 1. Develop multiyear surveillance plans

As part of the implementation of this action plan, and to ensure all plans are aligned with the revised Global Polio Eradication Strategy, bottom-up planning covering all components of surveillance will be conducted for priority countries. To ensure any additional measures do not strain lab capacity, planning will incorporate a lab capacity review.

Activity 2. Develop realistic surveillance budgets

There are several costs associated with surveillance, and accurately identifying the financial resources required to maintain all aspects of surveillance, including necessary human resources, is important. Programme will work to enhance capacity of teams to prepare and manage surveillance budgets and use appropriations judiciously.

As the GPEI supplements funding to governments for surveillance and as surveillance activities have increasingly shifted, expanded, and changed over time, the current surveillance budgets likely underestimate the real cost of polio surveillance. Budgeting and expenditure accounting need to

capture specific line-items and give a more realistic perspective of the cost of surveillance. Budgeting exercises will take place to allow for more accurate estimates of surveillance costs.

Activity 3. Map and manage human resources

To enhance understanding at all levels and ensure awareness of available resources deployed or supported by all partners, mapping of available human resources for surveillance, including field surveillance (AFP and ES) and data management, will be prioritized. In addition, staff capacity and training needs will be reviewed.

Activity 4. Monitor performance and track implementation of recommendations

Ultimately, the goal of all the activities and tasks outlined is to increase surveillance sensitivity especially in the highest-risk countries in AFRO and EMRO. Surveillance team will also assess performance against targets at national and sub-national level.

Activity 5. Management of transition

The structure and functions associated with polio surveillance will continue beyond certification of WPV eradication ("polio certification"). OPV will be used for some time after certification, and therefore polio surveillance will remain critical for timely detection of VDPVs and to guide VDPV outbreak response.

The current polio surveillance infrastructure has played an important role in expanding and strengthening vaccine-preventable disease (VPD) surveillance beyond polio surveillance, and many countries have integrated surveillance programs that include AFP surveillance. For countries that do not have integrated programmes, transition planning allows for a united government effort to continue the use of the polio infrastructure beyond polio certification and develop an integrated surveillance platform. This structure has the potential to enhance current surveillance for measles, rubella, and congenital rubella syndrome (CRS) and other VPDs or emerging and re-emerging diseases.

The *Post-Certification Strategy* (PCS) defines a global strategy for planning the transition of polio activities, which offers a unique opportunity for country programmes to identify areas and activities where lessons learned from polio surveillance and staff can contribute skills and experience.[6] It will be important for countries to use the PCS to identify a successful path to move their current polio surveillance system to one that will be needed beyond certification to maintain a polio-free world.

[6] GPEI. Polio Post-Certification Strategy. (http://polioeradication.org/polio-today/preparing-for-a-polio-free-world/transition-planning/polio-post-certification-strategy/) Accessed on 14 June 2018.

Tasks to enhance management and oversight

In 2019 and 2020, the programme will focus on the following tasks:

Activity 1. Develop multiyear surveillance plans

- Support regions, sub-regions, and priority countries in developing surveillance action plans. This will include:
    - Supporting the review of the implementation status of the action plan in Lake Chad countries and supporting the development of country-specific action plans.
    - In addition to providing support to endemic and outbreak countries, the programme will ensure that supplementary surveillance support is provided to selected high-risk countries.
    - Surveillance managers to ensure plans for specimen testing are discussed with the laboratory surveillance teams and contingency plans developed
- To support the GPLN develop appropriate contingency plans, the surveillance task team will provide projections on stool and environmental sample shipments expected with the full implementation of the action plan

Activity 2. Develop realistic surveillance budgets

- Ensure that the surveillance action plan is funded within the framework of the 2019-2023 multiyear budget plan.
- The programme will support the systematic development and review of a surveillance budgets for high-risk and high-cost countries. Selected priority countries will develop bottom-up surveillance budgets with support from the regional office and GPEI partners, using an expanded budget template.

Activity 3. Map and manage human resources

- Map existing surveillance infrastructure at regional and sub-regional level including the ISTs in AFRO
    - Enhance capacity by increasing support to regional and sub-regional teams
    - Increase capacity and accountability of sub-regional teams in AFRO by ensuring the deployment of adequate resources to the sub-regional support hubs and assessing impact on key surveillance deliverables
- In priority countries, map existing surveillance infrastructure including government and partner human resources and their involvement in AFP and ES surveillance and data management.
    - Surveillance managers to assess performance against terms of reference and states surveillance objectives
    - Surveillance managers to assess the impact on AFP surveillance (e.g., number of cases investigated and validated, number of active surveillance visits conducted, etc.)

Activity 4. Monitor performance and track implementation of recommendations

- A joint external surveillance review plan for priority countries in AFRO and EMRO to be developed
- Surveillance managers to document and track the implementation status of key recommendations of surveillance reviews and other recommendations related to surveillance on a quarterly basis.

- Surveillance managers to review and update surveillance plans for priority countries on a quarterly basis

Activity 5. Transition management

- In accordance with the 2019-2023 strategic plan, support the integration of polio field and lab surveillance with other surveillance systems. Diseases selected for integration will depend on regional/country priorities.
- Support next-generation information systems, sharing lessons learned around polio information systems (including POLIS) to optimize the use of data for immunization program monitoring and VPD surveillance.
- Support costing of essential functions of polio surveillance that need to continue after certification in countries for an estimated period and, where feasible, conduct similar costing studies and estimates for other VPDs, including the potential cost of establishing and maintaining high-quality surveillance systems.

Table G. Monitoring of activities for Objective 6 (Enhance Management and Oversight)

Objective Six: Enhance effectiveness of surveillance programme operations, management, and budget processes			
Activities	**Global**	**Regions**	**Priority countries**
1. Develop multiyear surveillance plans	• Provide guidance on development of multiyear surveillance plan • Provide support for lab contingency planning	• Support countries to develop multiyear plans	• Development of plan of action 2019-2020 for selected priority countries
2. Develop realistic surveillance budgets	• Provide template and review budgets	• Review country budgets	• Develop bottom-up surveillance budgets
3. Map and manage human resources	• Map human resources for surveillance	• Map human resources for surveillance	• Map human resources for surveillance • Conduct regular performance assessments
4. Monitor performance and track implementation of recommendations	• Consolidate external surveillance review plans and provide technical support	• Develop external surveillance review plan for the region	• Monitor surveillance processes on a quarterly basis through quarterly review meetings • Monitor progress of implementation against targets
5. Transition management	• Joint planning and performance review for selected priority countries	• Regional support for integration of polio surveillance	• Surveillance TORs for field staff expanded to include other diseases and reporting systems integrated in at selected priority countries

ANNEXES

Annex 1. Definitions of commonly used terms in polio surveillance

Active surveillance (general): Public health authorities routinely visit reporting sites (e.g., health facilities) to identify individuals diagnosed with diseases or conditions of interest. It is termed "active" because public health authorities *actively* identify cases. (*Polio*) Routine visits by surveillance officers to priority reporting sites to identify unreported AFP cases. This entails physical review of medical records and registers as well as interviews with healthcare providers to identify suspected AFP cases. Reporting sites targeted for active surveillance are those that are most likely to treat AFP patients (e.g., major hospitals, large pediatric clinics, physiotherapy centers). Additional characteristics may be considered in the prioritization algorithm, such as proximity to inaccessible areas and a site located within a high-risk population camp.

Acute flaccid paralysis: The sudden onset of paralysis or weakness in any part of the body of a child younger than 15 years of age, or any person of any age with paralytic illness if poliomyelitis is suspected by a clinician.

Ad hoc case search: Extraordinary, ad-hoc surveillance activity conducted to identify unreported AFP cases. This can be done through reviews of health facility records and interviews of healthcare providers (facility-based) and interviews of community leaders and parents (community-based). This is an ad-hoc activity that enhances routine active surveillance activities in the short-term under certain criteria, such as a new event or outbreak or when other concerning surveillance gap is identified

Adequate stool specimens (samples): Two stool specimens collected within 14 days of paralysis onset, collected at least 24 hours apart, both received in a WHO-accredited laboratory in good condition. Good condition defined as evidence that reverse cold-chain was maintained with no evidence of desiccation or leakage of the specimen.

Ad hoc environmental surveillance: The targeted collection and testing of environmental (sewage) samples from several designated sites in different cities/areas under exceptional circumstances and for a limited period (not less than six months).

Community-based surveillance (CBS): Surveillance approach in which trained community members are engaged to report suspected AFP cases, based on the simple case definition. As such, CBS provides an additional link between communities and the facility-based surveillance system. CBS case detection activities occur outside a health facility, and those performing case detection activities are community members and not medical professionals.

Community volunteers: Individuals within communities identified to support community-based surveillance. These individuals are trained to report suspected AFP cases to designated AFP focal points.

Contact sampling: Collection and testing of stool samples from contacts of AFP cases. A contact of an AFP case is defined as a child younger than five years of age who had direct contact with the AFP case in

the week prior to the onset of paralysis and/or in the two-week period after onset of paralysis. All AFP cases with ***inadequate*** stool specimen collection should have one stool specimen collected from three close contacts, preferably children younger than five years of age who are household members, close friends, or immediate neighbors of the AFP case. Contact sampling of AFP cases with ***adequate*** stool specimens is unnecessary and not recommended except under specific conditions.

Environmental surveillance (ES) for poliovirus: Routine collection and testing of environmental (i.e., sewage) samples from designated locations draining targeted populations.

Passive surveillance (general): Routine reporting of diseases or conditions of interest from reporting sites (e.g., health facilities) to public health authorities. It is termed "passive" because public health authorities rely on reporting sites to notify public health. (*Polio*) Reporting sites notify surveillance officers of suspected AFP cases. Reporting sites also send weekly AFP surveillance reports to surveillance officers documenting the number of suspect AFP cases detected during the week, including if no suspect cases were detected (i.e., Zero-reporting).

Reporting network: The comprehensive list of sites that report suspected AFP cases to public health authorities within an administrative unit. The network is comprised of formal and informal health care providers and facilities, private and public sector, community-based surveillance (where available), and other key reporters such as veterinarians and pharmacists.

Reporting site: The basic unit of a reporting network. Any facility or individual who detects and reports suspected AFP cases to public health authorities. This may include health facilities, traditional healers, and community members such as the village elder.

Silent district: A silent district is the district or area (or other administrative unit) that did not report a single AFP case in a period varying from 6 months up to 12 months or more, depending on the population size and the polio eradication context (certified polio-free, endemic, outbreak). This is based on a NPAFP rate of two per 100,000 children younger than 15 years of age per year.

Special populations: Groups or populations that are "not served or are underserved" by the regular health delivery system. This may be due to the health system not functioning, lack of access to health systems by populations, or lack of health-seeking behavior as some populations choose not to access health systems. Health systems serve as the foundation for surveillance activities, especially facility-based surveillance.

Stool adequacy: Two stool specimens collected more than 24 hours apart, both within 14 days of paralysis onset, and received at a WHO-accredited laboratory in good condition (i.e., sample should be at least 8 grams and reverse cold chain maintained upon collection to reception at a WHO-accredited laboratory with no evidence of desiccation or spillage).

Targeted healthy children stool survey: Collection and testing of stool samples from high-risk healthy children in areas where there is a high degree of suspicion of circulating virus. For this purpose, a

healthy child is: (1) not suffering from AFP; (2) younger than 15 years of age, preferably under five and under two when possible; and (3) not a close contact of an AFP case.

Zero-reporting: Notification to public health authorities by a reporting site that zero AFP cases were detected during a specified time period, typically one week. Used by public health authorities to distinguish between reporting sites that are conducting surveillance *and* do not detect AFP cases versus reporting sites that are not conducting surveillance.

Annex 2. Auditing of AFP surveillance

All countries need to conduct a thorough audit of their AFP surveillance performance paying special attention to identifying, mapping, and estimating population sizes for high-risk, access-compromised, and hard-to-reach areas and populations. These areas and populations require special plans and additional strategies and resources. They also require regular updates. All risk assessment, identification, and mapping should be developed in close coordination with Ministries of Health and authorities at all levels of the country, where possible, and adapted to meet the country context.

The process of performance auditing, risk assessment, and mapping includes:

1. Review of AFP surveillance performance, paying special focus on active and passive surveillance.
2. Mapping of human resources (from all sources) available for surveillance and evaluating their contribution to AFP surveillance.
3. Reviewing the capacity and training needs of available human resources for surveillance.
4. Mapping all access- and security-compromised areas with regular updates from all available data on accessibility, using the Office for the Coordination of Humanitarian Affairs (OCHA), the Office of the United Nations High Commissioner for Refugees (UNHCR), International Organization for Migration (IOM), ReliefWeb maps, nongovernmental organizations (NGOs), and other sources.
5. Mapping all hard-to-reach areas which may need special logistical planning.
6. Mapping all hard-to-reach and/or underserved populations: refugees, internally displaced populations (IDPs), economic migrant populations, nomadic populations, fishing communities, mining communities, border communities, ethnic minority populations, and others.
7. Mapping and profiling all resources in the area: healthcare providers and facilities (public and private, for-profit and non-profit, military and civilian), key community actors (leaders, traditional healers, faith leaders), NGOs, humanitarian agencies, and Medical Corp of the military, if required in a few special situations.
8. Using distinct indicators to assess risk, identify gaps, and rank administrative units, such as district and subdistricts. This risk analysis should include:
    - Risk of missing poliovirus transmission
    - Risk of importation
    - Risk of transmission and spread of virus
    - Risk of vaccine-derived poliovirus (VDPV) emergence
9. Developing plans to address these risks, close gaps, and ensure reach and geographic and demographic representativeness of surveillance. The following sections in this document highlight different strategies and activities that can be included in the country plans, including monitoring the plan's implementation by looking at disaggregated data.

Annex 3. Special population groups

Definition	Special population groups are groups that are "not served or are underserved" from the regular health delivery system. They may be mobile populations or reside in hard-to-reach areas.
Categories	1. Mobile populations: Nomads and seasonal migrants (e.g., agricultural or mine workers, brick kilns, construction workers, etc.) 2. (a) Refugees and IDPs in camps and (b) those living in host communities 3. Special populations in settled areas (e.g., cross-border population, urban slums, islanders, fishermen, etc.) 4. Inaccessible populations
Identification & Mapping	It is important to identify and profile these populations: • Geographic location, population size, route of movement, timing/seasonality of movement • Access to health services, health-seeking behavior, ability of the current surveillance network (health facilities, community-based) to detect AFP cases within the special populations • Identification of service providers (public and private, including NGO's, faith-based organizations, etc.) • Immunity status • Availability of communication activities targeting these special population
Rationale for Special Activities to Reach Particular Populations	These populations may have more susceptibility to the disease and more likelihood of missing and spreading transmission. • Underserved populations may not be covered by the surveillance system. • There is likely lower population immunity due to low vaccination. • High movement makes them prone to spread the virus to vulnerable populations.
Surveillance Strategies Applicable to the Special Population	*1. Populations living in security-compromised areas* • Access mapping and analysis with identification of key partners and factions and population dynamics and change • Access negotiating • Sensitizing and briefing armed forces and relevant partners and community about polio and case reporting

	• Revising surveillance network and identifying and training appropriate focal points for case reporting— i.e., community-based surveillance as appropriate • Conducting periodic active case search in community and healthcare facilities • Contact sampling around AFP cases (one sample, three contacts) • Conducting healthy children stool surveys (Annex 11) and ad hoc environmental surveillance (Annex 10), to be decided in coordination with WHO country and regional teams. • Ensuring access tracking and segregated data analysis
	2. Nomadic populations • Mapping and profiling with leaders or contact persons identified to serve as surveillance focal points • Determining itineraries of the population and mapping healthcare facilities and providers along the route • Sensitizing population and providers • Conducting market sensitization along the route and close to water points and camps • Establishing regular contact with the focal point for reminders on reporting and provision of feedback • Conducting active case search in large gatherings of nomadic groups during SIAs and mobile outreach services • Collecting contact sampling around AFP cases (one sample, three contacts) • Conducting healthy children stool surveys to be decided in coordination with WHO country and regional teams A similar approach will be used for other mobile population groups as appropriate – e.g., seasonal migrants such as agricultural or mine workers, brick kilns, or construction workers.
	3a. Refugees/IDPs in camps • Identifying focal point for AFP surveillance in camps (IDP or refugee camps) to include in the surveillance network • Profiling new arrivals (origin and immunization status) • Conducting active case search in health facilities of camps and during SIAs • Collecting contact sampling around AFP cases (one sample, three contacts)

	• Collecting healthy children sampling (new children under five yrs.) • Installing a permanent vaccination/surveillance team *3b. Informal IDPs and refugees in host community:* • Identifying key informants from the community to include in surveillance network • Providing appropriate job aids • Initiating community IDP and refugee tracking (tracker team) • Determining health-seeking behavior • Adjusting surveillance network • Conducting active case search during SIAs and mobile activities • Collecting contact sampling around AFP cases (one sample, three contacts) • Collecting healthy children sampling (health facilities used by IDPs or refugees)
	4. Special populations in settled areas include cross-border populations, urban slums, islanders, fishermen, mining workers, etc. *Cross-border populations* • Mapping official and non-official border crossings • Mapping seasonal movements • Estimating population flow averages • Mapping and profiling villages/settlements, special populations, security and access, gathering places on both sides • Mapping areas of one district/country only accessible from the neighboring district or country • Mapping of surveillance network on both sides • Identifying organizations working at border entry and exit points (e.g., immigration, port health services, police) • Providing orientation and sensitization of populations and healthcare providers on both sides • Using supplemental strategies – Active case search on both sides in the community (entry points, permanent vaccination sites, markets) and in health facilities – If there are security-compromised areas or special populations as refugees or IDPs, implement the specific proposed activities/strategies *Urban slums* • Profiling communities and their origin

	• Studying health-seeking behavior and modification of surveillance network • Conducting active case search • Consider adding ES sites
Challenges and Anticipated Issues	Special population surveillance encounters challenges such as: • Difficulties with mapping and population estimates • Lack of coordination with stakeholders • Lack of community involvement • High cost of additional resources and logistics (trainings, transportation, supervision, monitoring) • Lack of security
Tips for Success	Special population surveillance is facilitated by: • Special teams dedicated to surveillance in special population • Close coordination with partners (UNHCR, IOM, INGOs, civil society, veterinary services, etc.)
Monitoring and Evaluation	• Conduct a segregated analysis to ensure surveillance coverage and quality by population groups (starting with appropriate data collection) • Conduct regular mapping and risk assessment • Review/assess implementation of plans • Engagement of partners for independent monitoring

Annex 4. Ad hoc active case search for AFP cases

Definition	Ad hoc active case search (ACS) is an extraordinary, ad hoc surveillance activity conducted to identify unreported AFP cases. ACS is done through retrospective case search in health facility records and interviews of healthcare providers (facility-based) and community leaders and parents (community-based). As an ad hoc activity, ACS enhances routine active surveillance activities in the short term under certain criteria, such as a new event or outbreak or when other concerning surveillance gaps are identified.
Rationale and Indications	ACS is done to enhance the sensitivity of detecting AFP cases in areas that experience either suboptimal surveillance or new epidemiological risks. This activity can help identify gaps in the AFP surveillance system when new events or outbreaks occur – and it can help supplement activities during the beginning of a response plan. Conditions that may warrant ACS include: 1. Activities where opportunities to look for AFP cases exist, such as during house-to-house searches, while canvassing to collect geospatial data, while vaccinating newly accessible populations (e.g., refugees or IDPs from inaccessible areas), or during SIAs as part of clinic record review. 2. Events, outbreaks, and other triggers a) In a polio event or outbreak setting (collapse) i) As part of the investigation, retrospective case searches and facility-based ACS are implemented. ii) As part of enhanced surveillance by activating AFP case finding and record review b) Other trigger indications i) A disconnect between environmental surveillance (ES) and AFP surveillance findings (i.e., when WPV or VDPV is detected in ES and not through AFP) ii) Clustering of polio-compatible cases in time and space While AFP surveillance implementation or enhancements are being made, ACS can fill a surveillance gap in the short term:

	a) Sizable population arrival and settlement, such as IDP, refugees, and nomads coming from high-risk areas with a recent outbreak or polio event b) New access to previously inaccessible areas c) Silent districts or areas d) Low-performing surveillance areas* e) When surveillance reviews identify gaps in surveillance performance * While facility-based case search may be recommended in such instances, community-based case search is not recommended unless warranted by further review.
Procedure (Steps)	Setting up ACS can be resource-intensive, so it is important to have clear parameters, including the geographic scope, target population, and time period of interest (typically previous 6 months). For example, geographic scope for ACS will be defined in review of information from any outbreak-related risk assessments, current epidemiology, and genetics of new polio cases or other important risk factors to identify unreported cases. When there are positive environmental surveillance samples but no AFP case, the geographic scope may be more complex because of the catchment area, requiring additional planning considerations. ACS involves all or a subset of the following activities, depending on the situation. The steps below can be considered in setting up ACS activities, but it is important to be focused so the search doesn't become larger and more resource-intensive than needed. Activities should be consistently documented throughout the entire process. 1. Conduct an analysis of AFP surveillance indicators 2. Decide if the search will be facility- and/or community-based (usually both) 3. Develop tools (e.g., checklist, reporting formats) for recording the active search process and outcome 4. Conduct subgroup analysis to determine if surveillance is reaching all subsets of a population 5. Consider enlisting the help of NGOs for inaccessible areas 6. Provide training to those who will conduct searches 7. Develop reporting channels for identified AFP cases

	8. Establish a strong supportive supervision and monitoring mechanism at the field level *Additional Steps for Facility-based ACS* 1. Identify and profile all healthcare facilities within and outside the reporting network (public, private, traditional) 2. Retrospective case searches should look for unreported AFP cases up to 6 months prior to the search date. (Interview health providers, review health facility registers, make visits to wards.) *Additional Steps for Community-based ACS* 1. Map and profile areas and populations and identify leaders or contact persons 2. Ensure community engagement for information gathering and facilitation (e.g., IDPs/refugees: identify IDP/refugee elders, Camp Management Committee, IDP host community informants, etc.) 3. House-to-house case search, community case search All AFP cases identified through ACS should be added to the line list and should follow the AFP case investigation guidelines, including stool specimen collection within 60 days of paralysis onset and contact sampling guidelines. *Frequency* This is generally an ad hoc activity to be done when new events/outbreak are identified as part of initial response. Other situations where this activity could be considered, if not a resource/programme burden: When a window of opportunity opens in fully or partially inaccessible areas Every three to six months in recently accessible areas with disrupted healthcare infrastructure

Challenges and Anticipated Issues	ACS has challenges such as: • Lack of resources: untrained personnel or supervisors, poor documentation, or inadequate financial resources • Security issues • Lack of access to, poor quality or non-availability of health facility records • Logistical constraints in reaching communities and health facilities
Enabling Factors & Tips for Success	ACS is facilitated by: • Community engagement • Presence of NGOs in inaccessible areas • Careful, in-depth analysis to prioritize (as needed) the right areas, populations, or health facilities based on reporting patterns • Knowledgeable and motivated field staff, experienced supervisors • Good documentation of the active case search
Interpretation of Results	• The detection of unreported AFP cases demonstrates gaps in the AFP reporting network. • Retrospective review of records in facilities within the reporting network will reflect whether regular active surveillance of designated sites was conducted. • Interviewing traditional healthcare providers and/or private sector practitioners will reflect whether the local surveillance team has been orienting and contacting them. It may also highlight the need to revise the reporting network.
Monitoring & Evaluation	• Number of unreported AFP cases detected through ACS (1) with onset less than 60 days and (2) with onset more than 60 days to six months (or older) • Number of communities and health facilities that had unreported AFP cases found in the process • Assess impact of this activity on overall surveillance system, document any changes in routine active surveillance or reporting networks, and develop and implement improvement plans, where needed

Annex 5. Community-based surveillance

Definition	Community-based surveillance (CBS) is a surveillance approach in which trained community members are engaged to report suspected AFP cases, based on the simple case definition, to a designated focal person. As such, CBS can provide an additional link between communities and the facility-based surveillance system. It is important to note that CBS case detection activities occur outside a health facility, and those performing case detection activities are community members and not medical professionals.
Rationale and Indications	CBS can increase sensitivity and timeliness of AFP case detection. It may also increase community engagement and acceptance. CBS is recommended on a case-by-case basis where health facility-based surveillance cannot be performed or is not functioning optimally, particularly in high-risk populations or areas where there are high risks of undetected poliovirus transmission, importation, or VDPV emergence. Such conditions include: • Security-compromised areas • Special populations (e.g., refugees, IDPs, economic migrants, urban slums, fishing communities, mining communities, religious communities, nomads, ethnic and linguistic minorities, and remote or scattered populations) • Populations who rely on traditional healing practices and who are less likely to seek care at a health facility
Procedure (Steps)	CBS involves the following activities: 1. Map high-risk areas and populations and assess how well covered those populations are by the current AFP surveillance system. 2. For all high-risk areas, identify and profile all healthcare facilities and providers (public and private), all humanitarian agencies (UN, etc.), and all NGOs. 3. Identify key community actors (local and religious leaders, traditional healers) to engage and gain their support for CBS. Sensitize and brief them about polio and the detection and reporting of AFP cases.

	4. Jointly with community leaders, select community volunteers based on: education level, knowledge of the area, affiliation with certain communities and population groups, residence within the assigned community, age and gender suited to the community culture and norms, outspoken and good character invested with community trust and acceptance. 5. Train the community volunteers using simple educational materials focused on case definition, recording and reporting policies, stool collection and handling procedures, and roles and responsibilities. 6. Community volunteers will actively search for AFP cases in the community through rumours, home visits, or visits to traditional healers and religious leaders. They will also keep records of vaccination status and basic demographic data for every family and child visited, whenever possible. 7. Once the community volunteer has identified a case of AFP, he/she will report the individual to the designated focal point. The surveillance officer will follow up to confirm that the AFP case meets the case definition, initiate investigation and specimen collection, and notify the district health authority. In the event the surveillance officer cannot complete the investigation in a timely manner, the community volunteer may need to support the surveillance officer and interview the AFP case and collect and transport stool specimens for testing. 8. Establish an oversight structure that supports community volunteers by conducting regular supervisory visits and providing feedback to the volunteers. 9. Conduct periodic refresher trainings of community volunteers to ensure they maintain their knowledge and skills. Note: In hard-to-reach areas, options for proper storage facilities should be identified ahead of initiating CBS. Similarly, options for transportation of stool specimens to a designated health facility or polio focal person should be explored.

Challenges and Anticipated Issues	Challenges to CBS include: • Cost: Depending on how community volunteers are rewarded, CBS can be costly. Its sustainability must be addressed at the beginning of the project. • Difficulties in finding the 'right' community volunteers. Many local, national, and global programmes compete for suitable volunteers and may have different rewards. • Limited ability or inability to perform monitoring and supportive supervision. • Difficulties for surveillance officers to conduct AFP case investigation quickly in inaccessible areas and among some special populations. Other considerations include: • The need for a coordinated approach between surveillance field and laboratory in anticipation of expected workload. • Similarly, a need to ensure a constant relationship between CBS and the formal public health system. • The community volunteer must have a way to communicate with the surveillance officer (telephone, petty cash, or other means). • CBS requires a system for tracking volunteer activities and AFP cases reported to the public health system. • CBS requires forms, protocols, and training adapted to low-literacy users.
Enabling Factors and Tips for Success	CBS is facilitated by: *General* • Building community trust (through engagement in the volunteer selection process, recognition and motivation of volunteers, provision of feedback, respect of local social/cultural norms) and engaging local actors and partners invested with community trust • Messaging through popular local media (radio, mobile messaging) *Community volunteers* • Using a simple case definition and periodic refresher training

	• Offering flexibility to support investigation of AFP cases outside their areas (transportation cost for examination and/or specimen collection) • Providing a strong supervisory structure and regular feedback • Maintaining support and offering no discouragement if reported individuals suspected with AFP do not meet the AFP case definition
Monitoring & Evaluation	Monitoring activities can be done with the help of existing partners and community networks (e.g., community mobilizers) and through engagement of local government authorities. Assess initial CBS performance by reviewing changes in AFP reporting four months before and four months after CBS is implemented Number of AFP cases reported in the lowest administrative unit Percent of AFP cases reported by CBS versus other reporting sites Assess ongoing CBS performance Completeness and timeliness of weekly/monthly reporting, including zero reporting Percent of “true AFP” vs “not an AFP” cases reported by CBS Percent of AFP cases reported within seven days of paralysis onset Percent of AFP cases investigated within 48 hours of notification Percent of AFP cases with adequate stool specimens collected

Annex 6. Innovation

Definition	The generic definition of innovation is "the application of better solutions to meet new/existing requirements." In a polio surveillance context, the definition of innovation may extend to "non-conventional" methods and possibly technologies to improve the surveillance processes for challenging situations in hard-to-reach or security-compromised areas. Innovation can also mean transferring good ideas into great results.
Rationale and Indications	Due to the challenges experienced in high-risk areas/populations, new methods of approach may have to be devised to ensure service delivery and the continued utilization of available resources. However, this should not distract the programme from first ensuring that full advantage has been taken from the traditional surveillance approaches. • Innovation in surveillance has been used specifically to improve timeliness in the collection, storage, and dissemination of data and to improve monitoring and supervision activities.
Examples	• Mobile applications and mobile data collection to improve data quality and ensure real-time documentation of transmission with geolocation and tracking: – Collecting information and geolocation of AFP cases (case investigation form) – Documenting and tracking active surveillance visit and supervisory visits – Documenting and tracking community-based surveillance (Auto-Visual AFP Detection and Reporting System, or AVADAR) – Tracking stool specimen from collection to arrival at the lab (Somalia) • GIS mapping to locate catchment areas and population – Use of digital elevation maps (DEM) to locate the best site for environmental surveillance – Use of GIS and satellite imagery to map out surveillance network and AFP cases to ensure that all population is covered by the surveillance network (Nigeria and Somalia) • SMS-based surveillance

	– Send mobile message or SMS to informants to stimulate AFP reporting – SMS and Unstructured Supplementary Service Data (USSD) for reporting AFP cases
Procedure (Steps)	Innovation involves the following steps: 1. **Define the problem** – Identify what goal needs to be achieved, what issues or challenges obstruct achieving the goal, and what resources it would take to achieve the desired result with the least resistance 2. **Use case examples** – Identify similar challenges faced by other teams and the solutions used to handle them 3. **Explore the context** – With a clear understanding of the operating environment, define a tailor-made solution for the problem at hand 4. **Deploy awareness and testing** – Conduct a pilot while fully involving the community and other actors in the area. Monitor closely to assess reaction, impact, and improvement points 5. **Roll-out** - After a successful pilot, note any improvement points and roll out the project to the rest of the surveillance area 6. **Monitor and assess impact** – Review and understand the impact of the innovation and document everything
Challenges and Anticipated Issues	Innovation encounters challenges such as: • There is no standard solution; innovation does not always have a one-size-fits-all strategy. • There may be no buy-in from partners, community, or programme supervisors. • Solving one issue may risk creating another. • Lack of resources, especially for tools • Lack of sustainability of the new approach • Lack of full understanding of problem • Limited staff capacity to use the new approach

Enabling Factors & Tips for Success	Innovation is facilitated by: • Bottom-up research of the problem: understanding fully what issues are being faced on the ground • Conducting small-scale tests • Involving the community and partners • Exploring various solutions to a single problem • Adapting to a specific environment • Thinking creatively, having flexibility, and taking risk • Receiving mentorship and regular feedback • Assuring utilization of output • Promoting the product and assigning an advocate/champion
Monitoring & Evaluation	• Compare impact before and after new methods – Percentage of positive change (if measurable) – Contribution to the programme • Assess the outputs against the objectives • Survey community feedback • Track and document – Number of new ideas implemented – Number of discontinued projects – Speed of implementation – Lessons learned from failures and successes

Annex 7. AFP contact sampling

Definition	AFP contact sampling is the collection and testing of stool samples from contacts of AFP cases. A contact of an AFP case is defined as a child (preferably younger than five years of age) who likely had direct contact with the AFP case in the week prior to the onset of paralysis and/or in the two-week period after onset of paralysis.
Rationale and Indications	AFP contact sampling is done to increase the sensitivity of the surveillance system to detect circulating polioviruses (wild and/or vaccine-derived) and, during an outbreak, to gain a better understanding of the geographic extent of the transmission. • Individuals in direct contact with AFP cases have a higher likelihood of asymptomatic infection than people who do not have contact with an AFP case, if poliovirus is circulating. An infected asymptomatic individual may carry and excrete the virus up to two months and sometimes longer. • The analysis of data from countries implementing this strategy has illustrated the benefit of the system in early identification of new or ongoing virus circulation. • There are AFP cases for which stool specimens could not be collected or were not collected in a timely manner, particularly in areas with low-performing AFP surveillance or in hard-to-access, conflict-affected areas. • There is also a small proportion of AFP cases due to poliovirus infection for which specimens that are adequate are not found to be poliovirus positive. *Indications* • Stool samples should be collected from contacts of AFP cases that had inadequate stool samples (i.e., did not satisfy the definition of adequate stool samples which is two stool specimens collected within 14 days of paralysis onset, collected at least 24 hours apart, both received in a WHO-accredited laboratory in good condition [with a temperature below 8°C, a volume of 8 grams or above, no desiccation or leakage, and proper documentation]). • In those security compromised or hard-to-reach areas, contact samples should be collected for all reported AFP cases due to the difficulty in reaching those groups.

	• In populations where poliovirus transmission is highly suspected, contact samples may be collected for all reported AFP cases in close coordination and agreement with the laboratory for a limited period of not more than six months. • In a polio event or in an outbreak setting, contact sampling of all reported AFP cases may be warranted for specific geographic areas and/or for a limited time. This may be required to enhance the probability of detecting additional cases that may not otherwise be identified, or to better document the geographic extent and duration of an outbreak. The decision to expand contact sampling should be made in close consultation with and agreement of the laboratory for a limited period of not more than six months.
Procedure (Steps)	AFP contact sampling should be conducted within seven days from notification of the AFP case and should be done up to two months after onset of paralysis of the index AFP case. AFP contact sampling involves the following activities: 1. Explain the purpose of collecting stool samples to parents/guardians of the contact. 2. Identify potential contacts. Selection priority should be given to the following contacts: a. Children in frequent, direct contact with the AFP case, such as siblings, household members, playmates, and young neighbouring relatives; and b. Younger children (preferably younger than five years of age) 3. Collect one stool sample each from three separate contacts. 4. Adhere to AFP surveillance protocols for the collection, storage, and transportation of stool specimens. 5. Complete a separate laboratory request form for each contact. Similar to AFP cases, this form is sent to the laboratory along with the specimen while a copy is maintained in the AFP surveillance file of the AFP case. Each specimen should be labelled clearly as a contact of the AFP case. The unique identification number should be

	the same as the AFP case with an added contact number suffix—e.g., C1, C2, or C3. Note: Data collection, management, and monitoring of contact sampling data are integral parts of the AFP surveillance system to ensure quality and timeliness. ** If stool specimens have been collected more than 14 days from onset of paralysis but arrive the lab in poor condition, field staff should be notified and contact specimens collected.
Challenges and Anticipated Issues	Challenges to AFP contact sampling include: *General* • Delayed or lack of feedback on AFP case sample condition between laboratory and field • High refusal to collect stool specimens in some geographic areas • Need for flexibility among field and laboratory staff to prioritize sample collection and testing • Financial costs • Agreement for sustainability of activities *Hard-to-reach areas* • Limited accessibility may likewise limit the surveillance team from reaching the affected area. Innovative options should be explored, including moving AFP cases and their contacts to neighboring, accessible sites and considering stool collection from older children. • Transportation/storage challenges may be overcome by local solutions, such as negotiating with local bus drivers, local NGOs, and other groups that move in the areas.
Enabling Factors & Tips for Success	AFP contact sampling is facilitated by: • Coordinating with the laboratory in anticipation of increased workload • Identifying and profiling humanitarian agencies (UN, etc.) and NGOs in hard-to-reach areas, as they can support collecting, storing, and/or transporting stool samples, especially in security-compromised areas • Engaging in intensive community health education, especially in outbreak settings, to help raise community awareness about polio and acceptance of contact sampling

Interpretation of Results	• Negative results from AFP contacts don't exclude the possibility of circulating poliovirus in the community. • Isolation of WPV from a contact confirms the AFP case as a WPV case if the index AFP case had a WPV negative stool. • Isolation of a VDPV from an AFP contact confirms the AFP case as a VDPV case if the index AFP case had a VDPV negative stool. • If there is an isolation of a WPV or VDPV from an AFP contact with a poliovirus positive stool, the positive contact will not be listed as a case of poliomyelitis, but the isolate will be added to the WPV/VDPV count.
Monitoring & Evaluation	*Process indicators* 1. Timeliness of AFP contact sampling: percent of AFP contact specimens collected within **seven days from date of notification** of the AFP case. Target: minimum 80%. 2. Completeness of contact sampling: percent of eligible AFP cases with three contact samples collected. Target: minimum 80% *Outcome indicators* 3. Percent of AFP cases confirmed as polio as a result of WPV or VDPV isolated from contacts 4. Identification of newly infected administrative units – e.g., districts *Other indicators (quality)* 5. Age distribution of contacts: At least 80% of contacts should be younger than five years of age 6. Timeliness of specimens shipped to the lab: Percent of contact specimens sent to a WHO-accredited laboratory within $\leq$ three days 7. Good condition: 90% of stool samples received in good condition as reported by the laboratory for all samples collected from contacts 8. Non-polio enterovirus (NPEV) and Sabin-like virus isolation

Annex 8. Improving data quality and analysis through special monitoring and evaluation activities

Definition	Data quality and analyses can be improved by critically reviewing data on a regular basis and taking action to make improvements. Special monitoring and evaluation activities are tools that help identify gaps in surveillance and supplement classic surveillance indicators.
Rationale and Indications	Performing data quality checks and analyses improves overall quality of data and associated indicators through thorough analysis of all processes of AFP surveillance, while also exploring innovative approaches to analyse data to provide a new view and interpretation of the data. The purpose of special monitoring and evaluation activities is to: • Identify gaps in surveillance that may not be observable using classic surveillance indicators • Provide additional confidence regarding the quality of surveillance data • Provide additional data to certification commissions *Indications* These M&E activities should be part of overall surveillance monitoring everywhere but specifically: • For all areas or populations facing access challenges or are hard-to-reach • For special high-risk population groups • For areas or populations where, for whatever reason, additional confidence in surveillance is needed
Procedure (Steps)	Ensuring high data quality and analysis begins with re-examination of traditional analyses. Where needed, special monitoring and evaluation strategies may be implemented to address gaps. Areas of special concern should be prioritized when implementing these strategies. Special monitoring and evaluation strategies include: A. Case validation B. Population adjustment

	C. Re-examine traditional analyses D. Process indicators E. Data quality checks F. Explore innovative approaches G. Tracking silent areas and assessing surveillance in low population areas H. Disaggregated/group-specific analysis I. Tracking access and action at the lowest level J. Targeted surveillance reviews Specific procedures are established for each as detailed below.
A. Case Validation	Procedures for the validation of AFP cases reported from areas of concern must be put in place by each country. • Target a minimum of 80% of cases. • Proportion of cases validated / verified • Case validation should be conducted by senior officers, and regularly by secondary and tertiary supervisors. • Cases should be validated within 14 days of reporting, and independently of case investigation. • Focus should be given to critical data: date of onset, place of onset, and areas visited prior to onset, stool collection dates/processes, routine immunization (RI) and SIA doses, healthcare-seeking history, and collection of appropriate contact samples. • AFP surveillance data must be updated based on validation findings, and discrepancies systematically recorded. • Validation should not unduly affect the reporting of cases. • In areas facing access challenges or are hard-to-reach, the programme should collect stool samples for laboratory examination even if a reported AFP case may be excluded as non-AFP through validation. • A pediatrician/clinician must be consulted by surveillance personnel before labelling an AFP case as non-AFP. • Excluded cases must be properly documented and included in the AFP database with non-AFP classification.
B. Population Adjustment	It is important to: • Obtain population estimates for administrative levels as well as communities and special populations.

	• Assess the validity of population figures used for AFP surveillance; consider different sources of data and use the most reliable: government (census, elections), UN/quasi-UN agencies (OCHA, UN Development Programmes [UNDP], UNHCR, IOM), SIA target population, satellite imagery extraction. It may be necessary to use population movement (refugee, IDP, returnee) to update available populations. • Considering the difficulty in obtaining consensus amongst various stakeholders, special effort should be made to obtain an approval for operational use only. Negotiation and consultation with senior government officials should be instituted if required.
C. Re-examine traditional analyses	• Assess the distribution of reporting networks to ensure it adequately captures populations under surveillance • Ascertain the frequency of AFP surveillance reviews at country level • Assess the completeness and timeliness of reporting AFP cases • Among AFP cases reported from healthcare facilities, number of cases reported by the first healthcare contact • Time of stool shipment from collection to arrival at the lab • The proportion of reported AFP cases with inadequate stool samples pending classification 90 days after onset of paralysis • Completeness and timeliness of contact sampling • Surveillance quality at the sub-national level, including persistently low-performing districts. Persistently low-performing districts are defined as districts not meeting both key indicators for two or more consecutive years. • The existence of persistent circulation of orphan viruses detected in the environment without a confirmed AFP case.
D. Process Indicators	It is important to measure the process of activity implementation in areas and populations with access challenges, particularly when standard surveillance indicators make it difficult to assess surveillance in small populations, or over short periods of time. Below are some examples: • Human resources – % of each relevant administrative and/or operational unit with a focal person for surveillance – % of focal persons trained in the past 24 months

	– Focal persons per population, or per AFP case – Retention rate • Monthly surveillance review meetings – % of conducted meetings and minutes shared with relevant national-level (or if required, multi-country) coordination entity • Active surveillance site visits – % of workplans submitted for active surveillance site visits with a map showing distribution of sites and prioritization – % of planned visits implemented (weekly) – On a regular basis, senior officers who are able to access areas of concern should review a proportion of visits for quality. A supervisory checklist should be completed and submitted. • Weekly zero reporting – A clear map showing number and distribution of sites – Timeliness and completeness of zero reports – Senior officers to assess authenticity of submitted data • For both active surveillance and zero reporting, in areas where it is feasible, the use of electronic data collection with GPS should be encouraged • Supervisory visits – Number and distribution of supportive supervision visits conducted – % of planned supervisory visits implemented – % of investigations/validations conducted by secondary and tertiary supervisors • Laboratory – % of samples with feedback from the laboratory on stool condition – Timeliness of reporting of results • Environmental surveillance – Number of suitable ES sites in area of concern – Number/proportion of site visits where sampling was supervised by senior officer • Expert Review Committee (ERC) or equivalent held at least one meeting every month to review indeterminate cases • Community surveillance

	– Frequency of reporting (as per plan) – Geographic distribution – Number of visits and proportion of visits implemented (as per plan) – Knowledge: percentage trained
E. Data Quality	There are at least three reasons for poor or inaccurate data 1. Data was collected inaccurately or incompletely 2. Poor documentation, record keeping, or data management 3. Data falsification Data quality issues may be identified through desk or field reviews. Flags for data quality issues include: • Missing data: Incomplete or poorly entered Case Investigation Forms (CIFs) may lead to misinformation. Supervisors hence need to review each CIF that is produced. • Surveillance indicators – Too good to be true? Explore for unrealistic outcome indicators • SIA OPV doses, RI OPV doses: compare with SIA data, RI data, other data sources (depending on utility) and compare with a child's age • Clustering of AFP cases – Can be associated with an event, but may be a sign of underlying gaps in surveillance – Clustering in date of notification should be carefully reviewed • Residual weakness (RW) reporting: what fraction of AFP cases have RW, and how many have final diagnosis, how many were referred to ERC, how many were discarded by ERC • High number of "compatible" cases in an otherwise polio-free area, very low "compatible" cases in areas with ongoing transmission
F. Explore innovative approaches	• Explore the use of available historical surveillance data to build and validate models that can be used to auto-detect and flag possible deterioration in surveillance performance, and/or aberrations in surveillance data

	• Use innovative approaches to determine clustering of AFP cases. In areas where all or most of AFP cases are geo-tagged, the use of temporal-spatial clustering assessment tools, e.g., SatScan, may be explored
G. Silent Areas	A silent district or silent area is the district or area that did not report a single AFP case in a period varying from 6 months up to 12 months or more, depending on the population size and the expected AFP case reporting and taking into consideration that the non-polio AFP rate (NPAFP) is 2/100,000 or more depending on the polio eradication situation (certified polio-free, endemic, outbreak). • Measure and track the number and proportion of silent lowest admin level • Estimate the expected number of cases: – Use the local provincial/state NPAFP to estimate expected number of cases and not the "standard two per 100,000" – Trend of reporting in the area of concern (expected from historical data) – Review population movements • In areas with small populations, consider: – Adjusting timescale—for example, if district was silent for 12 months (and has a small population), review data for 24 months, 36 months, and so on – Combining data from neighboring districts • Map silent areas and review closely for clustering or contiguity • Action to be taken should include: – Issuing an alert or other communication that highlights the identified potential surveillance gap, – Reviewing the surveillance functioning and process (including active surveillance) and sensitizing the surveillance network – Conducting full surveillance review (if required) – Triggering an active case search to fill a surveillance gap in the short term
H. Group Specific Analysis	• Adjust all data collection, collation tools, and electronic data systems to facilitate the process of data analysis for specific geographies or population groups of concern • Obtain required denominator data for:

	– Each area of concern – Each special population group • Provide analysis – By accessibility – For hard-to-reach areas – By population type • Conduct trend analysis
I. Tracking Access and Action at Lowest Level	• Develop spreadsheets for settlements with access issues or special populations • Quantify population, resources, action taken, and performance at the lowest level • Update information on population/resources quarterly or twice/year
J. Targeted Surveillance Reviews	• Triggers for review: silence, data quality flags, virological risk (e.g., suspicion of silent circulation or isolation of orphan viruses), and certification requirements. • Conduct surveillance reviews with special focus in areas of concern and encompassing populations of interest • Simple desk, enhanced desk, and/or full reviews (desk and field reviews) may be conducted. • Reviews may be conducted by local team (district and or province) or by external team (from national or international teams). • In addition to (or as a substitute to) reviews, supportive missions may be planned. • In countries and areas with conflict and access issues, national independent groups from the areas of concern and outside an accessible area are called in for training and debriefing after completing the review.
Challenges and Anticipated Issues	Special monitoring activities encounter challenges such as: • Varying interest among many stakeholders • What makes a population of special concern may also inhibit programme capacity to conduct special monitoring activities • Difficulty in obtaining reliable population targets • Data systems not properly configured – Missing variables (supervision, surveillance review, data validation)

	– Lack of standardization of administrative levels – Inability to capture subpopulations or special populations
Enabling Factors & Tips for Success	Special monitoring activities are facilitated by: • Regular surveillance review meetings. • In each meeting, careful review of surveillance data from areas of concern/special populations. • Looking beyond the indicators for potential negative flags, to ensure "green is green." "Good surveillance indicators" are not always equivalent to "good surveillance," and detecting areas and/or population subgroups with poor surveillance system is especially difficult if indicators all point to a "strong system." Send teams to evaluate the area, if possible. • Using electronic data collection systems, if possible. • Zero tolerance for data fudging.
Interpretation of Results	• The goal of any additional monitoring is to ensure the programme has capacity to look beyond the indicators and ascertain the true quality of surveillance using supplementary evaluation processes. • Outcomes should be used to help make a decision on the reliability of the surveillance system in assuring the absence of WPV and/or VDPV circulation in the assessed area.
Monitoring & Evaluation	• All process indicators (see above) should be assessed and reported for geographic areas of concern/special populations (segregated analysis). • Case validation: proportion of cases validated by secondary and/or tertiary supervisor; proportion of cases where critical data was updated due to the outcome of validation. • Number of targeted surveillance reviews conducted by the national and/or regional surveillance team. • Number of silent areas that have been evaluated. • Regularly review data quality to flag potential data integrity issues.

Annex 9. Environmental surveillance

Definition	Environmental surveillance (ES) for poliovirus is the routine collection and testing of environmental (sewage) samples from designated locations draining target populations.
Rationale and Indications	Infected individuals can excrete poliovirus in faeces for up to several months, often in the absence of clinical symptoms of polio infection. Large numbers of excreted poliovirus particles remain infectious in the environment for varying lengths of time, depending on the immediate conditions (e.g., ambient temperature). ES can help: • Increase the sensitivity in detecting poliovirus circulation • Document persistence of poliovirus transmission • Provide supplementary supportive documentation for the certification of polio eradication Indications: • In polio-endemic settings, ES supplements AFP surveillance in detecting poliovirus circulation, identifying residual poliovirus transmission and can provide evidence to document interruption of poliovirus circulation. • In countries with outbreaks following importation of WPV or emergence of VDPVs – Inside known infected communities: ○ To assess transmission of VDPVs or WPV ○ To assess persistence of transmission and sufficiency of outbreak response activities ○ If mOPV2 is used in the response, to monitor persistence and potential transmission of Sabin 2 virus – Outside known infected communities: ○ To incidentally detect potential transmissions (e.g., spread from infected communities) and guide the scope of response ○ If mOPV2 is used in the response, to incidentally detect exportation of vaccine-related virus • In polio-free countries, ES is useful in areas at highest risk of WPV importation (or VDPV emergence) and spread, as well as

	those at risk of failing to detect WPV importation or VDPV emergence due to weak AFP surveillance. • Following OPV components withdrawal (tOPV-bOPV switch and bOPV cessation), ES helps to provide early detection of the emergence of new VDPV, document the elimination of Sabin-like viruses, and monitor the effectiveness of containment in accredited facilities.
Procedure (Steps)	ES should be initiated in full coordination with WHO regional office teams, WHO headquarters, and GPLN teams, following careful evaluation of the advantages of environmental surveillance in the context of global, regional, and national surveillance goals. ES involves the following activities: • Choosing an area within a country based on the epidemiology and risk. • Assessing suitability of ES sites in the targeted area. Sites for collection should be carefully selected, optimally from converging sewer networks with flowing water located upstream and away from industrial sites. Pit latrines should not be considered as ES sites. • Developing a comprehensive ES plan to address: schedule of sampling; details of sampling sites; sampling responsibilities; logistics; laboratory requirements (space, personnel, equipment and reagents, laboratory procedures); data management and reporting; training and quality assurance; and the envisaged consequences of possible laboratory results. • Where ES is possible, establishing monthly or biweekly collection. ES can either be set up as a permanent deployment, or on an ad hoc temporary basis. Permanent deployments are typically guided by global and regional ES expansion plans. Ad hoc deployments are justified in some special circumstances and are detailed more in Annex 10.

Challenges and Anticipated Issues	ES has challenges such as: • Representative sampling may be difficult to achieve in the absence of a network of confluent sewers and geographic locations of the targeted populations. • Difficulty in finding appropriate sampling sites – e.g, unavailability of sewage network and use of pit latrines in many of the hard-to-reach areas • Limited access for regular sewage collection in inaccessible areas • Collecting, maintaining reverse cold chain, and transporting ES sample may require creativity • Sampling and processing costs • Need for optimal coordination between the surveillance team and the laboratory team • Other challenges include difficulty tracking source of infection and response planning
Enabling Factors & Tips for Success	ES is facilitated by: • Existence of a (national) ES plan, including designation of roles and responsibilities for all actors • The selection of appropriate sites • Implication and coordination with the laboratory • Identification and training of dedicated sample collectors • Supportive and accountable supervision for sample collection • Allocation of adequate field and laboratory resources • The identification of a reliable mechanism and means of transport for the samples to the laboratory • Adequate set-up of the ES laboratory including use of validated procedures. • Prioritized testing of samples from inaccessible or hard-to-reach areas
Interpretation of Results	• Results are limited to geographic scope of catchment area. • Repeated sampling increases the probability of detecting low-level transmission of WPV or cVDPV in a population. • Positive results indicate viral excretion in the community but cannot pinpoint the exact source of the virus (the infected individuals or subcommunities)

	• As with AFP surveillance, negative results (WPV and VDPV) from an ES site do not rule out circulation. The degree to which negative samples support evidence for absence of poliovirus circulation in the catchment area depend on the quality and sensitivity of the site (see Monitoring and Evaluation section). • Negative laboratory results (to all viruses including NPEV) can be used to assess the appropriateness of selected ES sampling sites and quality of the reverse cold chain, as well as the effectiveness of laboratory procedures.
Monitoring & Evaluation	All sites should be geolocated, and catchment areas defined (population size and characteristics). *Site-specific process monitoring (6 months)* ○ ≥80% scheduled samples are collected (at least one sample per month per site) ○ ≥80% of scheduled samples are collected on the date assigned ○ ≥ 80% of samples are collected at the time assigned ○ ≥ 80% of samples must arrive in laboratory within 3 days of collection; or 7 days of collection if shipping to an international laboratory ○ ≥ 80% of samples arrive in the laboratory in good condition (no leakage of specimen, with an adequate specimen) ○ Detection of EV in ES samples (≥50%) ○ In populations immunized with OPV, environmental surveillance should also detect Sabin-like strains, within 6 weeks following SIAs in the catchment area *Laboratory specific monitoring (timeliness of laboratory results)* ○ ≥80% of virus isolation results within 21 days of specimen receipt in laboratory ○ ≥80% of ITD results within 7 days of isolate receipt in the ITD laboratory ○ ≥80% of sequencing results within 14 days of isolate receipt in the sequencing laboratory

Annex 10. Ad hoc environmental surveillance

Definition	Ad hoc environmental surveillance is the targeted collection and testing of environmental (sewage) samples from designated sites in different cities or areas under special circumstances and for a limited period.
Rationale and Indications	Infected individuals can excrete poliovirus in faeces for up to several months in the absence of clinical symptoms of polio infection. Large numbers of excreted poliovirus particles remain infectious in the environment for varying lengths of time, depending on the immediate conditions (e.g., ambient temperature, etc.). Ad hoc ES can help increase the sensitivity in detecting poliovirus circulation, particularly by enhancing surveillance in security-compromised and hard-to-reach areas, in newly accessible areas when there is a high index of suspicion of virus transmission, and around the arrival of new populations to safer places (such as IDP camps). Ad hoc ES should not replace AFP surveillance, and efforts to strengthen AFP surveillance should be the priority. However, ad hoc ES can be considered only under special circumstances and following careful review of the situation.
Procedure (Steps)	Ad hoc ES should be initiated in full coordination with WHO regional office teams, WHO headquarters, and the GPLN following careful evaluation of the advantages of ad hoc ES in the context of regional and national surveillance goals and capacities. Ad hoc environmental surveillance involves the following activities: 1. Conducting assessment of possible suitable collection sites in inaccessible and hard-to-reach areas (such as flowing water contaminated with household sewage). Site characteristics should be similar to standard ES deployments. 2. Procuring logistics and raising laboratory capacity 3. Identifying and training sample collectors 4. Collecting one sample per selected site

	5. Repeating rounds of collection – either biweekly or monthly 6. Establishing duration of collection, at a minimum 6 months
Challenges and Anticipated Issues	Ad hoc environmental surveillance encounters many of the same challenges as traditional ES deployments. • Representative sampling may be difficult to achieve in the absence of a network of confluent sewers. • Difficulty in finding appropriate sampling sites – e.g., unavailability of sewage network. • Collecting, maintaining reverse cold chain, and transporting ES sample may require creativity. • Need for optimal coordination between the surveillance team and the laboratory team. There may be additional logistical challenges in sample collection and transportation in access-compromised or hard-to-reach areas. • Limited access for regular sewage collection in inaccessible areas • Limited appropriate sampling sites – e.g., pit latrines used in many of the hard-to-reach areas • Limited population in the catchment area. For ad hoc deployments, site quality is difficult to establish, which can complicate interpretation of negative results.
Enabling Factors & Tips for Success	Ad hoc environmental surveillance is facilitated by: • The selection of appropriate sites • Well-motivated sample collectors who are identified in advance of the activity and included in site selection • Engagement and discussion with stakeholders, including the laboratory • Detailed field and laboratory plan, including budget • Supervision of sample collection • Allocation of adequate field and laboratory resources
Interpretation of Results	• Results are limited to geographic scope of catchment area • Positive results indicate viral excretion or importation in the community

	• As with AFP surveillance, negative results (WPV and VDPV) from an ad hoc ES site do not rule out circulation. The degree to which negative samples support evidence for absence of poliovirus circulation depend on the quality and sensitivity of the site (see Monitoring and Evaluation section).
Monitoring & Evaluation	All sites should be geolocated, and catchment areas defined (population size and characteristics). *Site-specific process monitoring (6 months)* ○ ≥80% scheduled samples are collected (at least one sample per month per site) ○ ≥80% of scheduled samples are collected on the date assigned ○ ≥ 80% of samples are collected at the time assigned ○ ≥ 80% of samples must arrive in laboratory within 3 days of collection; or 7 days of collection if shipping to an international laboratory ○ ≥ 80% of samples arrive in the laboratory in good condition (no leakage of specimen, with an adequate specimen) ○ Detection of EV in ES samples (≥50%) ○ In populations immunized with OPV, environmental surveillance should also detect Sabin-like strains, within 6 weeks following SIAs in the catchment area *Laboratory specific monitoring (timeliness of laboratory results)* ○ ≥80% of virus isolation results within 21 days of specimen receipt in laboratory ○ ≥80% of ITD results within 7 days of isolate receipt in the ITD laboratory ○ ≥80% of sequencing results within 14 days of isolate receipt in the sequencing laboratory

Annex 11. Targeted health children stool surveys

Definition	Targeted healthy children stool surveys are the collection and testing of stool samples from high-risk healthy children where there is a high degree of suspicion of circulating poliovirus. For this purpose, a healthy child is considered to be a child who is: • not suffering from AFP, • under 5 and under 2 when possible, and • not a close contact of an AFP case.
Rationale and Indications	**Note:** This supplemental strategy is not a substitute for good surveillance and **not** for use in silent districts. Targeted healthy children stool surveys may support the detection of poliovirus circulation in a context of silent circulation and when there is a high degree of suspicion of transmission. Targeted healthy children stool surveys are implemented either in a specific area and/or specific populations at a high risk of poliovirus circulation. They may be implemented in the following areas: • As a screening tool for internally displaced children and refugee children moving from areas of known or suspected virus circulation • In a polio event or an outbreak setting as part of initial investigations of all polio events: – Collect 20 samples from healthy children of same age group living in the community, in another part of the village, or in a nearby village (and not in close contact to the confirmed case) – Investigation of a positive environmental sample: collect 20-40 community stool samples from the catchment area
Procedure (Steps)	Targeted healthy children stool surveys involve the following activities: 1. Deciding on a source population: • Health facility-based sampling (when a child from the targeted area or group visits a health facility for any reason other than AFP) • Community sampling from households or camps

	2. Sensitizing and briefing community leaders about polio and the importance of collecting samples 3. Deciding on criteria for enrollment: the child should be from vulnerable communities most susceptible to infection among the population groups as described above—e.g., younger children (preferably younger than 5 years of age and underimmunized or not immunized) 4. Determining the number of children to be sampled (20 to 40) 5. Collecting only one stool specimen from each healthy child 6. Collecting, storing, and transporting stool specimens in the same way as for AFP cases 7. Completing a specific "targeted healthy children stool survey" form for each child and sending it to the laboratory along with the specimen. Each specimen should be labelled clearly as a 'healthy children stool survey' with a specific unique identification number.
Challenges and Anticipated Issues	Healthy children stool surveys have challenges such as: • Inaccessibility may limit the ability of the surveillance team to reach the affected area or transport samples. • Lack of community awareness may produce suspicions regarding the intention of the survey, and thus result in high numbers of refusal. • Diverted health staff may struggle to collect stool specimens, especially if samples are collected from communities. • Increased number of stool specimens can affect laboratory workload.
Enabling Factors & Tips for Success	Healthy children stool surveys are facilitated by: • Coordination with the laboratory in anticipation of increased workload • Identifying and profiling humanitarian agencies (UN, etc.) and NGOs, as they can support in collecting samples in many instances, especially security-compromised situations • Community sensitization in advance of collection of stool from healthy children

Interpretation of Results	• A positive result (WPV or VDPV) shall be considered evidence of transmission in the specified area and will prompt programmatic action as per outbreak response guidelines. • Positive healthy children will not be listed as cases of poliomyelitis, but the isolate will be added to the WPV/VDPV count and used for all analysis, including genetic sequencing and genetic diversity analysis conducted by the Global Polio Laboratory Network (GPLN). • A negative result may not be interpreted as the absence of poliovirus. It simply indicates that at the time of collection there was no virus shed by the sampled children.
Monitoring & Evaluation	*Process indicators* – Percent of collected samples out of planned – Arrival at the lab within three days and stool in good condition *Outcome indicators* – NPEV and Sabin-like isolation rates – Isolation of WPV or VDPV – Identification of newly infected administrative units—e.g., districts

Annex 12. Scientific references

Programme information

- Global Polio Eradication Initiative (website) http://polioeradication.org/
  The website includes updated global counts on wild and vaccine-derived poliovirus.
- For additional polio publications on topics including current status, surveillance, outbreaks, and testing, as well as special topics on containment, visit the following website:
  - Morbidity and Mortality Weekly Report (MMWR): https://www.cdc.gov/mmwr/index.html
  - Weekly Epidemiological Record (WER): http://www.who.int/wer/en/

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