

Guidelines for poliovirus surveillance in the WHO African Region

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List of acronyms and abbreviations

| | | | |
|----------|---|---------|---|
| AESI | Adverse event of special interest | NPL | National Polio Laboratory |
| AFP | Acute flaccid paralysis | nOPV | Novel oral polio vaccine |
| AFR | African Region (WHO) | nOPV2 | Novel oral polio vaccine type 2 |
| AMR | Region of the Americas (WHO) | NPAFP | Non-polio acute flaccid paralysis |
| AS | Active surveillance | NPEC | National Polio Expert Committee |
| AVADAR | Auto-Visual AFP Detection and Reporting | NPEV | Non-polio enterovirus |
| aVDPV | Ambiguous vaccine-derived poliovirus | NTF | National Task Force on Containment |
| bOPV | Bivalent oral polio vaccine | OAU | Organisation of African Unity |
| CBS | Community-based surveillance | OBRA | Outbreak response assessment |
| CIF | Case investigation form | OPV | Oral polio vaccine |
| COVID-19 | Coronavirus disease (2019) | PEF | Poliovirus Essential Facility |
| cVDPV | Circulating vaccine-derived poliovirus | PID | Primary immunodeficiency disorder |
| cVDPV1 | Circulating vaccine-derived poliovirus type 1 | POLIS | Polio Information System |
| cVDPV2 | Circulating vaccine-derived poliovirus type 2 | RCC | Regional Commission for the Certification of the Eradication of Poliomyelitis |
| cVDPV3 | Circulating vaccine-derived poliovirus type 3 | RNA | Ribonucleic acid |
| CSF | Cerebro-Spinal Fluid | RRL | Regional Reference Laboratory |
| DG | Director-general (WHO) | SEAR | South-East Asia Region (WHO) |
| EI | Essential immunization | SIA | Supplementary immunization activity |
| EMG | Electromyography | SL | Sabin-like |
| EMR | Eastern Mediterranean Region (WHO) | SOPs | Standard operating procedures |
| EPID | Epidemiological identification | tOPV | Trivalent oral polio vaccine |
| EPI | Expanded Program on Immunization | TH/TBA: | Traditional Healer/Traditional Birth Attendant |
| ERC | Expert Review Committee | TORs | Terms of reference |
| ES | Environmental surveillance | VAPP | Vaccine-associated paralytic poliomyelitis |
| EUR | European Region (WHO) | VDPV | Vaccine-derived poliovirus |
| GACVS | Global Advisory Committee on Vaccine Safety | VDPV1 | Vaccine-derived poliovirus type 1 |
| GBS | Guillain-Barré syndrome | VDPV2 | Vaccine-derived poliovirus type 2 |
| GCC | Global Commission for the Certification of the Eradication of Poliomyelitis | VDPV3 | Vaccine-derived poliovirus type 3 |
| GIS | Geographic information system | VP1 | Virus protein 1 |
| GPEI | Global Polio Eradication Initiative | VPD | Vaccine-preventable disease |
| GPLN | Global Polio Laboratory Network | VRE | Vaccine-related event |
| GPS | Global positioning system | WebIFA | Web-based information for action |
| IDP | Internally displaced population | WHO | World Health Organization |
| IPV | Inactivated polio vaccine | WPR | Western Pacific Region (WHO) |
| ITD | Intratypic differentiation | WPV | Wild poliovirus |
| iVDPV | Immunodeficiency-associated vaccine-derived poliovirus | WPV1 | Wild poliovirus type 1 |
| MOH | Ministry of Health | WPV2 | Wild poliovirus type 2 |
| mOPV | Monovalent oral polio vaccine | WPV3 | Wild poliovirus type |
| mOPV1 | Monovalent oral polio vaccine type 1 | | |
| mOPV2 | Monovalent oral polio vaccine type 2 | | |
| mOPV3 | Monovalent oral polio vaccine type 3 | | |
| NAC | National Authority for Containment | | |
| NCC | National Certification Committee | | |
| NPEC | National Polio Expert Committee | | |
| NGO | Nongovernmental organization | | |
| NID | National Immunization Day | | |

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Main objectives of the field guide

This document provides health workers conducting AFP and poliovirus surveillance at all levels of the health system in member states of the African Region with a comprehensive tool to guide and facilitate the implementation of surveillance activities. This regional guideline updates a preceding document and reflects important recent technical and operational developments in AFP and poliovirus surveillance. It will be useful as a reference document, and for training and sensitizing technical and medical field officers involved in polio surveillance.

Target audience. The field guide is intended to assist persons directly involved in surveillance for AFP and poliovirus with their day-to-day duties and to help them to clarify and trouble-shoot surveillance-related issues they encounter in the field. The tool will also be very useful for the induction and on-the-job training of any newly recruited public health staff, for whom AFP and poliovirus surveillance is part of their terms of reference. Another target group are data managers working on the collection, analysis and dissemination of immunization and surveillance data, who need to be acquainted with the basic principles and processes of AFP and poliovirus surveillance.

Overall, the guidelines highlight three cross-cutting issues that remain central to the success of the polio eradication programme:

1. the speed of poliovirus detection,
2. the quality of surveillance at the subnational levels, and
3. the need for integrating surveillance for polioviruses with surveillance for other vaccine-preventable diseases (VPDs), while ensuring that the quality of polio surveillance is sustained.

Main content. The updated guideline outlines well-established strategies and activities for AFP and poliovirus surveillance which allow countries to attain and maintain a surveillance system sensitive enough to either detect any circulating polioviruses, including wild polioviruses (WPVs), vaccine-derived polioviruses (VDPVs) and Sabin-like (SL) viruses, or to conclude that they remain free of poliovirus circulation.

The document makes use of several recently produced global guidelines and technical documents, including [the 2022-2024 Global Polio Surveillance Action Plan](#) (pls also see Annex 10. Technical resources for reference) and the updated Global Guidelines for Acute Flaccid Paralysis (AFP) Surveillance¹. (pls also see [Annex 5](#))

Main current surveillance-related challenges in the African Region are highlighted and new tools are presented, in particular those intended to enhance surveillance sensitivity and increase the speed of detecting circulating polioviruses. In addition to well-established indicators to assess surveillance quality, the updated guidelines also introduce new indicators, such as those aimed at capturing the timeliness of field activities.

Chapter summary. The document consists of 11 self-contained chapters which allow for quick reference to a specific topic of interest without having to go through the whole document. Following an outline of the overall objectives, [Chapter 1](#) provides an introduction to poliomyelitis and an overview of the Polio Eradication Initiative, including of the current status in the African Region, followed by chapters on the principles ([Chapter 2](#)) and main field strategies ([Chapter 3](#)) of AFP surveillance. [Chapter 4](#) provides details on all activities related to AFP case detection, reporting and investigation. It is followed by chapters on monitoring AFP surveillance performance ([Chapter 5](#)), environmental surveillance ([Chapter 6](#)) and the role of the laboratory ([Chapter 7](#)), and on surveillance logistics and support functions ([Chapter 8](#)). [Chapter 9](#) describes specific activities required to enhance surveillance in outbreak settings,

¹ To be published in mid-2023

and [Chapter 10](#) provides an overview of the principles of certification of polio-free status and of poliovirus laboratory containment. [Chapter 11](#) outlines the need for all countries of the African Region to further improve the integration AFP and poliovirus surveillance into national VPD and infectious disease surveillance systems.

More details for important chapters in the Annexes. In order to maintain the readability of the main text, some more detailed material, such as SOPs, other protocols and bulleted lists, is provided in a series of [Annexes](#). Notes and links in the respective Chapter refer readers looking for more details on a given subject to these Annexes. Finally, [Annex 10](#) lists relevant reference and resource documents, with hyperlinks for documents which are available on the internet.

All entries in the Table of Content at the beginning of the document are hyperlinked to the respective chapter and section in the document, which will facilitate navigation for readers using the digital version of the document.

1 Introduction

1.1 Poliovirus and poliomyelitis

Poliomyelitis is a highly contagious disease caused by a human enterovirus called poliovirus. Poliovirus consists of a ribonucleic acid (RNA) genome enclosed in a protein shell, referred to as a capsid. Each of the three serotypes of wild poliovirus (WPV types 1, 2, and 3), has a slightly different capsid protein. Largely, immunity to one serotype does not confer immunity to the other serotypes.

The virus is most often spread by the fecal-oral route through contact with the feces of an infected person, which occurs mostly in areas with poor water, sanitation and hygiene. It can also spread through droplets from a sneeze or cough (oral-to-oral transmission), though this is less common and occurs mainly in areas with relatively better hygiene and sanitary conditions. Poliovirus enters through the mouth and multiplies in the intestine. Infected individuals shed poliovirus into the environment for several weeks, where rapid person-to-person spread can occur in the community, especially in areas of poor sanitation.

Poliovirus infection (wild or circulating vaccine-derived poliovirus) of persons without immunity can have two main results:

- Most poliovirus infections are asymptomatic or cause only a minor illness, with non-specific mild symptoms, and without affecting the central nervous system.
- Less than 1% of poliovirus infections in non-immune persons result in paralysis by affecting the central nervous system, a life-threatening disease called paralytic poliomyelitis.

Poliomyelitis cannot be cured but can be prevented by vaccination. Two vaccines are available: the live oral poliovirus vaccine (OPV), itself a weakened, 'attenuated' form of poliovirus, which is given by mouth, and the 'killed', inactivated polio vaccine (IPV), which is injected.

Both vaccines have been proven to be safe and efficacious.

However, the success of the polio eradication campaign is largely attributed to the widespread utilization of the cost-effective OPV. The key factor driving this success is that OPV, in contrast to IPV, not only stimulates a humoral immune response, leading to the production of antibodies, but also induces mucosal immunity within the recipient's intestines. As a result, OPV more effectively enhances 'herd' immunity or population-wide protection, when compared to the effects of IPV.

Unfortunately, in very rare circumstances (approximately 1 in 2.7 million doses), the attenuated Sabin virus strains in OPV cause vaccine-associated paralytic poliomyelitis (VAPP) in the vaccine recipient or a non-immune close contact person.

Annex guidance

This section provides a high-level overview on poliovirus. Further details can be found in [Annex 1. Poliovirus](#).

In addition, through prolonged excretion and transmission in under-vaccinated populations, the OPV vaccine virus can, on rare occasions, mutate genetically to a form known as vaccine-derived poliovirus (VDPV). VDPVs can revert to cause paralytic polio and start to circulate, causing polio outbreaks. All three serotypes (see above) of VDPV virus have been found, reflecting that, for many years, the trivalent OPV preparation used for polio eradication campaigns contained attenuated vaccine virus of all three serotypes.

There are three categories of VDPVs: circulating, immunodeficiency-associated and ambiguous VDPVs. VDPVs, and particularly polio outbreaks caused by VDPVs, represent a challenge to polio eradication.

| Annex guidance |
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| For more information on VDPVs, see Annex 2. Vaccine-derived poliovirus classification and response . |

Despite major progress towards eradicating wild poliovirus globally and in the WHO African Region, which became the fifth WHO Region to be certified wild poliovirus-free in 2020, outbreaks of circulating VDPV, in the African Region particularly due to type 2 VDPV, continue to occur. Response activities to interrupt outbreaks caused by circulating VDPVs have become a major focus of the polio eradication programme in the last mile to eradication.

1.2 Polio eradication

Following the widespread use of poliovirus vaccine in the mid-20th century, the worldwide incidence of poliomyelitis declined rapidly. In view of the near-eradication of wild poliovirus from the WHO Region of the Americas (AMR) through the use of nationwide OPV vaccination campaigns (wild polio-free certification of AMR in 1994), the World Health Assembly (WHA) adopted the goal of global polio eradication in 1988.

The benefits of the global eradication of polio are at least threefold:

- 1. Reduction in morbidity and mortality:** Polio was a leading cause of disability in populations before the vaccine era. With the eradication of WPV types 2 and 3 (WPV2 and WPV3), the incidences of infection caused by these two WPV types have already been reduced to zero, thereby preventing thousands of polio-related deaths and saving millions of children from being crippled for life.
- 2. Strengthened health systems:** The polio eradication programme has enhanced the collaboration between the surveillance systems and laboratory networks. It has helped revitalize immunization programs and it contributes to the strengthening of health system planning, management and evaluation.
- 3. Economic impact:** It is estimated that US\$1.5 billion will be saved per year after the final remaining serotype (WPV1) is eradicated and immunization against polio can be stopped.

Polio can be eradicated because of the following main reasons:

- Polioviruses reside in the human intestinal system only - there is no animal reservoir;
- poliovirus survives for only a limited amount of time in the environment; and
- inexpensive and effective vaccines exist to protect the population and completely prevent the disease.

More than 200 countries and territories have eliminated WPV circulation through time-tested strategies by:

- attaining high routine immunization coverage (>90%) within the first year of life with at least three (3) doses of polio vaccine;
- conducting high-quality supplementary immunization activities (SIAs) to stop outbreaks and interrupt the spread of the virus; and

- implementing a sensitive surveillance system for poliovirus.

The following criteria are applied for the certification of WPV eradication (also see [Chapter 10](#)):

- no WPV transmission detected from any population source for a period of no less than three (3) years,
- adequate, 'certification quality' global poliovirus surveillance; and
- safe and secure containment of all WPVs retained in facilities, such as laboratories and vaccine manufacturing facilities.

Global wild poliovirus-free certification will have to be further sustained by requirements for the containment of all polioviruses used in vaccine manufacturing and remaining in laboratories, and by stopping the use of all live polio vaccines (OPVs) in order to eliminate the risk of emergence of VDPVs.

Since its establishment in 1988, the Global Polio Eradication Initiative (GPEI) has made major progress towards the goal of eradicating wild poliovirus (WPV). Five of six WHO regions have been certified as WPV-free: the Region of the Americas (1994), the Western Pacific Region (2000), the European Region (2002), the South-East Asian Region (2014) and the African Region (2020).

The Global Commission for the Certification of the Eradication of Poliomyelitis (GCC) has certified the global eradication of two of the three poliovirus serotypes: type 2 and type 3, last reported in 1999 and 2012, respectively. At the time of this writing (1st quarter 2023), only WPV type 1 (WPV1) remains, with only two countries of the WHO Eastern Mediterranean Region still classified as endemic for WPV1: Afghanistan and Pakistan.

1.3 Poliovirus surveillance

As the GPEI comes closer to the global goal of WPV eradication, sensitive surveillance allowing to reliably conclude the absence of poliovirus circulation becomes increasingly important. This is particularly true for the WHO African Region, where wild poliovirus-free countries need continued high-quality surveillance to be sure they remain polio-free and that no WPVs are circulating. They also need to be able to detect and respond to possible new outbreaks following virus importations or following emergence of VDPV in a timely manner.

Likewise, cVDPV outbreak-affected countries in the African Region need sensitive surveillance in order to monitor progress towards interrupting the outbreak.

To date, poliovirus surveillance permitting the reliable and timely detection of all types of poliovirus (WPV, VDPV, Sabin-like viruses) is mainly conducted using AFP and environmental surveillance.

1. **Acute flaccid paralysis (AFP) surveillance:** This case-based syndromic surveillance system is used globally and in all 47 member states of the African Region. It seeks to identify all cases of AFP in children aged < 15 yrs and to confirm the presence or absence of poliovirus by testing AFP case stool specimens in WHO-accredited laboratories. AFP surveillance remains one of the cornerstones to guide progress of polio eradication globally and in the African Region (see [Chapters 2, 3, 4](#) and [5](#)).
2. **Environmental surveillance (ES):** AFP surveillance is complemented by environmental surveillance (ES) which systematically tests sewage samples for poliovirus in specific settings. ES is conducted in an increasing number of countries globally; in the WHO African Region, 42 out of 47 member states (89%) use ES, as of mid-2023. Provided that ES is appropriately implemented in suitable locations and implementation is well-supervised, ES data can significantly increase the sensitivity of surveillance to detect polioviruses in order to show that circulation has either continued, or increase the confidence that an area or country is polio-free (see [Chapter 6](#)).

3. **Surveillance for immune-deficiency associated poliovirus (iVDPV surveillance):** A third, specialized surveillance system - iVDPV surveillance - is currently being introduced in some countries of the African Region and globally, targeting the identification of persons with primary immunodeficiencies (PIDs) affecting the antibody-producing B-cell immune system. The immune system of some PID patients cannot clear the intestinal OPV infection, which may lead to excreting vaccine-derived poliovirus ('iVDPV') for prolonged periods². Such chronic poliovirus excretors will pose a serious problem in the future, once the use of all OPVs has been stopped globally, because they could be the source of new community circulation of poliovirus. (Also see [Annex 2](#)).

All three of the above systems receive critically important support from the African Regional Polio Laboratory Network (see [Chapter 7](#)) as well as from global specialized polio labs. These laboratories perform confirmatory testing of stool and environmental samples, using viral isolation, intratypic differentiation and genomic sequencing procedures.

Epidemiological and virologic data generated by AFP and ES systems are reported to the AFRO Regional Office (see [Chapter 5](#)), where they are analyzed, integrated and forwarded weekly to the WHO global level to allow the ongoing 'real time' assessment of progress towards global eradication.

1.4 Main milestones - poliomyelitis and polio eradication, WHO African Region

At the time of the 1988 WHA resolution to eradicate polio globally, all member states and sub-Regions of the WHO African Region were considered endemic for wild poliovirus. Most countries in the WHO African Region started to implement polio eradication activities from 1998; 10 years after the 1988 WHA resolution. (Please also see Annex 3. Timeline of poliomyelitis and polio eradication in the African Region).

By 2000, eleven African countries had begun to notify Wild Poliovirus (WPV) through laboratory confirmation of reported AFP cases. Large polio outbreaks were detected in Angola in 1999 (55 cases) and Cape Verde (12 cases). In 2001, only 14 out of 47 AFR member states had achieved certification standard AFP surveillance quality.

With progress of the GPEI in all remaining endemic WHO Regions, the number of polio-endemic countries globally decreased to 10 (Afghanistan, Angola, Egypt, Ethiopia, India, Niger, Nigeria, Pakistan, Somalia and Sudan) in 2001, and to six in 2003 (Afghanistan, Egypt, India, Niger, Nigeria and Pakistan).

In mid-2003, the suspension of vaccination activities in the polio- endemic states in Northern Nigeria due to false rumors about the vaccine led to a resurgence in wild poliovirus transmission in the African region. By end-2004, more than a dozen countries within the African region and beyond had experienced importations of wild poliovirus of Nigerian origin. Wild poliovirus transmission was re-established in five countries: Burkina Faso, Central African Republic, Chad, Cote d'Ivoire and Mali. .

At the end of 2005, massive response vaccination campaigns successfully interrupted transmission in most outbreak-affected countries, leaving one country considered as 'endemic' (Nigeria), two countries with re-established transmission (Chad and Mali) and four countries with ongoing outbreaks due to recent importations.

1.5 Main challenges for polio surveillance in the African Region

Currently, the following main challenges affect the quality and sensitivity of AFP surveillance in the African Region:

² GUIDELINES for Implementing Poliovirus Surveillance among Patients with Primary Immunodeficiency Disorders (PIDs), WHO, 2022. https://polioeradication.org/wp-content/uploads/2022/06/Guidelines-for-Implementing-PID-Suveillance_EN.pdf

- Sub-national gaps in AFP surveillance quality continue to be detected in many countries of the Region, especially where surveillance networks may not cover special population groups, or in remote, hard-to-reach areas.
- Considerable delays in specimen or sample shipment to WHO-accredited laboratories still occur within the Region, resulting in late confirmation of polio cases and delaying outbreak response, while allowing the continues spread of poliovirus.
- Rapid staff turnover and attrition and insufficient training, supervision and monitoring affect the quality of field and laboratory surveillance and lead to the loss of skills, competencies and institutional memory.
- In countries that have been polio-free for many years, polio activities are no longer prioritized, and surveillance quality and sensitivity decrease. As a result, poliovirus importations or new emergences of VDPV and subsequent outbreaks are detected only very late, which affects the effectiveness of outbreak response.
- Low routine immunization coverage in some countries and large numbers of susceptible persons leading to persistent viral transmission
- Weak government ownership of surveillance in many countries. There is much dependence on donors due to low levels of domestic funding.
- Insecurity also is a challenge in surveillance, leading to pockets of areas/geographies that are not accessible for surveillance activities, including supervision and case search.

2 Principles of AFP surveillance

Acute flaccid paralysis (AFP) surveillance is a case-based surveillance system to detect and report the syndrome of acute flaccid paralysis, in children aged < 15 yrs³, and to test stool specimens from all AFP cases for the presence of poliovirus. AFP surveillance has been developed and standardized by WHO and is in use in the majority of WHO member states (> 150 countries). Similar processes, forms and tools, surveillance quality indicators and reporting systems are used in every country, including in all 47 member states of the WHO African Region.

Countries share uniform data collected with this standardized system with the regional and global level of WHO on a weekly basis. This allows the real-time monitoring of progress towards regional and global eradication goals, as well as the detection and targeting of areas where surveillance quality is weak.

The epidemiology of polio and characteristics of poliomyelitis make it particularly challenging to detect circulating poliovirus:

- Only 1 in 200 wild poliovirus (WPV) infections of persons who are not immune results in paralysis. This means that the great majority of poliovirus infections are “silent” as they do not cause paralysis; however, even persons with asymptomatic infections will excrete virus for several weeks and can transmit the disease to others.
- Even if a poliovirus infection causes paralysis, the clinical presentation of paralytic polio is not unique to polio, but is very similar to the presentation of other neurological diseases, such as Guillain-Barré syndrome (GBS) - the most common non-polio cause of AFP.

To overcome these challenges, two key measures were universally agreed on in the 1990s to improve the sensitivity of the surveillance system:

- adopting the syndrome of AFP as a reportable condition, and

³ AFP in persons > 15 yrs may also be reported, if a clinician suspects paralytic poliomyelitis.

- laboratory testing of AFP case stool specimens in polio laboratories accredited and quality-controlled by the World Health Organization (WHO), to separate AFP cases due to polio from non-polio AFP cases.

2.1 Adopting AFP as a reportable syndrome

When the Global Polio Eradication Initiative (GPEI) was first established, most countries were reporting only clinically confirmed polio cases. Polio was reported as just one of many diseases within disease surveillance systems, often on an annual basis. Given the epidemiology and characteristics of polio, i.e. that clinical polio cases represent only the 'tip of the iceberg' of many silent infections, this made it difficult to detect new cases and respond to outbreaks of polio both swiftly and effectively.

Also, reporting of 'clinically confirmed polio cases' very likely included a number of acute paralysis cases that were *not* due to polio, because several other neurological diseases may initially look like polio. For the purpose of eradication, a sensitive surveillance system to detect the poliovirus itself was needed.

Rather than reporting only cases that appeared to be polio clinically, it was decided to establish a system for the timely detection, reporting and investigation of all cases presenting with polio-like paralysis, i.e., cases of AFP, followed by laboratory testing to confirm or rule out polio as a cause. This led to the adoption of acute flaccid paralysis, or **AFP, as the syndrome** to be reported.⁴ Of note, AFP is neither a diagnosis nor a disease, but the lead syndrome (set of associated symptoms) for several neurological diseases, including paralytic poliomyelitis.

Because this sensitive case-based syndromic definition captures not only acute poliomyelitis but also other diseases that present similarly, including GBS, transverse myelitis and traumatic neuritis, each case of AFP case must be investigated with laboratory tests to confirm or rule out polio. ([Annex 1. Poliovirus, poliomyelitis and polio vaccines](#) offers more details on poliovirus, poliomyelitis, clinical signs and symptoms of polio and polio vaccines).

2.2 Testing all stool specimens in a WHO-accredited polio laboratory

Polioviruses are primarily transmitted from person-to-person through the fecal-oral route in settings with poor sanitation and hygiene and limited access to clean water. Polioviruses replicate (multiply) in the human intestinal system, and are excreted, or shed, intermittently (i.e., not continuously) in the stool of infected individuals. Shedding is most intense up to two weeks after the onset of paralysis, but can continue up to six to eight weeks after onset.

AFP case definition

An AFP case is defined as a child aged under 15 years presenting with sudden onset of floppy paralysis or muscle weakness due to any cause, or any person of any age with paralytic illness if poliomyelitis is suspected by a clinician.

Main AFP quality indicators, African Region

⁴ In the same way, smallpox eradication adopted detection and investigation of the "rash and fever" syndrome.

These features of a poliovirus infection need to be taken into account for laboratory testing to confirm or rule out polio in children with AFP. Many years of experience in the global eradication programme confirmed that the most reliable way to test children with AFP is to:

- collect two (2) stool specimens, 24 hours apart, from each AFP case - because shedding in the stool is not continuous;
- collect both specimens as early as possible, but no later than 14 days, after onset of paralysis in the AFP case, and
- use an appropriate carrier box, to transport the stool specimens to a WHO-accredited polio laboratory within 3 days after specimen collection (for details see [Chapter 4.3](#)).

Expected non-polio AFP rate

- ✓ At least two (2) non-polio AFP cases each year for every 100 000 children aged under 15 years.
- ✓ In outbreak-affected areas, at least three (3) non-polio AFP cases each year for every 100 000 children under 15 years.

Expected adequate stool specimen rate

- ✓ At least 80% of reported AFP cases have had adequate stool specimens taken (2 specimens, ≥ 24 hrs apart, AND ≤ 14 days of onset AND received in the lab in good condition).

See Annex 3 for core and non-core AFP surveillance indicators.

2.3 Main AFP surveillance quality indicators

One of the most important tasks for countries conducting AFP surveillance is to continuously monitor the quality of surveillance, in order to make sure surveillance data are reliable. The GPEI has established a number of indicators for the purpose of monitoring the sensitivity and performance of AFP surveillance quality. Surveillance results are considered as reliable only if the main surveillance quality indicators reach and surpass agreed-upon thresholds.

Two main quality indicators are used to assess AFP surveillance sensitivity: the 'non-polio AFP rate', and the percentage of reported AFP cases for which 'adequate specimens' were collected and sent to a WHO-accredited laboratory.

For both indicators, thresholds were set to indicate at what level AFP surveillance is considered sufficiently reliable to confirm or rule out poliovirus circulation in an area.

- 1) *Non-polio AFP rate*. This indicator measures how thoroughly the system detects and reports all cases of AFP in persons aged < 15 years. Experience in many countries has shown that, even in the absence of poliovirus circulation, an AFP system is only sensitive enough to detect poliovirus if at least one (1) case of AFP *not due to polio* (also called: non-polio AFP) per year is reported for every 100 000 children under 15 years. In the WHO African Region, due to the increased polio risk in many countries, the expected non-polio AFP rate was increased to at least 2 non-polio AFP cases per 100.000 < 15 year olds annually.

Definition of 'adequate stool specimens'

AFP case stool specimens are considered adequate if

- a) two specimens were collected, ≥ 24 hrs apart,
- b) within 14 days of onset, which
- c) arrive in the laboratory in 'good' condition, i.e. the specimen is of sufficient quantity and arrives in a carrier at a temperature of < 8 degrees C, not dried up

See Annex 3 for core and non-core AFP surveillance indicators.

- 2) *Adequate stool specimen rate (also called 'stool adequacy')* - the percentage of reported AFP cases for which adequate stool specimens (see text box above) are available for testing in a WHO-accredited laboratory; this percentage should be at least 80%.

The reason why this indicator is so important is that the presence or absence of poliovirus as a cause of AFP can only be reliably determined by the laboratory if it receives two 'adequate' specimens, collected and sent to the laboratory in a timely manner.

The expected target non-polio AFP rate of at least 2/100.000 < 15s may be increased in scenarios where AFP surveillance needs to be enhanced, such as when poliovirus is present or suspected. In at-risk countries or those with an ongoing outbreak the expected non-polio AFP rate will be increased to 3/100.000, in order to enhance the reporting of AFP cases. ([See Annex 3](#), with quality Indicators for AFP surveillance.)

3 Strategies for AFP surveillance

Epidemiological surveillance is the ongoing systematic collection, analysis, evaluation and dissemination of health data for the purpose of planning, implementing and evaluating disease control measures. Surveillance for AFP and poliovirus is a critically important component of the global and regional polio eradication effort, because without sensitive surveillance it would not be possible to target vaccination campaigns and to monitor progress towards the eradication goal.

For acute flaccid paralysis surveillance in countries of the WHO African Region, two main strategies are used to detect and report AFP cases: passive, or routine AFP surveillance, and active surveillance for AFP (AS). Overall AFP reporting is supplemented by community-based AFP reporting and other supplemental strategies for the detection and reporting of AFP cases from special population groups and from inaccessible, hard-to-reach areas.

3.1 Passive (routine) AFP surveillance

What is passive (routine) AFP surveillance? The regular reporting of AFP cases from reporting sites, such as health facilities and hospitals, is called passive, or routine AFP surveillance. For passive surveillance, unlike in active surveillance (see below), province or district surveillance staff do not actively search for AFP cases but rely on thousands of facility surveillance focal points to detect and report AFP cases.

In all countries of the Region, AFP is a notifiable condition; passive (routine) surveillance for AFP in most countries is conducted as part of an existing overall notifiable disease reporting system.

Defining routine surveillance

Routine surveillance is a process in which reporting sites are expected to a) immediately notify a case of AFP seen in the site, and b) send regular weekly reports to public health authorities, regardless of whether an AFP case has been seen or not ('zero reporting').

For passive (routine) AFP reporting, surveillance focal points at the reporting site are expected to check in their facility every week whether an AFP case has been seen. Any AFP case detected in the site must be immediately reported, or notified, to public health authorities at the district or province level. However, the focal points are also required to send a weekly report to the district level, whether or not an AFP was found. This is why passive / routine AFP reporting is also referred to as *zero reporting*. Having to submit regular zero reports is an important way to keep reporting sites sensitized about the need to report all AFP cases.

Every week, district level teams send summaries of facility reports to the provincial/regional level, from where they are sent to the national level.

a) Monitoring of passive (routine) AFP surveillance. All countries are required to monitor the completeness and timeliness of routine AFP reporting, which allows for the timely detection of gaps in reporting and surveillance quality. The indicators to monitor the completeness and timeliness of routine surveillance for AFP at the district and province / regional level are:

- the percentage of designated sites submitting weekly reports (including “zero reports”), even in the absence of cases, for a given time period (*completeness*); and
- the percentage of designated sites submitting weekly reports (including “zero reports”) on time, even in the absence of cases, by the agreed weekly deadline (*timeliness*).

Surveillance teams should use these indicators to identify and follow up on priority sites repeatedly failing to submit their weekly report or those reporting late.

Reports on the completeness and timeliness of passive (routine) reporting by districts are included in the annual update reports sent from countries of the African Region to the African Regional Polio Certification Commission (ARCC), which reviews this data as important evidence for the quality of surveillance, and that polio-free status is maintained.

b) Immediate reporting of any identified AFP case. AFP is a notifiable condition and AFP cases represent a potential public health emergency, i.e., possibly indicating a new polio outbreak.

Therefore, focal points at priority sites, as well as any other physician, health worker or community informant who identify an AFP case, are required to immediately report the case (i.e., within 24 hours) to a designated public health surveillance team for rapid investigation and stool specimen collection.

The requirement to immediately report is in addition to entering data on the identified AFP case on the weekly notifiable disease reporting form. Routine weekly surveillance reports, including zero reports, at all levels should be regularly reviewed to detect any unreported AFP cases that were included on the weekly report but not immediately notified, and that may have also been missed by the [active surveillance system](#).

c) Challenges with implementing passive (routine) surveillance. Experience has shown that the following main challenges may be encountered in the implementation of passive (routine) AFP surveillance.

- **Incomplete weekly reports.** Repeated failure to submit weekly reports from a reporting site may occur when the district or province level team has limited capacity either to follow up with “silent” reporting sites or to conduct training and sensitization activities for all reporting sites. It is important that non-reporting sites should be contacted to find out why they failed. In these cases, active surveillance (see below) provides opportunities to strengthen routine surveillance through visits with focal points at important reporting sites.
- **Declining awareness of AFP reporting.** Declining and insufficient awareness among health providers of the principles of AFP surveillance, i.e., of the importance of reporting AFP as a syndrome and notifiable condition, as opposed to reporting polio as a diagnosis, may lead to missing AFP cases at the reporting site. This may be a particular problem in facilities with high fluctuation of staff.

d) Confusion between passive and active surveillance may lead to insufficient engagement of both the formal and informal health sector. Under passive (routine) surveillance, district and provincial surveillance teams rely on AFP cases being reported from the reporting site. However, for active AFP surveillance (see 3.2 below), district and provincial surveillance teams are actively engaged in finding AFP cases by visiting surveillance sites on a regular basis.

The inquiries which a facility focal point should make to check for AFP cases before sending the weekly report has sometimes been considered as 'active surveillance'. However, by definition, only visits and searches by personnel external to the facility constitute *active surveillance*. Another incorrect practice

that has been observed, is that public health staff designated to conduct active surveillance do visit the active surveillance site, but then just collect the weekly zero report, instead of spending time and searching the facility to find unreported AFP cases.

3.2 Active surveillance for AFP

Experience during the early phase of the global eradication programme has shown that passive (routine) surveillance for AFP alone may not be sufficient, and that a combination of passive and well-implemented active surveillance (AS) for AFP is the most effective strategy to assure that AFP surveillance is sensitive enough not to miss ongoing poliovirus transmission.

It is highly recommended that active surveillance is used to complement passive surveillance in all 47 member states of the African Region.

What is active surveillance (AS)? For AS, trained public health surveillance staff regularly visit priority reporting sites to search for and investigate any unreported AFP cases. These sites can be within the formal health sector, such as tertiary, secondary and district hospitals, clinics, health centres and rehabilitation centers, or part of the informal health sector, such as community health centers run by nongovernmental organizations (NGOs), premises of traditional and faith healers and bone setters, or traditional birth attendants, patent medicine vendors or pharmacies.

Defining active surveillance

For AS, trained surveillance staff regularly visit all priority surveillance sites (i.e. all priority health facilities and community structures) to search for and investigate any unreported AFP cases. AS visitors ask AFP focal points at the site if they have seen a case of AFP, and review registers, log books and hospital wards at a health facility or reporting site to ensure that no AFP case is missed. These visits are used also for continued sensitization of staff on AFP and other VPD surveillance.

During the visits, AS staff conduct interviews with health workers and other potential informants, review health facility records (registers, logbooks, medical records), and visit all relevant departments and wards within hospitals. The visits are also used to inform and sensitize health workers and facility staff on polio eradication and AFP surveillance. To be effective, AS visits, particularly at larger hospitals, should be done by well-qualified staff who understand the polio eradication programme and have good interpersonal skills.



- *Experience has shown that some countries have effectively used AS for AFP as a platform for surveillance for vaccine-preventable diseases (VPDs) or other outbreak-prone diseases.*
- **[Download Best Practices in Active Surveillance for Polio Eradication.](#)**

a) Establishing active surveillance. Key activities in establishing effective active surveillance for AFP are the following:

1. Creating a network - selecting and prioritizing AS sites, followed by regular review, reprioritization and possible adjustment of the network later; it is recommended to review the site prioritization every six months
2. In each site, identifying a person who serves as surveillance 'focal point' and sensitizing health workers and potential informants on polio eradication and AFP surveillance,
3. Training and building capacity of surveillance staff to conduct AS visits and carry out AFP-related activities;

4. Ensuring that AS visits follow a structured procedure to ensure that AS visits are effective and no AFP cases are missed.

b) Active surveillance site selection. Most sites in an AS network will be facilities in the formal health sector (hospitals, clinics etc.), with some sites also drawn from the informal health system (i.e. NGO clinics in IDP camps, busy traditional healers, TBAs, etc.).

Main factor to consider when selecting facilities or sites to be included in an active surveillance network is *the probability that children aged < 15 yrs with AFP are seen at the facility*. In countries and areas where the population has access to hospitals, large- and medium-sized hospitals, i.e., tertiary and secondary hospitals, particularly those with pediatric and neurology departments, will therefore have priority to be included in the AS network.

The importance of larger hospitals has often been confirmed when countries find that the majority of AFP reports nationally originate from a relatively small number of facilities, namely the large and medium sized (tertiary and secondary) hospitals in the country. The reason for this is that parents and caregivers, when faced with a sudden emergency such as the sudden onset of paralysis in a child, are likely to bypass local health centers and small hospitals and go directly to the largest hospital accessible to them.

Selecting active surveillance sites

Active Surveillance networks include reporting sites from the formal and the informal health sector.

The primary factor to consider in selecting sites for the AS network is the probability that children under 15 years of age with AFP are seen at the facility.

Therefore, the primary factor to consider when selecting AS sites should be:

- the probability that children under 15 years of age with AFP are seen at the facility.

Additionally, AS sites should also be selected to ensure:

- that the AS network is *demographically and geographically well-distributed and representative of the population in a province or district*; and
- that facilities within the network *represent all sectors of the health system*, from public and private hospitals, to clinics and health centers, to pharmacies and even traditional healers, religious leaders or other local community resources.

Health providers in the informal health sector play an important role, particularly in countries and areas where the population does not have easy access to hospitals, or where families and communities traditionally first seek health care or advice from informal providers. In such areas, informal health providers (traditional medicine practitioners, faith healers etc,) who are likely to be consulted by caretakers of AFP cases need to be identified, sensitized and oriented on AFP surveillance. They also need to receive contact names and telephone numbers of who they should notify.

Overall, it is important to assess and consider the health-seeking behaviour of the population during surveillance site selection and prioritization.

c) Prioritization of active surveillance sites. Based on the likelihood that they see AFP cases, all facilities and sites selected for the AS network need to be assigned one of four priorities: highest, high, medium, and low priority. This prioritization determines the frequency with which district and provincial surveillance staff will conduct AS visits (see Table 1). Active surveillance visits are conducted two times per week to highest-, weekly to high priority, twice a month to medium and once a month to low priority sites. The highest priority should be given to those sites that see the most AFP cases.

Highest priority sites are facilities or sites located in IDP, refugee camps or serving communities of IDPs or refugees. High priority sites typically include larger health facilities and hospitals, with large flows of

patients in the target age group. It is also recommended that the other non-priority sites in each district are visited at least once every three months since AFP cases can seek health care anywhere.

Table 1: AS sites by priority and frequency of visits

| Classification | | Frequency of site visits |
|-------------------------------|--|---------------------------------------|
| Highest priority sites | Sites located in IDP or refugee camps, or sites in communities hosting refugees or IDP camps. | Visited twice weekly |
| High priority sites | Very large national referral hospitals (in some countries) All tertiary and secondary public and private hospitals and all hospitals with pediatric departments | Visited weekly |
| Medium-priority sites | Medium-sized hospitals, smaller hospitals and large health centers (in some countries) Traditional healers renowned for treating paralysis (in certain communities) | Visited every two weeks |
| Low-priority sites | Health posts, small health facilities, traditional healers, pharmacies that could see an AFP case | Visited monthly |
| Not prioritized | Not part of the AS network, but part of the routine surveillance network | At least one visit every three months |

AFP = acute flaccid paralysis; AS = active surveillance



- *Experience in polio-endemic countries has shown that, provided the prioritization exercise is executed appropriately, the number of sites in the highest and high priority group should be lowest, with more in the medium priority group, and the remainder of sites in the low priority group.*

d) Updating the Active Surveillance network. National, provincial and district surveillance teams should review the AS network twice per year and make adjustments, as needed, since the prioritization of a site may change over time. Facilities may have closed, or new facilities have opened. In many countries, the private health sector is growing rapidly, and new facilities may be predominantly in the private sector. Sites should be dropped from or added to the network accordingly.

Adjusting the AS site network is especially important in conflict settings, as conflict and insecurity may disrupt the healthcare system. In such instances, public health surveillance teams need to respond by updating and possibly expanding the AS network in those parts of the country around inaccessible areas and in host communities receiving IDPs or refugees, based

Reviewing and adjusting site network

The AS network must be reviewed and updated twice a year to account for the opening and closing of health facilities, as well as to reflect sociodemographic changes to the population.

on their health-seeking behavior. Where people no longer have regular access to health facilities, surveillance activities should be expanded to include direct reporting from affected communities by including IDP and refugee camps or NGOs that provide health services (see also [Community-based](#)

[surveillance](#) and [Annex 7](#)). Facilities within those IDP and refugee camps are usually designated as 'very high priority' AS sites.

e) Site focal points and surveillance officers. Depending on a country's size, district, provincial or national surveillance health officers will be responsible for organizing and scheduling regular AS visits to reporting sites in their area.

In each AS site, a suitable AFP surveillance focal point must be identified or designated, if not already in place. While different groups may be considered for this function, depending on the size of the health facility, priority should always be given to a pediatrician, if available.

The AS focal point has several key roles and responsibilities that include to:

- immediately notify an identified AFP case and provide support for the case investigation
- coordinate with public health staff during AS visits; and to
- check facilities and submit weekly routine / zero reports, for formal health facilities.



- *Experience has shown that, particularly in larger hospitals such as university hospitals, effective AS requires senior staff, who have experience working with senior clinicians. They can be shadowed by junior staff, who will in turn learn to build rapport with clinicians and eventually conduct AS visits independently.*

In the informal health sector, such as the premises of traditional healers, private pharmacies, or prominent community members, the focal point by default will be the service provider, whose responsibility will be to notify any new AFP case immediately. These informal establishments are typically not part of the routine surveillance system, hence are not expected to provide weekly 'zero reports'.

f) Active surveillance visit procedures. At the district or provincial level, public health surveillance officers should coordinate to plan and conduct AS visits according to the prioritization scheme, and following a AS site visit calendar (see [Table 1](#)).

The following are key points and activities surveillance officers should be aware of before and during site / hospital visits to assure that AS is effective:

1. Make sure to take along the current AFP case line listing for the district or health area in which the visited facility is situated; sometimes AFP cases detected during AS have already been reported previously. Also bring copies of AFP case investigation and laboratory forms, and other documents (i.e. for sensitization, such as the AFP field guide) if required.
2. At the start of the visit, meet with the facility surveillance focal point to ask whether any AFP cases were seen since the last visit, and to provide surveillance and polio eradication updates (or updates on progress in outbreak response, in outbreak settings).
3. Visit all relevant departments and wards and review patient registers.
 - Look for missed or unreported AFP cases since the date of the last visit. Look for "AFP" or associated signs, symptoms, or diagnoses (Table 2 below). Because AFP surveillance targets a syndrome, it is important to review both diagnoses and symptoms listed in registers and logbooks.
 - Highlight any AFP cases (or possible AFP cases) which were found in the register directly in the register (with a colored marker, if possible) and cross-check the line listing of all AFP cases (or possible AFP cases) which were found in the register.

Annex guidance

Surveillance officers should always follow standard procedures to structure AS visits. See [Annex 5](#) for an example of an AS visit form to support data collection and monitoring.

- Date and sign all patient registers that were reviewed.
4. Follow up on any AFP cases detected during the visit.
- Compare with the district line listing - if an AFP case was already reported and investigations were done, no further action is needed.
 - If AFP cases are found that were not previously reported, request medical records to search for details. Visit patients in the hospital if still admitted; if discharged, obtain addresses to visit patients at home. If the case is verified as AFP, conduct the AFP case investigation and initiate specimen collection (see **Case investigation and validation** under [Case activities for AFP surveillance](#), as well as [Annex 4](#)). In addition, speak to the physician or nursing staff to inquire why the case was not reported yet and sensitize them to report such cases immediately from now on. Conduct follow-up visits to ensure that no additional AFP cases are missed and that all relevant staff has been sensitized.
5. In addition, assess the overall status of polio-related functions during the visit.
- Take opportunities to sensitize department and ward staff on polio and AFP surveillance.
 - Determine whether and when a training session may be needed, and offer to conduct a session, such as during weekly staff meeting, or after staff turnover.
 - Ensure sufficient supplies and resources are available in the facility, including forms, stool kits, and wall posters, and check on stool sample handling and storage practices. One of the tasks for the (district) surveillance officer conducting AS visits is to bring along and replenish surveillance tools, including case investigation forms, stool collection kits, AFP wall posters etc.
 - Check immunization-related equipment and supplies, such as vaccines (oral polio vaccines [OPVs] and/or inactivated polio vaccine [IPV]) and cold chain storage and carriers.
 - Check how AFP surveillance is coordinated with other VPD surveillance functions, i.e., how well *Integrated Disease Surveillance* is implemented (see [Chapter 11](#)). As the integration of AFP surveillance into VPD surveillance progresses, it is important to take advantage of AS visits and search for and collect data on other VPDs or other outbreak-prone diseases.

Table 2: Symptoms and diagnoses in registers and logbooks indicating an AFP case

| | |
|---|---|
| Disease conditions always presenting as AFP | <ul style="list-style-type: none"> • Paralytic polio • Guillain-Barré syndrome (GBS) • Transverse myelitis • Traumatic neuritis |
| Disease conditions which may initially present with AFP | <ul style="list-style-type: none"> • Pott's disease (spinal tuberculosis) • Bacterial or tuberculous meningitis • Encephalitis • Cerebrovascular accidents (stroke) • Hemiplegia |
| Other signs and history to be considered suspicious, indicating that AFP may have been present initially | <ul style="list-style-type: none"> • Frequent falls • Weakness, paresis • Abnormal gait, unable to walk, difficulty in walking • Easy fatigability |

AFP = acute flaccid paralysis; GBS = Guillain-Barré syndrome

g) Monitoring and supervision of active surveillance. The completeness and adequacy of AS visits must be monitored at the district, provincial and national level. For a list of indicators used to monitor AS, see [Annex 4. Quality indicators for AFP surveillance](#).

Monitoring is best accomplished by using a form that is completed by the visiting surveillance officer and submitted after each visit to a supervisor at the provincial level. [Annex 5. Examples of forms](#) contains a

sample AS visit report. The form collects key data on all AS visits: the date, time and location, facility visited, and a list of departments visited within large hospitals, as well as whether an undetected AFP case was found during the visit, whether any AFP sensitization or orientation activities were conducted, and whether supplies were provided to the facility (e.g., stool collection kits or posters).

Supervision of AS is important to make sure that surveillance officers conduct effective AS visits. The best way to do this is for supervisors to join the responsible surveillance officer during a visit, observe how the visit is conducted, note any deficiencies and provide feedback and suggestions for improvement at the end of the visit. It is recommended that such supervisory visits should be regular, especially for supervising AS in the highest and high priority facilities. ([also see Chapter 8.5](#)).



- *Monitoring AS visits via mobile data and visualizing the analyzed data can help identify blind spots in the surveillance network and accelerate corrective actions.*
- *In the African Region, it is highly recommended that all Active Surveillance visits be documented using the eSurv checklist on the Open Data Kit (ODK)*
- *See [Monitoring AFP surveillance](#) for more innovations in disease surveillance.*

h) Challenges with implementing active surveillance. As public health surveillance teams implement AS, several challenges may arise.

Insufficient resources: After establishing the reporting network, surveillance teams often report insufficient resources (such as not enough time, qualified staff, or means of transportation) to conduct visits to all AS sites in the network.

- Faced with lack of human or other resources, teams should ensure that at least all highest and high-priority sites are visited regularly, followed by as many medium- and low-priority sites as possible. This should be feasible as a majority of high-priority sites (e.g., large hospitals) are in national or provincial capitals and relatively close to the national or provincial surveillance office. Highest priority sites are generally limited to areas with IDPs or refugees and should be given top priority for visits.
- For facilities that cannot be visited, facility surveillance focal points should at least be contacted by phone or email, OR the remote ACS tool in ODK should be used, in addition to monitoring the passive (routine) reports submitted from these sites.
- Lists of sites and a calendar of visits should be reviewed or re-adjusted regularly until more resources are made available.

Lack of attention to capital cities: AFP quality indicators from national capitals and the capital regions of many countries worldwide and in the WHO African Region tend to be surprisingly low. This is opposite to what should be expected, as these areas host large tertiary and secondary care hospitals and are densely populated, with large numbers of expected AFP cases.

In fact, the workload for AFP surveillance staff in capital city areas is often even higher than expected because relatively large numbers of AFP cases from nearby or even distant provinces are referred to or seek care in the large capital city hospitals. Unless additional staff time is allocated for AS in the capital, staff will not be able to cope with the relative work overload, and AFP cases will be missed as a result. This is why it is important to designate a trained surveillance focal point in each site.

Sensitive AFP surveillance, and particularly high-quality active surveillance for AFP, in capital city areas should be given highest priority in every country in the African Region.

- Large hospitals and high-priority tertiary care should be mapped and enrolled as reporting sites, with subsequent ACS visits planned and conducted on a regular and frequent basis.

- Taking into account the large dense populations of capital city areas, and the additional AFP cases coming in from other provinces, sufficient staff time should be allocated for AS visits to all high and medium priority sites in capital city areas.
- AS visits must be conducted by surveillance officers who are trained and experienced in sensitization and who are comfortable with medical personnel; this is particularly important when interacting with senior doctors in large hospitals. These visits should be accompanied by supportive supervision and monitoring for timeliness and completeness.

Inexperienced staff conducting AS visits: To successfully use AS visits for continuous sensitization of clinicians and other hospital workers on AFP surveillance concept and practices, public health officers must be trained on establishing rapport with medical staff, including with the chiefs of units, some of whom may still not accept or fully understand syndromic AFP surveillance (see also [Chapter 8.2](#)).

- Country programs should commit to building junior staff capacity through supportive supervision. Good mentoring and training ensure staff are well-qualified and equipped with strong interpersonal communication skills.
- Particular attention should be given to female public health officers who may encounter gender barriers while interacting with medical and hospital administrative staff.

Lack of access at private hospitals and facilities: Active surveillance visits can be challenging in private, military or other sector-specific facilities. Surveillance officers should be aware of this and may need support from higher-level officials to negotiate access for regular AS visits, and to be allowed to review log books and medical records. Experience has shown that access for AS staff to some private health sector hospitals must be renegotiated at regular intervals.

No access to patient records in hospitals with electronic patient data: surveillance staff may not be able to search patient registers and records in modern hospitals where most patient data is being digitalized. District and provincial surveillance teams should visit these hospitals and discuss alternative ways to review patient registers (i.e. provide a printout with relevant variables of patients seen since the last AS visit).

Insufficient geographic and demographic coverage or representativeness of AS network: The AS network may possess geographic or demographic blind spots. Surveillance teams should be vigilant to identify:

- overlooked population groups that live in remote or hard-to-reach areas;
- overlooked mobile populations, such as refugees and IDPs;
- overlooked informal health sector sites, including traditional medicine or faith-based healthcare facilities, or other healthcare sites, such as military or private facilities, patent medicine vendors, pharmacies, traditional birth attendants etc.;
- AS sites not visited for long periods;
- AS sites not updated, thus missing newer facilities or potentially key practitioners; and
- AS sites that have closed down.

The AS network can be kept up to date only through regular reviews and thorough mapping of healthcare sites. It is recommended that sites are updated twice per year in each district, and that this is preferably done in February and July. Special populations and the health-seeking behavior of cases and their caregivers are also need to be taken into consideration when identifying and addressing weaknesses and gaps in the coverage and geographic and demographic representativeness of the active surveillance network.

3.3 Community-based surveillance for AFP

a) What is community-based surveillance? Community-based surveillance (CBS) is a surveillance strategy in which trained community members are engaged to report suspected AFP cases to a designated focal person, based on a simple AFP case definition.⁵

What distinguishes CBS from routine and active surveillance is that case detection occurs outside health facilities and that those performing case detection activities are community members, not health professionals.

Defining community-based surveillance (CBS)

CBS is an AFP surveillance strategy that relies on trained community members to identify possible AFP cases in areas and communities with limited access to health facilities.

CBS is a key method to access hard-to-reach areas and communities that are not reached by the regular AFP surveillance system (see [Supplemental strategies for special populations](#) above).

CBS may be particularly useful in 'silent areas' (i.e. areas not reporting any AFP cases) and settings or areas at high risk of undetected poliovirus transmission or at risk of new outbreaks following importation or following emergence of vaccine-derived poliovirus (VDPV).

Settings where CBS can be very useful include:

- security-compromised areas;
- mobile populations such as nomads and seasonal workers;
- special populations that are underserved, such as refugees, IDPs, slum dwellers, ethnic minorities, isolated religious communities or remote populations in hard-to-reach areas; and
- areas or populations relying largely on traditional medicine, where people are less likely to have access to or seek care at a health facility.

CBS provides a link between communities and the health system through designated focal points – and it may increase community engagement in health care and acceptance of immunization and surveillance activities.

In the African Region, new technologies, such as the smartphone-based AVADAR system (Auto-Visual AFP Detection And Reporting⁶) were being used successfully in a community-based surveillance approach, in order to rapidly relay reports of suspect AFP cases from remote or access-compromised areas to the district or provincial surveillance team.

While CBS can increase the sensitivity and timeliness of AFP case detection, it can also be resource-intensive and should be used only where health facility-based surveillance cannot be performed or is not functioning well. CBS methods range in resource intensity. Training, sensitization, and supervision are minimum essential activities, and the addition of other activities comes with increased costs. Major cost drivers include: training (initial training and refreshers); supervision; reporting incentives or monthly payment, and the use of digital technology, mobile phones, or other tools (initial and recurring costs).

When considering CBS, countries should note that this strategy may be more cost-effective if used for multiple diseases rather than a single disease.

⁵ Rather than the full standard AFP case definition (see *Principles of AFP surveillance*, section 2), a simplified AFP case definition should be used when sensitizing community informants, such as: "Report all children with sudden presence of floppy paralysis or weakness."

⁶ Auto Visual AFP Detection and Response (AVADAR) is a community-based digital platform that deals with the collection and distribution of real-time information. AVADAR makes it possible to report suspected cases of paralysis in the field at the central level

b) Setting up community-based surveillance. Initiating CBS should be carefully assessed because of its resource-intensive nature. Other sensitization activities or adjustments to the AS network may be more efficient for closing surveillance gaps. Programs are advised to look first at more sustainable, cost-effective solutions.

A needs assessment must be conducted to first determine if CBS should be used. The needs assessment explores key questions that include: How well does the current AFP surveillance system cover or reach special populations or hard-to-reach areas? What are the real issues behind surveillance gaps? Are CBS activities currently operating for other diseases? See Annex 7. Special population groups for more guiding questions that can inform a CBS needs assessment.

Steps to establish CBS include the following activities:

1. Identify key community members, such as local and religious leaders.
2. Sensitize and brief them about polio and AFP (and other VPDs); ask for their advice to select community volunteers.
3. Select and train volunteers on their role in CBS. Engage both male and female community volunteers. Women can facilitate CBS in areas where access to female household heads or members is not customary for men. Similarly, the presence of a female team member can facilitate engaging with and accessing more traditional communities.
4. Link volunteers with a designated focal point and/or surveillance officer who will follow up and verify that the initial case report is an actual ('true') AFP case, investigate and initiate stool collection.



In some countries, CBS can be set up for the purpose of AFP surveillance only, while in other countries, CBS is an already-existing network that is fully integrated in the public health system for VPDs and outbreak-prone diseases, of which AFP surveillance is only one part.

c) Monitoring community-based surveillance. CBS should be carefully monitored, particularly for context-specific challenges such as hard-to-reach populations and inaccessible areas.

Key indicators to monitor CBS include:

- No. of AFP cases reported by CBS compared with AFP cases notified by reporting sites in the specific area
- percent of initial CBS-reported AFP cases verified as “true AFP”, out of all initial CBS AFP reports.

Complete indicators are available in the [Global Polio Surveillance Action Plan 2022 to 2024](#) .

d) Challenges with community-based surveillance. The following are main challenges and issues to look out for when setting up CBS.

- Implementing and sustaining effective CBS can be resource-intensive, as mentioned above. The resources needed for CBS depend upon the country context and results of the needs assessment for CBS, and on the decisions of the surveillance team.
- Hard-to-reach areas present unique challenges for ensuring a reliable line of communication between community informants and surveillance officers. To address this, some teams offer mobile phones or dispense petty cash to pay for communication expenses.
- Low literacy levels within local communities may require more time and effort on the part of the public health staff for adapting AFP surveillance training and sensitization protocols.

- Partially or fully inaccessible areas can seriously hinder the monitoring and supportive supervision of CBS informants, as well as create problems for conducting AFP case verification and investigation. If this occurs, AFP cases may need to be brought outside inaccessible areas for investigation (as has been necessary previously in parts of Borno state, NE Nigeria).
- A considerable percentage of reports of “suspected AFP” may not meet the standard AFP case definition and may give a low yield of actual (“true”) AFP cases, which may increase the workload of public health staff through the added time needed for verification and investigation.



Volunteers involved in conducting CBS for polio can be also referred to as “a network of informants,” “village polio volunteers” or “informers.” Depending on the country, community volunteers may or may not be remunerated or financially motivated and may or may not be working full time on polio surveillance.

3.4 Supplemental polio surveillance strategies for special populations

Certain population groups are underserved or not served at all by formal health systems. They are also likely to be missed by surveillance efforts. While the reasons for these gaps can be varied, one finding is that persistently missed population groups often belong to high-risk mobile populations or reside in hard-to-reach or inaccessible areas, including areas affected by insecurity and conflict.

These special population groups are particularly important for disease control and eradication programs because they have higher susceptibility to infection due to low immunization coverage and are therefore more likely to transmit viruses – and more likely to be missed by surveillance systems.

A GPEI document - "[Guidelines for Implementing Polio Surveillance in Hard-to-Reach Areas and Populations](#)" details some strategies (of which CBS is one approach) for implementing surveillance among special populations, with a focus on high-risk mobile populations.⁷

a) What are special populations? Several different marginalized population groups are at risk of being underserved or altogether missed by surveillance efforts.

These include:

- mobile populations, nomads and seasonal migrants such as agricultural, mine, brick kiln or construction workers;
- refugees and IDPs living in camps and in host communities;
- populations in settled areas which are underserved by existing health services such as cross-border populations, slum dwellers, ethnic minorities, islanders, fishermen and those living in hard-to-reach areas; and
- totally inaccessible population groups, such as those in security-compromised and conflict-affected areas.

b) Identifying and mapping special groups. By identifying, mapping and profiling unserved or underserved populations, special surveillance strategies can ensure that such populations are covered by polio immunization and surveillance.

The following data and information are critical to better characterize and reach such groups:

⁷ Global Polio Eradication Initiative (GPEI). Guidelines for Implementing Polio Surveillance in Hard-to-Reach Areas & Populations. Geneva: World Health Organization; 2017 (<https://polioeradication.org/wp-content/uploads/2020/10/Guidelines-polio-surveillance-H2R-areas.pdf>).

- geographic location and population size for mobile groups: itineraries and routes of migration, timing and possible seasonality of nomadic movement;
- current access to health services and health-seeking behavior (see Annex 10. Technical resources for reference - Health-seeking behavior);
- availability of the existing surveillance network (facility- or community-based) to detect AFP cases in this special population;
- identification of service providers who exist in the area but are not yet participating in polio activities (public and private, including NGOs or faith-based organizations);
- availability of options to develop communication activities targeting these special groups;
- means of communication through the availability of network coverage and/or readily available use of cell phones for public health officers and community workers and volunteers; and
- general information, such as language, literacy, community structure in terms of leaders and influencers.

c) Implementing a mix of surveillance strategies for each special group. Once special populations have been identified and profiled, surveillance approaches can be specifically tailored to ensure each group is adequately covered by poliovirus surveillance (see Table 3 below). A set or mix of suggested surveillance strategies for each kind of special population is recommended.

The key recommended strategies are:

- **Enhanced AFP surveillance** with ad hoc AFP case search and systematic contact sampling.
 - Ad hoc AFP case search in large gatherings of nomads, for example during SIAs and during mobile outreach services, during social ceremonies like child naming ceremonies in Nigeria etc
 - Systematic AFP contact sampling for all inadequate AFP samples, with one sample each from three contacts of an AFP cases with inadequate samples, for example. However, in coordination with surveillance and laboratory teams, this can be expanded to all AFP cases from special populations.
- **Targeted healthy children sampling** (also referred to as 'community sampling' in AFR) can be conducted in special populations that are at high risk for poliovirus; however, this is not a routine strategy and can only be initiated in coordination with and with the approval of surveillance and laboratory teams at the national and regional levels (for details pls also see Chapter 9 of the [Guidelines for polio surveillance in hard to reach areas](#)).
- **Ad hoc environmental surveillance sampling sites** can enhance surveillance in areas considered at high risk of poliovirus circulation because of an outbreak or the sudden influx of an at-risk population.⁹ This strategy should only be considered after strengthening AFP surveillance and in

| Annex guidance |
|--|
| For surveillance strategies suitable to different kinds of special populations, see Annex 7. Special population groups |

⁹ Global Polio Eradication Initiative (GPEI). Standard Operating Procedures (SOPs) for Polio Environmental Surveillance Enhancement Following Investigation of a Poliovirus Event or Outbreak. Geneva: World Health Organization; 2020 (<https://polioeradication.org/wp-content/uploads/2021/02/SOPs-for-Polio-ES-enhancement-following-outbreak-20210208.pdf>).

coordination with the laboratory. (For details pls also see Chapter 11 of the [Guidelines for polio surveillance in hard to reach areas](#)).

Table 3: Examples of activities by type of special populations

| Population type | Activity examples |
|---|--|
| Populations living in security-compromised areas | <p>Access mapping and analysis of population dynamics and movements; access negotiation, if needed.</p> <p>Coordination with armed forces or groups and relevant partners.</p> <p>Review of surveillance network and establishment of CBS as appropriate, including identifying and training appropriate focal points.</p> <p>Enhanced surveillance in parts of the country bordering inaccessible areas and wherever IDPs come out of inaccessible areas and are received (e.g., adding to reporting sites based on health-seeking behavior, identification and training of local informants).</p> |
| Nomadic populations | <p>Mapping and profiling of nomadic groups in coordination with nomad leaders; AFP focal points designated for each nomad group.</p> <p>Determining itineraries and migration pathways; mapping healthcare facilities and providers, as well as veterinary services, along the route.</p> <p>AFP sensitization among providers and in public places along migration pathways (i.e., in markets, at watering points and camps frequented by nomads); study of nomads' health-seeking behavior.</p> <p>Regular contact with AFP focal points established and maintained.</p> <p>A similar approach should be used for other mobile population groups, as appropriate: seasonal migrants; mine, brick kiln and construction workers; etc.</p> |
| Refugees and IDPs in camps | <p>Camp AFP focal point identified, designated and included in the AS network.</p> <p>Profile assessed of new arrivals: origin, immunization status, etc.</p> <p>Active AFP case search.</p> <p>Permanent vaccination and surveillance team installed.</p> |
| Refugees and informal IDPs in host communities and outside camps | <p>Key informants identified from the community and included in AS network (see Community-based surveillance).</p> <p>Tracking of IDPs and refugees in the community via special "tracker teams" to support understanding their health-seeking behavior.</p> <p>AS network adjusted to include providers serving refugees and IDPs.</p> |
| Cross-border groups | <p>Mapping of official and informal border crossings, villages and settlements, special groups, gathering places and seasonal movements; surveillance networks installed on both sides of the border.</p> <p>Averages estimated for numbers of population moving and migrating across borders.</p> <p>Regular contact between AFP surveillance officers on both side of the border to ensure sharing of data, cross notification, joint investigation and tracking of mobile groups.</p> <p>Organizations working at border entry and exit points identified (e.g., immigration, port health services and police); orientation and sensitization on polio and AFP surveillance provided to healthcare workers on both sides.</p> |
| Communities in urban slums | <p>Profile of communities and their origin.</p> <p>Health-seeking behavior studied, with adjustments to AS network.</p> <p>Active AFP case search conducted.</p> <p>Evaluation of any need to add environmental surveillance (ES) sites.</p> |

| | |
|--|---|
| Other hard-to-reach communities | <p>Mapping and profile of special populations who may live in remote areas such as islanders and highlanders, or ethnic minorities who may not access the same health facilities as the broader population.</p> <p>Identification of and regular contact with local key informants.</p> <p>Study health-seeking behavior of these communities and adjust the network.</p> |
|--|---|

AFP = acute flaccid paralysis; AS = active surveillance; CBS = community-based surveillance; IDP = internally displaced population

The decision to develop, implement and possibly modify any of these strategies should be discussed by all stakeholders involved at the local, national, and regional levels, including national or regional laboratories.

d) Challenges with supplemental strategies for special populations. Challenges to anticipate when implementing poliovirus surveillance in special groups are similar to those listed for CBS. See also [Annex 7. Special population groups.](#)

4 From AFP case detection to final AFP case classification

The main goal of surveillance for AFP is to reliably detect polioviruses wherever they may still circulate, and to target vaccination activities so that transmission can be interrupted.

Particularly for countries and areas considered as free of polio, the detection or emergence of poliovirus is a public health emergency that should trigger effective outbreak response activities as rapidly as possible after lab confirmation of poliovirus. Any delays in detecting virus or initiating response activities allows further spread of the virus and makes it more difficult to interrupt transmission.

As a result, timely coordination is required between field and laboratory surveillance for all required activities following the detection of an AFP case – from onset of paralysis in a patient, to reporting and investigating the case, collecting and testing of stool specimens, to final AFP case classification (pls see Figure 1). Every stage of the process depicted in Fig. 1 should be targeted for time-saving interventions, as timeliness will be closely monitored.

Recent [guidance on polio surveillance from the GPEI](#) has strongly focused on improving the timeliness of outbreak detection and response (see Annex 4. Quality indicators for AFP surveillance).

For certification purposes, in all countries, the definitions and thresholds for stool specimen collection and adequacy will remain unchanged (i.e. stool adequacy target of at least 80% AFP cases with 2 specimens collected, 1st and 2nd stool separated by an interval of at least 24 hrs and all the 2 stools within 14 days of paralysis onset and received in good condition in WHO accredited laboratory).

Activities to be conducted at the country, regional, and global levels have been identified to help meet these new timeliness targets in priority countries (also see Table 19: Delays in detection and possible mitigation measures).

| |
|---|
| Timeliness of PV detection: certification standard unchanged |
| <p>For certification purposes, in all countries, the definitions and thresholds for stool specimen collection and adequacy will remain unchanged:</p> <ul style="list-style-type: none"> - stool adequacy target of at least 80% AFP cases with 2 specimens collected within 14 days of paralysis onset, reaching the lab in good condition, within 3 days of collection |

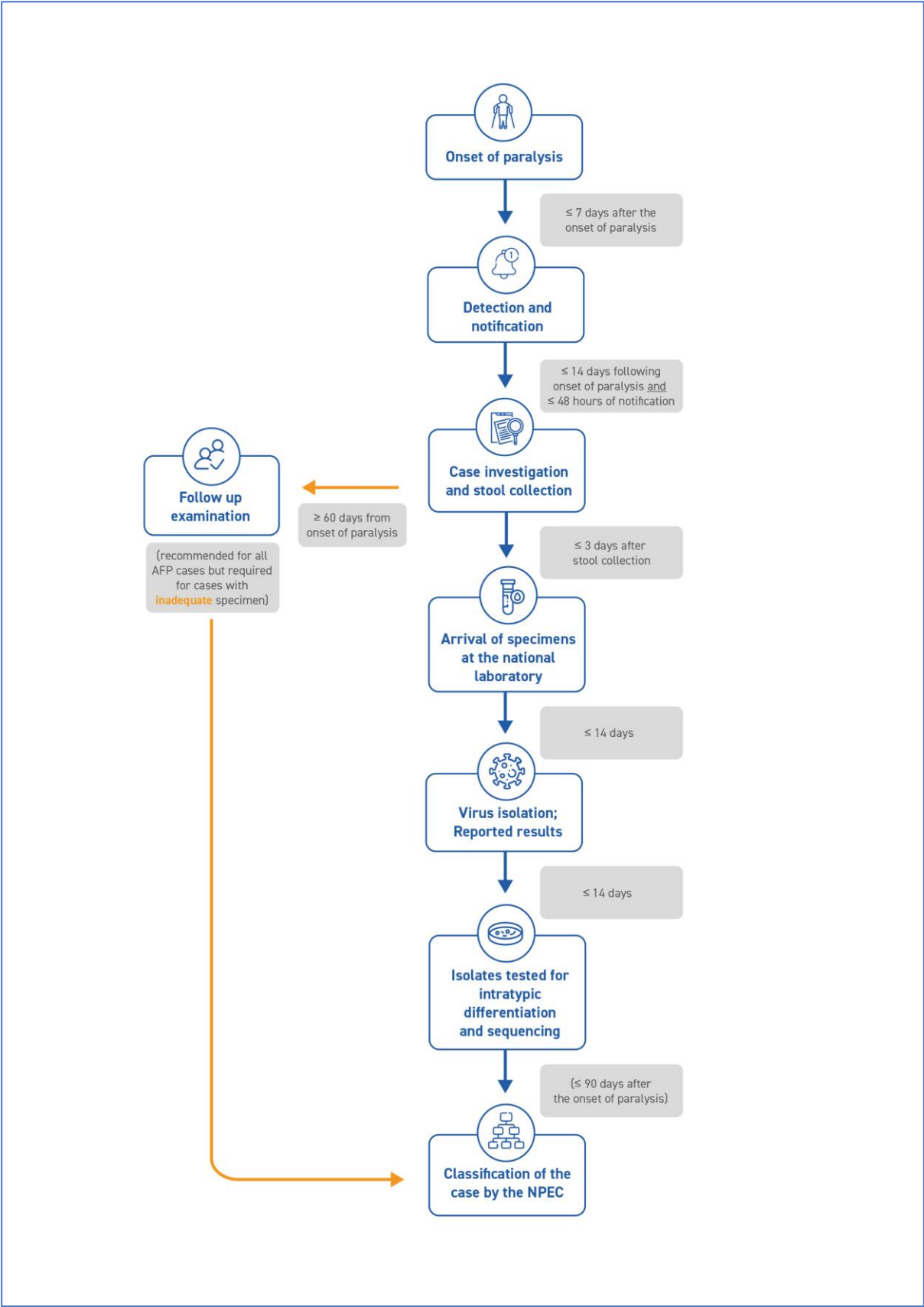


Figure 1: Process of AFP surveillance, with required intervals and timelines

4.1 Case detection and notification

A physician, health worker, community informant or volunteer who identifies an AFP case must report, or notify, the case **immediately** to the public health surveillance team at the district or provincial level. Notification is best to take place **before seven (7) days** after the onset of paralysis.

There are two possible reasons why AFP cases may be detected and notified late. First, parents or caretakers of the AFP case may be late in consulting a health provider, whether this is in the informal or formal health system. However, experience in polio eradication has shown that this is very rare; acute paralysis in a child is quite frightening to the family, who will usually seek help as soon as the problem is seen.

The most common reason for delays in detection and notification is that one or more health providers have been consulted and have actually seen the AFP case, but failed to recognize and notify the case. This is why the most important way to assure AFP cases are rapidly detected and reported is to set up and maintain a dynamic and wide-reaching AFP surveillance reporting network. As many health workers and providers in both the formal and informal sector, as well as community informants and volunteers, should have good awareness of the AFP concept and reporting requirements.

Whenever AFP cases are notified beyond 7 days of paralysis onset, it is important for surveillance teams to investigate if the AFP case has already been seen, but not reported, earlier by one or more health providers or community informants. This health-seeking history of AFP cases that were reported late should be documented in case investigation forms. Providers or informants who saw the AFP case but failed to report should be contacted and sensitized on AFP surveillance, to prevent this from happening again.

4.2 AFP case verification and investigation

Once an AFP case is notified, a trained, designated AFP focal point or surveillance officer, within 48 hrs, should first verify that the case is actually AFP (i.e. that the case conforms to the AFP case definition), and then conduct and document a thorough case investigation, using the national AFP case investigation form.

To support case verification and investigation, all supplies and materials should be prepared in advance to allow quick deployment of the investigation team. This includes case investigation forms (CIFs), laboratory request forms, stool specimen collection kits and stool carriers.

To minimize the risk of missing key information that may explain delays in detection, CIFs capture the social profile of cases and their community, as well as health-seeking behavior and gender-related information. (See [Annex 5. Examples of forms.](#))

a) AFP case verification. Before starting the investigation, the AFP focal point or surveillance officer must verify whether the case meets the AFP case definition. An AFP case is defined as:

"A child younger than 15 years of age, presenting with sudden onset of floppy paralysis or muscle weakness due to any cause, or any person of any age with paralytic illness if poliomyelitis is suspected by a clinician."

The person tasked with AFP case verification and investigation should do the following:

- carry out the full case investigation, using the national Case Investigation Form (CIF), if the case meets the case definition;
- stop the investigation, if the case **clearly does not meet the case definition**, and record the case as 'not an AFP' on the CIF. The only reasons for considering the case as 'not AFP' include age > 15 yrs, onset of paralysis not recent (i.e. onset > 6 months ago, or congenital problem), spastic paralysis (not flaccid), or recent trauma. The reasons for which the case was considered 'not an

AFP' should be clearly documented. A list of these initially reported cases verified not to be AFP should be kept separately.

- In case a clinician suspects paralytic polio in a person older than 15 year of age, the district (and/or province and national level) surveillance team should be informed, to alert the polio lab that specimens from an older person will be received and tested.

However, whenever there is any doubt about whether or not AFP is present, cases should be rather included as AFP (with investigation and stool collection) than excluded. Therefore, investigators should:

- still regard the case as AFP, even if in doubt about whether the observed weakness meets the AFP case definition - for example, a severely dehydrated infant showing general muscle hypotonia, or a young child suffering from acute protein-energy malnutrition); in such cases, a full investigation should be conducted and stool specimens collected;
- still conduct an investigation, even if the case has died in the meantime. The CIF must be filled out with the case history (date of paralysis onset; travel history of the case; history of health seeking; household members and visitors) and AFP contact specimens (see below) collected. Such cases will be sent to the NPEC for classification.

b) AFP case investigation. For all cases meeting the case definition (all cases verified as AFP, as per previous paragraph) the surveillance officer proceeds to the full investigation by performing the following steps and documenting these on the national CIF.

Invite the attending physician or health worker who reported the case to join in the case investigation.

1. Ask about the **working (or 'provisional') diagnosis** currently being considered, if the case was seen by a physician, and document this. For history-taking and clinical examination, signs and symptoms to look out for are *asymmetric flaccid paralysis, fever at onset, rapid progression of paralysis, without impaired sensory nerve function*.
2. Establish and document on the CIF the **history of the illness** (i.e. timeline and type and severity of symptoms), also including the travel history (recent travel to one or more locations away from home) and if parents or caregivers had consulted one or more other health providers for this illness (for details, see [Annex 6](#)).
3. Conduct a **physical examination**. Note that the objective of the clinical examination in the AFP case investigation is *not* to establish an exact medical-neurological diagnosis. Instead, it should be *established whether or not the patient currently shows any degree of paralysis or paresis, consistent with AFP; this is regardless of the current provisional medical diagnosis* (for details, see [Annex 6](#)).
4. Begin to organize the collection of two stool specimens.

c) Assigning an EPID number. A unique epidemiologic identification number (EPID #) must be assigned to each AFP case. This number should appear on all documents and forms related to this case, including on documents and tools with info on the investigation, stool specimen collection and laboratory testing results, 60-day follow-up and final classification. Consistent use of the EPID number is compulsory for each AFP case, because this is the only way in which all forms, documents and lab results pertaining to one AFP case can be reliably linked.

The EPID number (see Figures 2 and 3 below) contains information on the residence of the case, using 3-digit codes for country, province and district, on the year of onset of paralysis and also lists a 'running number' for each case within the district of residence (i.e. is it the first, second, or subsequent AFP case

for this year in the district). In smaller countries, the last three digits may represent a 'running number' at the national level, especially if EPID numbers are given at the national level.

Depending on the country context, it is best if the EPID number can be assigned at the time of case investigation, so that it can be used immediately to link the case investigation form (CIF) and the laboratory request form, which accompanies the specimens to the lab. Depending on the country, the assignment of EPID numbers can be coordinated at the district, provincial or the national level.

The EPID number is a 14-character string that consists of the following codes (**Figs. 2 and 3**)

- 1st to 3rd characters specify the country code in letters
- 4th to 6th characters specify the first administrative level (usually province) in letters.
- 7th to 9th characters specify the second administrative level (usually district) in letters.
- 10th to 11th characters specify the year of paralysis onset.
- 12th to 14th characters represent the 3-digit number of the case (using a chronological order)



Figure 2: Nomenclature for EPID number



Figure 3: Components of the EPID number

d) International and national cross-notification. If the onset of paralysis occurred in a country other than where the AFP case was detected, the AFP case will be assigned to the location in the other country where the paralysis began, and where, for polio cases, the AFP case was likely infected. All parties should be informed, including field, data and laboratory surveillance teams. International cross-notification is facilitated by the WHO regional office. National cross-notification, such as between two different provinces, is usually coordinated at the national level, according to national guidelines. The EPID number assigned to the case may also need to be modified accordingly, especially after a detailed field investigation has been completed.

e) AFP case validation. For a subset of AFP cases (around 50% or more, depending on the country surveillance guidelines), the accuracy of collected data should be 'validated' by someone other than the person who conducted the initial case investigation. AFP cases for validation should either be selected at random or based on country-specific criteria. Validation is ideally conducted within 14 days of the original case investigation by senior surveillance staff, typically by secondary and tertiary supervisors, interviewing the case and parents or caregivers.

The focus of case validation should be on cross-checking critical data: date of onset, place of onset, areas visited prior to onset, stool collection dates/processes, vaccine doses received through routine immunization (RI) and supplementary immunization activities (SIAs), health-seeking history - i.e. were one or more health providers consulted before the case was detected and reported, and collection of appropriate contact specimens. Based on the findings of the validation exercise, AFP surveillance data should be updated and corrected, if necessary. Any discrepancies of data between the initially recorded investigation and the validation should be systematically recorded.

4.3 Stool collection and transport to the laboratory

To optimize isolation of poliovirus in a WHO-accredited polio laboratory, two stool specimens must be collected as soon as possible, preferably within 14 days and no later than 60 days after the onset of paralysis (see).

Please note that in priority countries, as per Global Polio Surveillance Action Plan 2022-2024, both collection of 2 specimens (max. 11 days) and transport to the lab (3 days) should be accomplished within 14 days.

In AFP cases caused by poliovirus, the probability that poliovirus is actually isolated in the lab are greatest when the two specimens:

- are collected as soon as possible after onset of paralysis (the first specimen should therefore be collected at the time of the investigation or as soon as possible thereafter);
- are collected within 14 days and no later than 60 days of paralysis onset;
- are collected with an interval of at least 24 hrs; and
- arrive at a WHO-accredited laboratory within three (3) days of collection in 'good condition'.

| Paralysis onset ≤14 days | Paralysis onset >14 days to <60 days | Paralysis onset ≥60 days to ≤6 months | Paralysis onset >6 months |
|---|--|---|--|
| <ul style="list-style-type: none"> • Conduct AFP case investigation • Collect stool specimens <p>• Remember, stool specimens can be deemed inadequate upon arrival at the laboratory.</p> | <ul style="list-style-type: none"> • Conduct AFP case investigation • Collect stool specimens <p>• Additionally, conduct:</p> <ul style="list-style-type: none"> • AFP contact sampling • 60-day follow-up examination | <ul style="list-style-type: none"> • Conduct and document case investigation and enter into AFP database • Conduct 60 day follow-up examination • Do not collect stool specimens from AFP case or contacts | <ul style="list-style-type: none"> • Record information on "Unreported AFP Case" line list • No AFP case investigation • No stool specimens collected from AFP case or AFP contacts |

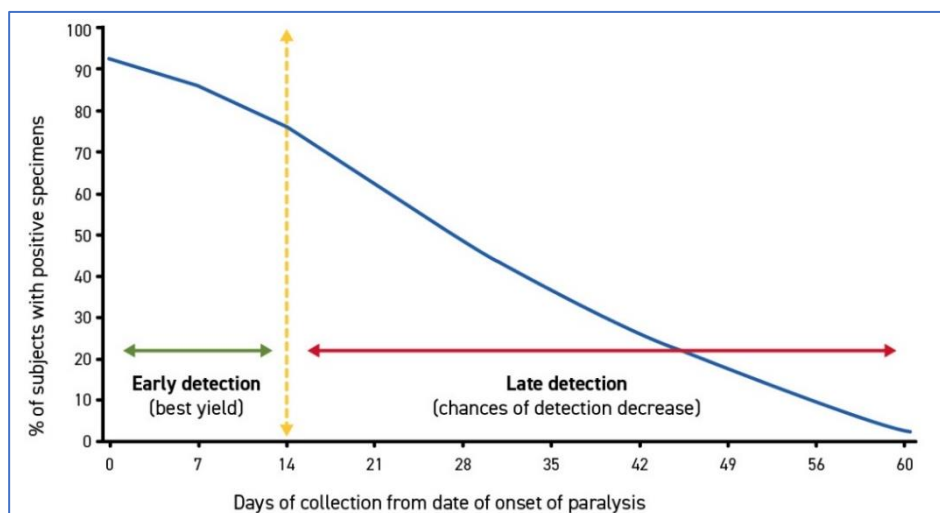
Figure 4: Stool collection relative to date of onset of paralysis

Persons infected with poliovirus do not excrete virus continuously, i.e., excretion is intermittent. Therefore, the chance of detecting virus in an infected person increases if not one but two specimens are collected, at least 24 hours apart.

Virus shedding is most intense during the first two weeks after paralysis onset, hence the need to collect the two specimens as soon as possible - best within 14 days of onset. Stool specimens should still be collected *after* two weeks, but *no later than 60 days* after paralysis onset (see Figure 4 above) For AFP cases detected very late, i.e. beyond 60 days past paralysis onset and up until six months after onset, no stool specimens should be collected but a CIF should still be completed and entered into the AFP database.

Stool specimens should ideally be collected at a health facility by trained personnel. If specimens cannot be collected at a health facility and must be collected by a caregiver at the home of the case, a sample

collection and transport kit with frozen ice packs should be left with the caregivers. Ensure the instructions are clearly understood, using simple language if needed, with contact information in case of questions or problems arise. Make an appointment to change melted ice packs and collect both specimens.



Source: Adapted from Alexander JP, Gary HE, Pallansch MA, Duration of Poliovirus Excretion and Its Implications for Acute Flaccid Paralysis Surveillance: A Review of Literature, J Infect Dis 175(1):S175-82;1997 (https://doi.org/10.1093/infdis/175.Supplement_1.S176).

Figure 5: Probability of excreting poliovirus over time, from date of onset of paralysis

Annex 5 - 'AFP case investigation' provides a standardized, step-by-step procedure for stool specimen collection, including a list of materials and supplies.

a) Adequate and inadequate stool specimens. One of the two key AFP surveillance quality indicators is the 'adequacy of stool specimens'; for at least 80% of AFP cases, adequate specimens should be available, to maximize the chance that poliovirus can be isolated and confirmed in the laboratory. Low specimen adequacy, or having more than 20% of AFP cases with inadequate specimens in an area, points to gaps in surveillance quality and may mean that virus transmission is missed.

AFP stool specimens are considered as 'adequate' if *two specimens are collected at least 24 hrs apart, within 14 days of paralysis onset, and received in a WHO-accredited laboratory in good condition, and with required documentation* (see text box).

Adequate stool specimens

- Two (2) stool specimens.
- Collected at a minimum 24 hours apart from each other's collection.
- Collected within 14 days of the onset of paralysis.
- Received at a WHO-accredited laboratory in good condition (at least 8 grams, reverse cold chain maintained from collection to arrival at laboratory, with no evidence of desiccation or spillage) and with adequate documentation.

In view of this definition, specimens are considered as **inadequate** for the following reasons:

- Delays in specimen collection - one or both specimens are collected after 14 days of onset of paralysis in the AFP case; this can be due to late detection and reporting of the AFP case and to late investigation of the AFP case;
- No specimen or only one specimen reaches the lab; reasons for this include:
 - the AFP case dies or cannot be found (is 'lost to follow-up') before specimen collection, or specimens were collected but are lost during transport to the lab, or if the team failed to collect a second specimen;
- **Specimens are not in 'good' condition** on arrival in the laboratory (see text box above):

- improper collection procedure or use of inadequate transport box, leading to spillage or desiccation of specimens during transport, or amount of stool collected is too low;
- temperature of > 8 degrees C in transport box on arrival in the laboratory, caused by poorly maintained 'reverse cold chain'.

b) Storing and transporting stool specimens. At all times after collection, specimens should be stored and transported maintaining a temperature between 4° and 8° C from the moment of collection until arrival at the laboratory - a system referred to as the 'reverse cold chain' (in comparison to the 'cold chain' used to transport vaccines from central to peripheral level).

In many countries, WHO and Ministries of Health (MOH) have contracts with commercial courier companies to provide ground or air transport services to facilitate specimen transport. Based on established indicators, transport time from collection of the second stool specimen to arrival in the WHO-accredited laboratory should not exceed three (3) days, irrespective of whether the laboratory is located within or outside of the country. Stool specimens should arrive at the laboratory in *good condition* (definition see above), including complete documentation (CIF and laboratory request form).

c) Maintaining the specimen reverse cold chain'. National polio programs must assure that the 'reverse cold chain' for safe storage and transport of specimens remains intact. Any interruption of the reverse cold chain, i.e. exposure of specimens to higher temperatures, may inactivate polioviruses in the specimens and decrease the ability of the laboratory to isolate the poliovirus. If it is anticipated that specimen transport duration will be > 72 hrs between collection of second stool and reaching the lab, provisions should be made to exchange cold packs, and/or assure intermediate cold storage of the specimens.

4.4 Collection of AFP contact specimens

Specimens collected from AFP cases which, for the reasons explained above, are considered to be 'inadequate', no longer allow the laboratory to produce reliable test results. As a consequence, poliovirus may be missed in specimens from poliovirus-infected AFP cases.

This is why the GPEI recommends that, for all AFP cases with inadequate specimens, stool specimens should be collected from direct contact persons of the AFP case. If polio caused the paralysis in the AFP case, virus is likely to circulate in the family and among close contacts of the case. Specimen collection from AFP contacts can therefore increase the chance to detect virus circulation; if any of the direct contacts is virus-positive, the AFP case will be confirmed as a polio case (see [Annex 7 - contact sampling](#)).

If the initial AFP case investigation is conducted late, and it is clear that two stool specimens cannot be collected in a timely manner (within 14 or 11 days of onset), AFP contact sampling should be conducted during the initial AFP investigation - ideally, within 7 days of AFP case notification. AFP contact sampling can still be done up to 60 days after paralysis onset, although it must be noted that the probability of detecting virus rapidly decreases with time.

To increase the sensitivity of poliovirus detection, AFP contact sampling can also be performed either as a part of regular AFP surveillance activities or as part of outbreak response activities. However, any decision to expand AFP contact sampling must be made in close consultation between regional and national polio teams and the polio laboratory to ensure that there is a sufficient reason justifying the additional sampling, and that the laboratory can accommodate the increase in workload.

AFP contact sampling should **not be done** in situations when the AFP case has already been confirmed as WPV or VDPV, or when the onset of paralysis of the AFP case occurred more than 60 days earlier, because in these situations contact sampling will not provide new or additional programmatically useful information.

e) **How to conduct AFP contact sampling.** AFP contact sampling should be done following a standardized procedure:

- Identify potential contacts. Give priority to younger children (under five years of age) who are in frequent, direct contact with the AFP case. Include siblings, household members or playmates. If the AFP case stayed in other locations one week prior to and/or two weeks after paralysis onset, then identify additional contacts at these locations.
- Explain the purpose of collecting samples to parents or guardians of the selected contact.
- Collect one stool sample each from three separate contacts.
- Follow AFP surveillance protocols for collection, storage, and transport of stool specimens (for details, see [Annex 5](#)).
- Fill out a separate laboratory request form for each contact.

Each contact specimen should be labelled clearly as a contact of the AFP case, using the EPID number of the AFP case with an added contact indicator (“C”) and a number from 1 to 3 (...C1,C2, C3). Please also see [Annex 7](#).

f) **How to interpret and use results from AFP contact sampling.** The following explains how laboratory results from AFP contact specimens should be interpreted and used.

1. If neither WPV nor VDPV were found in specimens from the AFP index case, the *isolation of WPV or VDPV from a healthy contact confirms the AFP case as a WPV or VDPV case*, even if the AFP case had adequate stool specimens.
2. If the AFP case was WPV- or VDPV-positive, the isolation of WPV or VDPV from a contact still represents information that is valuable for the program. However, the virus-positive community samples of AFP cases are **not** classified as confirmed poliovirus cases because they do not meet the case definition, which requires the presence of AFP. Such lab results are included as “others” or “other human source” in the count of poliovirus isolates.

4.5 60-day follow-up investigation

A typical feature of paralytic poliomyelitis is that a majority of cases will not fully recover, but suffer permanent neurological sequelae, or 'residual paralysis'. A neurological examination of AFP cases at least 60 days after onset of paralysis can give a strong indication for whether or not polio was the cause of AFP. This is why, before the era of laboratory confirmation, all AFP cases had to receive such a '60-day follow' examination.

a) **Which AFP cases need a 60-day follow-up**

examination? For AFP cases with adequate specimens, results from a WHO-accredited laboratory provide a very sensitive test to distinguish AFP due to polio from non-polio AFP. For these cases, the 60-day follow-up result is not needed.

In the WHO African Region, **only AFP cases with no or inadequate specimens must have a 60-day follow-up exam.** (In the absence of reliable lab results due to the inadequacy of the AFP case, the 60-day follow-up result will give some clue for such patients as to whether polio was the cause of AFP).

For which AFP cases is a 60-day follow-up exam required?

In the WHO African Region, a follow-up exam is required for the following:

- AFP cases without any specimen collection;
- AFP cases with with inadequate specimens; and
- AFP cases with isolation of vaccine-type (Sabin-type, nOPV-type) poliovirus.

The National Polio Expert Review Committee (NPEC), responsible for AFP case classification, will closely review all cases, and particularly those with inadequate specimens and residual paralysis at 60 days, to decide if such a case can still be discarded as non-polio AFP, or if the case should be classified as 'polio-compatible' (see also Figure 9 and [section on AFP case classification](#) below).

b) How to conduct a 60-day follow-up examination. The result of the 60-day follow-up examination depends considerably on the experience and clinical skills of the person conducting the exam. This examination should ideally be conducted by a pediatrician experienced in examining children. Well-trained pediatricians will detect even small degrees of residual weakness which less trained health workers may not be able to find. It is also preferred to have it done by the physician/officer who initially examined the case. Where no pediatricians are available, senior surveillance officers can also be trained to conduct the 60-day follow-up exams.

A 60-day follow-up examination is conducted using both the original CIF and the 60-day follow-up examination form ([Annex 4. Examples of forms](#)). During the exam, the clinician or officer should systematically assess the patient and

- verify with the family that all information on the previously documented CIF is correct;
- inquire if the paralysis or weakness has completely resolved, has improved, has remained the same, or has progressed;
- observe how the child moves their limbs or affected areas of the body. Watch the child walk, or move arms, and look for signs of atrophy (muscle wasting);
- examine muscle tone, power, and reflexes. Verify that sensation is normal; even mild residual weakness should be considered as 'residual paralysis';
- complete all sections of the 60-day follow-up examination form and send it to the national Expanded Programme on Immunization (EPI) or polio program.

Possible outcomes of the 60-day follow-up examination include:

- No residual paralysis: 60 days after date of onset, no weakness or paralysis in the initially affected limb or limbs; all functions were recovered.
- Residual paralysis: 60 days after date of onset, some weakness or paralysis persists (no improvement or slight improvement).
- No follow-up examination was possible - because the case could not be found ('lost to follow-up'), or died before follow-up could be done.

4.6 Final AFP case classification

Once final laboratory results have been received and the 60-day follow-up examination has been done, all AFP cases need to undergo final AFP case classification. This means that all AFP cases are either

- a) confirmed as polio,*
- b) discarded as non-polio AFP, or*
- c) classified as 'polio-compatible' (for details see below).*

The GPEI target is that all AFP cases should be finally classified no later than 90 days of the onset of paralysis.

For final classification, national polio teams, supported by the National Polio Expert Committee (NPEC), should follow the standard WHO AFP case classification criteria (see).

a) AFP case classification depending on specimen adequacy status and lab results. AFP cases for whom any stool specimen, regardless of whether they are adequate or not, test *positive for wild or vaccine-derived poliovirus* in a WHO-accredited laboratory are classified as 'confirmed polio'; virus-negative cases are also confirmed if WPV or VDPV is isolated from a close case contact.

Cases with *adequate specimens testing negative for poliovirus* are by default classified as *discarded as non-polio AFP* by the programme. This is done because if specimens were adequate, the result from a WHO-accredited lab is accepted as proving that the specimens did not contain WPV or VDPV, i.e., that a poliovirus infection was not the cause of the AFP.

AFP cases *without specimens or with inadequate specimens* are harder to classify, because classification has to be done without the benefit of a reliable lab result, based only on clinical data and on the result of the 60-day follow-up. Final classification for this group of cases is done by the National Polio Expert Committee (NPEC).

b) Role of the National Polio Expert Committee. The NPEC is a group of experts in pediatrics, neurology, virology and epidemiology, who meet regularly - at least four times a year, or more often, depending on the AFP case load - to assist in AFP case classification.

In the African Region, the role of the NPEC is to:

- conduct a detailed review and classification of AFP cases with no or inadequate specimens; while all *adequate* cases are classified by the secretariat, these must also be presented to the NPEC for validation;
- review AFP cases with adequate specimens testing positive for Sabin-like poliovirus, to decide on a possible diagnosis of vaccine-associated paralytic poliomyelitis (VAPP);
 - in this context, VAPP cases with a history of receiving nOPV2 should be referred to the '*Causality Assessment Committee*' to check a possible association with the use of nOPV2. In some countries using nOPV2 for outbreak response, the NPECs terms of reference include to serve as '*Causality Assessment Committee*' (for details, pls see the GPEI's [Guide for Surveillance of Adverse Events of Special Interest \(AESI\) during nOPV2 use](#))
- provide other technical advice and support pertaining to AFP cases and AFP surveillance, such as by participating in training courses on AFP surveillance and other advocacy activities to increase AFP awareness, particularly among clinicians;
- Exceptionally, the NPEC may request that a further detailed clinical review of the AFP case may be done by a neurologist, to provide additional neurological information which may facilitate final case classification.

c) How does the NPEC classify AFP cases without or with inadequate specimens?

Following the WHO classification scheme (see), the NPEC will classify such cases as:

- *confirmed polio* if WPV or VDPV was detected in any stool specimens from *either the AFP case or a direct contact*;
- *polio-compatible*¹⁰, if the NPEC has concluded that, after close review, polio could not be ruled out because the case had either
 - residual paralysis at the time of the 60-day follow-up, or

¹⁰ It should be noted that a case classified as *polio-compatible* cases is neither confirmed as polio, nor discarded as non-polio AFP

- no follow-up exam could be done because the case died or could not be found (was 'lost to follow-up'); or
- *discarded as non-polio AFP*, if no residual paralysis was observed at the 60-day follow-up visit of the case; note that the NPEC *may* discard as non-polio even cases *with residual paralysis, or without follow-up examination*, if the committee feels that there is sufficient evidence (from clinical notes, or other documentation) to show that the illness was *not clinically compatible with poliomyelitis*.

d) Significance of polio-compatible cases. Only the NPEC can classify an AFP case as 'polio-compatible'. Since no reliable lab results are available, 'compatible' AFP cases are neither confirmed as polio nor discarded as non-polio. However, polio-compatible cases are programmatically important. Since polio could not be reliably excluded, such cases do indicate a surveillance failure in any of the steps required to collect adequate specimens, from delays in the AFP case seeking health care to specimens received at a WHO-accredited polio laboratory in good condition.

A cluster of polio-compatible cases in a short period of time is of concern, as the programme cannot rule out polio as one of the reasons for this cluster of AFP cases. Regular mapping and review of polio-compatible cases helps to find areas with poor surveillance to address the underlying problem that has caused late specimen collection.

NPECs should make use of the 'polio-compatible' category whenever the available documentation is not sufficient to reliably rule out polio. The African Regional Commission for the Certification of Polio Eradication (ARCC) has repeatedly noted that NPECs in many countries of the Region tend to discard a considerable proportion of 'inadequate' AFP cases, without sufficient clinical evidence. The ARCC reminded NPEC chairs and polio country teams not to over-discard AFP cases, but to use the 'polio-compatible' classification category and utilize and map such cases as to indicate areas of weak surveillance.

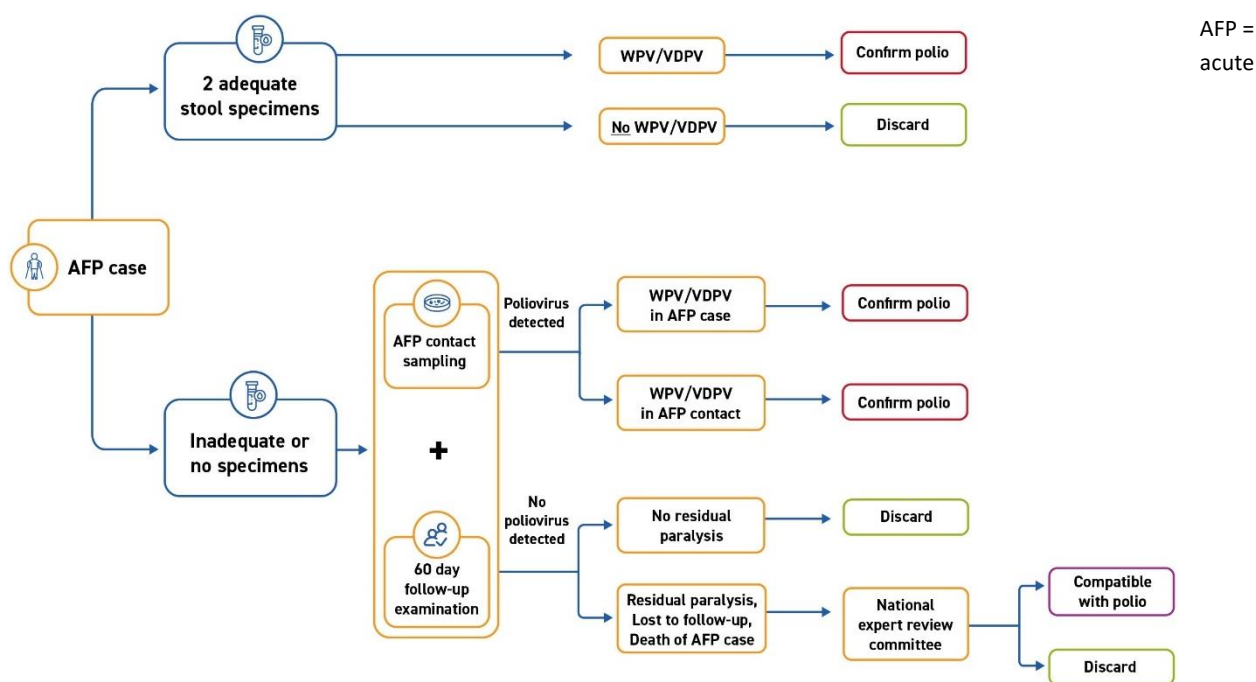


Figure 6: WHO AFP case classification scheme

flaccid paralysis; VDPV = vaccine-derived poliovirus; WPV = wild poliovirus, Source: WHO.

e) Role of the MoH/WHO secretariat in supporting the NPEC. At each NPEC meeting, MoH/WHO surveillance staff, acting as secretariat to the NPEC, will present all available data on AFP cases for which NPEC support for classification is required; the NPEC will discuss the case and suggest how it should be classified.

To prepare for the NPEC meeting, the MoH/WHO secretariat should assemble a file for each case with, at a minimum, the following documents:

- the completely filled-out case investigation form (CIF), and any other additional notes or report prepared after the case was investigated;
- for hospitalized AFP cases, copies of all medical records and clinical notes as well as any other documents and test results;
- for AFP cases who died, a copy of the death certificate;
- a copy of the duly filled-out 60-day follow-up form, and any other clinical notes made by the clinician who conducted the follow-up examination;

The MoH/WHO secretariat should briefly present each case, with all relevant details, to the NPEC, focusing on any underlying condition or past medical history that may have a bearing on an illness causing paralysis. Where possible, a representative of the district team who first notified and investigated the AFP should attend the NPEC meeting and assist in presenting the case.

5 AFP surveillance data management, monitoring and evaluation

A well-functioning AFP data management and information system is crucial for national immunization and polio eradication programs in order to provide programme managers with the data required to take appropriate action to guide the programme in the most effective way.

Jointly with data on polio routine and supplementary immunization coverage, AFP surveillance data analysis should allow polio program managers to regularly assess and monitor main polio risks, such as the risk of new outbreaks following virus importation or emergence of cVDPV.

Surveillance data is monitored and used by programme decision makers in several areas:

- Regular analysis of AFP surveillance quality indicators allows to monitor surveillance performance and sensitivity, to detect and focus corrective action on areas with low-performing surveillance
- In remaining endemic areas and outbreak-affected countries, AFP surveillance data tracks circulation of WPV or VDPV to monitor progress towards interrupting transmission.
- AFP surveillance data provides evidence on surveillance quality to national and regional certification groups, to monitor polio-free status in certified Regions and to provide the basis for eventual regional (only EMR remaining uncertified, as of mid-2023) and global WPV-free certification.

5.1 AFP data management

Data collection and management. Data that are complete, accurate and timely are key to monitoring the polio eradication program. For data to be of use, data collection and processing tools must be used correctly, and the data must be analyzed on a regular basis and interpreted properly to produce information that is reliable enough to guide decision making.

The programme gathers and uses acute flaccid paralysis (AFP) surveillance data from several sources:

- *Case-based AFP data*, collected through key data collection tools, such as case investigation forms (CIFs) and 60-day follow-up exam forms, are compiled in a database and shared weekly with the WHO African regional office and WHO headquarters. It is also placed on a global online polio data platform, the *Polio Information System (POLIS)*.
- *Specimen-based lab data* relating to specimens collected from all sources (stool specimens from AFP cases, case contacts and community samples - also referred to as 'healthy children sampling' - , and ES specimens), including lab results, are compiled in a laboratory database and shared weekly with WHO AFRO and WHO HQ.
- Genetic sequencing results for poliovirus isolates provided by global specialized laboratories also provide a source of data for AFP surveillance.
- Data on routine (passive) surveillance data (zero-reporting) is collected from all reporting sites and compiled at district, provincial and national level, to calculate completeness and timeliness of reporting.
- Date on active surveillance (AS) visits to health facilities and providers at all priority levels in the surveillance network is also collected and compiled at all levels, to assess completeness of AS visits.

Role of polio data managers. Broadly, poliovirus and AFP surveillance data management is indispensable to support decision-making (Table 5).

With a focus on AFP surveillance, the role of data managers is to ensure that:

- AFP data is collected and shared, where applicable, in a timely manner;
- AFP data is complete and free of data entry errors (data quality checks);
- AFP data is accurate (e.g., logical chronology of dates); and
- AFP data is filed and archived properly.

In collaboration with polio surveillance officers, polio data managers also ensure that:

- accurate and up-to-date data is analyzed, and information is presented clearly, to best support data-driven decision making; and
- reports and feedback are complete and provided in a timely manner, particularly the data used to monitor surveillance performance.

Table 4: Main uses of AFP and poliovirus surveillance data for programme decision-makers

| Country context | Use of AFP surveillance data |
|-----------------------------------|--|
| All countries | <ul style="list-style-type: none"> • Calculate standard AFP quality indicators for surveillance performance at least at the national, provincial and district level • Focus corrective efforts on low-performing areas |
| All countries | <ul style="list-style-type: none"> • Provide evidence on surveillance quality to national and regional certification bodies as the basis for regional and global polio-free certification |
| Endemic countries, outbreak areas | <ul style="list-style-type: none"> • Track WPV, VDPV circulation to inform immunization activities and monitor progress towards interrupting transmission |

AFP = acute flaccid paralysis; VDPV = vaccine-derived poliovirus; WPV = wild poliovirus

Routine calculation and sharing of key data include the calculation, at national and first subnational level, of key AFP surveillance performance indicators, such as the non-polio AFP rate and stool specimen adequacy, as well as of timeliness indicators for stool specimen transport and laboratory testing and data on the completeness and timeliness of AFP passive (routine, zero) reporting and active surveillance visits.

5.2 Main AFP and poliovirus surveillance tools and forms - WHO African Region

The AFP case register (also called the 'AFP line list') is the main database kept at district, province and national level, which contains all relevant data and information on all notified AFP cases. Using the individually assigned EPID number, AFP cases should be recorded in the register in the sequence in which they are notified. The case register, also called the 'AFP line list' in many countries, may be kept in paper form at the district and province level, but its content is then computerized and forms the core of the case-based AFP data shared weekly with the national, AFRO regional and global level.

The AFP register contains all relevant information collected in the case investigation form (CIF, see below) by the surveillance staff investigating the AFP case. Additional important data is added as they become available later, including the results of laboratory testing and of 60-day follow-up examination (in case of no or inadequate specimens).

The AFP case investigation form (CIF). The CIF is the form filled out by the persons conducting the case investigation. All parts and variables on the CIF must be completely and correctly filled out, because the CIF data are used to record and document all basic data related to 'time, place and person' of the AFP case which is required conducting important epidemiological analyses.

Key data to be entered on the CIF include identifying information - the EPID number, personal information, full address of residence or locating information, and data on the surveillance site and health worker initially notifying the case. Important dates to record include the date of onset of paralysis, date of consultation, investigation and notification, and information on the clinical history, main symptoms, vaccination status, date of collection of stool specimens, and results of laboratory testing and 60-day follow up examination, as well as final classification.

Stool specimen shipment form. All stool specimens must be accompanied by a fully completed stool specimen shipment form, on which important identifying information, such as the EPID-number, patient name, and dates of stool collection, are recorded. This form is also used to record important information on the itinerary the samples take on their way to the lab, and details on maintaining the 'reverse cold chain' (i.e. change of ice packs, other notes on the status of the samples during transport).

Sixty-day follow-up form. This form is filled out by the person conducting the 60-day follow-up examination for cases with inadequate specimens. The form includes the usual identifying information, most importantly the EPID-number, and details on the findings of the clinical exam of the AFP case seen 60 days after the date of the onset of paralysis.

Logistics management form. In the WHO African Region, this form is used to document and follow up on the the utilization of available transport when conducting surveillance-related tasks, such as field visits for supervision, active surveillance, or community sensitization activities. This form must be filled out for each surveillance-related mission conducted.

Please also see examples of the main AFP surveillance forms in [Annex 4](#).

5.3 Mobile applications and mobile data collection

The use of digital communication technologies can help to accelerate surveillance processes and improve the efficiency of data management. Applying such innovative technologies has been very helpful to improve timeliness in the collection, storage, analysis and dissemination of data and to improve

monitoring and supervision of activities (also see [Chapter 8.5](#)). There are also new digital tools to aid in locating populations and getting a better understanding of the scope of the surveillance network.

Table 5: Examples of digital mobile technologies used in countries of WHO AFR

| Innovation | Definition | Benefits | Tool |
|--|---|--|---|
| e-Surv (Electronic surveillance) | Real-time monitoring and reporting system on active surveillance (AS) visits. | <ul style="list-style-type: none"> Registers time, location and record data on AS visits. Tracks the coverage of AS visits | Mobile phone or tablet |
| ISS (Integrated supportive supervision) | Real-time monitoring and reporting system on supervisory visits for essential immunization, cold chain and vaccines, and incidence of VPDs. | <ul style="list-style-type: none"> Registers time, location and record data on supervisory visits Tracks coverage of supervisory visits Displays trends across time and geographies | Mobile phone or tablet |
| AVADAR Auto-Visual AFP Detection and Reporting ¹¹ | Reporting and monitoring tool for CBS to enable community members (i.e., birth attendants, traditional healers, village healers) to detect and report AFP cases | <ul style="list-style-type: none"> Reminder to look for AFP cases Time and location of notification of “suspected AFP case” Directs electronic notification of suspect AFP case to supervisor(s) | Mobile phone or tablet |
| Geo-localization | Mobile devices with global positioning system (GPS) receivers can allow geolocation of cases | <ul style="list-style-type: none"> Allows exact localization of AFP cases or health facilities | Mobile phone or tablet |
| WebIFA Web Information For Action | Designed to collect, report and analyze surveillance data using a mobile device | <ul style="list-style-type: none"> Centralized and harmonized data from field collection and laboratory reporting for AFP, environmental, and iVDPV surveillance Improves data quality, streamlines workflow between surveillance teams | Mobile phone or tablet, computer |
| Barcode | QR code system to track samples from collection to testing | <ul style="list-style-type: none"> Real-time tracking of samples Avoids data entry errors Linked to WebIFA for tracking and data verification | Mobile phone or tablets Currently being pilot tested |
| WhatsApp | Chat groups | <ul style="list-style-type: none"> Improves communication within surveillance teams, strengthens and connects teams Supports direct information dissemination and issue resolution. Motivates frontline surveillance efforts, provides training opportunities by taking and sharing pictures of their work. | Mobile phone |

The widespread use of mobile devices (smart phones), has allowed for cleaner, faster and more reliable data capture and is greatly facilitating communication between surveillance officers and the healthcare network. A number of such innovative mobile phone technologies are already being used successfully across the polio programme in countries of the WHO African Region (see Table 5). It is recommended

that country programs consult with AFRO to decide on which application is most suitable for the intended purpose, while meeting the required data standards.

5.4 Geographic information system (GIS) mapping

GIS mapping and satellite imagery are also useful to identify and locate populations and catchment areas. GIS is now widely used by the programme for vaccination campaigns but also in the context of surveillance to:

- Map AFP cases and the surveillance network (network of ES sites) by their respective geo-coordinates, and to ensure that populations are covered by the surveillance network.
- Better understand population movements and where populations are located. This helps to understand the performance of the surveillance system (indicators) and areas where surveillance strategies need to be adapted (e.g., inaccessible, hard-to-reach populations, such as in North-East Nigeria).
- Track the movement of polioviruses and outbreak response rounds to identify areas with reported polioviruses and with no or low quality of previous vaccination campaigns. This guides decision making during polio risk assessment.
- Map AFP surveillance indicators – NPAFP, Stool Adequacy – and overlay this with other surveillance data to identify areas with critical gaps.

While not possible in all contexts, the wider deployment and use of GIS mapping and satellite imagery is encouraged, including to capture the GPS coordinates of where AFP cases reside, of health facilities, reporting sites, etc., and to better visualize catchment areas.

5.5 Polio programme monitoring

Monitoring should be conducted on a regular basis and should highlight both trends and anomalies in the performance and quality of surveillance.

Collect, analyze, and use data. Data should be consolidated and analyzed at district, provincial and national levels to assess the sensitivity, timeliness and quality of surveillance. All data should be updated promptly once errors are found. Data should also be updated after laboratory results are received and once a final case classification is assigned.

Monitoring should be done:

- for case- and specimen-level data (in the AFP register, or line listing) ⇒ monitor the quality of case investigations (including completeness of forms) and ensure accurate and up-to-date case- and specimen-based data is available for performance analyses;
- for site visits, including active surveillance (AS) and supervisory ⇒ monitor completeness and timeliness of AS and supervisory visits and related data; and
- for reports, including AS and zero-reporting ⇒ monitor completeness of data and timeliness of reports.

Data should be disaggregated by space and time:

- within and/or across geographies: local, district, province, national; and
- over time: by month, by quarter, semester, yearly.

Data should also be stratified, where possible and whenever a more descriptive analysis is required:

- by gender (e.g., “number of unreported AFP cases by gender identified during AS visits”);

- by special population group (e.g., “number of AFP cases reported by category of special population”); and
- by health-seeking history (e.g., “number of AFP cases seen by 2 or more health providers before being notified”).

Routine analyses include the following set of reports and products:

- graph of confirmed polio cases by year (indicates progress made towards eradicating polio);
- graph of reported AFP and confirmed polio cases by month and 1st admin. level (indicates possible clustering of reported AFP cases in time and space);
- dot map (spotmap) of confirmed polio cases (shows where poliovirus is circulating and high-risk areas to be targeted with special strategies);
- dot map (spotmap) of AFP cases and compatible cases (identifies possible areas of low performance);
- table showing the key surveillance performance indicators by first administrative level (see [Annex 3](#));
- disaggregation of indicators by gender and by special population/high-risk groups or areas (helps pinpoint possible reasons for suboptimal performance or gaps in surveillance; hence can direct to possible solutions); and
- graph of OPV/IPV status, i.e., how many doses were received, of non-polio AFP cases aged 6-59 months (indicates whether immunization efforts should be intensified and areas of possible risk of virus emergence and/or spread).

In certain situations, the initial case investigation should be expanded into a more detailed investigation to gain a better understanding of the context and circumstance of the case or cluster of cases and thus uncover possible reasons for the occurrence and assess the risk of virus spread if present.

Therefore, any one of the following situations warrants a prompt detailed case investigation:

- a single isolate of WPV through AFP or ES;
- a single isolate of VDPV1, VDPV2 or VDPV3 through AFP or ES;
- any SL2 poliovirus in an area with no recent vaccination campaign with type 2-containing vaccine;
- a clustering of AFP cases classified as polio-compatibles, i.e., usually defined as two or more cases in either a single district or two neighboring districts within four weeks;
- a clustering of AFP cases within a district or in neighboring districts, i.e., at least twice the number of expected AFP cases reported within a month, in a limited geographical area.

AFP surveillance performance indicators. Performance indicators are used to monitor the quality of disease surveillance and laboratory performance using both core and non-core indicators. For a comprehensive list, see Annex 3. Indicators for AFP surveillance.

Two indicators remain the gold standard to assess AFP surveillance quality:

- ✓ the non-polio AFP rate, and
- ✓ stool adequacy.

Table 6: AFP surveillance indicators related to timeliness

| Timeliness of | Indicator |
|------------------|---|
| Detection | # of AFP cases with WPV/VDPV final laboratory results \leq 35 days of onset |
| Notification | # of AFP cases reported within 7 days of paralysis onset |
| Investigation | # of AFP cases investigated within 48 hours of notification |
| Stool collection | <ul style="list-style-type: none"> # of AFP cases with 2 samples collected \geq 24 hours apart, within 14 days of paralysis onset (<i>non-priority countries</i>), and # of AFP cases with 2 samples collected \geq 24 hours apart, collected (within 11 days) and shipped (3 days) within 14 days of paralysis onset (<i>priority countries</i>) |

AFP = acute flaccid paralysis; VDPV = vaccine-derived poliovirus; WPV = wild poliovirus

Indicators for the timeliness of activities, as introduced in the GPEI 2022-2026 Strategy, are of particular importance (see Table 9).

These timeliness indicators apply in particular to outbreak and at-risk countries. Delays in detection can happen at any stage of field, logistic, and laboratory activities. Countries must monitor timeliness at every stage of the process. [Annex 3](#) provides a full set of core and non-core AFP quality indicators, as per the GPSAP 22-26, and [Annex 8](#) provides insight into causes of delays and ways the programme can address them.

5.6 Polio surveillance evaluation

Evaluations can take the form of audits and desk or field reviews. For outbreak-affected countries, outbreak response quality assessments (OBRA) are also conducted.

Conduct audits. All countries benefit from internal annual audits of their AFP surveillance system to assess the system, in order to identify and respond to subnational managerial and performance gaps. The findings of an audit are particularly useful for annual surveillance planning.

Audits involve carrying out analyses on data that has been disaggregated by high-risk status, sex and health-seeking behavior. They also explore context-specific risk factors, such as special populations or hard-to-reach geographies.

Audits should assess all components of the AFP surveillance system: passive reporting, active surveillance, including the quality of AS visits, community-based surveillance (where applicable), staffing, logistics, financing, and more. Audits are typically performed internally by the national team and may include desk and/or field assessments.

Desk and field polio surveillance reviews. Periodic evaluations of poliovirus and AFP surveillance systems are done through desk reviews, often followed by field reviews; both types of review are typically done as 'external' activities, so conducted by, or with participation of, experts from outside the country.

- **Desk reviews** thoroughly review existing data and analyze surveillance quality indicators to assess overall AFP surveillance performance. Desk reviews provide an overview of surveillance sensitivity over a defined period, usually three years, and aim to highlight possible gaps. These reviews can be done at the office, i.e., at a “desk,” unlike field reviews that involve site visits. Generally field reviews also have the component of desk reviews as part of the activity.

Desk reviews are an excellent tool do identify and highlight the scope and type of surveillance quality gap and their location. Desk reviews alone will usually not, however, be sufficient to clarify the causes in detail, or to arrive at specific recommendations to address the problems.

- **Field reviews** build on preceding desk reviews by targeting a set of provinces or districts for visits. Field reviews are conducted by a team of peer reviewers, usually a mix of internal and external reviewers, to assess the performance of the surveillance system and the quality of the surveillance network.

Recommendations from desk and field reviews are translated into a surveillance plan to further improve the system, focusing on strengthening it wherever performance gaps were identified. Depending on the purpose and scope of these reviews, special attention should be paid to high-risk, access-compromised and hard-to-reach areas and populations, as these areas and populations require special strategies and added resources.

For outbreak-affected countries that use nOPV2 as part of their response, the GPEI has provided nOPV2 specific guidance for surveillance requirements.

[Download Polio Field and Laboratory Surveillance Requirements in the Context of nOPV2 Use](#)

Conduct outbreak response assessments (OBRA)s. Poliovirus surveillance quality is a key component of outbreak response assessments (OBRA)s, conducted by the GPEI for all polio outbreaks. OBRA)s assess whether vaccination and surveillance activities are robust enough to detect and stop poliovirus transmission. They also identify further activities to address remaining gaps and interrupt transmission of the outbreak virus.

OBRA)s are conducted regularly throughout an outbreak until an OBRA mission declares the outbreak to be over. Closure of the outbreak can only be done if there is evidence of high-quality surveillance sensitivity.¹²

6 Environmental surveillance (ES) for poliovirus

Environmental surveillance (ES) for poliovirus is the routine collection and testing for poliovirus of environmental (sewage/ wastewater) samples from designated locations. ES collection sites usually are at sewage treatment plants or sewage collectors downstream from areas with high-risk populations, which they are draining. If implemented well, ES can ideally complement AFP surveillance because it has the potential to detect virus excreted by infected individuals in the community regardless of manifestation of symptoms

The Global Polio Laboratory Network (GPLN) has developed and standardized sensitive methods to collect and concentrate sewage/wastewater samples, test them for the presence of poliovirus and then further differentiate wild polio from vaccine-derived poliovirus (VDPV) or Sabin-like virus. Genetic sequencing can then be used to establish links to other ES or AFP poliovirus isolates to confirm poliovirus circulation and track routes of transmission.

6.1 Rationale for ES and where ES can be useful

Well-implemented ES can significantly increase the sensitivity of surveillance for poliovirus in an area or region. ES has been used for more than 70 years as a surveillance system to detect polioviruses. Its

¹² For OBRA resources, see: Global Polio Eradication Initiative (GPEI). Aide-mémoire on OBRA)s, version 2. Geneva: World Health Organization; 2019 (<http://polioeradication.org/wp-content/uploads/2016/07/Polio-Outbreak-Response-Assessment-English-Version-2-December-2019-201912.pdf>). Global Polio Eradication Initiative (GPEI). Standard operating procedures: responding to a poliovirus event or outbreak, version 4. Geneva: World Health Organization; 2022 (<https://polioeradication.org/wp-content/uploads/2022/07/Standard-Operating-Procedures-For-Responding-to-a-Poliovirus-Event-Or-Outbreak-20220807-EN-Final.pdf>). Global Polio Eradication Initiative (GPEI). Interim Quick Reference on Strengthening Polio Surveillance during a Poliovirus Outbreak. Geneva: World Health Organization; undated (https://polioeradication.org/wp-content/uploads/2021/12/Quick-Reference_Strengthening-Surveillance-during-Poliovirus-Outbreaks_24-March-2021.pdf).

routine use in countries that were polio-free for a long time allowed to detect the reintroduction of wild poliovirus, such as in Finland, the Netherlands and Israel, and to monitor progress towards interrupting the respective outbreaks. ES also proved extremely useful during the final phase of polio eradication in previously polio-endemic countries, including in Egypt and India. Repeatedly, polio transmission was detected through ES even in areas where virus-positive AFP cases were no longer found, highlighting its complementary role to AFP surveillance.

ES is increasingly being used in the context of WPV-free certification. ES provides additional confidence that virus transmission has been truly interrupted, as endemic countries reach the final phase of eradication and countries experiencing outbreaks stop circulation. It also provides an additional level of confidence that polio-free status is being maintained in an area or country. While countries endemic for WPV were previously at the forefront of using ES, ES has become valuable beyond endemic countries, such as in the context of the evolving circulating VDPV type 2 (cVDPV2). As of 2023, ES is already routinely used in 42 of 47 member states of the WHO African Region.

In summary, the use of ES is indicated in the following settings (provided that suitable ES sites can be identified and established):

- a) In *polio-endemic countries*¹³, ES supplements AFP surveillance by detecting poliovirus circulation and providing increased evidence and confidence that circulation has been interrupted.
- b) In *previously polio-free countries with outbreaks following importation of WPV or emergence of cVDPVs*, ES is useful in the following contexts:
 - *Within communities known to be infected* to assess transmission of WPV or cVDPV and whether outbreak response activities were sufficient to stop transmission (i.e., breakthrough cases); and *where novel OPV 2 (nOPV2) has been used in cVDPV2 outbreaks*, to monitor possible persistence and potential transmission of Sabin 2 virus.
 - *Outside known infected communities* to monitor for any potential spread from known-to-be-infected areas, to guide the potential expansion of outbreak response, and to monitor for Sabin 2 virus wherever nOPV2 was used (see above).
- c) In *polio-free countries*, ES is useful as a monitoring tool in *countries and areas at highest risk of outbreaks following WPV importation or VDPV importation or emergence*, as well as in countries with chronically low-performing AFP surveillance.

Following the withdrawal of OPV components (Sabin 2 cessation through the tOPV-bOPV switch or the future planned bOPV cessation), use of ES in highest-risk countries will be important for the early detection of newly emerged VDPV, to document the elimination of all Sabin-type viruses, as well as to monitor the effectiveness of poliovirus containment in designated polio-essential facilities (see [Chapter 10](#) on PV containment).

This summary chapter describing ES is not intended to replace more detailed guidance recently published by the GPEI¹⁴ on setting up and implementing quality ES, focusing on collection site selection, sample collection and transport, and the use of ES data for action. Other documents, such as the 2015 Guidelines

¹³ As of August 2023, only two countries remained endemic for WPV1: Afghanistan and Pakistan

¹⁴ Field Guidance for the Implementation of Environmental Surveillance for Poliovirus
<https://polioeradication.org/wp-content/uploads/2022/11/Field-Guidance-for-the-Implementation-of-ES-20221118-ENG.pdf>

on environmental surveillance for detection of poliovirus¹⁵, contain detailed information on laboratory procedures for testing environmental samples for the presence of poliovirus.

6.2 Factors affecting the reliability of environmental surveillance

The probability of detecting poliovirus in wastewater samples depends on a number of variables, such as

- the duration and amount of poliovirus shed by one or more infected individuals in the catchment area of the ES site,
- the effect of physical, mechanical or chemical factors on the dilution and survival of poliovirus in the sewage system sampled at an ES site,
- the location of the excreter relative to the sample collection site,
- the frequency of collection and the laboratory's ability to detect poliovirus present in the sample,
- and seasonal variation in enterovirus isolation.

This means that it is not possible to successfully conduct environmental surveillance in all desired locations. In fact, ES works best in areas with networks of confluent sewers. The lack of convergent sewer networks in rural areas and some urban settings in developing countries reduces the feasibility (and/or cost effectiveness) of ES, thus reducing its advantage over AFP surveillance in some areas at highest risk for poliovirus circulation.

Therefore, to maintain poliovirus surveillance at the high sensitivity and specificity levels required to achieve and certify eradication, countries may rely on a combination of environmental and AFP surveillance, implementing best practices that optimize their effectiveness in the field.

In view of the factors mentioned above, ES results should be interpreted with caution: negative results do not exclude virus transmission in an area, and poliovirus-positive results cannot be linked to any individual but merely indicate that one or more persons excreting poliovirus is present in the area drained by the sewer which was sampled.

6.3 Coordination and planning to set up ES for poliovirus

Any new establishment of ES or expansion of existing ES systems requires close coordination with the WHO regional office and WHO headquarters teams, and with the regional and global polio lab networks. Such an endeavor should follow careful evaluation of the advantages of the newly established ES sites in the context of regional and national poliovirus surveillance objectives. The role of the country teams and collaboration with other stakeholders within the country such as the ministry of environment and sanitation agencies in the coordination and success of ES cannot be over emphasized.

A comprehensive national ES action plan should be developed, which should address the following: details of chosen sites, including estimated population catchment size; schedule of sampling; tasks and responsibilities; logistics; polio lab requirements, including space, personnel, equipment and reagents;

ES site management includes activities through the following phases: from selecting and opening, to operating and monitoring, and to closing sites, when this is deemed necessary.

¹⁵ Global Polio Eradication Initiative. Guidelines on environmental surveillance for detection of poliovirus. Geneva: World Health Organization; 2015.

http://polioeradication.org/wpcontent/uploads/2016/07/GPLN_GuidelinesES_April2015.pdf

sample transport to the laboratory, particularly if this is outside the country; lab procedures and capacity building of staff; data management and reporting of results; and training and quality assurance.

6.4 Selection of areas where ES will be used

Selection of specific areas for locating environmental surveillance sites should be based on the country's polio risk profile and the epidemiological situation. Sites should be in areas where they are most likely to complement and strengthen overall poliovirus surveillance efforts. Optimal areas in-country can be identified by mapping vulnerable populations and geographic areas that either pose a risk for poliovirus circulation or present an opportunity for gaining access to previously inaccessible and highly mobile communities.

Examples of selection criteria include:

- Areas with populations at epidemiologic risk for poliovirus circulation (history of WPV or VDPV or a shared border with areas or countries with recent endemic or outbreak transmission).
- Areas with suspected immunity gaps due to inadequate access to vaccination (i.e., minorities, temporary workers, undocumented migrants) or high numbers of vaccination refusals.
- Camps and host communities for refugees or IDPs, especially if they are fleeing from areas with a current or recent history of poliovirus circulation. Communities with suboptimal access to sanitation and health care, such as slums, illegal urban or peri-urban developments, and areas with a high proportion of minoritized groups.
- Areas with suboptimal AFP surveillance indicators and areas with "orphan viruses", i.e. poliovirus isolates with genetic characteristics which indicate that the virus strain has been circulating undetected for a prolonged time.
- Hubs for transportation, commerce, or large gatherings (i.e., festivals, markets and pilgrimage sites) with presence of women and infants.

6.5 Selection of ES sampling sites

Once areas of epidemiological interest have been selected within the country, field visits will be necessary to identify sampling sites, or sampling points, within these areas, where the collection of ES samples will be both feasible, cost-effective, and likely to detect polioviruses, should these be circulating in the area.

When identifying a sampling site, the national programme should consult with both local sanitary engineers and epidemiological experts who can assist in evaluating sewer and wastewater systems in the area and provide information about the size and type of populations and the catchment areas drained by the particular site.

Catchment population: The number of people living in the catchment area drained by an ES site affects the sensitivity of poliovirus detection in a population. In general, a catchment population of ~100 000 to 300 000 individuals for a sampling site is recommended as the optimal size to allow isolation of poliovirus if it is circulating in the population.

If sewage network maps are not available, collecting GPS (global positioning system) coordinates along the wastewater ways will allow the creation of "blue line maps" using specific computer software to get an estimate of the catchment population for a specific sampling point.

Type of sewer system:

- **Closed, converging sewer networks** which connect to household water closets, and which drain into wastewater treatment plants, are optimal for systematic ES. The best location for sampling sites is the inlet closest to the entry into the wastewater treatment plant, where the wastewater containing human faecal material from a larger population can be caught before being treated.
- **Open canals or water channels** carrying wastewater may be the choice for establishing ES sites which are available in developing countries. Main disadvantage of sites is that a sample is unlikely to be representative of a large catchment area population, compared to a sample collected downstream from a converging sewage system. Therefore, when open canals or channels, it is even important to conduct a thorough mapping of the size and type of the population upstream from the potential ES sampling site.

Selecting ES sites:

Choose areas based on Epi and risk profile and assess suitability of a site in the area, optimally an area:

 - With converging sewer networks
 - Downstream from flowing water and sewage
 - Away from industrial sites
 - With assured regular flow
 - Which is easily accessible, without physical barriers
- Selection of sites should be done in collaboration with local sewer engineers to detect blockages of wastewater lines that may exclude segments of the catchment population as well as to identify potential sources of toxic waste entering the sewage canal, which may decrease the chance to detect entero- and polioviruses in the wastewater. The usefulness of such sites will need to be carefully monitored (i.e. % of samples yielding enteroviruses)
- In areas where human waste is disposed into **latrines, septic tanks or open fields** without a convergent system, environmental sampling is not recommended because the number of individuals disposing of waste in a certain spot is too small.

Impact of toxic substances and compounds:

Several kinds of biological and chemical substances and compounds can reduce the survival of entero- and polioviruses in a wastewater sample. Before selecting a sampling site, points should be identified where potentially toxic substances and compounds may enter the sewage canal or channel, upstream from the site being considered. Such sites should not be selected.

Color and odor of wastewater at the sampling site may indicate the presence of toxic materials. In cases where wastewater canals or channels are located near agricultural or industrial activities (such as dairy farms, factories, garages or cloth dyeing sites), the sampling point should be moved up-stream, even without active observation of toxic waste in the canal during the exploration.

Accessibility:

- it is also important to assess the overall accessibility of a candidate site, including the requirements for logistics and transportation, as collectors will need to walk and stand in public areas for 30 minutes to complete procedures.
- In areas that are inaccessible for part of the year because of flooding, snow or other seasonal considerations, sites should not be established on a permanent basis, but only as ad-hoc or temporary environmental sites, in specific situations, such as to enhance surveillance sensitivity during outbreak response.

- Areas affected by active conflict or other situations which might threaten the safety of ES workers should be avoided.

6.6 Establishing a schedule of ES sample collection

For each selected ES site, the optimal time during the day when samples should be collected is decided after discussion with local sanitary engineers and following on-site observation of the wastewater flow at the sampling point at different times of the day during the initial assessment. The sampling schedule must also be discussed with and agreed upon by the poliovirus laboratory receiving the ES samples

- **Collection date:** collection days, and dates, should be scheduled to make the most efficient use of transportation and laboratory resources. For example, samples from several sites can be collected on the same day or consecutive days to send samples to the laboratory in batches, in order to reduce shipment cost. Coordination of collection and shipment schedules with the receiving poliovirus lab is important to allow the laboratory to optimize the lab's workflow, and to avoid any delays in testing and reporting.
- **Optimal time of day for collection:** Generally, samples collected during the early morning hours (e.g., the time of peak toilet usage, such as 06:30–08:30 am) are more likely to detect poliovirus. The exact timing of the peak sewage flow through a sampling time will vary depending on the distance from the sampling point to the catchment population and the slope of the waterways.
- **Sampling frequency:** The minimum sampling frequency is monthly for routine sites. The decision to increase sampling frequency (i.e., from once to twice monthly) needs to balance the potential enhancement in sensitivity or timeliness of detection with the increase in workload for the laboratory.

In any site, sample collection should be monthly (or bi-weekly, under certain conditions)

Pooled or composite samples: 24-hour pooled or composite samples made from aliquots collected several times a day are ideal and will be optimally representative for the drained catchment area. However, this sampling method is expensive and only feasible with a converging sewage system. It is usually not feasible to use this method where sampling is conducted from open, publicly accessible sewage canals.

6.7 Capacity building and required resources for ES

The country polio programme should ensure that personnel involved in field ES activities are well-trained and equipped and that sufficient supportive supervision is provided.

- **Training:** all staff involved in ES sample collection need to be well-trained. GPEI ES guidelines and advice from the WHO AFRO Regional Polio Laboratory Coordinator should be followed when training sample collectors on specific collection procedures. Sample collection and transport should be done using the appropriate standardized collection material which is supplied by WHO. Usually, one main sample collector and one backup staff are trained for each site to ensure continuity of sample collection even when the main sample collector is not available.
- **Supplies:** Collectors should have access to all re-usable and disposable supplies needed for collection, as per the table below. Prior to going to a collection site, it is the responsibility of collectors to ensure all required supplies are available, including cold chain materials. Samples must be placed into cold chain containers immediately upon collection, and the 'reverse cold chain' must be always maintained until arrival of the container in the laboratory.

Reusable

Disposable

| | |
|---|---|
| <ul style="list-style-type: none"> ✓ 5-litre bucket ✓ Rope or stick (~7 metre) ✓ Plastic funnel ✓ Rubber boots and thick rubber boots ✓ Permanent marker ✓ Pen ✓ Phone with ODK software installed (as relevant) ✓ Dedicated vaccine carrier (marked for transport of environmental samples only) | <ul style="list-style-type: none"> ✓ Personal protective equipment (PPE): surgical mask or respirator, disposable gloves, gown or apron ✓ Liquid bleach, water and gauze or paper towels to clean supplies ✓ Robust liquid container (1-1.5 litres) ✓ Parafilm tape ✓ Prefilled labels (with bar code, if available) ✓ Plastic bags or small zippered bags for paper forms, large bags for samples ✓ Frozen ice packs inside the dedicated vaccine carrier (both ice packs and vaccine carrier should be used for ES only) |
|---|---|

6.8 ES sample collection, packaging, and transport to the laboratory

The ES sample collection currently recommended by the WHO is referred to as 'grab sampling'. With grab sampling, a sample of at least one litre (1L) of wastewater is collected. This sample of 1L will usually be concentrated into ~20 mL (i.e., 50 to 100-fold concentration) in the laboratory. Collecting samples via a so-called 'bag-mediated filtration system' (BMFS) is an alternative collection method accepted by the WHO and used by several countries.

During ES sample collection, collectors need to be aware of all technical guidance regarding sample location, midstream sampling, and environmental conditions that may impact sampling.

- **Sampling location:** Samples should always be collected at the same "sampling point" decided during the site's initial field assessment.
 - If there are changes in accessibility within a few metres from the initial sampling point, such a change is acceptable only if it does not involve losing or adding any branch / inflow into the sewage canal or channel.
 - If the actual sampling point is shifted more than 50 metres away from the initial sampling point, or if the change involves a loss or gain of convergent branches in the catchment population, the collector must consult with the supervisor and surveillance focal person before making the change. These more drastic changes in location of the actual sampling point may be required because of construction or the appearance of toxicity.
 - Once the change is approved, notification should be made in the database.
- **Midstream sampling:** samples should be collected midstream, i.e. from the middle of the flowing sewage. Depending on the width and depth of the canal, sewage inlet or manhole, the collector may need to use a rope attached to a bucket or attach the collection container to a long handle.
 - Avoid the bottom of the canal, where a large amount of solid debris and potentially toxic compounds may inadvertently be included in the sample.
 - Avoid places where the flow is very slow or non-existent because of debris accumulation, and avoid collection at other than the agreed upon time of day, which may risk missing the peak flow associated with high toilet use.
- **Environmental conditions:** the following conditions should be avoided for sample collection:
 - Generally, avoid sample collection during heavy rains. Delay collecting samples by one or two days in heavy rain to ensure personal safety, protect equipment and to avoid diluted samples. Collection of the monthly ES sample should only be canceled altogether if a critical situation,

such as flooding, earthquake or other safety concern, prevents access for a period greater than one to two weeks. The laboratory should be informed of these changed circumstances.

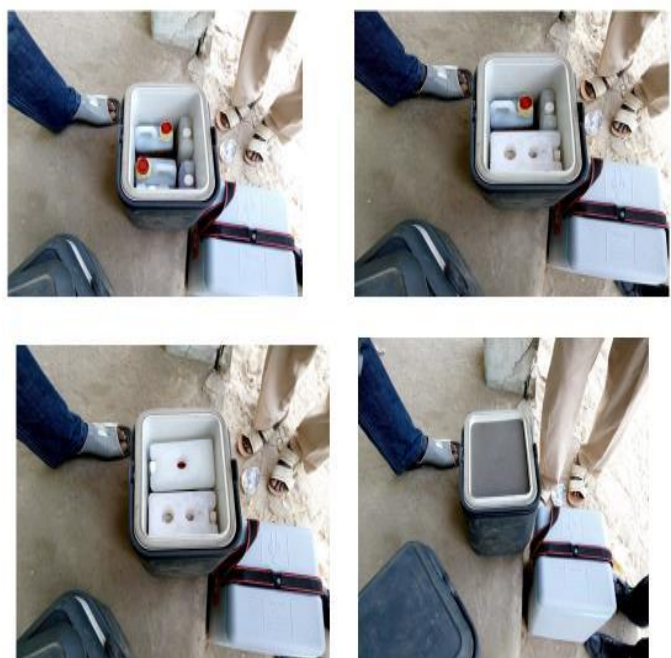
- In cases where the smell of the wastewater and its color or other signs suggest the presence of potentially toxic substances at the sampling point, contact the supervisor to record this observation.
- If the assumed toxicity appears to become permanent, the possibility of changing the sampling point or time of collection should be explored. Any change in sampling location and timing should be communicated in order to update the ES database.

- **Environmental sample collection and laboratory request form**

- For each sampling visit, the collector uses a form to record information regarding sample characteristics and collection details. Programmes may opt to use separate collection and laboratory request forms or incorporate into a single data collection and reporting mechanism (See Form XX in Annex XX.).
- Bar coding may be used to track samples. If the programme uses an electronic form to document sample collection, such as the open data kit (ODK) software for cell phones, the data should be made available to the focal person and laboratory staff.

- **Packaging ES samples**

- Environmental samples should be carefully packaged before transporting and shipment in order to prevent contamination and to ensure live enteroviruses within the sample are preserved for laboratory testing.
- *Dedicated containers:* environmental samples should be transported to the laboratory in dedicated, robust liquid or sample containers that are packed following the “triple packing” system for biological products or diagnostic specimens. AFP specimens and environmental samples should have separate cold chain transport containers which are appropriately labelled.



- **Transporting samples & reverse cold chain:** samples should be shipped and maintained so they arrive in the laboratory intact for testing, without the appearance of toxicity or bacterial overgrowth, and with all enteroviruses preserved.
 - *Rapid transport:* Transportation to the laboratory should be accomplished within three (3) days of collection. For samples requiring international shipment, seven (7) days between collection and arrival to the laboratory is acceptable.
 - *Reverse cold chain:* If samples cannot be shipped to the laboratory on the same day, they should be maintained in a refrigerator at 4°C (range: 2°–8°C). In cases where samples will not be shipped immediately, samples should be stored at -20°C in a freezer and shipped frozen.
- **Transport logistics:** field and laboratory staff should coordinate ES sampling to minimize transportation logistics and avoid delays in testing.
 - **Required logistics:** it is important to identify all necessary logistics (means and routes of transportation, and required couriers), with focal persons identified at each stage.
 - **Budget:** the programme should budget transportation costs based upon the expected number of ES samples per month from each site.
 - **Permits:** if international shipment to another country is planned, identify the process required to obtain import permits from the country and the International Air Transport Association (IATA).
 - **Contracts:** ensure that contracts with transport courier companies include awareness and acceptance of the transportation of sewage sample conditions.

Sewage samples (ES samples) should not be stored in the same refrigerator as clinical samples for AFP or any other disease because of the high risk of contamination

6.9 Environmental surveillance lab results and their interpretation

The results of environmental sample testing should be reported by the laboratory and immediately uploaded to the regional and global polio database. Environmental samples often contain mixtures of enteroviruses (i.e. non-polio enteroviruses, as well as SABIN or VDPV polioviruses) and extra steps may be required in the laboratory for virus typing and sequencing. Laboratories may therefore require more time to release final results, compared to for AFP stool specimens.

The WHO-accredited laboratory should ensure results are shared with the national programme in a timely and comprehensive manner and provide support for the interpretation of laboratory findings and their significance.

The following are key points to consider in interpreting ES results:

- **Positive results** indicate viral excretion by one or more individuals, but it is difficult to pinpoint the exact source of virus - the person(s) excreting cannot be identified.
- **Negative results** do not rule out poliovirus circulation in the area, since virus transmission may be very low-level, and excretion by infected individuals may be ongoing in an area not drained by currently established ES sites.
- **Repeated sampling** increases the probability that existing low-level poliovirus transmission may be detected.

- **Significance of detecting non-polio enteroviruses (NPEV):** even without detection of poliovirus, a considerable proportion (at least 50%) of ES samples should at least yield other non-polio enteroviruses (NPEV).

Repeated, persistent results negative for *any enterovirus* (i.e., neither poliovirus nor NPEV) should prompt a review to check:

- whether the ES site was appropriately selected,
 - if ES specimens are transported timely to the lab under proper 'reverse cold chain' conditions (i.e. in carrier boxes with ice packs, at 5 to 8 degrees C), and
 - the quality of laboratory procedures.
- **ES results need careful interpretation:** ES results reflect the situation only in the geographic scope of the population catchment area drained by the ES site; results should be interpreted with care.

6.10 Supervision, monitoring and evaluation of ES for poliovirus

- **Supervision of environmental surveillance:**
 - Is of utmost importance to ensure that all steps involved in ES sample collection and transport follow established guidelines and procedures, and that ES field activities should be regularly monitored. Trained supervisors should accompany sample collectors, in order to provide supportive supervision by identifying and correcting any issues observed during the collection, packaging and transport of environmental samples.
 - National programs should ensure and document on a quarterly basis that on-site field supervision was provided for at least 80% of sample collections, at each ES sampling site.
 - A monitoring tool for evaluating site performance is available in Annex 6 of the [ES Field Guidance document](#).
- **Monitoring and evaluation of ES**
 - Continued monitoring and evaluation of the performance of ES, including the use of site-specific process monitoring indicators and lab-specific monitoring indicators, is important to assure that data from ES is reliable and provides programmatically relevant results. Core indicators to monitor ES can be found in the [Global Polio Surveillance Action Plan \(GPSAP, 2022-2024\), Annex 3, Table E5](#).
 - The GPEI has published detailed relevant ES monitoring guidelines. A useful summary of these can be found under Section 3 of the ["FIELD GUIDANCE for the Implementation of Environmental Surveillance for Poliovirus"](#) referenced earlier. In addition, the Global Polio Surveillance Action Plan (GPSAP, 2022-2024) recommends quarterly ES desk reviews for countries and regions and biannual desk reviews at global level.
 - While each country may develop their own ES data operations, AFRO recommends that countries should be collecting a set of standard ES variables, utilizing a standardized reporting flow. Annex 6 of the above-mentioned ES Field Guidance document contains several WHO-recommended forms and checklists to facilitate the identification and registration of environmental sites and to assist with the collection and sharing of sample data and results.

6.11 Closing a non-performing ES site

If a site does not 'perform', i.e. does not meet the expected level of quality indicators, or where the network of ES sites in a country needs to be optimized, a decision may need to be taken to close a site.

A decision to discontinue the use of an established ES site should only be made after a thorough investigation and discussion between all groups concerned, including the WHO regional office polio team.

- **Criteria for closing a sampling site:**

- *The site may no longer meet programme needs:* country- or city-specific risk-assessment strongly suggested that the risk profile has changed, and the ES site no longer represents a catchment population considered at-risk.
- *Prioritization:* There is higher risk elsewhere in the country
- *Limitations in ES sample laboratory processing capacity* may require rationalization of the ES network.
- *The sampling site shows poor performance for at least six consecutive months*, with no cause identified or with no improvement in performance after corrective actions have been implemented.

- **Decision making process for closing a site:**

- The national programme *documents the need to close* one or several sampling sites, include rationale and timeline in coordination with WHO CO and share with the WHO RO and (as needed) WHO headquarters.
- *GPEI advice may be requested* and recommendations will be sent back to the country within a week. A site opened in response to an outbreak should be closed in consultation with the lead of the outbreak response.
- WHO (country office team, in coordination with regional office and HQ) informs all stakeholders about the decision through a *short summary report*.
- The site data form (electronic, paper-based) is updated to reflect the new status in the environmental site database.

6.12 Main challenges to conduct ES

Key challenges and issues to anticipate with ES implementation include the following:

- *Difficulties in finding appropriate sampling sites* - i.e., a system of convergent or confluent sewage system is not available, and the only option is collecting ES samples from open sewers.
- *Cost of sampling, sample transport, and of lab processing.* Financial resources for polio surveillance are diminishing. Hence, the programme need to explore collaboration with other programmes to ensure the long-term sustainability of ES for poliovirus.
- *Logistic problems* in specimen collection, including maintenance of the reverse cold chain and transportation of ES samples (1-liter specimens).
- *Limited access* to sites for regular sewage collection in hard-to-reach, inaccessible areas.
- *Lack of compliance with ES guidelines and SOPs*, despite of documented low site performance.
- The volume of ES samples from poorly performing sites burdens laboratories, wastes resources, and contributes to a false sense of security, since continued negative results are wrongly interpreted as 'no virus is circulating'.
- *Insufficient coordination and feedback* between surveillance and laboratory teams.

7 Role of the poliovirus laboratory

Laboratory testing of stool specimens from AFP cases or healthy contacts, and of environmental samples, is the most important surveillance component required to set up surveillance that is sufficiently sensitive for poliovirus detection in the polio eradication program. While the laboratory component is critically important, making best use of lab results will depend on effective collaboration between clinicians, epidemiologists, immunization programs and polio laboratories at the national, regional and the global levels.

7.1 African Regional and Global Polio Laboratory Networks

The WHO Regional and Global Polio Laboratory Networks (GPLN) were established by WHO to ensure that high-quality diagnostic services are available to polio programs in all countries. At the global level, over 220 000 stool samples from AFP cases and their contacts and more than 12 000 sewage samples are processed every year. In 2022, 87483 stool samples from AFP cases and their contacts and 8978 sewage samples were processed by the African Regional Polio Laboratory Network. These figures have been rising since 2020 due mainly to increasing outbreaks of cVDPVs and extension of environmental surveillance in the region.

As of 2022, the global network consists of 146 WHO-accredited polio laboratories in 92 countries across six WHO regions (Fig. 9). Of these, 123 are national or subnational level laboratories, 17 are regional reference laboratories, and 6 are global specialized laboratories. The African polio network consists of 16 polio laboratories (NPLs), across 15 countries. Of these, 13 are national level labs and three are regional reference laboratories.

To be included in the network, laboratories must have the proven capability and capacity to reliably and timely detect, identify and promptly report WPVs and VDPVs that may be present in clinical and environmental specimens. Likewise, the program must be able to rely on negative results from a laboratory, i.e. 'no virus isolated', as evidence that an area or country is polio-free.

Accreditation by WHO means that the polio laboratories conform to common standards, or codes of practice, of the WHO GPLN, for detecting and characterizing polioviruses from stool specimens and sewage samples. The accuracy and quality of testing of each lab is monitored by WHO through an annual accreditation program that includes onsite reviews of infrastructure, equipment, standard operating procedures (SOPs), work practices, and performance, as well as external proficiency testing.

Depending on their degree of specialization, roles of global polio network laboratories include to:

- detect poliovirus from stool specimens and sewage samples by isolation, using cell culture;
- identify and differentiate wild from vaccine or vaccine-derived polioviruses, using intratypic differentiation (ITD);
- genetically characterize polioviruses, using sequencing methods, which also determine whether isolated viruses are wild, vaccine-like or vaccine-derived;
- rapidly trace the geographic origin of new polioviruses isolated from AFP cases, contacts or from sewage samples, by comparing the genetic sequence of isolated viruses using a reference bank of virus nucleotide sequences.

7.2 Coordination between field and laboratory surveillance

Polio field and laboratory surveillance teams cooperate closely to:

- ensure that the laboratory is notified in advance of the shipment of stool specimens, and that the newly issued AFP case EPID-number is inserted into the lab request form;

- ensure that the laboratory provides feedback on the condition of stool specimens on arrival in the lab, particularly if there is a need to repeat specimen collection;
- ensure laboratories receive timely notice of any field surveillance activities affecting laboratory workload and testing capacity, such as additional sampling of contacts or healthy children, such as during the early phase of a new outbreak;
- regularly share all available data to ensure the accuracy of case details (e.g., EPID numbers), with corrective action taken when there are problems;
- mutually share epidemiological findings, laboratory and genomic sequence results, and final case classification; and
- reduce the period *between the identification of an AFP case and final laboratory results* so new virus-positive cases can be responded to as swiftly as possible. For a more detailed discussion of possible delays between AFP case detection and final laboratory results, please also consult [Annex 8](#).

Key timeliness indicators to monitor in relation to specimen transport and laboratory testing are:

- the duration of specimen transport from the field to the lab: ≥80% of stool specimens should arrive at a WHO-accredited polio laboratory under reverse cold chain conditions within three (3) days of collection of the second stool specimen collection, and
- the time between receipt of specimens in the laboratory and sharing final laboratory results. For at least 80% of case or environmental specimens, this interval should not be longer than 21 days.

7.3 Possible laboratory results

Table 7 shows the possible laboratory results which polio labs may communicate. These include:

- OPV-like, Sabin-like (SL), or nOPV2-like, i.e. the virus isolate is a vaccine-like virus (OPV, or nOPV2)
- WPV - wild poliovirus,
- VDPV - vaccine-derived poliovirus,
- NPEV - non-polio enterovirus, other viruses (non-enteroviruses, or NEV) or
- no virus isolated (NVI).

Table 7: Possible polio laboratory results - testing of stool and environmental samples

| Lab results | Type of virus | Reported as |
|--|--|--|
| OPV-like or Sabin-like (SL), or nOPV2-like | Vaccine strain poliovirus type 1, 2 or 3 | SL1, SL2, SL3, nOPV-like |
| Wild poliovirus | Wild poliovirus type 1, 2 or 3 | WPV1, WPV2, and WPV3 |
| Vaccine-derived poliovirus | Vaccine-derived poliovirus type 1, 2 or 3, further classified as: <ul style="list-style-type: none"> • circulating VDPVs (cVDPVs) • immunodeficiency-associated VDPVs (iVDPVs) • ambiguous VDPV (aVDPV) | VDPV1, VDPV2, VDPV3, further reported as: <ul style="list-style-type: none"> • cVDPV1, cVDPV2, cVDPV3 • iVDPV1, iVDPV2, iVDPV3 • aVDPV1, aVDPV2, aVDPV3 |

| | | |
|--------------------------------|---|---------------|
| | This is done by combining laboratory results with epidemiological and clinical information. * For nOPV2, specific terminology will be used when sufficient data will be gathered | |
| Non-polio enteroviruses | Non-polio enteroviruses | NPEV or NPENT |
| Non-enteroviruses | Non- enteroviruses | NEV |
| No virus isolated | No virus isolated | NVI |

aVDPV = ambiguous vaccine-derived poliovirus; cVDPV = circulating vaccine-derived poliovirus (types 1,2,3); iVDPV = immunodeficiency-associated vaccine derived poliovirus (types 1,2,3); NEV = non-enterovirus; nOPV = novel oral polio vaccine; nOPV2 = novel oral polio vaccine type 2; NPENT = non-polio enterovirus; NPEV = non-polio enterovirus; NVI = no virus isolated; OPV = oral polio vaccine; SL = Sabin-like (types 1,2,3); VDPV = vaccine-derived poliovirus (types 1,2,3); WPV = wild poliovirus (types 1,2,3)

7.4 Monitoring laboratory timeliness

The timeliness of the work done in GPLN member laboratories is routinely measured, with the following indicators and their targets for stool specimen processing. Note that the target intervals for lab timeliness which laboratories should reach, differ depending on whether or not the specimen derives from a country which already uses a newly introduced laboratory method called 'direct detection'. Direct detection significantly shortens the time needed until a final lab result is available.

- ≥80% of specimens with final results available within 21 days of receipt from a direct detection country OR within 28 days of receipt from a non-direct detection country at a WHO-accredited polio laboratory.
- ≥80% of specimens with WPV/VDPV final results available within 21 days of receipt from a direct detection country OR within 28 days of receipt from a non-direct detection country at a WHO-accredited polio laboratory.
- ≥80% of poliovirus specimens with sequencing results available within 7 days of receipt of isolate at a WHO-accredited Polio sequencing laboratory.

The overall target and indicator for the timeliness of obtaining final laboratory results (interval from paralysis onset to specimen testing and result) for priority countries is:

- ≥80% of WPVs and VDPVs reporting final laboratory results within 35 days of AFP case onset of paralysis.

8 Polio surveillance support functions and logistics

Several important support functions need to be established and well-implemented in order For AFP and poliovirus surveillance to reach the required levels of sensitivity. These functions include:

- **planning** for surveillance activities,
- using **social mobilization** and communication to create awareness among health workers and in communities of the AFP concept and the need to report AFP cases,
- creating **effective communication** networks between all polio surveillance stakeholders,
- **building and maintaining a skilled workforce**, through a program of ongoing **training and sensitization** on AFP and PV surveillance for health workers and community focal points,

- **supportive supervision** of surveillance staff in the field, and
- assuring that all required **surveillance logistics**, particular transportation for active surveillance and case investigation visits, and all required material and logistics for specimen collection and transport, is readily available when and where needed.

8.1. Polio surveillance planning

AFP surveillance activities must be carefully planned. Planning needs to take into account the results and recommendations of risk assessment analysis, surveillance audits, as well as of desk and field reviews. Surveillance planning should become part of the overall EPI / polio eradication workplan, which should include a specific surveillance budget line to make sure all financial and human resources needs for surveillance can be met.

Surveillance plans must be re-assessed regularly, such as during yearly or half-yearly audits, to track progress in implementing and improving core surveillance activities, and to take appropriate action to address identified quality gaps and obstacles.

8.2. Sensitization and social mobilization for surveillance

Both in polio-free and especially in outbreak-affected countries, surveillance teams need to maintain a continued program of raising awareness and sensitization on the AFP concept and the need to report AFP cases, both among health workers in the formal and informal health systems, as well as at the community level.

Any opportunity should be used for sensitization, focusing on staff in hospitals and other health facilities, but also including other stakeholders in medical associations, community organizations and NGOs, pharmacies, as well as teachers and religious leaders.

Such opportunities arise during active surveillance visits in hospitals and clinics, in waiting rooms at these facilities, or during events at the community level. AFP awareness is particularly important among medical doctors, and the surveillance team needs to develop a good relationship with leading doctors and physicians, particularly pediatricians and neurologists. These senior doctors should ideally be recruited as 'ambassadors' for AFP surveillance to promote AFP surveillance and lead brief seminars on polio eradication and AFP surveillance, including at meetings of their own professional associations.

Ongoing sensitization of clinicians on the difference between AFP and poliomyelitis. In this context, it is important to remember that most clinicians, but especially the highly specialized experts, initially find it difficult to understand the syndromic AFP surveillance concept. While they are very willing to help with AFP surveillance, they often do not immediately understand or accept the need to report AFP as a syndrome, independent of the current diagnosis, rather than to report 'polio cases'. During the sensitization sessions, clinicians should therefore be reminded of the difference between reporting 'polio cases' in the past and the reporting of children with AFP, a syndrome, not a diagnosis, in the context of global eradication.

At the community level, particularly in hard-to-reach or security-compromised areas where community-based surveillance is the surveillance method of choice, surveillance teams should identify local leaders, including teachers and religious leaders, who should be trained to understand the AFP concept and AFP reporting requirement. These local leaders should, in turn, work with families and communities, using local language and respecting local customs, to make sure they report any child with acute onset weakness or paralysis.

Messages to convey at the community level should be as simple as possible. For example, the standard AFP case definition might be simplified to say, in the local language:

"Please report any child under 15 years of age with sudden weakness of one or more arm or leg to the nearest health center. The weakness should have started recently, not long ago".

8.3 Communication for surveillance

A good communications system is vital for the effective implementation of AFP surveillance. MoH surveillance staff have to be able to communicate reliably and quickly amongst each other, as well as with the operational level of AFP and PV surveillance, i.e. with health facilities and health workers in the field, with polio laboratories, and with WHO teams at the local, national, or regional office level.

The widespread use of internet-ready smartphones for disease surveillance purposes has been a near-revolution for communicating in public health and surveillance networks. Direct voice communication, as well as email and data transfer over the internet using simple data collection and uploading programs, has proved invaluable for polio eradication teams, particularly in the WHO African Region.

Mobile phone networks, including data networks, are now available in all countries of the African Region. The use of mobile phones facilitates cleaner, timelier and more reliable data capture and transfer, and increases the scope and speed of communication between surveillance officers and the healthcare network. These new technologies have also greatly helped to improve surveillance processes, through aiding monitoring and supervision, and by better locating populations (see also [chapter 5, section 3](#) above).

8.4 Building and maintaining a skilled workforce

The quality of AFP surveillance depends heavily on trained, skilled field health workers. No health workers should be made responsible for AFP surveillance unless they have been properly trained in the core AFP surveillance activities.

A training package on AFP surveillance is available online.

[Download it here](#)

To ensure that all staff working on AFP and PV surveillance have up-to-date technical and interpersonal skills, program administrators should work together with surveillance supervisors and managers to select, train, and support an effective and motivated surveillance workforce.

1. *Staff selection*: The selection of surveillance officers, supervisors, routine surveillance focal points and community-based surveillance (CBS) informants should be based on a candidate's ability to perform the role, as well as their potential for development. Gender balance and appropriateness to culture and norms should be prioritized and upheld for all roles.
2. *Capacity building through training*: While capacity building is a larger function that represents a shared responsibility between managers and staff, it is fundamentally rooted in training. All surveillance staff should be equipped with an initial 'induction' training. Regular refresher training, as well as advanced formal training, either in-person or virtually, should be offered at least every two years.
3. *Maintaining performance*: Managers should follow through on training and capacity building to make sure field staff are supported in their roles – so their skills are applied and further developed.

8.5 Supportive supervision

AFP surveillance activities must be monitored and supervised to ensure the system remains highly sensitive. Such continuous supervision should follow a predefined plan, using checklists for staff performance and including staff feedback and follow-up on potential corrective actions. At all levels, supervisory visits and any other visit to the sites should be documented and written, constructive feedback should be provided (i.e. using the facilities' supervisory book) .

Supportive supervision visits for provincial and district surveillance teams should not come across as 'inspections', or focus on fault-finding, but emphasize sensitization, training, problem-solving and two-way communication.

One-on-one mentoring helps to build field staff capacity and confidence. As part of their mentoring and monitoring roles, supervisors should regularly accompany field staff during active surveillance (AS) visits and case investigations, and use the opportunity for ad-hoc, one-on-one mentoring.

Managers should hold *review meetings* – both regular (ideally quarterly) group review meetings and one-on-one personal reviews – to discuss staff performance, provide updates, and set objectives and goals.

Ways to improve supportive supervision

- Include regular (monthly or at least quarterly) supervisory visits in workplans and plan for them as a recurring, funded cost.
- Observe staff in the field by accompanying them on a AS visit to a high-priority large hospital.
- Structure visits by sharing objectives, following up on previous recommendations, and preparing updates or refresher training.
- Identify gaps and help to solve problems, using positive feedback in public and performance tips in private conversation.
- Openly discuss findings and recommendations.

8.6 Logistics for surveillance

Conducting high quality AFP and poliovirus surveillance requires considerable logistical support, particularly in countries of the African Region where resources are often limited. In providing that support, MoH logisticians will usually be supported by their counterparts working as logisticians in the country's UNICEF and WHO offices.

Main areas for which the direct involvement of experienced logisticians is needed, but for which surveillance officers should also be trained and sensitized, are the following:

- a) **transportation** - ensuring that vehicles are available when and where they are needed by field surveillance officers for active surveillance or case investigations, as well as for transport of stool specimens to the laboratory, i.e. coordination with mail or courier services; in large countries, experts in vehicle fleet management and vehicle maintenance are needed, as is expert support in arranging frequent domestic and occasional international air transport, both for staff and for specimen transport;
- b) **materials needed for stool collection and transport** - making sure that stool collection kits, specimen carriers, ice packs and temperature monitoring devices are available where and when they are needed - allowing to maintain an intact 'reverse cold chain' for specimen transport;
- c) for countries with a **polio laboratory, logistical expertise** is needed to assist the laboratory to ensure that laboratory materials, including consumables, reagents etc., are procured and available at the right time in the right quantities; laboratories also need support in arranging national and international transport of stool and environmental specimens and of poliovirus isolates;
- c) **communication and data management** - enabling the surveillance team to have the capacity for voice and data communication - whether through provision of mobile phones or through

reimbursing the use of private devices; in larger countries, expert help is needed to purchase and maintain computer and other digital equipment (i.e. GIS devices)

Main tasks for logisticians related to AFP and poliovirus surveillance are to make sure that a) transport is available where and when it is needed, and that b) supplies are procured and available

'in the right quantities, right conditions, in the right place, at the right time and right cost'

To accomplish this, the logistics officer, closely coordinating with other program managers, must make sure that the logistics aspects of surveillance are sufficiently considered in planning and budgeting surveillance and also during training of surveillance staff, and that all necessary resources - supplies and equipment - are procured in time and maintained.

Main surveillance-related *equipment* to be procured and managed by the logistician include:

- laboratory equipment, specimen carriers, refrigerators/freezers, vehicles, motor bikes, bicycles, boats etc., computer and other digital equipment, communications equipment, etc.

Surveillance related *supplies* include:

- laboratory consumables, stool specimen kits, specimen shipping bags, fuel, maintenance of computers and communication equipment, printing and distribution of standard surveillance forms, production and distribution of social mobilization materials for surveillance, etc.

9 AFP and poliovirus surveillance in outbreak settings

Sensitive surveillance for AFP and poliovirus is critically important for the timely detection of and response to polio outbreaks following the importation of wild or vaccine-derived poliovirus or emergence of cVDPV. Surveillance is a critically important outbreak response strategy. As outlined in the GPEIs Standard Operating Procedures for responding to a poliovirus event or outbreak¹⁶, all countries affected by polio outbreaks should assure that surveillance is rapidly strengthened to be sufficiently robust and sensitive so that progress towards interrupting and eventually 'closing' the outbreak can be reliably monitored.

As soon as the outbreak is laboratory-confirmed, a rapid risk assessment, including the analysis of surveillance and immunization data, will be conducted to determine the type and scope of the required large-scale immunization response. In most newly detected polio outbreaks, only relatively small sub-national areas appear to be affected initially. However, the outbreak virus is likely to already be circulating widely and spreading rapidly, and the full extent of transmission may not yet be detected because of weak surveillance. MOH and GPEI should develop a joint vaccination and surveillance strengthening plan and budget to guide outbreak response activities.

Therefore, surveillance strengthening and enhancement, as rapidly as possible, is an integral part of outbreak response activities. The following summarizes current globally recommended polio surveillance activities (AFP, environmental, and laboratory) to achieve the required sensitivity. In addition to specifying the scope of the immunization response, national and subnational outbreak response plans should contain detailed sections on how to strengthen surveillance in order to address identified gaps in surveillance quality, and to achieve a high level of sensitivity. Technical and financial resources needed to implement activities, including dedicated surveillance staff at all levels, should be identified and also included in outbreak response plans.

Outbreaks cannot be considered closed, i.e. one cannot assume that transmission is interrupted, if the polio surveillance system is not sufficiently sensitive. Surveillance teams at all levels should be prepared

¹⁶ Standard Operating Procedures for Responding to a Poliovirus Event or Outbreak. WHO, 2022.

<https://polioeradication.org/wp-content/uploads/2022/09/Standard-Operating-Procedures-For-Responding-to-a-Poliovirus-Event-Or-Outbreak-20220905-V4-EN.pdf>

to provide a comprehensive summary of surveillance performance as part of the GPEI's Outbreak Response Assessments (OBRA, also see [Chapter 5.6](#)). OBRAs assess whether vaccination and surveillance activities are robust enough to stop transmission and to provide evidence to reliably document progress. If an OBRA finds that an outbreak cannot yet be considered as interrupted, further activities will be identified and recommended to address remaining gaps towards interrupting transmission of the outbreak virus.

9.1 Enhancing AFP surveillance

Many polio outbreaks, whether due to importations of poliovirus or emergence of cVDPV, occur in countries which have been polio-free for prolonged periods, where the quality of AFP and poliovirus surveillance activities has often decreased over time. Extra efforts, considerably beyond the routine maintenance of surveillance, are needed to *rapidly increase* surveillance sensitivity.

The following are key recommended steps that should be taken to enhance and strengthen AFP surveillance once an outbreak has been confirmed. Readers can find additional details in a special WHO resource on this topic: [Quick Reference on Strengthening Polio Surveillance during a Poliovirus Outbreak](#).

a) Immediate notification of surveillance and lab personnel. As soon as the outbreak is confirmed by the laboratory, personnel at all levels must be informed to avoid any delays in starting outbreak response activities. Informal communication may be necessary until a formal communication can be made. The notification should include to remind personnel of the importance to rapidly enhance all surveillance activities, including to conduct regular active and passive surveillance (and zero-reporting), and to review surveillance quality data and indicators, in order to identify and address surveillance quality gaps.

b) Increasing the annualized target non-polio AFP rate to > 3 per 100,000 children <15 years in outbreak-affected and polio high-risk areas, or in the entire country (depending on the size of the country), to increase the sensitivity of poliovirus detection. The target for stool adequacy remains at >80%. The new non-polio AFP target is to be met until 12 months have passed after the last virus-confirmed case or outbreak virus isolate from any source.

c) Reviewing and updating the AFP surveillance reporting network, including the prioritization of sites, in all provinces and districts. It is urgent to verify that the reporting network is robust and contains all reporting sites to accurately reflect current health service providers in provinces and districts, including public and private health facilities (e.g., hospitals, clinics, health centers), non-governmental organizations (NGOs), and refugee camps. Depending on the evolving epidemiology of the outbreak and on the health-seeking behavior of populations at high risk for poliovirus, the reporting network should be expanded to include additional providers, particularly at the community level, such as traditional healers, pharmacists, and key community informants.

d) Ensuring that active surveillance visits (AS) are conducted regularly nationwide and Active Surveillance is monitored. Prioritize high and medium priority sites in outbreak-affected and high-risk areas, if human resources are limited. Verify that prioritized lists of reporting sites, as well as schedules and plans for AS visits and the required logistics, are available, and that AS visits are regularly supervised and documented. Check and verify at high and medium priority sites and facilities that the surveillance officer conducts an effective visit, including to review medical records and logbooks at all appropriate units, wards, and departments, and to interview and sensitize medical staff on polio and AFP reporting.

e) Ensure good completeness and timeliness of routine (passive) surveillance. Upon outbreak confirmation and notification, surveillance officers across the country should review routine (passive) surveillance monitoring data to verify that targets for completeness and timeliness of reporting are met. If national and subnational resources are limited, outbreak-affected and polio high-risk areas should be prioritized for immediate corrective steps.

f) Conducting ad-hoc retrospective searches to identify unreported AFP cases. Ad-hoc 'active case searches', also known as retrospective medical records reviews, should be conducted in high priority

health facilities, especially in the national capital region, even if the capital is not in the outbreak area. Activities during these visits are similar to active surveillance, except that records should be reviewed retrospectively for at least 6 months prior to the visit, to search for missed AFP cases. Visits should be used to sensitize health workers on AFP surveillance.

All opportunities, such as visits for AFP case investigations or AFP sensitization, should be used to also conduct active case searches at the community level, such as by asking community members and leaders about individuals with AFP symptoms. Active case search should be included in trainings for vaccination field teams, who should ask about AFP cases during house-to-house vaccination.

g) Ensuring that special population groups are covered by surveillance activities. Surveillance officers should work with government and NGO partners in their province and district to identify special population groups which are mobile, hard to reach, or inaccessible for other reasons. Efforts should be made to actively engage and include these groups, to make sure they are covered by polio surveillance activities. Refer to [Section 3.4](#) and [Annex 6](#) in this document, as well as to the GPEI's Guidelines for Implementing Polio Surveillance in Hard-to-reach Areas & Populations¹⁷ for suggested approaches.

h) Supportive supervision and monitoring of surveillance officers. Supportive supervision and monitoring of surveillance staff, especially in the outbreak-affected and polio high risk areas, may require pulling staff from other parts of the country, including province and national level staff, to ensure that surveillance activities are regular and effective. Documentation of supervisory activities is required to facilitate corrective actions; the use of electronic tools is encouraged.

i) Monitor surveillance performance and use data for action. From the beginning of the outbreak, the performance of AFP surveillance should be closely monitored, with a focus on regular review of the non-polio AFP rate, stool specimen adequacy, and on process indicators, to identify and correct quality gaps which may leave circulating virus undetected.

Data analysis should be used to regularly monitor the evolving epidemiology of the outbreak in order to guide outbreak response activities. Key data for regular review includes the geographic and age distribution, as well as vaccination and risk group status of confirmed cases. Findings may suggest that SIAs may need to be expanded geographically, with priority focus on certain special groups. Clusters of AFP cases should be thoroughly investigated since the cluster may point to undetected virus circulation.

j) Prioritize investigation of 'silent' districts and provinces. Failure to report AFP cases from any province or district should alert the surveillance team to this 'silent' area and possibly serious surveillance quality gap, especially if the area has an estimated > 50,000 children aged < 15 years. Reasons for which the area remains silent should be immediately investigated and addressed. The program should visit such areas and conduct retrospective 'ad hoc active case searches' to identify possibly unreported AFP cases. Refer also to the [guidelines for polio surveillance in hard to reach areas](#).

9.2 AFP case investigation in an outbreak setting

a) Collection of additional data during case investigations. To better understand the dynamics of the outbreak, staff investigating cases should collect additional data, beyond the content of the case investigation form, including:

- carefully eliciting the history of recent travel of AFP case and/or household members (location, dates, people met), and whether or not visitors had been received before and after the onset of paralysis;
- polio vaccination history of the AFP case, separating routine doses from campaign vaccine doses; details, including dates, when nOPV2 (mOPV2) vaccine was received.

¹⁷ Guidelines for Implementing Polio Surveillance in Hard-to-reach Areas & Populations <https://polioeradication.org/wp-content/uploads/2020/10/Guidelines-polio-surveillance-H2R-areas.pdf>

Countries planning to use nOPV2 for outbreak response should refer to [GPEI's field and laboratory surveillance requirements in the context of nOPV2](#)¹⁸ for specific modifications to the AFP case investigation form.

b) Stool sampling of AFP contacts. Conduct AFP contact sampling for all cases with inadequate stool specimens nationwide (see [Chapter 4.4](#) and [Annex 7](#)). AFP contact sampling for all AFP cases, including for those with adequate specimens, may be initiated for a limited period in specific geographic areas to enhance the probability of detecting poliovirus. However, note that any decision to expand AFP contact sampling should only be made in close coordination and collaboration with national surveillance and laboratory personnel.

9.3 Training and sensitization activities

Awareness of polio eradication and AFP has typically declined considerably in countries which were polio-free for long periods but are now facing a renewed polio outbreak. The required rapid improvements in polio surveillance will depend on conducting AFP refresher trainings and sensitization sessions for as many health workers as possible (also see [Chapter 8.2 and 8.3](#)).

a) Refresher trainings for surveillance and other public health staff. It will be best if surveillance and public health staff receive formal trainings, with practical, hands-on exercises, conducted by experienced trainers. However, where this is not immediately possible, informal trainings and sensitization on AFP surveillance should be conducted until a formal training can be organized, to make sure that public health and surveillance teams are knowledgeable.

b) AFP sensitization sessions for healthcare providers and clinicians. Brief sessions for health workers and clinicians, particularly in large and medium-sized hospitals, should focus on explaining the syndromic approach of AFP surveillance, i.e. the need to detect and report cases of the syndrome of AFP rather than reporting clinical polio cases. These sessions should be held at every opportunity - i.e. during active surveillance, or other meetings, such as meetings of professional doctors' associations. Wall posters, brief 'job aids' and list of telephone numbers to call should be provided.

c) Sensitization to report AFP at the community level. During outbreaks, AFP reporting can be increased by raising awareness to recognize and report AFP among community members who serve as polio volunteers, community informants, and community health workers, as well as among community leaders and the broader community. AFP sensitization should be prioritized for special populations where community-based surveillance for AFP is already operating because facility-based surveillance cannot be done.

d) Sensitization of other government and non-government organizations on the outbreak and AFP surveillance, particularly those caring for and providing services to special populations, such as in refugee camps. NGO support and engagement in AFP reporting can extend the reach of polio surveillance in the country.

9.4 Environmental surveillance during an outbreak

Please also refer to [Chapter 6](#) below. - A document with Standard Operating Procedures (SOPs) for polio environmental surveillance (ES) enhancement following investigation of a poliovirus event or outbreak is

¹⁸ Polio Field and Laboratory Surveillance Requirements in the Context of nOPV2 Use <https://polioeradication.org/wp-content/uploads/2022/06/nOPV2-surveillance-guidance.pdf>

available on the GPEI website¹⁹. Please refer to these SOPs for detailed steps to be taken as part of enhancing ES during outbreak response.

The two primary activities are to:

- a) **Determine (re-assess) the adequacy of existing ES sites**, and to
- b) **Identify high-risk areas for ES expansion during an outbreak, including the use of ad-hoc ES sites.**

Note that an expansion of ES, including the use of ad-hoc ES sites, during an outbreak causes considerable additional work and expenses, particularly for the laboratory. Therefore, before any decision on expansion is made, all relevant groups, but at a minimum both surveillance and laboratory personnel, should be included in discussions about the role of ES in the outbreak response.

9.5 Coordinating with the polio laboratory

- a) **Assuring sufficient lab capacity to meet increased demand.** Increased testing and storage of stool specimens and sewage samples can overwhelm laboratory resources and staff if advance notification is not provided for planning. However, the tipping point can come quickly when demand for testing outweighs available laboratory capacity. Ensure that a contingency plan for testing samples is available and can be readily implemented, if necessary.
- b) **Regular, ongoing communication between surveillance and laboratory teams.** It is critical for surveillance and laboratory personnel to routinely communicate with one another, at a minimum weekly, on the changing demand for laboratory resources, and to discuss lab results and harmonize data.
- c) **Ensure proper specimen and sample collection practice, maintenance of reverse cold chain and timely transport to the lab.** Supplies for stool specimen and ES sample collection should meet the increased demand; specimen collection should be done properly, and the reverse cold chain must be maintained, especially for samples coming from remote or hard-to-access areas. Review and assure that specimen and sample transport is reliable and timely. If bottlenecks are found delaying transport, adjust transport networks, as necessary, to ensure the fastest possible transport to the lab.

Please also refer to [Chapter 7](#).

10 Polio-free certification and poliovirus laboratory containment

Sensitive surveillance for AFP and polioviruses is critically important for two other polio eradication workstreams - the certification of wild poliovirus eradication, and poliovirus containment. Therefore, all personnel involved in polio surveillance should be aware of objectives and principles underlying the work of the African Regional Commission for the Certification of Poliomyelitis Eradication (ARCC), of National Certification Committees (NCCs), and of National Task Forces for Poliovirus Containment (NTF).

The following chapter describes main principles of both activities, the current status of certification and containment in the African Region, and how staff involved in AFP and poliovirus surveillance can assist in ensuring that national certification and containment activities achieve their objectives.

10.1 Principles of polio-free certification

From the beginning of the GPEI, and led by the Global Commission for the Certification of the Eradication of Poliomyelitis (GCC), Regional Certification Commissions (RCCs), including the Africa Regional

¹⁹ Standard Operating Procedures for Polio Environmental Surveillance Enhancement Following Investigation of a Poliovirus Event or Outbreak. WHO, 2022.

<https://polioeradication.org/wp-content/uploads/2021/02/SOPs-for-Polio-ES-enhancement-following-outbreak-20210208.pdf>

Certification Commission (ARCC), have been working with National Certification Committees (NCCs) in each country to assess progress towards regional and global eradication of wild poliovirus.

WPV-free certification of polio eradication is conducted on a regional basis. Each region can consider certification only when all countries in the area demonstrate the absence of wild poliovirus transmission for at least three consecutive years, in the presence of certification standard surveillance. Five of six Regions have already been certified WPV-free by their respective RCCs (see also Chapter 1), including the Africa Region, which became the most recent WHO Region to be certified in 2020. This leaves only the Eastern Mediterranean Region yet to be certified, where parts of Afghanistan and Pakistan are still endemic for wild poliovirus.

Following regional WPV-free certification, RCCs and NCCs in all Region have continued to function. At their yearly meetings, these groups conduct detailed reviews and risk assessments of how well countries and region have been able to maintain their polio-free status. For this assessment, the RCCs will be particularly interested to assess the level of immunity (i.e. immunization coverage) and the quality and sensitivity of AFP and poliovirus surveillance.

From the beginning, the GCC and RCCs have also established criteria and reviewed progress of preparations for the eventual containment of poliovirus infectious and potentially infectious materials in all facilities still holding such material.

10.2 Roles of certification groups at national, regional and global level

The following are brief descriptions of the roles and responsibilities of certification groups at the national, regional and global level, including an explanation of what national level polio teams need to do to support the NCC and RCC in their work.

National Certification Committee (NCC). National Certification Committees (NCCs) are groups of independent experts in disciplines relevant for the certification of polio eradication, such as public health, immunization, epidemiology, pediatrics, infectious diseases, neurology and virology. NCCs are appointed by the national government in consultation with regional offices of the World Health Organization (WHO). NCC members act in a personal capacity only and cannot have responsibility for any activities to implement polio eradication in the country.

NCCs are responsible for assessing and verifying national documentation on polio-free status, which is assembled by the Ministry of Health (MoH) with WHO support. EPI and polio team managers working at the national and provincial level have a key role in making sure that NCCs have accurate and up-to-date information and data, particularly surveillance data.

NCCs cannot certify polio eradication in their own country. Only the RCC, by reviewing documentation from each country, can certify the entire Region as wild poliovirus-free. Regional WPV-free certification requires the absence of WPV transmission from any source (AFP, community samples and sewage samples) for at least three (3) consecutive years and a timely and sensitive AFP surveillance that meets the GCC's certification standards and the following performance indicators:²⁰

- Detection of at least one (1) NPAFP case annually per 100 000 children younger than 15 years.
- Collection of adequate stool specimens from at least 80% of AFP cases.
- Testing of all specimens at a WHO-accredited laboratory.

In WHO regions not yet certified as wild poliovirus (WPV)-free and for WHO Member States where no WPV has been detected from any source for at least three (3) years under conditions of “certification-

²⁰ Given programme advancements in genomic analysis and the widespread use of environmental surveillance in many countries, the GCC is reviewing the criteria and may recommend global certification sooner than the traditional three years. Changes to these requirements will be posted on the GPEI website (<https://polioeradication.org/polio-today/preparing-for-a-polio-free-world/certification>).

standard” surveillance, NCCs provide the RCC with documentation on all aspects related to polio eradication, including immunization activities, surveillance, laboratory support, and containment (including environmental surveillance of wastewater emitted from polio-essential facilities, or PEF)s.

Once the RCC formally accepts this documentation, signaling their agreement with the NCCs claim that WPV transmission in the country has been interrupted, the NCC will continue to provide annual reports to the RCC on the maintenance of polio-free status in the country. NCCs will also convey the RCCs recommendations on how to improve polio activities to their respective governments. The obligation to provide annual updates remains for all WHO member states globally, until global WPV-free certification.

The Africa Regional Certification Commission (ARCC). As all other RCCs, the ARCC is an independent panel of international public health experts, established by the AFR Regional Director in 1998, which advises the WHO African Regional Office on all issues related to the certification of WPV eradication and, following WPV-free certification in 2020, related to the maintenance of WPV-free status.

The ARCC meets once or twice a year, and reviews updated documentation submitted by NCCs from each Member State on the maintenance of WPV-free status, i.e., on immunization, surveillance, polio laboratory support and poliovirus containment.

The ARCC then reports conclusions on risk assessment and recommended risk mitigation measures to the respective country and to the WHO AFRO Regional Director. Related to poliovirus containment, the ARCC works with NCCs to review national reports and documentation, specifically updating and maintaining complete inventories of facilities which previously hosted WPV or any other infectious or potentially infectious poliovirus materials.

Global Certification Commission (GCC). The GCC is the independent global oversight body which will issue, if and when appropriate, a final report to the Director-General of the WHO (DG-WHO) to certify that the global eradication of WPV has been achieved. The GCC also oversees global poliovirus containment. It receives annual reports from RCCs on poliovirus survey and inventory activities in all six WHO regions, as reported by NCCs in their annual reports to the RCCs on the achievement or maintenance of WPV-free status.

Given programme advancements in genomic analysis and the widespread use of environmental surveillance in many countries, the GCC is currently reviewing the criteria allowing global WPV-free certification, and may recommend that the 'three-year rule' may no longer apply, i.e., that it may be possible to certify the world as WPV-free before 3 years have passed without detecting WPV from any source. Changes to these requirements will be posted [on the GPEI website](#) if and when the GCC comes to a decision.

The GCC is expected to also eventually validate the absence of all vaccine-derived polioviruses, as well as certify that global containment of all retained live poliovirus materials—including WPV, Sabin and vaccine-derived poliovirus (VDPV) of all types—has been achieved and maintained. It is still yet to be decided whether the GCC will exist by the time containment of all poliovirus materials (WPV, Sabin and VDPV) will be achieved. As of this writing, the mandate to the GCC from the DG-WHO remains to certify WPV eradication.

As of 2023, five of six WHO regions have been certified as free of wild poliovirus; however, as long as wild poliovirus is not eradicated globally, NCCs and RCCs still have also a role to play in monitoring polio surveillance performance in their respective country and in updating the GCC. The GCC may also recommend that the certification bodies at global, regional and country level will be charged with overseeing the validation of the absence of vaccine-derived polioviruses; the way this will be done, as well as the exact role of the certification groups, is currently being discussed.

For additional information on certification, refer to GPEI webpage on [Preparing for a Polio-Free World](#). Interested readers can find the reports on annual meetings of the GCC and RCCs [here](#)²¹

10.3 Laboratory containment of poliovirus - main principles and goals

For poliovirus containment, a set of biosafety and biosecurity requirements for biorisk management was established which all laboratories, vaccine production sites, or any other facility that handles or stores polioviruses should follow. The main goal of poliovirus containment is to minimize the risk of reintroducing polioviruses into a population once the global eradication of all wild polioviruses (WPVs) is certified, the absence of all vaccine-derived polioviruses (VDPVs) is validated, and the use of all live oral poliovirus vaccine (OPV) has stopped.

Two of three strains of wild poliovirus have been declared globally eradicated. In September 2015, the Global Commission for the Certification of Eradication of Poliomyelitis declared wild poliovirus type 2 as eradicated, and in October 2019, wild poliovirus type 3 followed. A number of facilities worldwide, however, still handle or store the viruses for activities such as vaccine production, polio diagnostics and research. Further, type 2 or type 3-containing oral polio vaccines, made with weakened, live vaccine viruses, continue to be used across the world for outbreak response or routine immunization.

In addition to the global eradication of poliovirus, the appropriate containment of all poliovirus (PV) materials in facilities, including wild, Sabin-type and vaccine-derived PV materials, is therefore a key objective of the GPEI's Polio Eradication Strategy 2022-2026, and will be critical for achieving and maintaining a polio-free world.

Why containment is critical to polio eradication. In view of the enormous investments of financial and human resources made by countries and global partners to eradicate polio, all stakeholders must understand the importance of poliovirus containment to eradication. As long as poliovirus materials remain in any facility, potential release of poliovirus will be a serious risk to certified countries and regions – a risk that will increase in the post-eradication era. Poliovirus lab containment is often referred to as the "other half of polio eradication", an acknowledgement of the significance of the activity for the GPEI.

Once global eradication is achieved and mass polio vaccination campaigns with OPVs are no longer conducted, population immunity to polioviruses will decrease, particularly in countries and areas with low-performing or no essential immunization programs. The consequences of any unintentional release, or 'escape', of live poliovirus into communities would be severe. This risk is real, as illustrated by several incidents reported since the GPEI began²².

Main goals of global poliovirus containment. The following three strategic goals for poliovirus containment will need to be achieved in parallel to the process to interrupt WPV and cVDPV transmission – and beyond, into the post-certification era.

- 1 to reduce the number of facilities retaining poliovirus materials to a minimum;
- 2 to ensure that all poliovirus materials in poliovirus-essential facilities²³ (PEFs) are stored and handled according to international standards to maintain long-term containment; and
- 3 to strengthen and support national and international programs to ensure sustainability and continuity of poliovirus containment in the post-certification era.

How to reduce the number of facilities holding poliovirus. To achieve this goal, containment efforts have, from the beginning, focused on four main activities:

²¹ <https://polioeradication.org/tools-and-library/policy-reports/certification-reports/global-certification-commission/>

²² Bandyopadhyay AS, Singh H, Fournier-Caruana J, Modlin JF, Wenger J, Partridge J, Sutter RW, Zaffran MJ. Facility-Associated Release of Polioviruses into Communities—Risks for the Posteradication Era. *Emerg Infect Dis.* 2019;25(7):1363-69 (https://wwwnc.cdc.gov/eid/article/25/7/18-1703_article).

²³ Poliovirus-essential facilities (PEFs) serve critical national and international functions and maintain the ability to work with and/or store infectious and potentially infectious poliovirus materials. PEFs have to undergo a rigorous process of certification to assure they comply with all internationally required biorisk standards

| Identify ⇨ | Destroy ⇨ | Transfer ⇨ | Contain |
|--|---|---|--|
| All WHO Member States survey their laboratories, vaccine manufacturers, and other facilities to identify and create inventories of facilities handling and/or storing infectious and potentially infectious poliovirus materials (IM and PIM). | Once inventories have been created, all identified laboratories and facilities must destroy all materials which are not required for nationally or internationally diagnostic, research or vaccine production purposes. | Laboratories and other facilities without appropriate containment measures and which are not designated as PEFs may transfer any needed poliovirus materials to a designated/certified PEF. | Eventually, the only locations allowed to retain eradicated polioviruses will be PEFs, as designated by Member States, which will need to be fully certified as complying with all internationally required biorisk management standards, as described in GAP. |

10.4 Conduct and provide oversight of containment activities at the national level

Conducting surveys and establishing and maintaining inventories of facilities holding both infectious and potentially infectious poliovirus material (IM and PIM) is a critical baseline activity required in all countries. It is conducted by National Poliovirus Containment Task Forces (NPCTFs), led by a national poliovirus containment coordinator (NPCC), with support and oversight from the independent National Certification Committees (NCCs).

National containment task forces (NCTFs) must review and update inventories on a regular basis as facilities may have closed or new facilities opened, or a new poliovirus importation or polio outbreak may have occurred with one or more facilities possibly holding new infectious (PM) or potentially infectious materials (PIM), including OPV and novel oral polio vaccine (nOPV) vials.

All countries in the WHO African Region have done their baseline surveys, to establish inventories of facilities holding poliovirus, a long time ago; countries are now in the maintenance phase, where NCTFs update these surveys and inventories on an annual basis.

Report on national containment activities from the national to the regional level. Regional Certification Commissions (RCCs) in each WHO region, including in the African Region, require annual reports from NCCs of all Member States on the status of maintaining their wild poliovirus-free status, addressing the quality of their surveillance and immunization activities, as well as their progress in implementing poliovirus containment measures such as surveys and inventories (containment phase I activities).

Conduct surveys for facilities holding potentially infectious materials (PIMs). In addition to identifying facilities retaining materials known to be poliovirus infectious (WPV, VDPV, OPV/Sabin), countries are also required to identify laboratories and other facilities holding materials which *may* potentially contain polioviruses - materials referred to as 'potentially infectious materials (PIMs)'. Such facilities are often not even aware that they may be harboring PIMs. PIMs may be found in specimens collected for other purposes than poliovirus-associated work in countries where WPV and cVDPVs were in circulation or where OPV or nOPV were used.

Maintain a poliovirus type-specific approach to containment activities. Following the declaration of the eradication of wild poliovirus type 2 (WPV2) and the subsequent globally coordinated cessation of type 2 OPV (OPV2) for essential immunization, all WHO Member States committed to containing all type 2 polioviruses, including wild, vaccine-derived and Sabin strains. Accordingly, containment activities, including the conduct of surveys and creation of facility inventories, initially focused on type 2 polioviruses.

However, as requested in the 2018 resolution (WHA71.16), it is important that all poliovirus type 2, and all wild and vaccine-derived poliovirus (VDPV) type 3, is destroyed, or safely and securely contained so that these viruses are not released from facilities that retain them. It is also important that inventories and appropriate destruction of unused vaccine containing live type 2 strains is conducted as per GPEI

outbreak response guidelines. Currently, measures only apply to live type 2-containing vaccines used for outbreak response.

10.5 Main containment action points for countries in the African Region

Designation of poliovirus essential facilities (PEF) in the African Region. Unlike in other WHO Regions, only one country - South Africa - has previously designated a facility (the National Institute of Communicable Diseases, or NICD) as 'poliovirus essential facility', or PEF. This facility is the only global specialized polio lab on the continent. However, the NICD poliovirus laboratory, in February 2023, discontinued its preparation towards eventual certification of the facility as complying with all international biosafety requirements for poliovirus containment, as laid out in the [Global Poliovirus Containment Strategy](#) and the [WHO Global Action Plan for Poliovirus Containment, fourth edition](#). Of note, South Africa had been one of the first countries globally to nominate and establish a National Authority for Containment (NAC) has been established in South Africa, to oversee the multi-step process towards certification.

Main containment focus in Africa on maintaining updated inventories. Ongoing work to complete and maintain surveys and inventories (for both poliovirus IM and PIM) in all member states should be intensified to include wild, Sabin and vaccine-derived PVs of all three types, even if only the currently required PV types are included in the annual report from the country to the Africa Regional Certification Commission (ARCC).

Managing containment risks of using type 2 containing vaccines for cVDPV2 outbreak response. Due to the ongoing multiple cVDPV2 outbreaks in countries of the African Region (as of 1st quarter 2023), it is important that inventories must be updated whenever and wherever type 2-containing vaccines (mOPV2, tOPV and nOPV2) are used for cVDPV2 outbreak response.

Also, all African countries and supporting GPEI stakeholders involved in cVDPV2 outbreak response should collaborate to ensure that the risks associated with the handling, transport and possible storage of cVDPV2 outbreak virus isolates (and with the use of vaccines containing OPV2, such as mOPV2, tOPV and nOPV2) are fully addressed. Relevant containment issues should be included in both outbreak response plans and outbreak response assessments.

11 Integrated disease surveillance systems

AFP surveillance is one of the cornerstones of implementing the GPEI. Most countries in the world, including all member states of the WHO African Region, have been implementing AFP surveillance systems for many years. Most countries in the Region also have used the opportunity to rationalize resources and use the AFP system to report additional diseases, most often by adding surveillance for other VPDs, or to utilize AFP surveillance to facilitate surveillance and response for other outbreak-prone diseases.

As one of the first WHO Regions, the African Region already started in the late 1990s to create and implement an *Integrated Disease Surveillance and Response system*²⁴ (IDSR, see below). Efforts to implement IDSR have become standard practice in many African countries, where resources for disease surveillance are limited, particularly at the district level. From the beginning these integration activities benefited from additional external resources made available through AFP surveillance.

However, as the world prepares for reaching the global polio goal and with the certification of the African region as wild poliovirus-free in 2020, the external additional funding and resources provided from the

²⁴Integrated Disease Surveillance and Response. Addressing health security risks in African Countries. <https://www.afro.who.int/publications/technical-guidelines-integrated-disease-surveillance-and-response-african-region-third>

GPEI, including for AFP surveillance have been reduced. Additional funding for surveillance is being withdrawn in most countries and maintained only in a limited number of polio priority high risk countries of the Region. WHO and other GPEI partners have been actively working on a transition programme to ensure that key assets and capacities built up as part of the polio programme, including surveillance, are not lost but will be successfully integrated into other programs.

11.1 Integrated Disease Surveillance and Response (IDSR) in the African Region

To make better use of limited available resources, the WHO African Region started earlier than other Regions to work towards integrating public health and disease surveillance. Already in 1998, a strategy for developing and implementing comprehensive public health surveillance and response systems in African countries called Integrated Disease Surveillance and Response (IDSR) was adopted in the Region and widely implemented in member states. The IDSR system relied considerably on the structure of and additional resources available for AFP surveillance.

There were other reasons that led to these integration efforts. The coming into force in 2007, of the International Health Regulations (IHR 2005), the emergence of new diseases, and the formulation of strategies for disaster risk management (DRM) resulted in a new focus on health security overall and re-emphasized the need for an effective early warning and response system.

In most countries, disease and public health programs have developed and used their own disease surveillance systems, which often exist in parallel to each other. Each program has made efforts through the years to improve its ability to obtain data for developing timely and reliable information that can be used for action. These systems make use of similar functions and often use the same structures, processes and personnel, especially at district and health facility levels. This is where the IDSR strategy comes in, because it provides for a rational joint use of resources for disease control and prevention.

Although progress towards a coordinated, integrated surveillance system in African countries has been mixed. Almost every country in the African Region and their partners invested human and material resources in the process to build capacities for public health surveillance systems for early detection, confirmation and response to public health threats. This process attempts to link community, health facility, district and national levels.

a) Overall objectives of IDSR. Overall objective of the IDSR strategy is to provide a rational basis for decision-making and implementing public health interventions that are efficacious in responding to priority communicable diseases. To implement IDSR, WHO/AFRO has proposed to countries a system of simplified data collection tools and response actions. These data tools should contribute to efficient and timely decision-making based on the use of timely information, selection of appropriate responses and effective use of available resources for preventing and controlling communicable diseases.

At the district level, the goal of IDSR is to improve the ability of districts to detect and respond to diseases and conditions that cause high levels of death, illness and disability in the district's catchments area. By strengthening skills and resources for integrated disease surveillance and response will have a positive impact on health and well-being for the communities in the district.

To that end, integrated disease surveillance seeks to:

- Strengthen the capacity of countries to conduct effective surveillance activities;
- Integrate multiple surveillance systems so that forms, personnel and resources can be used more efficiently and effectively;
- Improve the use of information for decision-making;
- Improve the flow of surveillance information between and within levels of the health system;
- Improve laboratory capacity in identification of pathogens;

- Increase the involvement of clinicians in the surveillance system;
- Emphasize community participation in detection and response to public health problems;
- Strengthen the involvement of laboratory personnel in epidemiologic surveillance.

b) How to develop and implement integrated surveillance activities. The following are key assets, both physical and organizational resources, which were developed as part of the polio / AFP surveillance system, and which will be immediately useful also for use under a wider IDSR umbrella:

- Communication network;
- Community involvement
- Laboratory support and lab facilities (where this exists);
- Technical meetings and regular review and monitoring;
- Planning and conducting joint activities (Ministry of health, with partners);
- Partnership (Inter-agency Coordination Committees at national and provincial level);

The following are suggested steps to be taken to support integration at the country level:

- Develop one comprehensive operational surveillance workplan at the country (province) level
- Establish and train a core team of trained staff at the national and sub-national level
- Harmonization of data collection tools and surveillance data management infrastructure

Specific deliverables of a well-functioning AFP surveillance system which will be equally useful when integrating other diseases, particularly other VPDs:

- Use of the AFP surveillance network, with weekly routine (passive) reporting from health facilities, where appropriate, also including reporting from informal health providers
- Active surveillance, including visits by trained surveillance staff to priority health facilities and informal providers in the AS network
- Community-based surveillance networks in selected areas, particularly where these were set up for AFP surveillance
- Activities to enhance surveillance, such as retrospective case search at health facilities when outbreaks occur
- Regular assessment of surveillance quality using agreed standard surveillance indicators that need to be met at national and subnational levels

Please find details on the latest edition of the WHO AFRO guideline on planning and implementing the IDSR strategy, laid out in a series of five technical booklets, at this [webpage](https://www.afro.who.int/publications/technical-guidelines-integrated-disease-surveillance-and-response-african-region-third):

<https://www.afro.who.int/publications/technical-guidelines-integrated-disease-surveillance-and-response-african-region-third>

11.2 Polio transition and post-certification strategy

The objective of the polio transition plan is to sustain the required level of poliovirus surveillance in each country, but also to strengthen overall disease and public health surveillance by integrating with and building on the polio platform, wherever possible.

As the world gets closer to the goal of polio eradication, WHO AFRO, along with other GPEI partners, is actively working towards assisting countries with transitioning the assets and capacities of the polio programme to other disease control and public health programs. Surveillance, as a main polio eradication strategy, is probably the polio eradication asset with greatest relevance for the polio eradication transition programme.

The polio transition plan seeks to assure that the key polio programme assets, including surveillance, are not lost but transitioned towards:

- strengthening emergency preparedness, detection and response capacity in countries in order to fully implement the International Health Regulations (2005),
- strengthening immunization systems, including surveillance for vaccine-preventable diseases,
- sustaining a polio-free world after eradication of poliovirus by ensuring polio essential functions such as AFP surveillance continues.

Work that has already been done in a number of countries worldwide to integrate polio resources, including polio surveillance, including lessons learned, has been well documented and is available for review, such as in this publication²⁵.

For updates on the polio transition plan please consult the following webpage:

<https://polioeradication.org/polio-today/preparing-for-a-polio-free-world/transition-planning>,

To support post-certification planning, the GPEI has published the 'Polio Post-Certification Strategy (PCS)' in 2018²⁶. Continued need for poliovirus surveillance after global polio-free certification is a core component of the PCS. At mid-2023, planning is underway to revise this document considering the evolution of the GPEI over the last several years.

Future updates on the post-certification strategy can be found at: <https://polioeradication.org/polio-today/preparing-for-a-polio-free-world/transition-planning/polio-post-certification-strategy>

11.3 Comprehensive VPD surveillance under the Immunization Agenda 2030

Additional guidance on integrating surveillance for VPDs can be found in the 'global strategy for comprehensive vaccine-preventable diseases'²⁷, has been published by WHO as part of the '[Global Immunization Agenda 2030](#)'.

The document highlights options for establishing comprehensive, all-encompassing vaccine-preventable disease surveillance to meet all VPD threats faced by a country, in all geographic areas and populations, using all laboratory and other methodologies required to detect diseases reliably.

It also provides guidance on integrating VPD surveillance, wherever possible, taking advantage of shared infrastructure for components of surveillance such as data management and laboratory systems.

²⁵ Using Acute Flaccid Paralysis Surveillance as a Platform for Vaccine-Preventable Disease Surveillance Steven G. F. Wassilak, Cheryl L. Williams, Christopher S. Murrill, Benjamin A. Dahl, Chima Oluabunwo, Rudolf H. Tangermann https://academic.oup.com/jid/article/216/suppl_1/S293/3935052

²⁶ Polio Post-Certification Strategy: A risk mitigation strategy for a polio-free world. Geneva: World Health Organization; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-post-certification-strategy-20180424-2.pdf>).

²⁷ [https://www.who.int/publications/m/item/global-strategy-for-comprehensive-vaccine-preventable-disease-\(vpd\)-surveillance](https://www.who.int/publications/m/item/global-strategy-for-comprehensive-vaccine-preventable-disease-(vpd)-surveillance)

12 Annexes

Annex 1. Poliovirus, poliomyelitis and polio vaccines

Poliovirus is a member of the enterovirus subgroup of the family *Picornaviridae*. *Picornaviruses* are small, with a ribonucleic acid (RNA) genome. Heat, formaldehyde, chlorine and ultraviolet (UV) light rapidly inactivate the poliovirus.

Poliovirus has three serotypes: type 1, type 2 and type 3. All three serotypes of poliovirus cause paralytic disease, and there is minimal cross-immunity between the three serotypes.

Epidemiology

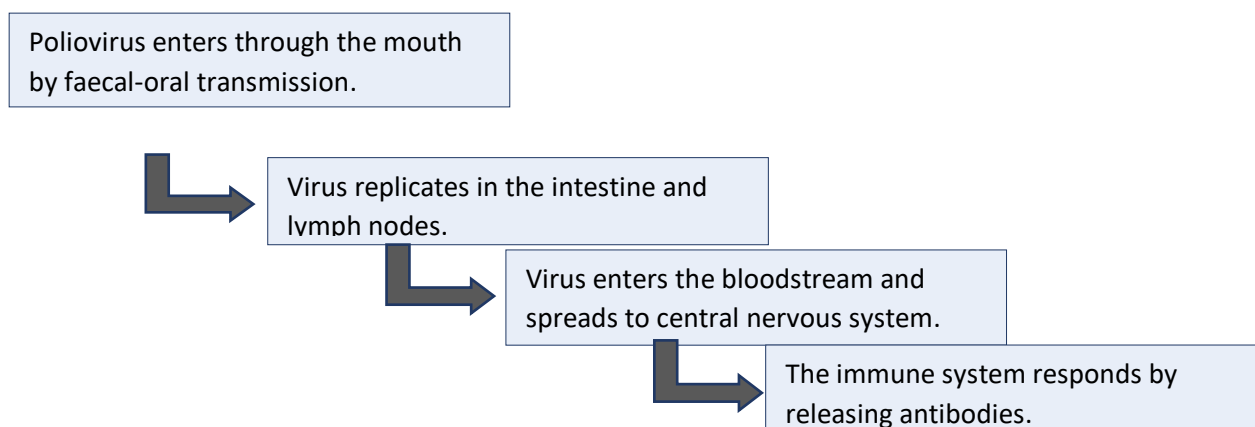
Reservoir. Humans are the only known reservoir of poliovirus (i.e. there is no animal host), which is transmitted most frequently by persons with silent, asymptomatic infections. There is no asymptomatic long-term carrier state, except in persons with immune deficiencies, whose immune system is unable to clear the poliovirus infection.

Transmission and temporal pattern. Poliovirus is spread by both the fecal-oral route (i.e., the poliovirus multiplies in the intestines and is spread through the feces) and by the respiratory route. Infection is more common in infants and young children. Polio occurs at an earlier age among children living in poor hygienic conditions. In temperate climates, poliovirus infections are most common during summer and autumn. In tropical areas, there is less of a seasonal pattern.

The time between infection and onset of paralysis is 7–21 days. The virus spreads rapidly to non-immune persons and transmission is usually widespread in a community by the time paralytic symptoms appear in the first paralytic cases. The virus is intermittently excreted for one month or more after infection. The heaviest fecal excretion of the virus occurs just before and during the first two weeks after the onset of paralysis.

Communicability. Poliovirus is highly infectious. After one person in a household gets infected, nearly 100% of non-immune contact children, and more than 90% of adults in the household are infected.

Immunity. Protective immunity against poliovirus infection develops as a result of natural infection and through immunization. Immunity to one poliovirus sub-type does not protect against infection with other poliovirus types. Immunity following natural infection or administration of a live oral polio vaccine (OPV) is believed to be lifelong. The duration of protective antibodies after administration of an inactivated polio vaccine (IPV) is unknown but likely to be lifelong after a complete series.²⁸ Infants born to mothers who have a high level of antibodies against poliovirus are protected for the first several weeks of life.



Source: WHO.

²⁸ Centers for Disease Control and Prevention. *Epidemiology and Prevention of Vaccine-Preventable Diseases*. Hall E, Wodi AP, Hamborsky J, et al., eds. 14th ed. Chapter 18: Poliomyelitis. Washington, D.C.: Public Health Foundation; 2021 (<https://www.cdc.gov/vaccines/pubs/pinkbook/downloads/polio.pdf>).

Pathogenesis - how does poliovirus cause paralysis. The virus enters the body through the mouth following fecal-oral or respiratory contact. Primary multiplication of the virus occurs at the site of implantation of the poliovirus receptor in mainly lymphatic tissues: tonsils, intestinal cells, gut or 'Peyer's patches' that line the small intestine, and lymph nodes.

The virus is usually present in the throat and in the stools before the onset of clinical symptoms. One week after paralysis onset, there is little virus in the throat, but virus continues to be excreted in the stools for several weeks. After infection, the virus enters the blood stream, and then rarely may cross from the bloodstream into cells of the central nervous system.

Poliovirus has a "tropism", i.e. preference, for nerve tissue and is thought to spread back along nerves ("axons") to the spinal cord. Replication of poliovirus in motor neurons of the spinal cord anterior horn and of the brain stem destroys nerve cells and causes paralysis, the typical manifestations of poliomyelitis. The extent of paralysis depends on proportion of motor neurons lost.

Symptoms of poliovirus infection (symptoms). The incubation period of paralytic poliomyelitis, i.e. the period between infection and first paralytic symptoms, usually is 7–21 days (with a range from 3–35 days).

Infection with poliovirus can result in a spectrum of clinical symptoms and outcomes, from asymptomatic, 'silent' infection to non-specific febrile illness, aseptic meningitis, paralytic disease and death. In 90 to 95% of non-immune infected individuals, poliovirus infection does not cause any symptoms at all.

Symptomatic infections may present in one of the following ways:

- A **non-specific febrile illness**, also called 'abortive polio' (because no visible paralysis developed), occurs in 4–8% of cases and is characterized by low-grade fever, sore throat, vomiting, abdominal pain, loss of appetite and malaise. Complete and rapid recovery follows, without paralysis. This non-specific illness can usually not be distinguished from other mild viral illnesses with mild respiratory tract or gastrointestinal manifestations.
- **Non-paralytic aseptic (i.e. viral) meningitis** occurs in 1–2% of infections with symptoms of headache, painful neck, back and/or abdominal region, and extremities, fever, vomiting, lethargy and irritability, following a preceding non-specific phase, similar to 'abortive polio'. Cases recover within 2–10 days. This illness cannot be clinically distinguished from other causes of aseptic meningitis.
- **Paralytic poliomyelitis** occurs in <1% of cases following a minor illness, sometimes separated by several days without symptoms ('biphasic' illness). Paralytic symptoms generally begin 1–10 days after prodromal symptoms and progress for 2–3 days. Symptoms begins with severe muscle pain, spasms and return of fever, followed by rapid onset of flaccid (floppy) paralysis in one or more limbs, with diminished deep tendon reflexes. Paralysis is usually 'complete' (i.e. does not progress any more) within 72 hours. Patients do not experience sensory loss or changes in cognition / consciousness.
- Depending on the sites of paralysis, poliomyelitis can be classified as spinal, bulbar or spino-bulbar disease. Classically, certain groups of muscles are affected in an asymmetrical pattern. The lower limbs are affected more often than the upper limbs, and one leg or one part of the leg may be involved. The affected muscles are weak and floppy (flaccid).

In a very small number of cases, bulbar polio develops, i.e. the virus attacks the motor nerve cells that control the muscles of the face, throat, and tongue, and muscles of respiration. The patient's ability to swallow, speak and breathe is affected; bulbar polio may lead to death. Of all paralytic polio cases, 2–10% are fatal due to affection of respiratory muscles, 10% recover completely, and the remainder of cases show some residual paralysis or permanent disability.

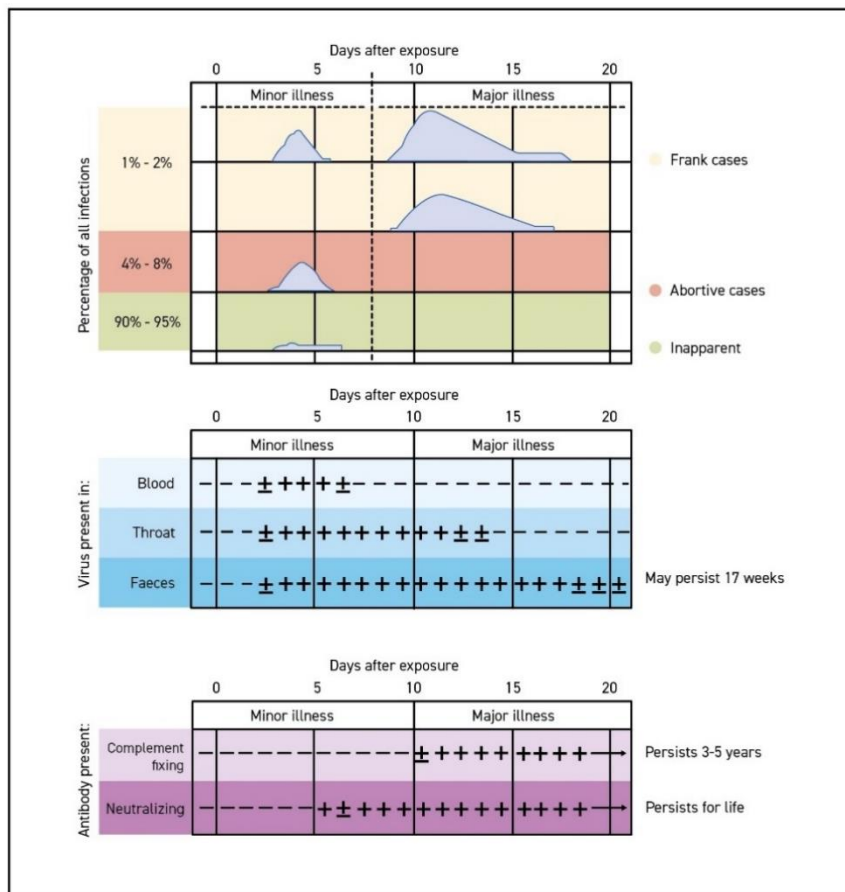


Figure 7: Timeline of symptoms, presence of virus and development of antibodies following exposure to poliovirus

Source: WHO. Field guide for supplementary activities aimed at achieving polio eradication, Rev. 1996. Geneva: World Health Organization; 1996;4 (https://apps.who.int/iris/bitstream/handle/10665/63478/WHO_EPI_GEN_95.01_REV.1.pdf).

Differential diagnosis of acute flaccid paralysis. The differential diagnosis of acute flaccid paralysis (AFP) most commonly includes paralytic poliomyelitis, Guillain-Barré syndrome (GBS), traumatic neuritis, and transverse myelitis. Less common etiologies are traumatic neuritis, encephalitis, meningitis, other enterovirus infections and tumors.

Distinguishing characteristics of paralytic polio are asymmetric flaccid paralysis, fever at onset, rapid progression of paralysis, residual paralysis after 60 days and preservation of sensory nerve function.

| | Polio | Guillain-Barré syndrome | Traumatic neuritis | Transverse myelitis |
|----------------------------------|--|--|---|---|
| Installation of paralysis | 24 to 48 hours onset to full paralysis | From hours to ten days | From hours to four days | from hours to four days |
| Fever at onset | High, always present at onset of flaccid paralysis, gone the following day | Not common | Commonly present before, during and after flaccid paralysis | rarely present |
| Flaccid paralysis | Acute, usually asymmetrical, principally proximal | Generally acute, symmetrical and distal | Asymmetrical, acute and affecting only one limb | acute, lower limbs, symmetrical |
| Muscle tone | Reduced or absent in affected limb | Global hypotonia | Reduced or absent in affected limb | Hypotonia in lower limbs |
| Deep-tendon reflexes | Decreased to absent | Globally absent | Decreased to absent | Absent in lower limbs early hyper-reflexia late |
| Sensation | Severe myalgia, backache, no sensory changes | Cramps, tingling, hypoanaesthesia of palms and soles | Pain in gluteus, hypothermia | Anesthesia of lower limbs with sensory level |
| Cranial nerve involvement | Only when bulbar involvement is present | Often present, affecting nerves VII, IX, X, XI, XII | Absent | Absent |
| Respiratory insufficiency | Only when bulbar involvement is present | in severe cases, enhanced by bacterial pneumonia | Absent | Sometimes |

Figure 8: Differential diagnosis of acute flaccid paralysis (AFP)

Figure 8 shows a comparison of the four mentioned most common differential diagnoses of AFP. Of note, however, readers are reminded that this information is provided as background for clinicians and health workers. The condition under surveillance, AFP, is a syndrome, not a diagnosis. There are many other possible etiologies and conditions which can manifest with AFP, which should be reported as a syndrome, regardless of the possible diagnosis.

Clinical case management. There is no specific treatment for poliomyelitis. Suspected AFP cases should be referred to a hospital immediately for medical care. Any problem with respiration suggesting involvement of the diaphragm requires immediate attention. Supportive care should be given to paralytic cases under physician management.

Preventing polio

Polio vaccines provide the best protection against polio because they can totally prevent the infection. There are two main types of vaccines against polio: oral poliovirus vaccine (OPV), which contains a weakened form of poliovirus, and injectable, inactivated (or killed) polio vaccine (IPV). You can find details on all types of polio vaccine on a special GPEI website.²⁹

²⁹ Global Polio Eradication Initiative. The Vaccines (webpage). (<https://polioeradication.org/polio-today/polio-prevention/the-vaccines>).

Oral poliovirus vaccine (OPV). OPVs are the predominant vaccine used in the fight to eradicate polio (see Table 8). The weakened, or attenuated poliovirus(es) contained in OPV can multiply effectively in the intestinal tract and enables individuals to develop an immune response against the virus. All countries which have eradicated polio since the GPEI began have used OPV to interrupt person-to-person transmission of the virus.

Advantages

- OPVs are safe, effective and inexpensive, and because OPV can be given orally, no health professional is required for vaccinating children.
- For several weeks after vaccination, the vaccine virus replicates in the intestine, is excreted and can be spread to, and effectively vaccinating, others in close contact. In areas with poor hygiene and sanitation, immunization with OPV can therefore result in “passive” immunization of people who have no.

Disadvantages

- OPV is safe and effective. However, in extremely rare cases (at a rate of approximately 2–4 events per 1 million births), the live, weakened vaccine virus in OPV can itself cause paralysis³⁰. In some cases, this may be triggered by an immunodeficiency. The extremely low risk of vaccine-associated paralytic poliomyelitis (VAPP) is well accepted by most public health programmes.
- Very rarely, when there is insufficient infant immunization coverage in a community, the vaccine virus may begin to circulate, mutate and, over the course of 12 to 18 months, regain neurovirulence, i.e. the ability to cause paralysis. This is known as a circulating vaccine-derived poliovirus (cVDPV)³¹.

Once polio has been eradicated, all OPV use will be stopped to prevent re-establishment of transmission due to vaccine-derived polioviruses (VDPVs).

Table 8: Indications of use for OPVs by serotype

| OPV type | Serotype | Indications for use |
|---|--------------------------|---|
| Monovalent oral poliovirus vaccines (mOPVs) | Type 1 (mOPV1) | Elicit the best immune response against the serotype they target. mOPV2 is stockpiled in the event of a cVDPV2 outbreak but is progressively being replaced by nOPV2. |
| | Type 2 (mOPV2) | |
| | Type 3 (mOPV3) | |
| Novel oral polio vaccine type 2 (nOPV2) | Type 2 (nOPV2) | Provides comparable protection against poliovirus type 2 while being more genetically stable, therefore making it much less likely that VDPV2 will emerge in low-immunity settings. At the time of writing these guidelines (2023), nOPV2 is being used for type 2 outbreak response, however still under an Emergency Use Listing of the WHO. |
| Bivalent oral poliovirus vaccine (bOPV) | Type 1 and type 3 (bOPV) | Contains attenuated virus of serotypes 1 and 3. bOPV elicits a better immune response against poliovirus types 1 and 3 than tOPV, but it does not give immunity against |

³⁰ Platt, Lauren R., Concepción F. Estívariz, and Roland W. Sutter. "Vaccine-associated paralytic poliomyelitis: a review of the epidemiology and estimation of the global burden." *The Journal of infectious diseases* 210.suppl_1 (2014): S380-S389.

³¹ Burns, Cara C., Ousmane M. Diop, Roland W. Sutter, and Olen M. Kew. "Vaccine-derived polioviruses." *The Journal of infectious diseases* 210, no. suppl_1 (2014): S283-S293.

| | | |
|---|----------------------------------|---|
| Trivalent oral poliovirus vaccine (tOPV) | | serotype 2. Since April 2016, the trivalent oral poliovirus vaccine (tOPV) has been replaced with bOPV in essential immunization and for outbreak response against types 1 and 3 outbreaks. |
| | Type 1, type 2 and type 3 (tOPV) | Withdrawn in April 2016 from essential immunization and replaced with bOPV, tOPV can still be used in outbreak response under specific circumstances, such as co-circulation of type 1 and type 2 polioviruses. |

bOPV = bivalent oral polio vaccine; cVDPV2 = circulating vaccine-derived poliovirus type 2; mOPV = monovalent oral polio vaccine; mOPV1 = monovalent oral polio vaccine type 1; mOPV2 = monovalent oral polio vaccine type 2; mOPV3 = monovalent oral polio vaccine type 3; nOPV = novel oral polio vaccine; nOPV2 = novel oral polio vaccine type 2; tOPV = trivalent oral polio vaccine; VDPV2 = vaccine-derived poliovirus type 2; WHO = World Health Organization

Inactivated poliovirus vaccine (IPV). IPV consists of inactivated (killed) poliovirus strains of all three poliovirus types. IPV is given by intramuscular or intradermal injection and therefore needs to be administered by a trained health worker. It produces antibodies in the blood to all three types of polioviruses. In the event of infection, these antibodies prevent the spread of the virus to the central nervous system and protect against paralysis.

IPV is used in routine immunization and, in some instances, to respond to polio outbreaks. As IPV does not stop transmission of the virus, OPV is still the vaccine of choice for outbreak response activities even in countries that rely exclusively on IPV for their essential immunization programs.

Advantages

- As IPV is not a 'live' vaccine and is administered by direct injection (i.e. not excreted by recipients), it carries no risk of VAPP or development of VDPV. It is one of the safest vaccines in use.
- IPV triggers an excellent protective immune response in most people.

Disadvantages

- IPV induces very low levels of immunity in the intestine. As a result, when a person immunized with IPV is infected with wild poliovirus, the virus can still multiply inside the intestines and be shed in the faeces, thereby risking continued circulation.
- Administering the vaccine requires trained health workers, as well as sterile injection equipment and procedures.
- IPV is over five times more expensive than OPV.

Annex 2. Vaccine-derived poliovirus classification and response

There are three categories of vaccine-derived polioviruses (VDPVs), each with a unique classification and associated mode of response (see).

Circulating vaccine-derived poliovirus (cVDPV): Through serial transmission of vaccine virus in an under-vaccinated community, the attenuated (weakened) vaccine polioviruses can regain the neurovirulence and transmission characteristics of wild poliovirus (WPV). VDPVs that have emerged, or have been established through community circulation in under-vaccinated populations, are classified as *circulating vaccine-derived polioviruses* (cVDPVs).

cVDPVs have become an urgent issue for the polio eradication program as cVDPVs, mainly type 2 cVDPVs, have been responsible for thousands of poliomyelitis cases since their first characterization in 2000.³² Strengthening routine immunization systems and conducting supplemental immunization activities (SIAs) are necessary to reduce the risk of cVDPVs emerging. After community transmission has become established, interrupting cVDPV requires outbreak response measures, including high-quality SIAs to reach every child in affected communities.³³

Immunodeficiency-associated vaccine-derived poliovirus (iVDPV): A far smaller but potentially serious challenge to sustaining global polio eradication in the future is represented by VDPVs that evolve in and are excreted by patients born with inherited primary immunodeficiency disorders (PIDs). PIDs affect the B-cell, antibody-producing part of the immune system. Following receipt of or exposure to oral polio vaccine (OPV) viruses, PID patients may excrete a type of VDPV categorized as *immunodeficiency-associated vaccine-derived polioviruses* (iVDPVs) which can cause paralytic polio in the individual hosting the iVDPV, but more importantly, can potentially re-establish VDPV transmission within a community.

Due to their deficient immune system, some PID patients are unable to stop the replication of OPV virus in their intestinal system and may continue to excrete iVDPV for months or years. The PID patient may eventually experience polio paralysis, and the excreted virus may start to circulate in the patient's community. To reduce the risk posed by iVDPVs to the individual PID patient and the community during the polio endgame and the post-eradication era, it will be important to establish surveillance for PID patients and iVDPV. Once country programs identify non-paralytic PID patients excreting polioviruses, iVDPV surveillance provides strategies and treatments to rid both the individual and the community of the risk posed by iVDPVs.³⁴

Ambiguous vaccine-derived poliovirus (aVDPV): A final category of poliovirus is called *ambiguous vaccine-derived poliovirus* (aVDPV). The term 'ambiguous' is used because the virus is neither c- nor iVDPV: it is not isolated from an individual with known immunodeficiency, nor can it be linked (yet) genetically to previously known VDPVs. aVDPVs may be an early indication of the possibility of a cVDPV developing, and therefore surveillance needs to be ramped up as soon as one is detected.

³² Public Health Dispatch: Outbreak of Poliomyelitis --- Dominican Republic and Haiti, 2000. MMWR Morb. Mortal. Wkly. Rep. 2000;49(48):1094,1103 (<https://www.cdc.gov/mmwr/preview/mmwrhtml/mm4948a4.htm>).

³³ Global Polio Eradication Initiative (GPEI). Standard operating procedures: responding to a poliovirus event or outbreak, version 4. Geneva: World Health Organization; 2022 (<https://polioeradication.org/wp-content/uploads/2022/07/Standard-Operating-Procedures-For-Responding-to-a-Poliavirus-Event-Or-Outbreak-20220807-EN-Final.pdf>).

³⁴ Global Polio Eradication Initiative (GPEI). Guidelines for Implementing Poliovirus Surveillance among Patients with Primary Immunodeficiency Disorders (PIDs), revised 2022. Geneva: World Health Organization; 2022 (https://polioeradication.org/wp-content/uploads/2022/06/Guidelines-for-Implementing-PID-Suveillance_EN.pdf).

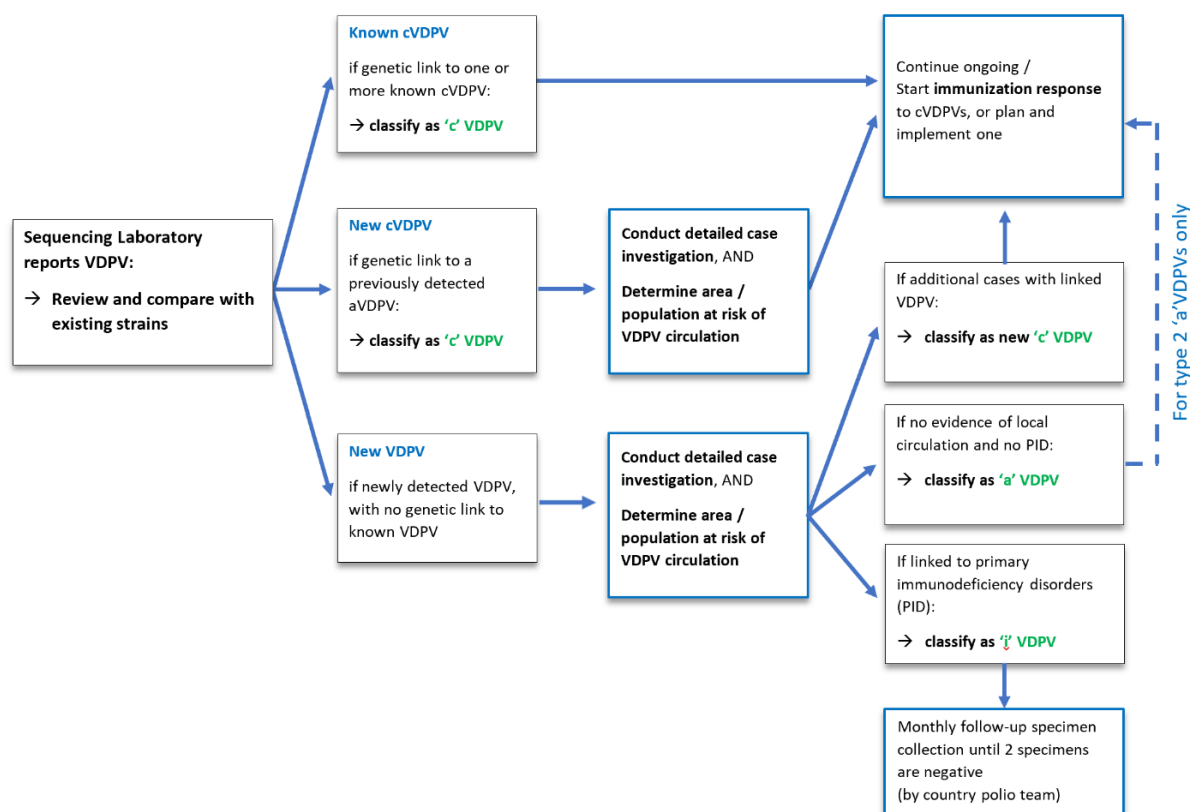


Figure 9 : Classification of and response to reported VDPV isolates

Note: Note that the classification of VDPV isolates is done by the sequencing laboratory in collaboration with the WHO regional polio team. aVDPV = ambiguous vaccine-derived poliovirus; cVDPV = circulating vaccine-derived poliovirus; iVDPV = immunodeficiency-associated vaccine-derived poliovirus; PID = primary immunodeficiency disorder; VDPV = vaccine-derived poliovirus. Source: GPEI. Classification and reporting of vaccine-derived polioviruses (VDPV). Geneva: World Health Organization; 2016 (https://polioeradication.org/wp-content/uploads/2016/09/Reporting-and-Classification-of-VDPVs_Aug2016_EN.pdf).

Annex 3. Timeline of poliomyelitis and polio eradication in the African Region

| | |
|----------------|---|
| 1918 | First large polio epidemic recognized in South Africa |
| 1948 | SA's largest polio outbreak w. 3,000 cases, 200 deaths - Polio Research Foundation in 1950. |
| 1949-54 | Large polio epidemics in Angola, DRC, French Eq. Africa, Kenya, Zimbabwe, Uganda, SA. |
| 1961-62 | Polio cases increase in 24 of 34 African countries reporting polio cases to WHO |
| 1974 | 168,000 polio cases estimated in Africa yearly – much higher than suspected. Estimate based on 'lameness surveys' conducted in 14 African countries, starting with Ghana. |
| 1976 | SA: Polio Research Foundation Lab opens, later becomes National Institute for Virology |
| 1988 | WHA resolution to eradicate polio worldwide, launch of 'Global Polio Eradication Initiative' |
| 1989 | WHO Africa Reg. Committee adopts 1988 WHA resolution, endorses reg. eradication goal |

| | |
|----------------|--|
| 1996 | OAU adopts Yaoundé Declaration to eradicate polio in Africa. Nelson Mandela launches 'Kick Polio out of Africa' campaign |
| 1999 | First house-to-house polio campaigns conducted in Nigeria; UN negotiates ceasefire between warring parties in DRC to allow ten million children to be immunized against polio; huge type 3 outbreak of polio in Luanda, Angola |
| 2003 | Boycott of polio vaccine in N. Nigeria: outbreak spreading to 20 countries worldwide by 2008 |
| 2005 | Importation of wild polio 1 from India: outbreaks in Luanda, Angola, and 2006 in Namibia |
| 2008 | WHO calls on Nigeria to respond swiftly to a polio outbreak affecting 15 countries in west-central Africa by 2010, followed by synchronized cross-border campaigns across the region |
| 2011 | Environmental surveillance for poliovirus used for the first time in Nigeria, first in the Region |
| 2012 | Nigeria accounts for 50% of the world's wild polio cases. - Nigeria sets up Polio Emergency Operations Center launches a national emergency plan, which accelerates progress. |
| 2013 | Wild PV 1 type 1 outbreak in Somalia spreads to Ethiopia and Kenya - trigger for large-scale vaccination campaigns across Horn of Africa countries |
| 2014 | WHO declares wild polio and cVPDVs as Public Health Emergency of International Concern |
| 2015 | Wild poliovirus 2 declared eradicated globally; last case of WPV2 found in India in 1999. |
| 2016 | After 3 years without wild polio case, 4 cases again detected in NE Nigeria around Lake Chad. Huge Lake Chad emergency response targets over 45 million children in 5 countries |
| 2016 | 155 countries and territories worldwide, including across Africa, switch from 'trivalent' OPV to 'bivalent' OPV, which does not contain the eradicated type 2 strain |
| 2016 | Independent review in 8 African countries: polio has provided major benefits to Africa's health systems, incl. for disease surveillance, routine immunization and outbreak response. |
| 2017 | DRC sees a wave of cVDPV2 outbreaks that leaves 29 children paralyzed |
| 2018 | Increase in reported cVDPV cases across all regions in Africa. Cases reported in 12 countries |
| 2019 | Wild poliovirus type 3 is certified to have been eradicated globally. |
| 2019 | WHO AFRO sets up Rapid Response Team to coordinate responses to cVDPV outbreaks. |
| 2019 | Nigeria 3 years wild polio free - regional wild polio-free certification process starts |
| 2020 | ARCC certifies WHO African Region wild polio-free after > 4 years without wild polio detected by certification-standard disease surveillance |
| 2021-23 | Continued cVDPV outbreaks; in 2022, cVDPV2 cases in 15, and cVDPV1 cases in 5 AFR countries |
| 2022 | Wild polio 1 importation from Pakistan into SE Africa - cases in Malawi, Mozambique; WPV1 transmission interrupted by end-2022 |

Annex 4. Quality indicators for AFP surveillance

Core timeliness indicators, as introduced by the GPEI 2022-2026 Strategy, reflect the overall capacity of the programme to rapidly identify any wild poliovirus (WPV) or vaccine-derived poliovirus (VDPV).

This capacity has been defined as: (1) the capacity of the programme to report a positive acute flaccid paralysis (AFP) case rapidly so that a response can be mounted fast; and (2) the capacity to process

rapidly any positive specimen (**Table 3.1**). Additional indicators highlight the capacity of the programme to report any laboratory results rapidly, regardless of the final result.

For certification purposes, in all countries, the definitions and thresholds for stool specimen collection and adequacy will remain unchanged (i.e. stool adequacy target of at least 80% AFP cases with 2 specimens collected at least 24 hrs apart, both within 14 days of paralysis onset, and received in good condition in a WHO-accredited polio laboratory).

However, the Global Polio Surveillance Action plan 2022 to 2024 identified a list of 'priority countries'³⁵, mainly in the African Region, where a new standard should be applied as programmatic target, to improve the timeliness of detection:

- two adequate stool specimens be **collected from all AFP cases and reach the laboratory in good condition within 14 days of the onset of paralysis** (i.e., 2 specimens collected within 11 days of onset, reaching the laboratory within 3 days of collection, see Figure 2 below)
- testing and sequencing and/or whole genomic sequencing results, i.e., the **final results of lab testing, should be reported within 35 days** of the onset of paralysis.

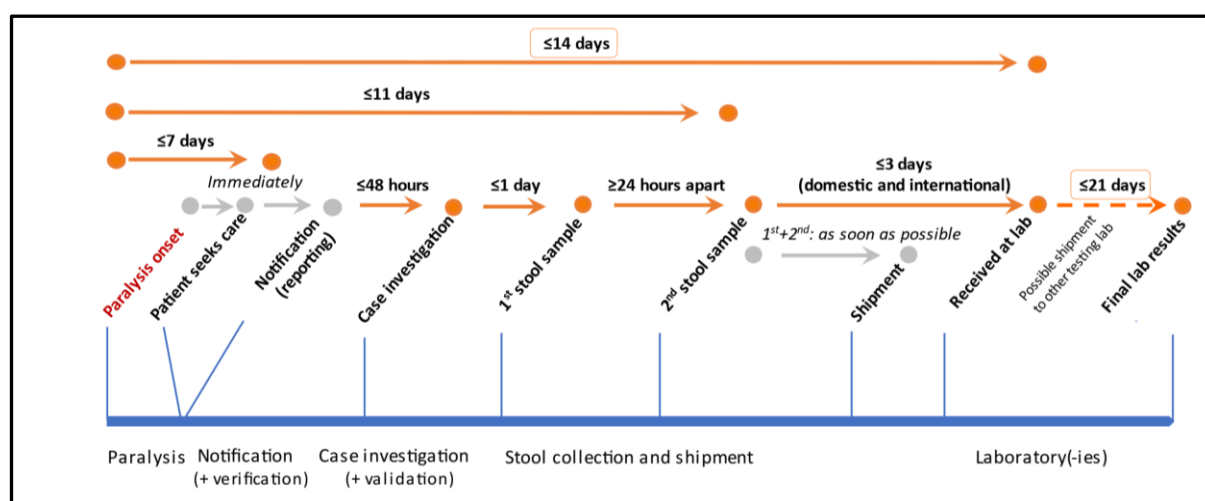


Figure 10: Timeliness of detection (AFP cases), 35 days (onset to final lab result)

Table 9: Overall indicators on timeliness

| Indicator | Calculation (expressed as a percentage) | Target |
|-------------------------------|--|--------|
| Overall detection of WPV/VDPV | For AFP (1) # of AFP cases* with WPV/VDPV final lab results ≤35 days of onset / # of AFP cases* with WPV/VDPV final lab results | ≥80% |
| | System capacity (2)† # of WPVs and VDPVs with final lab results ≤35 days of onset for AFP cases / # of WPVs and VDPVs | ≥80% |
| AFP detection – system | # of AFP cases* with final lab results ≤35 days of onset / # of AFP cases* | ≥80% |

³⁵ Countries were identified as “priority countries” due to persistent gaps in surveillance and chronic vulnerability to poliovirus transmission. As of publication of the GPSAP in early 2022, 20 of the 30 priority countries identified worldwide were in the WHO African Region.

AFP = acute flaccid paralysis; VDPV = vaccine-derived poliovirus; WPV = wild poliovirus
 *Aggregated results: all lab results (AFP + contacts) used to classify AFP case as confirmed/discarded.
 †Specimen-based calculation

Table 10: Indicators on timeliness for field activities

| Indicator | Calculation (expressed as a percentage) | Target |
|--|--|-------------|
| Timeliness of notification | $\frac{\text{\# of AFP cases reported } \leq 7 \text{ days of onset}}{\text{\# of AFP cases}}$ | $\geq 80\%$ |
| Timeliness of investigation | $\frac{\text{\# of AFP cases investigated } \leq 48 \text{ hours of notification}}{\text{\# of AFP cases}}$ | $\geq 80\%$ |
| Timeliness of field activities | $\frac{\text{\# of AFP cases with 2 stool specimens collected } \geq 24 \text{ hrs apart AND } \leq 11 \text{ days of onset}}{\text{\# of AFP cases}}$ | $\geq 80\%$ |
| Timeliness of field and shipment activities | $\frac{\text{\# of AFP cases with 2 stool specimens collected } \geq 24 \text{ hours apart AND received in good condition* at a WHO-accredited laboratory AND } \leq 14 \text{ days of onset}}{\text{\# of reported AFP cases}}$ | $\geq 80\%$ |
| Timeliness of stool specimen shipment | $\frac{\text{\# of stool specimens that arrive in good condition* at a WHO-accredited lab AND } \leq 3 \text{ days of specimen collection}}{\text{\# of stool specimens collected}}$ | $\geq 80\%$ |

AFP = acute flaccid paralysis; WHO = World Health Organization
 *For calculations: missing stool condition = poor condition

Table 11: Indicators on timeliness for laboratory activities

| Indicator | Calculation (expressed as a percentage) | Target |
|---|--|-------------|
| AFP: Timeliness of reporting laboratory results (system performance) | $\frac{\text{\# of stool specimens with final lab results available } \leq 21 \text{ days from a direct detection country OR } \leq 28 \text{ days from a non-direct detection country of receipt at a WHO-accredited lab}}{\text{\# of stool specimens collected}}$ | $\geq 80\%$ |
| AFP: Timeliness of reporting WPV/VDPV results (detection) | $\frac{\text{\# of stool specimens with WPV/VDPV final lab results available } \leq 21 \text{ days of receipt from a direct detection country OR } \leq 28 \text{ days of receipt from a non-direct detection country at a WHO-accredited lab}}{\text{\# of stool specimens collected positive for WPV/VDPV}}$ | $\geq 80\%$ |
| AFP: Timeliness of reporting poliovirus laboratory results | $\frac{\text{\# poliovirus stool specimens with sequencing results available } \leq 7 \text{ days of receipt at a WHO-accredited sequencing lab}}{\text{\# of PV stool specimens positive by ITD requiring sequencing}}$ | $\geq 80\%$ |

AFP = acute flaccid paralysis; ITD = intratypic differentiation; VDPV = vaccine-derived poliovirus; WHO = World Health Organization; WPV = wild poliovirus

Table 12: Core indicators on AFP surveillance quality

| Indicator | Calculation | Target |
|---------------------------------|---|---|
| NPAFP rate* | $\frac{(\text{\# of cases discarded as NPAFP in children <15 years of age})}{(\text{\# of children <15 years of age})} \times 100\,000 \text{ per year}$ <p>Note: Endemic countries are encouraged to have ≥ 3</p> | AFR, EMR, SEAR: ≥ 2 AMR, EUR, WPR: ≥ 1 OB-affected:† ≥ 2 |
| NPAFP rate – subnational | $\frac{(\text{\# of districts with } \geq 100\,000 \text{ children <15 years old that meet the NPAFP rate target})}{(\text{\# of districts with } \geq 100\,000 \text{ children <15 years old})} \times 100$ <p>Note: Need to reach ≥ 3 per 100,000 in all high-risk districts within an outbreak country</p> | AFR, EMR: $\geq 80\%$ SEAR: $\geq 50\%$ AMR, EUR, WPR: NA OB-affected districts:* 100% |
| Stool adequacy | $\frac{(\text{\# of AFP cases with 2 stool specimens collected } \geq 24 \text{ hours apart AND } \leq 14 \text{ days of onset AND received in good condition‡ in a WHO-accredited laboratory})}{(\text{\# of AFP cases})} \times 100$ <p>Note: Certification indicator (14 days)</p> | $\geq 80\%$ |

AFP = acute flaccid paralysis; AFR = African Region; AMR = Region of the Americas; EMR = Eastern Mediterranean Region; EUR = European Region; NA = not applicable; NPAFP = non-polio acute flaccid paralysis; OB = outbreak; SEAR = South-East Asia Region; WHO = World Health Organization; WPR = Western Pacific Region

*Rate should be annualized.

†Outbreak-affected country is defined as: any country experiencing an outbreak of WPV or circulating vaccine-derived poliovirus (cVDPV) currently or in the previous 12 months.

‡For calculation: missing stool condition = poor condition

Table 12 (continued)

| Indicator | Calculation (expressed as a percentage) | Target |
|-------------------------------------|---|-------------|
| Stool adequacy – subnational | $\frac{(\text{\# of districts that reported } \geq 5 \text{ AFP cases that meet the stool adequacy target})}{(\text{\# of districts that reported } \geq 5 \text{ AFP cases})} \times 100$ | $\geq 80\%$ |
| Stool timeliness | $\frac{(\text{\# of AFP cases with 2 stool specimens collected } \geq 24 \text{ hrs apart, AND } \leq 14 \text{ days of onset})}{(\text{\# of reported AFP cases})} \times 100$ <p>Note: Certification indicator (14 days of onset)</p> | $\geq 80\%$ |
| Stool condition | $\frac{(\text{\# of AFP cases with two stool specimens arriving in good condition* at a WHO accredited lab})}{(\text{\# of reported AFP cases})}$ | $\geq 80\%$ |
| Composite index – national | $\frac{(\text{Population living in districts that meets both NPAFP rate target and stool adequacy target})}{(\text{Population living in all districts (Admin2)})}$ | $\geq 80\%$ |

| | | |
|---|--|---------------------------|
| Composite index – subnational | $\frac{\text{\# of districts with } \geq 100,000 \text{ children } < 15 \text{ years old that meet NPAFP rate target and stool adequacy target}}{\text{\# of districts with } \geq 100,000 \text{ children } < 15 \text{ years of age}}$ | $\geq 80\%$ |
| Adequacy of active surveillance visits† (2 calculations) | 1. $\frac{\text{\# visits to HP sites conducted}}{\text{\# HP site visits planned}}$ 2. $\frac{\text{\# HP sites visited}}{\text{Total \# HP sites}}$ | 1. $\geq 80\%$ 2. 100% |
| Completeness of 60-day follow-ups | $\frac{\text{\# of inadequate AFP cases with a follow up exam for residual paralysis completed } \geq 60 \text{ days AND } \leq 90 \text{ days of onset}}{\text{\# of inadequate AFP cases}}$ | $\geq 80\%$ |
| Completeness of weekly zero reporting (WZR) | $\frac{\text{\# of sites reporting}}{\text{\# of designated reporting sites for AFP surveillance}}$ | $\geq 80\%$ |
| Timeliness of WZR | $\frac{\text{\# of sites reporting by the deadline}}{\text{\# of designated reporting sites for AFP surveillance}}$ | $\geq 80\%$ |

AFP = acute flaccid paralysis; HP = high-priority; NPAFP = non-polio acute flaccid paralysis; WZR = weekly zero reporting

*For calculation: missing stool condition = poor condition

†(a) High-priority sites are those facilities where there is a high likelihood of seeing an AFP case; they are visited at least on a weekly basis and sometimes more often, (b) Combination indicator in which “all HP sites have ≥ 1 visit each month” to be used as a flag, (c) Calculated per month.

Table 13: Non-core indicators on AFP surveillance*†

| Indicator | Calculation (expressed as a percentage) | Target |
|--|--|--------|
| Unreported AFP cases found during active surveillance | $\frac{\text{\# of unreported AFP cases found in the register during active surveillance visits}}{\text{month}}$ | None |
| Percentage of supervised active surveillance visits† | $\frac{\text{\# of active surveillance visits supervised per month}}{\text{\# of active surveillance visits conducted per month}}$ | >=25% |
| Number of active surveillance visits in high-priority sites | $\frac{\text{>=4 visits per month to the HP site}}{\text{\# of visits planned to the HP site}}$ | 100% |
| AFP case field validation Note: as opposed to a clinical validation; would be done by a supervisor or higher than the person who reported the case | $\frac{\text{\# of AFP cases validated <=14 of investigation}}{\text{\# of AFP cases}}$ | >=50% |
| Completeness of AFP contact sampling | $\frac{\text{\# of inadequate AFP cases with contact sampling§}}{\text{\# of inadequate AFP cases}}$ | >=80% |
| Timeliness of AFP contact sampling | $\frac{\text{\# of contact stool specimens of inadequate cases collected <=7 of days of investigation}}{\text{\# of contact stool specimens of inadequate cases}}$ | >=80% |

AFP = acute flaccid paralysis; HP = high-priority

* For priority countries (very high risk, high risk, and medium-high risk), indicators should be analysed monthly.

† For non-priority countries, indicators should be reviewed quarterly and included in desk reviews.

‡ Calculated by priority site, by geography, and by quarter.

§ 2 or 3 contact samples per inadequate AFP case, as per regional recommendation.

Table 14: Non-core indicators on health-seeking behaviours*†

| Indicator | Calculation (expressed as a percentage) | Target |
|--|--|-------------|
| AFP case encounters‡ | $\frac{\text{\# of AFP cases with } \leq 2 \text{ health encounters between onset and notification}}{\text{\# of AFP cases}}$ | $\geq 80\%$ |
| Adequacy of notification by designation | $\frac{\text{\# of 1st health encounters that led to a notification, by designation [reporting source]§}}{\text{\# of health encounters by that same designation}}$ | $\geq 80\%$ |
| Appropriateness of surveillance network | $\frac{\text{\# of AFP cases with first health encounters with a reporting site within the AFP surveillance network}}{\text{\# of AFP cases}}$ | $\geq 80\%$ |
| Late reported AFP cases: Completeness of health encounter information | $\frac{\text{Among AFP cases reported } > 14 \text{ days after paralysis onset: \# of AFP cases with no information on health encounters}}{\text{\# AFP cases reported } > 14 \text{ days after paralysis onset}}$ | $\geq 80\%$ |

AFP = acute flaccid paralysis

* For priority countries (very high risk, high risk, medium-high risk), indicators should be analysed monthly.

† For non-priority countries, indicators should be reviewed quarterly and included in desk reviews.

‡ Results should be stratified by sex.

§ This is the "percentage of 1st encounters by designation (e.g., doctor, nurse, traditional healer, vaccinator, other) that led to the notification of an AFP case."

Table 15: Non-core indicators on community-based surveillance

| Indicator | Calculation (expressed as a percentage) | Target |
|--|---|-------------------|
| Proportion of AFP cases reported by CBS | $\frac{\text{\# of AFP cases (those on linelist) identified by community informant}}{\text{\# of AFP cases on linelist}}$ | TBD |
| Proportion of 'verified' AFP reported by CBS | $\frac{\text{\# of 'suspect' AFP cases identified by community informant}}{\text{\# of AFP cases 'verified' by surveillance officers}}$ | TBD |
| Completeness of weekly/monthly zero reporting (WZR/MZR) | $\frac{\text{\# of reports received from community informants}}{\text{\# of expected reports from community informants}}$ | $\geq 80\%$ |
| Timeliness of WZR/MZR | $\frac{\text{\# of reports received on time from community informants}}{\text{\# of expected reports from community informants}}$ | $\geq 80\%$ |
| Proportion of female informants | $\frac{\text{\# of female informants}}{\text{\# of informants}}$ | $\geq 50\%-80\%*$ |
| Proportion of informants from local area | $\frac{\text{\# of local informants}}{\text{\# of informants}}$ | $\geq 80%*$ |

AFP = acute flaccid paralysis; CBS = community-based surveillance; MZR = monthly zero reporting; TBD = to be determined;

WZR = weekly zero reporting

*Target to be adjusted at the country level; priority countries to regularly analyse.

Table 15 - continued

| Indicator | Calculation (expressed as a percentage) | Target |
|--|---|-------------|
| Supervision of informants^{† ‡} | $\frac{\text{\# of informants who have received at least one supervisory visit in last 3 months}}{\text{\# of informants}}$ | $\geq 80\%$ |
| Informant training^{‡ §} | $\frac{\text{\# of informants with training within the last year}}{\text{\# of informants}}$ | $\geq 80\%$ |
| Informant turnover rate^{‡ § ¶} | $\frac{\text{\# of informants who left during the previous year}}{\text{\# of informants}}$ | TBD |

[†] To be reviewed quarterly; priority countries to regularly analyse. Suggest to stratify results by supervisor.

[‡] Results should be stratified by sex.

[§] To be reviewed annually; priority countries to regularly analyse.

[¶] Informant turnover rate is a flag; the target is to be defined at the country level. The calculations should be based on the number of informants at the beginning of the review period.

Table 16: Gender-related indicators

| Indicators | Calculation (expressed as a percentage) |
|--|---|
| Case detection | $\frac{\text{\# of AFP cases* by sex with final lab results } \leq 35 \text{ days of onset}}{\text{\# of AFP cases}}$ |
| Timeliness of field activities | $\frac{\text{\# of AFP cases by sex with 2 samples collected } \geq 24 \text{ hrs apart, both within 11 days of paralysis onset}}{\text{\# of reported AFP cases}}$ |
| Timeliness of notification | $\frac{\text{\# of AFP cases by sex reported within 7 days of paralysis onset}}{\text{\# of reported AFP cases}}$ |
| Health contact | $\frac{\text{\# of AFP cases by sex with } \leq 2 \text{ healthcare encounters between onset and before notification}}{\text{\# of AFP cases}}$ |
| Professional profile by sex (by category) | $\frac{\text{\# of women [professional profile]}}{\text{total \# of staff or informants (by category: surveillance officer, supervisor, CBS informant)}}$ |
| Staff with completed PRSEAH | $\frac{\text{\# of surveillance staff having completed PRSEAH training}}{\text{\# of staff}}$ |

AFP = acute flaccid paralysis; CBS = community-based surveillance; PRSEAH = preventing and responding to sexual exploitation, abuse and harassment

*Aggregated results: all lab results (AFP + contacts) used to classify AFP case as confirmed/discarded

Annex 5. Examples of forms

5.1 - Active surveillance visit form

Active surveillance (AS) for acute flaccid paralysis (AFP)

Name of officer: _____

Date of visit: _____

Year _____

Month of visit: _____

Province: _____

District: _____

Name of health facility (+ other identifier): _____

| No. | Item | Status | | | Remarks |
|--|---|------------------|--|-------------|-------------------------------------|
| 1 | Interview with: | | | | |
| 1.1 | Doctor in charge | Yes | No | N/A | |
| 1.2 | AFP / surveillance focal point | Yes | No | N/A | |
| 1.3 | Pediatrician of the facility | Yes | No | N/A | |
| 1.4 | Neurologist of the facility | Yes | No | N/A | |
| 1.5 | Physiotherapist of the facility | Yes | No | N/A | |
| 1.6 | Other health facility staff. <i>Specify:</i> _____ | Yes | No | N/A | |
| 2 | Check for new / missed AFP cases: | | | | Details of new AFP cases: |
| 2.1 | Outpatient register (OPD) checked for AFP cases | Yes | No | N/A | |
| 2.2 | Inpatient register (IPD) checked for AFP cases | Yes | No | N/A | |
| 2.3 | Internal medicine department / ward | Yes | No | N/A | |
| 2.4 | Neurology unit | Yes | No | N/A | |
| 2.5 | Orthopedic department | Yes | No | N/A | |
| 2.6 | Physiotherapy unit | Yes | No | N/A | |
| 2.7 | Other departments / units / wards. <i>Specify:</i> _____ | Yes | No | N/A | |
| 3 | Check for supplies and material availability: | | | | |
| 3.1 | Stool specimen kit(s) | Yes | No | N/A | |
| 3.2 | Specimen carrier(s) | Yes | No | N/A | |
| 3.3 | AFP poster(s) visible in the facility | Yes | No | N/A | |
| 4 | <i>Summary:</i> New and unreported cases <i>since last visit:</i> | New (all new) | Unreported (out of the new cases found) | | If already reported, write EPID no. |
| 4.1 | Number of AFP cases found during this visit, since the last visit | | | | |
| 5 | Feedback: | Number | | | EPID of cases for result pending |
| 5.1 | Number of AFP cases for which results have not reached the facility in >60 days | | | | |
| 6 | Other checks done: | | | | Remarks |
| 6.1 | Vaccine cold chain fully functional | Yes | No | N/A | |
| 6.2 | Polio vaccine in stock | Yes | No | N/A | |
| 6.3 | <i>Other:</i> _____ | Yes | No | N/A | |
| Name of person in charge of facility: _____ | | | | | |
| Signature of person in charge of facility: _____ | | | | Date: _____ | |
| Signature of officer: _____ | | | | Date: _____ | |

5.2 - Case investigation form (used since December 2020 in all countries in AFRO)

POLIO ERADICATION PROGRAMME: ACUTE FLACCID PARALYSIS CASE INVESTIGATION FORM

Official Use

Only: EPID Number: _____ Received: ____/____/____
Country Region/Prov. Districts Year onset Case Number by the Programme at National level

IDENTIFICATION

District: _____ Region/Province: _____ Name nearest Health Facility: _____
 Address: _____ Village: _____ City: _____

AFP case coordinates (WGS 1984 format) : Longitude : _____ Latitude : _____

Patient name: _____ Father/Mother: _____

Date of Birth (DOB) ____/____/____ Age: _____ years _____ months Sex: M=Male
 (If DOB Unknown) (If DOB Unknown) F=Female

NOTIFICATION/INVESTIGATION:

Date of Notified by: _____ Date of Notification ____/____/____ Investigation: ____/____/____

HOSPITALIZATION

Hospitalized: 1=Y Date of admission to hospital, if applicable: ____/____/____
2=N

Hospital record #: _____ Name of hospital/Address: _____

CLINICAL HISTORY of paralysis?

Fever at the onset Progressive Paralysis
≤ 3 d 1=Y, 2=N, 99=Unknown 1=Y, 2=N, 99=Unknown LA RA
 Date of onset: ____/____/____ Is Paralysis flaccid and acute? Asymmetric? Site of Paralysis LL RL
1=Y, 2=N, 99=Unknown 1=Y, 2=N, 99=Unknown

Paralysed limb (s) Sensitive to pain: Yes/No
 Was there any injection just before onset of paralysis: Yes/No

If yes mention the site of injection in the table below

| | Arm | Fore-arm | Buttocks | Thigh | Leg |
|--------------|-----|----------|----------|-------|-----|
| Right | | | | | |
| Left | | | | | |

PROVISIONAL DIAGNOSIS-----

AFTER INVESTIGATION, WAS THIS A TRUE AFP? 1=Y If not, do not fill the rest of the form and record 6 under
2=N final classification

IMMUNIZATION HISTORY

Total Number of Polio vaccine doses Exclude dose at birth OPV dose at birth ____/____/____ 2nd ____/____/____ 4th ____/____/____
99=Unknown 1st ____/____/____ 3rd ____/____/____ dose Last ____/____/____
If > 4

Total OPV doses received through SIA: 99=Unknown Total OPV doses received through RI: 99=Unknown.

Date of last OPV dose received through SIA: ____/____/____

Total IPV doses received through SIA: 99=Unknown Total IPV doses received through RI: 99=Unknown

Date of last IPV dose received through SIA: ____/____/____ Source of RI vaccination information: Card Recall Choose one

STOOL SPECIMEN COLLECTION:

_____ / _____ / _____ _____ / _____ / _____ _____ / _____ / _____
 Date 1st specimen Date 2nd specimen Date specimen sent to the
 to the national level

_____ / _____ / _____ _____ / _____ / _____
 Date specimen received at Date specimen sent
 the national level inter-county/national Laboratory

STOOL SPECIMEN RESULTS:

_____ / _____ / _____ 1= Adequate _____ / _____ / _____ _____ / _____ / _____
 Date specimen received at 2=Not adequate Date combined Cell Culture Date Results sent to
 inter country (I-C)/national Lab Status of specimen at Results available national EPI Date Results received at
 Reception at the lab Final cell 1=Suspected poliovirus 3=NPENT national EPI
 Culture Results 2= Negative 4-Suspect poliovirus + NPENT

_____ / _____ / _____ _____ / _____ / _____ _____ / _____ / _____
 Date sent from I-C/National Date I-T differentiation Date I-T differentiation
 Laboratory to regional lab results sent to EPI results received at EPI

_____ / _____ / _____ _____ / _____ / _____
 Date isolate sent for sequencing Date seq results sent to program

Discordant

| | | | | | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| W1 | W2 | W3 | Sabin | SL1 | SL2 | SL3 | (R) NPENT | NEV |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1=Y, 2=N | | | Type 1,2,3 | 1=Y, 2=N | | | 1=positive, 2=Negative | |

Final Lab Results

FOLLOW-UP EXAMINATION

_____ / _____ / _____ Residual LA 1 = Residual Flaccid Paralysis
 Date of Follow-up exam. Paralysis? LL results 2= Residual paralysis
 LL RL of exam 3= Lost follow-up
 4=Died before follow-up
 5= Residual Spastic Paralysis

Immunocompromised status suspected: 1=Y, 2=N, 99=Unknown

FINAL CLASSIFICATION

1=Confirmed Polio 7=cVDPV pro-type (1, 2, 3)
 2=Compatible
 3=Discarded 8=aVDPV
 6=Not an AFP case 9=iVDPV

Fill in this section before signing the form

Where has the child been seeking help for this problem before presenting at present place (in sequence of visits)?

(1). Place: _____ Duration: months _____ days _____ (2) Place: _____ Duration: months _____ days _____

(3). Place: _____ Duration: months _____ days _____ (4) Place: _____ Duration: months _____ days _____

INVESTIGATOR: Name _____ Title _____

Unit: _____ Address _____ Tel: _____

| Contact Stool Collection Form – (for inadequate AFP cases) | | | | | | |
|---|--|------------------------|---------------------------|----------|---------------------|-------|
| EPID number of contact <i>(index AFP EPID number – C1, C2 or C3)</i> | | | | | | |
| EPID number of community sample CCC-PPP-DDD-YY-000CC1 etc | | | | | | |
| Reason for collection | Inadequate | Hot case | Hard-to-reach area | Other | | |
| Name of contact/Community case | | | | | | |
| Address | | | | | | |
| Area | | | | | | |
| District | | | | | | |
| Province | | | | | | |
| Country | | | | | | |
| Specimen number (in case of multiple samples from contact) | | | | | | |
| Date of stool collection | | | | | | |
| Date stool sent to laboratory | | | | | | |
| Name of Index Case | | | | | | |
| Relation to index case | Household relative | Household non-relative | Out-of-household relative | Neighbor | Playmate/Schoolmate | Other |
| Period of Exposure to Index AFP cases | <input type="checkbox"/> more than 7 days prior to onset of paralysis <input type="checkbox"/> within 7 days prior to onset of paralysis <input type="checkbox"/> within 2 weeks after onset of paralysis or N/A | | | | | |
| Date of birth or Age in months | ___/___/___ months | | | | | |
| Sex | Male | | | Female | | |
| Number of routine OPV/IPV doses | | | | | | |
| Number of SIA OPV/IPV doses | | | | | | |
| Date of last OPV/IPV | | | | | | |
| Date stool received at laboratory | | | | | | |
| Laboratory serial number | | | | | | |

| | |
|---|--|
| Date culture results sent from lab to EPI | |
| Comment and Signature | |

Instructions:

1. Systematically Collect 1 specimen from 3 contacts of all All inadequate AFP cases.
2. Prioritize contacts under 5 years of age living in the same house as the AFP case.
3. If there are less than 5 contacts in the house, choose the closest playmates or neighbors of the AFP case
4. Fill a contact specimen collection form for each contact. Or separate form for each community case.
5. Use the same specimen collection procedures and reverse chain as for the AFP case specimen collection.
6. Use a separate vaccine carrier for contact specimens and the AFP case specimens.

C=Contact

CC= Community sample

Signature: _____

5.3 - Detailed case investigation form

The main elements to include in a detailed case investigation form (CIF) or report are:³⁶

- **Case notification**
 - Name and unique epidemiological identification (EPID) number
 - Date of notification
 - Name of respondent and relationship with case
 - Name of interviewer, contact information and affiliation
 - Date of case investigation
- **Demographic**
 - Residence (province, district, village, etc.)
 - Date of birth, age
 - Sex
- **Vaccination**
 - Total number of oral polio vaccine (OPV) doses received in essential immunization (incl. code for unknown, i.e., 99)
 - Total number of OPV doses received during supplemental immunization activities (SIAs) (incl. code for unknown, i.e., 99)
 - Total number of inactivated polio vaccine (IPV) doses received in essential immunization (incl. code for unknown, i.e., 99)
 - Total number of IPV doses received in SIAs (incl. code for unknown, i.e., 99)
 - Date of last OPV dose
- **Clinical information**
 - Date of paralysis onset
 - Fever at onset of paralysis?
 - Asymmetric paralysis?
 - Neurological examination
- **Risk factors**
 - Occupation of parents/caregivers
 - Ethnicity
 - Special population (check all that apply): refugee, internally displaced population (IDP), reside in security-challenged area, migrant/mobile population
 - Travel history of case and household members (outside of district or country) within one (1) month of onset of paralysis
 - History of attendance at gathering of case and household members (large scale market/fair, other) within one (1) month of onset of paralysis
 - History of visitors to the household within one (1) month of onset of paralysis
- **Specimens**
 - Specimen numbers
 - Date of collection of stool specimens
 - Date stool specimen received in laboratory
 - Condition of stool (good, poor, unknown)
- **Laboratory results**
- **History of care-seeking prior to notification**
 - Name and location of sites / facilities visited by the case between onset and notification
 - Dates of visits
- **Other AFP cases in area?**
- **Geographic and demographic information, population size of area**
- **Rapid OPV/IPV coverage survey of area**
- **Essential immunization and SIA coverage**
- **Map**

If the polio isolate was detected through environmental surveillance (ES), special focus should go towards understanding the catchment area of this ES site, the sociodemographic characteristics and level of vaccination coverage of the population living in that catchment area. In addition, the investigation should look for missed AFP cases in/around the ES site catchment area.

³⁶ An example of a detailed case investigation form can be found on the GPEI website (http://polioeradication.org/wp-content/uploads/2016/09/Detailed-Case-Investigation-Form_July2011_EN.doc).

**EXPLANATORY NOTES FOR THE FILLING OUT OF THE
60-DAY FOLLOW-UP EXAMINATION FORM OF
AFP CASES**

1. EPID number, Identification, History of illness, Follow-up Examination

(See instructions on the AFP case investigation form for details on how to fill out this section)

2. Medical history

Mention other information that has occurred with the patient since the last examination, such as vaccinations and other illnesses that may explain the patient's current condition.

3. Clinical examination (current symptoms)

Mention all the symptoms that the patient presents at the interview with the parents/caregivers and the patient him/herself

4. Physical signs

Describe the physical signs observed during the examination, including the condition of the limbs

5. Other information

Mention any other information on the child's health status that could guide the members of the National Committee of Experts on Poliomyelitis (CNEP) in their decision-making

Annex 6. AFP case investigation

6.1 How to document the AFP case history. While observing the patient for signs of paralysis or weakness, the surveillance officer should take the history of the case from the patient's caregiver (or the patient, if an older child), transcribing key elements on the case investigation form (CIF), including:

(1) Patient identification

- Patient / caregiver identification (names, address or location, mobile phone, etc.) that will be key to tracing the family back, if needed.
- Date of onset of paralysis. Key for further analyses.

(2) Immunization history

- Number of oral polio vaccine (OPV) and/or inactivated polio vaccine (IPV) doses received prior to onset of weakness, whether through supplementary immunization activities (SIA) or essential immunization (confirm with immunization card, if available).
- Siblings (OPV and/or IPV) vaccination status.

(3) History of illness

- First symptoms; date and place of onset of weakness or paralysis (key for the assignment of the epidemiological identification [EPID] number); fever or other symptoms at onset, incl. whether the weakness progressed rapidly or not, and whether the weakness affected both extremities equally or not.
- If one or more health providers (formal, informal) were consulted prior to the case being notified, this should be noted, as well as the dates and the names of providers and what treatment, if any, was provided.
- The caregiver should be asked whether there is anyone else in the community with similar symptoms.

(4) Travel history

- Travel by the case or anyone else in the household during the 30 days prior to onset of weakness (record details: person, place, time).
- Visitors received during the 30 days prior to onset of weakness (record details: person, place, time).

(5) Special population or high-risk group

- Nomads, internally displaced population (IDP), refugees, people living in inaccessible areas, or other special population or high-risk group should be recorded on the CIF, if applicable.

6.2 How to conduct the clinical examination

The objective of the clinical examination in a case investigation of acute flaccid paralysis (AFP) is to *establish whether there is any degree of paralysis or paresis or not*, regardless of the current clinical diagnosis. It is therefore NOT to establish an exact medical-neurological diagnosis. The physical examination should then be done ideally by a person qualified to do so – either the person charged with the investigation or the attending physician in the hospital.

In AFP surveillance, the objective of the clinical examination is to establish whether there is any paralysis or paresis or not. It is **NOT** to establish an exact medical-neurological diagnosis.

In most cases, the investigator will have learned much about the presence or absence of flaccid paralysis just through the initial observation of the patient. Depending on the patient's age and ability to cooperate, the investigator should request the patient to walk (if there is an involvement of lower limbs) and then observe the patient's gait. If there is involvement of the upper limbs, request the patient to lift his/her arms. While the physical examination is easier with a cooperative older child, it must also be done with infants and toddlers, and thus, trust must be secured.

The focus of the examination should be on simple neurological testing, including an assessment of motor power, muscle tone and reflexes. Status of sensation should be verified. A brief overall clinical examination should be conducted to assess the health status of the child, including a temperature check for a fever and any signs of malnutrition and dehydration. Where / when feasible, a neurological examination through a pediatrician or neurologist can be carried out and attached to the CIF but is *not essential*.

6.3 How to collect and store stool samples from AFP cases

Materials and supplies

- | | | |
|--|--|--|
| ✓ Specimen carrier | ✓ Water-resistant pen for labelling | ✓ Contact information of parent/guardian |
| ✓ Frozen ice packs (4) | ✓ Absorbent material (e.g., cotton) | ✓ EPID numbers, if available |
| ✓ Case investigation form (CIF) | ✓ Gloves | |
| ✓ Laboratory request form | ✓ 4 Ziploc plastic bags (to hold containers and forms) | |
| ✓ 2 screw-top specimen collection containers | | |
| ✓ Container labels (adhesive) | | |

Step-by-step instructions for stool collection

For a process flow on collecting stool samples for AFP cases, see **Fig. 11**.

1. Use only the designated stool carrier (not the carrier used for vaccines), which should be lined with frozen ice packs.
2. Use the designated screw-top specimen containers. Should such containers not be available, use any dry, clean, leak-proof container or bottle.
3. WEAR GLOVES DURING SPECIMEN COLLECTION!
4. For patients who need more time to produce a specimen, leave all materials listed above in the health facility or with the family. Explain the collection procedure in simple language. Return to collect the specimens and provide new frozen ice packs.
5. Collect fresh stool from the patient's diapers or bed pan, or have the patient defecate onto a piece of paper or plastic.
6. Collect a volume of stool about the size of two adult thumbnails (approximately 8-10 grams). Note that the laboratory may reject extremely watery samples and the laboratory also considers rectal swabs inadequate.
7. Use the spatula provided in the kit container to place the specimen in a clean, leak-proof, screw-capped container and firmly screw the cap back on.
8. Use an indelible or permanent marker to record the following on the self-adhesive label (or a piece of tape or directly on the container, if labels are not available):



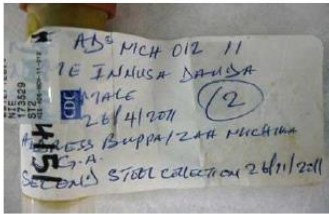
- a. First and last name of the case
 - b. EPID number
 - c. Date of collection for each specimen
 - d. Time of collection for each specimen
 - e. Specimen number (“1st” or “2nd”)
 - f. “Hot case”
9. Stick the label to the appropriate specimen container.
 10. Firmly close the container, place it in the Ziploc plastic bag, and seal the bag. If available, wrap the container in absorbent material prior to placing in the bag in case of shock or leak during transport.
 11. Immediately place the specimen into the specimen carrier, in the middle of the four (4) frozen ice packs. Never store stool samples in refrigerators or freezers with vaccines or food.
 12. Remove gloves and dispose of them appropriately. Wash hands with soap and water after the completion of specimen collection and glove disposal.
 13. Repeat steps 1-11 for the second sample, to be collected at least 24 hours after the collection of the first specimen.
 14. Replace ice packs with new, frozen ice packs every 24 hours.
 15. Once both stool samples are in the carrier, pack the remaining empty space in the carrier with paper or cotton so that the containers do not move when the carrier is transported.
 16. Place the completed CIF in a Ziploc plastic bag and place it in the carrier.
 17. Place the completed laboratory request form for the case in a sealed Ziploc plastic bag and place inside the carrier before sending to the laboratory.

Figure 11: Process of specimen collection, packing and transport

1. All AFP cases should be investigated including the collection of stool specimens



2. Label specimen container with patient name, unique ID number, date of collection, and specimen number.



3. Collect an appropriate amount of stool, (adult thumb nail size), and place in labeled container.

5. Place each specimen in a plastic bag and then store in a specimen carrier with frozen icepacks. Icepacks should be replaced every 24 hours.

4. A 2nd stool should be collected at least 24 hours after the 1st and packaged / stored as described



6. The completed case investigation form should be placed in a plastic bag. Then both specimen bags, and the bag with the case investigation form, should be placed in another larger plastic bag.



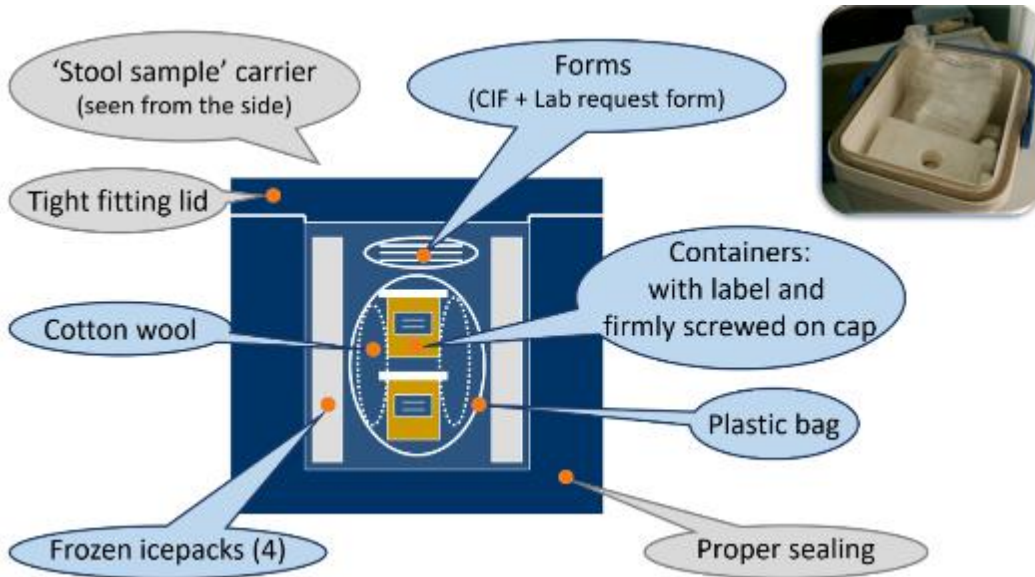
7. The specimens and case investigation form should be stored in a specimen carrier with 4 frozen icepacks until arrival at the laboratory.



8. Ship specimens as soon as possible.

Source: WHO.

Figure 12: Placement of specimens and supplies in sample carrier, side view



Source: WHO.

Annex 7. Special population groups

Table 17: Special population groups

| Special population groups | |
|---|---|
| Definition | Special populations are groups that are not served or are underserved by the regular health delivery system. |
| Categories | <ol style="list-style-type: none"> 1. Populations living in security-compromised areas 2. Mobile populations: nomads and seasonal migrants (e.g., agricultural or mine workers, brick kilns, construction workers, etc.) 3. (a) Refugees and IDPs in camps and (b) those living in host communities 4. Special populations in settled areas (e.g., cross-border population, urban slums, islanders, fishermen, etc.) |
| Identification & mapping | <p>It is important to identify and profile these populations based on:</p> <ul style="list-style-type: none"> ● geographic location, population size, movement routes, timing/seasonality of movement; ● access to health services, health-seeking behaviors, ability of the current surveillance network (health facilities, community-based) to detect AFP cases within the group; ● identification of service providers (public and private, including NGO's, faith-based organizations, etc.); ● vaccination coverage and immunity status; and ● availability of communication activities targeting these special population. |
| Rationale for special activities to reach particular populations | <p>These populations may have more susceptibility to the disease and more likelihood of missing and spreading transmission.</p> <ul style="list-style-type: none"> ● 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. |
| Challenges and anticipated issues for surveillance among special populations | <ul style="list-style-type: none"> ● Difficulties with mapping and population estimates ● Lack of coordination with stakeholders ● Lack of community involvement ● High cost of resources and logistics: trainings, transportation, supervision, monitoring ● Lack of security |
| Tips for success | <p>Special population surveillance is facilitated by:</p> <ul style="list-style-type: none"> ● Special teams dedicated to surveillance in special population ● Close coordination with partners (UNHCR, IOM, INGOs, civil society, veterinary services, etc.) |
| Surveillance strategies applicable to the special population | <p>1. Populations living in security-compromised areas</p> <ul style="list-style-type: none"> ● Access mapping and analysis that identifies key partners and factions, population dynamics and changes. ● Access negotiating ● Sensitizing and briefing armed forces, relevant partners and community members about polio and AFP case reporting. ● Revising surveillance network by identifying and training appropriate focal points for case reporting— i.e., community-based surveillance (CBS) 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 and ad hoc environmental surveillance (ES), to be decided in coordination with WHO country and regional teams. ● Ensuring access tracking and segregated data analysis to monitor surveillance by population group. |

2. Mobile populations

- Mapping and profiling with leaders or persons identified as surveillance focal points.
- Determining itineraries of the population and mapping healthcare facilities and providers (including veterinarians) along the route.
- Sensitizing population and providers.
- Conducting market sensitization along the route and close to water points and camps.
- Establishing regular contact with focal points for reminders and feedback on reporting.
- 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 points in camps (IDP or refugee) 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 year), to be decided in coordination with WHO country and regional teams.
- 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), to be decided in coordination with WHO country and regional teams.

4. Special populations in settled areas

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

Special population groups (continued)

| | |
|----------------------------------|--|
| | <ul style="list-style-type: none">● 4. Special populations in settled areas (continued)● Urban slums● Profiling communities and their origin● Studying health-seeking behavior and modification of surveillance network● Conducting active case search● Consider adding ES sites |
| Monitoring and Evaluation | <ul style="list-style-type: none">● 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 |

AFP = acute flaccid paralysis; CBS = community-based surveillance; ES = environmental surveillance; IDP = internally displaced population; INGO = International nongovernmental organization; IOM = International Organization on Migration; NGO = nongovernmental organization; UNHCR = United Nations High Commissioner for Refugees; WHO = World Health Organization

Annex 8. Stool sampling of close AFP contacts

Table 18: Stool sampling of close AFP contacts

| AFP contact sampling | |
|-----------------------|--|
| Also known as | Direct contact sampling and close contact sampling |
| Definition | <p>The collection and testing of one (1) stool specimen from three (3) individuals in contact with an acute flaccid paralysis (AFP) case. Children in frequent contact with an AFP case (e.g., touching, sharing toys, and sharing food) should be identified for specimen collection. Surveillance guidelines recommend:</p> <ul style="list-style-type: none"> • Children, preferably <5 years of age. • In contact with AFP case within a week prior to and/or two weeks after paralysis onset. • Examples include siblings and other children living in the same household and/or neighboring children who played with the AFP case during the period of interest. • Stool specimens from AFP case contacts may be collected up to 60 days after paralysis onset, as poliovirus may be excreted up to two (2) months or longer. • Stool specimens are typically collected from the community of residence of the AFP case. However, if the AFP case stayed in other communities one week prior to and/or two weeks after paralysis onset, then collection of specimens from contacts of the AFP case at these locations may also be warranted. |
| Purpose and rationale | <p>AFP contact sampling is used to provide laboratory evidence of poliovirus in an AFP case. Individuals in contact with AFP cases have a higher likelihood of asymptomatic infection and virus excretion than people who have not had contact. The collection of stool specimens from contacts of AFP cases provides an additional approach to determine if poliovirus is the cause of paralysis in an AFP case. Positive laboratory results of contact specimens are used to confirm poliovirus infection in an AFP case who is not otherwise laboratory-confirmed.</p> |
| Indications | <p>AFP contact sampling should be performed as part of regular AFP surveillance activities. Expanded use of AFP contact sampling may also be done as part of outbreak response activities.</p> <ul style="list-style-type: none"> • Regular AFP surveillance activities: Recommendations per the Global Polio Surveillance Action Plan 2022–2024 for AFP contact sampling. • All AFP cases with inadequate stool specimens. Examples of inadequate stool specimens are: (a) 0 or 1 stool specimen collected; (b) at least one stool specimen collected > 14 days after paralysis onset; (c) two stools collected <24 hours apart; and (d) poor stool condition (e.g., specimen was hot upon arrival at laboratory). • After close coordination with national surveillance and laboratory colleagues, consider all AFP cases who reside in security-compromised or hard-to-reach areas to take advantage of the limited opportunity to reach these individuals and communities. • Outbreak response activities: Expansion of AFP contact sampling to enhance AFP surveillance may be warranted under specific circumstances. Expansion should occur in close coordination and collaboration between the national surveillance and laboratory colleagues. <ul style="list-style-type: none"> ○ All AFP cases in an outbreak-affected country, to improve detection of all viruses ○ All AFP cases detected outside the subnational outbreak zone, to increase the probability of detecting virus movement beyond the designated outbreak zone |

Additional important information

| | |
|-------------------------------|--|
| When to conduct | <p>AFP contact sampling should be conducted during the initial or follow-up activity of an AFP case investigation (i.e., before laboratory results are available).</p> <ul style="list-style-type: none"> • <i>Initial AFP case investigation:</i> Conduct AFP contact sampling if it is known that two stool specimens cannot be collected in a timely manner. • <i>Follow-up activity:</i> Conduct AFP contact sampling if the laboratory reports that the AFP case's stool specimens were received in poor condition. |
| Specimen labelling | <p>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 indicator ("C") and number (#) suffix (e.g., C1, C2, C3).</p> |
| "Other" classification | <p>Positive AFP contacts are <u>not</u> classified as confirmed poliovirus cases because they do not meet the case definition, which requires acute flaccid paralysis. Results are included as "others" in poliovirus isolation counts.</p> |
| Procedures | <p>Refer to the GPEI Global Polio Surveillance Action Plan 2022–2024 for further details.</p> |

AFP = acute flaccid paralysis; GPEI = Global Polio Eradication Initiative

Annex 9. Timely case and virus detection

Because delays in detection can happen at any stage of field, logistic and laboratory activities, countries must monitor timeliness at every stage of the process, particularly at the subnational level and especially in the collection and transport of stool specimens. Only with clear insight into delays can swift actions be taken to address the identified bottlenecks (**Table 14.1**). Furthermore, anticipating issues and proactively identifying alternatives as part of preparedness is highly recommended.

Table 19: Delays in detection and possible mitigation measures

| Stage | Target | Possible cause | Mitigation measures & solutions |
|---|---|--|--|
| Onset to care seeking | AFP cases reported ≤ 7 days of onset (ideally immediately) | <ul style="list-style-type: none"> Distance to nearest facility/person Distrust in the health system Cost of service Language barrier Gender barriers (including no female nurse/doctor, no authorization to travel to health facility) | <ul style="list-style-type: none"> Modify data collection tools and analyze by disaggregated data: social or linguistic profile/at-risk population group, sex and health-seeking behavior. Conduct periodic (six-month) social mapping as part of the active surveillance (AS) network review to identify gaps in coverage. Based on findings, address all issues (e.g., mobile clinics, female health workers, consultation and sensitization with the community). |
| Care seeking to notification | AFP cases reported ≤ 7 days of onset (ideally immediately) | <ul style="list-style-type: none"> Lack of awareness and sensitization of healthcare providers | <ul style="list-style-type: none"> Conduct consistent, supportive supervisory visits to reporting units. Ensure training and sensitization of every new staff member. Provide information, education and communication (IEC) materials: case definition, reporting requirement and pathway, surveillance officer contact information. |
| Notification to investigation | ≤ 48 hours | <ul style="list-style-type: none"> Lack of training Absence of qualified person to conduct investigation Delay in locating the case Case is lost to follow-up (i.e., cannot find case) Competing priorities, challenging workloads | <ul style="list-style-type: none"> Ensure case investigation kits (equipment, supplies, and materials) are readily available. Promote clear responsibilities and reasonable workloads (i.e., back-up should be available in the absence of the main surveillance officer). Conduct regular trainings for surveillance officers and back-ups (e.g., other public health staff) at the field level. |
| Investigation to stool 1 collection | ≤ 1 day | <ul style="list-style-type: none"> Absence of kit Inability to locate the case (due to discharge, travel, etc.) Case has died | <ul style="list-style-type: none"> Ensure case investigation kits (equipment, supplies and material) are readily available. Ensure contact information and address of case is available. If stool specimen collection must be done by caregiver, ensure it is adequately done. |
| Stool 1 collection to stool 2 collection | ≥ 24 hours apart | <ul style="list-style-type: none"> Case has died Case is no longer at same location (follow-up issues) | <ul style="list-style-type: none"> Provide clear instructions to nurses and caregivers on collecting the stool specimen. Provide clear instructions on contact sampling in the event of a case of inadequate specimens. |

AFP = acute flaccid paralysis; AS = active surveillance; IEC = information, education and communication

Table 17 (continued)

| Stage | Target | Possible cause | Mitigation measures & solutions |
|--|---|---|---|
| Stool 2 collection to shipment to national level Shipment to national level to arrival at national level Arrival at national level to shipment to (inter)national laboratory Shipment to (inter)national laboratory to arrival at (inter)national laboratory Arrival at (inter)national laboratory to final results (i.e., negative results or sequencing results for positive specimens) | Stools 1+2 arrival at laboratory ≤ 3 days of collection of stool 2 (ideally immediately) | <ul style="list-style-type: none"> No or poor communication on when stool 2 was collected Poor coordination with courier services Issues related to routes of transport (e.g., lockdowns, route closure) Batching of specimens | <ul style="list-style-type: none"> Pilot electronic tracking of stool specimens. Plan transport ahead of time, including plan for contingencies. Obtain special permission to transport samples, if needed. Identify alternative routes, carriers. Increase storage capacity, identify storing points. Don't batch specimens. Prioritize samples for shipment in event of suspected polio case ("hot" case). |
| | Stools 1+2 arrival at laboratory ≤ 3 days of collection of stool 2 | <ul style="list-style-type: none"> Poor planning for transport, shipment Insecurity or road closures | <ul style="list-style-type: none"> Pilot electronic tracking of stool specimens. Create contingency plans with alternative routes or laboratory. |
| | Stools 1+2 arrival at laboratory ≤ 3 days of collection of stool 2 (ideally immediately) | <ul style="list-style-type: none"> Samples kept at national level until several are collected and shipped ("batch" send-off) | <ul style="list-style-type: none"> Explore and pursue ad hoc solutions in case of conflict or insecurity (e.g., using humanitarian flights for transport; sending samples to an alternative WHO-accredited lab). |
| | Stools 1+2 arrival at laboratory ≤ 3 days of collection of stool 2 | <ul style="list-style-type: none"> International border closures Suspension of flights | |
| | Stools 1+2 are processed following standard GPLN procedures within defined GPLN target times for all procedures | <ul style="list-style-type: none"> International border closures Issues with shipping isolates to sequencing laboratory Shortage of critical reagents Ambiguities in testing outcomes (e.g., mismatched or missing EPID numbers, suspicion of cross-contamination). Receipt of large batches of specimens. | <ul style="list-style-type: none"> Ensure a minimum buffer stock (critical consumables and reagents) for a one-year workload when placing orders for 2022. Secure a shipping contract with several in-country couriers. Develop an alternative domestic and international shipping plan with different sequencing laboratories. |

AFP = acute flaccid paralysis; EPID = epidemiological identification; GPLN = Global Polio Laboratory Network; WHO = World Health Organization

Annex 10. Technical resources for reference

Table 20: Technical resources for AFP and poliovirus surveillance

| Focus area | Resources |
|-------------------------------------|--|
| Programme information | <ul style="list-style-type: none"> Global Polio Eradication Initiative (GPEI): polioeradication.org The GPEI website includes updated global counts on wild and vaccine derived poliovirus cases. <p>For additional polio publications on topics such as surveillance, outbreaks, and testing, as well as special topics such as on containment, visit the following website:</p> <ul style="list-style-type: none"> Morbidity and Mortality Weekly Report (MMWR): www.cdc.gov/mmwr/index.html Weekly Epidemiological Record (WER): www.who.int/wer/en |
| AFP surveillance | <ul style="list-style-type: none"> Global Polio Surveillance Action Plan 2022-2024 polioeradication.org/wp-content/uploads/2022/04/GPSAP-2022-2024-EN.pdf Global Polio Surveillance Action Plan 2018-2020 polioeradication.org/wp-content/uploads/2016/07/GPEI-global-polio-surveillance-action-plan-2018-2020-EN-1.pdf Quick Reference on Strengthening Polio Surveillance during a Poliovirus Outbreak polioeradication.org/wp-content/uploads/2021/12/Quick-Reference-Strengthening-Surveillance-during-Poliovirus-Outbreaks-24-March-2021.pdf Guidelines for Implementing Polio Surveillance in Hard-to-Reach Areas & Populations polioeradication.org/wp-content/uploads/2020/10/Guidelines-polio-surveillance-H2R-areas.pdf Job Aid: Use of AFP contact sampling and targeted healthy children stool sampling polioeradication.org/wp-content/uploads/2020/03/AFP-contact-sampling-and-targeted-healthy-children-stool-sampling-20200327.pdf Best practices in active surveillance for polio surveillance polioeradication.org/wp-content/uploads/2018/12/Best-practices-in-active-surveillance-for-polio-eradication.pdf Guidelines for Implementing Poliovirus Surveillance among Patients with Primary Immunodeficiency Disorders (PIDs) polioeradication.org/wp-content/uploads/2020/12/Guidelines-for-Implementing-PID-Surveillance-3.3-20201215.pdf Classification and reporting of vaccine-derived polioviruses (VDPV). polioeradication.org/wp-content/uploads/2016/09/Reporting-and-Classification-of-VDPVs_Aug2016_EN.pdf Standard Operating Procedures: Responding to a Polio Event or Outbreak polioeradication.org/wp-content/uploads/2022/07/Standard-Operating-Procedures-For-Responding-to-a-Poliovirus-Event-Or-Outbreak-20220807-EN-Final.pdf Polio Field and Laboratory Surveillance Requirements in the Context of nOPV2 use polioeradication.org/wp-content/uploads/2022/06/nOPV2-surveillance-guidance.pdf Interim guidance for the poliomyelitis (polio) surveillance network in the context of coronavirus disease (COVID-19) www.who.int/publications/i/item/WHO-POLIO-20.04 |
| Community-based surveillance | <ul style="list-style-type: none"> Technical Contributors to the June 2018 WHO meeting. A definition for community-based surveillance and a way forward: results of the WHO global technical meeting, France, 26 to 28 June 2018. Euro Surveill. 2019;24(2): pii=1800681. doi.org/10.2807/1560-7917.ES.2019.24.2.1800681 |
| Poliovirus testing | <ul style="list-style-type: none"> Department of Immunization, Vaccines, and Biologicals (2004) WHO Polio Laboratory Manual 4th ed. Geneva, Switzerland: World Health Organization. WHO/IVB/04.10. apps.who.int/iris/bitstream/handle/10665/68762/WHO_IVB_04.10.pdf |

| | |
|-------------------------|--|
| Gender training | <ul style="list-style-type: none"> • Gender and Polio Introductory Training: Facilitation Guide polioeradication.org/wp-content/uploads/2022/06/Gender-and-polio-introductory-training-facilitation-guide-20220620.pdf • Gender and Polio Introductory Training: Presentation Slides polioeradication.org/wp-content/uploads/2022/06/Presentation-Gender-and-Polio-Training.pdf • Gender and Polio profile polioeradication.org/wp-content/uploads/2022/06/Gender-and-Polio-Profile-20220620.pdf |
| VPD surveillance | <ul style="list-style-type: none"> • Surveillance standards for vaccine-preventable diseases, 2nd ed. Geneva: World Health Organization; 2018. www.who.int/publications/i/item/surveillance-standards-for-vaccine-preventable-diseases-2nd-edition • Global strategy for comprehensive Vaccine-Preventable Disease (VPD) surveillance. www.who.int/publications/m/item/global-strategy-for-comprehensive-vaccine-preventable-disease-(vpd)-surveillance |

Latitude-----

Longitude-----

Nomadic _____; Not Nomadic _____

Island _____; Mainland _____

DETAILED CASE INVESTIGATION FORM

Insert picture of
the case

EPID Number: _____

Reason for investigation:

Check one: WPV1 _____ WPV3 _____ cVDPV-(Type.....) _____ Compatible _____ inadequate _____ Sabin _____ nOPV2 _____
Zero Dose _____ Hot AFP case _____

From Index case _____ contact _____

DATE Lab CONFIRMATION /NPEC REPORT RECEIVED dd/mm/yy ____/____/____

DATE THIS INVESTIGATION STARTED dd/mm/yy ____/____/____ COMPLETED ____/____/____

If more than 48 hours passed between receiving of lab confirmation/NPEC report and completing the polio outbreak case investigation, EXPLAIN reason for delay (only applies to WPV1, WPV3 and cVDPV2):

LIST NAMES OF INVESTIGATORS AND ORGANIZATION:

- 1.
- 2.
- 3.
- 4.

- 5.
- 6.
- 7.
- 8.
- 9

**INSTRUCTIONS FOR COMPLETION OF
DETAILED INVESTIGATION REPORT**

WHO- Polio Eradication Program

- 1. The form should be filled completely, with clear writing
- 2. Use dd/mm/yy format in those that require dates
- 3. After fully completing the form it should be sent to Ministry of Health, WHO country offices and the GFPI

Name of Informant: _____

(Informants should preferably be persons responsible for the child/case within two weeks before and after onset of paralysis)

Relationship of informant to AFP case being investigated: _____

I. IDENTIFYING INFORMATION

- 1. EPID Number: _____
- 2. Date Onset of Paralysis: (dd/mm/yy) ____/____/_____
- 3. Name: _____
- 4. Sex (check one): Male Female
- 5. Date of Birth (dd/mm/yy): ____/____/_____

(If Date of birth not available then) Age in Months or years at time of Onset of Paralysis: _____

- 6. Date of notification, ____/____/_____
- 7. Date of investigation, ____/____/_____
- 8. Date of 1st stool collection, ____/____/____ Date of 2nd stool collection, ____/____/_____
- 9. Date stools sent to the lab, ____/____/_____
- 10. Date stools arrived in the lab, ____/____/_____
- 11. Stool condition on arrival at lab: Adequate Inadequate
- 12. Reason if stool is inadequate:

| | |
|---|-----|
| Two samples taken > 14 days from onset | Y/N |
| Only one sample taken | Y/N |
| Sample reaching the Lab not in 'good condition' | Y/N |
| No sample taken | Y/N |
| Other reason | |

13. Fathers Name _____ Age of Father: _____
14. Father's Occupation: _____
15. Mother's Name: _____
16. Mother's Occupation: _____
17. Religion: Muslim _____ Christian: _____ other (explain) _____
Location: _____
18. Address: _____ Village _____
19. Settlement: _____ Health area: _____
20. District/ward _____ Province/State _____
21. How long has the child been living at this location?
(Specify days, months or years) _____
22. Is the family of the case nomads? Yes _____ No _____
23. Was the child living in a different location in the month prior to the onset of paralysis? (Yes or no) _____
If yes please give location: Settlement: _____ Ward/District: _____
Province/State _____

II Additional History

1. Parents Educational Status (Check box for the highest level of education of each parent)

| Highest Educational Level | Father | Mother |
|---------------------------------|--------|--------|
| None | | |
| Koranic School | | |
| Primary School | | |
| Secondary School | | |
| Post Secondary School or Higher | | |

2. Socio-economic Status of Case household (give you best personal assessment)

| |
|---------------------------------|
| Poor: _____ Middle Class: _____ |
|---------------------------------|

3. Description of Area (check one)

| | |
|--------------------|--|
| Urban Upper Class | |
| Urban Middle Class | |
| Urban Slum | |
| Town | |
| Village | |
| Island | |

Give any other information that you feel is significant in describing the area in which the case household live.

4. Does the family live in a permanent structure? Yes _____ No _____
5. Number of Health facilities offering routine immunization services in this Ward/Health Area _____.

6. Vaccination performance of the DISTRICT (indicators) for last three years and current (Jan-..)

| Indicator | Year... | Year.... | Year... | Current year (Jan-.....) |
|-----------|---------|----------|---------|--------------------------|
| OPV3 | | | | |
| VPI | | | | |

7. What is the cumulative OPV3 and IPV coverage in this Ward/Health Areas/ZD? OPV3: ___IPV: ____,
8. What is the total number of settlements/villages in this Ward/Health Area/ZD? _____.
9. Distance (estimated in KM) from the case household to the nearest health facility? _____
10. Name of nearest health facility. _____
11. Does that health facility offer routine EPI immunization services? Yes _____ No _____
12. How many settlements/Villages in the health facility catchment area? _____.
13. Are all settlements/Villages in the health facility catchment area covered and reached? Yes: ___NO: ___
14. What is the OPV/IPV coverage in this health facility? _OPV: _____IPV: _____
15. Are there any Nomadic camps within 5 km of the case household? Yes__ No_____
16. Is there weekly market within 5 km of the case household? Yes: _____No: _____
17. Is the family aware of any other AFP Cases in the surrounding area? Yes_No _____

If yes give the name and location of cases and whether they have been previously investigated or not: (put this information below)

III. Clinical Information (this information should be reconfirmed from the family and not copied from the original case investigation form)

Data on initial examination

1. Was there fever at the onset of paralysis? Yes _____ No _____
2. How long, in days, between the onset of paralysis and full paralysis? _____ Days
3. Body parts involved in paralysis/weakness: (check all that apply)

| | Upper Arm | Lower Arm | Upper Leg | Lower Leg |
|-------|-----------|-----------|-----------|-----------|
| Right | | | | |
| Left | | | | |

4. Was the paralysis/weakness asymmetric? Yes__ No_____
5. Describe the muscle tone of the paralyzed/weak limbs at time of onset (check one):
Normal _____ Decreased/Floppy _____
6. Were the stool specimens adequate? Yes _____ No _____
If no, explain _____
7. Was there any history of trauma in the days or weeks prior to the onset of paralysis? Yes__No__

If yes please explain _____

8. Was there any history of injections in the days or weeks prior to the onset of paralysis? Yes ___ No ___

If yes please explain: _____

IV. Travel History

1. Did the AFP case travel in the 30 days prior to the onset of paralysis/weakness? Yes ___ No ___

2. If yes where? (explain briefly and give dates as best as possible) _____

3. Did any close family members travel outside of the local area in the 30 days before onset of paralysis?

Yes _____ No _____

If yes where? (explain briefly and give dates as best as possible) _____

4. Were there any recent visitors to the home from outside of the local area in the 30 days prior to the onset of paralysis? Yes _____ No _____

If yes from where? (explain briefly and give dates as best as possible) _____

5. Has the AFP case travelled since the onset of paralysis/weakness? Yes _____ No _____

If yes where? (explain briefly and give dates as best as possible) _____

V. Vaccination History

V.I Routine Vaccination

1. Total number of OPV doses the child received from routine vaccination (*do not include doses received after the onset of paralysis*) _____

2. Total number of IPV doses the child has received through routine vaccination _____

3. What is the source of information on routine vaccination?

History _____ Vaccination Card _____ (Select one)

4. If the child is not fully vaccinated (three doses of OPV by routine vaccination by 12 months of age, not including birth dose) explain why: _____

V.II Supplemental Doses:

1. Total OPV doses received through SIA:

2. Date of last OPV dose received through SIA: ____/____/____ Vaccine used: bOPV: ___ nOPV:

3 Total IPV doses received through SIA: _____

4. Date of last IPV dose received through SIA: ____/____/____

5. List all immunization campaigns conducted in the area in the last 12 months. Indicate in the table below whether the child received OPV or IPV and if not state the reason why.

| Date of Campaign | Type of Campaign (e.g. sNIDs, NIDs, MopUp, MNCHW) | Did the child receive OPV (YES, NO) | Did the child receive IPV (YES, NO) | If no, give reason (see codes for reason below)* |
|------------------|---|-------------------------------------|-------------------------------------|--|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

*Reasons for missing supplemental doses:

- 1 = Child not eligible as age greater than 5 years at the time of campaign
- 2 = No team came to the house
- 3 = Family refused vaccination (if refused explain the reason in detail below)
- 4 = Other

If other or refused then give an explanation of the reason why were missed _____

6. Total number of doses of OPV that the child was eligible to receive during campaigns. _____

7. Total number of doses of OPV child actually received through Routine and SIA _____

8. Total number of doses of IPV the child actually received through Routine and SIA _____

9. Child's parent interview:

9a. What else you needed to know about immunization to make you vaccinate your child?

(Select from list below)

- OPV Safety -----
- Why House-to-House -----
- Why many rounds -----
- Side effects of OPV -----
- Contents of OPV -----
- Why OPV Free -----
- Why only OPV -----
- Benefits of OPV vaccination -----
- Risk of Paralysis -----

9b. Who in your immediate community do you trust to convince you to fully immunize your child?

(Select from list below)

- Political Leader-----
- Qualified Health Worker-----
- Religious leader-----
- Traditional Leader-----
- Traditional healer-----
- TBA/women leader-----

- Youth leader-----
- Community leader-----
- Relative-----
- Others-----

9c. What source of information about immunization/OPV would have been more credible?

(Select from list below)

- Political leader-----
- Trad Leader-----
- Mosque/Religious leader-----
- Town announcer-----
- Community Leader/philanthropist-----
- VCM-----
- Vacc Team-----
- Health Worker-----
- Radio-----
- Newspaper-----
- Television-----

9d. What other health interventions given along with immunization would have made you to fully immunize your child? Select from list below

- Other antigens (Measles, Penta, BCG, YF etc) -----
- ANC-----
- Free/Discounted drugs-----
- Anti Malarials-----
- ITNs-----
- Free Medical consultations-----
- Wheel chairs to paralyzed children-----
- Hosp/Clinic services-----

9e. Would you support immunization of children <5 years in your community?

- Yes-----
- No-----
- Not decided-----

9f. How would you support immunization of children <5 years in your community?
(Select from list below)

- Sensitize Non-compliant families-----
- Vaccinate my own Children publicly-----
- Convince neighbours/family members & others-----

10. In the affected settlement, is there evidence that Traditional Leaders are fully engaged/supportive (e.g ward heads following the vaccination teams? Are the vaccination teams selected from the area) Yes ___ No ___
If no, explain _____

11. Is the DISTRICT task force functional? Yes.... No....
If no explain.....

12. Is there any evidence of gaps in micro-planning for SIAs? Yes _____ No _____

If Yes, explain _____

13. Is there any evidence of gaps in vaccination team performance Yes _____ No _____

If Yes, explain _____

VI. Instructions for Vaccination Coverage Survey

- Select 30 houses with at least one child less than 5 years of age in the area surrounding the case household. Record the following information on all children less than 5 years of age **(if more than one under 5 children available in the HH, interview the youngest child only)** in those 30 households; *Age of child in months, Number of doses of OPV received through routine immunization, whether child had received a dose of IPV through routine immunization, whether the child received OPV during the last immunization campaign and whether the child received OPV in the previous immunization campaign. If zero dose in SIAs, indicate the reason.*
- Tally the information using Appendix II and then complete the information on Appendix I.

VII. AFP surveillance

- Who Reported this case? District focal point/Facility focal Point--/Clinician---/Vaccination team ___/Informant___/Other: _____
 - If other, explain _____

- AFP surveillance performance of the DISTRICT (indicators) for last three years and current (Jan-...)

| Indicator | Year... | Year... | Year... | Current (Jan-.....) |
|------------------|---------|---------|---------|---------------------|
| NPAFP rate | | | | |
| % Stool adequacy | | | | |

- Is there any evidence that active surveillance was conducted in the nearest health facility according to the guidelines? (signature on HF register, report on visitors book etc)?
Yes_____ No_____

Is there any evidence that retro active case search was conducted at District and healths facilities levels the last two years? Yes_____ No_____

If yes, file the table below.

Nearest health facility/informant Active Case Search:

| S/N | Name of health facility/informant | Priority status (Highest P/HP/MP/LP/others) | Date HF was last visited by District FP/Health Area FP/others | No of unreported AFP cases detected |
|-----|-----------------------------------|---|---|-------------------------------------|
| | | | | |
| | | | | |
| | | | | |

- Is there any orphan virus in the Province/District in the previous year or this year? Yes_____ No_____
- Is there any orther compatible (s) in the District with date onset less than or equal to 8 weeks? Yes----No---
- Trend of confirmed polio and compatible cases in the State/ in the last two years and current (Jan-)

| Level | Year... | | | Year... | | | Current (Jan-.....) | | |
|----------|-----------|---------------------|------------------|-----------|--------------|------------------|---------------------|--------------|------------------|
| | No of WPV | No. of cVDPV2/VDPV2 | No of compatible | No of WPV | No. of cVDPV | No of compatible | No of WPV | No. of cVDPV | No of compatible |
| State | | | | | | | | | |
| DISTRICT | | | | | | | | | |

- Key gaps identified in AFP Surveillance:
 -
 -
 -
 -

8. Surveillance Findings from house to house Survey

In the HH survey, how many missed AFP cases were found and how many new cases were investigated

9. Instructions for Samples collections:

1. **Stools samples:** one stool sample from each of the contacts
2. **Blood sample:** one blood sample from the case to be collected for immunodeficiency search.

VIII. Conclusion

Reasons for the child to have polio:

Reasons for the child to have inadequate sample:

IX. Key Recommendations

| S/no | Recommendation | Time line | Responsible person |
|------|----------------|-----------|--------------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 6 | | | |
| 7 | | | |

APPENDIX I. Vaccination Coverage Survey

Calculate and report the following using the data in Appendix II:

1. Percentage of children 6 – 35 months of age who had received **3 routine OPV doses**. _____%
2. Percentage of children 3 – 12 months of age who had received **1 routine IPV doses**. _____%
3. Reasons for zero dose in RI-For OPV or IPV (analyze codes below and give percentage)

4. Percentage of children 0-5 years who received **OPV in the last immunization round**. _____%
5. Reasons for non-vaccination in last immunization campaign _____
6. Percentage of children less than 0-5 years who received **OPV in the prior immunization round**. _____%
7. Reasons for non vaccination in the prior immunization round _____
8. Reason for zero dose in SIAs (analyze codes below and give percentage)

9. Give the reported EPI coverage (for last year and cumulative for the most current this year) for OPV for the DISTRICT in which the case lives (as reported by the EPI program) _____%

Appendix II

DISTRICT _____
 Ward: _____
 Settlement: _____

Date: _____ Name of the Investigator: _____

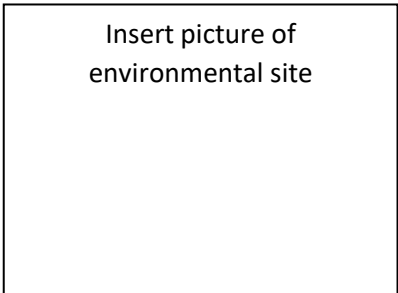
| House Number | Name of the Child | Sex (M/F) | Age (months) | RI Card seen (Y/N) | OPV Status | | | | | | | | | AFP |
|--------------|-------------------|-----------|--------------|--------------------|---|---|--|--|---|--------------------------------|---|---|---|---|
| | | | | | Number of OPV doses received through RI | Number of IPV doses received through RI | *Reason if ZD for RI (use codes below) | Number of OPV doses received through SIA | *Reason if ZD for SIA (Use codes below) | Immunised in Last round? (Y/N) | *Reason if not immunized last round (use codes below) | Immunised in round prior to Last round? (Y/N) | *Reason if not immunized in round prior to last round (Use codes below) | Is there AFP case in the Household? (Y/N) |
| 1 | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | |
| 21 | | | | | | | | | | | | | | |
| 22 | | | | | | | | | | | | | | |
| 23 | | | | | | | | | | | | | | |
| 24 | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | |
| 26 | | | | | | | | | | | | | | |
| 27 | | | | | | | | | | | | | | |
| 28 | | | | | | | | | | | | | | |
| 29 | | | | | | | | | | | | | | |
| 30 | | | | | | | | | | | | | | |

Codes for Reasons for not receiving Vaccines: 1=OPV Safety; 2. Child Sick; 3=Religious Belief; 4=No Felt Need; 5=Political Differences; 6=No Caregivers Consent; 7=Unhappy with Immunisation Personnel; 8= Reason not given; 9=Not aware of the immunisation; 10=Service not provided; 11=SIA teams not visited the house; 12=To far from the health facility; 13: Child absent; 14=No pluses; 15=AEFI; 16= Others,

Latitude -----
 Longitude-----
 (NB: Coordinates of environmental sample site where sample was collected)

Investigation Form for Confirmed Polioviruses from Environmental Samples

NB: Fill Using any Colour Ink, Not Black and in Small Letters



EPID Number: _____

Polio Type (Check one): WPV1_____WPV3_____

VDPV (Specify 1, 2 or 3/a or c/Unclassified) _____

Date of laboratory confirmation: dd/mm/yy ____/____/____

Date Investigation Started: dd/mm/yy ____/____/____

Date Investigation Completed: ____/____/____

Explain the reason for delay if the interval between receipt of laboratory confirmation and completing the polio outbreak case investigation is more than 48hours

| S/No | Name of Investigators | Organization | Phone Number |
|------|-----------------------|--------------|--------------|
| 1 | | | |
| 2 | | | |
| 3 | | | |
| 4 | | | |
| 5 | | | |
| 6 | | | |
| 7 | | | |
| 8 | | | |
| 9 | | | |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |
| 14 | | | |
| 15 | | | |

Instructions for Completion of Poliovirus Investigation Report

4. The form should be filled completely, with clear writing using coloured ink (not black), in small letters and NOT APPLICABLE where necessary
5. Use dd/mm/yy format in those that require dates

Investigation template Poliovirus from Environmental Samples

1. Profile of the Province/Region

Province/State Name _____ No. of Districts/LGAs _____ No. of Health areas/Wards _____

Province/State total population _____ RI (<1yr) population _____

Surveillance (<15yr) population _____ No. of Health facilities (Public/Private) ____/____

No. of health facilities providing RI services (Public/Private) ____/____

Date of 'switch' (tOPV/bOPV) _____

Date of IPV introduction _____

Date of last tOPV SIA _____

Date of last mOPV2 SIA _____

Complete the table below indicating the period

| S/N | Indicators | Period in current year | Values |
|-----|---------------------------------------|------------------------|--------|
| 1 | OPV3 coverage | | |
| 2 | IPV coverage | | |
| 3 | Penta3 coverage | | |
| 4 | No. of Unimmunized < 1year children | | |
| 5 | NPAFP rate | | |
| 6 | Stool adequacy rate | | |
| 7 | % of Health areas reporting AFP cases | | |
| 8 | NPENT rate | | |

Indicate the presence or absence of high-risk groups in the province

| S/N | High Risk Groups | Present/Absent | Remarks |
|-----|--|----------------|---------|
| 1 | Refugees | | |
| 2 | Inaccessible populations due to geographic reasons | | |
| 3 | Inaccessible populations due to insecurity | | |
| 4 | Nomadic camps | | |
| 5 | IDP | | |
| 6 | Others (specify) | | |

2. DISTRICT Profile

District Name _____ No. of Health areas _____ No. of Settlements /villages _____

District total population _____ RI (<1yr) population _____

Surveillance (<15yr) population _____ No. of Health facilities (Public/Private) ____/____

No. of health facilities providing RI services (Public/Private) ____/____

Date of 'switch' (tOPV/bOPV) _____

Date of IPV introduction _____

Date of last tOPV SIA _____

Date of last mOPV2 SIA _____

Complete the table below indicating the period

| S/N | Indicators | Period in current year | Values |
|-----|-------------------------------------|------------------------|--------|
| 1 | OPV3 coverage | | |
| 2 | IPV coverage | | |
| 3 | Penta3 coverage | | |
| 4 | No. of Unimmunized < 1year children | | |
| 5 | NPAFP rate | | |
| 6 | Stool adequacy rate | | |
| 7 | % of Wards reporting AFP cases | | |
| 8 | NPENT rate | | |

Indicate the presence or absence of high-risk groups in the state

| S/N | High Risk Groups | Present/Absent | Remarks |
|-----|--|----------------|---------|
| 1 | Refugees | | |
| 2 | Inaccessible populations due to geographic reasons | | |
| 3 | Inaccessible populations due to insecurity | | |
| 4 | Nomadic camps | | |
| 5 | IDP | | |
| 6 | Others (specify) | | |

Complete with information on the last five SIAs organized in the District

| Date of SIA | Type of SIA* | Type of OPV used** | Target population | No. of children vaccinated | Administrative coverage | LQAS results |
|-------------|--------------|--------------------|-------------------|----------------------------|-------------------------|--------------|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

*(sNID, NID, mop-up, OBR, Mother and Child Health Days);

**tOPV, bOPV, mOPV 1, mOPV 2, IPV, fIPV

3. Environmental Sample

EPID Number: _____ Name of collection site _____

District _____ Health Area _____ Settlements/villages _____

Date of sample collection _____ Frequency of sample collection _____

Date of initiation of sample collection at this site _____

Date of last WPV isolate from site _____

Date and type of last VDPV isolate from site _____

Date of last Sabin 2 isolate from site _____

Date of last NPENT isolate from site _____

Complete the table below per LGA/Ward/Settlement drained by ES site

| S/N | Name of District drained by ES site | Name of Health Area drained by ES site | Name of settlements/villages per health area drained by ES site | Under 5 Population for each settlement/village per health area |
|-----|-------------------------------------|--|---|--|
| 1 | | | | |
| 2 | | | | |
| 3 | | | | |
| 4 | | | | |
| 5 | | | | |
| 6 | | | | |
| 7 | | | | |

| | | | | |
|--------------|--|--|--|--|
| 8 | | | | |
| Total | | | | |

Add as many rows as desired with respect to the number of settlements

4. Routine Immunization and Community Survey around the AFP/Sample Collection Site

Sample at least 30 households with under 5 children per health area drained by site and determine the immunization status of the community/IDP Camp. Use the community immunization coverage survey form in annex I.

Note: Collect *ONE stool sample from 20 healthy children aged < 5 years living within the catchment area, selected randomly. Precise on investigation form "HC" for Healthy Children*.

Results of community immunization coverage:

How many households sampled _____

Routine Immunization (RI)

Complete the Table below for RI

| Antigen type | Age Group | Total No. of children surveyed | FIFA | | PIFA | | NI | |
|--------------|-------------------|--------------------------------|---------------|---|---------------|---|---------------|---|
| | | | No. Immunized | % | No. Immunized | % | No. Immunized | % |
| OPV | <12 months | | | | | | | |
| | 1 to 5 years | | | | | | | |
| | 0 to 5 years | | | | | | | |
| IPV | 14 wks to 1 year | | | | | | | |
| | 1 to 5 years | | | | | | | |
| | 14 wks to 5 years | | | | | | | |

FIFA=Fully Immunized For Age, PI=Partially Immunized For Age, NI=Not Immunized, wk = Weeks;

Supplementary Immunization Activities

Complete the Table below for the last SIA

| Antigen type | Age group | No. Immunized | No. surveyed | Coverage (%) |
|--------------|---------------------|---------------|--------------|--------------|
| OPV | <12 months | | | |
| | 1 to 5 years | | | |
| | 0 to 5 years | | | |
| IPV | 14wks - <12 months | | | |
| | 1 to 5 years | | | |
| | 14 weeks to 5 years | | | |

Complete the Table below for the last three SIAs

| Antigen type | Age group | No. Immunized in all 3 SIAs | No. surveyed | Coverage (%) |
|--------------|--------------|-----------------------------|--------------|--------------|
| OPV | <12 months | | | |
| | 1 to 5 years | | | |
| | 0 to 5 years | | | |

| | | | | |
|------------|-------------------------------|--|--|--|
| | | | | |
| IPV | 14 wks - <12 months | | | |
| | 1 to 5 years | | | |
| | 14 wks to 5 years | | | |

d) Summary of findings from Health Facility and community search for AFP

- No. of Districts involved _____
- No of health areas involved _____
- No of settlements/Villages/IDP camps involved _____
- No of households covered _____
- No of health workers involved _____
- No. of health facilities visited _____
- No. of missed AFP cases found in visited health facilities _____
- No. of missed AFP cases found in the community _____
- No. of AFP cases that had been previously investigated (already in database) _____
- No. of missed AFP cases not in database with:
 - Date of onset of Paralysis 0-14 Days: _____
 - Date of onset of Paralysis =15-60 Days: _____
 - Date of onset of Paralysis = >60 days: _____
- Number of missed AFP cases in which two stool sample was collected: _____
- Community coverage survey results:
 - RI OPV 3 coverage in under 1 year old -----
 - RI OPV 3 coverage in 1 to 5 years old -----
 - RI IPV coverage in under 1 year old -----
 - RI IPV coverage in 1 to 5 years old -----
 - Proportion of children vaccinated in the last SIA implemented in District-----
 -
 - Proportion of children vaccinated in the last three SIA implemented in District-----
 -

5. Laboratory Findings (including genetic sequencing results)

.....
.....

6. Summary of Findings (provide bullet list of main findings)

.....
.....
.....
.....

.....
.....
.....
.....

COMMUNITY SURVEY FORM

| Community Survey : Name of Settlement _____ | | | | | | | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|---|----|-------|------|------|----|
| 1 | Serial Number of the Child Checked | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | Total | | | |
| 2 | Age of the Child checked < 1 year (in months) | | | | | | | | | | | | | | |
| 3 | Age of the Child checked 1 to 5 years (Years) | | | | | | | | | | | | | | |
| 4 | Sex of the Child checked (M/F) | | | | | | | | | | | | M | F | |
| 5 | Is there evidence of Child Health Card/Vaccination card showing the vaccines the child has received | | | | | | | | | | | | Y | N | |
| 6 | Is the Child Fully or appropriately immunized for age (FIFA)/Partially Immunized for age (PIFA) / Not Immunized (NI) as per OPV immunization schedule | | | | | | | | | | | | FIFA | PIFA | NI |
| 7 | Is the Child Fully or appropriately immunized for age (FIFA)/Partially Immunized for age (PIFA) /Not Immunized (NI) as per IPV immunization schedule | | | | | | | | | | | | FIFA | PIFA | NI |
| 8 | **Reason for child not receiving routine vaccines up to date (choose codes from below) | | | | | | | | | | | | | | |
| 9 | Was child vaccinated in the last OPV SIA organized in LGA? | | | | | | | | | | | | | | |
| 10 | Did child take all 3 SIA Polio doses organized in LGA in his/her presence (3 SIAs) | | | | | | | | | | | | | | |
| 11 | Did child take IPV during an SIA if ever organized in his/her LGA? | | | | | | | | | | | | | Y | N |
| **Code to fill options on Community Survey: 1= Not Aware of RI, 2=Health worker Attitude, 3=Does not believe in Vaccination, 4=Dissatisfied with Health Worker, 5=Non-availability of vaccines, 6=No Immunization services in the settlement, 7=AEFI, 8= Religious beliefs, 9=Others | | | | | | | | | | | | | | | |
| Action Taken: | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |