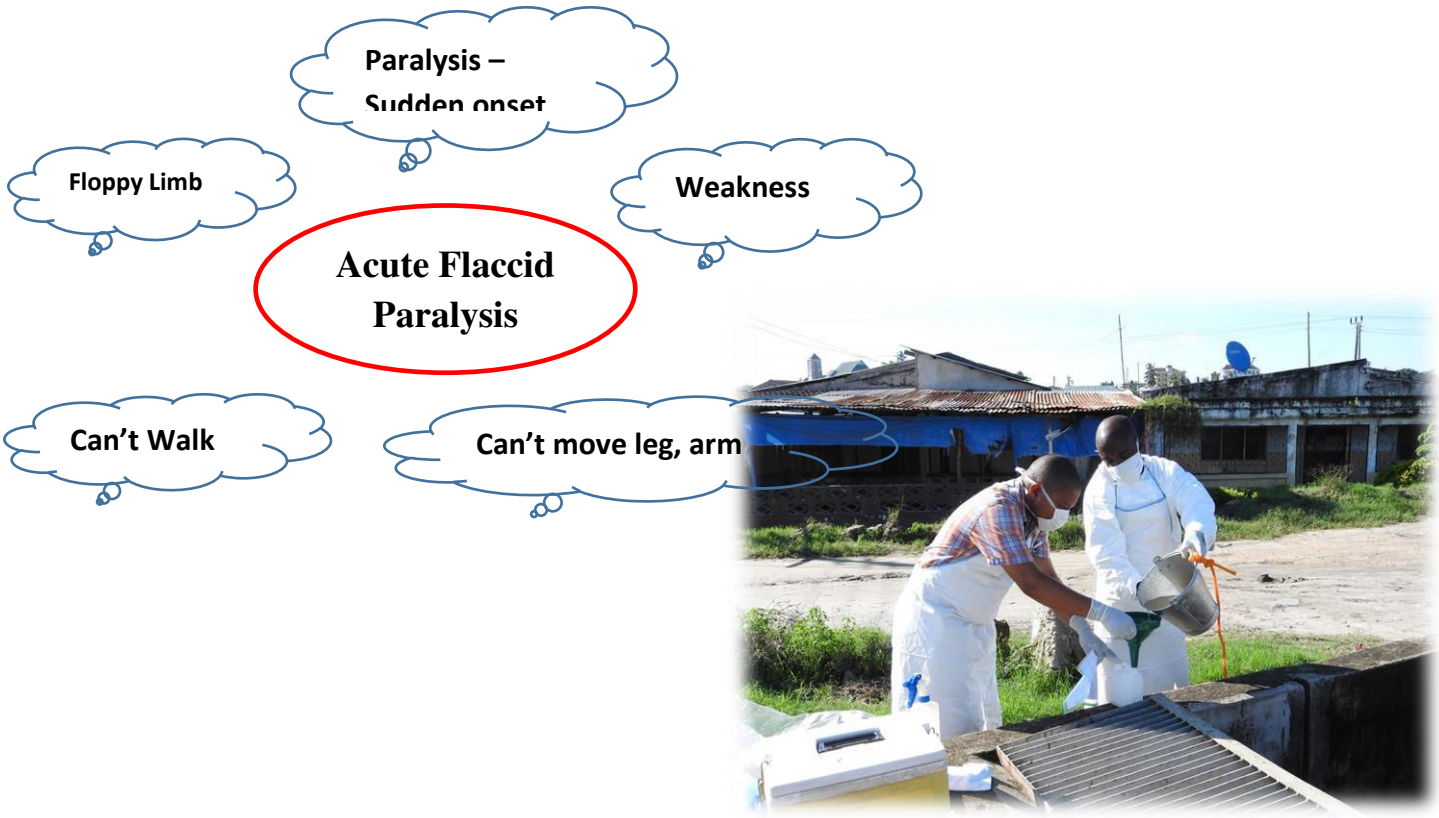
POLIO SURVEILLANCE GUIDELINES, GHANA



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PREFACE

This document is a product of key stakeholder meetings and other Global Polio Eradication Initiative resources aimed at improving Polio Surveillance in Ghana. It is well positioned to serve as a quick reference material on the field and also for teaching purposes.

Acute Flaccid Paralysis surveillance has been the driving force behind many disease surveillance systems in various countries. The goal of ensuring the eradication of Polio has brought about diversions in achieving the objectives of the surveillance component of the Polio Eradication Initiative. The introduction of environmental surveillance in 2016 has widened the frontiers of surveillance. Further widening the scope is the introduction of concepts such as a “hot case” and “inadequate case” among other concepts that need to be well explained.

The Integrated Disease Surveillance and Response Technical Guidelines describes AFP surveillance, but not extensively to cover the other areas. This guideline is therefore supposed to serve as a reference document covering all aspects of Polio Surveillance and not only AFP Surveillance.

FOREWORD

The World Health Assembly first committed to polio eradication when it adopted resolution 41.28 in 1988 calling for the worldwide eradication of the disease by the year 2000. Since then, Polio transmission has reduced significantly over the years through global eradication efforts, with total number of reported Wild Poliovirus (WPV) cases reducing from 350,000 in 125 countries in 1988 to 33 cases from 2 countries in 2018. The number of African countries reporting WPV transmission reduced from 32 in 2010 to zero at the end of 2019.

In Ghana, 52 WPV cases were reported between 1996 and 2008. The last reported case of indigenous WPV was in 1999 from the Bole district in the Savannah Region (part of the then Northern region). Eight imported cases of WPV were reported in 2003. Following these, several response measures were instituted to break the transmission of the virus. These included National Immunisation Days (NIDs) and sub-NIDs. In 2007, Ghana was recognised by the African Regional Commission for Certification (ARCC) to have broken transmission of WPV. Ghana again reported eight imported cases in 2008. Additional response measures implemented resulted in Ghana attaining polio free status in 2015.

In 2019, circulating Vaccine-Derived Poliovirus type 2 (cVDPV2) were isolated from 19 cases of Acute Flaccid Paralysis (AFP). In 2020, Ghana detected 12 more cases of cVDPV2. Apart from cases of cVDPV2 among AFP cases, cVDPV2 has also been found in the environment through the Environmental Surveillance (ES) programme. In 2018, 18 environmental cVDPV2 were identified and in 2020, 17 were detected. Recently, cVDPV2 outbreaks have been recorded in the neighbouring countries including countries sharing borders with Ghana. These events have warranted heightened surveillance for Polio.

Though the current IDSR Guidelines includes AFP surveillance as part of its SOPs, the country deemed it more prudent to have a separate guideline specifically for Polio surveillance which will serve as a reference document to address salient issues in both AFP and environmental surveillance.

This field guide is intended for use primarily by persons involved in Polio Surveillance, including clinicians. For officers involved directly in polio surveillance, this tool will serve as an important reference document in the implementation of their day-to-day activities. It can be used in troubleshooting of issues or problems encountered in the field and for the training or induction of all recruited staff who have surveillance included in their terms of reference.

This Polio Surveillance Guidelines will provide hands-on information to guide all actors and stakeholders in the implementation of Polio Surveillance

I appeal to all stakeholders that these guidelines be implemented within the broader context of health system strengthening to ensure that polio remains an issue of low public health significance in Ghana.

Kwaku Agyeman-Manu (MP).
Minister for Health

ACKNOWLEDGEMENT

We wish to acknowledge the contributions of various literature used in the development of this document which has been listed in the reference section.

Special mention goes to Polio Eradication Initiative Partners, the US Centers for Disease Control and Prevention, Rotary International, UNICEF and Bill and Melinda Gates Foundation for their contribution to Polio eradication over the years.

Members of the various Polio Committees together with the Secretariat served as the core group to consolidate the initial draft and therefore need to be commended. It is worth noting the quest to improve the sensitivity and specificity of surveillance has brought about the need to have a reference document to guide the smooth implementation of Polio surveillance.

We wish to indicate our appreciation to the World Health Organization (WHO) for the invaluable technical support and leadership provided.

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List of Acronyms

AFP	Acute Flaccid Paralysis
AFRO	African Regional Office of WHO
AUR	Annual Update Report
CBSV	Community-Based Surveillance Volunteer
CDC	Centers for Disease Control and Prevention
CHPS	Community Health Planning and Services
CSF	Cerebro-Spinal Fluid
cVDPV	Circulating Vaccine-Derived Poliovirus
DDHS	District Director of Health Services
DSD	Disease Surveillance Department
EPI	Expanded Programme on Immunisation
ES	Environmental Surveillance
GPEI	Global Polio Eradication Initiative
GPLN	Global Polio Laboratory Network
GPS	Global Positioning System
HI	Health Information
IDP	Internally Displaced Persons
IPC	Infection Prevention and Control
IT	Information Technology
ITD	Intra-typic Differentiation
LQA	Laboratory Quality Assurance
NCC	National Certification Committee
NGO	Non-Governmental Organization
NIDs	National Immunisation Days
NPEC	National Polio Expert Committee
NTCC	National Technical Coordinating Committee
NTF	National Taskforce on Containment of Wild Poliovirus
nOPV	Novel Oral Polio Vaccine
OPD	Out-Patient Department
OPV	Oral Polio Vaccine
PEI	Polio Eradication Initiative
PHEMC	Public Health Emergency Management Committee
SBCC	Social Behavioural Change Communication
SOP	Standard Operating Procedures
TBA	Traditional Birth Attendant
VAPP	Vaccine-Associated Paralytic Polio
WHO	World Health Organization
WPV	Wild Poliovirus

Glossary

Adequate stool specimens: Two (2) stool specimens collected 24-48 hours apart, within 14 days of the onset of paralysis, and arriving in the laboratory within 72 hours of collection with adequate documentation, frozen ice packs present and enough quantity for laboratory analysis.

NB: stool samples must be kept under reverse cold chain conditions between collection and shipment

Active AFP Surveillance: This involves regular visits by designated officers to surveillance sites where AFP cases can be found.

Passive AFP Surveillance: This is a system by which a health institution receives routine reports on AFP through the normal reporting system from the lower to the next higher level reporting sites (hospital, clinics, etc.) or community.

Hot case: (i) AFP case that is more likely to be paralytic polio ('polio' or 'suspected polio' based on history and clinical findings) and/or (ii) AFP case with direct contact to a confirmed polio case. This definition should include the following criteria: a case below 5 years old, with fever at onset, progressive paralysis over a period of 3 days, asymmetrical paralysis and received less than 3 OPV doses.

Investigation, stool collection and laboratory processing of specimens should be prioritized.

Polio-compatible AFP cases are those with inadequate specimens, and no 60-day follow-up examination done, or 60-day follow up done and child presents with residual flaccid paralysis, or child died before follow-up, or was lost to follow up. Such a case shall be presented to the National Polio Expert Committee (NPEC) for classification.

Asymmetry: The absence or violation of symmetry (i.e., not affecting both sides equally). Polio usually affects one limb more than the other. In this case we say the paralysis is asymmetrical.

Mopping-up: Mop-up Immunisation refers specifically to two (2) rounds of house-to-house Immunisation with Oral Polio Vaccine (OPV) targeting all children less than 5 years old, regardless of prior Immunisation status, conducted in a limited geographical area around the foci of wild poliovirus transmission. The purpose of the mopping up is to rapidly increase the population immunity around the foci in order to contain the spread of the virus.

Breakthrough case: Reporting a case of Polio from a particular area, 3 weeks after a vaccination response.

Chapter 1: Introduction

1.1 Background Information

Polio transmission has reduced significantly over the years through global eradication efforts from 1988, with total number of reported Wild Poliovirus (WPV) cases reducing from 350,000 in 125 countries to 33 reported WPV cases from 2 countries in 2018. The number of African countries reporting WPV transmission reduced from 32 in 2010 to zero at the end of 2019[1].

In Ghana, 52 WPV cases were reported between 1996 and 2008. The last reported case of indigenous wild polio was in 1999 from the Bole district in the Savannah Region (part of the then Northern region). Eight imported cases were reported in 2003. Following these, several response measures including National Immunisation Days (NIDs) and sub-NIDs were put in place to break the transmission of the virus. In 2007, Ghana was recognised by the African Regional Commission for Certification (ARCC) to have broken transmission of WPV. Ghana again reported eight imported cases in 2008. Additional response measures implemented resulted in Ghana attaining polio free status in 2015.

In 2019, nineteen polio cases due to circulating Vaccine-Derived Poliovirus type 2 (cVDPV2) were isolated from cases of Acute Flaccid Paralysis (AFP) and 12 detected in 2020. The onset of the first cVDPV2 case was 23 July 2019 which was reported from Chereponi District in the North East Region while the onset of the most recent case was 9 March 2020, reported from Jomoro District in the Western Region. Eighteen cVDPV2 were identified in 2019 and 17 in 2020 from the environment through Environmental Surveillance (ES).

As we get closer to the eradication of WPV, Polio Surveillance becomes the most important strategy of the Global Polio Eradication Initiative (GPEI). Polio Surveillance encompasses AFP surveillance and ES. It will help to evaluate the PEI activities and monitor the absence of Poliovirus in Ghana. The introduction of concepts such as **a hot case, inadequate case** and other tools have added to the developments causing the change in the surveillance landscape.

In view of the current epidemiological situation and the lessons learnt from field activities, the existing strategies have been adopted as follows:

1. Strengthening routine immunisation activities; attaining at least 90% OPV3 coverage by district and 95% coverage at national level. The same target is expected for Inactivated Polio Vaccine (IPV).
2. Implementing high quality polio supplementary Immunisation activities (NIDs or SNIDs) using appropriate polio vaccine.
3. Attaining and sustaining high level Polio Surveillance indicators;
4. “Mopping-up” campaigns conducted in case of importation of wild poliovirus, outbreak of cVDPV or identified high-risk areas.

1.2 Purpose of the Field Guide

This document is to provide hands-on information to guide all actors and stakeholders in the implementation of Polio Surveillance. This guide may also be used to train field officers, as well as serve as a reference document at all levels of health care delivery in the country.

[1] https://www.who.int/immunization/sage/meetings/2019/october/5_GVAP_2019_Regional_reports_YB.PDF

1.3 Target Audience

This field guide is intended for use primarily by persons involved in Polio Surveillance, including clinicians. It is also a tool for surveillance officers to enable them carry out their day-to-day duties. It can be used in troubleshooting of issues or problems encountered in the field and for the training or induction of all recruited staff who have surveillance included in their terms of reference.

Chapter 2: Epidemiology of Poliomyelitis

2.1. Causative Agent

Poliomyelitis (Polio) is caused by Polioviruses. Polioviruses are three related enteroviruses - types 1, 2 and 3, commonly referred to as WPV. All three types cause paralysis. The most frequent cause of epidemic polio is the poliovirus type 1. There are also Vaccine-Associated Paralytic Polio (VAPP) cases which are commonly due to type 2 or 3.

Rarely and in under-immunized populations, the live weakened virus in OPV can circulate in a community for an extended period and mutate into a form that causes paralysis. This is known as Circulating Vaccine-Derived Poliovirus (cVDPV). cVDPVs are not related to, nor indicative of a re-emergence of wild poliovirus. There are also three cVDPV types - Type 1, Type 2 and Type 3, with Type 2 causing the majority of cVDPV paralytic cases.

2.2. Reservoir

Poliovirus infects only human beings; there is no animal reservoir. The virus survives in the environment depending on certain factors. For example, in warmer climates, it takes two weeks for the infectivity of the virus in soil to fall by 90%. In sewage kept at 26^{o}C, the virus survives up to 26 days. In surface fresh water however, virus survives up to 5.5 days and in seawater, it survives only 2.5 days.

2.3 Mode of Transmission

Poliovirus is highly communicable. An infected individual will probably infect all other non-immune persons in a household, especially where sanitation is poor. Transmission is primarily person-to-person via the faeco-oral route, i.e. the poliovirus multiplies in the intestines and is spread through the ingestion of faeces. The time between infection and onset of paralysis is commonly 7 to 14 days and ranges between 3-35 days. The virus spreads rapidly to non-immune persons and transmission is usually widespread by the time of onset of paralysis. The virus is intermittently excreted for one month or more after infection. The heaviest excretion of the virus occurs just prior to the onset of paralysis and during the first two weeks after paralysis occurs.

2.4 Clinical Manifestation

Clinical Presentation: Infection with poliomyelitis is most often recognized by the acute onset of flaccid paralysis. Flaccid paralysis occurs in less than 1% of poliovirus infections (approximately 1 in 200 infections). Other clinical presentations include fever, malaise, nausea and vomiting, severe muscle pain, neck and back stiffness.

The paralysis of poliomyelitis is usually asymmetrical with fever present at onset. The maximum extent of paralysis is usually reached in a short period of time, usually 3-4 days. The legs are usually more affected than the arms. Paralysis of respiratory and/or swallowing muscles (bulbar polio) can be life threatening. Some improvement in paralysis may occur during convalescence but paralysis still present after 60 days is likely to be permanent. Commonly, there is no sensory involvement in polio infection.

Diagnosis: Poliomyelitis can only be distinguished from other paralytic conditions by isolation of the poliovirus from stool specimen. Other non-polio enteroviruses such as echoviruses and coxsackieviruses can cause an illness similar to paralytic poliomyelitis.

Differential Diagnosis: The common differential diagnoses that must be distinguished from poliomyelitis include:

- Guillain-Barré Syndrome (GBS)
- Acute motor axonal neuropathy (China Paralytic Syndrome)
- Transverse myelitis
- Traumatic neuritis
- Infectious and toxic neuropathies
- Tick paralysis
- Myasthenia gravis
- Porphyria
- Botulism
- Insecticide poisoning
- Polymyositis
- Trichinosis
- Periodic paralysis
- Snake bite

2.5 Risk Factors

Common risk factors for Poliovirus infection include:

- age less than 15 years,
- poor environmental and personal sanitation (limited access to safe water and liquid waste disposal system),
- immuno-compromised states
- unimmunised/under-immunised individuals
- low polio vaccination coverage rate; including urban poor, nomads, internally displaced persons/refugees, migrants and vaccination refusals, are especially at high risk**.**

2.6 Occurrence

Historically, in endemic areas, cases of poliomyelitis occurred both sporadically and as epidemics, with a less pronounced seasonal peak occurring in the dry and rainy season.

2.7 Prevention of Poliomyelitis

Poliomyelitis is not treatable but can be prevented through a number of measures. These include immunisation, enhancing surveillance and improving personal and environmental sanitation (improving access to safe water and liquid waste disposal systems).

2.7.1 Polio Immunisation

Immunity is the ability of an organism to resist a particular infection or toxin by the action of specific antibodies or sensitised white blood cells. Protective immunity against poliovirus infection develops by immunisation or natural infection. Immunity to one poliovirus type does not protect against infection with other poliovirus types. Immunity following natural infection or administration of live Oral Polio

Vaccine (OPV) is believed to be lifelong. The duration of protective antibodies after administration of Inactivated Polio Vaccine (IPV) is unknown. Infants born to mothers with high antibody levels against poliovirus are protected for the first several weeks of life.

2.7.1.1 Polio Vaccines

The following vaccines offer protection against polio transmission:

- Inactivated polio vaccine (IPV) – protects against poliovirus types 1, 2, and 3
- Trivalent Oral Polio Vaccine (tOPV) – protects against poliovirus types 1, 2, and 3 - *following the "OPV Switch" in April 2016, tOPV is no longer in use*
- Bivalent Oral Polio Vaccine (bOPV) – protects against poliovirus types 1, and 3
- Monovalent Oral Polio Vaccines (mOPV1, mOPV2 and mOPV3) – protect against each individual type of poliovirus, respectively
- On the 13 November 2020**,** the World Health Organization's (WHO) Prequalification (PQ) program issued an Emergency Use Listing (EUL) recommendation for the type 2 novel oral polio vaccine (nOPV2). This will allow rollout of the vaccine for limited initial use in countries affected by circulating vaccine-derived poliovirus type 2 (cVDPV2) outbreaks.

nOPV2 is a modified version of the existing OPV2 vaccine (also known as the Sabin OPV type 2 vaccine, or mOPV2) that provides comparable protection against poliovirus type 2. In addition to safety and efficacy of nOPV2, clinical trials show the vaccine is more genetically stable than mOPV2, making it significantly less likely to revert into a form which can cause paralysis in areas of low immunisation coverage. This means a reduced risk of seeding new cVDPV2 viruses compared to mOPV2, which remains a safe and effective vaccine that protects against polio and has successfully stopped cVDPV2 outbreaks in the past.

2.7.2 Improving Sanitation

Since community spread of poliovirus is aided by poor sanitation, measures to improve access to safe water and liquid waste disposal systems should be instituted. Public education on hand washing should be intensified and maintained. Local Assemblies (Authorities) should be supported by all stakeholders to enforce the legislation on sanitation, especially those requiring all houses and schools to have and use toilet facilities, in order to curb open defecation. All open drains should be covered and all sewage leakages promptly sealed.

2.8 Surveillance for Poliomyelitis

Early detection of polio cases is crucial to prevent the spread of the infection in the community. A surveillance system to actively look for and investigate all cases of AFP in children under 15 years and all other age groups when Polio is suspected is required to facilitate early detection and necessary action. There should also be active ES for monitoring of poliovirus transmission in human populations by screening environmental specimens assumed to be contaminated by human faeces.

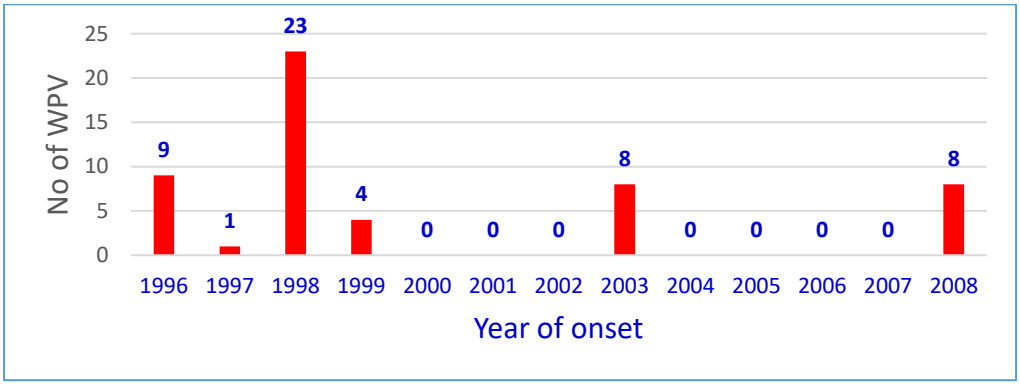
2.9 Overview of the Poliovirus transmission in Ghana

Ghana launched polio eradication campaign in 1996. This was in response to the World Health Assembly Resolution WHA41.28 of 1988 for polio eradication in all countries. The country has over the years implemented all the four recommended strategies and had interrupted local transmission of the virus, with the last indigenous wild poliovirus case reported in 1999. The country, however, experienced

episodes of wild poliovirus importations from Nigeria in 2003 and 2008. With the support of partners, both internal and external, the country responded swiftly to these importations and the outbreaks were brought under control. Since then Ghana has not recorded any WPV in the country and has remained polio-free with the last case in the country having a date of onset of 8 November 2008. The year 2019 brought in its wake AFP cases detected to have cVDPV2 with most recent case having date of onset in March 2020.

With the establishment of AFP surveillance, nine Type 1 WPVs were detected in 1996 and one in 1997 as shown in the figure below. Type 1 WPV transmission was highest in 1998 and then dropped to four when the last indigenous WPV was detected in the country.

Fig 2.1 Reported WPV in Ghana 1996 - 2008



Most of the Type 1 WPVs isolated in Ghana during 1995–1997 came from the southern part whiles majority of the WPVs in 1998 and 1999 were from the northern part of the country. The country, however experienced two polio outbreaks in 2003 and 2008 when eight Type 1 WPVs each were confirmed as importations from the neighbouring countries (Nigeria through Benin). To date, 37 indigenous type 1 WPVs and 16 importations have been confirmed through the AFP surveillance.

In 2019, Ghana had a cVDPV2 outbreak. The virus was first detected in the environment and then in humans. At the end of December 2019, seven regions out of the 16 in the country reported 12 confirmed cVDPV2 in humans and 15 in the environment. All the viruses were linked to a cVDPV strain that circulated in Nigeria in 2018.

Records show that Ghana had documented a laboratory confirmed WPV1 from Dzodze in the Volta Region and Accra in the Greater Region all in 1995 prior to the adaptation of WHO's effort to eradicate poliovirus and the introduction of AFP surveillance in the country in 1996.

Chapter 3. Principles of AFP Surveillance

3.1 Case Definition of AFP

Any child under 15 years of age with Acute (sudden onset) Flaccid Paralysis of the limb – arm, leg or both), or any person of any age with paralytic illness if Polio is suspected by a clinician.

Answer Three (3) Questions:

1. Is the case less than 15 years old? If older, does a clinician suspect polio?
2. Does he/she have paralysis/weakness (of the limbs – arm, leg or both)?
3. Is the paralysis/weakness sudden (appeared within 3 to 4 days) and Flaccid (Weakness or Floppiness)?

If yes to all three then the case should be investigated as an AFP CASE. In case of doubt, REPORT the case to your supervisor**.**

REMEMBER: WE ARE NOT LOOKING FOR POLIO, BUT ACUTE FLACCID PARALYSIS, A SYNDROME!

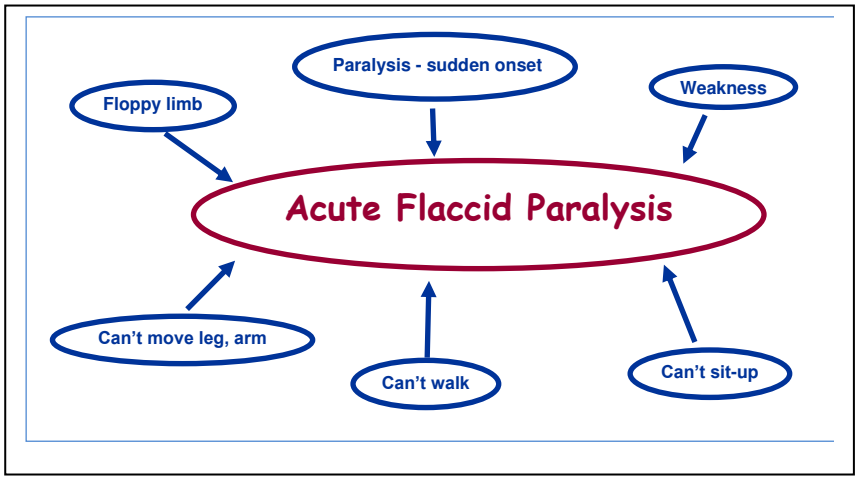


Fig 3.1: Signs and Symptoms of Acute Flaccid Paralysis

3.2 Types of AFP surveillance

There are two main types of AFP surveillance. These are active and passive surveillance.

Active AFP Surveillance: This involves regular visits by health workers and community volunteers to surveillance sites where AFP cases can be found. Such sites include health care facilities (such as clinics, hospitals, rehabilitation centers) and other sites (traditional healer's premises, Traditional Birth Attendants (TBA) homes, bone setters, schools, community leaders etc.) to search and investigate for AFP cases. The process of active surveillance involves the following:

1. the review of the health facility records,
2. conduct of interviews with health workers and CBSVs and/or
3. visit to paediatric wards and the community to review cases.

These activities are key in the identification of missed cases and serve as an opportunity to sensitize health workers.

To facilitate active case search, surveillance sites should be prioritized (see table 3.1) according to their probability of seeing AFP cases i.e. those sites, which have a higher probability of seeing an AFP case, should be visited more frequently. Every district should have a list of surveillance sites and a schedule to visit those sites. Each surveillance visit should be documented. Monitoring and reporting on active surveillance visits is a Polio certification requirement.

Passive AFP Surveillance: a system by which a health institution receives routine reports on AFP through the normal reporting system from the lower to the next higher level reporting sites (hospital, clinics, etc.) or community. AFP is also to be included in the weekly and monthly reporting system. When no case of AFP is detected, reporting units should still send weekly and monthly reports indicating 'zero cases' (Zero Reporting).

Active surveillance is recommended for polio eradication although some passive surveillance activities can support the system. Immediate notification of AFP in children < 15 years of age is required.

3.3 Steps of AFP surveillance

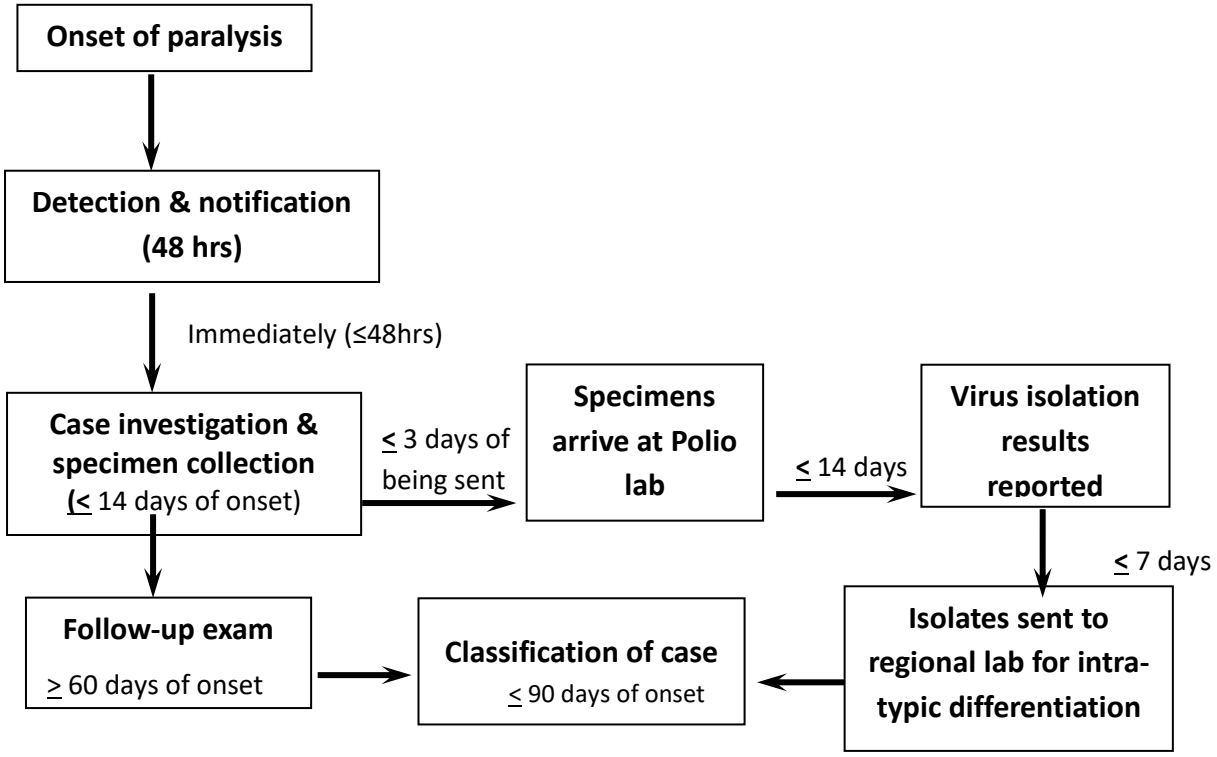
AFP surveillance includes the following major steps (Fig.3.2):

i. Case detection (active and passive surveillance) using case definitions
ii. Case notification and reporting
iii. Case investigation

- Complete case investigation form- within 48 hours of notification (both hard and electronic).
- Collect two stool specimens, 24 to 48 hours apart, within 14 days following the onset of paralysis. If the case is a **"hot case**" or has **"inadequate stool"** then there will be the need to collect one (1) sample each from 3 contacts (children less than 5 years) in the catchment area.
- Store stool sample using the reverse cold chain system in an appropriate stool specimen container and a dedicated carrier from collection of first sample to the time it arrives in the laboratory.
- Transport stool sample immediately to the National Polio Reference laboratory i.e. Noguchi Memorial Institute for Medical Research (NMIMR) Polio Laboratory for investigations.
- Update case investigation form with laboratory results. Conduct 60-day follow up examination

iv. National Polio Expert Committee (NPEC) classification
v. epidemiologic situation report and share with relevant stakeholders

Fig. 3.2: Summary of AFP surveillance



3.4 Case Detection and notification

Understanding the role of case detection is important for every person involved in AFP Surveillance. Case detection should be done from all health facilities (CHPS compounds to Teaching Hospitals and other specialist health institutions) and community-based surveillance network (chemical sellers, traditional birth attendants, traditional healers, prayer camps, bonesetters, including CBSVs).

Detection and notification of cases from within the community is usually by community informants, such as CBSV, opinion leaders and non-governmental organizations (NGOs) who have received basic orientation on how to recognize and notify an AFP case. Other persons that may report cases include commercial drivers and teachers.

After detection of the AFP case, notification should be done immediately to the next level, for example a nearby health facility staff or the District Disease Control Officer.

3.4.1 AFP Surveillance Network

The local or district health authority should establish a surveillance network that fully covers the entire catchment area for effective AFP surveillance. In Ghana, the IDSR approach is used. No area should be left out of the system. Attention should be given to areas most likely to have or attend to cases of paralysis. The table below shows some of the possible sites.

Table 3.2 Surveillance sites

Health Facilities	Community Locations/Persons
• CHPS compound	• Traditional Healers/Bone Setters
• Health Centers/ Clinics /Polyclinics	• Traditional Birth Attendants (TBAs)
• Hospitals (teaching, regional, district)	• Schools • Spiritual Healers / Prayer camps
• Physiotherapy and Rehabilitation Centers	• Village/Community Leaders (Chiefs) etc.) • Women's Groups/ Community-based organizations (CBOs)
• Faith-Based/Quasi-Government Hospitals/Clinics	• Spiritual Leaders/ Churches/Faith-Based Organizations
• Private clinics/hospitals	• Chemical sellers/ Over-the-counter (OTC) Medicine Seller
• Other Sites as determined by district	• Other sites as determined by the district

Particular attention, and appropriate strategy, must be put in place to reach the hard-to-reach areas and communities, including identification and training of CBSVs within such communities. It is also recommended to identify and train individuals as CBSVs in special populations (nomads, mobile population, fishing communities, scattered seasonal farming communities or areas with security challenges). The CBSV is designated to work and report on surveillance in these special populations. The District should determine how to make regular contact with them to monitor reporting of cases.

3.4.2 Prioritisation of surveillance sites

All Districts should classify their surveillance sites into one of the following three categories of risk: HIGH, MEDIUM and LOW (Table 3.4). Surveillance site, in this context means any reporting entity, any contact person and a focal point at any level of reporting. This prioritization may change over time; the District Director of Health Service (DDHS) should review prioritization of sites twice a year (January and July each year). Table 3.3 shows the basis for categorizing surveillance sites.

Table 3.3 Prioritization of Active Surveillance Sites

HIGH (Weekly Visits)	MEDIUM (Every two weeks Visits)	LOW (Monthly Visits)
Sites where AFP cases are **most likely** to seek Care • All hospitals (government, quasi government, Faith-Based and Private) • Any site that reported AFP that was positive for WPV/cVDVP in the last three years • Health facility or surveillance site located in areas of high population movement such as Cross Border Areas, Internally Displaced Persons (IDP) or Refugee Camp • High volume physiotherapy or rehabilitation centres, paediatric or traditional healers	Sites where AFP cases are **likely** to seek Care • All Health Centres and clinics with high patient turn over	The rest of sites not classified as high or medium • Clinics not selected as high or medium priority sites

Table 3.4 Frequency of visits by Surveillance Officer to surveillance sites

Priority Level	Likelihood of an AFP Case Seeking Care	Frequency of Visit
High	Most likely	Once a week
Medium	Likely	Once every two weeks
Low	Less likely	Once a month

3.5 Case Detection and Investigation

Using the case definition, AFP cases may be detected during day-to-day clinical activities, during active case search, retrospective reviews, during SIAs, in schools, market places, churches, play grounds, social events like naming ceremonies, and voluntary reporting from the community. Supervision or any visit to the health institution is an opportunity to inquire about AFP cases not yet reported.

The gold standard is to detect and investigate ALL AFP cases within 14 days of onset of paralysis. However, as we are very close to polio eradication in the region and globally, **it is mandatory to report and investigate all AFP cases with date of onset of paralysis within six months.**

For AFP cases with onset within the first 60 days upon detection, full investigation has to be carried out as has been the case including collection of the two stool samples and transport to the laboratory adhering to standard operating procedures.

For AFP cases detected after 60 days from onset of paralysis but with date of onset within or equal to six months, investigation should be conducted just like the case within 60 days but in this case *NO STOOL SHOULD BE COLLECTED.* The case should be adequately investigated including the reasons for the late reporting. The same AFP case investigation form (CIF) should be used to capture the required information. All the information on the CIF should be entered into the district AFP data base just as for

an AFP case detected within 60 days from onset of paralysis. Copies of the investigation reports should be submitted to the regional and national levels.
Similarly, for AFP cases detected after six months, case should be adequately investigated including the reasons for the late reporting. The same AFP case investigation form (CIF) should be used to capture the required information. All the information on the CIF should be entered into the district AFP data base just as for an AFP case detected within 60 days from onset of paralysis. Copies of the investigation reports should be submitted to the regional and national levels. ***(NB: in this situation, the case investigation should not be sent to the national level and the case will not be entered into the national database)***

Keeping record of AFP cases with onset within six months from date of onset of paralysis adds value to the surveillance system as follows;

- it measures the sensitivity of the surveillance system (number of missed true AFP by surveillance system)
- provides information on the health seeking behaviour in a community
- provides a better understanding of the incidence of AFP

3.5.1 Conducting active case search

The district and subdistrict surveillance focal persons should conduct active case search by visiting health facilities or community locations. The frequency of visits to these health facilities or community locations will depend on the priority level of such sites. At the health facility, there should be a designated surveillance person who conducts daily case search.
The steps for conducting daily case search at the facility level (paper-based or electronic) are detailed below.

3.5.1.1 Conducting Active Case Search at the Facility Level: Paper-based health records system

- Locate the outpatient department (OPD) and in-patient register where applicable
- Review the *provisional diagnosis*, *principal diagnosis* and *additional diagnosis* columns, row by row, from the last time the register was reviewed up to the most recent cases recorded. (Any previous record reviews conducted is indicated by the date and signature of the reviewer)
- As you review the diagnoses columns, search for the keywords in relation to AFP diagnosis (see Table 3.4). If any possible cases of AFP are identified, record their names, age and folder number for follow up
- Consider preliminary information about whether the patient meets case definition or not (for example age less than 15 years compared to age 60 years or hemiparesis i.e. weakness on one side of the body)
- If patient is likely to meet the case definition, or there is insufficient information, look for patient folder. Read and review clinical notes, preferably with a clinician.
- Determine if the case meets the case definition for AFP
- If case definition for AFP is met, report to the District Disease Control Officer or to the Surveillance Officer at the next level.
- Make sure to indicate the date and your signature in the register at the point where you ended the case review/search (this is important to indicate where you left off and for monitoring visits)

3.5.1.2 Conducting Active Case Search at the Facility Level: Electronic Health Records (EHR) System

Increasingly is the need to review electronic databases as they replace paper-based registers. This calls for the granting of permission to persons external to these electronic databases who are to conduct a case search within a facility. Please follow all protocols as required in both situations.

- Make sure you have logon credentials (username and password) with the right user access level (contact your facility's health information (HI) officer or information technologist (IT) if you need help)
- If it is your first-time performing case search using EHR, log in and display the OPD or in-patient electronic register for the past two days, as practice. (You may need the help of your HI or IT to show you how to display and/or download a line list with patients details and diagnoses on each row, NOT a tally of cases or diagnoses)
- Export or convert the downloaded file to excel, (or PDF if excel is unavailable). Use the "search" function, verify whether it works by searching for something you can see in the document (for example search for a patient name or ward name/ number that you can clearly see on the line list).
- Use the 'search' (or "Find and Select" in some Excel versions) function to find any of the keywords in relation to AFP (see Table 3.3) in the Excel/PDF file.
- If any possible cases of AFP are identified through the search, record their names, age and case ID number for follow up
- Consider preliminary information about whether the patient meets case definition or not (for example age less than 15 years compared to age 60 years or hemiparesis i.e. weakness on one side of the body)
- If patient is likely to meet the case definition, or there is insufficient information, you may need to access patient's clinical notes (you may need a higher user access for this). Read and review clinical notes, preferably with a clinician.
- Determine if the case meets the case definition for AFP
- If case definition for AFP is met, report to the District Disease Control Officer or to the Surveillance Officer at the next level.
- Make sure to name the downloaded electronic file using both the type of register (OPD or in-patient), place/ward and the date of review, separated by underscore (_). For example, **OPD_CR2_January022020** or **Inpatient_Femaleward_Jan052020.** (This can serve as evidence of record review for monitoring purposes)

Institutional Public Health Units should ensure that a robust system for active case search is instituted, covering the whole hospital, especially clinical service delivery areas. Surveillance officers should be assigned to specific clinical service points (especially general OPD and medical emergency areas) and high priority specialties for AFP (paediatrics, neurology, orthopaedics, physiotherapy, etc.). Supervisors should ensure daily active case search is carried out at high priority specialties.

3.5.2 How to conduct active case search at the Health Facilities:

- ❑ Meet with the surveillance focal point (e.g. Surveillance Officer, Community Health Nurse, or any designated person) at the health facility.
- ❑ Ask if any cases of AFP have been identified at the facility since the last visit.
- ❑ Review the registers (admission, outpatients) for any of these diagnoses listed in table 3.3 which can be associated with AFP

- Ask for the patient folder or electronic health record (if available) for any person who has one of the above diagnoses listed with their name in the registers.
- Review medical records of any of these cases with medical personnel based in the health facility (Nurse, Physician Assistant, Community Health Nurse, Doctor, others) to ascertain that they are cases of AFP. This also acts to build capacity of the staff.
- If cases are identified in the records but were never admitted or are no longer on admission, get contact information and find them in the community with the help of the local staff.
- Sensitize facility staff on AFP case definition and procedures at each visit.
- Record active case search using a monitoring tool (e.g. Checklist for monitoring IDSR activities; see Annex 8H of IDSR Technical guidelines). Sign off in the register reviewed and visitors' book. Record where and with whom you visited; and have your focal person sign off on reporting form.
- Check if surveillance tools (case definition, Case Investigation Forms, Standard Operating Procedures, etc.) are available.
- Check for stool collection kits and dedicated specimen carrier and ice packs for stool transportation

3.5.3 Visit to the Community

- Identified community contacts or groups include
  - Community Leaders (Assembly member, Chiefs, etc.)
  - Community Development Committee
  - Traditional /Spiritual Healers / Prayer camps
  - Community Health Workers
  - Traditional Birth Attendants
  - Women's Groups/ Community-Based Organizations (CBOs)
  - Churches/faith-based organizations.
  - Youth Leaders
  - NGOs, Cattle Camps, Water points, other, etc.
- Make regular visits (as per priority level) to all community contacts.
- Make sure you visit all focal points in your District.
- At each visit, take time to teach people the basic facts about Polio, AFP and the importance of immunisation. Make it a point to provide feedback on AFP cases reported previously.
- Ask if your focal person has heard about any cases of AFP.
- If you are told about any cases of AFP, investigate immediately!
- Record on the reporting form where and with whom you visited. Have your contact sign on the reporting form.
- Make sure the community focal persons know how to reach the next level supervisors if AFP case is detected (physical address, telephone number, etc.)
- Also keep a log of visits to your community informants/contacts.

Table 3.4 Symptoms and diagnoses of AFP cases

SYMPTOMS	DIAGNOSES (ALWAYS present with AFP)	DIAGNOSES (Sometimes present with AFP)
• Paralysis • Paresis (weakness) • Flaccid (floppy) • Weakness (of limb, of unclear origin, etc.) • "Frequent falls" • "Gait disturbance" • "Cannot walk" • "Cannot stand"	• Poliomyelitis • Rule out polio • Suspect polio (polio causes rapidly progressing floppy paralysis of usually ONE leg or ONE arm within less than one week) • Guillain-Barre Syndrome (illness causing slowly progressing floppy paralysis for BOTH legs) • Transverse myelitis (rare illness causing floppy paralysis of BOTH legs) • Traumatic neuritis (usually due to an intramuscular injection)	• Muscle Hypotonia (Hypotonia means loss of muscular tone due to various causes) • Hypokalemic paralysis (weakness due to low potassium levels in the blood; this often happens during diarrhea, and is quickly reversible) • Pott's disease (TB of the spinal vertebrae) • TB meningitis (all other meningitis) • Encephalitis (an infection of the brain matter) • Osteomyelitis (i.e., infection of the bones, child may not move limb if affected because of pain)

3.6 Case Notification / Reporting

Each AFP case must be notified and investigated within 48 hours. Completed AFP case investigation forms must be sent to the next level immediately (within 24 hours).

3.7 Case Investigation

The District Health Directorate should initiate AFP investigation within 24 hours of notification from the lower health facility. There should be a trained health worker to support the investigation of AFP cases in all health facilities including the CHPS Zones and CBSV.

3.7.1 Steps in case investigation

1. The district should form an investigation team comprising of a Clinician, Laboratory Technician, Disease Control Officer and any other health staff that managed the case at the reporting health facility.
2. Prepare logistics for field investigation.
    a. Stool collection kit, Wellington boot, cold box, gloves, patella hammer, case investigation forms, frozen ice packs and transport arrangement
3. Verify and re-examine the case
    a. Clinician examines the patient to assess whether it is a true AFP
    b. If it meets the case definition of a true AFP, then send the patient to the facility and proceed to the next step. If not AFP, establish which diagnosis and refer appropriately and document.
4. Collect and package stool samples and transport to Polio Laboratory at Noguchi. Refer to session 3.5 of this document.
    a. Samples for each patient should be sent immediately to the Polio laboratory (avoid batching, that is waiting for several more samples before sending).

b. Samples should reach the lab within 72 hours of collection.

5. Complete case investigation form.
    a. All data fields must be filled during the initial investigation and later 60-day follow up investigation findings indicated
    b. Ask the patient for travel history within the previous 30 days or for a visitor who has been with the patient during the 30 days prior to the onset of paralysis to help determine where the infection occurred if it is likely to be polio.
6. Conduct case search for additional cases
    a. Health facility case search
    b. Community case search focusing on where the case came from using the standard AFP case definition.
    c. If any additional cases are found; follow the above steps to conduct the case investigation.
7. Write and submit a report to the District Director of Health Services for onward transmission to the Regional Director of Health Services and the Head of Disease Surveillance Department. The report should include;
    a. Completed AFP case investigation form
    b. Summary of key findings.
8. Analyze and update AFP database at the district level and the reporting health facilities.
9. conduct case validation
    a. It is essential that the regional and national level teams re-examine (spot check) at least 80% of all cases as a quality control measure to ensure that what is reported as AFP is truly AFP.

3.8 Specimen Collection and Transportation

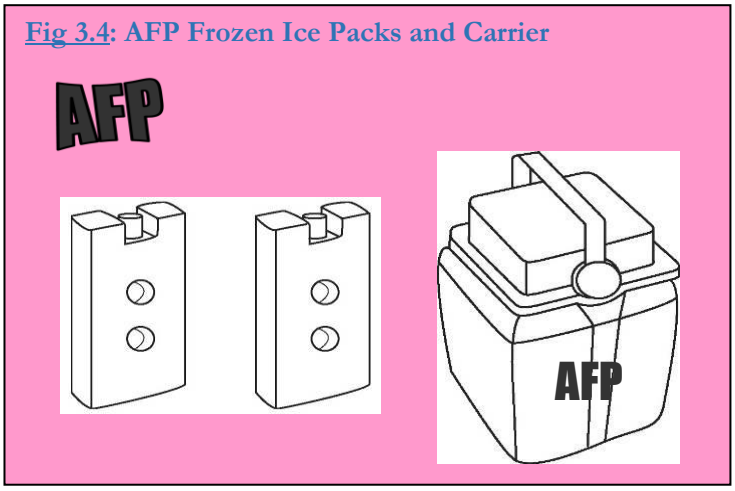
3.8.1 Collection Kit:

Supplies to be prepared are:

1. Sample carrier (Boldly write "AFP" and Name of District on dedicated carrier, Fig.3.4).
2. AFP case investigation form
3. Water-resistant felt-tip pen (to complete form and label the container)
4. Container labels
5. Leak-proof specimen container with a screw cap
6. Absorbent material
7. Plastic bags
8. Temperature monitor (if available). Remember to maintain ice packs frozen for immediate use.

Frozen ice packs used for specimen transportation should not be put in vaccine carriers.

Fig 3.4: AFP Frozen Ice Packs and Carrier



3.8.2 Rationale for collection of stool specimen

The excretion of wild polioviruses is known to be intermittent and higher yield during the first 14 days (Figure 3.5) of onset of paralysis. In order to increase the chances of isolating poliovirus, two stool specimens are collected, the first on contact with the patient and the second is collected 24 to 48 hours later.

Note: THE STOOL SPECIMENS MUST BE COLLECTED WITHIN 14 DAYS AFTER ONSET OF PARALYSIS (early detection) AND MAY BE COLLECTED UP TO 60 DAYS (late detection).

Fig 3.5 Poliovirus excretion rate in stool from onset of paralysis

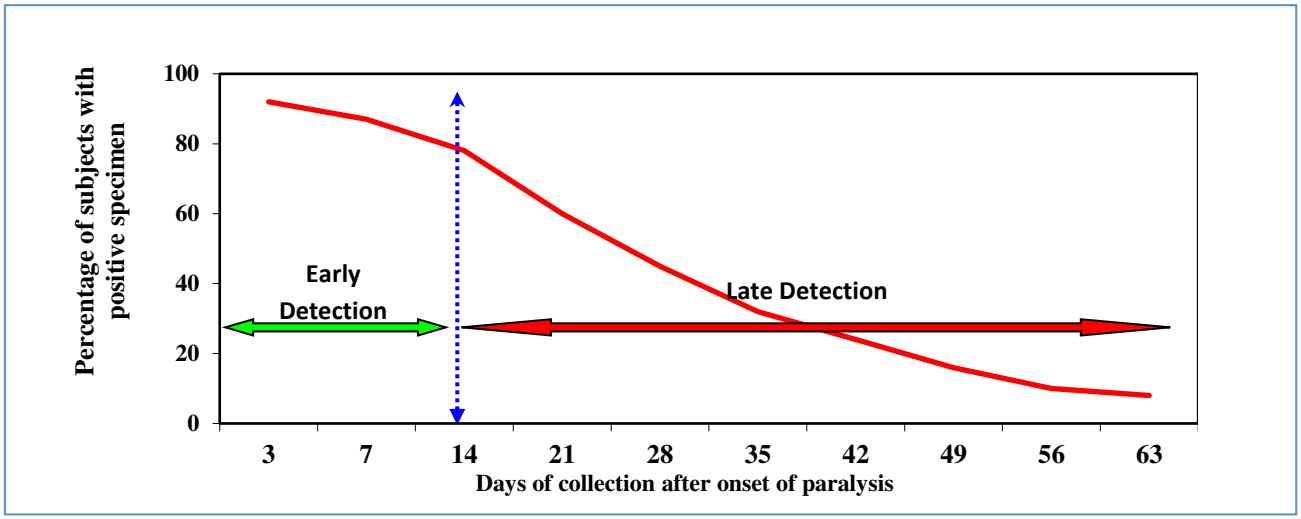


Figure 3.5 shows Poliovirus excretion rate in stool from onset of paralysis. The excretion of Poliovirus in stool gradually reduces with time from onset of paralysis. After 14 days from onset of paralysis (late detection) the detection rate of poliovirus reduces significantly. Chance of poliovirus recovery after 60 days is less than 10%. Therefore, stool specimens should not be collected after 60 days of onset of paralysis.

NB: After 60 days of onset every AFP case detected has to be investigated without stool sample collection.

3.8.3 Stool Collection Procedures

1. Provide a clean polythene material (e.g. polythene bag) to the mother/caregiver
2. Mother/caregiver lines the chamber pot with the clean polythene material (to avoid stool contamination)
3. The patient now defecates into the lined chamber pot.
4. Using a clean spatula, the mother/caregiver collects about 8g (adult thumb size) of the top part of the stool into the stool container, such as wide mouthed screw-on cap and closes it tightly.
5. The Surveillance officer labels the side of container with name, identification number of the case, number of specimen (1 or 2), and date of collection using a water-resistant pen
6. Place specimen container in sealed plastic bag with cotton wool or gauze to serve as specimen absorbent in case of leakage

3.8.4 Stool Storage and Transport

The stool specimens should immediately be kept at +2 to +8°C after collection. A dedicated sample carrier with appropriate number of frozen ice packs should be used (2 to 6 frozen ice packs). This is called **"reverse cold chain[2]"**, basically meaning the stool specimen is kept cold (+2 to +8°C) from the time of collection, from the AFP case, to the laboratory. If for any reason stool cannot be transported to the national Laboratory within 48 hours, it should be frozen. During transport, the ice packs should be changed, once it is noticed they are no longer cold enough to maintain the temperature in the specimen carrier at less than 8°C (see Fig 3.4).

3.8.5 Collection of Specimens from Contacts of AFP Cases

3.8.5.1 Purpose of Contact Stool Collection

A sensitive surveillance system that timely detects the circulation of poliovirus and directs program interventions is very essential at all times. . Collection of adequate stool samples from AFP cases is an essential component of AFP surveillance. Under certain circumstances however, the ability to collect adequate stool samples may be challenging leading to inadequate cases or "Hot Cases". In such a situation, supplemental surveillance activities such as AFP contact sample collection will enhance poliovirus detection.

Collection of stools from contacts becomes more important with the introduction of new vaccines such as nOPV2 when surveillance on vaccine derived strains have to be intensified.

3.8.5.2 Rationale

The purpose of AFP contact sampling is to **increase the probability of detecting and confirming poliovirus, if it is circulating. This is based on the following:**

i. Poliovirus spreads by faced-oral route. In environments with poor sanitation, food or fluids may easily get contaminated by feces. Contacts of infected persons have a higher chance of being infected, compared with non-contacts;
ii. Most poliovirus infections are asymptomatic;
iii. An infected asymptomatic child may carry and excrete the virus for up to two months; immune-deficient children may excrete much longer.

3.8.5.3 Definition of terms

- Acute Flaccid Paralysis contact sampling: is the collection of stool samples from close contacts of an AFP case.
- Contact of an index AFP case: is a healthy child aged below 5 years who was in direct contact with the index AFP case (household, close family, neighbour and playmate), 7 days prior to onset of paralysis and/or within 14 days after onset of paralysis.

3.8.5.4 Indications for acute flaccid paralysis contact sampling

The following are indications for AFP contact sampling:

a) All AFP cases with inadequate stool samples that may be due to any of the following reasons:
    i. Late AFP case detection: this implies AFP cases detected from the 15th to the 60th day of onset of paralysis. It is important to note that no sample should be collected

[2] Keeping specimen at temperatures within +2 to +8°C from the point of collection through to the designated laboratory

from contacts of AFP cases that are detected after 60 days of onset of paralysis.

ii. Inability to collect two stool samples from AFP case (e.g death or loss to follow up).
iii. Small quantity (<8 grams) of stool samples collected
iv. Two stool samples NOT collected 24-48 hours apart
v. Inadequate cold chain maintenance during collection, storage and transportation of stool samples
vi. Poor condition of samples (e.g. leakage or desiccation)
vii. Poor/no documentation.

b) All AFP cases detected from *selected* polio high risk districts following guidance from the national polio programme.

c) When there is a 'Hot case'

A "Hot AFP case" is described as a child (<5 years) having **incomplete vaccination history** and presenting with the following three clinical cardinal signs:

- Fever at onset of paralysis
- Asymmetric paralysis
- Rapid progression of paralysis (within 3 days).

3.8.5.5 Selection of contacts

Select three (3) children aged less than 5 years living in and around the residence of the AFP index case. Try to locate those children who have had the closest contact with the AFP index case within a week prior to onset or within 2 weeks of the onset of paralysis, e.g. siblings, living in same household, play mates etc. If these are too few, sampling from children in the neighbourhood or vicinity is acceptable. Samples should be taken immediately.

3.8.5.6 Timing of collection of contact specimens

Contact specimens should be collected as quickly as possible, as soon as the investigation team realizes that specimen collection from the index case will not be possible within 14 days. Virus excretion diminishes after 14 days from paralysis onset, therefore the sooner the contact specimens are collected, the higher the probability of virus isolation. Stools can be collected from contacts of the index case up to six months following the onset of paralysis in an index case.

3.8.5.7 Stool Collection Procedure and Documentation

Obtain **one** stool specimen from each contact child. The guidelines for quantity of stool to be collected, packing, labelling and transportation are identical to that for AFP cases. The contact stool form (see Annex 5- Contact Specimen Collection Form) should accompany the stool specimens to the Polio laboratory at NMIMR and a copy sent to the Disease Surveillance Department at Korle Bu.

3.8.5.8 Assign EPID numbers to the AFP case contacts

The EPID number should be assigned at the district level. Each contact specimen should be identified by a unique identification number linked to the EPID number of the index case. Using the EPID number of the index case, assign identification numbers to each of the 3 contact specimens as follows:
EPID-C1 through C3, for example:
Reference case is GHA-RRR-DDD-19-002
Contacts:
GHA-RRR-DDD-19-002-C1
GHA-RRR-DDD-19-002-C2
GHA-RRR-DDD-19-002-C3

NB: Only one stool specimen is required per contact. In general, three contacts are required but contacts could be more based on epidemiological situation.

3.8.6 Healthy children/Community stool sampling or survey

3.8.6.1 Definition of terms

Targeted Healthy Children Stool Surveys are the collection of stool samples from high-risk healthy children and testing them for polioviruses. A healthy child is a child younger than 15 years of age who does not have symptoms of AFP, and who is not an immediate/direct contact of an AFP case

3.8.6.2 Rationale and Indications

Most poliovirus infections occur with no symptoms, which lead to the possibility of silent circulation. Targeted Healthy Children Stool Surveys could lead to detection in cases of silent circulation. Poliovirus spreads by oral-faecal route and in environments with poor sanitation; food or fluids may easily get contaminated by faeces. Contacts of infected persons have a higher chance of being infected when they ingest the contaminated food or drink. An infected asymptomatic child may carry and excrete the virus for up to two months; immune- deficient children may excrete much longer. Even vaccinated children, who are protected from paralysis, if infected, can still excrete the virus in their stools for a short time.

Periodic stool surveys may be conducted among healthy children from high-risk populations. They may be implemented in the following areas:

- Hard-to-reach areas and areas that were previously inaccessible where there is a new opportunity to enter
- Areas where the programme strongly believes they may be missing polio transmission

In polio event/outbreak settings, as part of initial investigations:

- Collect 20 samples from healthy children under 5 years living in a different section of the community or a nearby community (and not in close contact to the confirmed case)
- In case of a positive environmental sample: collect community stool samples from 20 children under five years of age (with preference for those less than two years) chosen randomly from the same community

Targeted healthy children stool surveys may also be implemented among communities which may have had contact with areas known or suspected to have had poliovirus circulation. Such groups may include:

- Refugees and IDPs
- Children coming out of previously inaccessible areas
- Ethnic groups, minorities, and marginalized groups who are isolated from the surrounding community or do not accept the health services/vaccination for any reason

Determining frequency, periodicity, target areas, and populations is usually done in consultation with partners.

3.8.6.3 Procedure (Steps)

Targeted healthy children stool surveys involve the following activities:

1. Decide on the source population:
   - Health facility-based sampling (when a child from the targeted area/ group visits health facility for any reason other than AFP)
   - Community sampling from households or camps
2. Sensitize and brief community leaders about polio and the importance of collecting samples

3. Decide on criteria for enrollments: the child should be from the vulnerable communities most susceptible to be infected among the population groups as described above—e.g., younger children (preferably younger than 5 years of age, unimmunized or under-immunized)
4. Determine number of children to be sampled (e.g. 20 to 40)
5. Collect only one stool specimen from each healthy child
6. Collect, store, and transport stool specimens in the same way as for AFP cases

Complete a specific "targeted healthy children stool survey" form for each child and send it to the polio laboratory along with the specimen. Each specimen should be labeled clearly as a 'healthy children stool survey' with a specific unique identification number.

3.8.6.4 Assign EPID numbers to Healthy Children surveyed

Each specimen should be identified by a unique identification number. Note that in healthy children survey, there is no index case. For example, if stools were collected from 10 healthy children from Nkwanta North District in Oti Region of Ghana, the EPID numbers should look like this:

GHA-OTI-NKO-19-001 CC
GHA-OTI-NKO-19-002 CC
GHA-OTI-NKO-19-003 CC
GHA-OTI-NKO-19-004 CC
GHA-OTI-NKO-19-005 CC ……..
GHA-OTI-NKO-19-010 CC

NB: "CC" denotes community or healthy children sample. The number of samples to be collected depends on the situation and may vary based on the needs of the programme.

1. Decide on criteria for enrollments: the child should be from the vulnerable communities most susceptible to be infected among the population groups as described above—e.g., younger children (preferably younger than 5 years of age unimmunized or under-immunized)
2. Determine number of children to be sampled (e.g. 20 to 40)
3. Collect only one stool specimen from each healthy child
4. Collect, store, and transport stool specimens in the same way as for AFP cases

Complete a specific "targeted healthy children stool survey" form for each child and send it to the polio laboratory along with the specimen. Each specimen should be labeled clearly as a 'healthy children stool survey' with a specific unique identification number.

3.8.6.5 Interpretation of Results

- A positive result (WPV or VDPV) shall be considered evidence of transmission in the specified area and will prompt programmatic action as per the outbreak response guidelines.
- Positive healthy children will not be listed as cases of poliomyelitis, but the isolate will be added to the WPV/VDPV count and used for all analysis, including genetic sequencing and genetic diversity analysis conducted by the Global Polio Laboratory Network (GPLN).
- A negative result may not be interpreted as the absence of poliovirus in the community. It simply indicates that at the time of collection there was no virus shed by any of the sampled children.

3.8.6.6 Interpretation and Dissemination of Laboratory Results

Presence of wild or vaccine-derived poliovirus in any one of the three contact specimens is highly suggestive that the index case was also infected. Any index AFP case with one or more contacts testing positive for wild or circulating poliovirus will be classified as "confirmed polio".
The results of the laboratory investigation will be shared with the Disease Surveillance Department. The Surveillance Department will communicate the results to WHO and send feedback to region and the region will make the results available to district and reporting facility or even the community.

3.8.6.7 Intervention and response

Once poliovirus (WPV or cVDPV) is identified in an area (District), appropriate and timely response should follow. This includes conducting detailed case investigation and strengthening AFP surveillance. The regional and district teams should plan and implement mop up vaccination activities as per national guidelines.

nOPV2 requirement: In the context of nOPV2 use, and as per Emergency Use Listing (EUL) requirement, the program must carry out systematic contact sampling of all AFP cases, for a 6-month period, following the use of nOPV2.

After this 6-month period, the program will make the decision to revert to contact sampling for AFP cases as described below.

In the context of nOPV2 requirement: *the programme will consider sensitization of all key stakeholders in the surveillance system i.e. the laboratory personnel, clinicians, surveillance officers and the EPI team.*

- *Furthermore, provisions will be made for adequate supplies*
  - Case investigation forms
  - Specimen carriers.
  - Ice packs.
  - Water resistant felt-tip pen or permanent marker.
  - Container labels.
  - Leak-proof specimen container with a screw cap.
  - Plastic bags.

3.9 Sixty (60)-day Follow Up

Definition: A follow-up clinical examination conducted by a clinician (preferably by Medical Officer or Physician Assistant trained to conduct the assessment) 60 days after the onset of paralysis of an AFP case. In Ghana, it is recommended that all AFP cases should be followed up after 60-Days of onset of paralysis (but not exceeding 90 days of paralysis onset) and detailed clinical examination including neurological findings documented. It is preferable that the re-examination be done by the same team who conducted the first investigation of the case.

3.9.1 Rationale for 60-Day follow up

- To determine the presence of residual paralysis after 60-days of onset (NB: presence of paralysis after 60-days is an indication of a possible poliovirus infection).
- To guide final classification by the NPEC

To conduct the follow-up examination, the investigation team should:

- Have in hand a copy of the initial case investigation form for the particular case
- Use the 60-day follow-up case investigation form for AFP
- Verify with the parent/guardian that the information on the case investigation form is correct
- Ask the parent/guardian if there is a change in the degree of paralysis
- Observe how the child moves limbs (look for muscle atrophy and, if possible, watch the child walk)
- Verify whether there is residual paralysis (flaccid or floppy)
- Check for;
    - Muscle tone
    - Power of the limb
    - Deep tendon reflex
    - Muscle Volume (Muscle bulk)
    - Sensory Loss
- Complete the 60-Day Follow up Case Investigation form;
- Ensure that appropriate diagnosis is provided (Provisional and or Final)
- Sign and send copy of the completed 60-Day Follow-up Case Investigation form to next level with detailed clinical notes immediately (within 24hrs)

3.9.2 Outcome of the 60-day follow up visit:

1. No residual paralysis: 60 days after onset of paralysis, no weakness or paralysis is present (the affected limb/s has recovered)
2. Residual paralysis: 60 days after onset of paralysis, some weakness or paralysis persists (no improvement or slight improvement).
3. Lost to follow-up: case cannot be traced for whatever reason
4. Death: Patient died before follow-up

3.10 AFP Case Classification

The National Polio Expert Committee (NPEC)

The final classification of all AFP cases in Ghana is done by the NPEC. The NPEC is a group of experts comprising scientists, physicians, academicians and others familiar with polio eradication initiative and EPI. The NPEC works closely with the Secretariat involved in Polio Surveillance. The Secretariat comprises members of the Disease Surveillance Department the National Expanded Programme on Immunisation (EPI), the Polio Reference Laboratory and WHO.

The NPEC meets at least once every two months or more frequently depending on AFP case load and the poliovirus epidemiology in the country. NPEC classifies AFP cases using the virological classification scheme (Fig 3.6).

Outcomes of classification are as follows:

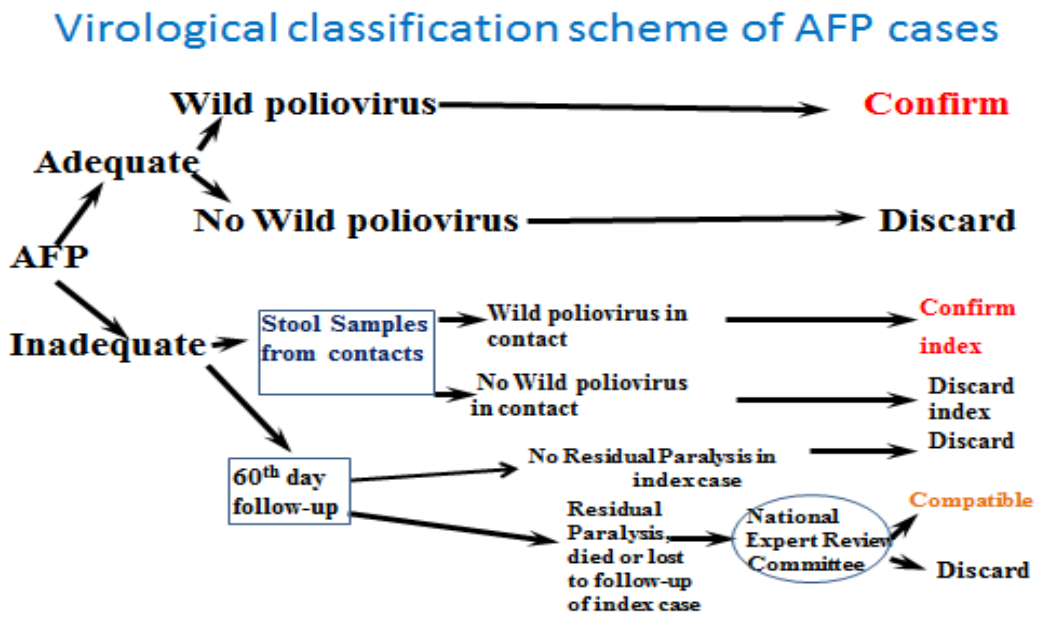
- Confirmed (WPV, cVDPV, iVDPV, aVDPV)

- Compatible (Inadequate stool without 60-day follow up, or lost to follow up, or patient died or residual paralysis after 60-days without alternative diagnosis)
- Discarded (Non-polio AFP)
- Not AFP

ALL cases classified as polio-compatible should have an explanatory note. For each polio compatible case, an epidemiological investigation should be conducted to document surveillance gaps so as to implement corrective actions.

Note that detailed documentation should be kept at all levels for certification purposes.

Fig 3.6 Virological classification scheme of AFP Cases



NB: cVDPV, iVDPV, aVDPV all classified as confirmed

3.11 Feedback on surveillance performance

AFP surveillance activities require regular feedback using the information captured in the case investigation form, the laboratory results, the 60-day follow-up examination findings, remarks from NPEC and other programme activities.

3.11.1 At the national level

The Disease Surveillance Department and the Polio Reference Laboratory should provide weekly feedback to the regional and district teams on all the components of AFP surveillance.

3.11.2 At the regional level

The Regional Health Directorate should provide weekly feedback to district and facility teams on all the components of AFP surveillance (epidemiological situation, data management, lab results, stool condition, timeliness of stool collection, etc.) An epidemiological bulletin (monthly and weekly) can be used for this purpose.

3.11.3 At the district level

The District Health Directorate should provide weekly feedback to sub-district and facility teams on all the components of AFP surveillance (epidemiological situation, data management, lab results, stool condition, timeliness of stool collection, etc.) An epidemiological bulletin (monthly and weekly) can be used for this purpose.

3.11.4 At the health facility level

Health workers at the reporting facility should send feedback received from higher level (sub district or district) to the clinicians and other health workers, community focal person, community informant and family as mentioned above. The feedback could be both oral or written.

3.11.5 At the community and family level

The outcome of investigation should be given to the community focal person (CBSV or CHO) and family by designated Surveillance Officer immediately after receipt of the results without delay[3]

3.12 Roles and Responsibilities of Officers in Surveillance Network

The major responsibilities include the detection, reporting and investigation of AFP cases and basic data analysis (person, place and time). The following are the three major actors at this level: CBSVs, the health facility workers and the focal persons at sub-district/district level.

3.12.1 The Community Level

The main actors are Community Based Surveillance Volunteers (CBSV). Their duties and responsibilities include:

1. Detect and notify all cases of weakness/ paralysis to health facility workers
2. Sensitise communities on issues of case detection and early reporting
3. Sensitise family members regarding the 60-day follow-up (to reduce the number of "lost to follow up" cases).
4. Support surveillance officers in case investigation
5. Provide feedback to families on outcomes of investigation
6. Educate community on maintaining clean environment and personal hygiene

3.12.2 Health Facility level:

The main actors are facility focal person(s). Their duties and responsibilities include:

1. Support investigation of all cases in the community.
2. Conduct daily records review in priority units/wards
3. Review AFP case and report to district level for appropriate action.
4. Detect and notify AFP cases to the District level.
5. Investigate AFP case using the case investigation form with support of the district team.
6. Collect stool samples and ensure maintenance of reverse cold chain.
7. Sensitise traditional healers, traditional birth attendants, religious and community leaders on issues of GPEI.
8. Provide regular feedback to communities and families.

[3] Copies of feedback should be shared with the next higher level.

9. Support the conduct of 60-day follow-up investigation.
10. Conduct regular visit to surveillance priority site.

3.12.3 District level

The main actors are District Director of Health Service (DDHS), District Surveillance and Disease Control Officers. The DDHS has overall responsibility and ensure the following are implemented:

1. Prioritise surveillance sites based on set criteria twice each year (February and August).
2. Conduct regular active surveillance site visits at health facilities and communities as planned.
3. Detect and notify of AFP cases to the regional and national levels.
4. Investigate AFP cases using the AFP case investigation form.
5. Provide necessary logistics needed for stool sample collection
6. Support stool samples collection and ensure maintenance of reverse cold chain.
7. Collate and conduct regular analysis of AFP data to monitor the progress and take necessary actions in the field.
8. Sensitise clinicians (private or public) including traditional healers, traditional birth attendants and community leaders on the issues of PEI and AFP surveillance during the active surveillance visits.
9. Conduct 60-day follow-up investigations.
10. Provide regular feedback to sub-districts and facilities on polio surveillance activities.
11. Facilitate the planning and implementation of outbreak response
12. Advocate with opinion leaders and others in the community regularly on GPEI activities.

3.12.4 Roles and responsibilities at regional level:

The main actors are the Deputy Director Public Health (DDPH), Regional Surveillance and Disease Control Officers.

The DDPH has overall responsibility including:

1. Liaise with all districts to prioritise surveillance sites.
2. Send feedback to the districts on all GPEI activities.
3. Participate in the investigation of suspected polio outbreaks and send reports promptly to national level
4. Support district teams to conduct investigation of polio compatibles
5. Facilitate the planning and implementation of outbreak response
6. Provide logistical and technical support to districts (reverse cold chain and transport of stool samples including tools and updated guidelines and capacity building).
7. Ensure that district staff are conducting regular surveillance field visits by reviewing AFP surveillance reports and reporting findings to National Level.
8. Organize and conduct quarterly meetings using standardized and specific agenda for the areas covered. This must include capacity building.

The Regional Surveillance and Disease Control Officers' duties and responsibilities include:

1. Resolve issues related to location of AFP cases.
2. Participate in the investigation of suspected polio outbreaks and send reports promptly to national level

3. Support district teams to conduct investigation of polio compatibles
4. Supervise active AFP surveillance visits and records reviews at districts and health facilities.
5. Validate reported AFP cases. Re-examine all districts at least 50% of randomly selected AFP cases to ascertain the validity of all AFP cases reported (SPOT CHECK).
6. Analyze data from the district and facility levels for epidemiological links, showing trends and achievement of control targets.
7. Prepare feedback to DDPH on al GPEI activities
8. Provide reminders to districts to conduct 60-day follow up examinations.

3.12.5 Roles and responsibilities at the National Level

The main actors are the Director Public Health, Deputy Director Public Health (Surveillance) and Deputy Director Public Health (Disease Control), Head of Polio Lab and Technical Staff.

1. Work with regions to coordinate national AFP surveillance activities.
2. Ensure that laboratory results and data are promptly shared with all levels.
3. Analyze national data for epidemiological links, trends, and achievement of control targets and provide regular feedback to all stakeholders.
4. Provide prompt support to lower level for every polio outbreak investigation (SPOT CHECK, case management, laboratory, epidemiology, health promotion, and logistics).
5. Ensure quality supervision including providing written feedback and evaluating activities in the field.
6. Report to WHO and other partners as required (International Health Regulations).
7. Evaluate and adapt guidelines for planning, training and supervisory purposes.
8. Disseminate adapted tools and guidelines to all levels.
9. Coordinate capacity building for the use of the adapted tools and guidelines.
10. Monitor AFP case notification and sample tracking.
11. Conduct monthly national AFP data analysis and provide feedback to all levels.
12. Conduct monthly meetings with national level personnel to evaluate AFP surveillance performance at all levels and provide feedback including proposed actions to address areas of weakness. These meetings must include data harmonization involving laboratory and surveillance officers.
13. Conduct regular supportive supervisory visits to regional and district levels to ensure that surveillance field visits are conducted at all levels.
14. Provide monthly/quarterly written feedback to the lower level and all stakeholders.
15. Follow up on polio laboratory results.
16. Ensure all lab supplies are available at all times.
17. Make sure all lab equipment are regularly serviced by the authorized institutions as per WHO standards.
18. Make arrangements for laboratory accreditation exercise and follow-up implementation of recommendations.
19. Organize and conduct annual surveillance monitoring and evaluation meeting with the aim of carrying out a detailed situation analysis (strengths, weaknesses, opportunities, and threats) and using the findings to plan for the following year.
20. Prepare Annual Update Report (AUR) on overall implementation of polio eradication activities in the country
21. Serve as secretariat to support the Polio Technical Advisory Committees

3.13 Implementing High Quality AFP Surveillance

Implementing high quality AFP surveillance requires a good plan taking into account the following:

- Detailed regular situation analysis to identify high risk areas/populations and all resources required to intensify and conduct high quality AFP surveillance activities
- Updating objectives and strategies in line with the findings of the situation analysis
- Developing a realistic and operational plan
- Regular monitoring and evaluation at all levels

Chapter 4: The Polio Laboratory

4.1 Role of the Polio Laboratory

The polio eradication initiative requires close integration between surveillance and laboratory activities to ensure that the data generated from epidemiology and virology are available as the basis for action. In 1989 a plan of action was developed detailing laboratory support for global eradication of poliomyelitis. The Global Polio Laboratory Network (GPLN) was established in 1990 by WHO and national governments. Its primary responsibility is to distinguish poliovirus as a cause of AFP from AFP caused by other diseases. The Polio laboratory network is part of the GPEI. Its resources are planned in an integrated manner with those of surveillance and are required for human resources, equipment, logistics, maintenance of infrastructure and operational costs.

4.2 Role of the Laboratory in Polio Eradication

The laboratory plays a key role in providing virologic diagnostic support and information that can be used to target and focus resources on eradication, in the case of importation, limiting the spread WPV and VDPVs through early and timely provision of results. The roles include;

4.2.1 Confirmation of Poliovirus

Isolation and identification of poliovirus from stool and sewage are the best current method to confirm the diagnosis of poliomyelitis. The national polio laboratory applies standard operating procedures specified by WHO to perform the following specific activities:

- Receipt of specimens and verification of stool condition
- Validation of accompanying case investigation form to ensure that all data fields have been completed
- Perform virus isolation using standard procedures within 14 days
- Report primary isolation results to the program (DSD, EPI)
- Perform Intra-typic Differentiation (ITD) of poliovirus isolate within 7 days
- Perform genomic sequencing of poliovirus isolate within 7 days
- Send sequencing files to a global specialized laboratory (CDC in Atlanta and National Institute for Biological Standards and Control (NIBSC) in UK) or the regional laboratory (National Institute for Communicable Diseases (NICD) in South Africa) or any other accredited Regional Reference Polio Laboratory for the determination of the closest match and final classification of the poliovirus.

4.2.2 Tracing the Virus Origin

The laboratory provides genetic sequence information that enables the programme track the evolution and spread of viruses. This helps to determine the quality and impact of programme activities. In addition, the laboratory provides evidence for certification of polio eradication.

4.2.3 Coordination of Services

The national polio laboratory works in collaboration with the National Certification Committees, DSD and EPI of the Ghana Health Service, responding to their requirements for accurate and rapid virological diagnosis of polio cases.

4.2.4 Evidence for Certification of Polio Eradication

The national polio laboratory provides evidence of absence of poliovirus circulation through AFP surveillance, stool surveys of healthy children in high-risk areas and environmental surveillance.

4.2.5 Assessment of vaccine potency and efficacy

The national polio laboratory performs potency tests on polio vaccine if circumstances indicate possible failure. In selected situations, the laboratory participate in epidemiologic sero-surveys if knowledge of the antibody status of the population or a given cohort is needed.

4.2.6 Feedback

Feedback from the laboratory include:

- Provision of results on WPV or VDPV in a standard format within 24 hours of being available
- Submission of weekly results to the Disease Surveillance Department
- Participation in data reconciliation meeting at DSD as required.
- Submission of Report from any support on-site visit

4.2.7 Accreditation of national Polio Laboratory

There are structures in place for quality assurance and accreditation of the polio laboratory to conform to international standards. Accreditation of Ghana Polio Laboratory is reviewed annually by the WHO Regional Office and is based on laboratory performance during the preceding 12 months. The accreditation includes identification of polioviruses from unknown panel of samples and onsite visit to conduct assessment.

4.2.8 Laboratory Quality Assurance

Laboratory Quality Assurance (LQA) is concerned with the organizational processes and the conditions under which laboratory activities are planned, performed, monitored, recorded and reported. Adherence by laboratories to the principles of LQA ensures the proper planning of activities and the provision of adequate means to carry them out. It promotes full and accurate reporting and provides a means whereby the integrity of the activities can be verified.

The Ghana Polio Lab has set up an LQA system defining the organizational structure, responsibilities, procedures, processes and resources necessary to achieve the following objectives; prevent risks, detect deviations, correct errors, improve efficiency and ensure data quality and integrity.

The polio lab undertakes cell sensitivity testing quarterly on all cell lines to ensure that the cells have not lost their sensitivity to isolate poliovirus. The results are shared with WHO/AFRO for assessment.

Proficiency test is conducted annually by WHO/AFRO using a set of unknown panels for virus isolation, ITD and virus sequencing. The pass mark for accreditation is 90%.

Chapter 5 Environmental Surveillance

5.1 Overview of Environmental surveillance

Environmental Surveillance (ES) for poliovirus is the monitoring of poliovirus (PV) transmission in human populations by screening environmental specimens assumed to be contaminated by human faeces. The rationale is based on the fact that PV-infected individuals shed large amounts of PV in the faeces for several weeks whether or not they are symptomatic. Large numbers of excreted polioviruses remain infectious in the environment for varying lengths of time depending on the environmental conditions. There are situations in which there are good reasons to suspect that negative results of AFP surveillance are not reliable, hence supplementary information is required in such situations and one approach for that is ES. Environmental Surveillance is complementary to AFP Surveillance. It has been used successfully in monitoring enteric virus circulation and in assessing the extent or duration of epidemic poliovirus circulation in specific populations. In several countries, WPV have been detected in the environment in the absence of reported WPV from AFP cases. Environmental surveillance is also a tool for monitoring cVDPV.

Due to inherent limitations and additional resource requirements, ES should be restricted to selected populations where deficiencies in AFP surveillance are suspected and high risk populations for poliovirus circulation (e.g. low polio vaccination coverage or risk of poliovirus importation or transmission).

5.2 Environmental Surveillance in Ghana

In 2016, Ghana commenced a pilot study to assess national capacity and preparedness to implement ES as part of routine polio surveillance activity. Sewage sample collection were done in 4 sites in Greater Accra region and 2 sites in Eastern region.

The country currently has 14 active ES sites in 7 regions, namely; Greater Accra (4) , Eastern (2), Volta (2), Northern (2), Ashanti (2), Bono East (1) and Bono (1) Regions. Additional sites may be identified when the need arises.

5.3 Planning Environmental Surveillance

ES has some inherent limitations and requires additional resources. It should only be implemented after careful planning of all steps in the operation and thorough assessment of the potential benefits. The plan for ES initiation should include the following elements:

1. National ES plan as part of overall polio surveillance
2. Advocacy to relevant stakeholders
3. Identification and engagement of human resource needs
4. Length and time schedule of sampling
5. Details of the actual sampling sites (location and population sizes likely to be represented)
6. Responsibilities for sampling, instructions for sampling and sample logistics
7. Provision of laboratory space, personnel, equipment and reagents;
8. Protocols for sample processing and virus identification
9. Data management and reporting (contents of reports and reporting channels)
10. Training and quality assurance
11. Monitoring and supervision

12. Envisaged consequences of different laboratory results.

5.4 Criteria for Selection of Sites

Environmental Surveillance monitors polioviruses in the environment and also helps to monitor circulation of viruses following the use of OPV.

- Whether the site is within a region/population classified as high risk for poliovirus transmission, based on existing data (i.e., population density, high-risk population, sanitation, living conditions, routine Immunisation, and SIA coverage). Preferable size of the source population is 100,000 to 300,000.
- Presence of a sewer line that receives waste from a considerable proportion of the population in catchment area, with minimum amount of waste coming from other areas
- If environmental surveillance is prompted by known or suspected re-introduction of WPV or appearance of cases caused by cVDPV, the initial plan may cover a shorter period (not less than 12 months) and apply more frequent sampling, targeted to selected populations. This must always be accompanied by intensified AFP surveillance.
- If sewer network is available, sampling sites should be located at inlets to sewage treatment plants or other major sewers. If sewer network is not available, representative sampling may be difficult to achieve and ES should only be started if the major wastewater flow routes contain human faecal material.
- Absence of industrial waste in the proposed site
- Poor AFP performance indicators

Note:
Industrial wastes may contain compounds that may be toxic to cell cultures and/or interfere with poliovirus replication. This has to be taken into account when selecting the sampling sites.

5.5 Sampling Frequency

For supplementary evidence of elimination of WPV circulation in a population, a long term, regular sampling programme of a representative population is preferable.

The current sampling frequency is once a month in all the ES sites but this will change to twice per month for at least 6 months once nOPV2 is introduced in a particular region or district.

Sampling from the environment should be continued for at least one year, and preferably three years after the last wild poliovirus isolation.

5.5.1 Sampling principles and sample logistics

Who should collect the samples? Two sample collectors (main collector and backup) should be designated for collecting the samples at each sampling site. This should be led by Ghana Health Service and Environmental Health agencies. Training, written instructions and adequate logistics should be provided to persons collecting the samples.

5.6 Methods of Collecting environmental samples

There are two methods for collecting ES samples:

1. **Grab method:** One litre of raw sewage/wastewater is collected at a selected sampling site, preferably at the peak hours of household sewage excretion/discharge (usually early in the morning).
2. **Trap method;** Samples are collected by hanging a bag of non-specific absorbing material in the sewage/wastewater stream. After one or more days, the bag is taken out of the collection site. The absorbed material is eluted in the laboratory and analyzed for the presence of polioviruses.

Note: A relatively new method of collecting samples known as the Bag Mediated Filtration System (BMFS) has been tried in some countries with promising results

The preferred sampling method: Grab sampling is preferred to trap sampling, as it is more feasible for quantitative estimation of detection and sensitivity of the system.
Polioviruses and non-polio enteroviruses are detected more often with the grab method than in trap sampling.

5.7 Collecting a "Grab" Environmental Sample

It is the preferred collection method used in most countries.

5.7.1 Persons responsible for sampling

The personnel who should collect the samples are preferably trained local surveillance or environmental health staff.

5.7.2 Specification of environmental sample collection container

A one litre plastic screw tight cap container and should be clean. Sterilization is not essential. The container should be labeled with the EPID number, date and time of sample collection, name and contact number of sample collector. The container should be accompanied with a completely filled environmental surveillance investigation and laboratory form.

5.7.3 Sampling procedure at each sampling site

1. Samples should be taken from mid-stream of a predetermined point of collection using a bucket or other suitable means
2. Composite samples can also be generated by collecting smaller volumes at intervals to cover known peak hours of household wastewater flow, or to combine samples representing smaller than optimal adjacent population sizes.
3. A sample of one litre of raw sewage fluid should be transferred from the bucket into the
4. Container. The container should be tightly closed, and the outside wiped with a disinfectant before packaging in a cold transport container.
5. The container and ES Form should be labelled as follows:

Sample Identification Number: **ENV-Country code - Region code – District code - Site code - Year of collection - Serial number of sample** e.g. **ENV-GHA-EAS-NEJ-KOF-21-002**

5.8 Environmental surveillance sample storage and transportation

The Sample should be immediately kept in specimen carriers and transported to the polio laboratory within 48 hours of collection at a temperature of $+2^0$ C to $+8^0$C. The laboratory should be notified in advance and should acknowledge the receipt of the sample.

5.9 Supervision of sample collection

For optimal performance of ES, it is expected that at least 90% of samples collected should be supervised by using environmental surveillance supervisory monitoring checklist on the ODK platform. Feedback on supervisory findings/performance should be shared quarterly with stakeholders including sample collectors. Supervisory findings should inform conduct of intervention measures.

Whenever chemical discharge is suspected during supervision, a detailed investigation should be done to ascertain this suspicion and implement corrective actions recommended guidelines (Standard Operating Procedures to investigate suspected environmental surveillance site chemical discharge).

5.10 Sample Processing, Monitoring and Evaluation

The performance of ES is monitored through certain indicators. This monitoring helps to identify sites with sub-optimal performance which subsequently leads to further investigation to determine the cause of poor performance for intervention. All environmental sampling sites should be geolocated, and catchment areas defined including population size and characteristics.

5.11 Laboratory Investigations

Detection of enteroviruses in ES samples (>50%) is an indication of the yield or viability of the site. In populations immunized with OPV, environmental surveillance should also detect Sabin-like strains within 6 weeks following SIAs in the catchment area

5.11.1 Process monitoring (completeness and timeliness)

5.11.2 Timeliness of laboratory results

> 100% of scheduled samples are collected
> 80% of scheduled samples are collected on the date assigned
> 80% of samples are collected on the time assigned
> 80% of samples must arrive in laboratory within 3 days of collection
> 80% of samples arrive in the laboratory in good condition (no leakage of specimen, with an adequate amount of specimen
> 80% of virus isolation results within 21 days of specimen receipt in the laboratory

> 80% of ITD results within 7 days of isolate receipt in the ITD laboratory
> 80% of sequencing results within 14 days of isolate receipt in the sequencing laboratory

5.12 Specimen Processing, Virus Isolation, Intratypic Differentiation and Sequencing

Effective laboratory diagnosis depends upon the timely collection and quality of clinical specimens and their transportation under optimal conditions (reverse cold chain). This requires close cooperation and communication between laboratory, surveillance and clinical staff at all levels to guarantee quality results.

The laboratory's role starts with the receipt and registration of samples. After registration, samples are treated in the laboratory according to defined Standard Operating Procedures (SOPs).

With introduction of the new isolation testing algorithm, laboratories are no longer expected to serotype isolates. All isolates obtained at the isolation laboratory level are then packaged and shipped according to International Air Travel Association (IATA) guidelines [in designated containers/triple packaging] to the ITD laboratories for further analysis. Under the new algorithm the turnaround time for virus isolation is within 14 days. Once the isolates have been received at the ITD lab, the ITD testing should be completed within 7 days. The total time from specimen receipt in the lab to ITD results is now 21 days.

Upon completion of the ITD testing, results are provided to the national programme where they are used in making appropriate decisions and instituting appropriate interventions.

In addition to ITD results, genetic sequence information is generated by the NICD laboratory, Johannesburg or CDC Laboratories in Atlanta within 14 days of ITD results being available.

5.13 Communication between Laboratory and National program

Communication between the laboratory network and DSD is key in obtaining timely and accurate information on suspected poliomyelitis cases. All available facilities should be used to reinforce interaction between the laboratory network, Surveillance and the EPI Programme: These include Email, Fax, Telephone, courier services, WhatsApp, etc.

Chapter 6 Data Management, Analysis and Dissemination

6.1 AFP Surveillance Data Management

Data management of AFP surveillance includes several components:

I. The availability of AFP surveillance tools
II. The accurate filling of AFP surveillance tools
III. Data entry
IV. Data Cleaning
V. Data analysis
VI. Feedback

AFP Surveillance Data must be promptly available and of the highest quality to guide action in the field. At least basic analysis should be conducted at the field level and more detailed analysis should be conducted at supervisory levels and feedback provided, for prompt action in the field.

6.1.1 Data Quality

On an ongoing basis, data must be reviewed to ensure the highest quality and, any necessary queries sent immediately to the source for appropriate amendments. This exercise should happen at all levels; district, regional and national.

6.1.2 Filling AFP Surveillance Tools

INSTRUCTIONS FOR FILLING AFP CASE INVESTIGATION FORM

The EPID number contains information related to location (where) the AFP case is detected thus district, region and the country. Allocation of EPID number is done at the district level. It is important that this EPID number is shared with all the levels and any changes must be communicated and captured in the national database.

The AFP case investigation form (annex 1a) includes the following parts:

1. ***The EPID Number***

The general form of the EPID number is: **[CCC/RRR/DDD/YY/###]**

The EPID number enables us to provide a code which is unique to each AFP case for purposes of identification. The codes are harmonized for the whole African region and include:

- country code (3 characters, **CCC**)
- region code (3 characters, **RRR**)
- district code (3 characters, **DDD**)
- 2 digits to indicate the year of disease onset (**YY** e.g. 18= 2018, 19=2019, 20=2020, 21=2021).

- Digit(s) for the number of the case ###, which is unique for each AFP case. Eg 001 for first case

2. ***Received on:*** indicate the date when the AFP investigation form is received at national level to measure the duration (turnaround time) of specimen movement from field to national level

3. ***The patient's identification and his/her origin***

   The identification includes important information that will guide the decision-making process. The following information must be clearly entered: the name of the district, province (region) where the case comes from (where case was 2 weeks prior to onset) and the health facility where the patient has, eventually been taken care of. Provide the patient's address, his (her) village, if applicable, the name of the city, etc. It is, also, mandatory to enter the **date of birth, the age and sex of the patient.**

4. ***Information on the date of notification and date of investigation***

   The **date of notification** is the date when the AFP case is recorded by the field surveillance personnel, at the notification site.

   - For the variable "**NOTIFIED BY"**, please indicate the **CATEGORY** of the person reporting e.g., health worker, CBSV, traditional healer, patient's relative, community/opinion leader, chemical/pharmacist, etc.
   - The **date of investigation** is the date when the health worker performs the investigation to confirm if true or not true AFP case.

5. ***Patient's Hospitalization***

   It should be indicated if the patient was hospitalized or not. Enter the date, the number and address of the health facility or hospital.

6. ***The history of Current illness***

   Use all events that happened to help the patient remember the date of onset of the paralysis. Also, provide information on the other signs and symptoms that occurred at the onset of the disease (fever etc.).

7. ***Immunisation History (Status)***

   Fill in the number of OPV doses received by the child and, if known, the dates for each dose. The Immunisation status of AFP cases is key information for the PEI and must be regularly monitored.

8. ***The collection of stool specimen***

   Enter the **collection dates** for both stool samples remembering that the interval between the two specimens is **24 to 48 hours, apart**. **The shipping date** of the stool to the accredited laboratory is the date when the samples leave the site of collection toward the laboratory.

9. ***The laboratory results***

   This section is exclusively reserved to the accredited laboratory. The lab enters the date the samples were received and the condition of the stool (stool condition). After testing the samples, the laboratory enters results and shares with Surveillance and EPI Offices in a summary form.

10. ***The Follow-up examination***

    Record the result of the follow up examination performed at least within 60 to 90 days after the date of onset of the paralysis.

11. ***The AFP case Final classification***

    Record the result of the classification conducted by the National Polio Expert committee (NPEC).

12.***Travel History of Patient***

The investigator must probe to collect information on the places and duration patient has been in months and/or days *(state duration before onset and after onset)*

13. ***Information on the investigator***

The person conducting the investigation must clearly enter his/her name, title, unit, telephone number, and address, just in case supplementary information is required

14. Validation of AFP Case investigation form**;** the AFP surveillance supervisor for the site i.e., District Surveillance Officer must verify all sections of the case investigation form for completeness; he/she must then sign the form to indicate validation of all entered data, before data (form) is submitted to the next level.

NOTE: ALL PARTS OF THE AFP CASE INVESTIGATION FORM ARE MANDATORY

INSTRUCTIONS FOR FILLING THE COMPLEMENTARY FOLLOW-UP EXAM FORM (annex 1b) ***(60-Day Follow-Up Form)***

1 EPID Number, Identification, History of illness, Follow up Exam

(Please read instructions for the AFP investigation Form)

2 Other Medical History

Enter any other medical event that occurred since the last medical exam, such as Immunisations received and other illness that could explain the current status of the patient.

3 Clinical Exam (current symptoms)

Revisit all the symptoms presented by the patient on the exam date when interviewing parents and the patient, as well.

4 Physical Signs

Describe the physical signs noted during the exam, including the status of limbs' mobility:

(Look for the presence of residual paralysis if any)

5 Other information

Record any other relevant information regarding child's health that might help the NPEC in the decision towards final classification of the AFP case.

6.1.3 AFP Surveillance Data Entry

To ease the data analysis and allow appropriate and data driven actions, AFP surveillance data must be correctly recorded and entered.

AFP database in EPI INFO is available and can be used at all levels by trained personnel for data entry, collation and analysis.

6.2 AFP Surveillance Data Analysis

Regular analysis of surveillance data at all levels is paramount to evaluate action taken and guide the program on way forward. Recommended AFP surveillance data analysis:

- Descriptive Analysis
  - Age and vaccination status of cases.

- To identify areas of surveillance gaps
  - Sub-optimal AFP surveillance performance indicators
  - Silent areas
  - Clusters of polio-compatible cases
- To identify high risk areas
  - Clustering of high-risk (hot) cases
  - VDPV cases
- Data for Action: Using data analysis
  - Action to address surveillance gaps
  - Investigation of clusters of compatibles or reported VDPV case(s)
  - Prioritization and investigation and laboratory work for "hot cases"

6.3 Training

The quality of AFP surveillance depends on trained skilled field health workers. Health workers responsible for AFP surveillance should be properly trained in core AFP surveillance activities.

Based on the prioritization of the reporting site and the availability of supervisors, each visit should be used to refresh field health workers on the various AFP surveillance activities. Also, community sensitization is a one of the best practices which can lead to increase in AFP case detection rate.

6.4 Community contact (CBSV)

When setting up the system, a community contact person for AFP surveillance should be identified and trained. The CBSV should be able to recognize a sudden paralysis and report it to the investigation team or the reporting site. This contact person should be reminded regularly of his/her duty in the community at each visit. The CBSV must be known and acceptable to the community and should preferably be identified together with the community.

6.5 Health Facility Focal Person training

The AFP surveillance focal persons at all health institutions should be trained in case detection and reporting. Clinicians involved in AFP Surveillance should be trained to provide appropriate examination and diagnosis of an AFP case (See Case Definition). These health institutions include Health facilities, public or private sectors, recognized traditional healers, orthopaedic centres, etc.

6.6 Supportive supervision

Supervision is an important and supportive activity to maintain high quality AFP surveillance. It is NOT inspection. A good supervisor is a good COACH. He/she makes sure everything is put into motion for the team to win.

A reporting site should be supervised regularly, ideally once a month, but not more than two months apart

For each supervisory visit, make sure that:

1) The field person has:

- A dedicated AFP investigation kit (including frozen ice packs);
- The standard AFP investigation forms (hard or electronic format);
- A prioritized list of all health institutions, in the area of activity;
- A visit plan for the coming months.

2) Review past performance: cases investigated since the last visit, number of field visits for active surveillance.
3) Observe personnel conducting active surveillance visit, and observe them filling an investigation form
4) Give feedback starting by discussing the strengths of the surveillance system and ending with the areas that need improvement. It is important to set up a date of the next visit so that each side has to work towards addressing issues that had been identified, during current visit with a timeline.

6.7 Feedback

Communication and feedback are crucial to ensure data of the highest quality at each level is used. The following must happen:

- A crude overview and analysis of data must be conducted to ensure all reporting sites have submitted forms and there are no missing information, no typing errors and misreported data on the forms.
- A feedback acknowledging receipt of the data and all relevant queries (all gaps noted in the data) must follow as soon as possible. Immediate correction of these gaps is mandatory and the data source (where the data was generated) is primarily responsible for addressing this issue.

This must happen each time new data is added or collected, and all queries and subsequent correspondence should be fed forward to the next level of data submission.
At all levels, supervisory visits and any other visit to the sites should be documented and a written, constructive feedback is the best way to do this.

At Field level:

Feedback is a very good opportunity to help improve the overall performance of the supervised level. Advantage should be taken to update and train/refresh the field worker, considering the specific issues (faced by the field worker) observed during the visit.

Feedback should be:

- Directed to address precise issues
- Constructive
- Documented, preferably written

At Supervisor's Levels:

The analysis of surveillance data (trends) should be communicated to the field staff with the proposed appropriate action/activities to undertake. This includes questionable data (quality), silent areas (not reporting) and analysis of trends of AFP cases. This can be in the form of a memorandum, a newsletter, and a feedback bulletin, that is disseminated periodically or as part of an end of mission report.

Also, regular dissemination of surveillance indicators to show the progress made by the program to all stakeholders (major partners and community leaders and the other sectors), should be done in order to maintain support and sustain advocacy.

Chapter 7 AFP Surveillance Activities During Polio Outbreaks

7.1 Suspected Polio Outbreak

A suspected Polio Outbreak is defined as:

1. Any cluster of Polio compatible AFP cases i.e. 2 or more compatible cases as classified by National Polio Expert Committee, with onset in the same or neighbouring districts within a two-month period, in polio-free areas.

2. Any rapid increase in the reported number of AFP cases (greater than three times the expected number of AFP cases) within a district or in neighbouring districts occurring within a two-month period,

Note: Prior to classification, any cluster of AFP cases with a high index of suspicion (multiple AFP cases without final classification) is strongly suggestive of clinical polio with onset in the same or neighbouring districts within a two-month period.

If an outbreak is suspected, response action should be immediate. The first thing to do is to gather much information as possible to help confirm or rule out the outbreak; then initiate preparations for an appropriate response, if confirmed (Fig.8.1). The RRT should be activated and initiate response activities

7.1.1 Investigation of suspected Polio outbreaks

Carry out rapid investigation within 48 hours of identification of a suspected outbreak. The investigation should consist of the following:

A. Thematic Areas to Consider

1) **Clinical investigation**:

a) Find out if the signs and symptoms of the cases are consistent with polio

b) Verify if cases or their close contacts have travelled to polio endemic areas within the past one month or have been in close contact with person(s) from polio endemic areas?

2) **Epidemiological investigation**

a) Look for additional unreported AFP cases in the community (through health records review and conduct active case search through interviews with all healthcare providers including traditional healers, spiritualists, community-to-community search and other identified areas)

3) **Assess population immunity**

- Conduct review of immunisation performance in the district and sub district concerned. The review should cover routine immunisation with focus on OPV3 and IPV as well as supplementary immunisation activities in the last twelve (12) months
- Conduct immunisation coverage survey among children under 5yrs in the community where the case or cases reside and in neighbouring villages. The survey should be conducted in 30 households with at least one eligible child.

4) **Virologic investigation**:

Transport all stool samples of AFP cases to the National Polio laboratory at NMIMR for virologic investigation.

5) **Environmental investigation:**

Conduct environmental assessment in the community where the case resides taking into account the water, sanitation and hygiene (WASH) situation.

B. Risk assessment

The risk assessment should be conducted by the National team with support from partners. The risk assessment should answer the following questions

The team will review surveillance data, immunisation coverage, population dynamics, environmental assessment and outbreak report and other relevant documents to determine whether;

- an outbreak has occurred;
- whether any poliovirus transmission could have been previously missed.
- whether there is the risk of further spread

Communicate the findings to the Eradication and Outbreak Management Group (EOMG) members and later with the response plan, the vaccine needs and budget to the Advisory group.

Note, in outbreak situations, the Non-Polio AFP Rate used to indicate a high sensitivity is 3 per 100,000 population for children less than 15 years.

C. Initiating Immunisation response

Develop rapid response plan that includes additional vaccination response campaigns based on the risk assessment. This risk assessment will be useful in determining the scope, age group and required logistics (vaccines and related supplies) and the budget (ref SOP-Polio outbreak response) . This plan needs to be updated and finalized if the outbreak is confirmed.

D. Communication

Alert neighbouring districts of a potential Polio outbreak (refer to Chapter 9)

7.2 Confirmed Poliovirus Outbreaks

A confirmed Polio Outbreak is defined as:

One or more cases of AFP with poliovirus isolation in a polio-free area with evidence of person-to-person transmission represents an **outbreak**. However, a case of cVDPV from an AFP case qualifies as an **outbreak**. Similarly, a single case of VDPV with no evidence of person-to-person transmission is described as an **event**.

Any confirmed outbreak of polio in a polio-free zone requires an immediate large-scale house-to-house response vaccination. It also requires immediate implementation of activities to enhance surveillance.

The decision of an outbreak response should be taken in collaboration with partners and should be implemented according to guidelines for outbreak response.

A. Immunisation Response

A four-step vaccination strategy has been endorsed by GPEI for outbreaks and events in high-risk contexts for all poliovirus types (types 1, 2 and 3). The response consists of rapid response, SIA1, SIA2, and a mandatory targeted mop-up round, with the option for further SIAs if justified by breakthrough isolates, cases or other evidence of ongoing transmission.

The aim of this strategy is to ensure:

1) a timely response (as per the polio SOP);
2) two high-quality large-scale rounds;
3) re-vaccination of all areas where quality was insufficient; and
4) removal of all mOPV2/nOPV2 from the field as soon as possible (for type 2 response only).

A rapid response (RR) vaccination campaign

For an outbreak or high-risk event, a RR vaccination campaign is the first vaccination response within 14 days of receipt of a laboratory results (Day 0). It targets the immediate area of the virus isolation, to stop further transmission rapidly (even if the source remains unknown).

SIA 1 and SIA 2

Two high-quality large-scale vaccination campaigns (>95% of children vaccinated) should be completed within eight weeks on receipt of laboratory result (Day 0). The response will be tailored to the virus type and local context. The duration of the campaign for SIA1 and SIA2 can be extended, or effort intensified in other ways, such as deployment of additional personnel and supervisors, to complete the campaign and reach missed children in areas of low coverage as identified by intra-campaign monitoring or supervisor observations.

Mop-up round or additional SIAs

A mop-up round is required as an additional step wherever monitoring suggests children have been missed in certain districts or areas, to ensure interruption of transmission (even in the absence of new poliovirus detections). Information to guide the selection of districts for full mop-up can include: intra-campaign monitoring, independent monitoring, Lot Quality Assurance Sampling (LQAS) Methodology, post-campaign surveys, or new events such as population movements, and breakthrough cases. A mop-up round should be included in the initial outbreak response plan, appropriately scaled and implemented after SIA2 (Round 2), and only cancelled if ALL health areas demonstrated high-quality implementation and vaccination coverage. Where quality is clearly inadequate in a large geographic area, break-through isolates are identified, or the outbreak continues to spread to unvaccinated areas, additional SIAs should be considered and planned. Two campaigns must be completed after the last detected virus. A high-quality mop-up round may be considered as one of these campaigns, if the area of the detected virus was covered twice.

Target population

The first RR (or Round Zero) can be 200,000 to 400,000 children, and approximately 2 million for subsequent larger scale rounds. It is possible to consider increasing the scope further, in densely populated areas, or if there is evidence of, or potential for, extensive circulation (e.g. outbreak population well connected to a major urban area).

The geographic scope for response is assessed case-by-case through a detailed risk assessment, informed by discussion with local and external technical experts to ensure that all high-risk zones are reached. The target population must be within the capacity of the programme to attain high coverage. Depending on the local context and capacity, phasing of campaigns may be considered to ensure quality in each geographic and demographic region covered.

Target age-group

For SIAs/NIDs, children less than five years of age are targeted. The age group could be expanded (up to 15 years, or the whole population depending on local context) if there is evidence of virus circulation among older age groups.

Short-interval campaigns

The interval between SIA rounds can be as short as one week. This applies regardless of the type of OPV used. For example, an mOPV2/nOPV2 campaign could be followed one week later with an additional round of mOPV2/nOPV2 or bOPV where needed. A short interval additional dose (SIAD) strategy may be used in special circumstances when there are multiple circulating polioviruses and/or when short windows of access or opportunity to vaccinate arise (e.g. mobile or hard-to-access children).

B. Surveillance Response

Following the initial investigation of any polio event or outbreak, it is critical to assess and enhance poliovirus surveillance. Vigorous effort is required to put the surveillance system on high alert and improve sensitivity to identify promptly any new virus, AFP cases, or ongoing transmission, even outside the immediate outbreak zone. The outbreak response plan must include surveillance initiatives from Day 0 of the event/outbreak,

i) continue surveillance in parallel with other aspects of the response, and
ii) maintain selected supplemental strategies for six months or more after the last detected poliovirus.

A key objective of AFP surveillance, following identification of an event in a high-risk area or any outbreak, is to achieve an annualized rate of at least three non-polio AFP cases per 100,000 children less than 15 years of age in every district, for at least 12 months after the last case. While districts with fewer than 50,000 children under 15 years of age may not detect AFP every year, the quality of AFP surveillance should be checked for any silent district regardless of population size.

The following activities are to be undertaken to enhance AFP surveillance:

1. National level to notify all regional and district surveillance units about the poliovirus event/ outbreak.
2. Sensitize all health care workers on AFP surveillance.

3. Review and update reporting sites (if required) in the AFP active surveillance network within the immediate outbreak zone and of neighbouring districts (high-risk areas).
4. Ensure secondary and tertiary health facilities are fully involved in AFP surveillance.
5. Ensure that supplemental AFP case-finding strategies are in place in the outbreak zone and high-risk areas, including ad hoc active search during campaigns by vaccination teams, independent monitors, and LQAS survey teams.
6. Monitor and document at least 90% of all planned active surveillance visits are conducted.

Fig. 8.1 Response to poliovirus outbreak

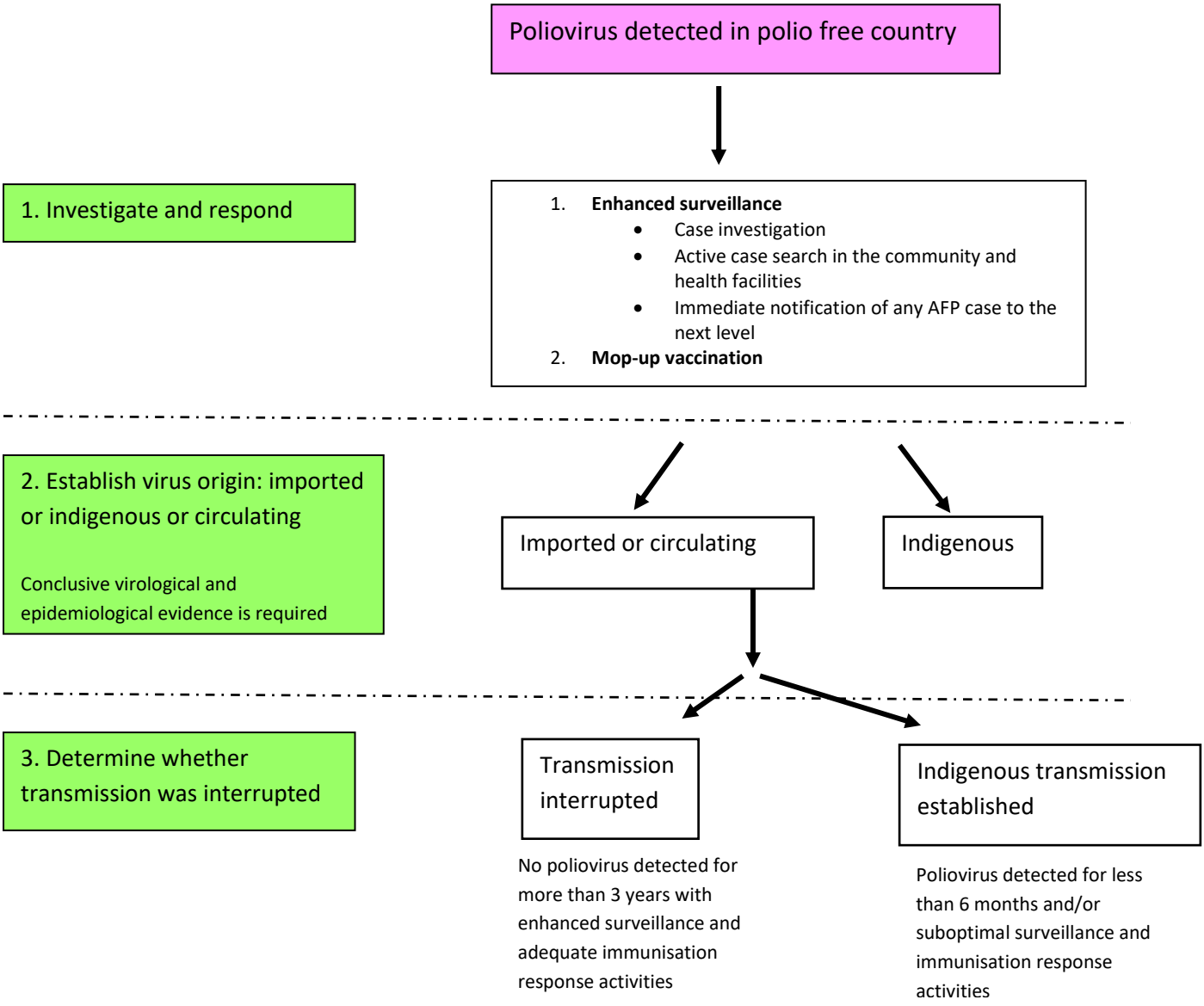


Table 7.1: Differences and Similarities between VDPV an VAPP

VDPV vs. VAPP		
	VDPV: Vaccine Derived Poliovirus	**VAPP: Vaccine Associated Paralytic Polio**
Similarities	❖ **Both due to Oral Polio vaccine (OPV)** ❖ **Both cause paralysis similar to the Wild Poliovirus (WPV)**	
Differences	❖ VDPV is a descendant of the polio vaccine strain which has an accumulation of spot mutations that occur over a six month or longer period and result in a virologically different strain from the Sabin virus that re-acquires neurovirulence (multiple passage, transmission) ❖ VDPV originating event is much less frequent than VAPP ❖ More likely to occur in the same target population as the WPV (under 5 years) ❖ Associated with circulation of virus in the community (causes endemic and epidemic disease) ❖ It only occurs where there is poor sanitation and low OPV coverage (accumulation of susceptible) ❖ As with wild virus, circulation can persist indefinitely if conditions do not change	❖ VAPP is paralytic disease in vaccine recipient or close contact ❖ Rare event (1 VAPP case in 3 million OPV doses, distributed, or more ❖ More likely to occur in persons over 18 years of age ❖ Not associated with any circulation of virus in a community (endemic or epidemic disease) ❖ Might occur everywhere the vaccine is used

Chapter 8 - AFP Surveillance & Integrated Disease Surveillance

8.1. Introduction

Experiences with some disease eradication and elimination programmes show that disease control and prevention objectives are successfully met when resources are dedicated to improving the ability of health officials to detect the targeted diseases, obtain laboratory confirmation of outbreaks, and use action thresholds at the district level. Building on these successes, the WHO/Regional Office for Africa (AFRO) proposed a comprehensive strategy for improving communicable disease surveillance and response through Integrated Disease Surveillance and Response (IDSR) linking community, health facility, district and national levels in the African Region.

The IDSR strategy provides for a rational use of resources for disease control and prevention. Currently, many intervention programs have their own disease surveillance systems. 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. They involve similar functions especially at district and health facility levels. They often use the same structures, processes and personnel.

Integrating/mainstreaming Polio Eradication Initiative (PEI) infrastructure and AFP surveillance infrastructure is an intrinsic part of the initiative. As the PEI draws to an end, it is imperative to start considering adding on the other diseases (Measles, Maternal and Neonatal Tetanus, Yellow Fever) control activities and work in an integrated way with all other health sectors conducting similar functions and surveillance is one such similar function.

8.2. Objectives of Integrated Disease Surveillance & Response (IDSR)

The general 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 tools and response actions. These 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.

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, improved health and well-being for the communities in the district can be achieved.

To that end, IDSR 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 and monitoring of drug sensitivity;
- 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.

8.3 Case Management of AFP

Clinical History

The history of polio typically includes mention of a child who is unable to stand or walk. It could also include a short duration of febrile illness followed by paralytic symptoms. A child seeking medical attention with sudden onset and progression of weakness in any limb (i.e., AFP) should alert the clinician to the possibility of polio.

Examination

Examination of a AFP case involves a complete physical examination with emphasis on neurological. Examination of the neurological system is primarily to confirm the existence of asymmetric flaccid paralysis (by assessing power in the limb, site of paresis or paralysis, muscle bulk and tone with intact sensory innervation).
The findings of clinical examination are recorded legibly in the patients record book/folder or any relevant document/AFP case investigation form provided by the surveillance officer.

Diagnosis

Some medical conditions present with AFP just like Poliomyelitis. The most common ones include Guillain-Barre Syndrome (GBS), Traumatic Neuritis (e.g. Injection Neuritis), and Transverse Myelitis, Meningitis, amongst others. **Residual asymmetric paralysis after 60 days, and preservation of sensory nerves function is peculiar with polio**.

- The diagnosis of paralytic polio involves virologic testing of stool samples to isolate Poliovirus. CSF from Lumbar Puncture and Nasopharyngeal swab may also be used.
- Stool sample collection and transport is an integral part of AFP Surveillance system. This test is performed at the Polio Laboratory of the Noguchi Memorial Institute for Medical Research (NMIMR) in Accra.
- Management for all AFP case must commence as soon as samples are sent to the national polio Laboratory.

Prevention and Management of Polio

- Polio can be prevented by vaccination
- Isolation of AFP case is not recommended during treatment
- There are no specific anti-viral drugs available for poliomyelitis, although some poliovirus antiviral compounds are currently being developed to primarily limit extended virus shedding in the stools of immunocompromised children who become infected with Poliovirus.
- The DDHS should coordinate referrals of AFP cases to Regional or Tertiary institutions for specialist care.
- Management of AFP case should be done at a facility where there is clinical and supportive care
- Referral for Neurologist, Paediatrician and Orthopaedic surgeons for regular review is recommended
- Management consists of supportive, symptomatic care during the acute phase, including respiratory support in cases with respiratory muscle paralysis.

- Educate caregivers to report signs of breathlessness, unexplained coughing, and inability to swallow as an alert to respiratory involvement in polio infection. If respiratory involvement is suspected, refer promptly to a hospital with appropriate expertise (e.g. teaching hospital or specialist hospital).
- Children with bowel or bladder involvement (inability to pass stools or acute retention of urine) should similarly be referred for specialist management.
- Routine supportive care in the acute phase includes bed rest, painkillers, nutritional support and moderate exercises.
- Antibiotics may be used to treat or prevent secondary bacterial infections such as pneumonia.
- Strict IPC measures for supervised burial in a dignified manner should be observed when a suspected or confirmed Polio case dies. (Refer to Ghana's Infection Prevention and Control guidelines)

8.4 Physical Rehabilitation and Physiotherapy

Rehabilitation with physiotherapy should commence as early as possible. In the chronic phase, physiotherapy helps to maintain muscle bulk and bone health. Physiotherapy can help attain maximum function after paralytic poliomyelitis and can prevent or reduce the extent of limb deformity occurring later.

8.5 Infection Prevention and Control (IPC) Practices

Strict adherence of standard precautions of IPC are required during management of AFP cases or during polio outbreaks. To limit the spread of Polio, observe the following:

- Appropriate use of Personal Protective Equipment (PPE)
- Safe handling of food and utensils used by AFP case in acute phase of infection
- Wash hands frequently with soap and clean water. Use alcohol hand rub when water is not available and hands are not visibly soiled.
- Avoid open defaecation in communities.
- Human waste including vomitus and faeces of a case should be well-managed. Encourage defaecation into a pit latrine or water closet (WC). If a chamber pot is used, disinfectant (0.5% Chlorine Solution) should be added to faeces and disposed into a pit latrine or WC.
- Cover the mouth and nose of client when sneezing or coughing.
- Encourage community to utilize polio vaccination programmes
- Minimize interactions between sick child and other children by staying away from school, playgrounds, etc.

Chapter 9 - Risk Communication in Polio Outbreak

9.0 Definition

Risk communication refers to the exchange of real-time information, advice and opinions between experts and people facing threats to their health, economic or social well-being. Risk communication should include the health risk (e.g. Polio), the response that is being organized and messages on how to prevent or protect against a disease. When done properly, risk communication increases compliance with preventive behaviours.

A strong communication strategy will strengthen performance of all response activities, increase uptake of vaccination in all population groups, and support robust surveillance with early notification of AFP.

9.1 General Communication Strategies

Following confirmation of Polio, the primary health and the district level authorities should liaise with the national level authorities to communicate and receive guidance on common positions to be delivered to the media.

From first announcement throughout the outbreak, Risk Communication Sub-committees/teams at the various technical committee levels (e.g. National Technical Coordinating Committees, District and Regional PHEMC) should follow the plans and key messages developed at national level in consultation with the field team, in order to ensure consistency and speaking with one voice.

Even though communication should be centrally coordinated by the national level, the media should approach local and district public health response level to obtain first-hand information from direct sources.

In addition, the DDHS should support the communication process and provide scientific expertise as evidence for intervention. Risk communication should be integrated into all aspects of planning and response to the outbreak

In implementing risk communication for Polio, the following approaches can be used:

- Personal communication (e.g. healthcare worker to caregiver)
- Media (Radio, TV, Newspapers etc)
- Social media (Twitter, Facebook, WhatsApp, etc)
- Community engagements

The target audience for risk communication for polio includes:

- Community
- Healthcare workers
- Travellers
- Schools and workplaces
- Traditional and religious leaders
- Relatives of AFP clients
- Bone setters, etc.

Effective communication requires the understanding of the people's perceptions, concerns and beliefs as well as their knowledge and practices on AFP and Polio. It also requires early identification and management of rumours, misinformation and other challenges.

The following approaches should be considered when delivering messages:

- Make sure messages are clear and understandable to the audience
- Promote dialogue (trustworthy)
- Demonstrate empathy and be caring
- Provide harmonized and consistent messages (transparency)

9.2 Risk Communication before an outbreak

- Identify existing channels of communication in each District and develop plans to utilize them. This should be part of plans of the PHEMC.
- Continuous public education on the need to vaccinate children against polio using all appropriate channels of communication must be done.
- Public education on hand hygiene, proper environmental hygiene and waste management, and the use of appropriate PPEs-droplet precautions must be enforced.
- Establish communication lines with media houses, community leaders and CBSVs.
- Hard to reach populations such as mobile populations must be planned for.

9.3 Risk Communication during Polio Vaccination Campaigns

During mass polio vaccination campaigns, risk communication should focus on how to:

- Raise community awareness on Polio and vaccination dates
- Strengthen community perception of vaccination through building trust in health worker capacity, vaccine safety and efficacy
- Address bottlenecks in the decision to vaccinate

9.4 Risk Communication during Polio Outbreak Response

Following the confirmation of a case of polio and the declaration of an outbreak, immediate outbreak response communication should be initiated.

- Risk communication should be integrated into all aspects of planning and response to the outbreak.
- Part of the communication strategy should incorporate findings from epidemiological and social investigation of the infected case/area.
- Risk communication should also incorporate all relevant social barriers and promote vaccination and appropriate IPC measures such as hand hygiene, safe and appropriate disposal of stools and human remains.
- Communication should also emphasize the implications for the outbreak. Healthcare workers must highlight the fact that there is an outbreak in the community that puts children at risk of Polio.
- There should be constant communication with the affected community.
- Produce and distribute Social Behavioural Change Communication (SBCC) materials on AFP and Polio.

9.5 Actions at the district level for Polio case

Immediate outbreak response communication should be initiated when a confirmed case of polio or an outbreak is declared.

- Identify spokesperson(s) at district level.
- Liaise regularly with the regional PHEMC.
- Press briefings should NOT be encouraged at all levels below the Regional PHEMC during an outbreak
- Develop good relationships with local media to aid delivery of accurate, transparent, timely messages when mandated to do so.
- Use information materials developed at the national level with clear and consistent messages to provide guidance to the population.
- Identify appropriate local channels for the delivery of information to the population.
- Meet regularly with local stakeholders to disseminate key messages on Polio prevention and surveillance to the population.
- Undertake communication activities to educate the population on polio prevention measures including polio vaccination

The media is an important partner in maintaining public health confidence in the system. As such, maintain a good relationship with them before, during and after outbreak.

9.6 Post Outbreak Risk Communication

A post-outbreak report should be prepared by the district team that conducted the investigation and should include a section on the implementation of risk communication. The report should include the steps in identifying the problem, how it was investigated, the response to the problem and the outcome. It should also include decisions that were taken and the recommendations made.

The following should be undertaken as part of the post-outbreak risk communication:

- Assess the effectiveness of the communications team in each phase and area of work.
- Assess the effectiveness of meetings.
- Assess the effectiveness of the internal flow of communications.
- Assess the monitoring of communications and of the media.
- Assess the response of the communications channels
- Assess the outputs and outcomes of risk communication and community engagement

In addition to these, there should be periodic testing of the risk communication plan through the following:

- Conduct simulation exercises to test the risk communication plan in order to detect possible weaknesses or gaps that need to be corrected before an outbreak
- Revise the plan based on lessons learnt from the simulation exercise.

Chapter 10: Polio Eradication Certification Process

10.1 Polio Certification bodies

There are three national technical advisory committees that are involved in GPEI. These are:

1. National Certification Committee (**NCC**)
2. National Polio Expert Committee (**NPEC**)
3. National Task Force on Containment of Poliovirus (**NTF**)

1. The NCC is the body to supervise certification process, activities and progress at national level. The NCC should scrutinize, review and endorse country annual certification reports and completeness of national documentation on polio eradication before submitting to the ARCC.
2. The NPEC is responsible for classifying all AFP cases with more focus on cases with inadequate stool and residual paralysis at 60-day follow-up examination.

   The NTF is a sub-committee of the NCC, with the NTF chair being a member of the NCC. The NTF is responsible for implementing laboratory containment activities and submission of reports to NCC.

These three committees are supported by a national secretariat comprising of DSD, EPI, national Polio Lab, WHO and Surveillance Focal Persons.

Chapter 11 Monitoring and Evaluation

11.1 Definition of Monitoring and Evaluation

1. Monitoring is routine tracking and reporting of priority information about a programme and its intended output and outcomes.
2. Evaluation provides a measure of whether the outputs are comparable with initial goals set. Monitoring of Polio surveillance performance indicators is key in guiding the Polio Eradication Initiative and to determine whether the surveillance system is sensitive enough to rapidly detect poliovirus transmission.

Monitoring and evaluation remain an important activity towards the realization of set objectives through the recommended strategies and activities. This requires an efficient feedback mechanism for stakeholders to adequately play their respective roles which could also be complementary.

11.2 Routine AFP Surveillance

Various administrative levels should monitor weekly surveillance indicators and report with emphasis on high-risk sub-populations and the outcome and impact of all enhanced activities. In addition, regular updates on process indicators should be monitored and reported on, including timeliness of investigation, sample collection, and receipt at the laboratory. Reporting should be adequate to allow authorities to identify issues early, generate appropriate solutions to improve performance, and bolster confidence that the performance is good enough to detect ongoing virus transmission. For example, findings from retrospective and ad hoc active case searches in community and health facilities should be comprehensively summarized and reported in a timely manner.

The core indicators of AFP surveillance are:

- Non-Polio AFP Rate
- Stool Adequacy

a) Non-Polio AFP Rate:

$$\textit{Non Polio AFP/NPAFP rate:} = \frac{\textit{The number of non-polio AFP cases <15 years of age}}{\textit{Total number of children under 15 years old}} \textit{ X 100,000}$$

In order to annualize it, we multiply it by a factor 12 (total number of months in the year) of 52 (total number of weeks in a year) For e.g. if September multiply by 12/ 9 or the Week 34 use 52/34

The sensitivity indicator of acute flaccid paralysis surveillance is the NPAFP rate. This measures the capacity of the surveillance system to detect AFP cases due to other causes than Polio. The certification target is **1/100,000** children under 15 years of age per year. In polio endemic countries, the target is at least **2/100,000** children under 15 years of age while in an outbreak setting it is **3/100,000** under 15 years population.

Non-Polio AFP rates below these targets in any of the above-mentioned circumstances have been found not to be sensitive enough in detecting transmission of poliovirus. When calculating NPAFP

rate, cases of WPV, VDPV and compatibles should be deducted from the reported AFP cases in the numerator while the denominator is the expected cases within a period.

It is important to monitor district performance regularly since national or regional level indicators of surveillance may mask wide variation in district performance, with some critical areas potentially failing to detect expected AFP cases.

b) Stool Adequacy (Target ≥ 80%):

Two stool samples collected within 14 days of onset of paralysis, 24 to 48 hours apart and arriving at the laboratory in good condition.

$$\textit{Stool Adequacy} = \frac{\textit{AFP cases reported with 2 adequate stool specimens within 14 days of onset of paralysis}}{\textit{Total number of AFP case reported}} \times 100$$

c) Timeliness of surveillance report: (Target ≥ 80%)

Is a measure of whether surveillance reports are sent on time as per programme set standards. It includes "zero" reporting when cases are not seen. The measure of **timeliness** of reporting from reporting sources (health facility, District, Region) is computed as;

$$\textit{Timeliness (\%)} = \frac{\textit{Number of weekly reports received before the specified deadline}}{\textit{Number of weekly reports expected, based on number of reporting sites}} \times 100$$

d) Completeness of surveillance report (Target ≥ 90%)
The completeness of surveillance report includes reports from all reporting sites including zero reports. The measure of completeness from reporting sources is computed as;

$$\textit{Completeness (\%)} = \frac{\textit{Number of weekly reports received}}{\textit{Number of weekly reports expected, based on number of reporting sites}} \times 100$$

e) Acute Flaccid Paralysis Surveillance Index
Due to the need to compare progress over time and/or geographic difference (between sub-national areas or different countries), programme managers and surveillance officers use the **"the surveillance index"** tool to facilitate the detection of serious gaps in national (or sub-national) surveillance performance by use of the two primary indicators in combination. The product of the annualized non-polio AFP rate and stool adequacy provides an index that allows more rapid comparison, but each component should be individually scrutinized to ensure that sample collection meets the target. Since the minimum expected for NPAFP rate is 2.0 per 100,000 (endemic) and the minimum for stool adequacy is 80%, therefore the minimum expected for Surveillance Index is given by the calculation: [2.0 x 80% = 2.0 x 0.8 = 1.6]. Any district or state below 1.6 is not meeting the minimum expected Surveillance Index. Using the index in maps particularly helps in identifying areas of risk, which are even more of concern

if there is clustering of such high-risk areas, or if the areas are on the borders of administrative responsibilities, such as regional or country lines.

Acute flaccid paralysis surveillance index and its interpretation

Surveillance Index = (NPAFP rate) x (% stool adequacy) e.g.: NPAFP rate of 2.5 and % stool adequacy of 75% = 1.875 index

Table 11.1: Surveillance index interpretation guideline

Indicator	Interpretation
<1.0	Serious deficiencies in detection, with or without deficiencies in timely sample collection
1.0 – 1.5	Insufficient AFP surveillance performance
1.6 – 2.4	Sensitive AFP surveillance on average*
≥ 2.5	Strong AFP surveillance on average*

*Pending careful review of each performance indicator and examination of sub-national data

Note: The surveillance index is a management tool only. It does not replace the use and analysis of each surveillance performance indicator. Full interpretation of the index requires review of NPAFP rate and timely specimen collection individually at every level.

Table 11.2: Summary table of indicators of acute flaccid paralysis surveillance and laboratory performance

No.	Indicators	Target
1	Annualized non-polio AFP rate per 100,000 children under 15 years of age. The NPAFP rate is an indicator of surveillance "sensitivity" (If it is < 2/100,000 in an endemic setting, then the surveillance system is probably missing cases of AFP)	≥ 2/100,000
2	Percentage of AFP cases with two adequate stool specimens collected 24-48 hours apart and ≤14 days after onset	≥ 80%
3	Timeliness of monthly reporting.	≥ 80%
4	Percentage of all expected monthly reports that were received	≥ 90%
5	Reported AFP cases investigated ≤ 48 hours of report.	≥ 80%
6	Reported AFP cases with a follow-up examination at least 60 days after paralysis onset. To verify the presence of residual paralysis or weakness	≥ 80%, 100% by 90 days
7	Samples arriving at national laboratory within 3 days (72 hours) of collection of the 2nd stool sample	≥ 80%
8	Samples arriving at the laboratory in "good condition". Good condition" means that upon arrival: There is ice or thermometer (showing ≤ 8°C) in the container, the sample volume is adequate (≥8 grams) and there is no evidence of leakage or desiccation with appropriate documentation.	≥ 80%
9	Receipt of Samples with a turn-around time for isolation (AFP)	≤14 days
10	Receipt of Samples with a turn-around time for isolation (ES)	≤ 21 days
11	Timeliness of feedback of laboratory results (within 28 days of specimen receipt at laboratory) to the district and facilities	> 80%
12	**Stool samples from which non-polio enterovirus (NPENT) was isolated.** NPENT isolation (non-polio enterovirus)	≥ 10%

In addition to monitoring the surveillance performance indicators, the surveillance personnel are encouraged to produce the following:

1. Bar chart of final classification of AFP cases by month
2. Map the distribution of AFP cases by final classification
3. Map distribution of NPENT and Sabin viruses
4. Mapping of areas with Orphan viruses
5. Monitoring of OPV doses (vaccination history) of NPAFP cases aged between 6-35 months and 6 – 59 months and of the WPV positive cases.

Note: An orphan virus is defined by the percentage identity (genetic distance) to the closest match of other known virus sequences. The cut-off for orphan status is a 1.5% or greater difference in identity to its closest match (the closest match must be of an earlier onset/specimen date).

Example: A newly sequenced isolate from Côte d'Ivoire reported in April 2011, is an "orphan virus". Its closest relatives at 96.33% (a 3.67% difference) had not been detected since mid-2008 while related viruses were found in Katsina State, Nigeria. This indicates that the virus was not detected but had circulated for 44 months. Orphan polioviruses are indicators of surveillance gaps that have existed for a prolonged period without detection.

In addition to these AFP surveillance indicators the certification committees require the monitoring of two main components:

1. Monitoring routine/passive surveillance reports

- Total number of expected reports.
- Total number of reports received
- Total number of reports received on time.

2. Monitoring active surveillance visits

- Total number of surveillance sites by priority.
- Total number of active surveillance visits planned by priority.
- Total number of active surveillance visits conducted by priority

Reference is made to Chapter 11, Monitoring and Evaluation of Response in the publication titled; STANDARD OPERATING PROCEDURES, RESPONDING TO A POLIOVIRUS EVENT OR OUTBREAK (Version 3, January 2019) for further reading on subject matter.

Table 11.3: Assessing quality of response: factors to consider before, during and after implementation of campaigns

Surveillance	Vaccination	Communication and social mobilization
Planning and Preparations		
• Rapid review of available surveillance data • Increase ES sampling frequency to every two weeks • Initiate new ES if appropriate • Validate AFP cases and ES sewage sample collection	• Preparedness dashboard indicators >90% • Evidence of training for all personnel • Accurate bottom-up micro plans with detailed mapping, complemented by innovations such as GIS imagery and cross validation where feasible	• Evidence of engagement with community interest groups • Engagement of national government with active support for response • Targeted strategies detailed and updated for special populations • In-depth social investigation of case(s) and/or community to identify special populations or under-vaccinated children
Implementation		
• AFP annualized rate >3 cases/100,000 children under 15 years of age in outbreak zone and immediate risk area • Impact of surveillance enhancement (e.g. source and number of AFP cases reported, active search) • ES process and performance indicators	• Intra-campaign independent monitoring >90% coverage • Spot checks and surveys >90% coverage (e.g. at markets, transit hubs) • Use of strategies to ensure that borders are covered (e.g. "handshake" hand-off between teams)	• Targeted strategies used to optimize response activities in special populations • Evidence of overall increased community sensitization to AFP and importance of vaccination • Active support from community interest groups including women's groups and religious leaders during vaccination campaigns • No block vaccination refusals
Post-campaign follow-up		
• AFP surveillance >3/100,000 for at least 12 months after last poliovirus detection • Specific analysis of AFP rate for all high-risk populations • Evidence of impact of surveillance in hard-to-reach, inaccessible, and high-risk populations	• Post-campaign independent monitoring >90% coverage; and >80% LQAS lots passed at 90% threshold • No evidence of persistently missed children or missed geographic areas • Robust and timely reporting, using innovations such as mobile-data collection and/or global positioning system (GPS) coordinates for coverage where feasible	• Evidence that campaign awareness was >90% of all households (IM and/or LQAS) • Special populations >90% coverage • Analysis of disaggregated data for high-risk populations and gender for missed children or refusals, to guide interventions

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Annexes

Annex 1: AFP Case Investigation Form
Annex 2: AFP 60-Day Follow up Examination Form
*Annex 3: **Contact Specimen Collection Form***
Annex 4: Protocol for Case Search in Ghana for preparation to introduce nOPV2

Annex 1: AFP Case Investigation Form

POLIO ERADICATION PROGRAMME: ACUTE FLACCID PARALYSIS CASE INVESTIGATION FORM

Official Use Only: EPID Number: _____-_____-_____-_____-_____
Country Region/Prov. Districts Year onset Case Number

Received: _____/_____/_____
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 (If DOB Unknown) Sex: ☐ M=Male F=Female

NOTIFICATION/INVESTIGATION:
Date of Notified by:_____ Date of Notification____/_____/_____ Investigation: ____/_____/_____

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

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

CLINICAL HISTORY of paralysis? Fever at the onset ≤ 3 d ☐ 1=Y, 2=N, 99=Unknown Progressive Paralysis ☐ 1=Y, 2=N, 99=Unknown

Date of onset: of paralysis: ____/_____/_____ Is Paralysis flaccid and acute? ☐ 1=Y, 2=N, 99=Unknown Asymmetric? ☐ 1=Y, 2=N, 99=Unknown

Site of Paralysis LA ☐☐ RA LL ☐☐ RL

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 2=N If not, do not fill the rest of the form and record 6 under final classification

IMMUNIZATION HISTORY

Total Number of Polio vaccine doses ☐ Exclude dose at birth
99=Unknown

OPV dose at birth _____/_____/____ 1st _____/_____/____ 2nd _____/_____/____ 3rd_____/_____/____ 4th ____/_____/____ If > 4 Last _____/_____/____ dose

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 to the national level

_____/_____/_____ Date 2nd specimen

_____/_____/_____ Date specimen sent to the

_____/_____/_____ Date specimen received at the national level

_____/_____/_____ Date specimen sent inter-county/national Laboratory

STOOL SPECIMEN RESULTS:

____/_____/_____ Date specimen received at inter country (I-C)/national Lab

☐ Status of specimen at Reception at the lab: 1= Adequate, 2=Not adequate

___/_____/_____ Date combined Cell Culture Results available

____/_____/_____ Date Results sent to national EPI

____/_____/_____ Date Results received at national EPI

Final cell Culture Results: 1=Suspected poliovirus, 2= Negative, 3=NPENT, 4-Suspect poliovirus + NPENT ☐

____/_____/_____ Date sent from I-C/National Laboratory to regional lab

____/_____/_____ Date I-T differentiation results sent to EPI

____/_____/_____ Date I-T differentiation results received at EPI

Final Lab Results

W1	W2	W3	Discordant Sabin	SL1	SL2	SL3	(R) NPENT	NEV
1=Y, 2=N			Type 1,2,3	1=Y, 2=N			1=positive, 2=Negative	

____/_____/_____ Date isolate sent for sequencing

____/_____/_____ Date seq results sent to program

FOLLOW-UP EXAMINATION

____/_____/_____ Date of Follow-up exam.

Residual Paralysis? LA ☐ LL ☐ RL

1 = Residual Flaccid Paralysis results of exam

2= ☐ sidual paralysis

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
2=Compatible
3=Discarded
6=Not an AFP case
☐

7=cVDPV
8=aVDPV
9=iVDPV

☐ ero-type (1, 2, 3) ☐

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:_____

Annex 2: 60-day Follow up Case Investigation Form

60-DAY FOLLOW-UP CASE INVESTIGATION FORM - ACUTE FLACCID PARALYSIS

1) Epid Number: _____ Country	_____ Region	_____ District	_____ Year Onset	_____ Case
2) Name of Person Examining Case:			**3) Date of Follow-up**	
4) Name of Patient		**5) Sex:**	**6) Date of Birth:**	
7) Region:	**8) District:**		**9) Community:**	

10) Residential Location (Detailed Description):

Was the patient found? Yes [ ] No [ ]

If no, why:

Death [ ]

Lost to Follow-up [ ]

Describe attempt to locate child [ ] _____

_____

_____

60 -Day Examination

11) Is paralysis or **weakness still present?** Yes [ ] No [ ]

If yes, site of paralysis

Left Arm [ ] Right Arm [ ]

Other:_____

Left Leg [ ] Right Leg [ ]

12) Is paralysis or weakness floppy? Yes [ ] No [ ]

Muscle tone:	In paralyzed Parts **(circle one)**:	Increased [ ]	Normal [ ] Decreased [ ]
	In other parts of the body:	Increased [ ] Normal [ ] Decreased [ ]	
Deep tendon reflex:	Exaggerated [ ] Normal [ ] Diminished/Absent [ ]		
Muscle Volume:	Normal [ ] Wasted [ ]		
Sensory Loss:	In paralyzed body parts?	Yes [ ] No [ ]	

13) Provisional Diagnosis:

_____

d

14) Contact Details of Person conducting follow-up examination:	Phone Number:
	Email Address:

Annex 3: Contact Specimen Collection Form

Index AFP case information	**EPID Number:** **GHA/ __ / _ / _ /___**	**Name of AFP case:**

Contact information	**Contact No.** (circle one): **1 / 2 / 3 / 4/ 5**	**Relationship to AFP case**: (circle one): Same Household / Neighbour/ Other:_____	
	Name of Contact:	**Sex:** **Male** ☐ **Female** ☐	**Date of birth** **or** **Years ___Months____**
	Father's name: **Mother's name:**	**Town/village:**	**District:**
	Telephone contact	**Region:**	**Sub district:**

Contact history	Did **contact** receive OPV before AFP case got paralyzed? Yes [ ] No [ ] Unknown [ ] **If Yes:** Date of last OPV dose _____ Number of OPV doses: RI doses _____ SIAs doses _____

Stool specimen collection	Date collected	Date sent to National	Date received National	Date sent to Lab
	___/___/____	___/___/____	___/___/____	___/___/____

Stool specimen results	Date specimen received in the lab: ___/___/____ ☐ 1 = Adequate Lab results: W1 ☐ W2 ☐ W3 ☐ (1=Yes 2=No) Sabin ☐ (Type 1, 2, 3) V1 ☐ V2 ☐ V3 ☐ (1=Yes 2=No) NPENT ☐ NEV ☐ (1=Positive 2=Negative)

Instructions:

1. Collect a specimen from each of 3 contacts.
2. Collect 1 stool specimen from each contact.
3. Prioritize contacts under 5 years living in the same house as the AFP case.
4. If there are less than 3 contacts in the house, choose the closest playmates or neighbors of the AFP case
5. Fill a contact specimen collection form for each contact.
6. Use the same specimen collection procedures and reverse cold chain as for the AFP case specimen collection.
7. Use one separate vaccine carrier for contact specimens and another one for the case specimens.

Name and designation

Signature: _____

Mobile Telephone Number …….

Contact specimens should be collected if:

1. **AFP case is a hot AFP case:**
   a. Below 5 years of age, AND
   b. Fever at onset., AND
   c. Less than 4 days from onset to complete paralysis, AND
   d. Asymmetric paralysis (one side of body weaker than other)
2. **Not able to collect 2 stool specimens from the AFP case within 14 days after onset of paralysis - including those who have died before 2 stool specimens can be collected.**
3. **If cases are identified in high-risk group of population eg- IDP camps, border areas, difficult to access (insecure)**

Annex 4

Annex 4: Ghana SOP to collect vaccination coverage data from age-matched, randomly selected community controls of VDPV2 cases post nOPV2 use- for Disease Control Officers, Surveillance, EPI and WHO Officers

This SOP should be followed by surveillance officers to find community controls for each VDPV2 case. Twelve community controls will be age-matched to each VDPV2 case and vaccination histories of these community controls will be obtained.

This SOP must be commenced within two weeks of confirmation of a VDPV2 case and data from the twelve community controls must be collected within a month of confirmation of the VDPV2 case.

For the purposes of this activity, VDPV2 cases are defined as:

- AFP cases with a laboratory isolation of VDPV2 in their stool sample (or isolation of VDPV2 from stool of his/her contact if the AFP case has inadequate stool)
- who resides or was in an area that used nOPV2 in outbreak response at least once, with date of paralysis onset after the first nOPV2 outbreak response campaign, and
- with polio vaccination histories (both routine and SIA) recorded as part of the Case Investigation Form (CIF).

Definition of community control:

Children who:

- likely had the same VDPV2 exposure as the VDPV2 case
- resided in the same community as the VDPV2 case at the time of paralysis
- are of similar age (+/- 1 year)

Inclusion criteria for community controls:

- Age: +/- 1 year of age of the current age of the VDPV2 case
- Residence:
    - Their household is in the same community as the VDPV2 case.
    - They resided in this household at the time of paralysis onset of the VDPV2 case.
    - The child and primary caregiver must both be present at the time of the interview (allow for two re-visits before choosing a new household due to absence of child and primary caregiver).
    - Only one child per household will be included as a community control.
    - When VDPV2 cases are reported in small villages there may not be enough households to collect enough community controls, therefore households from adjacent villages in the same district can be included.

Definition of household:

- People who share a kitchen and eat from the same pot

Definition of a primary caregiver:

- The mother, grandmother, father, or guardian who is aware about the child's health status
- No siblings of children < 15 years
- No distant family members or neighbours

Random selection of households:

A total of 12 households will have information recorded on 12 community controls (1 control per household).

- Four households will be selected from each of three randomly selected directions of the VDPV2 case.
- In each direction, every fourth household will be sampled.

When a household does not contain children meeting the inclusion criteria, or the child and primary caregiver are not present at two additional attempted visits, the next adjacent households will be visited until a suitable household is reached

Steps for collecting Vaccination History of age matched, randomly selected community controls of VDPV2 cases

Materials needed

- A pen or pencil
- Either a smartphone with the ODK household screening form and data collection form installed or the paper household screening tool and paper investigation form to record data on each community control
- A calendar/list of dates of previous polio SIAs in the community (please remove any information of the type of OPV administered to avoid bias)

Steps to follow

1. Obtain the address of the VDPV2 case where s/he was residing when paralysis onset occurred.

2. Generate three random directions to walk from this location by spinning a pen on the ground outside the home of the VDPV2 case.

- If a street or household is not directly in the direction of where the pen points, choose the closest street or household to go in from that direction.
- Local information should be considered in selecting households in a certain direction. For example, if a VDPV2 case resides on the edge of a village. If feasible, another direction should be randomly selected.

3. For each of these directions, visit the first household in this direction from the VDPV2 case.
   - In cities with multi-level buildings, the first household in such a building will be the nearest household on the ground floor.
4. When contacting a new household, introduce yourself and explain the purpose of the visit.
5. Ask to speak with the primary caregiver and use the household screening tool to determine if a child resides in the household who fits the matching criteria (+/- 1 year of age of the VDPV2 case).
   - Begin by explaining how the primary caregiver can help.
   - Include children only who are physically present at the time of visit and were living in the household at the time of paralysis onset of the VDPV2 case.
   - **Do not** include visiting children or the children of relatives who were not present in the household at the time of paralysis onset of the VDPV2 case.
   - If there is more than one child who fits these criteria, choose the child who is closest in age to the VDPV2 case.
6. If the primary caregiver and / or child is not present at the time of the initial visit, re-visit up to two more times before choosing an alternative household to collect information from.

   o When selecting an alternative household visit adjacent households in the same direction until a suitable household is reached (or in multi-level buildings, visit adjacent apartments and then move up floors before moving on to the adjacent building in the street).

7. If a suitable child does live in this household:
   - Record the GPS coordinates of the household (if applicable).
   - Ask the primary caregiver to:
     - retrieve the vaccination record of the community control child
     - provide demographic of the child as required by the investigation form

    - provide details on the child's vaccination status (by both vaccination card and verbal recall of SIAs) as required by the investigation form.
- Then thank the primary caregiver for their time and continue in the same direction, count four households and at the fourth household determine if a child resides within the matching criteria. (In multi-level buildings count households by moving up the building before visiting the adjacent buildings.)

8. If no suitable children live in this household, thank the primary caregiver for his/her help and continue in the same direction to the next adjacent household until a suitable household is reached (or in multi-level buildings visit adjacent apartments and then move up floors before moving on to the adjacent building in the street).

9. Repeat steps 4 – 8 until data from four children from four households in each direction have been collected. If the village is too small to find enough households, visit adjacent villages in the same district.

10. Ultimately 12 children per VDPV2 case should be selected from 12 different households that are in three different directions from the VDPV2 case residence (i.e., four households per direction)

Annex 4: Protocol for Case Search in Ghana for preparation to introduce nOPV2

Protocol for AFP Active/Retrospective Case Search in Ghana for preparation to introduce nOPV2

The most efficient way to find AFP cases is to conduct **"active surveillance''** for AFP at facilities where they are likely to be found. Active Surveillance is a process by which surveillance officers visit facilities (clinics, hospitals, rehabilitation centers, traditional healers, informants etc.) regularly to search for and investigate unreported AFP cases. Active surveillance is done through:

- a review of facility records and registers;
- interviews with facility workers and/or;
- visits to relevant outpatient clinics and hospital wards to review cases.

When an unreported case is found, the staff conducting active surveillance documents relevant data of the case and ensure it is investigated and properly documented. Surveillance sites should be prioritized according to their probability of seeing AFP cases, i.e. those sites, which have a higher probability of seeing an AFP case should be visited more regularly. Every surveillance officer should have a list of surveillance sites and a schedule of visits for these sites. Each surveillance visit should be documented since monitoring of active surveillance visits is a certification requirement -documentation, filing and a quick retrieval system is mandatory at each level.

Steps in Conducting Active Surveillance Visits

1) **Before leaving your office** for a surveillance visit, make sure you have:
   - stool collection kits
   - case investigation forms
   - the most recent AFP line list
   - communications material (e.g. posters)
   - notebook and pen
   - tape and thumbtacks (to put up posters/case definition)

2) **When you arrive** at the active surveillance site, **meet with the facility surveillance focal person** (Note: If it is your first visit to the site, pay a courtesy visit to the director of the facility, explain the purpose of your visit and ask permission to conduct regular visits)

3) Contact the surveillance focal person inside the health facility and ask (preferably in the presence of other senior staff) about any children with AFP if the site has received or seen a **case meeting the definition of AFP** since the last visit

4) **Conduct a case search by:**
   - Visit appropriate outpatient departments (particularly the emergency room, general and pediatric outpatient department, neurology department and the physiotherapy) centers also the in-patient admissions wards (pediatric ward, physiotherapy wards, orthopedic wards etc.)

Special instruction for nOPV2: Retrospective case search one month after first use of nOPV2.

As per EUL requirement, one month after the first round of nOPV2 in country, the program must carry out a one-off retrospective case search for AFP and AESI in all high priority facility, looking at the records for the last 6 months.

Review the register for the last 6 months and document all AFP and Adverse Events of Special Interest (AESI) (pre/post nOPV2 use) found.

- **and checking the patient register(s)** for any preliminary or final **diagnosis** of disease or **condition** that could have caused an AFP. If no diagnosis, look for **signs or symptoms**. Do this for all visits since the last visit.

- A good understanding of the AFP case definition (standard and community based) is important for identifying and reporting AFP case. Regular training and retraining of all stakeholders in surveillance network and sensitization is critical to understanding of what to look for and what should be done. Surveillance officer must regularly visit Health facilities based on prioritization and provide feedback to lower level officers.

  For nOPV2 requirement, please refer to instruction in the above text box.

  - Hold brief discussions with the clinicians on surveillance.

Note: Remember that active surveillance is comparable to detective work:

- Records rarely indicate diagnoses. If there is a case of polio, you may not find the word "polio" or "poliomyelitis"
- The signs/symptoms described will rarely correspond to the AFP case definition. Some possible words and phrases you might see:
  - "paralysis, paresis (weakness), flaccid (soft)"
  - "weakness, hypotonia (of members, of unknown origin, etc.)"
  - "frequent falls, walking distortion"
  - "can no longer walk"
  - "can no longer stand up"

  and these can be in any **language** or **dialect**

5) Collect in your notebook the **names and addresses** of AFP cases you found

6) In the register, below the last registered patient, note down the result of your search (**number of AFP cases found** in the register, e.g. "0 AFP cases found," if none found) along with **today's date** and add your **signature,** so that supervisors will know that you have visited

7) If you find a case in the register that looks like a missed AFP case, ask whether or not this case was already reported. Also, compare it to the national AFP line list.

8) If you establish that the case is 'new' – not previously reported – plan **investigating** it as soon as possible

9) **Sensitize** the surveillance focal person, if new on the job**,** and other people likely to encounter a case (e.g. nurses), if they're not familiar with AFP surveillance. Note: If the facility has no surveillance focal point (i.e. is a new site), make sure that one is identified and trained as quickly as possible.

Notes on main messages to:

Clinicians

- Looking for AFP cases, not polio
- There will be no additional work for the clinician

Traditional practitioners and midwives

- No competition; patients will remain their patients
- Stools in the lab, results shared with them

Refugee camps and entry areas into the country

- Share a simple AFP case definition

10) Give **feedback** on the facility's "zero reports" (routine reporting), if necessary (i.e. in case of incomplete or late reports).

11) Provide the site with:
    - High-priority sites: AFP **case investigation forms** and **stool collection kits**
    - All sites: **case definitions**, posters, flyers, etc. If possible, put up the case definitions and posters yourself!

12) Thank the staff and remind them of the **date of your next visit**

Note: In some countries, checking the cold chain (vaccines) is part of active surveillance visits.

Once back in the district:

13) Note the salient **results** of the visit in the supervisory notebook (including people met and sensitized, weaknesses observed, number of cases found) for your record and reports

14) Immediately **notify** any new AFP case(s) to the national level and conduct the **investigation** of those AFP cases

Planned Protocol for AFP Active Case Search (ACS) in Ghana
Period: (6 months after introduction of nOPV2)

Who is responsible for conducting ACS?

- The **surveillance officer at the district level**

Where does it take place?

- ACS should be carried out in all places ("active surveillance sites") **likely to receive AFP cases** within the entire country. This should include formal and informal sites e.g. Hospitals, Health centers, clinics, prayer grounds, traditional healers, refugee camps, nomadic settlements, etc

Site selection considerations:

Type of health facility/alternate health care facility

- Likely to see AFP cases (e.g. physiotherapy units, physiotherapy centers…)
- High patient workload
- Frequented by patients under 15 years of age (e.g. pediatric unit of hospitals/clinics,)
- Likely to see populations coming from areas with polio

Site prioritization criteria –3 priority levels should be implemented in Ghana:

Structure/person	Rationale	Priority	Frequency of visit
Specialized and high frequented facilities and persons, Refugee / IDP camp, nomadic settlements, etc	AFP case would **very likely** seek care	**High** priority	Once every week

m

Health facilities and persons	AFP case would **likely** seek care	**Medium** priority	Once every 2 weeks
Other sites	AFP case would **perhaps** seek care	**Low** priority	Once every month

Site Review

A periodic review of the focal sites is thus necessary to assess the effectiveness of the current focal sites in identifying and notification of AFP cases. Analysis of this review should guide the team to retain, reclassify, discard and/or include focal sites. ***The surveillance teams should review reporting sites every six months***, possibly revise the list of active surveillance sites and adapt the schedule of visit and plan based on these considerations:

- Is the network functional?
- Is active surveillance detecting the AFP cases?
- Are there changes in the context?

Visit calendar

Model for elaboration of site visit plan for active case search in Ghana below; Please note that a specific one-off retrospective active case search must be carried out at least once a month after the first use of nOPV2. The frequency depends on the level of priority of the surveillance site.

Sites	Priority	Frequency	Month 1				Month 2				Month 3				Month 4				Month 5				Month 6			
			WK 1	WK 2	WK 3	WK 4	WK 1	WK 2	WK 3	WK 4	WK 1	WK 2	WK 3	WK 4	WK 1	WK 2	WK 3	WK 4	WK 1	WK 2	WK 3	WK 4	WK 1	WK 2	WK 3	WK4
Specialized and high frequented HF/ persons	High Priority	Once/week	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
Health facilities and persons	Medium Priority	Once every 2 weeks	**X**		**X**		**X**		**X**		**X**		**X**		**X**		**X**		**X**		**X**		**X**		**X**	
Other sites	Low Priority	Once every 4 weeks	**X**				**X**				**X**				**X**				**X**				**X**			