polio global eradication initiative

BEST PRACTICES IN ACTIVE SURVEILLANCE FOR POLIO ERADICATION

World Health Organization

Best practices in active surveillance for polio eradication

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ACKNOWLEDGEMENTS

These best practices documents for polio eradication have been developed from the contributions of many people from all over the world. The people concerned have themselves spent many years striving to eradicate polio, learning from successes and failures to understand what works best and what does not, and quickly making changes to suit the situation. In writing these best practices the aim has been to distil the collective experiences into pages that are easy to read and detailed enough to be adapted for other health programmes.

'To strive, to seek, to find, and not to yield'

CONTENTS

ACRONYMS

AFP	Acute flaccid paralysis
AFR	Acute fever and rash
cVDPV	Circulating vaccine-derived poliovirus
GPEI	Global Polio Eradication Initiative
ODK	Open Data Kit
OPV	Oral polio vaccine
SARS	Severe Acute Respiratory Syndrome
SIA	Supplementary immunization activity
VPD	Vaccine-preventable disease
WHO	World Health Organization
WPV	Wild poliovirus
WPV1	Wild poliovirus type 1

INTRODUCTION

DOCUMENTING BEST PRACTICES FROM POLIO ERADICATION

Objective 4 of the *Polio Eradication & Endgame Strategic Plan 2013–2018 calls for the Global Polio Eradication Initiative (GPEI) to undertake planning to "ensure that the investments made to eradicate poliomyelitis contribute to future health goals, through a work programme that systematically documents and transitions the GPEI's knowledge, lessons learnt and assets". As outlined in the Plan, the key elements of this body of work include:*

- ensuring that functions needed to maintain a polio-free world after eradication are mainstreamed into ongoing public health programmes (such as immunization, surveillance, communication, response and containment);
- transitioning non-essential capabilities and processes, where feasible, desirable and appropriate, to support other health priorities and ensure sustainability of the global polio programme;
- **ensuring that the knowledge generated and lessons learnt from polio eradication activities are documented and shared with other health initiatives.**

THE SCOPE OF DOCUMENTING BEST PRACTICES

Best practice documents deal with technical aspects of polio eradication. The documents will include clear guidelines, case studies of effective programmes and processes, case studies of failures, and innovations developed at the national, regional and global levels, and highlight areas where other programmes could benefit from the polio practices to achieve their health priorities. A series of technical subjects are being developed on:

- improving microplanning
- ensuring quality acute flaccid paralysis (AFP) surveillance
- monitoring the quality of supplementary immunization activities (SIAs)
- securing access for immunization in security-compromised areas
- targeting and planning for vaccination of older age groups during polio SIAs
- coordinating cross-border vaccination campaigns
- integrating other antigens or other interventions into polio SIAs
- targeting and planning for vaccination of nomadic populations during polio SIAs
- benefiting from other relevant technical areas where WHO country, regional and headquarter polio teams have significant expertise.

THE PURPOSE OF THIS DOCUMENT

THE RELEVANCE OF THIS DOCUMENT TO OTHER HEALTH INITIATIVES

Effective surveillance systems are essential for the control of communicable diseases, yet it is not only the quality of the data, but also the response that makes the system effective. This was an early lesson learnt; polio eradication could never rely on routine health information systems alone. New polio cases need a timely response, and this needs a system that can detect, investigate and confirm suspected cases of acute flaccid paralysis (AFP) without delay. Active surveillance for AFP has been designed for eradication, but all communicable diseases that are subject to control need a responsive surveillance system. The standardized system of AFP surveillance adopted internationally has made it possible to share data rapidly and interrupt transmission across borders.

THE SCOPE OF THIS DOCUMENT

This document describes best practices in surveillance for polio eradication. It is focused on active surveillance for AFP, which is an innovative approach developed to suit the exacting requirements for detecting every single poliomyelitis case, taking action and thereby eradicating polioviruses, even in areas where little health infrastructure is in place.

BACKGROUND AND ORIGINS OF ACTIVE SURVEILLANCE FOR ACUTE FLACCID PARALYSIS

The aim of polio eradication is to completely remove wild poliovirus (WPV) from circulation in the world. This means that every case of poliomyelitis must be detected and responded to; a single polio case represents the continued circulation of the poliovirus in a wide area, with many hundreds of individuals infected, many without symptoms.

DEFINING ACTIVE SURVEILLANCE

Active surveillance is a process in which designated surveillance staff make regular visits to health facilities to detect, report and investigate cases of communicable diseases. Surveillance staff are often external to the health facility; they collect data from individual cases, registers, medical records or log books at a reporting site to ensure that no case is missed.

ACTIVELY SURVEILLING FOR AFP

Active surveillance for AFP involves a very sensitive system that enables rapidly detecting, reporting, investigating and responding to confirmed poliomyelitis cases.

Some lessons learnt

It is impossible to distinguish clinically between poliomyelitis and other diseases when they first present; every case of acute flaccid paralysis must be investigated for poliovirus, which confirms poliomyelitis.

Active surveillance for AFP makes the system very sensitive, ensuring that no case of polio will be missed; the laboratory network makes the system very specific, even to the extent of identifying the original location of each virus and of reservoirs of transmission.

Active surveillance for AFP depends, above all, on early detection and timely action. Keeping ahead of the virus requires a well-managed system for detecting AFP cases that entails immediately investigating, reporting, taking stool specimens and sending them to the laboratory, and getting the results as quickly as possible.

Without an appropriate response, surveillance fails. The driving force for AFP surveillance is an immediate response with full investigation, followed by confirmation and outbreak immunization.

AFP surveillance has adopted a system that is standardized throughout the world, using the same tools, indicators and reporting systems in every country. This standardized system has greatly strengthened collaboration with immunization partners by sharing uniform data on a weekly basis and advocating for action and support where risks and weaknesses are detected.

ADOPTING ACUTE FLACCID PARALYSIS AS A REPORTABLE SYNDROME

When the polio eradication initiative was first established, most countries were reporting polio cases as just one of many diseases within their disease surveillance systems, often only on an annual basis. Detecting new cases and outbreaks of polio and responding effectively was difficult.

Many diseases may initially look like polio, so a more sensitive system was needed, enabling suspected new cases to be detected, reported and investigated as rapidly as possible. This led to the adoption of AFP as the syndrome to be reported, in the same way that smallpox eradication had previously adopted detection and investigation of the "rash and fever" syndrome.

DEFINING ACUTE FLACCID PARALYSIS

AFP is defined as a sudden onset of weakness and floppiness in any child aged under 15 years, or in a person of any age in whom a clinician suspects polio. This sensitive case definition will capture acute poliomyelitis but also other diseases, including Guillain-Barre syndrome, transverse myelitis and traumatic neuritis, such that each case must be investigated, with laboratory tests to confirm poliomyelitis through the detection of poliovirus in the stool samples of AFP cases.

ESTABLISHING SYSTEMS FOR AFP SURVEILLANCE

Initially, national surveillance systems did not recognize the AFP syndrome as a reportable disease. Yet the worldwide eradication of WPV requires rapidly reporting and investigating every AFP case in order to respond with immunization wherever poliovirus transmission occurs.

In some countries, AFP surveillance data were separately managed and monitored and were not included in the national surveillance and information system. At first this led to some confusion, with polio cases separately reported from established reporting sites and AFP cases reported from a variety of sites, sometimes the same ones. It soon became evident that surveillance for AFP rather than for polio cases was a much more accurate and efficient way to detect, keep track of and respond to the transmission of poliovirus. AFP data are now used to update national information systems.

To intensify AFP surveillance, several countries established collaboration between the ministries of health, WHO, the US Centers for Disease Control and Prevention, other polio eradication partners and private practitioners to detect, report and investigate AFP. The system required overall management at the central level, and field units where surveillance staff would be deployed.

Non-polio afp indicator

The incidence in any population of AFP cases due to other conditions than polio (the non-polio AFP rate) is estimated to be one case per 100 000 children aged under 15 years. This is a useful indicator to measure the sensitivity of the surveillance system. Achieving this indicator implies the surveillance system is sensitive enough to detect polio cases should they occur. It became the basis for measuring AFP surveillance quality, and has been revised to two cases per 100 000 children aged under 15 years in the late stages of polio eradication. Today, 179 of 194 WHO Member States conduct AFP surveillance and submit weekly AFP reports to WHO regional offices and WHO headquarters.

INITIATING ACTIVE SURVEILLANCE FOR AFP: ORIGINS IN THE WESTERN PACIFIC REGION

The WHO Region of the Americas was the pioneer in polio eradication, using well-established reporting networks and a system of regular case reporting often communicated by phone and fax, including zero reporting in the absence of cases to establish a fully reliable system.

The next region to embark on polio eradication was the Western Pacific Region in 1991, where in some countries disease surveillance networks and modern telecommunications were not well established. As very few polio cases were reported there, an innovative AFP system was needed. A trial of active surveillance for AFP began in Cambodia in 1992 in collaboration with WHO and the Ministry of Health of Cambodia. The system involved designating surveillance staff from the National Immunization Programme to visit the hospitals where AFP cases were most likely to be found, interviewing clinicians and reviewing case registers. If an AFP case was found, a case investigation form would be completed by surveillance staff and stool samples taken for virological analysis. The system did not depend on the hospital's passive reporting system. This active AFP surveillance system worked well and was soon adopted by every country in the Western Pacific Region, followed by other regions.

UNDERSTANDING THE DIFFERENCES BETWEEN ACTIVE AND PASSIVE SURVEILLANCE

- Active surveillance is a sensitive system that facilitates early detection and a rapid response to new cases of communicable diseases.
- Active surveillance places the responsibility for detecting, reporting and investigating these diseases in the hands of surveillance staff who are responsible for communicable disease eradication, elimination and control.
- Passive surveillance, often known as routine reporting, is disease data collection from all potential reporting sites and health-care workers.
- Passive surveillance may be well established, but it is commonly associated with incompleteness and delays, and is therefore less well suited to an eradication or elimination programme.

BEST PRACTICES FOR MANAGING AN ACTIVE SURVEILLANCE NETWORK FOR AFP

An active surveillance network for AFP consists of active surveillance sites and informers connected with surveillance staff.

Active surveillance sites

- Active surveillance sites are all government or private hospitals, children's nursing homes and health facilities likely to be visited by a large number of children aged under 15 years and likely to see AFP cases.
- Active surveillance sites are visited regularly by designated surveillance staff who are from government or partner agencies.

Active surveillance informers

- Health facility based
  The head of the health facility designates focal points in government health facilities to report AFP cases. Private practitioners can also be designated as active surveillance informers. The focal points in the health facilities and the private practitioners can assist with early detection, notification, investigation and stool sample collection. Focal points will phone designated surveillance staff when AFP cases are detected.
- Informal health sector
  Various informal health practitioners, including faith healers and practitioners of traditional medicine who are likely to encounter AFP cases but are not working in the formal health system, can be reliable assets for AFP case detection. After an orientation session, they are expected to phone surveillance staff when they see suspected AFP cases.
- Community based
  Community-based surveillance can be adopted in countries where little or no formal or informal health infrastructure exists. In these locations, certain individuals in the community, such as shopkeepers, religious leaders and school teachers, can join orientation sessions that will teach them to detect suspected AFP with the aim of reporting the cases by phone to surveillance staff and recommend immunization.

Surveillance staff

Surveillance staff are external to the health facility and should establish a good relationship with the active surveillance sites and informers, and agree upon a schedule of regular visits. They may be government employees or from partner agencies.

Close cooperation is needed when arranging visits and detailed case investigation (forms must be completed and two separate stool samples collected). It is important to:

- choose appropriate times to visit active surveillance sites and informers (in consultation with clinicians);
- keep the appointments for visits, provide orientation and give feedback to health facilities.

Orientation of health facility staff

- Senior surveillance staff should encourage all medical and nursing staff to fully cooperate in active surveillance. This may require a meeting at the designated active surveillance health facility to provide information and answer questions. The aim should be to provide orientation on early detection and report AFP cases without delay to surveillance staff.
- Surveillance staff should be accepted in the health facility and welcomed. Health facility staff should receive feedback on the outcome of the case investigation and local progress.
- Medical staff should be encouraged to notify the external surveillance staff when a case of AFP is encountered. All health facility staff should be given the telephone number of the surveillance staff; a phone call will alert the surveillance staff so they visit the health facility and carry out a case investigation without delay.
- When a country becomes polio-free, it is important to continue to encourage active surveillance for AFP. Therefore it is necessary to explain the requirements for certification to the health facility staff.

Orientation of informers

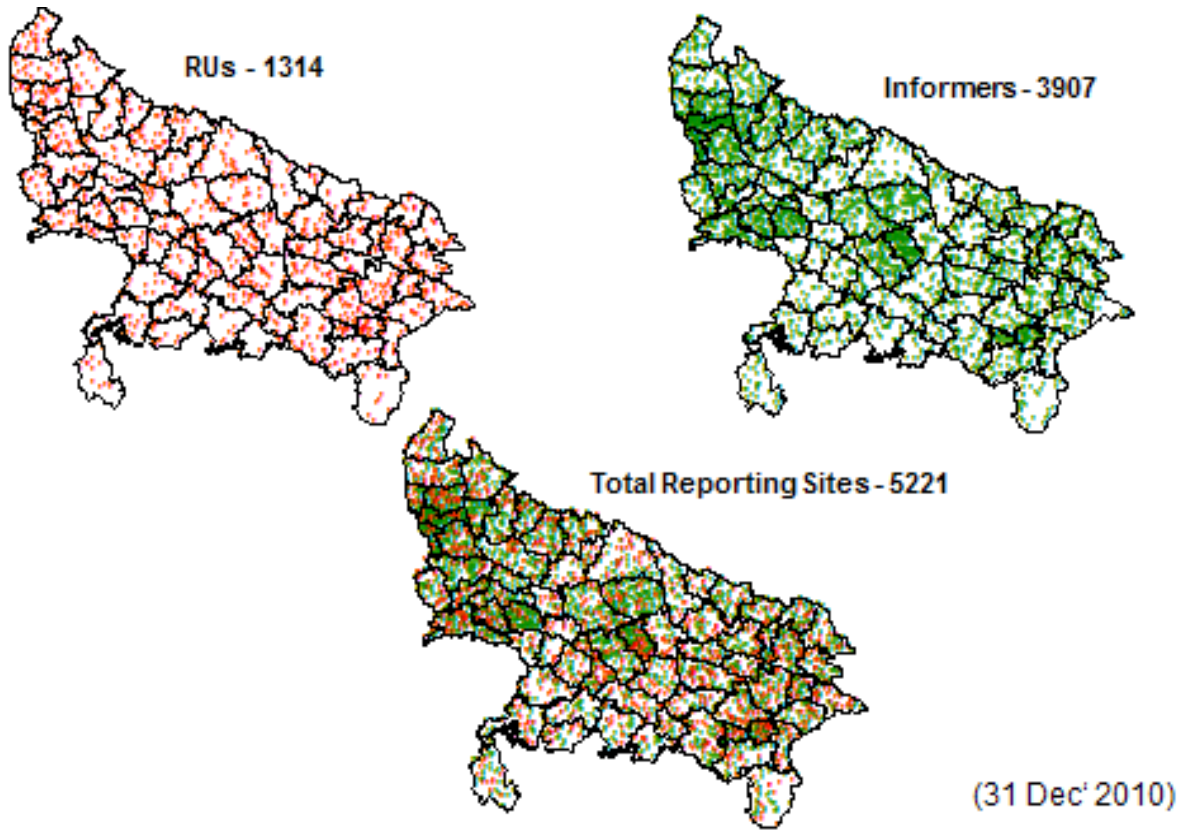
Surveillance staff should conduct orientation sessions for informers on a regular basis. However, given the extensive informer network, follow-up visits after initial orientation will depend on the active surveillance priorities and workload.

Making the best use of active surveillance sites and informers

- Regular visits and phone communication throughout the network will encourage active surveillance.
- Urgent notification by phone is vital. The phone numbers of government and partner agency surveillance staff must be given to all sites and informers.
- Some sites will have the capacity and informers with sufficient skills to take stool samples and collect information for case investigation.
- Documentation is also vital. Certain essential details should be notified before the case is investigated.
- All active surveillance sites should have stool kits and cold boxes with ice packs for stool transport.
- The sites should have clear instructions for handling and transporting the cold boxes.
- Some informers and community volunteers, especially in remote areas, must also be able to collect stool samples and send them to designated focal points.

In densely populated areas with high levels of poliovirus transmission, a vast network for AFP surveillance has been set up. This example from India shows an extensive surveillance network of reporting sites.

Figure 1. Surveillance of acute flaccid paralysis reporting sites, Uttar Pradesh, 2010



RU: reporting units (health facilities of any kind)

- The reporting sites include all health facilities; the largest ones are designated active surveillance sites.
- Informers include formal and informal practitioners outside the government health service.

SCHEDULING VISITS TO ACTIVE SURVEILLANCE SITES

Designated active surveillance sites should be visited according to an established schedule. The schedule should assign priority to the health facilities in line with their probability of encountering cases of AFP. Frequency can vary from country to country, but in highly populated areas where there are likely to be hundreds or even thousands of patients consulted every day, weekly active surveillance visits and register reviews may be needed. Others may be visited on a monthly basis, but the frequency of visits should be subject to regular review based on surveillance priorities and workload.

High-priority weekly visits	Lower-priority monthly visits
All major public and private hospitals, including at the national, province/state and district levels	Large health centres Busy private clinics
Paediatric hospitals	Informers: private practitioners
Paediatric specialists	Informal practitioners

The best practices for monitoring active surveillance visits and reports can be found in the annexes.

SUPPORTING ACTIVE SURVEILLANCE STAFF IN THE FIELD

Active surveillance depends on a close working relationship between surveillance staff, hospital and other health facility staff and supporting partners. It includes:

- regular communication on case detection and investigation by mobile phone and regular visits;
- shared responsibilities for identification, reporting and investigation, depending on staff availability;
- teamwork and shared transport when needed;
- orientation and refresher training from the surveillance unit on a regular basis;
- joint participation in other responsibilities, for instance pertaining to measles, dengue outbreak or yellow fever;
- the facilitation of stool sample collection and transport;
- rapid communication to the surveillance unit and supervisors;
- email copies of case investigation and laboratory requests to all concerned in the investigation;
- feedback on clinical and laboratory results and progress.

SUPERVISING ACTIVE SURVEILLANCE SITES

Every active surveillance site needs regular supervisory visits. Supervisors at the district level can maintain a map of the active surveillance sites with a list of the names of the sites and of the focal persons and their mobile phone numbers.

The field surveillance office should monitor and supervise the active surveillance sites using simple indicators:

- **Monthly:** ensuring the percentage of sites submitting weekly reports $\geq$80%, and the percentage of reports received on time $\geq$ 80%;
- **Annually:** updating the network of active surveillance sites by reviewing their function, to include new sites and exclude others as required; reviewing the lists of informers working inside and outside the health sector to identify weak surveillance areas that need to be enhanced and to replace non-functioning informers.

BEST PRACTICES FOR IMPROVING THE SENSITIVITY OF ACTIVE SURVEILLANCE FOR AFP

As the GPEI made progress and the number of polio cases declined significantly, it became vital to increase the sensitivity of active surveillance to avoid missing any AFP cases. The countries with continued transmission adopted the following practices:

INCREASING THE NON-POLIO AFP SENSITIVITY INDICATOR

The indicator for sensitivity of AFP surveillance was increased from at least one case of non-polio AFP annually per 100 000 population aged under 15 years to at least two cases of non-polio AFP per 100 000 in endemic regions, and at least three per 100 000 in countries with new outbreaks.

REPORTING ALL, EVEN UNCERTAIN, AFP CASES

- All cases of AFP were reported and investigated, regardless of the clinical diagnosis on presentation of the cases, if they fit the official case definition for AFP.
- The question of which AFP-reported cases should be included has often arisen, given that some are considered as "uncertain AFP", with atypical presentation. However, the consequences of missing a polio case outweigh those of including an uncertain AFP case.
- Best practice thus encourages the reporting of all AFP cases, even those that appear uncertain. In the past, certain children presenting with Bell's palsy (facial palsy) were found to be suffering from poliomyelitis (see the figure below). Therefore, all AFP cases, even if atypical, should be investigated and stool samples should be collected within 14 days of onset of paralysis.
- Even uncertain AFP cases, when fully investigated, will add to the body of information needed to determine whether polioviruses are still circulating.
- Clinicians who declare on clinical grounds that any AFP case is not due to polio should nevertheless report it and facilitate its full investigation. A significant number of confirmed polio cases presented without typical AFP symptoms in India.

Figure 2. Clinical presentations of confirmed wild poliovirus cases, India, 2006–2007

Clinical Presentation of WPV	WPVs-2006	WPV2-2007
Clinical Poliomyelitis	586 (86.7)	757 (86.71)
Only history of Paralysis	24 (2.7)	14 (1.60)
Hemiplegia	35 (5.2)	54 (6.19)
G.B.Syndrome	6 (0.9)	3 (0.34)
Traumatic Neuritis	4 (0.6)	8 (0.92)
Only Limp	4 (0.6)	1 (0.11)
Acute Encephalitis	3 (0.4)	3 (0.34)
Isolated Facial Palsy	3 (0.4)	19 (2.18)
Isolated Neck Flop	4 (0.6)	5 (0.52)
Post Diphtheritic Polyneuritis		2 (0.23)
Others	7 (1.0)	7 (0.08)
Total	**676**	**873**

EXTENDING THE AFP SURVEILLANCE NETWORK TO THE COMMUNITY

Including informers in the community

In some countries, informal practitioners provide health care close to the villages and communities they serve but outside the network of government facilities. Some may be qualified private practitioners, but others are often unqualified healers who have the respect of the community and see many clients every day. They are often called "informers".

- Informers can join orientation sessions to help them understand the importance of detecting and reporting AFP cases.
- They often keep their own client registers with names and addresses that can be checked during an active surveillance visit.
- Even those informers who do not keep formal records can be encouraged to report AFP.
- The names and phone numbers of the informers and surveillance staff should be exchanged to facilitate reporting.
- Regularly visiting informal practitioners, displaying posters and providing other information will encourage them to report.
- Informers can be provided with stool collection kits and trained in taking stool samples, and relied upon to phone the surveillance unit so it collects and transports the samples.
- In most circumstances, informers require a small payment for their services as they are not working within the official government health structure.

Actively searching for AFP cases in the community

An active search for AFP cases may be carried out by reviewing medical records at any level of the health service in the following circumstances:

- at surveillance sites where performance has been inadequate;
- during a new polio outbreak where its magnitude and extent need to be understood for action to be taken;
- in remote or hard-to-reach areas where there is little or no health infrastructure to support regular reporting;
- during polio SIAs, especially in high-risk areas, when vaccinators vaccinating from house to house can enquire about any new AFP cases.

Improving special surveillance activities in areas with under-reporting

In areas that do not submit regular AFP reports, steps can be taken to improve surveillance sensitivity, including:

- ensuring systematic contact sampling for every AFP case (collecting stool samples from at least two contacts for every AFP case collected);
- collecting stool samples from healthy children in remote areas and areas considered to be at high risk of transmission.

Conducting environmental surveillance for polioviruses

Environmental surveillance is conducted by testing sewage samples for polioviruses. This inspection does not detect AFP cases, but it can reveal circulating polioviruses that may indicate continued transmission among individuals who do not develop paralysis, or the new importation of a poliovirus into a polio-free area. Often the detection of environmental polioviruses will indirectly increase the sensitivity of surveillance by boosting active AFP surveillance in the area concerned and in other areas where the virus may be found to be genetically linked.

BEST PRACTICES FOR IMPROVING THE QUALITY OF SURVEILLANCE FOR AFP

INDICATORS OF SURVEILLANCE PERFORMANCE

- **Completeness of reporting**

At least 80% of expected routine (weekly or monthly) AFP surveillance reports should be received on time, including zero reports in which no AFP cases are detected. The distribution of reporting sites should be representative of the country's geography and demography.

- **Sensitivity of surveillance**

At least **one** case of non-polio AFP should be detected annually per 100 000 population aged under 15 years. To ensure even higher sensitivity in endemic regions, this rate should be **two** per 100 000 children aged under 15 years, and three per 100 000 in countries with recent outbreaks.

- **Completeness of case investigation**

All AFP cases should have a full clinical and virological investigation, and at least 80% of AFP cases should have "adequate" stool specimens. Adequate stool specimens are two stool specimens of sufficient quantity for laboratory analysis, collected at least 24 hours apart, within 14 days after the onset of paralysis, and arriving at the laboratory by reverse cold chain and with proper documentation.

- **Completeness of follow-up**

At least 80% of AFP cases should have a follow-up examination for residual paralysis 60 days after the onset of paralysis.

- **Laboratory performance**

All AFP case specimens must be processed in a WHO-accredited laboratory within the Global Polio Laboratory Network.

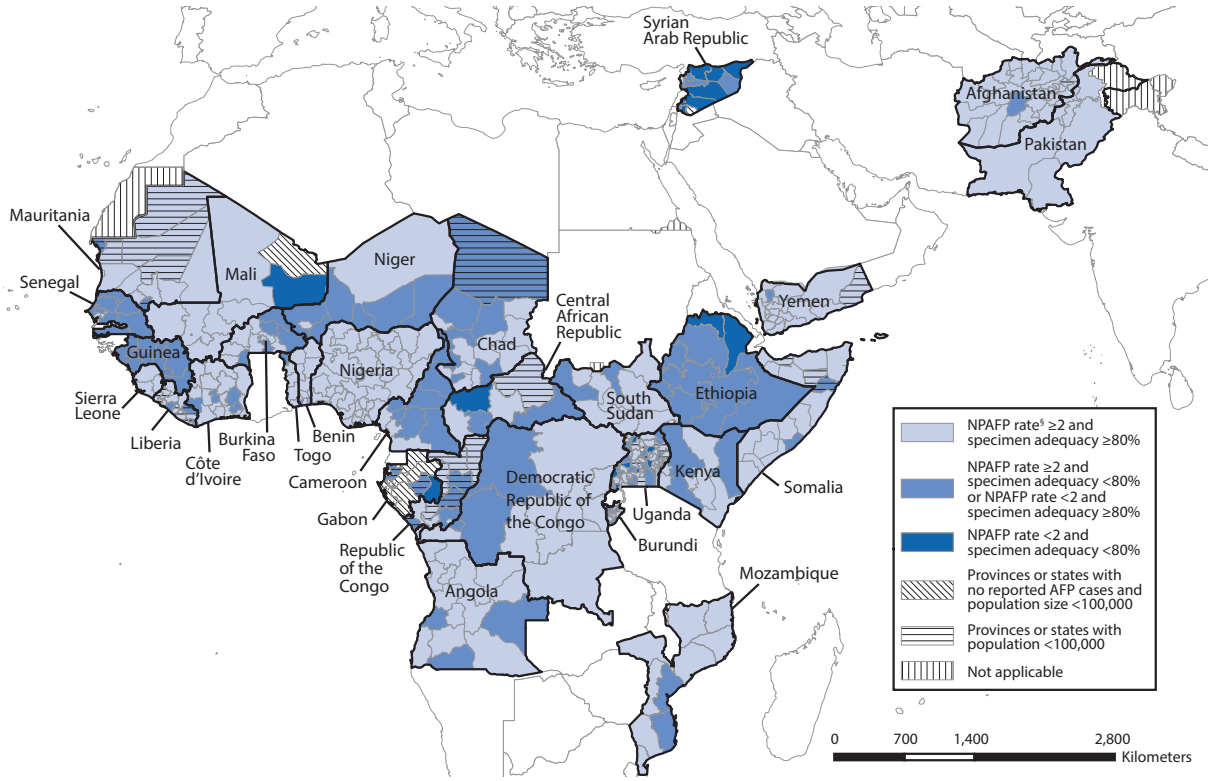
Two indicators set the gold standard for AFP surveillance quality:

- at least two cases of non-polio AFP reported yearly per 100 000 children aged under 15 years (increased to three per 100 000 in areas with new outbreaks);
- at least 80% of AFP cases with two adequate* stool samples.
  *Specimen adequacy is defined as two specimens collected at least 24 hours apart, both within 14 days after the onset of paralysis, shipped on ice or frozen packs and arriving in good condition at a World Health Organization-accredited laboratory.

These two indicators can be combined into a single indicator of AFP surveillance quality:

- a non-polio AFP rate of at least two, and specimen adequacy of at least 80%.

Figure 3. Combined performance indicator for the quality of acute flaccid paralysis surveillance in subnational areas, African Region and Eastern Mediterranean Region, 2010–2014



This combined indicator can be mapped as shown in the figure, presenting the quality of AFP surveillance in polio-affected states and provinces of 29 countries from 2010 to 2014 in the WHO African Region and Eastern Mediterranean Region.

THE IMPORTANCE OF TIMELINESS IN AFP SURVEILLANCE

Standard indicators for AFP surveillance include timeliness in order to maximize the opportunity to isolate the poliovirus in the laboratory, the highest probability occurring in the first 14 days after onset of paralysis.

- Percentage of AFP cases investigated **within 48 hours**: target of at least 80%;
- Percentage of AFP cases with two adequate stool specimens **collected 24–48 hours apart and within 14 days after onset:** target of at least 80%;
- Percentage of specimens arriving at the laboratory in good condition: target of at least 80%;
- Percentage of specimens arriving at a WHO-accredited laboratory **within three days of being sent**: target of at least 80%;
- Percentage of specimens for which laboratory results are sent **within 28 days of their receipt**: target of at least 80%.

BEST PRACTICES FOR INVESTIGATING AND REDUCING DELAYS IN AFP SURVEILLANCE

ASSIGNING AN EPID NUMBER TO EVERY AFP CASE AT THE TIME OF INVESTIGATION

The epidemiological (EPID) number (AFP case identification number) should be used to track the case and laboratory samples through all steps of the investigation. The AFP cases can be listed in a table (see the figure) to identify the timeliness in each step of the case investigation. These data can mostly be obtained from case investigation forms and laboratory records.

Figure 4. Table listing AFP cases to identify surveillance timeliness

AFP case EPID number	Location	Reported by	Days from onset to notification	Days from notification to investigation	Days from investigation to 2nd stool collection	Days from stool collection to stool dispatch	Days from stool dispatch to stool reception in lab	Days from stool reception in lab to result received in district office

Figure 5. Examples of best practices for reducing delays in acute flaccid paralysis surveillance

Delays in reporting AFP at the community level	Parents with sick children may visit any number of persons within the informal medical community (faith healers, village dispensaries, etc.) before visiting a reporting unit where the case can be reported and investigated.	The solution is to understand who in the informal medical community are the persons most likely to see AFP cases, and to include them as informants who can be visited regularly by active surveillance staff; another is to collect information on health-seeking behaviour in the communities.
Delays in AFP case investigation	A reporting unit may report an AFP case in time, but the investigation by a suitably experienced person may be delayed.	The solution is to make sure that the person responsible for case investigation is available and connected by mobile phone to all the reporting units for which they are responsible.

Delays in stool collection	AFP cases may be reported and investigated in time but stool collection may be delayed. The child may not defecate immediately.	The solution is to ensure reporting sites are equipped with stool sampling kits and containers for transport under reverse cold-chain conditions. The child can remain under observation until the specimen is collected.
Delays in stool transport	Stools may be collected in time, but no means of transport is available or the location is remote.	Keep specimens in the refrigerator or, if the delay is long, freeze them at -20 °C.

IMPLEMENTING THE REVERSE COLD CHAIN

Faecal specimens are analysed for the presence of poliovirus. Because shedding of the virus is variable (stool samples may contain variable amounts of virus when finally excreted as faeces), two specimens – collected 24–48 hours apart – are required. Timeliness is essential, since the highest concentrations of poliovirus in the stools of infected individuals are found during the first two weeks after onset of paralysis.

- The properties of wild poliovirus type 1 (WPV1) show the risks of exposing stool specimens to prolonged high temperatures:
  - at 25 °C, highly stable for at least 28 days
  - at 35 °C, stable for four days but becoming undetectable by 16 days
  - at 45 °C, undetectable at four days.

However, these properties may be reduced if the concentration of poliovirus in the specimens is low. To be confident the virus is retained if it is present, stool specimens must be sealed in containers and stored immediately inside a refrigerator or placed between frozen ice packs at 4–8 °C in a cold box, ready for shipment to a laboratory. Undue delays or prolonged exposure to heat on the way to the laboratory may destroy the virus. Specimens should arrive at the laboratory preferably within 72 hours of collection.

Shipping stool specimens

All materials should be shipped using the basic triple packaging system in the collection kit. All infectious substances must be accompanied by a Shipper's Declaration for Dangerous Goods, indicating the shipment of infectious substances and the use of ice packs or dry ice in the shipment, where appropriate.

SHIPPER'S DECLARATION FOR DANGEROUS GOODS (Provide at least three copies to the airline.)

Shipper

Air Waybill No.

Page of Pages

Shipper's Reference Number *(optional)*

Consignee

This shipper's declaration was prepared using a FedEx Express template.
It must be used ONLY for:
* Class 7 radioactive shipments
* Shipments using an 023 air waybill (IP1, IXF or ATA service)
* Shipments originating from a non-US location

Two completed and signed copies of this Declaration must be handed to the operator

WARNING

Failure to comply with all respects with the applicable Dangerous Goods Regulations may be in breach of the applicable law, subject to legal penalties.

TRANSPORT DETAILS

This shipment is within the limitations prescribed for: *(delete non applicable)*

PASSENGER AND CARGO AIRCRAFT | CARGO AIRCRAFT ONLY

Airport of Departure

Airport of Destination:

Shipment type: *(delete non-applicable)*

NON-RADIOACTIVE | RADIOACTIVE

NATURE AND QUANTITY OF DANGEROUS GOODS

Dangerous Goods Identification				Quantity and type of packaging	Packing Inst.	Authorization
UN or ID No.	Proper Shipping Name	Class or Division (Subsidiary Risk)	Packing Group			

Additional Handling Information

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable International and National Governmental Regulations. I declare that all of the applicable air transport requirements have been met.

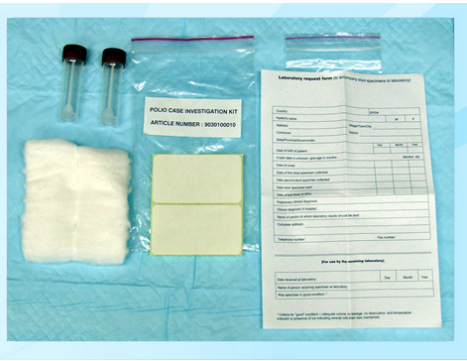
Name/Title of Signatory

Place and Date

Signature *(see warning above)*

Emergency Telephone Number

FOR RADIOACTIVE MATERIAL SHIPMENT ACCEPTABLE FOR PASSENGER AIRCRAFT, THE SHIPMENT CONTAINS RADIOACTIVE MATERIAL INTENDED FOR USE IN OR INCIDENT TO RESEARCH, MEDICAL DIAGNOSIS, OR TREATMENT. ADR EUROPEAN TRANSPORT STATEMENT: CARRIAGE IN ACCORDANCE WITH 1.1.4.2.1



Photos show:

- Stool collection kit
- Cold box shipping container with ice packs
- Danger label for the shipping container
- Shipper's Declaration for Dangerous Goods for transport

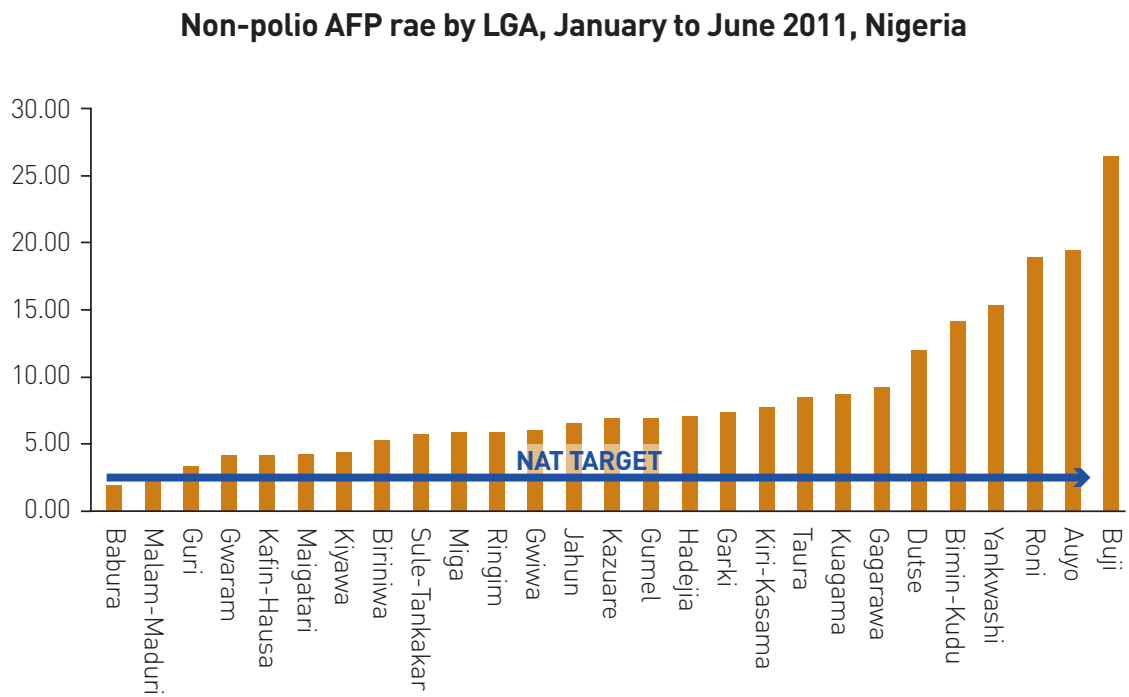
Common problems with active AFP surveillance quality

False confidence in AFP surveillance indicators

AFP surveillance indicators appearing to meet certification standards do not mean that surveillance is adequate.

In the state of Jigawa, Nigeria, the non-polio AFP rate reached almost 10 per 100 000 children aged under 15 years in 2011. An analysis of polio viruses, however, detected both WPV and circulating vaccine-derived poliovirus (cVDPV), showing that chains of transmission had been missed. Despite meeting the required indicator standard, there was incomplete detection, reporting and investigation of AFP cases.

Figure 6. Non-polio AFP rate by local government area in Jigawa, Nigeria, January–June 2011



Using WPV and cVDPV genomic sequence analysis to measure AFP surveillance quality

Analysis of the nucleotide sequence of the VP1 region of all WPV and cVDPV type 2 isolates is used to investigate transmission links, track international spread and assess both viral diversity as a measure of circulation intensity and surveillance sensitivity. After a substantial decline in the genetic diversity (reflected by the number of genetic clusters) of WPV1 strains from 21 clusters in 2009 to four clusters in 2010, the number of clusters increased to eight in 2011. The number of WPV type 3 clusters declined from 21 in 2009 to six in 2010 and four in 2011. Genomic sequence analysis shows much less genetic linkage than expected with sensitive AFP surveillance, including some chains of WPV transmission during 2011–2012 not detected for more than a year.

Despite very high non-polio AFP rates, it can be concluded that the continued detection of orphan viruses (WPV and cVDPV) with less genetic linkage in Jigawa in 2011 indicates missed transmission and missed AFP cases.

Best practice in the regular analysis of AFP surveillance quality

A regular and detailed analysis of all AFP cases is the best way to understand the dynamics of poliovirus transmission. In countries with active transmission, the best practice is to hold weekly reviews of all AFP cases to understand the underlying causes of inadequate cases, unimmunized cases and the precise location of each case and source of report. It is this level of detailed analysis that enables the programme to stay ahead of the poliovirus and predict where transmission will continue and where it will need to be stopped with high-quality immunization.

Figure 7. Common problems with active AFP surveillance quality and solutions to improve it

Common problems with active AFP surveillance quality	Solutions to improve active surveillance quality
Lack of prioritization of the active surveillance network • Certain hospitals, especially in the urban areas that are more likely to see AFP cases, may not receive adequate regular visits from surveillance staff.	• List all reporting sites by order of priority, and assign the frequency of visits accordingly; ensure large urban hospitals have top priority for weekly visits. • Include the sources of information to be searched during the visit: inpatient and outpatient records, paediatric ward, etc. • Include the name and phone number of the focal point at the reporting site.
Poor quality work by surveillance staff • Active surveillance becomes zero reporting due to a lack of real search for AFP cases. • Surveillance staff do not have the sufficient medical or public health status to sensitize medical staff in hospitals, or to enquire about and search for cases. • Cases that clearly do not fit the AFP case definition are included without questioning. • Regular case searches are superficial and fail to detect genuine AFP cases. • Surveillance staff do not follow field guidelines and have had no recent training. • Insufficient time is spent in the active surveillance site.	• Assign the best qualified surveillance staff to the most important sites. • Raise the status of surveillance staff, and encourage and improve the sensitization of staff at reporting sites through supervisory visits. • Update active surveillance guidelines and posters and share them with all surveillance staff. • Ensure that all staff know the AFP case definition and expected rate of non-polio AFP detection. • Provide feedback on results and progress to reporting units. • Allow enough time to talk to designated active surveillance and other clinicians and nurses.

Common problems with active AFP surveillance quality	Solutions to improve active surveillance quality
Poor quality monitoring and supervision of the surveillance system • There is infrequent and inadequate supervision of field surveillance activities. • WHO and partners lack engagement to support government counterparts in ensuring high-quality AFP surveillance.	• At each surveillance site, list and monitor every reporting unit and informers for completeness and timeliness. • Provide surveillance staff with regular on-the-job supportive supervision so they do not lose confidence and interest. • Engage hospital/health facility staff to remind them of the AFP case definition and the need for full cooperation. • Add active surveillance for measles (acute fever and rash [AFR]) to AFP to maintain interest in active surveillance visits.
Poor management of surveillance staff • Surveillance staff lack resources to do their job effectively and travel to investigate cases.	• Ensure all surveillance staff have access to transport resources. • Provide office and transport resources, transport cost allowances, phone allowances and access to office equipment and supplies to make and send reports, make photocopies, etc.
Inadequate handling of AFP laboratory specimens • Stool specimens are kept or transported under inadequate reverse cold-chain conditions.	• Provide resources for stool transport: kits, cold-chain containers, etc., to all reporting units and selected informers. • Arrange the timely collection and transport of specimens in reverse cold chains.
Lack of training of informers • Informers often have no medical training and may not understand the AFP case definition, and therefore may not provide any reports.	• Make regular visits to all informers, provide simple materials and make regular phone contact. • Use the mobile phone training app for informers (see the section on new technology).

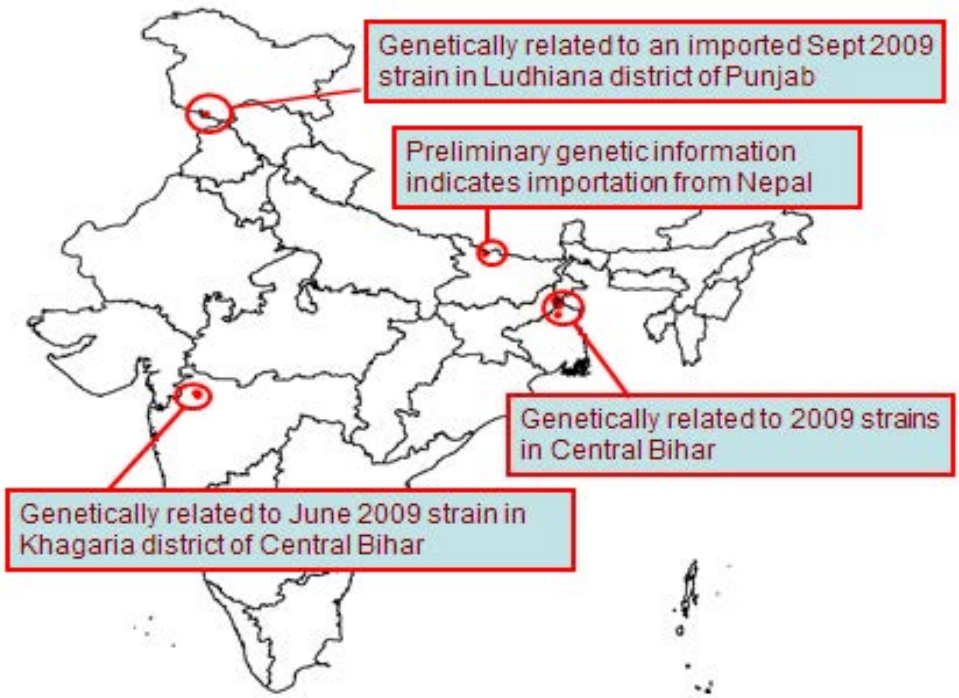
BEST PRACTICES FOR TRACKING THE ORIGIN OF WILD POLIOVIRUSES

The laboratory sequencing of the genetic characteristics of poliovirus isolates has proved to be a vital adjunct to AFP surveillance, especially in the late stages of polio eradication. Sequencing can be used to:

- detect linkages in the epidemiology of polio cases;
- differentiate between imported and indigenous polio cases;
- monitor progress through the decreasing biodiversity in lineages of polioviruses;
- detect vaccine-derived polioviruses;
- detect gaps in AFP surveillance quality from the identification of orphan viruses significantly different from previous viruses, which therefore leads to the conclusion that circulation has continued undetected for some time.

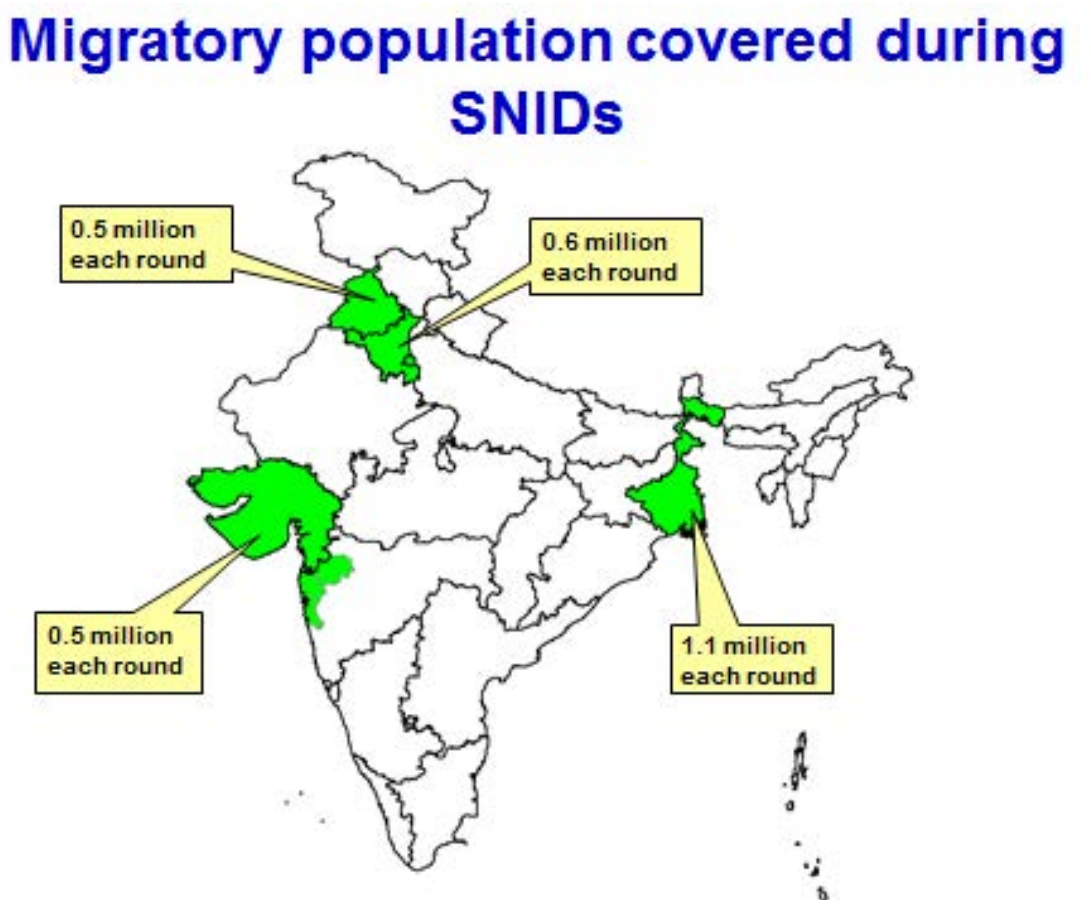
A notable example was the detection of polioviruses originating in Bihar, which indicated that the Kosi riverine area was a reservoir of polioviruses that were spread by migrant workers to various parts of India.

Figure 8. Genetic linkages of WPV1 cases, 2010*



* at 10 September 2010

Figure 9. Migratory population covered during Subnational Immunization Days, 2011



BEST PRACTICES FOR RESPONDING TO AFP SURVEILLANCE DATA

Responding to "hot" AFP cases

In the late stages of polio eradication, AFP surveillance yields many hundreds of cases that are not due to polio (non-polio AFP), but at the same time it is imperative that immediate action be taken for any AFP case that looks likely to be polio. Such cases are labelled "hot" cases and are defined as those in which the individual:

- is aged under 5 years;
- has a history of fever at the time of onset of paralysis;
- has rapidly progressive paralysis resulting in death.

When a hot case is detected, action includes:

- urgently responding and shipping the stool specimens;
- taking stool samples from five persons who have had contact with the case;
- fast-tracking the specimen testing in the laboratory;
- treating recently reported AFP cases in neighbouring districts as hot cases.

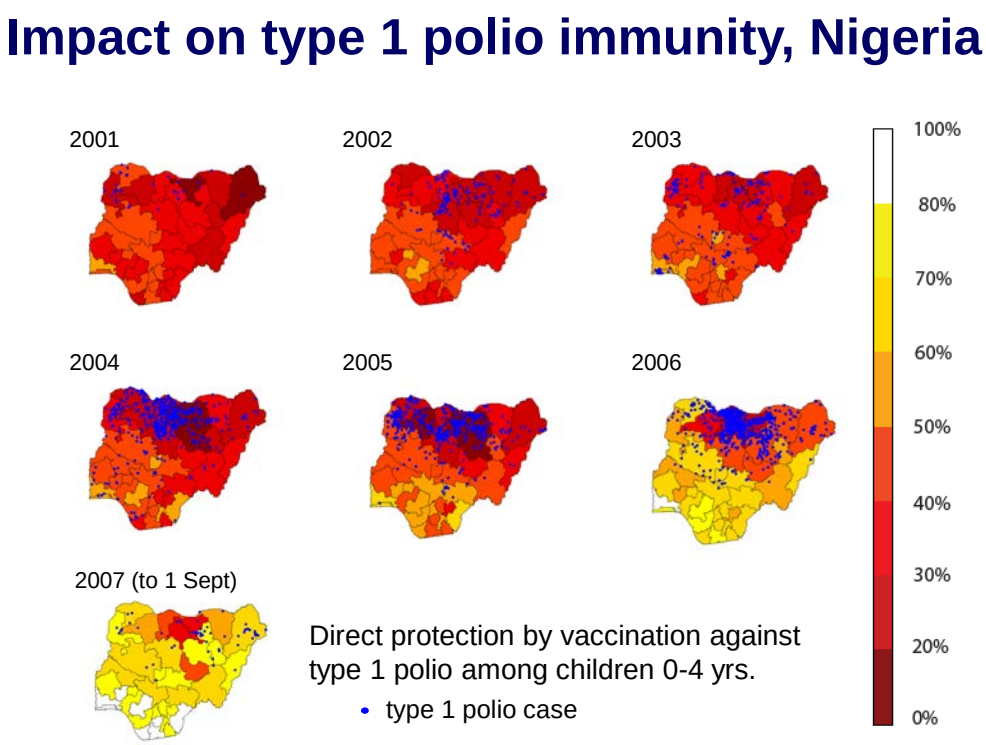
Using AFP surveillance data to triangulate a measurement of SIA quality

AFP surveillance data can be used as one component to reliably measure SIA quality, which must not depend on one indicator, such as coverage alone.

The following data are triangulated to assess missed children over time:

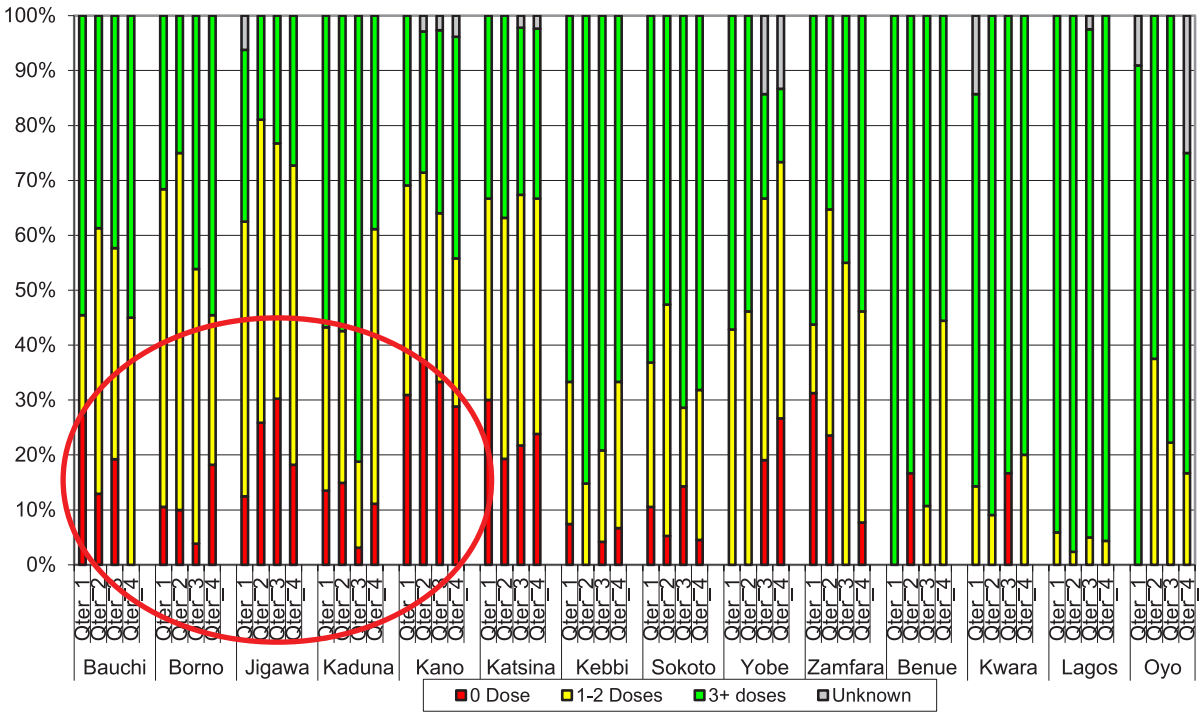
- the oral polio vaccine (OPV) immunization status of non-polio AFP cases;
- lot quality assurance sampling conducted in high-risk and worst-performing areas immediately after SIA rounds;
- demographic and social data on polio cases to develop a risk profile;
- post-campaign market surveys and independent monitoring.

Figure 10. Impact on WPV1 immunity, Nigeria, 2001–2007



The figure above shows progress in reducing polio cases in Nigeria between 2005 and 2007. However, an analysis of the surveillance data indicates that many children in the states circled in the figure below had not received any dose of OPV.

Figure 11. OPV status of non-polio AFP cases, Nigeria, 2007



By triangulating SIA results with surveillance data, it can be concluded that the risks of continued transmission in 2007 were still high, and SIA quality needed to be improved.

BEST PRACTICES FOR EXTENDING ACTIVE AFP SURVEILLANCE TO OTHER DISEASES

EXTENDING AFP SURVEILLANCE TO THE DETECTION OF OTHER VACCINE-PREVENTABLE DISEASES

By 2003, 131 of 194 WHO Member States had added surveillance for measles and other vaccine-preventable diseases (most commonly neonatal tetanus, cholera, meningitis, acute encephalitis syndrome for Japanese encephalitis and yellow fever) to AFP surveillance. Response including full investigation has been the key to sustaining AFP surveillance, so it is preferable to add other diseases that also require investigation and response as part of an elimination programme. Active surveillance for AFR for suspected measles and rubella is a well-suited addition to AFP surveillance and has boosted it in countries that are polio-free (see Annex 4).

In addition, field surveillance, including case investigation, for acute meningitis and encephalitis syndromes has been integrated into existing polio and measles surveillance activities in several countries, including Bangladesh, China and India.

Figure 12. Table showing the structure and performance of AFP and measles surveillance systems, by WHO region, 2003

Table: Structure and performance of global acute flaccid paralysis (AFP) and measles surveillance systems, by World Health Organization (WHO) region, 2003

WHO region	No. of countries with AFP systems	No. of countries integrating AFP with measles/ neonatal tetanus reporting	No. of national and international staff members funded by polio partnership	No. of laboratories		Reported ADP and confirmed polio cases					Reported suspected and confirmed measles cases				
				Poliovirus	Measles	No. and rate* of AFP cases (nonpolio AFP)		AFP with adequate † specimens tested		No. of laboratory-confirmed cases	No. of clinically suspected measles cases	No. of clinically suspected cases tested		No. of laboratory-confirmed measles cases	
						No.	Rate	No.	(%)			No.	(%)	No.	(%)
Africa	46	28	780	16	34	8,181	2.6	7,199	(88)	446	262,314	14,583	(6)	3,543	(24)
Americas	44	44	1	9	178	2,229	1.3	1,805	(81)	0	34,766	33,028	(95)	105	–
Eastern Mediterranean	22	22	806	12	20	5,290	2.4	4,761	(90)	113	52,882	8,619	(16)	4,650	(54)
Europe	39	2	15	48	60	1,529	1.2	1,269	(83)	0	27,158§	7,904	(29)	737	(9)
Southeast Asia	11	10	1,087	16	16	11,289	1.9	9,369	(83)	225	83,862	1,083	(1)	506	(47)
Western Pacific	36	25	17	44	382	6,397	1.4	5,629	(88)	0	101,810	n/a		13,193	
WHO headquarters	–	–	45	–	–	–	–	–	–	–	–	–	–	–	–
Total	**198**	**131**	**2,752**	**145**	**690**	**34,915**		**30,032**	**(86)**	**784**	**562,792**	**65,217**		**22,734**	

* Annual number of nonpolio AFP cases per 100,000 population aged ≤ 15 years.
† Two specimens collected 24 hours apart within 14 days of onset of paralysis, arriving in the laboratory in good condition.
§ Expanded Program on Immunization monthly surveillance data.

USING AFP SURVEILLANCE INFRASTRUCTURE IN RESPONSE TO OTHER OUTBREAKS

Nigeria used the AFP surveillance infrastructure and resources to respond to the Ebola outbreak in 2014. Surveillance teams identified 894 Ebola case contacts, and completed nearly 19 000 contact tracing visits. As a result, transmission from at least 20 cases of Ebola virus disease was halted, preventing a massive outbreak in the country.

Active surveillance as conducted for AFP can be used as a response method for various other diseases and outbreaks. Every case in an outbreak of Ebola or Severe Acute Respiratory Syndrome (SARS) requires detection and response in a timely manner, and active AFP surveillance offers the great advantage of providing this capacity.

BEST PRACTICES FOR MONITORING AND EVALUATING AFP SURVEILLANCE

RESPECTING THE RAPID ASSESSMENT PROTOCOL FOR AFP SURVEILLANCE (see Annex 6)

A rapid assessment of AFP surveillance can be carried out over a short period (five days) by a limited number of participants, usually an external team of 3–5 persons plus national counterparts. If the country wants to include measles, neonatal tetanus and other diseases in its surveillance system, these activities can also be reviewed.

Objectives

The aims of monitoring and evaluating AFP surveillance are:

- to assess the capacity of the existing AFP surveillance system to detect poliovirus circulation in a timely manner;
- to make specific recommendations on how to ensure and maintain high-quality AFP surveillance at all administrative levels, focusing on what may need immediate and urgent action.

Method

The review is conducted at the national, provincial and district levels. Up to five teams of external and national members are formed to review the information and data concerning the AFP surveillance system. Team members also interview key government officials and individuals involved in the Expanded Programme on Immunization and the GPEI, including the:

- Reference Polio Laboratory;
- National Certification Committee;
- National Expert Review Committee;
- National Task Force on Laboratory Containment.

Sites to be visited

The review includes visits to:

- major cities/municipalities;
- high-risk border areas;
- a mix of high-performing and low-performing provinces;
- within each province, province, district and health centres, targeting the main hospitals and high-risk zones.

Assessment at each site

The assessment must include a review of:

- the routine AFP surveillance policies and the staff's knowledge;
- the system for detecting AFP cases (active surveillance, reporting network, prioritization, training sessions, weekly reporting, zero reporting, knowledge of the surveillance network);
- the registry pertaining to the detection of any unreported cases;
- the system for responding to detected AFP cases (case investigation, stool collection and transportation, reporting of results);
- the analysis of AFP surveillance performance (indicators and data documentation).

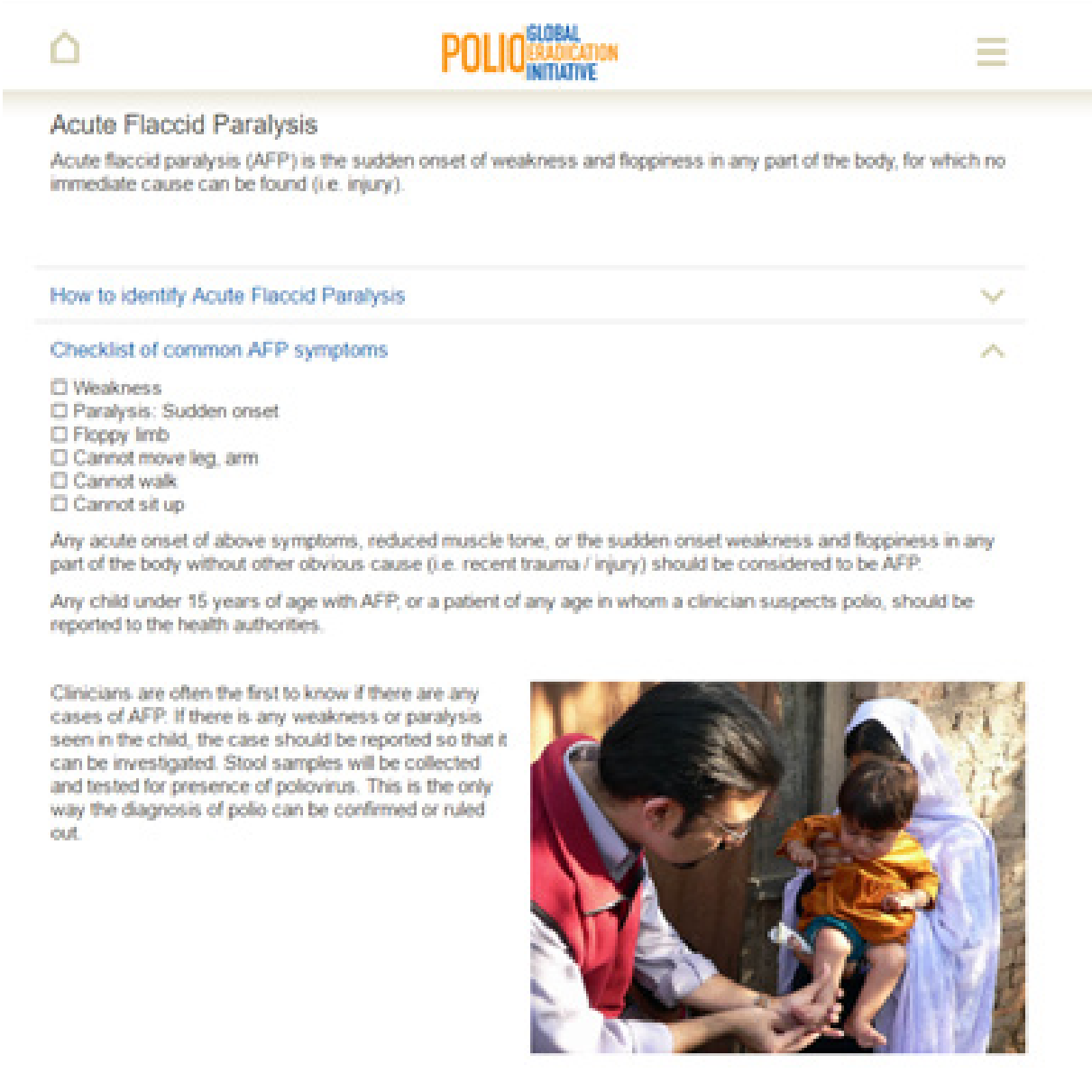
Output

The assessment concludes with a report detailing the findings on the AFP surveillance system, including its strengths and weaknesses. Recommendations will be prioritized and presented to the national authorities responsible for surveillance and polio eradication.

BEST PRACTICES FOR APPLYING NEW TECHNOLOGY FOR AFP SURVEILLANCE

USING A MOBILE PHONE APPLICATION TO TRAIN SURVEILLANCE PERSONNEL

The mobile phone application to train surveillance personnel is available in three languages. A screenshot appears below:



USING MOBILE PHONES FOR DATA COLLECTION IN THE FIELD

Some countries are now using Open Data Kit (ODK), a programme for real-time data collection on mobile phones. ODK is a free and open-source set of tools that allows the collection and management of data from the field. The programme can be used to:

- collect surveillance data on a form in excel spreadsheet (XLS) format using the software installed on the mobile phone;
- send the data by phone to a server;
- aggregate the collected data on a server and extract it in useful formats;
- add GPS locations and photos.

The software company, Nafundi, designs forms that can be used with ODK and installed on mobile phones. They are in Microsoft excel format so the forms can be created on any computer and uploaded to mobile phones. An aggregate programme can then be installed on any server or in the cloud for data analysis. (See http://nafundi.com/services/.)

For the programme to function reliably, arrangements should be made with mobile phone service providers to ensure the phone costs are not borne by the vaccinators.

The same level of supervision is needed as with a paper-based system to ensure accuracy, reliability and the retention of mobile phones.

CONCLUSION

Active surveillance for AFP was created to meet the needs of polio eradication, ensuring that every case is detected, investigated with laboratory confirmation and followed by an appropriate immunization response. As the active surveillance network has expanded, it has reached the community level with thousands of informers who are not employed by a health service making major contributions by detecting and reporting AFP cases.

In some areas, active surveillance is conducted through proactive hospital medical practitioners who investigate AFP cases and work closely with their local surveillance and reporting site. Where there are no health facilities, informers, who may be faith healers or other unqualified practitioners, will detect AFP cases in children who consult with them, and report the details to their local surveillance staff who will then conduct an investigation.

The technical advances in poliovirus surveillance have been significant, assisted by the Global Polio Laboratory Network, which has created a global genetic map of the poliovirus, allowing the origin of viruses and reservoirs of transmission to be identified and eliminated. Technology has also made major contributions through mobile phone communication, facilitating the rapid sharing of information and locating cases precisely with GPS.

Active surveillance for AFP succeeds when information is collected and shared quickly. It has brought clinical, public health and laboratory branches of health services together in ways that never existed before. Each depends on the timely action and close collaboration of the other, forming a global network that publishes surveillance data from every country on a weekly basis.

It can be argued that such a large-scale active surveillance network is only needed for an eradication programme. Yet active surveillance is essential in many circumstances. New communicable disease outbreaks, such as SARS and Ebola, must also be rapidly contained and every new case recognized. Countries affected by such outbreaks have benefited from their active AFP networks, and will continue to do so in the future.

ANNEX 1
STEPS FOR SETTING UP ACTIVE SURVEILLANCE FOR AFP

1. Arrange discussions with senior ministry of health officials:
   a. discuss which diseases should be subject to active surveillance, such as those that require immediate reporting and for which eradication, elimination and control measures are well established, including AFP, measles and neonatal tetanus, and other diseases subject to outbreaks, including cholera, dengue, diphtheria and pertussis;
   b. keep the list short to avoid overloading active surveillance staff.

2. Discuss the role of each department or institution to ensure those usually involved in surveillance continue to have a role:
   a. make the selected diseases subject to immediate report, investigation and response;
   b. define the responsibilities of each department or institution involved in active surveillance;
   c. clarify the purposes and responsibilities of the health information service and the communicable disease surveillance service;
   d. designate national and provincial staff who are ready to conduct immediate investigation of suspected outbreaks;
   e. include responsibilities for travel to conduct timely investigations.

3. Decide on key responsibilities under active surveillance for AFP and other selected diseases:
   a. assign surveillance staff to visit hospitals, identify suspected cases, report back immediately and investigate cases;
   b. ensure laboratory investigation confirmation is carried out by designated national laboratories;
   c. make sure outbreak investigation and response is shared with the Communicable Disease Surveillance Centre and institute staff who should be prepared to travel together as part of a core response group;
   d. involve health information departments in the publication of the regular reports.

4. Establish standards for the following:
   a. case definitions;
   b. case investigation forms;
   c. immediate reporting procedures;
   d. communication procedures for immediate reports and zero reports;
   e. routines for active surveillance hospital visits;
   f. outbreak investigation forms and procedures;
   g. response activity procedures;
   h. response logistics forms;
   i. specimen collection and transport protocols;
   j. laboratory procedures;
   k. report monitoring form.

5. Assign surveillance staff at the central and peripheral levels to form a national active surveillance network.

6. Train and monitor active surveillance staff.

7. Plan orientation sessions for hospital staff, physicians and nurses to communicate the requirements for active surveillance.

8. Establish communication by mobile phone between health facility focal points and surveillance staff to facilitate the timely reporting and investigation of new cases.

9. Designate health facilities as reporting sites for active surveillance:
   a. begin active surveillance for AFP at accessible national hospitals, preferably at a central level, with a schedule based on the workload and other factors, including the presence of emergency facilities, the number of children aged under 15 years using the hospital, the availability of paediatric and neurological facilities, etc.;
   b. expand the active surveillance network gradually to include all provincial hospitals;
   c. add district-level facilities later where appropriate and where the capacity exists;
   d. decide on a schedule for the frequency of visits to reporting sites;
   e. add other diseases to AFP during the surveillance staff's weekly visits; inform health facilities that active surveillance is being expanded to include other diseases and that this will not interfere with their usual function.

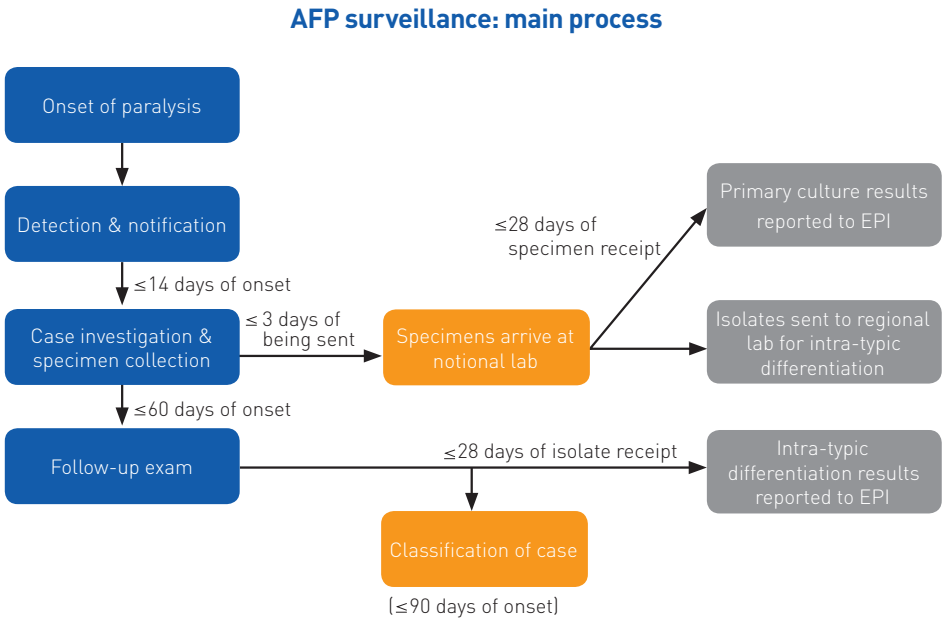
10. Set up an active surveillance monitoring system to check completeness and timeliness.

11. Establish a communicable disease bulletin; determine content, format and frequency of publication, and distribute it widely, including to private practitioners.

12. Establish designated laboratories to investigate sample specimens.

ANNEX 2
PERFORMANCE INDICATORS FOR AFP SURVEILLANCE

Figure A2.1. Acute flaccid paralysis surveillance: main process



EPI: Expanded Programme on Immunization

INDICATORS OF SURVEILLANCE PERFORMANCE

- **Completeness of reporting**

At least 80% of expected routine (weekly or monthly) AFP surveillance reports should be received on time, including zero reports in which no AFP cases are detected. The distribution of reporting sites should be representative of the country's geography and demography.

- **Sensitivity of surveillance**

At least one case of non-polio AFP should be detected annually per 100 000 population aged under 15 years. In endemic regions, this rate should be two per 100 000 to ensure even higher sensitivity.

- **Completeness of case investigation**

All AFP cases should have a full clinical and virological investigation, and at least 80% of AFP cases should have "adequate" stool specimens. Adequate stool specimens are two stool specimens of sufficient quantity for laboratory analysis, collected at least 24 hours apart, within 14 days after the onset of paralysis, and arriving at the laboratory by reverse cold chain and with proper documentation.

- **Completeness of follow-up**

At least 80% of AFP cases should have a follow-up examination for residual paralysis 60 days after the onset of paralysis.

- **Laboratory performance**

All AFP case specimens must be processed in a WHO-accredited laboratory within the Global Polio Laboratory Network.

ANNEX 3
AFP CASE INVESTIGATION FORM

Acute Flaccid Paralysis
CASE INVESTIGATION FORM

EPID Number:
IND - ___ - _____ - _____ - _____
(matches Lab Request Form)

1. Notification / Investigation Information:

Date Case Notified: ____ /____ / ____ Notified by: _____ Title: _____

Date Case Investigated: ____ / ____ / ____ Investigated by: _____ Title: DIO/Medical Officer/ Nodal Officer/ SMO/ Other

Date Case Investigated by SMO: ____ / ____ / ____ Name of SMO: _____

Notifying Health Facility: **Type** : RU/ Informer/ Other **Category**: VHP/ HP/ LP/ Other **Setup**: Govt. Allopathic/ Pvt Allopathic/ ISM Pract./ Quack/Others

2. Case Identification: Patient's Name: _____ other given names: _____

Sex: ____ Date of birth: ____/ ____/ ____ Age (at onset): years_____ months_____

Father's Name: _____ Mother's Name: _____

Father's Occupation: _____ Grand father's Name: _____

Address: _____ Religion: Muslim / Hindu / Other Caste: _____

Landmark: _____ Village / Mohalla: _____ HRA: Y / N

Block /Urban area: _____ District: _____ Setting: Urban / Rural

State: _____ Tel. _____

Child belongs to migratory family/Community : Yes/ No/ Unknown If yes, specify: Slum with migration/ Nomad/ Brick Kiln/ Construction site/ Others (specify): _____

3. Hospitalization: Yes / No Date of Hospitalization: ___/___/___

Name of Hospital: _____ Diagnosis as per hospital records, if any: _____

4. Immunization History: a. OPV doses received through routine EPI (before onset): _____

b. OPV doses received through SIAs (before onset): _____ Total OPV doses (a+b): _____

Date of last dose of OPV (before onset): ____/ ____/____ (to be filled in linelist)

Date of last dose of OPV (before stool collection): ____/ ____/____ (to be filled in LRF)

5. Clinical Symptoms: Date of Paralysis Onset: ____/____/____

Number of days from onset to maximum paralysis: _____

Acute paralysis: Yes / No / Unknown Flaccid paralysis (anytime during course of illness) Yes/ No/Unknown

Any Injections during 30 days before paralysis onset: Yes / No / Unknown If Yes, side and site of injection _____

Fever on day of paralysis onset: Yes / No / Unknown

Ascending paralysis: Yes / No / Unknown Descending paralysis: Yes / No / Unknown

6. Clinical history: (write evolution and progression of illness)

Respiratory involvement: Yes/ No
Bulbar involvement: Yes/ No
Bladder/bowel: Yes/ No
Joint pain/Swelling: Yes/ No
Gait:

7. Travel history: Travel of child within 35 days prior to onset of paralysis (indicate dates and place of travel with arrows on dateline)

Write dates of travel: **Day of onset**

35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1 0

Write here places visited corresponding to the travel dates

Requires cross notification? Yes / No

If yes, date of cross notification:

District of residence: _____

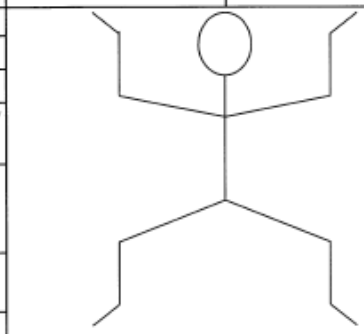
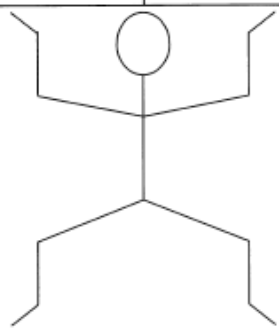
Block/ Urban area of residence: _____

8. History of contacts with healthcare providers after the date of paralysis onset (including the notifying health facility):

Name & address of Hospital/ doctor/ quack:	1	2	3	4
Dates case visited:				
Already RU/informer?	Yes/No	Yes/No	Yes/No	Yes/No
Did they report this case?	Yes/No	Yes/No	Yes/No	Yes/No
Action taken by SMO / Date of visit by SMO				

CIF contains two pages, both pages must be filled for all AFP cases

CIF (Page 2) **EPID No.:** IND - ____ - _____ - _____ - _____

9. Clinical examination:	**Initial case investigation; Date:** _____		**60-day follow-up; Date:** _____	
	Examined by : _____		**Examined by :** _____	
Tone: (normal/↑/↓)	**UL**: Right:	**LL**: Right:	**UL**: Right:	**LL**: Right:
	Left:	Left:	Left:	Left:
Power: (Grade 0 to 5) *0 - No Contraction* *1 – Flicker of contraction* *2 – Active movement with gravity eliminated* *3 – Active Movement against gravity but no resistance* *4 - Active Movement against resistance* *5 – Normal*				
Reflexes:	**N/ ↑/ ↓/ absent/ uncooperative child**	**N/ ↑/ ↓/ absent/ uncooperative child**	**N/ ↑/ ↓/ absent/ uncooperative child**	**N/ ↑/ ↓/ absent/ uncooperative child**
Biceps:	Right	Left	Right	Left
Triceps:	Right	Left	Right	Left
Supinator:	Right	Left	Right	Left
Knee jerk:	Right	Left	Right	Left
Ankle jerk:	Right	Left	Right	Left
Plantar:	Right: *flexor / extensor/ Uncooperative child*	Left *flexor / extensor/ Uncooperative child*	Right *flexor / extensor/ Uncooperative child*	Left: *flexor / extensor/ Uncooperative child*
Circumference: Mid-arm:	Right	Left	Right	Left
Fore-arm:	Right	Left	Right	Left
Mid-thigh	Right	Left	Right	Left
Mid-calf:	Right	Left	Right	Left
Cranial nerves affected	Right	Left	Right	Left

Sensation loss: Yes / No / Unknown Asymmetrical paralysis: Yes / No / Unknown Hot AFP case: Yes / No

Site(s) of Paralysis: right arm / left arm / right leg / left leg / neck / bulbar / respiratory muscle / trunk / facial/ other_____

10. Provisional diagnosis:

Guillain-Barre Syndrome / Transverse Myelitis / Traumatic Neuritis / Transient Paralysis / Facial Palsy / other / Unknown If other, specify: _____

AFP case: Yes / No If No, reason for rejection: Injury / spastic paralysis / onset >6 months / congenital defect / other (specify)_____

If yes, case selection based on: Flaccid paralysis at the time of investigation / History of flaccid paralysis but no paralysis at the time of investigation / Borderline or ambiguous case

11. Contact stool: Was this case eligible for contact stool collection: Yes / No If yes, date collected: _____ / _____ / _____

12. Stool Specimen Collection:

	Date Collected	Date Sent	Date of Result	Condition	Laboratory Result (circle)					
Stool 1	___/___/___	___/___/___	___/___/___	Good / Poor	P1	P2	P3	Wild/Vaccine	NPEV	Negative
Stool 2	___/___/___	___/___/___	___/___/___	Good / Poor	P1	P2	P3	Wild/Vaccine	NPEV	Negative

If Stool Not Collected in 14 days why? Late Notification/ Late investigation/ Delay in stool collection/ Constipation/ Death/ Lost/ Other

13. Active Case Search and Outbreak Response:

Active case search in community done: Yes / No

ORI done: Yes / No If yes, date begun: ___/___/___ Additional AFP case found: Yes / No Number:_____

If no, why?_____ Date active case search conducted: ___/___/___

14. 60 Day Follow-up Examination: Not required / Yes / Death / Lost If died, date of death: ____/____/____

Date of follow-up: ____/____/____ Residual weakness present: Yes/No cause of death: _____

Site of weakness: right arm / left arm / right leg / left leg / neck / bulbar / respiratory muscle / trunk / facial/other _____

15. Final Classification: Confirmed Polio / Compatible / Discarded

If compatible, why? _____

If discarded, what was the final diagnosis:

Guillain-Barre Syndrome / Transverse Myelitis / Traumatic Neuritis / Transient Paralysis / Facial Palsy / other / Unknown If other, specify: _____

Use extra sheet of paper to write additional information, if any.

ANNEX 4
WEEKLY HOSPITAL REPORT

Form VPD-H002

ACUTE FLACCID PARALYSIS AND MEASLES SURVEILLANCE SYSTEM - WEEKLY HOSPITAL REPORT

After review of all wards and registry books, please send this report to the following person every Monday.

Name: _____

Address: _____

Fax: _____

Name of Reporting Hospital: _____ Year: _____

Week No. _____ Period included in the report: From: _____ To: _____

Number of cases Identified: AFP* _____ Suspected Measles** _____
If no cases were identified, write Zero (0)

Write the case details of AFP cases identified and reported this week

Patient's name and Father's name	Age in months	Sex	Address / Village name and landmark	Block name	District name

Fill up information on all Measles cases below:

Patient's name and Father's name	Age in months	Sex	Received measles vaccine (Y/N/U)#	Village name and landmark	PHC name	Block name	District name	Outcome: Died? (Y/N/U)#

Y=Yes, N=No, U=unknown

Name of person filling this report: _____

Date report sent to District: _____

Approval of Medical Director: _____

* All cases of AFP in children under 15 years of age should be reported and investigated per guidelines.
** All cases of suspected measles of any age should be reported and investigated per guidelines.

ANNEX 5
ACTIVE SURVEILLANCE VISIT FORM

Name of investigator and signature	
Name of facility visited	
Date of visit	
Type of facility (hospital , rehabilitation center)	
Director of fever hospital queried (signature)	
Hospital inpatient records searched (yes/no) Hospital outpatient records searched (yes/no)	
Chief of pediatric queried(signature) Pediatric inpatient records searched(yes/no) Pediatric outpatient records searched(yes/no)	
Medical Records Department (signature) inpatient records searched(yes/no) outpatient records searched(yes/no)	
Head of physical therapy queried (signature) Physical therapy records searched(yes/no)	
Intensive respiratory care unite (signature) Inpatient records searched (yes/no)	
Chief of neurology queried(signature) neurology inpatient records searched(yes/no) neurology outpatient records searched(yes/no)	
Total number of AFP cases found since last visit*	
Total number of these AFP cases unreported *	
Total number of (neonatal tetanus) cases found since last active visit Total number of these (neonatal tetanus) cases unreported	
Total number of (measles) cases found since last active visit Total number of these (measles) cases unreported	
Total number of (diphtheria) cases found since last active visit Total number of these (diphtheria) cases unreported	
Total number of (whooping cough) cases found since last active visit Total number of these (whooping cough) cases unreported	

ANNEX 6
MONITORING ACTIVE SURVEILLANCE VISITS

EXAMPLE OF A TABLE TO MONITOR ACTIVE SURVEILLANCE VISITS ON A WEEKLY AND MONTHLY BASIS

Weekly Reporting Site	**Week 1**			**Week 2**			**Week 3**			**Week 4**		
	Date visit planned	Date visit done	**# of AFP cases detected**	Date visit planned	Date visit done	**# of AFP cases detected**	Date visit planned	Date visit done	**# of AFP cases detected**	Date visit planned	Date visit done	**# of AFP cases detected**
Central Hospital	4 Jan	4 Jan	0	11 Jan	11 Jan	1	18 Jan	18 Jan	0	25 Jan	25 Jan	2
Paediatric Hospital	6 Jan	7 Jan	1	13 Jan	13 Jan	0	20 Jan	21 Jan	0	27 Jan	27 Jan	1
Private Hospital	8 Jan	7 Jan	0	15 Jan	17 Jan	0	22 Jan	23 Jan	0	29 Jan	30 Jan	0
Monthly Reporting Site	**Month 1**			**Month 2**			**Month 3**			**Month 4**		
	Date visit planned	Date visit done	**# of AFP cases detected**	Date visit planned	Date visit done	**# of AFP cases detected**	Date visit planned	Date visit done	**# of AFP cases detected**	Date visit planned	Date visit done	**# of AFP cases detected**
Health Centre 1	15 Jan	15 Jan	0	15 Feb	16 Feb	0	22 Mar	22 Mar	0	21 April	22 Apr	1
Health Centre 2	15 Jan	15 Jan	0	16 Feb	17 Feb	0	22 Mar	22 Mar	0	21 April	23 Apr	0
Informant 1	21 Jan	22 Jan	0	21 Feb	23 Feb	0	16 Mar	16 Mar	0	16 April	18 Apr	0
Informant 2	22 Jan	22 Jan	1	22 Feb	22 Feb	0	18 Mar	19 Mar	0	18 April	18 Apr	0

ANNEX 7A
ASSESSING SURVEILLANCE AT THE PROVINCIAL AND DISTRICT LEVELS

Name of respondent:	Province/District:
Designation:	Date of visit:

These forms can be adapted to suit country circumstances.

A: General background

Number of AFP cases reported:	_____	Write in data for last two years
Number of measles cases reported:	_____	
Number of neonatal tetanus cases reported:	_____	
Number of reporting sites:	_____	
Number of reporting sites sending weekly/monthly reports:	_____	
Number of reporting sites sending complete reports:	_____	
Are district staff involved in surveillance activities?	Yes/No	
Investigating cases?	Yes/No	
Supervising specimen collection?	Yes/No	
Visiting reporting units?	Yes/No	
Performing active case searches?	Yes/No	
Analysing data?	Yes/No	

B: Assessment of reporting network

Are there an adequate number of reporting sites?	Yes/No	
How many reporting sites are there?	_____	
Are the reporting sites geographically distributed to cover the whole province/district?	Yes/No	
Are reporting sites prioritized?	Yes/No	
Is the private sector involved in reporting cases of vaccine-preventable diseases?	Yes/No	
Are specialized doctors (neurologist, paediatric neurologists) part of the network?	Yes/No	
Is there adequate representation from traditional healers and/or informal practitioners in the reporting network?	Yes/No	
Are there institutions/doctors/informal practitioners that should be included in the network?	Yes/No	
Should the network be expanded?	Yes/No	
Are active case searches being performed?	Yes/No	
If so, are they adequate?	Yes/No	
Are reporting sites getting regular written feedback in a standard form?	Yes/No	
Are copies of the feedback forms available at the province/district office?	Yes/No	

C. Assessment of vaccine-preventable disease (VPD) surveillance documentation, data analysis and mapping/charting

Does the province/district have the following documents:		
All Case Investigation Forms – serially filed and updated?	Yes/No	
Line list (updated)?	Yes/No	
List of reporting sites (prioritized)?	Yes/No	
Documents showing timeliness and completeness from reporting sites?	Yes/No	
Documents showing transmission ofroutine reports from province/district tonational level?	Yes/No	
Documents showing active case searchesconducted by province/district authoritythis year and previous year?	Yes/No	
All Case Investigation Forms of cross-notified cases in/out of the province/district?	Yes/No	
Maps showing subdistricts?	Yes/No	
Spot maps of VPD cases?	Yes/No	
Dose the province/district line list match the national line list?	Yes/No	
Is it updated?	Yes/No	
Is regular analysis of VPD surveillance taking place?	Yes/No	
Are province-/district-level indicators being calculated for AFP, measles and neonatal tetanus?	Yes/No	
Is the quality of the analysis good? Adequate?	Yes/No	
Is the analysis used for action? Active case searches? Prioritizing reporting site visits? Planning training?	Yes/No	
Are any VPD cases reported late?	Yes/No	
How many?	_____	
Was any corrective action taken?	Yes/No	

ANNEX 7B
ASSESSING SURVEILLANCE AT THE HEALTH FACILITY LEVEL

Name of respondent:	Province/District:
Designation:	Date of visit:

Number of times the facility was visited by next level for active surveillance in last 12 months.		
Approximate interval between active case searches (give a range in weeks or months).		
Has a focal point for surveillance been identified at this reporting site?	Yes/No	Meet with surveillance focal point
Are focal points/doctors aware of vaccine-preventable disease (VPD) surveillance (AFP/measles/tetanus)?	Yes/No	Discuss VPD surveillance with relevant doctors.
Are doctors in all relevant departments involved sufficiently?	Yes/No	
Paediatrics?	Yes/No	
Medicine?	Yes/No	
Orthopaedics?	Yes/No	
Neurology?	Yes/No	
Intensive care unit?	Yes/No	
Emergency/Casualty?	Yes/No	
Medical records?	Yes/No	
When was the last AFP case reported from this health facility?	_____	
How many AFP cases were reported from this health facility in the last two years?	_____	
Did this health facility receive feedback and lab reports from the reported cases?	Yes/No	
Do nodal officers/doctors understand fully the requirements of VPD surveillance (AFP/measles/tetanus)?	Yes/No	Are there any unmet training needs? Suggest ways to improve training.
Are case definitions clearly understood by all doctors (AFP/measles/tetanus)?	Yes/No	
Are nodal officers/doctors trained in VPD surveillance?	Yes/No	
When was the last training held?	_____	Month/Year

Number of times the facility was visited by next level for active surveillance in last 12 months.		
Approximate interval between active case searches (give a range in weeks or months).		
Are there systems of internal communication between the nodal officer and doctors?	Yes/No	Was there any breakdown in communication?
Are all VPD cases that meet the case definition being reported?	Yes/No	
Are the mechanisms for VPD case reporting proper and well established? Are there any delays in notification of cases?	Yes/No	List reasons for delays.
Are VPD surveillance reports sent regularly (weekly/monthly)? Are copies of reports available?	Yes/No Yes/No	Check copies of weekly/ monthly reports.
Are active case searches conducted at this site regularly? If "yes", by whom? Is this frequency adequate? Are all departments/wards searched every time?	Yes/No _____ Yes/No Yes/No	
Are there special registers for VDP cases (AFP/measles/tetanus)? Are any unreported VPD cases found in this reporting unit?	Yes/No Yes/No	 Perform active case search and note outcome.
Are the requirements for specimen collection understood? Are the collection and shipment procedures followed? Are the kits/forms/cold-chain equipment available? Is there an assigned place to store specimens before shipment?	Yes/No Yes/No Yes/No Yes/No	
Are VPD posters, calendars and newsletters available?	Yes/No	
Does this reporting unit get regular written feedback from the next level? Are copies of the feedback available?	Yes/No Yes/No	Check feedback forms. Does feedback reach all relevant persons?

Additional notes

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