POLIO GLOBAL ERADICATION INITIATIVE

World Health Organization

STANDARD OPERATING PROCEDURES

RESPONDING TO A POLIOVIRUS EVENT OR OUTBREAK

VERSION 3.1 MARCH 2020

POLIO GLOBAL ERADICATION INITIATIVE

World Health Organization

STANDARD OPERATING PROCEDURES

RESPONDING TO A POLIOVIRUS EVENT OR OUTBREAK

Version 3.1 March 2020

Published by the World Health Organisation (WHO) on behalf of the Global Polio Eradication Initiative (GPEI)

Standard operating procedures: responding to a poliovirus event or outbreak, version 3.1

ISBN 978-92-4-000299-9 (electronic version)
ISBN 978-92-4-000300-2 (print version)

Suggested citation. Standard operating procedures: responding to a poliovirus event or outbreak, version 3.1. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO.

Cataloguing-in-Publication (CIP) data. CIP data are available at http://apps.who.int/iris.

Printed in Switzerland

Design by Inis Communication – www.iniscommunication.com

Contents

Acronyms and abbreviations

AFP	acute flaccid paralysis
C4D	Communication for Development
EOC	emergency operations centre
EOMG	Eradication and Outbreak Management Group
ES	environmental surveillance
fIPV	fractional dose inactivated polio vaccine
GIS	geographic information system
GPEI	Global Polio Eradication Initiative
GPLN	Global Polio Laboratory Network
IDSR	Integrated Disease Surveillance and Response
IHR	International Health Regulations (2005)
IM	independent monitoring
IPV	inactivated polio vaccine
LQAS	lot quality assurance sampling
NGO	nongovernmental organization
NPAFP	non-polio acute flaccid paralysis
NPENT	non-polio enterovirus
OBRA	outbreak response assessment
OPRTT	Outbreak Preparedness and Response Task Team
OPV	oral polio-containing vaccine
bOPV	bivalent OPV (contains Sabin types 1 and 3)
tOPV	trivalent OPV (contains Sabin types 1, 2 and 3)
mOPV2	mOPV2 monovalent OPV (contains Sabin type 2)
RED	Reaching Every District
RI	routine immunization
RR	rapid response
SAGE	Strategic Advisory Group of Experts on Immunization
SIA	supplementary immunization activities
SIAD	short interval additional dose
SOPs	standard operating procedures
SR	surge response
STOP	Stop Transmission of Polio
UNDSS	United Nations Department of Safety and Security
UNICEF	United Nations Children's Fund
VDPV	vaccine-derived polio virus
aVDPV	ambiguous vaccine-derived polio virus
cVDPV	circulating vaccine-derived polio virus
iVDPV	immunodeficiency related vaccine-derived polio virus
WHE	WHO Health Emergencies
WHO	World Health Organization
WPV	wild poliovirus
WPV1	type 1 wild poliovirus
WPV2	type 2 wild poliovirus
WPV3	type 3 wild poliovirus

1 Overview

Background

As of July 2018, three countries remain endemic for type 1 wild poliovirus (WPV1): Afghanistan, Nigeria and Pakistan. In 2015, type 2 WPV (WPV2) was declared eradicated, and type 3 WPV (WPV3) was last reported in November 2012. In 2016, type 2 oral polio-containing vaccine was withdrawn from all routine immunization programmes worldwide, replacing trivalent oral polio vaccine (tOPV) containing attenuated poliovirus vaccine serotypes 1, 2 and 3 with bivalent oral polio vaccine (bOPV) containing only types 1 and 3.

While efforts to eradicate WPV1 continue in endemic countries, the world needs to be prepared for the international spread of WPV, and for vaccine-derived poliovirus (VDPV) of serotypes 1, 2 or 3, which can also still emerge in different contexts. Poliovirus events or outbreaks may arise due to a number of possible factors, including low population immunity, importation of virus, or a containment breach from laboratory or vaccine manufacturing facilities.

Purpose

The purpose of these standard operating procedures (SOPs) is to offer policy guidance and to provide performance standards on how to respond to any type of poliovirus outbreak or event in a timely and effective manner, and specifically, to stop an outbreak within 120 days.

This guide is for national governments and public health decision-makers who coordinate responses to poliovirus events and outbreaks, and their global, regional and country-level partners.

Scope

These Global Polio Eradication Initiative (GPEI) SOPs establish response standards and timelines for actions to stop transmission when WPV spreads to a non-endemic country, or when VDPV events and/or outbreaks of any type (VDPV1, VDPV2 or VDPV3) are detected in any context, whether a new emergence or previously undetected circulating vaccine-derived poliovirus (cVDPV).

The SOPs summarize the roles and responsibilities of countries and GPEI partners during a polio outbreak or event. Since WPV2 is now considered an eradicated pathogen, specific measures are outlined for responding to type 2 events and outbreaks, including how to request and account for monovalent oral type 2 polio vaccine (mOPV2) from the global emergency vaccine stockpile.

Guidance in these SOPs relies on scientific evidence and expert consensus, while remaining grounded in operational realities and the context of waning global immunity to type 2 poliovirus. Critical aspects of the SOPs result from broad consultation of expert advisory groups, including the World Health Organization (WHO) Strategic Advisory Group of Experts (SAGE) on immunization, and endorsement by the GPEI Eradication and Outbreak Management Group.

These SOPs do not cover: WPV1 case response due to local transmission in an endemic context, field-level operational guidance or tools for planning high-quality supplemental immunization activities (SIAs), or detailed methods for enhanced surveillance.

What's new in this version

This document updates the most recent version of the Standard Operating Procedures: Responding to a poliovirus event or outbreak", Version 3, published January 2019. Version 3.1 incorporates lessons learned from outbreak response efforts and takes into account the current context of the global program.

Revisions are highlighted throughout the document and summarized below.

1. Revisions to Type 2 Vaccination Response Scope

While the number of cVDPV2 outbreaks due to pre-switch use of tOPV has declined as expected, the number of new emergences sharply increased starting in the second half of 2018, and in 2019 is now far higher than anticipated at the time of cessation. New emergences have been concentrated around areas of recent mOPV2 use in sub-Saharan Africa, but recent outbreaks confirmed in other regions of the world (e.g. Western Pacific and Eastern Mediterranean) demonstrate additional risk elsewhere.

Continuation of outbreaks requires improvements in the timeliness and quality of outbreak response so that any ongoing transmission in mOPV2 response zones is stopped. Additionally, the sharp increase in cVDPV2 outbreaks is possibly as a result of population movement of recently vaccinated children into areas with low population immunity or errant use of mOPV2 outside of response zones. This trend is likely to intensify in the coming year, as more mOPV2 is used in response to new and ongoing outbreaks while mucosal immunity to Type-2 poliovirus continues to decline.

Outbreaks of cVDPV2 will still require use of mOPV2, which remains the only tool capable of stopping the outbreaks in areas with poor sanitation. However, use of mOPV2 will continue to risk the generation of new outbreaks, until an alternative vaccine which does not generate new outbreaks becomes available. In the interim, a revised response strategy for detections of VDPV2 will be needed, balancing the increased risk of cVDPV2 spread and increased risk of mOPV2 use.

Since the number of VDPV1 and VDPV3 outbreaks continues to be minimal and there is less risk associated with bOPV vaccine used in SIA response, the recommendations for these outbreaks should proceed as outlined in version 3.

Details of the revisions are provided within the relevant text of the "Chapter 7 Vaccination Response". However, **for response to VDPV2 only**, the key proposed changes are summarized below:

Version 3	Version 3.1	Comment
Conduct rapid (<14 days) focused response of 200–500k children for SIA Round 0	Conduct rapid (<14 days) focused response of **100–400k** children for R0	Initial response (R0) should be rapid, focused, and small scale; the intent should be to maximize quality in high-risk areas near the detection. If it cannot be conducted quickly (within three weeks), the country team may consider proceeding directly with SIA1 and its appropriate target population as per below. This decision should be made in consultation of GPEI partners.
Response scope for cVDPV2 should be 1–2 million* children for R1 and R2	Response scope for newly infected areas with cVDPV2 should be R0 (100 – 400k), R1, R2 **(1-4 million* children) and mop up** For additional cVDPV2 detections (regardless whether related to an already established or new) in areas where >_ 2 mOPV2 SIAs beyond R0 have been conducted **within the last 6 months,** conduct at least 2 additional SIAs but reduce scope to <2 million. For **additional cVDPV2 detections** (regardless whether related to an already established or new) in areas where ≥ 2 mOPV2 SIAs beyond R0 have been conducted **more than 6 months ago,** response scope should be R0 (100 – 400k), R1, R2 (1-4 million* children) and mop up	Potentially increase response size for R1 and R2 (ideally when quality can be supported by adequate technical assistance) in order to improve the chance of rapidly stopping transmission. Breakthrough transmission in prior response zones may indicate low quality in the initial SIAs and signify a requirement for further technical assistance. Additional SIAs in these areas are reduced in size to allow quality improvements in known transmission areas and to reduce the potential for further vaccine-derived poliovirus emergence.

Version 3	Version 3.1	Comment
Detection of aVDPV2 (single isolation) does NOT require an immediate vaccination response unless deemed to be found in a high-risk scenario (See chapter 5, Risk Assessment).	Detection of a newly emergent single VDPV2 (e.g. aVDPV) **in an area with mOPV2 use within the last 12 months** does **NOT** require an immediate vaccination response unless deemed to be found in a high-risk scenario due to virology, context, or potential international spread^	Version 3.1 shifts the default for aVDPV2 detection to trigger a SIA response since the vast majority of aVDPV2s found in sub-Saharan areas without recent mOPV2 use in end-2018 and 2019 have proceeded to become cVDPV2s. Local circumstances may require exceptions that should be discussed with GPEI partners.
	Detection of a newly emergent single VDPV2 (e.g. aVDPV) **in an area without mOPV2 use within the last 12 months** requires an immediate vaccination response of 100-400k children unless the epidemiology and program situation are deemed to require further assessment.	Detection of aVDPVs in areas without prior mOP2 use in the last 12 months should trigger the same number of SIAs (e.g. R0 + R1 + R2) as for a cVDPV2 but initially on a reduced scale. Maintain highly targeted response around the aVDPV detection unless additional surveillance/assessment determines ongoing community transmission in the same area which would signify the possible necessity to expand the scope.
	Response scope for additional R1 and R2 for these detections may be reduced to **100–400k; however**, additional SIAs with increased scope should be conducted if evidence of further transmission (i.e. confirmed cVDPV2) is obtained.	

*All response sizes are general recommendations and should be based on local epidemiology and other risk factors determined through a local assessment and in consultation with GPEI partners. ^See SOP, V3, Table 3 for details.

NOTE: The proposed total number of responses SIAs has not changed. Two campaigns must still 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.

Other revisions include:

2. Correction on the **IHR notification process** (Chapter 4) and additional information on IHR criteria to assess countries as no longer being infected by WPV or cVDPV2 (Chapter 11)

3. **Clarification on AFP contact sampling and Targeted healthy children stool sampling** including how and under what circumstances they should be conducted (Chapter 4).

4. Due to improvement of global vaccine supply, recommendations for **IPV use in an outbreak setting** and the process for requesting IPV has been updated (Chapter 7).

5. The **scope and timing of Outbreak Response Assessments (OBRAs)** have been revised to reflect changes in the program and after feedback from WHO and UNICEF regional and country teams (Chapter 11).

Supporting documents

Resources referenced in these SOPs are available on the GPEI website (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/) and/or are listed in the bibliography.

2 Strategic response framework

This framework guides national responses to poliovirus events or outbreaks, providing the basis for coordination and collaboration among partners, to ensure that national polio response activities are fully supported.

Below are the essential elements to a successful response to a polio event or outbreak:

i) Fully engaged national and subnational governments
ii) Rapid detection, notification, investigation and risk assessment
iii) Strong advocacy, communication and social mobilization
iv) A robust immunization response, where indicated
v) High-quality and enhanced surveillance.

All countries must plan for the eventuality of a poliovirus importation or local detection, particularly those with low immunization coverage and those at risk of importation, or those with facilities that handle the poliovirus (e.g. laboratory, research, vaccine manufacturing facilities). A preparedness plan should be developed and tested in a polio outbreak simulation exercise to ensure that public health personnel and emergency systems are prepared to react quickly and effectively if any poliovirus isolate is detected. Countries with high-risk populations and/or facing conflict, insecurity or access challenges must consider how to prioritize these populations and areas, adapting strategies to the local context.

3 Poliovirus events and outbreaks

Definitions

Poliovirus isolates detected in persons or in the environment can fall into three major categories: wild, Sabin and Sabin-like, or vaccine-derived. New detection of a poliovirus isolate may constitute an emergency, which can be categorized as an event or an outbreak, depending on characteristics of the isolate and the context in which it appears (see below).

1. **Wild polioviruses**. At this stage of the eradication programme, each case or isolate of wild poliovirus requires rigorous review as it may represent an importation, a local containment breach, or ongoing transmission in endemic countries.
2. **Sabin virus**. Sabin virus is the live attenuated poliovirus in oral polio vaccine (OPV). This category also includes Sabin-like polioviruses, which are those genetically very closely related to the strains in OPV but that have not yet diverged sufficiently to meet the definition of a vaccine-derived virus (see below). Sabin and Sabin-like viruses are commonly detected following vaccination with OPV.[a]
3. **Vaccine-derived polioviruses** (VDPVs). In under-immunized populations, if Sabin-like viruses continue to be transmitted from person-to-person they can continue to diverge genetically and eventually in rare instances become VDPVs, which may evolve and can eventually regain the ability to cause paralysis.

VDPVs are identified based on their degree of genetic divergence from the parent OPV virus strain. Viruses that are >1% divergent (i.e. ≥ 10 nucleotide changes, for types 1 and 3) or >0.6% divergent (i.e. ≥ 6 nucleotide changes, for type 2) from the corresponding OPV virus strain, are labelled as VDPV.[b]

Classification of vaccine-derived polioviruses

VDPVs are classified into three categories:

i) **Circulating vaccine-derived poliovirus (cVDPV)** is a VDPV demonstrating person-to-person transmission in the community, based on evidence from human and/or environmental detections of related viruses.

ii) **Immunodeficiency-related vaccine-derived poliovirus (iVDPV)** is a VDPV isolated from an individual with evidence of primary immunodeficiency. Unlike immunocompetent persons, who excrete the vaccine virus for a limited period, in rare cases immunodeficient persons may excrete a genetically diverged vaccine virus for an extended period of time after receiving OPV.

iii) **Ambiguous vaccine-derived poliovirus (aVDPV)** is a classification of exclusion when the investigation does not support classification as cVDPV or iVDPV. Isolates may be from persons with no known immunodeficiency or from an environmental sample, without evidence of circulation.

a Type 2 Sabin and Sabin-like virus should no longer be detected except where mOPV2 has recently been used for response. Any Sabin or Sabin-like type 2 virus outside this circumstance warrants urgent investigation.

b See "Classification and reporting of vaccine-derived polioviruses (VDPV)". Geneva: Global Polio Eradication Initiative; 2016 (http://polioeradication.org/wp-content/uploads/2016/09/Reporting-and-Classification-of-VDPVs_Aug2016_EN.pdf, accessed 8 November 2018).

These definitions are relevant to isolates of all poliovirus serotypes (i.e. 1, 2 or 3).

The GPEI guidelines, *Classification and reporting of vaccine-derived polioviruses*,[c] provide definitions and describes the laboratory and field epidemiological investigation needed to classify an isolate. Occasionally, investigation and genetic sequencing of a VDPV may take some time. A new isolate unrelated to any known VDPV is referred to as a VDPV "pending classification" and may require response measures. A previously classified virus may also be re-classified based on new information.

Event or outbreak

Table 1 categorizes new or continuing poliovirus isolation as an event or outbreak to help describe the extent of person-to-person transmission and determine an appropriate response. The term "outbreak" is reserved for situations with clear evidence of person-to-person transmission.

Events may evolve into outbreaks.

Defining "Day 0" for response monitoring

All poliovirus events and outbreaks will trigger the same set of response actions including; investigation, risk assessment, surveillance enhancement, strategic advocacy, and communication, with or without a vaccination response.

For the purpose of performance monitoring, a "Day 0" is defined so that progress of all response actions can be monitored against the standards set in these SOPs.

Day 0 is the day of receipt of the genetic sequencing laboratory result by WHO headquarters.

Previously isolated VDPVs, classified as ambiguous or pending classification, may be reclassified as circulating (i.e. an outbreak) if another related poliovirus is detected indicating evidence of transmission.

For outbreaks or medium to high-risk events (deemed to require a vaccination response), Day 0 remains the same for the purpose of operational response monitoring, even if new information confirming transmission becomes available.

In the case of a low-risk event without vaccination response, genetic sequencing information for new isolates may subsequently confirm transmission. In this case, consideration may be given by GPEI to adjust Day 0 to the date the new sequencing information is received.

c See "Classification and reporting of vaccine-derived polioviruses (VDPV)". Geneva: Global Polio Eradication Initiative; 2016 (http://polioeradication.org/wp-content/uploads/2016/09/Reporting-and-Classification-of-VDPVs_Aug2016_EN.pdf, accessed 8 November 2018).

Table 1: Definition of poliovirus events and outbreaks

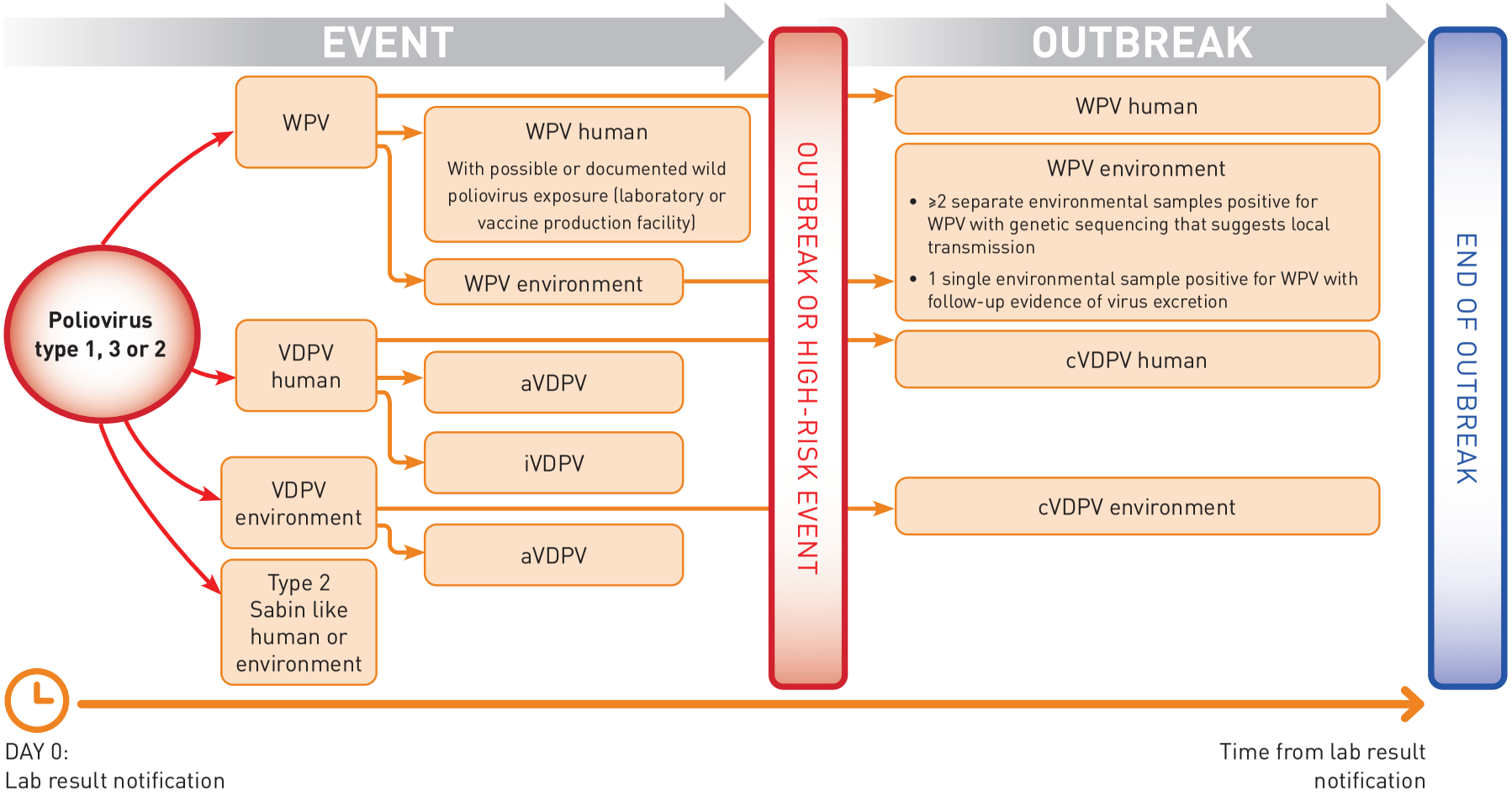
Typology	Definition
Event (no evidence of transmission)	**Human**
	Detection of: • VDPV in: - single acute flaccid paralysis (AFP) case or asymptomatic person (e.g. contact), or - one or more persons,[1] with no evidence of further community-level circulation (iVDPV or aVDPV isolates) OR • Type 2 Sabin or Sabin-like isolate from individual sample(s) more than four months after use of any type 2 containing OPV (i.e. mOPV2 or tOPV) OR • WPV1, WPV2 or WPV3 infected individual with suspected or documented type-specific virus exposure in a laboratory or vaccine production facility.
	Environmental
	Detection of: • WPV single environmental sample without follow-up evidence of virus excretion;[2] OR • VDPV without evidence of further transmission, such as: - a single environmental sample without evidence of prolonged circulation; or - an aVDPV. OR • Type 2 Sabin or Sabin-like isolate from environmental sample(s) more than four months after use of any type 2 containing OPV (i.e. mOPV2 or tOPV).
Outbreak (evidence of transmission)	**Human**
	Detection of: • any WPV-infected individual(s)[1] (i.e. outside endemic areas and without documented exposure to WPV in a laboratory or vaccine production facility); OR • any cVDPV infected individual(s).[1]
	Environmental
	Detection of: • two or more separate[3] environmental samples positive for WPV with genetic sequencing information indicating sustained local transmission; OR • a single environmental sample positive for WPV with follow-up evidence of virus excretion[2] (and no documented exposure in a laboratory or vaccine production facility); OR • any cVDPV positive environmental sample(s).

1 Infected person can be an AFP case, or an asymptomatic/healthy person.

2 Evidence of virus excretion as identified during follow-up community investigation.

3 Separate means that samples were collected at more than one distinct environmental surveillance collection site (i.e. no overlapping of catchment areas), OR samples were collected from one site, but collection was more than two months apart.

Figure 1: SOPs at a glance: Events and Outbreaks



4 Detection, notification and investigation

Detection

Samples collected from human (biological) or environment sources during routine surveillance or an event or outbreak investigation are sent to a laboratory of the Global Polio Laboratory Network (GPLN) to determine the presence of poliovirus. The virus can be identified through culture, intra-typic differentiation and genetic sequencing.

Notification

As soon as poliovirus is identified, the GPLN will inform the health authorities of the affected country and WHO at the country, regional and headquarters levels. Under the *International Health Regulations (2005)* (IHR),[d] all notifiable polioviruses (see Box 1) must also be immediately reported by national authorities to the IHR focal point at the respective WHO regional office.

WHO headquarters will inform GPEI partners when this information is received and validated. Additional details, including any links to other polioviruses, will be shared by the GPLN and WHO headquarters as soon as available.

Notification to WHO may lead to publication of a disease outbreak news report on the WHO website, as appropriate, based on virus type, risk assessment and outbreak status.

Investigation

The country must investigate any poliovirus isolate notifiable under IHR, whether the isolate is from AFP cases, AFP contacts or environmental surveillance. The GPEI will support the country as needed.

Local health authorities should initiate the investigation within 24 hours of a poliovirus isolate report. The most effective approach is a joint epidemiological and social investigation with support from the national level of any case and affected community, as well as the gathering of relevant national data. Whether a known poliovirus strain is isolated in a previously infected area or a previously uninfected area, or a new poliovirus strain is detected, all require a comprehensive detailed investigation.

Information from the GPLN and the epidemiological and social investigation are used to describe the characteristics of the virus and determine if there is evidence of person-to-person transmission. This will inform the risk assessment and classification. As investigation and classification can take days or weeks; it is critical to appreciate that response activities are often required before final virus classification.

d See "International Health Regulations" (2005), 2nd Edition. Geneva: World Health Organization; 2008 (http://www.who.int/ihr/publications/9789241596664/en, accessed 8 November 2018).

Box 1. International Health Regulations 2005 (IHR) and the obligation to notify

Under IHR, notification is required for all events that may constitute a **public health emergency of international concern.** For polio this includes detection in human or non-human sources of:

- WPV,
- VDPV (type 1, 2, or 3),
- and Sabin / Sabin-like type 2 viruses.

Sabin / Sabin-like viruses types 1 and 3 are not notifiable.

The national IHR focal point must notify WHO within 24 hours the IHR contact person at the respective WHO regional office of all notifiable polioviruses, without waiting for final classification.

Table 2 outlines the scope and objectives of an investigation.

Table 2: Investigation of poliovirus isolates from AFP cases, contacts or environmental surveillance

Investigation components		Objectives
Part A: Investigating the case or environmental isolate and local context	1. Detailed case investigation for a poliovirus isolate from an AFP case or a positive contact 2. Investigating the site of an isolate from environmental surveillance 3. Describing the community context of any detected isolate, regardless of source: • Population immunity • Recent SIA performance • Population characteristics, movement and migration routes • Community social mapping.	• Gather information to confirm the event/ outbreak • Identify possible source of infection/ causes of the event/outbreak • Determine the number and characteristics of cases, the context for environmental isolates
Part B: Determining the geographic extent of transmission	4. Community search for additional cases of AFP and evidence of virus transmission: • Surveillance Data • AFP contact sampling • Targeted healthy children stool sampling • Community household search • Local Health facility search • Other community outreach	• Determine the geographic extent and assess the risk of further transmission

Part A: Investigating the case or environmental isolate and local context

1. Detailed case investigation of an isolate from an AFP case or contact

For any poliovirus isolated from a child or adult (AFP case or contact), conduct a detailed clinical and neurological examination. Collect a detailed history of treatment, injections and vaccination (including all routine and SIA doses of any polio vaccine, date of last vaccination, and reasons for any missed doses). Clinical and family history should include any signs or symptoms of primary immunodeficiency, and a test for quantitative immunoglobulins where indicated.

An urgent epidemiological (i.e. person, place and time) and social investigation of the AFP case and

close contacts is required. It is important to collect detailed information on travel history, socioeconomic and community context, distance to health facility or other barriers to vaccination, and other relevant information. The GPEI form, *Detailed epidemiologic case investigation form*,[e] provides a guiding template for a joint epidemiological and social investigation.[f]

2. Investigating the site of an isolate from environmental surveillance

Describe the catchment area of the infected sampling site and other collection sites in the area, including information on population demographics (especially high-risk groups), population movement, and relevant institutions (e.g. health facilities, schools and bus parks or other transportation centres).

Describe the sewage or drainage system into the collection site, complemented by geographic information system (GIS) imagery where possible (e.g. elevation profile, links with other sites, and density of dwellings). Document the history of the site, collection schedule, timeliness and completeness of collection, and proportion of samples positive for non-polio enteroviruses (NPENT). Record any poliovirus detected, including Sabin virus.

For Sabin 2 virus isolation, investigate immediately using the field guide and investigation template available (unless within four months of a mOPV2 response in the immediate area).

Investigation of a WPV isolate in a non-endemic country must consider possible release from a laboratory or other facility,[g] or importation (e.g. byan incoming traveller), particularly when genetic sequencing to ascertain origin is still pending.

3. Describing the community context of any detected isolate, regardless of source

The information outlined below should be collected following detection of poliovirus in a previously uninfected community. For any subsequent detection in the same area, focus on significant updates to the general information previously collected.

Population immunity. Develop an immunity profile based on available information such as type-specific vaccination status of non-polio AFP cases, routine and SIA vaccination coverage data, and community immunization surveys. Determine the characteristics of unvaccinated and partially vaccinated children, high-risk or special populations, and seek details of health-seeking behaviour.

For type 2 isolates, distinguish carefully between immunity to type 2 compared to types 1 and 3 polioviruses, and pay special attention to birth cohorts born since the switch or since last use of mOPV2. Estimate the population naive to oral polio vaccine or protected only by inactivated polio vaccine (IPV) for type 2 poliovirus.

Collect epidemiologic evidence of any past poliovirus detections (WPV or VDPV) in the affected or surrounding communities. Review documented communicable disease incidence and transmission patterns, including vaccine-preventable diseases, while paying special attention to diseases with faecal–oral transmission such as cholera and acute bloody diarrhoea.

Recent SIA performance. Use immunization coverage, independent monitoring (IM), and lot quality assurance sampling (LQAS) indicators from recent SIAs to define the following: i) number and characteristics of missed children; ii) reasons for missing them; and iii) any interventions that worked to successfully reach missed children.

---

e See "Detailed epidemiologic case investigation form". GPEI guidance. Geneva: Global Polio Eradication Initiative; 2011 (see document within GPEI library http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/, accessed 8 November 2018).

f Country-specific tools required to investigate a poliovirus detection should be developed during outbreak preparedness and response planning. A national team to conduct the investigation should be trained as core capacity development for implementation of IHR or Integrated Disease Surveillance and Response (IDSR).

g See "Public Health Management of Facility-Related Exposure to Live Polioviruses: Interim guidance in managing exposed persons for countries hosting facilities that maintain live polioviruses" on GPEI website library, http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/).

For any type 2 poliovirus, in addition to information on any post-switch detection of Sabin 2 or previous VDPV2, collect additional details regarding last known use of tOPV or mOPV2, quality of mOPV2 vaccine management, and steps taken to search for any remaining tOPV or mOPV2 vials.

Population characteristics, movement and migration routes. Obtain a general overview of the affected population, including information on population density, social structure and networks, presence of minority or non-local residents, and community awareness of polio and immunization. Highlight any security and access constraints. Take note of major population movements due to economic, seasonal or nomadic migration, religious pilgrimage, insecurity, or natural disaster.

Community social mapping. Use formal or informal sources to gain an appreciation of immunization practice and vaccine acceptance in the community. Gather general information on media reach, community influencers, and relevant social groups.

Part B: Determining the geographic extent of transmission

4. Community search for additional cases of AFP and evidence of virus transmission

Once a poliovirus has been detected from any source, additional steps are required to ascertain the geographic extent of possible transmission. These activities can include a review of surveillance data, investigation of AFP contacts, others in the community, and health facilities using strategies that are often part of routine poliovirus surveillance, but also useful in specific circumstances after a poliovirus has been confirmed (see also Section 8 on enhanced routine surveillance).

Surveillance data. Conduct an in-depth review for polio across the country to analyze risk and determine the quality and sensitivity of the current surveillance system. Include a review of AFP indicators at lowest applicable administrative level, including AFP detection, stool adequacy, and the non-polio AFP (NPAFP) immunization profile for children 6–59 months, for the last three to five years. Also consider evidence of implementation of recommendations for surveillance strengthening from recent programme or surveillance reviews.

Further investigation in the community and health facilities are time and resource intensive, and so require close coordination with the relevant surveillance and laboratory colleagues to prepare for any surge requirements. Unless otherwise indicated, the strategies below should only be implemented as part of the field investigation following detection of a new unclassified VDPV case or newly positive environmental sample (VDPV or WPV) in an area that has not had documented transmission within the past 12 months.

Possibly relevant investigation strategies include:

AFP Contact sampling (also known as direct contact sampling and close contact sampling) should be conducted during the initial, or follow-up AFP investigation, when an AFP case has inadequate stool specimens for laboratory confirmation of poliovirus.

It is the collection and laboratory testing of one stool specimen from three children **in contact with an AFP case** to support diagnosis of poliovirus in the AFP case. Children in contact with AFP cases (referred to as AFP contacts) have a higher likelihood of asymptomatic infection and virus excretion. If poliovirus is isolated in a stool sample from an AFP contact, this will also confirm poliovirus in the AFP case.

AFP contact sampling should not be conducted for laboratory-confirmed cases of poliovirus.

Children (preferably <5 years of age) in contact with the AFP case in the week prior and/or two weeks after paralysis onset should be targeted for specimen collection. The objective is to identify children who had contact with the AFP case (e.g., touching, sharing toys, and sharing food) which may have resulted in infection with poliovirus, if poliovirus is the cause of paralysis. Examples include siblings and other children living in the same household, and neighboring

children who played with the AFP case during the period of interest. These contacts are referred to as close contacts.

Under specific circumstances during a poliovirus outbreak, AFP contact sampling may be expanded for all AFP cases for a limited time period. Examples include AFP cases outside the outbreak zone to detect further transmission, or AFP cases within a security compromised or hard-to-reach area to take advantage of the limited opportunities to reach this community. Decisions on expansion should be made at the national-level with laboratory colleagues.

See AFP contact sampling job aid and GPEI website for more information on the process for sampling and specimen labeling.

Targeted healthy children stool sampling (also known as community contact sampling, community stool sampling, or asymptomatic children stool sampling) may be conducted following a new VDPV isolation when community transmission has not been confirmed. The decision to conduct targeted healthy children stool sampling must be made in close coordination with national surveillance and laboratory teams.

It is the collection and laboratory testing of one stool specimen from 20 asymptomatic children (i.e. children without AFP) to determine presence of poliovirus and hence, transmission in the community.

If there is already evidence of community-wide transmission, targeted healthy children stool samplings should not be conducted.

Children (<5 years old but preferably <2 years old) with no evidence of AFP, **and have not had contact with the AFP case,** should be targeted for specimen collection. The objective is to identify children that reside in the same community but are not close contacts.

Any decision to do a targeted health children stool sampling should be made at the national-level in consultation with laboratory colleagues.

See AFP contact sampling job aid[h] and GPEI website for more information on the process for sampling and specimen labeling.

Community household search. For any area with a newly detected VDPV or environmental surveillance (ES) sample, a house-to-house search to identify any person with sudden onset of weakness or paralysis in one or more limbs in the past 60 days can help to determine if there is any additional community transmission. The number of households to visit will depend on local population density and other risk factors. National authorities and/or GPEI technical expert advisory bodies can provide further guidance.

Local health facility search. Conduct retrospective case searches in health facilities (formal and informal) and document findings. Include at least six-month record reviews for undetected/unreported AFP cases; and investigate unreported AFP cases. Assess clinicians' knowledge of AFP surveillance and polio immunization performance and capabilities and provide sensitization as necessary. Complete a search for vials of tOPV or mOPV2 where relevant.

Other community outreach. As part of the search for any cases of AFP, including during household search, investigators should engage local leaders and influencers in the community and sensitize them to the case definition of AFP and the importance of early reporting of AFP

h See "Use of AFP contact sampling and targeted healthy children stool sampling: GPEI Job Aid. Geneva: Global Polio Eradication Initiative 2019. (see document with GPEI library http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/)

5 Risk assessment

Initial risk assessment

Isolation of a poliovirus in a previously non-infected area represents an event or outbreak that requires national authorities to complete an immediate risk assessment to inform the type and scale of response. The purpose of the risk assessment is to review virologic and epidemiologic characteristics of the newly detected virus, event or outbreak and determine the level of risk for further local or international spread as high, medium or low.

The risk assessment is presented by national authorities and/or WHO national or regional offices to GPEI partners within 72 hours of receipt of a genetic sequencing result, or outbreak confirmation. The assessment reviews critical factors that will influence the type and scale of response and allows GPEI to recommend appropriate action.

A risk assessment addresses three risk elements: virologic, contextual, and risk of international transmission (see Table 3).

A detailed summary of elements to help countries prepare a robust risk assessment is provided, along with additional resources and tools (see Annex 1: Risk assessment overview for detailed guidance).

Type 2 poliovirus

All type 2 virus isolations require special attention when conducting a risk assessment and determining the type and scale of response. Following the global withdrawal of type 2 containing OPV from routine immunization programmes in April and May of 2016, there is increasing risk of very rapid virus spread associated with declining mucosal immunity in children.

For type 2 poliovirus (VDPV2 or WPV2) detection, consultation with GPEI partners is systematic and will often result in a discussion with the mOPV2 Advisory Group to review the risk assessment and assess the need for a potential vaccination response with monovalent type 2 oral polio vaccine (mOPV2).

Table 3: Elements to assess risk for further poliovirus transmission that will influence type and scale of response

Risk element	Sample of risk factors considered (not exhaustive)
Virologic risk[1]	High degree of genetic deviation from parent Sabin, number and nature of nucleotide changes, and expert interpretation by virologists, etc.
Contextual risk	Recent poliovirus detection or other sentinel events, sensitivity of AFP surveillance system, high population density, low immunization coverage and population immunity, geographic access, conflict, inaccessible or hard-to-reach populations, and population movements, etc.
Risk of international transmission	Border area with high population mobility, nomadic or refugee populations, cross-border conflict, and international travel routes, etc.

1 Virologic risk is considered high for any WPV or cVDPV.

A detection of type 2 Sabin or Sabin-like virus in an area where mOPV2 has not been used in the previous four months is notifiable under IHR. Such a finding may reflect ongoing and/or unauthorized use of tOPV or mOPV2, as children vaccinated with OPV continue to shed Sabin virus for approximately three months. For this reason, detection of type 2 Sabin or Sabin-like virus from any source four months or more after last mOPV2 use requires an investigation, risk assessment and IHR notification to WHO.

Including sentinel events in the risk assessment

A sentinel event is information or an occurrence of any nature, related or unrelated to polio, which suggests that the community or general geographic area may be at risk for a polio outbreak. Sentinel events can include:

1. Appearance of vaccine-preventable disease (e.g. measles, diphtheria, and/or VDPV of any type) that suggests low routine immunization performance in general (e.g. measles) or polio-specific transmission risk due to mode of person-to-person spread (e.g. cholera);
2. Rapid displacement or ongoing movement of under-immunized communities;
3. Detection of type 2 Sabin virus from a biological or environmental source in the absence of mOPV2 use;
4. Finding vials of tOPV or mOPV2 in the community.

Communities or administrative areas with sentinel events should be included in the investigation and risk assessment.

Ongoing risk assessment

Following initial investigation and risk assessment, national authorities must continue to collect detailed information to update the situation analysis and risk assessment (i.e. results from laboratory investigations, or detailed information on affected communities, etc.). Neighbouring countries/regions must also continue to update their risk assessment with support from WHO regional offices.

Relevant risk factors to include in the ongoing risk assessment include:

- detailed quantitative and qualitative analysis and mapping of population movement (e.g. trade, migration, displacement, and travel and migration routes such as roads, lakes and rivers);
- quantification of special high-risk or hard-to-reach populations (e.g. geographic or cultural inaccessibility, areas of insecurity, vaccine refusals and sentinel events);
- modelling of population immunity to relevant outbreak/event poliovirus type(s);
- detailed assessment of all surveillance indicators at subnational level;
- mapping with geographic information system (GIS), with emphasis on high-risk populations, urban areas, border areas and regions difficult to access for any reason.

Ongoing analysis should use information from all possible sources, including data beyond standard polio programme information. Entities such as the International Organization for Migration, the United Nations Office for the Coordination of Humanitarian Affairs, and the WHO Health Emergencies Programme can provide critical information on population migration and insecurity.

6 Response standards – overview

The scope of response to a detected event or outbreak will be determined by the type and classification of the poliovirus and the risk assessment. The key to a successful response and interrupting transmission lies in adapting strategies as the situation evolves, over the course of the investigation and response.

Minimum response standards for poliovirus events and outbreaks

Notification of a new poliovirus, or the spread of poliovirus to a new geographic area or population, requires national authorities and GPEI partners to be strongly engaged and rapidly initiate the following elements:

1. **Detailed investigation and risk assessment** (see chapters 4 and 5)
2. **Enhanced surveillance** to increase sensitivity and confidence that any ongoing person-to-person transmission of poliovirus will be rapidly detected (see investigation in chapters 5 and 8)
3. **Planning of a vaccination response.**

The core and enabling functions are illustrated in Figure 2.

Robust coordination, planning, budgeting, community engagement, and monitoring are enabling functions central to successful response. Risk communication and social mobilization efforts should be tailored to the event or outbreak context and support surveillance enhancement, vaccination response activities and routine immunization. For all outbreak and event responses, it is necessary to monitor and report all interventions and enhancements for surveillance, vaccination and communication (see Chapter 11).

Scope of vaccination. The scope of vaccination campaigns will vary with the type of poliovirus event or outbreak, the source of detection and the context. All outbreaks (VDPV or WPV) require a vaccination response with an appropriate type-specific OPV within 14 days of laboratory notification. In some circumstances, events in high-risk contexts may also warrant vaccination response, based on the risk assessment and discussion with country health authorities and GPEI technical experts. This includes VDPVs pending classification or ambiguous VDPVs (aVDPVs).

Isolation of an iVDPV requires careful assessment to ensure that all household members and close community contacts are immunized with IPV. Larger-scale SIAs are not required unless circulation in the community is established. An iVDPV carrier should receive appropriate therapy for their underlying immune deficiency syndrome and be offered optimal anti-poliovirus treatment where available.

Figure 2. Core and enabling functions for quality outbreak response

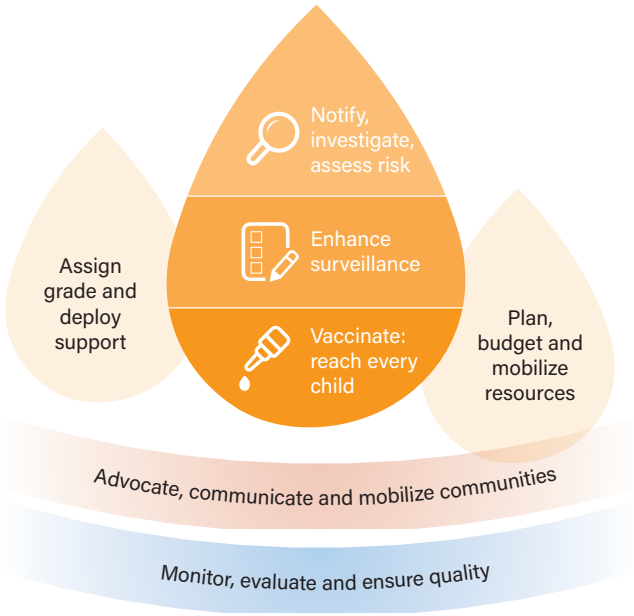
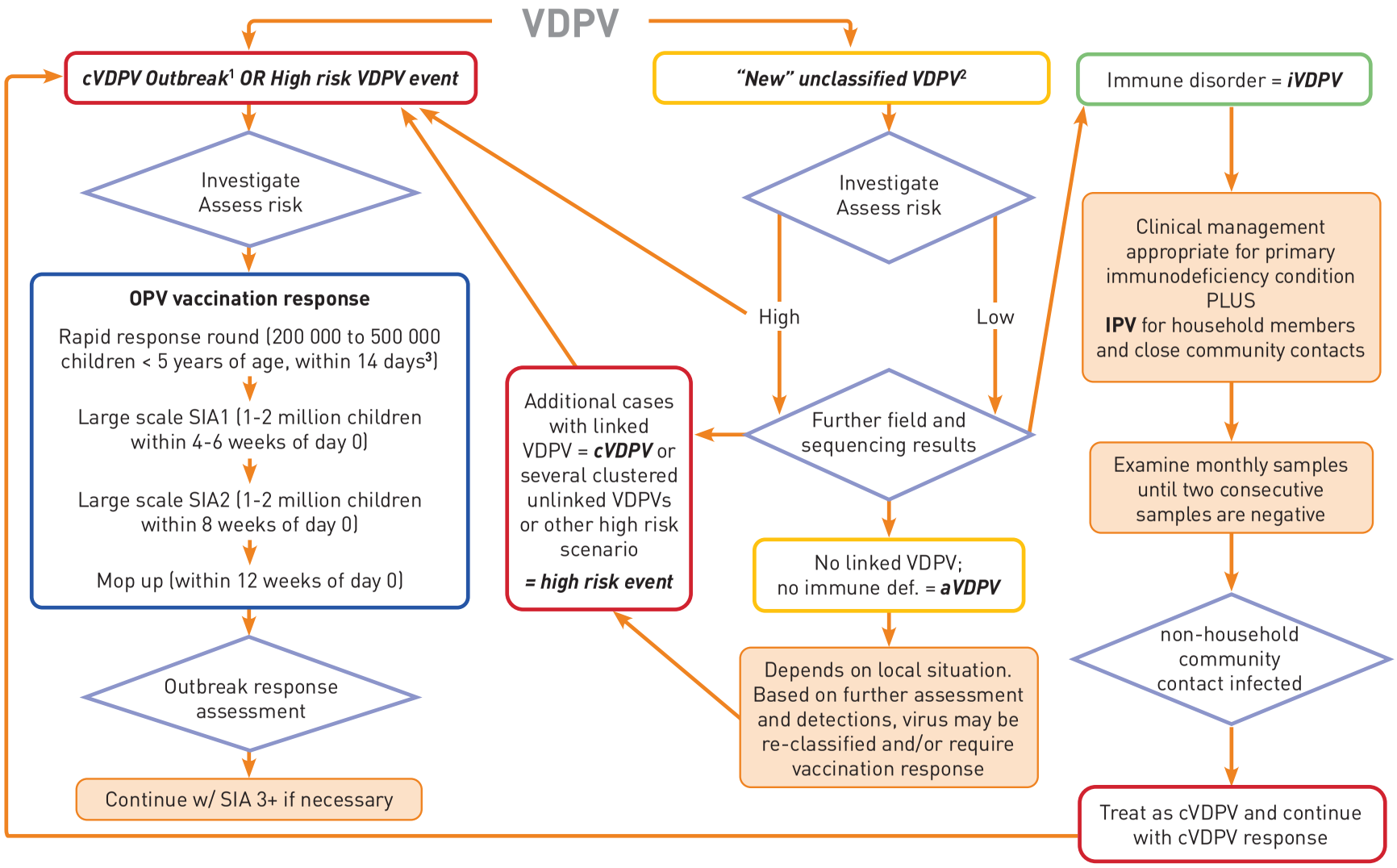


Figure 3: Response strategies following detection of an isolate of vaccine-derived poliovirus



1 genetically linked to known cVDPV or previous aVDPV
2 surveillance (ES) sample or single human/acute flaccid paralysis (AFP) case not linked to known aVDPV
3 all times are from Day 0, the day of receipt by WHO HQ of VDPV2 genetic sequencing results

Response strategies following detection of an isolate of vaccine-derived poliovirus are illustrated in Figure 3.

Defining and planning high-quality outbreak response. A comprehensive outbreak response includes investigation, surveillance and vaccination, all supported by communication and social mobilization activities, including cross-border coordination between countries. Coordinated and high-quality activities will ensure confidence in the country's ability to detect rapidly any poliovirus circulation and to interrupt transmission through vaccination. For surveillance, it is necessary to monitor carefully both process (e.g. AFP reporting rates, lab performance) and outcomes (e.g. early detection of virus through all surveillance strategies in high-risk special populations).

Outbreak grading

All outbreaks, and in some instances, events in high-risk contexts, will be graded by WHO as per the *Health Emergency Response Framework*.[i]

Grading is a procedure that triggers outbreak response policies in WHO and the affected country or countries. The grading will indicate risk level and determine actions needed to manage the poliovirus event or outbreak in the country context. See Chapter 10 for outbreak response scale-up and detailed information on GPEI support according to grading.

The purpose of the grading is to:

- inform all partners of the nature of the event or outbreak, the response required and the need for mobilization of internal and external resources;
- activate GPEI response mechanisms;
- prompt local government and GPEI partners at all levels to mobilize resources for support, including immediate human resources.

WHO will assign an outbreak Grade 1, 2 or 3 within 72 hours of Day 0. A grade is valid for three to six months, through the first phase of outbreak response, and should be reviewed with new information and/or as response activities progress.

The criteria used to grade outbreaks include: 1) the potential for transmission within the country and beyond national borders based on the risk assessment (virologic, contextual, risk of international spread); and 2) the strength of the country's ability to respond to and contain the outbreak, including vaccine management capacity. Depending on circumstances, the risk assessment may include discussion of the urgency and complexity of the event and the reputational risk it may generate. Country capacity is a subjective assessment based on health infrastructure and current security or access challenges. Figure 4 presents a general risk matrix for grading an event or outbreak.

Figure 4: General risk matrix for grading an event or outbreak

	Country capacity to respond		
Risk of local or international transmission	**Strong**	**Moderate**	**Weak**
Low	Grade 1	Grade 1	Grade 2
Medium	Grade 1	Grade 2	Grade 3
High	Grade 2	Grade 3	Grade 3

i See "Emergency Response Framework (ERF)". World Health Organization; 2017 (https://www.who.int/hac/about/erf/en, pg. 28, accessed 8 November 2018).

Standard timelines for outbreak response

Table 4 outlines key actions and timelines for event and outbreak response (see Annex 2 for a detailed list from Day 0 to close of outbreak). It is essential to rapidly establish coordination mechanisms between countries and GPEI partners at all levels. This may include multilevel calls with sub-regional outbreak coordination offices, regional offices and global partners. Following initial consultation, operations are supported by the GPEI Outbreak Preparedness and Response Task Team (OPRTT) to manage coordination with all partners.

Table 4. Major steps and timelines for critical components of event and outbreak response

Timeline	Response actions for all isolates
Within 24 hours	Initiate investigation
	Country and each partner agency to initiate internal consultations
Within 48 hours	Initiate partner coordination via OPRTT[1]
Within 72 hours	Country to notify WHO through IHR
	Risk assessment and grading
	mOPV2 Advisory Group and vaccine request (if applicable)
	Country to declare national public health emergency
72 hours to initiate	Develop response plan for surveillance,[2] vaccination and social mobilization
	OPRTT to coordinate and deploy RR team as required
Within 14 days	Rapid response vaccination (Round Zero)
Within 90 days Independent monitoring and LQAS results to be shared within 14 days of each campaign	First large-scale, second large-scale, and a mop-up round Assess immunization quality: • Independent monitoring required[3] • LQAS[4] to start as soon as possible
Outbreak response assessments (OBRAs)	1. First assessment within three months of lab notification (Day 0) 2. Follow-up quarterly assessments 3. Final assessment after at least six months without poliovirus detection

1 OPRTT = Outbreak Preparedness and Response Task Team
2 See chapter 4 (Determining the geographic extent of transmission) and chapter 8 (Surveillance following investigation)
3 Independent monitoring does not replace, nor equal supervision
4 LQAS = lot quality assurance sampling

7 Vaccination response

The primary objective of vaccination response is to rapidly interrupt person-to-person transmission of poliovirus. **Both the timing and the quality of the vaccination response are critically important.** To accomplish virus interruption, a prompt vaccination response is required in a sufficiently large population and geographic scope. High-quality vaccination will protect individuals from poliovirus infection and prevent future outbreaks if importation occurs.

The oral polio vaccine appropriate to the poliovirus strain induces intestinal mucosal immunity and remains the vaccine of choice to interrupt transmission rapidly and stop polio outbreaks. The most appropriate vaccine is selected with technical support from WHO and GPEI partners.[j]

Timing and scale of immunization activities

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) (see Figure 5). 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; 2) two high-quality large-scale rounds; 3) re-vaccination of all areas where quality was insufficient; and 4) removal of all mOPV2 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 sequencing result (Day 0). It targets the immediate area of the virus isolation, to stop further transmission rapidly (even if the source remains unknown).

The RR should be rapid, focused, and small scale; the intent should be to maximize quality in high-risk areas near the detection. If it cannot be conducted quickly (within three weeks), the country team may consider proceeding directly with SIA1 and its appropriate target population. This decision should be made in consultation of GPEI partners.

SIA 1 and SIA 2

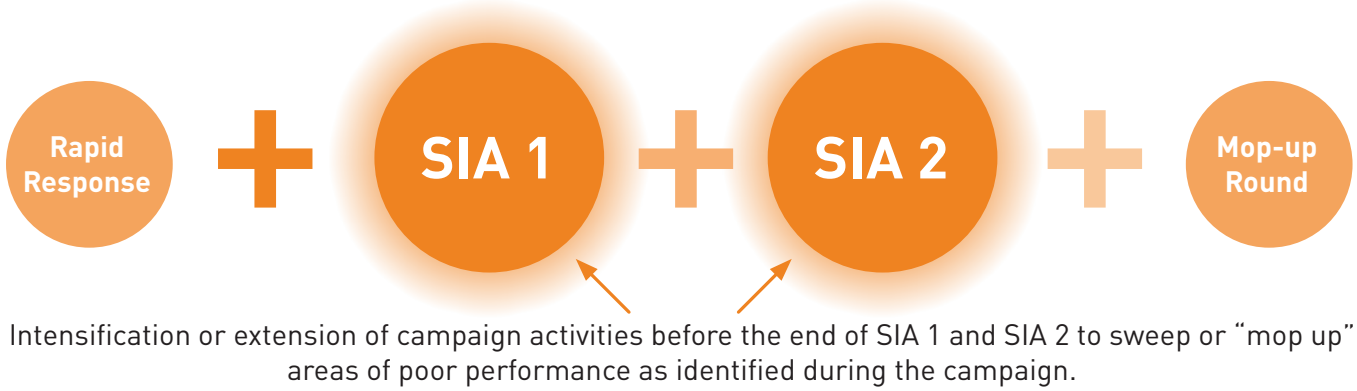
Two high-quality large-scale vaccination campaigns (>90% of children vaccinated) should be completed within eight weeks of laboratory sequencing result (Day 0). The response will be tailored to the virus type and local context. The duration of the campaign for SIA1 and SIA2 can be extended, or effort intensified in other ways, such as deployment of additional personnel and supervisors, to complete the campaign and reach missed children in areas of poor performance, 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 health 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, eyewitness accounts and spot checks, LQAS, post-campaign surveys, or new events such as population movements, and breakthrough

j See "15th Meeting of the Strategic Advisory Group of Experts (SAGE)" Polio Working Group, April 2018 – Conclusions and recommendations, Note for the Record. Geneva: World Health Organization;

Figure 5. Visual representation of timing and scale of immunization activities required



cases. A mop-up round should be included in the initial outbreak response plan, appropriately scaled and implemented after SIA2, 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

Type 1 and Type 3 events or outbreaks: The first RR (or Round Zero) can be 200 000 to 500 000 children, and approximately 2 million for subsequent larger scale rounds.

Type 2 events or outbreaks: The first RR (or Round Zero) can be 100 000 to 400 000 children, and approximately 1–4 million for subsequent larger scale rounds. See **Tables 5 and 6 for more information.**

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 technical experts (i.e. epidemiologists, virologists and country 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 are children less than five years of age. An **expanded age group** (up to 10 or 15 years, or the whole population depending on local context) should be considered 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 campaign could be followed one week later with an additional round of mOPV2 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). Response strategies recommended for OPV using countries for each type of poliovirus type are outlined in Table 5 (events) and Table 6 (outbreaks).

Routine immunization

Strengthening routine immunization (RI) remains a central pillar of polio eradication. Vaccination with bOPV/IPV and other antigens must continue as usual and be further strengthened, even if immunization sessions are conducted on the same day as, or within days of, an outbreak response. Strategies to mitigate any negative impact of outbreak response on the conduct of RI should be planned in advance (e.g. if staff are diverted for the SIA efforts, immediate rescheduling of RI sessions).

Type 2 poliovirus response

For type 2 events or outbreaks, when the use of mOPV2 is necessary to protect children from paralysis and stop transmission, it is even more critical to respond quickly, and then ensure high quality in larger scale and mop-up rounds. As type 2-containing OPV is no longer used in RI, mOPV2 mop-up rounds are a final opportunity to ensure mucosal protection against type 2 poliovirus.

Box 2.

- Type 2 poliovirus now spreads rapidly due to waning type 2 immunity. In WPV1 endemic countries, response to cVDPV2 must be immediate.
- During concurrent outbreaks of cVDPV2 and cVDPV1 or cVDPV3, immediate cVDPV2 response also takes precedence
- Co-administration of mOPV2 and bOPV is not recommended during campaigns for operational reasons
- A polio event or outbreak in a country that has been using only IPV in the RI programme requires immediate consultation with WHO, as for any polio event or outbreak anywhere
- Regardless of outbreak response plans, routine bOPV and IPV immunization must continue without a break

Table 5. Event response strategies by poliovirus type

Isolate	Source	General response	Immunization response	Time frame
WPV				
WPV 1 or 3	Environment	• Community search for cases and evidence of virus transmission • Assess population immunity • Enhance surveillance • Event response assessment if SIAs conducted	SIAs plan and implementation depends on local situation, as advised by WHO and GPEI partners	
WPV 2	Environment (with no evidence of individual excreting virus)	• Community search for cases and evidence of virus transmission • Assess population immunity • Enhance surveillance • Event response assessment if SIAs conducted	SIAs plan and implementation depends on the local situation No SIAs unless high risk. In high-risk scenario, plan for two high quality SIA rounds - Target age 0–5 years - mOPV2 vaccine - Targeting approx. 1–2 million children - Vaccine request to WHO Director-General	In high-risk scenario: First SIA within 14 days followed by successive high coverage campaigns
VDPV				
VDPV2 (new unrelated isolation) in an area without mOPV2 use within the last 12 months	Human or Environment	• Epidemiological and social investigation • Community search for cases and evidence of virus transmission • Assess population immunity • Enhance surveillance • GPEI advises on virological risk • Strengthen IPV routine immunization • Event response assessment if SIAs conducted	SIAs plan and implementation depends on the local situation Detection of a VDPV2 **in an area without mOPV2 use within the last 12 months**, requires an immediate rapid response (RR) high quality SIA1, SIA2 and mop-up round - Target age 0–5 years - mOPV2 vaccine - RR targeting approx. 100 000–400 000 children - Scope for SIAs 1 and 2 may be reduced to < 2 million children may be reduced to 100 000 – 400 000 children, **however**, additional SIAS with increased scope should be conducted if there is evidence of transmission (i.e cVDPV2) - Mop-up round target as required - Vaccine request to WHO Director-General	

Isolate	Source	General response	Immunization response	Time frame
VDPV2 (new unrelated isolation) in an area with at least 2 mOPV2 SIAs conducted in the last 12 months	Human or Environment	• Epidemiological and social investigation • Community search for cases and evidence of virus transmission • Assess population immunity • Enhance surveillance • GPEI advises on virological risk • Strengthen IPV routine immunization • Event response assessment if SIAs conducted	SIAs plan and implementation depends on the local situation Does NOT require an immediate vaccination response unless deemed to be found in a high-risk scenario	
iVDPV2	Human	• Epidemiological and social investigation	SIAs are not required - Intravenous immunoglobulin for case (+ monoclonal antibodies or anti-virals if available) - IPV for household members and close community contacts	
VDPV1 or 3 (pending classification)	Human or Environment	• Epidemiological and social investigation • Community search for cases and evidence of virus transmission • Assess population immunity • Enhance surveillance • Event Response Assessment if SIAs conducted	SIAs may be considered	
aVDPV1 or 3	Human or Environment	• Epidemiological and social investigation • Community search for cases and evidence of virus transmission • Assess population immunity • Enhance surveillance • Event Response Assessment if SIAs conducted	SIAs may be considered	

Isolate	Source	General response	Immunization response	Time frame
iVDPV1 or 3	Human	• Epidemiological and social investigation	SIAs are not required	
Sabin				
Sabin-like 2	Human or Environment (over four months since last mOPV2 response in immediate area)	• Epidemiological and social investigation • Assess population immunity • Enhance surveillance	SIAs are not required unless deemed to be high risk scenario	

Table 6. Outbreak response vaccination by poliovirus type for OPV-using countries

Outbreak virus type	Campaign strategy	Campaign scope	Age group	Vaccine	Campaign timing from Day 0 (lab sequencing result)
cVDPV					
cVDPV2 **Human or environment** **Newly infected area or in an area without mOPV2 use within the last 6 months**	Rapid response (RR)[1] Small geographic immediate risk zone (outbreak epicentre)	Approximately. 100 000 to 400 000 children	0–5 years	mOPV2 Request to WHO Director- General through mOPV2 Advisory Group	Within 14 days Timeliness is critical
	SIA 1 High quality microplanning	At least 1–4 million children, consider all zones at risk	0–5 years	mOPV2	Within 28 days
	SIA 2 With further quality improvements	At least 1–4 million children, consider all zones at risk	0–5 years	mOPV2	Within 6–8 weeks
	Mop-up round[2] Required in all areas/health zones not meeting quality standards: e.g. coverage < 90%, failed LQAS, missed children in SIA1/2	As required	0–5 years	mOPV2	Mop-up round within three months (90 days) of initial virus sequencing results, in all health zones not meeting quality standards

Outbreak virus type	Campaign strategy	Campaign scope	Age group	Vaccine	Campaign timing from Day 0 (lab sequencing result)
cVDPV2 Human or environment Breakthrough isolation	Additional detections or breakthrough cases in areas with more than 2 mOPV2 SIAs, within the last 6 months, **conduct at least two additional SIAs or as needed until two SIAs completed after the last poliovirus detection**[3]	**Scope reduced to < 2 million children**	0–5 years	mOPV2	Ongoing GPEI and mOPV2 Advisory Group consultation to review strategy and scope
cVDPV1 or 3 Human or environment	Rapid response (RR)[1] Small geographic immediate risk zone (outbreak epicentre)	Approximately 200 000 to 500 000 children	0–5 years	bOPV	Within 14 days Timeliness is critical
	SIA 1 High quality microplanning	2 million children, consider all zones at risk	0–5 years (or expanded age group if warranted)	bOPV	Within 28 days
	SIA 2 With further quality improvements	2 million children, consider all zones at risk	0–5 years	bOPV	Within 6–8 weeks
	Mop-up round[2] Required in all areas / health zones not meeting quality standards: e.g. coverage < 90%, failed LQAS, missed children in SIA1/2	As required	0–5 years	bOPV	Mop-up round within three months (90 days) of initial virus sequencing results, in all health zones not meeting quality standards
	Further targeted mop-up round or expanded SIAs if outbreak not stopped within 120 days SIA3/SIA4 as needed until two SIAs completed after the last poliovirus detection[3]	Ongoing GPEI consultation to review strategy and scope			
WPV					
WPV 1 or 3 Human or environmental	Rapid response (RR)[1] Small geographic immediate risk zone (outbreak epicentre)	Minimum 500 000 children	0–5 years	bOPV	Within 14 days Timeliness is critical
	SIA 1 High quality micro-planning	Minimum 2 million children, consider all zones at risk	0–5 years	bOPV	Within 28 days

Outbreak virus type	Campaign strategy	Campaign scope	Age group	Vaccine	Campaign timing from Day 0 (lab sequencing result)
	SIA 2 With further quality improvements	Minimum 2 million children, consider all zones at risk	0–5 years	bOPV	Within 6–8 weeks
	Mop-up round[2] Required in all areas / health zones not meeting quality standards: e.g. coverage < 90%, failed LQAS, missed children in SIA1/2	As required	0–5 years	bOPV	Mop-up round within 3 months (90 days) of initial virus sequencing results, in all health zones not meeting quality standards
	Further targeted mop-up round or expanded SIAs if outbreak not stopped within 120 days SIA3/SIA4 as needed until two SIAs completed after the last poliovirus detection[3]	Ongoing GPEI and mOPV2 Advisory Group consultation to review strategy and scope			
WPV 2 **Human Depends on local situation and whether a containment breach is identified or re-emergence of unknown source**	Rapid response (RR)[1] Small geographic immediate risk zone (outbreak epicentre)	Approximately 200 000 to 500 000 children	0–5 years	mOPV2 Request to WHO Director- General through mOPV2 Advisory Group	Within 14 days Timeliness is critical
	SIA 1 High quality microplanning	At least 1–2 million children, consider all zones at risk	0–5 years	mOPV2	Within 28 days
	SIA 2 With further quality improvements	At least 1–2 million children, consider all zones at risk	0–5 years	mOPV2	Within 6–8 weeks
	Mop-up round[2] Required in all areas/health zones not meeting quality standards: e.g. coverage < 90%, failed LQAS, missed children in SIA1/2	As required	0–5 years	mOPV2	Mop-up round within three months (90 days) of initial virus sequencing results, in all health zones not meeting quality standards

Outbreak virus type	Campaign strategy	Campaign scope	Age group	Vaccine	Campaign timing from Day 0 (lab sequencing result)
	Further targeted mop-up round or expanded SIAs if outbreak not stopped within 120 days SIA3/SIA4 as needed until two SIAs completed after the last poliovirus detection[3]	Ongoing GPEI and mOPV2 Advisory Group consultation to review strategy and scope			
WPV2 Containment breach Consult guidance for public health management of facility-related exposure to live polioviruses[k]	WPV infection or AFP case: check immunization status; and give OPV/IPV to exposed person/ case, family, and close contacts Review options for broader response	Consult with WHO, GPEI partners and mOPV2 Advisory Group			
WPV 2 Environment	Investigate with emphasis on possible containment breech; response depends on many factors	Consult with WHO, GPEI partners and mOPV2 Advisory Group			

1 A rapid response (RR) round is also sometimes referred to as Round Zero to emphasize that speed is the first priority.

2 A mop-up round is required if evidence of less than 90% coverage, failed LQAS (90% threshold), persistently missed children (e.g. as revealed by purposeful independent monitoring in hard-to-reach groups, newly discovered villages, or chronic refusals) or any other evidence suggesting inadequate campaign reach or quality. Anecdotal information suggesting vaccination gaps must be fully investigated.

3 The scale and scope of SIAs will depend on local circumstances. For example, in specific situations, an SIA and a mandatory mop-up round may suffice if the latter covered the area of the last detected poliovirus isolate.

k See "Public Health Management of Facility-Related Exposure to Live Polioviruses: Interim guidance in managing exposed persons for countries hosting facilities that maintain live polioviruses" on GPEI website library; http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/.

High-quality campaigns

Consistent with the performance targets of the SOPs, all polio outbreaks and any type 2 polio event at high risk of rapid expansion require RR vaccination within 14 days of notification, followed by implementation of high-quality vaccination campaigns (i.e. SIAs). In implementing the four-step vaccination strategy for outbreak response, a tension exists between achieving a timely response (i.e. within 14 days) and achieving the desired vaccination coverage (>90%). In settings where poliovirus is detected, the RR (Round 0) may not meet all quality expectations (e.g. situations with security or access challenges, operational difficulties, hard-to-reach subpopulations and/or vaccine hesitancy, or simply lack of adequate time to plan). This is acceptable as long as the response is timely.

However, quality campaigns are essential to interrupt transmission of poliovirus from child to child. Therefore, it is critical to ensure that the first and second large-scale vaccination rounds (SIA1 and SIA2) reach every child. Reaching every child is particularly important when using mOPV2 due to rapidly declining type 2 mucosal immunity everywhere since withdrawal of tOPV.

Quality microplanning, preparedness monitoring, and intra- and post-campaign monitoring are essential strategies to prepare and achieve high-quality campaigns.

Quality microplanning. Preparation of macro-level plans and budgets based on the target population, local conditions and operational costs allows stakeholders to discuss strategies and secure resources. Such top-down planning must rapidly be accompanied with effective bottom-up microplanning (i.e. developing and validating plans at the community level). Training and supportive supervision help ensure that micro plans are of high quality. Innovations such as GIS imagery are useful to validate plans in challenging or hard-to-reach contexts (e.g. densely populated urban areas, remote settlements with weak documentation or no prior SIAs, inaccessible or mobile populations). See Microplanning Guidelines[l] and Best Practices in Microplanning for Polio Eradication[m] to guide development of micro plans.

Preparedness monitoring. A preparedness dashboard and/or a checklist and timeline are required to track country readiness to launch SIAs and support quality implementation. Detailed pre-campaign readiness and intra-campaign quality monitoring are expected for all vaccination responses. Resources to support preparedness monitoring are available.

Campaign monitoring. A high-quality campaign must aim for coverage of >90% for SIA1 and SIA2 with no persistently missed children. Intra- and post-campaign monitoring is essential to ensure quality of SIAs in all phases. All sources of intra- and post-campaign data must be reviewed and triangulated to assess the quality of the campaign, including but not limited to:

- administrative coverage
- rapid intra-campaign monitoring, convenience surveys and spot checks
- Independent monitoring: house-to-house and out-of-house (market surveys) monitoring
- clustered LQAS
- overall consistency of data sources
- ongoing and new population movements
- vaccine management, monitoring and reporting of vaccine wastage, doses remaining, number of vials unaccounted for (especially for mOPV2)
- observations of campaign personnel, supervisors, monitors, and observers in the field.

For any areas or populations where suboptimal campaign planning and implementation are identified (e.g. coverage <90%, persistently missed children, vaccine hesitancy/refusal), mop-up vaccination must be rapidly carried out. Further details of monitoring approaches are provided in ***Best Practices for Monitoring the Quality of Polio Eradication Campaign Performancen and below in chapter 11.***

l See "Microplanning Guidelines". GPEI guidance. Geneva: Global Polio Eradication Initiative; 2011 (see document within GPEI library http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/, accessed 8 November 2018).

m See "Best practices in microplanning for polio eradication". GPEI guidelines. Geneva: Global Polio Eradication Initiative; 2018 (http://polioeradication.org/wp-content/uploads/2018/08/best-practices-20180810-03.pdf, accessed 8 November 2018).

n See "Best Practices for Monitoring the Quality of Polio Eradication Campaign Performance", GPEI guidelines. Geneva: Global Polio Eradication Initiative; 2018 (http://polioeradication.org/wp-content/uploads/2018/08/best-practices-20180810-03.pdf, accessed 8 November 2018).

Planning for mobile, hard-to-reach and special populations

Special populations are groups that are underserved or not served by the regular health system for reasons such as insecurity, inadequate infrastructure, and/or access barriers. Population groups may be mobile (e.g. economic migrants, internally displaced persons, refugees, nomadic populations) or stationary (e.g. remote, hard-to-reach communities, such as fisherman or islanders, or urban hard-to-reach populations, such as those who live in informal settlements, religious communities, or who are members of marginalized groups). All aspects of outbreak response, including surveillance, immunization and communication strategies, must be tailored to reach special populations.

Strategies for special populations should be developed in conjunction with community leaders, communication and social mobilization experts, and personnel knowledgeable of the context, as well as service providers with special expertise (e.g. non-governmental organizations (NGOs), public services, women's groups, faith-based organizations). Appropriate strategies to vaccinate every child may require creative thinking, and could include tactics such as transit posts, hit-and-run teams, market vaccinations, and/or combined outreach with veterinary or animal vaccinations or other special strategies.

All strategies and tactics must be well documented to ensure that data on the number of children vaccinated, appropriate vaccine management, and other relevant information is collected.

Concurrent circulation of different poliovirus types

If **polioviruses** of different types circulate concurrently, the response to type 2 poliovirus takes precedence, as type 2 immunity is waning globally. Detailed response plans should be reviewed on a case-by-case basis in consultation with GPEI technical experts.

Examples include:

i) **A type 2 poliovirus event or outbreak with concurrent endemic WPV1 transmission**. Both bOPV and mOPV2 are required. The two campaigns may take place separately two weeks apart (or less if operationally feasible). For example, one mOPV2 SIA could be followed 10 to 14 days later by one bOPV SIA. Use of mOPV1 may exceptionally be considered.

ii) **Ongoing transmission of two cVDPVs, such as cVDPV1 or cVDPV3 with cVDPV2.** Response to cVDPV2 takes priority. Rounds of mOPV2 and bOPV might be staggered based on operational feasibility.

Response strategy decisions will be made based on careful review of the epidemiology, the geographical areas affected, the capacity for robust response, and vaccine availability.

Integration with other health interventions

During outbreak response planning, consideration can be given to integrating with other health interventions (e.g. measles campaign already planned, vitamin A, etc.) in the following circumstances:

- Full discussion with all partners takes place at country and other relevant levels.
- Following types 1 and/or 3 outbreak response: RR, SIA1 and SIA2 rounds were successfully implemented. Subsequent risk mitigation rounds could consider integration as a cost-saving measure.
- During type 2 outbreak response: Additional opportunity available to offer bOPV in the midst of a type 2 outbreak, appropriate if bOPV campaign would otherwise be deferred, so as not to allow the type 2 response activities to compete with bOPV risk mitigation and generate types 1 and 3 immunity gap.
- Plans are in place to secure high quality intervention for all antigens considered.
- Monitoring mechanisms are agreed upon in advance.

Inactivated polio vaccine (IPV)

IPV provides a high-level of individual immunity and protection against paralysis. IPV does not induce mucosal immunity in persons without prior OPV immunization for the corresponding serotype. In a child infected with poliovirus without previous OPV vaccination, IPV does not stop onward transmission of the virus. Conversely, IPV boosts mucosal immunity in those with prior OPV exposure .

In specific instances, IPV may be used as a part of immediate response actions, with scope and age group to be determined by local circumstances and following discussion with GPEI partners Where IPV campaigns are deemed to be of benefit, fractional-dose IPV (fIPV) should be implementedHealth worker training materials for fIPV administration are available.

Requesting vaccine

bOPV requests

Vaccine requests for bOPV follow usual procurement procedures through the United Nations Children's Fund (UNICEF).

mOPV2 requests

In line with the World Health Assembly resolution,[o] specifi procedures are in place to access or use mOPV2. Countries must present a risk assessment and vaccine request for consultation by the Advisory Group on mOPV2 Provision(Advisory Group). Only

the WHO Director-General can authorize release of mOPV2 from the global vaccine stockpile, or use of in-country remaining mOPV2 stocks, upon the recommendation of the Advisory Group.

For any outbreak or high-risk event that may require a vaccination response, the country must submit a vaccine request for mOPV2, signed by the national authorities, within 72 hours of the type 2 poliovirus sequencing result (Day 0). The Advisory Group will rapidly review the risk assessment and vaccine request and recommend a course of action to the WHO Director-General.

Upon approval, the mOPV2 vaccine stock with the shortest shelf life will be released by UNICEF from the global stockpile for immediate use. (See vaccine request form and template for approval of import, on the GPEI website[p]).

IPV requests

Any country considering use of IPV in SIAs should fully justify this in the risk assessment and response plan. An IPV response plan should provide rationale, target geography and population, vaccination delivery strategy preferences, preparedness interventions for effective use of vaccine, monitoring and evaluation plans and estimates of the operations costs. This plan should be supported by the National Technical Advisory Group or its equivalent, endorsed by the National Inter-Agency Coordination committee or its equivalent before submitted to GPEI/GAVI for funding. Approvals will be on an exceptional basis only, in line with local circumstances, in-country stock and global IPV supply availability. The country can also request supplies/devices for intradermal administration of fIPV(e.g. 0.1ml syringes and/or adaptors).

o See "Resolution WHA68. Poliomyelitis. In: Sixty-eighth World Health Assembly", pg. 10. Geneva: World Health Organization, 26 May 2015. (http://apps.who.int/gb/ebwha/pdf_files/WHA68-REC1/A68_R1_REC1-en.pdf#page=1, accessed 8 November 2018).

p See "mOPV2 Vaccine Request Form". (Document within GPEI library (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/, accessed 8 November 2018)

Vaccine management and reporting

Vaccine management is integral to ensuring a high-quality vaccination campaign and of paramount importance at all levels and at all stages of the response. The movement of any vaccine used in outbreak response must be monitored. All vaccine received, distributed, and administered must be recorded, through for example, stock management tools and/or vaccine utilization records. All vials and doses used, partially used or unused, must be fully recorded (whether due to partial use, contamination, or vaccine vial monitor changes) and vials returned must be fully accounted for each SIA.

A reverse logistics and vial disposal plan must be integrated with the outbreak response plan outlining:

that health facilities and district vaccine stores will be left with a one-month supply (except for all mOPV2, which is immediately withdrawn);

how excess unused vaccine will be returned to central or regional storage in a reverse cold chain;

(for mOPV2 only), how all vials will be returned to safe disposal sites (used, partially used, unused, vials discarded due to vaccine vial monitor changes or contamination).

For all mOPV2 campaigns and mop-up rounds, it is of critical importance that every vial and dose of unused vaccine is accounted for and withdrawn to central storage in a safe and secure manner. Reporting on the status of vaccine used, retrieved and in storage is required after each and every SIA, including the immediate RR. All lost and missing vials must be reported.[q]

Routine immunization: Recovery and strengthening

The backbone of polio eradication and outbreak response remains routine immunization (RI) against polio in line with the national childhood immunization schedule. In general, cVDPV outbreaks occur in areas with sub-optimal routine immunization coverage. Although priority must be given to achieving high-quality vaccination, polio surge resources can be tasked with supporting RI recovery as soon as possible. Immunization recovery should begin during the outbreak response period, maximizing use of surge capacity to strengthen programme management, microplanning, community mobilization and performance monitoring. It is also critical to build on the political attention resulting from the cVDPV to ensure accountability for routine immunization service delivery. The Emergency Operations Centre (EOC) in collaboration with EPI should effectively maximize the benefit of time-limited support to RI, through a thorough analysis of the reasons for low immunization coverage in the outbreak areas followed by selected short and medium-term immunization systems strengthening actions in line with the operational components of the **Reaching Every District** (RED)[r] approach, namely:

1. Optimization of immunization services (focus on expansion and re-establishment of outreach)
2. Supportive supervision for immunization quality assurance
3. Linking immunization services with communities
4. Monitoring and use of data for action
5. Effective planning and management of immunization resources.

q See: Technical Guidance for mOPV2 vaccine management, monitoring, removal and validation. Geneva: Global Polio Eradication Initiative; 2016 (http://polioeradication.org/wp-content/uploads/2016/11/Technical-guidance-mOPV2-management-monitoring-removal-and-validation_Oct2016_EN.pdf, accessed 8 November 2018).

r See: Technical Guidance for mOPV2 vaccine management, monitoring, removal and validation. Geneva: Global Polio Eradication Initiative; 2016 (http://polioeradication.org/wp-content/uploads/2016/11/Technical-guidance-mOPV2-management-monitoring-removal-and-validation_Oct2016_EN.pdf, accessed 8 November 2018).

8 Surveillance following investigation

Guidelines for routine poliovirus surveillance, including AFP and environmental surveillance, are outlined in other GPEI documents, including; Best Practices in Active Surveillance for Polio Eradication[s]*, and the Global Polio Surveillance Action Plan*[t]*. (While Chapter 4 (above) outlines the initial surveillance steps required as part of a thorough investigation, the current chapter focuses on surveillance enhancement following initial investigation.*

Surveillance enhancement

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, continue surveillance in parallel with other aspects of the response, and 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 greater than three non-polio AFP cases per 100 000 children, younger than 15 years of age, in every subnational division equivalent to a district, for at least 12 months after the last case or isolate. 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.

Countries are to undertake the following activities to enhance AFP surveillance:

- Immediately notify all national and subnational surveillance units about the poliovirus event/outbreak.
- Rigorously sensitize all health care workers to AFP surveillance and notification requirements, including zero-reporting.
- Review and reclassify reporting sites (if required) in the AFP active surveillance network within the immediate outbreak zone and of neighbouring

Box 3. The goal of surveillance during a poliovirus high-risk event or outbreak is to increase sensitivity to detect any poliovirus. To achieve this it is also necessary to ensure proper data management and to meticulously document activity and performance indicators.

An outbreak surveillance plan should include steps for the ongoing review of timeliness and completeness of reporting sites in the AFP surveillance network (both AFP and ES), monitoring active case search, mapping populations not covered by the surveillance network, and raising awareness of surveillance needs among health care providers and the community. All national and international resource requirements (human, financial and logistical) should be included in the plan.

s See "Best practices in Active Surveillance for Polio Eradication", 2018. GPEI guidelines. Geneva: Global Polio Eradication Initiative; 2018 (http://polioeradication.org/wp-content/uploads/2018/08/best-practices-20180810-01.pdf, accessed 8 November 2018).

t See "The Global Polio Surveillance Action Plan (2019–2020)" 2019. GPEI guidelines. Geneva: Global Polio Eradication Initiative (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/).

districts (high-risk areas) and ensure that secondary and tertiary health facilities are fully involved in AFP surveillance.

- 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.
- Monitor and document that at least 90% of all planned active surveillance visits are conducted.
- Consider supplemental strategies, such as enhancing environmental surveillance, in consultation with national and GPEI surveillance experts.
- Ensure the national laboratory is involved in outbreak planning and that capacity is strengthened to handle additional workload and maintain rapid specimen handling.

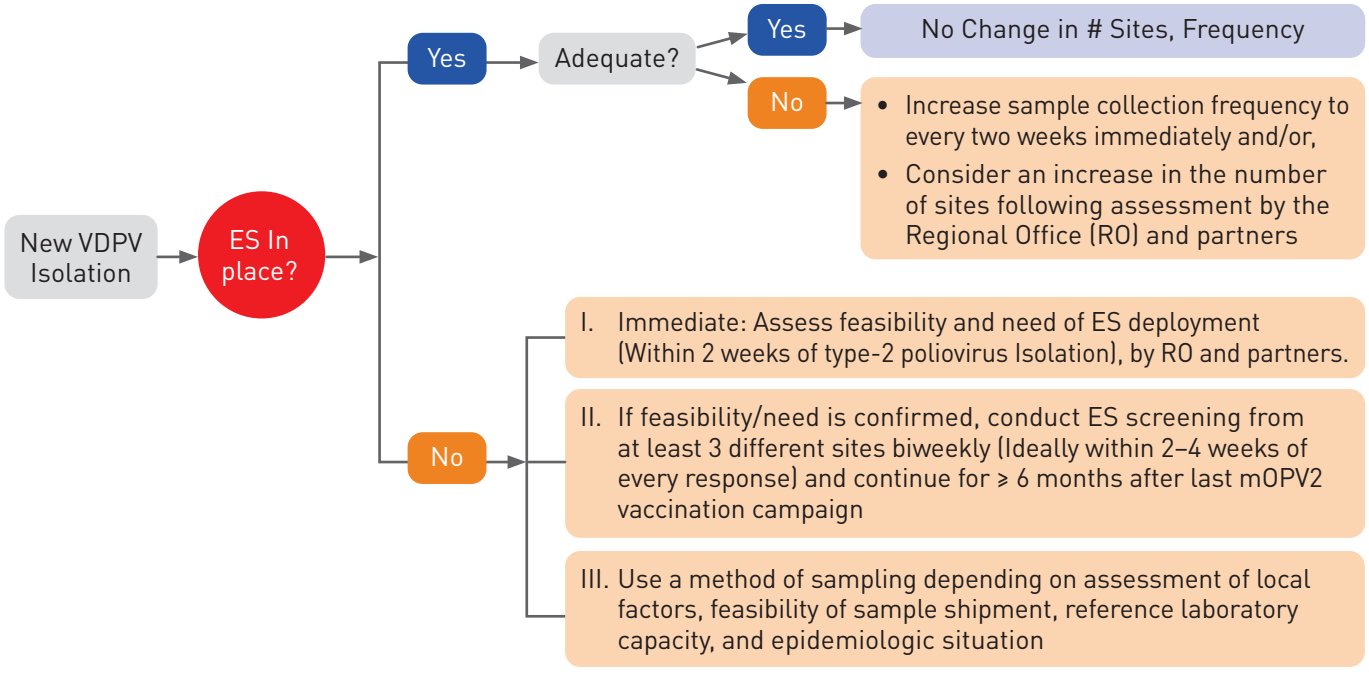
Environmental surveillance

Environmental surveillance (ES) serves as a complement to AFP surveillance, but never as a substitute. It is the monitoring of wastewater or sewage from designated locations to detect the presence of poliovirus. In the context of events and outbreaks, ES can provide information on the geographic extent and duration of poliovirus circulation, as well as the excretion of polio vaccine virus following vaccination.

At the outset of a new event or outbreak, the following actions should be put in place

- Assess the performance of all existing ES sites in the area.
- Increase the frequency of specimen collection to every two weeks, where feasible, for a minimum of six months following the most recent isolate detected or the most recent use of mOPV2, whichever is later.
- Consider new collection sites within and outside the outbreak or event area, where technically appropriate and laboratory capacity allows.
- Assess nearby urban areas with a population of 100 000 or more as candidates for new or enhanced environmental sampling.

Figure 6. Decision process for enhancement of environmental surveillance following a new VDPV2 isolation



Source: Polio Environmental Surveillance Enhancement Following Detection of Vaccine-Related Type-2 Poliovirus. 9 May 2018

Any proposal to scale up ES must consider laboratory capacity to support the effort, and not jeopardize AFP surveillance. Detailed guidelines on *polio environmental surveillance enhancement following detection of vaccine-related type 2 poliovirus* is available, from which Figure 6 is drawn[u].

Strategies for special populations and security-compromised areas

Supplemental surveillance strategies may be required in circumstances involving highly vulnerable populations (e.g. nomads or other populations who do not routinely access health services) and/or inaccessible areas beyond the routine reach of even enhanced health or surveillance services. Activities will need to be tailored to the specific situation, but consider the following approaches:

1. If not already in place, identify community leaders or healers, including women, as focal points and provide the training and tools to facilitate access to and reporting of suspect AFP cases.
2. Increase community sensitization to polio and AFP surveillance, using culturally appropriate tools.
3. Leverage innovative partnership with other groups or services with access to special populations (e.g. other government ministries or departments, other United Nations organizations, NGOs, civil society groups, veterinarians, etc.).
4. Selectively use other supplemental strategies that are usually only part of an initial field investigation. Given the relatively low yield and high resource needs of these strategies when used in the long term, they should only be considered in consultation with GPEI partners and laboratory counterparts.
    - Contact sampling in high-risk, security-compromised or hard-to-reach populations may exceptionally be advised for every AFP case for a limited time only, such as, for example, in recently accessed areas. As an ongoing surveillance strategy, ongoing contact sampling can be maintained for no longer than six months.
    - Once transmission has been demonstrated in an area, healthy children surveys are no longer necessary and not recommended. However, such surveys may occasionally help assess possible outbreak expansion (e.g. into other geographic areas where poliovirus may be circulating undetected by AFP surveillance, or along transit routes of mobile groups). In exceptional situations, a stool survey may be a screening tool for groups moving from an event/outbreak area to a new area (e.g. internally displaced populations, refugees).
5. If poliovirus is found in a high-risk mobile population (e.g. internally displaced populations, refugees, or nomads), or in an area frequented by populations on the move, then immediately assess surveillance sites along known migration routes to seek evidence of transmission.

u See "Polio Environmental Surveillance Enhancement Following Detection of Vaccine-Related Type-2 Poliovirus." 2018. Geneva: Global Polio Eradication Initiative (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines).

9 Communication and social mobilization

Communication for Development (C4D) is a systematic, planned and evidence-informed strategy to promote positive and measurable behaviour and social change. Effective social mobilization, with emphasis on high-risk populations, is a key component of polio outbreak response. The polio C4D outbreak response approach is designed to redress perceptions and social norms that deter caregivers from vaccinating their children, and rebuild commitment to vaccination, including routine immunization.

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.

Critical C4D steps include:

- raising awareness of campaign dates
- strengthening community perception of vaccination through building trust in health worker capacity, vaccine safety and efficacy
- elevating perception of polio risk
- addressing bottlenecks in the decision to vaccinate.

In the context of vaccine-derived poliovirus, communication of risk is particularly challenging, especially when the virus is detected only in the environment. While the C4D outbreak response for VDPVs follows the same principles as for WPV, it is important to reinforce vaccine safety messaging and address any context-specific fears or misconceptions around vaccines. For VDPV found only from environmental sources, it is critical to explain that low immunity is the root cause.

Strategic C4D framework for polio outbreak response

Immediate C4D outbreak response communication is initiated as soon as an outbreak is declared and should be integrated in all aspects of planning and responding to an outbreak or high-risk event. The outcome of the joint epidemiological and social investigation of the infected case/area is critical to understand the social environment for areas or groups affected by the virus. Interventions should be based on understanding of all relevant social barriers and promote vaccination. (See Strategic Framework within the *Communication for Development Guidelines for Responding to Polio Events and Outbreaks* for detailed guidance[v]).

At this phase, the focus is on building (or rebuilding) caregivers' critical awareness about polio, OPV and the fact that there is an outbreak in the community that puts children at risk. The primary goal is to raise awareness of the outbreak to at least 90%. Communication approaches should be straightforward, clear and elicit an urgent response from parents and the community at large.

Plans for subsequent campaigns, including SIA1, SIA2 and a mop-up round, should include C4D interventions to reach missed children and reduce refusals. Activities should continue to elevate public risk perception of the outbreak and its impact, especially for non-compliant groups or communities. For campaigns using the SIAD approach, locally appropriate messaging is important, so that families understand the process and why children may be vaccinated more than one time in short intervals.

v See "Communication for development guidelines for responding to polio events and outbreaks, post switch". 2016. Geneva: Global Polio Eradication Initiative (http://polioeradication.org/wp-content/uploads/2016/12/C4DGuidelines_OutbreakPostSwitch_Nov2016_EN.pdf, accessed 8 November 2018).

Protracted outbreak response. Where an outbreak is ongoing for more than four months (120 days), there may be one or more underlying communication barriers. As the target audience may include acceptors, vulnerable acceptors, transient groups or even rejecters, conducting a root cause analysis is effective to identify such barriers, whether social, or related to access or quality of the service. Reasons for missed children should be well investigated and analysed to adjust strategies for issues such as fatigue of repeated campaigns, or mistrust in vaccine or frontline workers.

In a protracted outbreak, the barriers to acceptance are specific to each community, culture and region, and may be unique and complex. It is important to monitor systematically and understand patterns of reported reasons for missed children before designing communication solutions. The objective is to maintain or increase the percentage of awareness to 90% or more and keep total refusals below 2%.

Maintaining gains and strengthening routine immunization. Regardless of how the outbreak evolves, the focus of C4D strategies should shift towards supporting routine immunization as soon as possible, and also as the outbreak draws to a close. Outbreak response plans should indicate how routine immunization services will be promoted, especially for low coverage areas. The outbreak coordination should also develop preparedness plans to mitigate the risk of future outbreaks. The final outbreak response assessment (OBRA) reviews country improvement plans for routine immunization and longer-term preparedness. Achievements and lessons learned from social mobilization, advocacy and media and partnership activities at the national, provincial, and district levels should be documented.

Data gathering to guide C4D activities

At the beginning of an outbreak, it is important to review existing data sources for knowledge, attitudes, practices and behaviour, or if not available, to conduct a rapid social assessment of norms that may affect vaccination. Gender issues should be integrated into data analysis to ensure that gender roles and norms are considered, and communications interventions address the different needs, challenges, preferences and perceptions of everyone in the community. This review should be done before initiating the response and to guide the development of C4D interventions.

After each campaign, IM/LQAS data and or other sources should be analysed in a timely way, especially regarding the core indicators for C4D, in order to amend communication strategies as required. Core indicators include: overall percentage of missed children; percentage of missed children for different reasons (grouped into social, operational and absences); percentage of refusals; percentage of refusals by reason; percentage of absence by reason; percentage of parents aware of the campaign prior to vaccinator's visit; and percentage reached through different communication channels. This data must be sex-disaggregated and analysed accordingly.

At the end of the outbreak, it is important to assess community acceptance of, and commitment to, vaccination, for example, through small-scale surveys or secondary data analysis, and to document the outcome of C4D activities.

Communication strategies

Deploying a variety of strategies ensures that communities and decision-makers at local, national, and regional levels are engaged in promoting vaccination. The C4D interventions must always precede the conduct of campaigns to achieve the desired awareness and acceptance of vaccination. Immediately creating or reinvigorating a national communication or social mobilization committee is critical. The role of the committee is to plan, coordinate and ensure the successful implementation of media and C4D interventions.

In many contexts, **political advocacy** is urgent to garner the attention needed to support response efforts and strengthen public trust in vaccination.

At the beginning of the outbreak, **media advocacy** is also critical to ensure that information is clear and managed. The Ministry of Health and WHO, generally the first to announce an outbreak, should take the lead in this area. As part of the C4D/ communication strategy it is recommended to

Box 4. Details of C4D and communication activities, including social mapping, training of social mobilizers, engagement with influencers, tracked refusals, etc. should all be included as part of the operational micro plans.

establish immediately which agency is leading the media response. This leadership role will depend on capacity in each country, noting that UNICEF usually leads C4D and supports the media response.

Mass and social media play a critical role for reaching a large audience very quickly, especially where interpersonal communication networks are less strong. In conflict areas, radios are an excellent channelling tool.

Engagement with religious and community leaders, health providers, parliamentarians, women's and youth groups, or other influencers in the social network is an important strategy to build strong public consensus about the urgency of the outbreak and the need to take collectively the decision to vaccinate.

Training of frontline workers and community mobilizers is critical for high-quality response, especially when the C4D strategy relies on interpersonal communication. Global training standards are available for training of vaccinators and other volunteers.[w]

Reaching special populations and conflict-affected areas

Special populations that are hard-to-reach or in conflict areas can be particularly vulnerable to polio outbreaks. The design of strategic C4D interventions and messages for these populations should always be based on social profiling of polio-confirmed and zero-dose non-polio AFP cases or contact cases, as well as any other available social research for those groups.

Community mobilizers should be selected from target communities and efforts should be made to include women. To build community trust, (s)he should be trained on key messages and be part of the vaccination team.

Community influencers/groups should be consulted and engaged in the planning phase of the campaign with continuation through to the end of the outbreak. These influencers can be a clan leader, mayor, grandmother, school teacher, or a community elder. It would be important to sensitize communities to AFP and encourage reporting, including through community networks if applicable.

Geographic, security or demographic challenges could limit access. The use of non-traditional means such as mobile texting, awareness around water points, days when a population moves from one place to the other, printing messages about polio on food bags, or inserting messages in bread packages and other innovations, may augment standard communication strategies.

w See Polio training manual for health worker supervisors. Geneva: Global Polio Eradication Initiative (https://poliok.it/library/Polio%20Training%20Manual%20For%20Health%20Worker%20Supervisors, accessed 8 November 2018).

10 GPEI support

National authorities have the ultimate ownership and accountability for a robust and comprehensive response to poliovirus outbreaks and the maintenance of leadership throughout. The GPEI partners support key functions for an outbreak response including:

- outbreak preparedness
- risk assessment and event/outbreak response planning
- advocacy and coordination
- technical and human resources, including:
  - information management
  - communication, social mobilization and behaviour change
  - vaccination activities
  - surveillance enhancement
  - security and access
- finance and logistics, including coordinated resource mobilization
- outbreak response assessment.

Table 7 offers a summary of the nature of support that GPEI is expected to provide, according to the grade of the outbreak as assigned by WHO or amended for GPEI surge support. Each outbreak is unique, and so are the support needs. Those responsible for outbreak coordination nationally, regionally and globally, will need to reassess support needs on a continuing basis to ensure effective and timely response.

Table 7. Outbreak response scale-up and support according to grade

Type of Support	Grade 1	Grade 2	Grade 3
Response leadership	National coordinator	GPEI-nominated coordinator	GPEI-nominated coordinator and high-level advocacy as needed
Technical liaison	Polio expert mission from the GPEI partners to support outbreak response plan development	Deployment of a multidisciplinary rapid response team	Deployment of a multidisciplinary rapid response team
Surge	Stop Transmission of Polio (STOP) programme support if needed	• Deployment of surge support team:[1] multidisciplinary consultant team for minimum six-month deployment • STOP support	• Deployment of surge support team:[1] multidisciplinary consultant team for minimum six -month deployment • STOP support
Financial	Standard financing for outbreak response immunization activities (an advance of up to US$500 000)[2]	'No-regrets' financing policy (an advance of up to $500 000) prior to completion of response budget	'No-regrets' financing policy Financial support for security measures, if required
Security and access	Coordination with United Nations and humanitarian agencies in the field	Coordination with United Nations and humanitarian agencies in the field	Deployment of field security officer(s) where necessary Coordination with United Nations and humanitarian agencies in the field

1 Composition of team and number of experts deployed for rapid response and surge support teams will be scaled up to meet the needs of the country.

2 Standard financing is subject to re-payment conditions, as determined on a case-by-case basis.

Coordination

Coordination mechanisms for polio are triggered by a laboratory notification (Day 0) of a new outbreak or high-risk event. The country, region and global levels will coordinate to support the investigation, rapid risk assessment and determination of next steps.

The OPRTT will lead outbreak coordination with national authorities, WHO and UNICEF regional offices, and all GPEI partners. The OPRTT will conduct a coordination call within 48 to 72 hours with partners to address the needs of the country, monitor the immediate provision of no-regrets funding, and plan the required resources and initial response support interventions. The OPRTT will include all necessary skill sets to coordinate outbreak response, including a resource mobilization focal point. Regular updates will be provided from OPRTT to the GPEI Eradication and Outbreak Management Group.

For grade 2 and 3 outbreaks (and high-risk events), WHO and UNICEF regional offices, in consultation with OPRTT, will nominate an outbreak coordinator for deployment to the country level within 14 days of Day 0. The GPEI outbreak coordinator will be deployed as additional support for in-country authorities, supplementary to existing senior GPEI staff, to ensure comprehensive and timely coordination and outbreak management at national and subnational levels.

Budgets and financing

Coordinated approach

The goal of outbreak response financing is to ensure that cash flow challenges do not interfere with the roll-out of response activities, based on a "**budget–mobilize–finance–replenish**" model. National authorities should rapidly prepare a comprehensive budget, in collaboration with WHO, UNICEF and other partners. The budget should include a comprehensive estimate of costs for all activities (i.e. coordination, vaccination, surveillance, communication and social mobilization) and enabling functions (i.e. laboratory operations, training and transport). A joint comprehensive work plan and budget shared with all levels involved will aid in mobilizing funds from donors to secure financing for response activities.

WHO headquarters will provide specific guidance and timelines on outbreak budgeting.

"No-regrets" financing policy

The "no-regrets" financing policy (an advance of up to $500 000) helps ensure a timely, barrier-free release of funds to countries to support outbreak response, even if it is later realized that a smaller contribution may have sufficed. This policy affirms that it is better to over-resource critical functions than to risk failure by delays in resources. The release of funds by GPEI partners may pre-date outbreak grading by WHO, based on the initial risk assessment and discussion between national, regional and global levels. Whereas funds will usually be released by WHO, either UNICEF or another GPEI partner may on occasion provide the funding.

Human resource surge

The objectives of GPEI surge support are to: i) **rapidly activate deployment** of skilled professionals, especially for grade 2 and grade 3 outbreaks, to support the national response team for key outbreak response functions; and ii) **ensure smooth transition** to longer-term staffing. It is important to ensure the balanced recruitment of women and men into technical and operational roles at all levels.

The earliest activation is deployment within 72 hours of laboratory result notification (Day 0) through a partner-wide interregional mechanism for deploying staff and engaging qualified consultants.

The OPRTT coordinates surge support and technical assistance in the following areas:

- Identifying key roles, according to outbreak grade and assessed needs of the country. Expertise offered includes both technical (communication, immunization, surveillance, data management), and operational (coordination, finance, human resources) skill sets.

- Team composition scaled according to need, for example, outbreak coordinator, operations manager, communications officer, and technical experts for immunization and surveillance.
- Personnel with specialized expertise may also be available to provide support to innovative strategies to improve the quality of response, such as for GIS mapping of the outbreak zone.
- The **Rapid Response Team** involves deployment from respective GPEI agencies, including regional offices. Recruitment for active support may extend beyond outbreak teams within each agency. The period of deployment is from outbreak notification until the rapid response SIA, where indicated.
- The **Surge Support Team** is an interagency on-call roster for longer-term deployment using a central platform for ease of visibility and reporting. The Surge Support Team should be in place within three weeks of outbreak confirmation. The expected period of deployment is from the rapid response SIA until the end of the outbreak. Response teams will aim for at least one week of overlap between the work of the Rapid Response Team and that of the Surge Support Team to ensure complete and detailed handover.
- Identifying needs and advocating for specialized support and innovation when warranted by context (e.g. GIS-informed microplanning, detailed enumeration, administration, and finance).

GPEI performance standards

The GPEI partners will undertake a range of activities to support a country-led response. Outbreak response performance standards describe the expected outputs from each level of GPEI partners in key outbreak response functions. The actions and deliverables expected of countries and GPEI partners by specific timeline (within hours, days and weeks of virus sequencing report) are outlined in Annex 2).

These performance standards apply to polio outbreaks of all grades. The time frame for the expected response is counted forward from the date of the initial laboratory sequencing results. These standards are not exhaustive and may be modified as required to fit the context specific to the country and the outbreak.

The OPRTT will provide support to coordinate and monitor the outbreak response.

11 Monitoring and evaluation of response

Quality assurance for outbreak response is critical and should include both quantitative and qualitative methods for all core aspects of response. Countries are encouraged to develop tools and indicators tailored to best monitor all stages and components of outbreak investigation and response See GPEI library for tools and guidance documents. [x]

Table 8 outlines suggested, but not comprehensive, approaches and indicators for monitoring. Electronic data capture using mobile-enabled devices and real-time secure data upload is recommended wherever feasible to support timely and comprehensive reporting for all response activities (surveillance, vaccination, social indicators). The use of electronic data capture methods requires effective training, data cleaning and analysis, and continual quality checks.

Table 8. Assessing quality of response: factors to consider before, during and after implementation

Surveillance	Vaccination	Communication and social mobilization
Planning and preparation		
• 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 microplans with detailed mapping, complemented by innovations such as GIS imagery and cross-validation where feasible	• Evidence of engagement with community, women's groups and religious leaders • 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[1]	• 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 including women's groups and religious leaders active during vaccination campaigns • No block vaccination refusals

x See GPEI tools, protocols and guidelines (website). Geneva: Global Polio Eradication Initiative (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/, accessed 8 November 2018).

Surveillance	Vaccination	Communication and social mobilization
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

1 For detailed guidance see Global Polio Surveillance Action Plan and Polio Environmental Surveillance Enhancement Following Detection of Vaccine-Related Type-2 Poliovirus in GPEI library (http://polioeradication.org/tools-and-library/).

Monitoring quality of SIAs

The primary indicator for the **rapid response SIA** is the time in days from outbreak notification (Day 0) to the first day of vaccination (Target <14 days). Campaign monitoring may be carried out if capacity allows but should not detract resources from high-quality microplanning for large-scale SIA1 and SIA2.

SIA 1 and **SIA 2** must be fully monitored, and results communicated to GPEI partners within 14 days of each campaign. The purpose of monitoring is to identify all areas or sub-populations with <90% coverage or persistently missed children so that corrective action may be taken. Under-performing areas must be comprehensively discussed to determine special strategies, additional effort (e.g. extending the campaign, additional communications and/or vaccination teams, or a mop-up round with an adjusted communications strategy), and resources needed.

Strategies required to monitor campaigns for all SIAs (SIA1, SIA2), all mop-up activities, and additional large-scale SIAs – include, at a minimum, IM and clustered-LQAS.

Intra- and post-campaign monitoring. Intra and post-campaign monitoring employ survey methods with purposeful sampling in areas where coverage is expected to be insufficient and should be implemented according to protocol. The goal of intra-campaign monitoring is to ensure corrective action in a timely manner (e.g. the same day or the next day, including re-visit strategies) to improve implementation performance. Post-campaign monitoring allows in-depth and rigorous analysis for areas missed or not meeting coverage targets, and an examination of the reasons for missed or unvaccinated children.

Clustered LQAS surveys undertaken with sampling proportional to population size are recommended for all areas covered by outbreak response. For results to be valid, care must be taken to plan and implement according to protocol. Specific guidance is available.[y]

Spot checks, convenience surveys and verbal reports by monitors, supervisors, and independent campaign observers (e.g. international GPEI personnel or third-party agency personnel) are a very useful adjunct for SIA monitoring, and should be welcomed and used liberally to confirm or question coverage reporting.

Selection and training of monitors is important. Clear terms of reference outlining independence of the monitors from immunization activities are helpful for all monitors. Ideally, monitors should be recruited and trained for each SIA round. Deploying the same personnel for successive campaigns is

y See "Assessing vaccination coverage levels using clustered lot quality assurance sampling: field manual". 2012. Geneva, Global Polio Eradication Manual (http://polioeradication.org/wp-content/uploads/2016/09/Assessing-Vaccination-Coverage-Levels-Using-Clustered-LQAS_Apr2012_EN.pdf, accessed 8 November 2018).

discouraged. Sources for recruitment of monitors include universities and colleges (e.g. nursing or medical students), community NGOs or service agencies (e.g. health workers not directly involved in the response) and should be selected to fit the local context.

Timeliness of reporting monitoring results is important to ensure accountability, rapid issue identification, and course correction where warranted. Monitoring results must be communicated to GPEI partners at national, regional and global levels within 14 days of campaign completion.

Monitoring surveillance enhancement

Countries should monitor weekly surveillance indicators and reporting from all subnational reporting units with emphasis on high-risk sub-populations and the outcome and impact of all enhancements.

In addition to routine AFP surveillance indicators with detail to subnational reporting level, regular updates on process indicators should be provided, including timeliness of investigation, sample collection, and receipt at 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 laboratory should also routinely summarize any capacity challenges they face and proposed solutions.

Outbreak response assessments (OBRAs)

The purpose of OBRAs is to assess whether vaccination and surveillance response is robust enough to detect and stop poliovirus transmission and to determine what is needed to address gaps. Polio OBRAs should be timely, effective, practical and independent.

The first OBRAs is conducted 3 – 4 months after virus notification, a follow up program desk review will be conducted 6–9 months from last detected isolate, or as appropriate to the circumstances. Extended outbreaks may warrant intermediate OBRAs or desk-reviews.

An external team of experts will assess the quality of response, the evidence of poliovirus transmission and the quality of surveillance. Specifically, the objectives are to:

1. assess and strengthen efforts to increase population immunity;
2. assess progress towards interrupting poliovirus transmission;
3. assess and strengthen surveillance sensitivity.

The OPRTT and WHO regional office will facilitate organization of the OBRAs and follow up program desk reviews in coordination with country teams.

For any response with mOPV2, the OBRA team will recommend management options for the vaccine remaining after all campaigns are completed. For high-risk events for which vaccination was carried out, an event response assessment or external desk review may also be undertaken.

The OBRA team leader will conduct a debriefing before departing and submit a report to the country team, OPRTT chair, WHO regional office, and the Director of the WHO polio programme.

The WHO regional office will confirm the end of the outbreak based on the response assessment report and recommendations.

The country must provide a post-OBRA action plan within one month of the end of the OBRA.

Detailed guidance, tools and materials for outbreak response assessments and vaccine management are available.[z]

z See "Polio Outbreak Response Assessment (OBRA): Aide Mémoire". 2018 (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/).

Is the outbreak over?

The criteria to determine if a poliovirus outbreak has ended are outlined below in table 9.

Table 9. Criteria to determine if a poliovirus outbreak is over

Criteria to determine if a poliovirus outbreak is over
1 No poliovirus of the outbreak serotype detected from any source (AFP, contact, environmental) for at least six months since virus last detected.
AND
2 Surveillance criteria over previous 12 months met in outbreak and high-risk areas, and other areas at risk, including cross-border outbreaks[1]: i) NPAFP ⩾3 per 100 000 population <15 years of age (or national objective, whichever is higher). ii) ⩾80% stool adequacy of all AFP case stool collected.
AND
3 Convincing evidence that areas at high risk or with conflict, displacement, difficult to access and small populations, have been identified and planned for, and that adapted strategies[2] have been successfully implemented to: i) interrupt transmission of poliovirus; ii) detect any ongoing poliovirus transmission.
After comprehensive review of indicators, data quality and qualitative information in the local context, the OBRA team has the responsibility to give the best possible opinion as to whether: i) an outbreak appears to be over, even if not all criteria are strictly met; or ii) an outbreak cannot be considered over, even in the absence of detectable virus isolation.

1 Criteria to be met at first administrative level, or second administrative level for populous countries (e.g. India, Nigeria, Pakistan), and other high-risk areas, as determined by the OBRA team.

2 Strategies include: innovative vaccination outreach activities, active case search, community surveillance, estimate of population, as yet unreached by vaccination, by surveillance

The OBRAs should continue until the end of outbreak criteria are met.

If the 'end of outbreak' criteria are not met in a country or zone, the OBRA team will recommend the next steps:

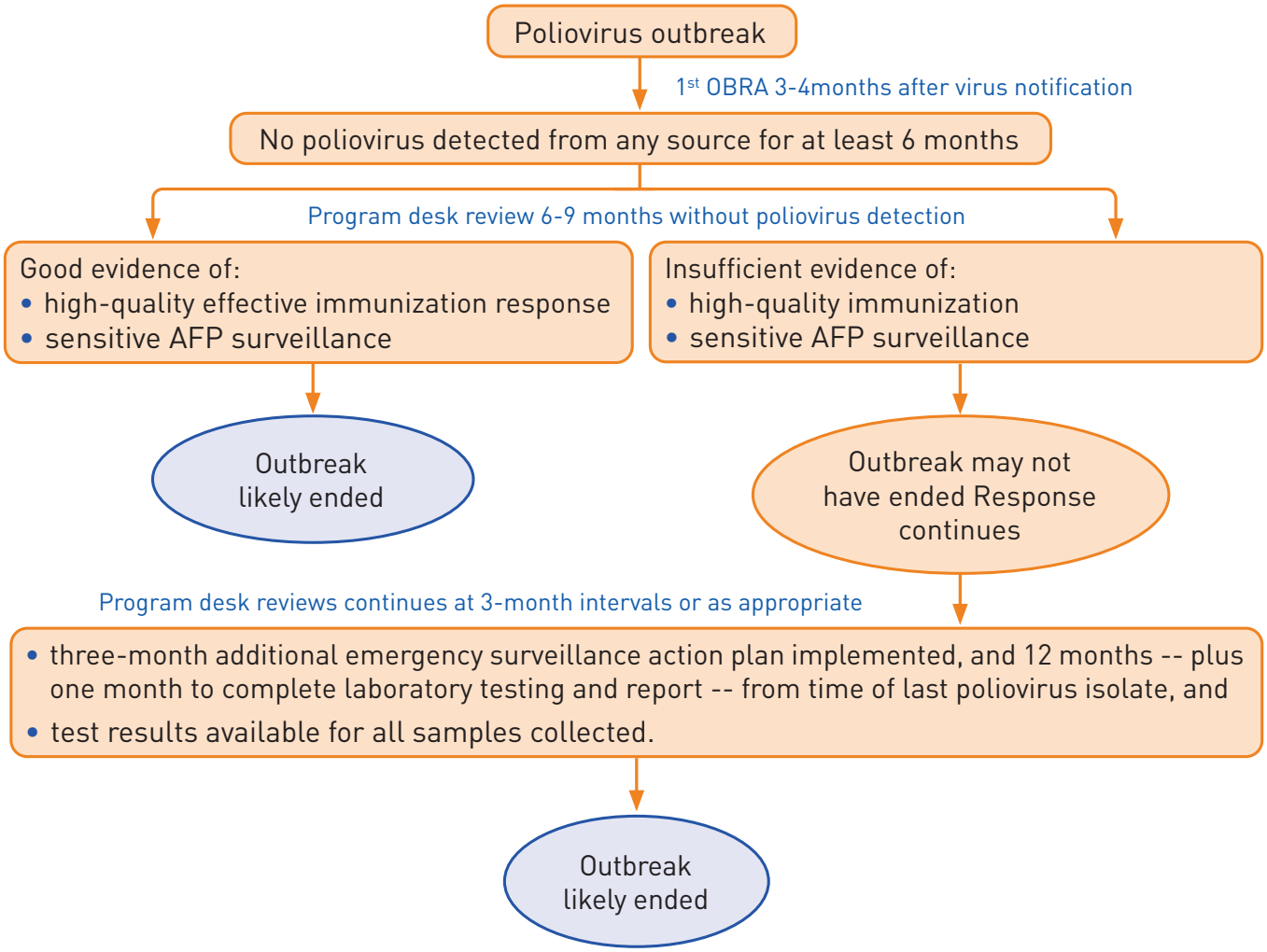
- At 6 months with no poliovirus detected, strengthen internal and external support for response and continue OBRAs and/or external desk reviews as appropriate.
- At 9 to 12 months without virus detected, put in place an additional 3- month emergency plan for:
  - a) surveillance, e.g. intense active case search in outbreak area or other enhancements
  - b) supplemental immunization, e.g. innovative strategies to reach every child in mobile or high-risk populations
  - c) routine immunization, e.g. proven strategies to reach every district (RED approach);
- Repeat program desk reviews after 3–4 months,or as appropriate .

When criteria are met and/or the OBRA team is satisfied that outbreak response has been sufficient, in following the decision tree below (Figure 7), the OBRA team recommends that the outbreak can be closed.

The WHO regional office considers the OBRA findings in consultation with the OPRTT, shares the report with the national and regional certification commissions, and may confirm the outbreak is over and can be 'closed'. The country is informed accordingly.

Figure 7 illustrates a decision tree for determining if an outbreak has ended.

Figure 7. Outbreak response assessment decision tree



International Health Regulations

Polio was declared a public health emergency of international concern on the 5th of May 2014, and according to the Temporary Recommendations issued by the WHO Director General, the criteria to assess countries as no longer infected by WPV1 or cVDPV are as below.

- Poliovirus Case: 12 months after the onset date of the most recent case PLUS one month to account for case detection, investigation, laboratory testing and reporting period OR when all reported AFP cases with onset within 12 months of last case have been tested for polio and excluded for WPV1 or cVDPV, and environmental samples collected within 12 months of the last case have also tested negative, whichever is the longer.
- Environmental isolation of WPV1 or cVDPV (no poliovirus case): 12 months after collection of the most recent positive environmental sample PLUS one month to account for the laboratory testing and reporting period.

Every three months, the committee meets to review the emergency status and to determine to which countries the Temporary Recommendations should apply. However, if a country is considered no-longer infected according to the Temporary Recommendations this does not always mean the outbreak is closed, as the response may need to continue.

Documenting lessons learned

There is great value for countries to review the performance of the outbreak or event response and document lessons learned. The outbreak documentation should, among other things, include:

a) a detailed outbreak investigation and risk assessment
b) descriptive epidemiology (including index case investigation)
c) surveillance response to monitor the evolution up to the end
d) immunization response outlining the key milestones for quality assurance and innovations (micro-planning, training, preparedness monitoring, logistics management, community engagement and monitoring/supervision)
e) coordination of the outbreak response, including timing and effectiveness of surge of efforts.

Typically, best practice in emergency response includes a formal after-action review. The lessons learned are useful in improving emergency preparedness planning and can inform response to future events or outbreaks.

Outbreak documentation should also outline lessons learned and best practices highlighted by the OBRAs as strategic to successful interruption of polio outbreaks. Several relevant documents on best practice have recently been published[aa]. Support is available for countries to document lessons learned from polio eradication.

aa See Capturing and sharing lessons learned [website] Geneva: Global Polio Eradication Initiative (http://polioeradication.org/polio-today/preparing-for-a-polio-free-world/transition-planning/lessons-learned-from-polio-eradication/, accessed 8 November).

Bibliography

For additional information, users of this document are requested to consult the following:

AGORA. UNICEF's Global Hub for Learning and Development (https://agora.unicef.org/index.php, accessed on 4 December 2018). Assessing immunization coverage with clustered lot quality assurance sampling (clustered-LQAS). Field Manual. Geneva: Global Polio Eradication Initiative; 2012 (http://polioeradication.org/wp-content/uploads/2016/09/Assessing-Vaccination-Coverage-Levels-Using-Clustered-LQAS_Apr2012_EN.pdf, accessed 8 November 2018).

Best Practices for Monitoring the Quality of Polio Eradication Campaign Performance. GPEI guidelines. Geneva: Global Polio Eradication Initiative; 2018 (http://polioeradication.org/wp-content/uploads/2018/08/best-practices-20180810-03.pdf, accessed 8 November 2018).

Best practices for planning a vaccination campaign for an entire population: supplement to Best practices in microplanning for polio eradication. Geneva: World Health Organization; 2018 (WHO/ POLIO/18.04). License: CC BY-NC-SA 3.0 IGO. (http://polioeradication.org/wp-content/uploads/2018/08/best-practices-20180810-01.pdf, accessed 28 November 2018).

Best practices in microplanning for polio eradication. GPEI guidelines. Geneva: Global Polio Eradication Initiative; 2018 (http://polioeradication.org/wp-content/uploads/2018/08/best-practices-20180810-03.pdf, accessed 8 November 2018).

15th Meeting of Strategic Advisory Group of Experts (SAGE) Polio Working Group, April 2018 – Conclusions and recommendations, Note for the Record. Geneva: World Health Organization; 2018 (http://www.who.int/immunization/sage/meetings/2018/april/2_WHO_Polio_SAGE_Apr2018.pdf?ua=1, accessed 8 November 2018).

Guidance note on cold chain logistics and vaccine management during polio supplementary immunization activities. GPEI guidelines. New York: UNICEF; 2017 (http://polioeradication.org/wp-content/uploads/2017/10/Cold-chain-logistics-and-vaccine-management-during-SIA_May2017_EN.pdf, accessed 8 November 2018)

Global guidelines. Independent monitoring of polio supplementary immunization activities. Geneva: Global Polio Eradication Initiative; 2016 (http://polioeradication.org/wp-content/uploads/2016/08/IndependentMonitoringGuidelines_20101124.pdf, accessed 8 November 2018).

Global Polio Laboratory Network (GPLN) [website]. Geneva: Global Polio Eradication Initiative (http://polioeradication.org/polio-today/polio-now/surveillance-indicators/the-global-polio-laboratory-network-gpln/, accessed 4 December 2018).

GPEI Polio outbreak response assessment (OBRA): Aide-Mémoire. (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/).

International Health Regulations (2005), 2nd Edition. Geneva: World Health Organization; 2008 (http://www.who.int/ihr/publications/9789241596664/en , accessed 8 November 2018).

Polio Environmental Surveillance Enhancement Following Detection of Vaccine-Related Type-2 Poliovirus. 2018. Geneva: Global Polio Eradication Initiative (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/, accessed on 4 December 2018),

Polio eradication and endgame strategic plan 2013–2018 [website]. Geneva: Global Polio Eradication Initiative; 2013 (http://www.polioeradication.org/resourcelibrary/strategyandwork.aspx, accessed 8 November 2018).

Polio vaccines: WHO position paper – March 2016. Weekly Epidemiological Record. 2016; 91(12):145–168 (http://www.who.int/wer/2016/wer9112.pdf?ua=1), accessed 8 November 2018).

Poliomyelitis: intensification of the global eradication initiative. Report A67/38. In: Sixty-seventh World Health Assembly. Geneva: World Health Organization, 2014 (http://apps.who.int/gb/ebwha/pdf_files/WHA67/A67_38-en.pdf, accessed 8 November 2018).

Public Health Management of Facility-Related Exposure to Live Polioviruses: Interim guidance in managing exposed persons for countries hosting facilities that maintain live polioviruses, GPEI website library (http://polioeradication.org/tools-and-library/resources-for-polio-eradicators/gpei-tools-protocols-and-guidelines/, accessed on 4 December 2018).

Reaching Every District (RED), 2017 revision. Brazzaville: World Health Organization. 2017 (http://apps.who.int/iris/bitstream/handle/10665/260112/9789290233954-eng.pdf?sequence=1&isAllowed=y, accessed 8 November 2018).

Reporting and classification of vaccine-derived polioviruses. GPEI guidelines. Geneva: Global Polio Eradication Initiative; 2016 (http://polioeradication.org/wp-content/uploads/2016/09/Reporting-and-Classification-of-VDPVs_Aug2016_EN.pdf, accessed 8 November 2018).

Rhizome by GPEI; Tools and guidance to help you design data-driven communication strategies that help vaccinate every child (https://poliok.it/c4d, accessed on 4 December 2018).

Stop Transmission of Polio (STOP) Program [website]. Atlanta: United States Centers for Disease Control (http://www.cdc.gov/globalhealth/immunization/stop/index.htm, accessed 8 November 2018).

Surveillance Indicators [website]. Geneva: Global Polio Eradication Initiative (http://www.polioeradication.org/Dataandmonitoring/Surveillance.aspx, accessed 4 December 2018).

Technical guidance: mOPV2 vaccine management, monitoring, removal and validation. Oct 2016. (http://polioeradication.org/wp-content/uploads/2016/11/Technical-guidance-mOPV2-management-monitoring-removal-and-validation_Oct2016_EN.pdf, accessed 30 October 2018).

Use of fractional-dose inactivated polio vaccine (fIPV) in supplementary-immunization activities (SIAs). GPEI Aide Mémoire, 2017 (http://polioeradication.org/wp-content/uploads/2017/11/polio-fipv-in-sias-aide-memoire-01092017-en.pdf, accessed 8 November 2018).

Use of AFP contact sampling and targeted healthy children stool sampling. GPEI Job Aid. 2019 (http://polioeradication.org/wp-content/uploads/2016/07/AFP-contact-sampling-and-targeted-healthy-children-stool-sampling-20190919.pdf, accessed 20th January 2020).

Vaccine-associated paralytic polio (VAPP) and vaccine-derived poliovirus (VDPV). GPEI fact sheet. Geneva: World Health Organization; 2015 (http://www.who.int/immunization/diseases/poliomyelitis/endgame_objective2/oral_polio_vaccine/VAPPandcVDPVFactSheet-Feb2015.pdf, accessed 8 November 2018).

World Health Assembly. Resolution WHA68 on Poliomyelitis. In: Sixty-eighth World Health Assembly. Geneva: World Health Organization, 26 May 2015. (http://apps.who.int/gb/ebwha/pdf_files/WHA68-REC1/A68_R1_REC1-en.pdf#page=1, pg. 10. accessed 8 November 2018).

WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use. Geneva: World Health Organization; 2015 (http://apps.who.int/iris/handle/10665/208872, accessed 8 November 2018).

Annexes

Annex 1.

Risk assessment overview: Summary of elements for systematic risk assessment of a new VDPV, WPV or SL2 isolation.

Annex 2.

Timeline and responsibility for outbreak response activities from Day 0 to outbreak closure

Annex 1. Risk assessment overview: Summary of elements for systematic risk assessment of a new VDPV, WPV or SL2 isolation

Risk Category	High risk	Low risk	Remarks
Virology			
cVDPV	Automatically defined as high-risk situation		
Virologic factors			
• Genetic deviation from parent Sabin (nucleotide changes)	Substantial	Not Substantial	Seek expert virologist assessment
• Relatedness, if any, to past isolations	Related	Not related	
• Virologist characterization / interpretation	Yes	No	
• Co-circulation with WPV	Yes	No	
• Detection of other (un-related) VDPVs in region	Yes	No	
Human source			
• Co-isolation with other Sabin or enterovirus	Yes	No	
• Evidence of primary immunodeficiency	No	Yes	
Environmental source			
• Number / density of virus in samples	High	Medium/low	
• Mix of poliovirus, Sabin virus, and other enteric virus in sample	Yes	No	
Context			
Case Characteristics			Review and discussion by technical experts, between country, region and global levels
• Member of known "high risk"/underserved population (slum, minority, refugee, mobile, internally displaced, etc.)	Yes	No	
• 0 dose or "under"-vaccinated	Yes	No	
• Aged above 5 years	Yes	No	
Coverage data			"Population Immunity" for type 2 polioviruses, should factor time since switch and use of IPV to estimate type 2 naïve population
• RI coverage (IPV if available-otherwise diptheria-tetanus-pertussis (DPT3) in infected Admin 1 level	Poor	Good/high	
• Quality of prior SIAs (>5% missed children by IM data)	Poor	Fair/good	
Surveillance quality			
• Surveillance gaps (e.g. sub-standard AFP indicators, infrequent or absent ES, orphan virus) in infected Admin 1 level	Evident	Fair/good	
• Other recent poliovirus detection	Yes	No	

Risk Category	High risk	Low risk	Remarks
Admin level 1 context			
• Large, densely populated area	Yes	No	
• Known high risk populations (e.g. mobile, refugee, trade, pilgrimage, displacement)	Yes	No	
• Insecure and/or inaccessible area affecting surveillance and/or immunization	Yes	No	
• Any type of sentinel events suggesting higher risk of rapid spread	Yes	No	
• Evidence of containment breach	Yes	No	
• Finding tOPV/mOPV2 in a sweep of the vaccine distribution chain	Yes	No	
• Environmental conditions associated with high levels of fecal-oral transmission	Poor water and sanitation	Fair/good water and sanitation	
International Spread			
Linkages with International Border			Local case investigation / based on available data
• Contiguous or direct transport link to int'l border (especially if other area is known high risk)	Yes	No	
• Links between site or person with poliovirus to other countries (e.g. markets, transport routes)	Yes	No	Review and discussion by GPEI technical experts, in consultation with country, regional levels
• Travel history of poliovirus case or household (e.g. refugee, nomadic, pilgrimage, stateless persons)	Yes	No	
• History of any other sentinel event shared across borders	Yes	No	
• Prior history of polio transmission patterns and outbreaks between countries	Yes	No	
Population mobility-migration			
• Common service points between infected area and neighbouring areas like markets, pilgrim sites, watering points for nomads	Yes	No	
• Evidence of high levels of migration (from sequencing data, available cell phone data, prior migration patterns, etc.)	Yes	No	
Context of neighboring areas			
• Evidence of surveillance gaps or other high-risk factors in neighboring areas susceptible to importation from affected area	Yes	No	
• Population immunity in neighbouring countries	Low	Good/high	
• Conflict	Present	None	

Annex 2A: Timeline and responsibility for actions in the first month following poliovirus detection

Actions	Days post sequencing results																
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15–30	30+
Notification																	
GPLN informs health authorities of the affected country and WHO at country office, regional office and headquarters levels	■																
Country informs health authorities, WHO headquarters informs relevant Global Polio Eradication Initiative (GPEI) partners		■	■														
IHR focal point notifies WHO		■	■	■													
Investigation																	
Country team initiates epidemiological/social investigation		■	■	■													
Coordination																	
Establish event/outbreak response mechanisms at regional offices and headquarters, including the OPRTT for GPEI partner coordination			■	■													
Activate rapid response surge and deploy as soon as available		■	■	■	■	■	■	■	■	■	■	■	■	■	■		
Activate surge support and deploy as soon as available															■	■	■
Risk assessment and response plan																	
Country team presents risk assessment and response proposal to GPEI partners (Advisory Group for mOPV2 (AD G) /Eradication and Outbreak Management Group - EOMG)			■	■													
Country team submits vaccine request for mOPV2 (if applicable)				■	■												
GPEI partners (AD G/EOMG) meet and provide recommendations to country team			■	■													
Outbreak to be graded by WHO Health Emergencies (WHE) Headquarters, as per the ERF Framework				■													
Country team to finalize and submit outbreak response plan and budget							■	■									
Vaccine management																	
WHO Director-General authorizes release of mOPV2 from stockpile (if applicable)			■	■													
mOPV2 vaccine and syringes shipped to country (if applicable)							■	■	■	■							
mOPV2 vaccine sent to field (if applicable)										■	■	■	■				
Response activities																	
No regrets funding (up to $500 000) released to regional/country office to fund initial response activities				■	■												
Declare polio outbreak a National Public Health Emergency				■													
Develop and implement a national advocacy and communication plan					■	■	■	■	■	■	■	■	■	■	■	■	■
Initiate surveillance enhancement activities					■	■	■	■	■	■	■	■	■	■	■	■	■
Implement "Round 0"													■	■	■		
Outbreak response budget endorsed and funds release to the country																■	
Implement SIA 1, SIA 2 and mop-up rounds																	■

Annex 2B: Timeline and responsibility for outbreak response activities from Day 0 to close of outbreak

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
Notification of virus from laboratory - Day 0	Outbreak coordination	Establish an outbreak management team with representation from all relevant agencies.	National health authorities, with support from WHO and UNICEF country offices	
	Resources	Find national polio outbreak preparedness and response plan (can be found in Annex in National Certification Committee (NCC) report).	National health authorities, with support from WHO and UNICEF country offices	
	Resources	Identify trained or experienced polio outbreak response persons in country/region.	National health authorities, with support from WHO and UNICEF country offices	WHO and UNICEF regional offices/ headquarters to rapidly provide required documents
	Resources	Read any reports or documents of previous outbreak response activities.	National health authorities, with support from WHO and UNICEF country offices	
Within 24 hours of notification	Resources	Ensure country team has technical guidance documents to support investigation and response (outbreak SOPs, investigation template, risk assessment template, etc.).		WHO and UNICEF regional offices and headquarters
	Investigation	**Initiate joint epidemiological and social investigation** (see Chapter 4 and template for guidance): Part A: Investigate case/ES isolate and local context Part B: Determine geographic extent of transmission (i.e contact sampling, active search etc.).	National health authorities, with support from WHO and UNICEF country offices	With support from WHO and UNICEF regional office and headquarters
	Communication	Inform national authorities and other relevant partners.	National health authorities	WHO headquarters to inform GPEI partners (OPRTT, EOMG, Strategy Committee - SC)
Within 24 hours of notification	Outbreak coordination and advocacy	Brief Minister of Health, Head of Government/State and other relevant officials on the specific steps required for an urgent response to stop the outbreak: 1. Declare polio a National Public Health Emergency within 72 hours in case of outbreak or advise the potential need to declare an emergency if the virus is reclassified as an outbreak. 2. Establish a national emergency operating center (EOC) if an existing emergency coordination structure is not already in place, led by a senior government official as the designated outbreak focal point and supported by staff for administration, strategic communication, operations, logistics, supply management and finance. 3.Implement the required response operations to stop the virus transmission as per the outbreak response SOPs, virus type and classification (see Chapter 7).	National health authorities, with support from WHO and UNICEF country offices	With support from GPEI partners to ensure the national health authorities have the necessary information to communicate effectively with country stakeholders.

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
		4. Ensure systematic monitoring mechanism at all levels (national, regional and district) to monitor progress of planning, implementation and follow up actions throughout response activities. 5. Timely and regular reporting of the progress of outbreak response activities to the head of government/ state and GPEI partners.		
Within 24 hours of notification	Communication	Alert UNICEF supply division if type 2 poliovirus		WHO and UNICEF headquarters
	Outbreak coordination	Initiate event/outbreak response mechanisms at regional office and headquarters levels. Share any available information with country team (draft risk assessment, surveillance assessments, historical coverage, security assessments, high-risk groups, etc.).		GPEI partners
	Outbreak coordination	Outbreak Response and Preparedness Team (OPRTT) to establish weekly conference calls between WHO, UNICEF and GPEI partners.	WHO and UNICEF to participate	OPRTT to initiative and chair calls
	HR surge support	Assess the on-the-ground HR capacity of the national health system, WHO, UNICEF and other in-country partners to implement response operations.	National health authorities, WHO and UNICEF country offices	
	HR surge support	Request expedited procedures for visas at the port of entry for any international outbreak responders.	National health authorities	WHO and UNICEF regional offices/ headquarters to provide required documents rapidly
	HR surge support	Activate surge support processes; deploy as soon as available. (Target 72 hours - Rapid Response; Target 21 days - Surge Support).	WHO and UNICEF country offices to make in-country arrangements	OPRTT to coordinate
	Risk assessment and response	Initiate risk assessment template with proposal for immunization response strategy (see template and chapter 7).	National health authorities with support from WHO and UNICEF country offices	With support from WHO/UNICEF regional office and headquarters
	Communication	Identify a media focal person and spokesperson for the outbreak.	National health authorities, WHO and UNICEF country offices to agree and nominate	
Within 24 hours of notification	Communication	Work with partners and government counterparts to: • Conduct a media landscape analysis • Conduct a press briefing/media release • Initiate media monitoring.	National health authorities with support from WHO and UNICEF country offices	With support from WHO/UNICEF regional office and headquarters

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
	Complex emergency settings (if applicable)	Inform the United Nations Resident Coordinator and the Humanitarian Country Team.	WHO country office	
		Coordinate with the United Nations Department of Safety and Security (UNDSS) on field missions.	WHO and UNICEF representatives	
		Assess the security and access in the area of the virus isolate and surrounding areas. Request security advisor to conduct a field level assessment.	UNDSS, in collaboration with national authorities	WHO regional office and headquarters security advisors support as required
Within 72 hours (3 days) of notification	Risk assessment and response planning	**1) Finalize risk assessment and response proposal,** with all available information, including from neighbouring countries 2) Present risk assessment and proposal to OPRTT/ EOMG (Type 1 or Type 3 poliovirus) or mOPV2 Advisory Group (Type 2 poliovirus) for feedback and recommendations.	National Health Authorities with support from WHO and UNICEF country offices	WHO/UNICEF regional office and Headquarters with OPRTT support
	Logistics planning	Complete a logistics plan including: vaccine forecasts, cold storage, warehousing, distribution, utilization monitoring, vaccine accountability, and disposal (see vaccine management guidance.	National Health Authorities with support from WHO and UNICEF country offices	UNICEF Headquarters to support
	Vaccine request	Submit mOPV2 vaccine request form for authorization of vaccine realease by WHO Director-General.	National Health Authorities with support from WHO and UNICEF country offices	mOPV2 Advisory Group secretariat to review and send to UNICEF Supply Division
	Outbreak response	Declare polio a National Public Health Emergency.	National Health Authorities	
	IHR notification	Submit IHR notification to WHO; a summary may be reported publicly on the WHO website as a Disease Outbreak Notification (DON).	National IHR focal point	WHO Headquarters to support
	Grading	Prepare and participate in WHO 3-level call for grading by WHE, WHO Polio headquarters, regional office and country office, as per the Emergency Response Framework.	WHO and UNICEF country offices with national health authorities	WHO headquarters to coordinate, WHE Headquarters to grade in consultation with regional office
	Finance	Release "no regret" funding (up to $500 000) to regional/ country office to fund initial response activities.		WHO headquarters to coordinate and release
	Logistics	Initiate shipment of bundled response vaccine as per response proposal.	UNICEF country office	UNICEF Supply Division

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
Within 72 hours (3 days) of notification	Outbreak response	Communicate preliminary plan to all provinces and districts involved in response activities.	National health authorities with support from WHO and UNICEF country offices	
		Initiate development of the outbreak response plan (see template for detailed guidance). • Background and risk for further transmission • Proposed strategy of SIAs (scope, timing, etc.) • Surveillance enhancement activities • Advocacy, communication and social mobilization activities • Coordination and partnerships • Human resources assessment • Monitoring, evaluation and outbreak response assessments (OBRA) • Budget Seek feedback and input from subnational teams	National health authorities, with support from WHO and UNICEF country offices	OPRTT to facilitate review and recommendations from GPEI partners
		Activate the national emergency operating center (EOC) or existing emergency coordination structure to roll out activities required for the first immunization response and subsequent activities in the outbreak response plan.	National health authorities with support from WHO and UNICEF country offices	WHO and UNICEF regional offices to support
	Advocacy and communication	**Initiate development of a national advocacy and communication plan** focusing on community engagement, social mobilization and general information dissemination strategies across the outbreak response period. (See Chapter 9 for detailed guidance.) Include: • Pre-campaign awareness sessions targeting high-risk and hard-to-reach populations • Proactive communication ensuring communities and health workers are sensitized to the dangers of the disease and benefits of the vaccine	National health authorities with support from WHO and UNICEF country offices	WHO and UNICEF regional offices/ headquarters to support
Within 72 hours (3 days) of notification	Advocacy and communication	• Engagement of key influencers and key stakeholders (including political, religious, community leaders, celebrities) to provide access to hard-to-reach communities • Development of a special crisis communication plan to address rumours in case of resistance to vaccination and rapid respond actions to adverse events following vaccination.		

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
		Provide a briefing to the highest government authorities (e.g. cabinet memo or presidential brief) and other key strategic partners needed for a successful response (relevant ministries, parliamentarians, political/religious/ civic leaders, health and NGO partners in the epicenter).	National health authorities, with support from WHO and UNICEF country offices	
	Communication	Conduct a follow up media briefing on plans and proposals for responding to the outbreak.	National health authorities, with support from WHO and UNICEF country offices	UNICEF regional office and headquarters to support
	C4D, social mobilization and communication	Share the C4D polio toolkit and list of long-term agreements that the country office can immediately use to accelerate response activities.		UNICEF regional office and headquarters
		Complete the social profiling of the case and context using special country investigation tools to guide the design of C4D interventions.	National health authorities and UNICEF country office	UNICEF regional office and headquarters with OPRTT support
Within 7 days of notification	Human resources surge support	Determine human resources surge requirements with OPRTT based on grading and country needs.	National health authorities, with support from WHO and UNICEF country offices	OPRTT to facilitate GPEI partner support
	Outbreak response	Develop a preparedness dashboard to assess readiness for "Round 0". Initiate tracking of activities (for example, dashboards available for guidance).	National health authorities	
	Surveillance enhancement	**Initiate surveillance enhancement activates** (See Chapter 8 for detailed guidance.): • Notify and sensitize health care workers at national and subnational surveillance units about notification requirements • Implement supplemental AFP case-finding activities • Review and reclassify reporting sites in the AFP active surveillance network • Ensure the national laboratory is involved in outbreak planning to ensure capacity is strengthened • Increase frequency of environmental sampling from already existing sites, where feasible and appropriate.	National health authorities, with WHO country office	GPEI partners to support
	Advocacy and communication	Develop an external advocacy plan to secure high-level political commitment from the affected country and complement in-country advocacy efforts.	National health authorities, with support from WHO and UNICEF country offices	OPRTT, WHO/UNICEF regional offices and Headquarters
	Advocacy and communication	WHO and UNICEF regional directors to write to the Minister of Health highlighting the emergency and the full support of the country representatives and organizations for guidance and support.	WHO and UNICEF country offices to facilitate	WHO/UNICEF regional directors

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
	Communication	Initiate the development of a joint WHO/UNICEF situation report (SITREP) to update GPEI partners weekly on the progress of investigation, planning and response activities (template available for guidance).	WHO and UNICEF country offices	With support from WHO/UNICEF regional offices and headquarters
Within 7 days of notification	Communication	Inform broader donor community of poliovirus notification and status of polio response activities, including immunization and surveillance.	WHO and UNICEF country offices with in-country donors and media	
	Communication	Finalize media protocol kit with key messages, produce media briefs and other communication products relevant to the outbreak for local and regional/global use.	National health authorities with UNICEF country office	UNICEF regional office and headquarters to support
	Communication	Initiate weekly media briefing on the response plan and status of immunization and surveillance activities.	National health authorities with UNICEF country office	
	Complex emergency settings (if applicable)	Initiate development of an access plan, including: • Mapping community leaders, key players, stakeholders and identify influencers • Planning for permanent/transit vaccination point strategies surrounding inaccessible areas • Planning for opportunistic vaccination strategies to reach populations in inaccessible areas.	National health authorities with support from UNDSS	WHO regional offices
	Partner coordination	Initiate partner coordination with other United Nations and humanitarian agencies on the ground.	WHO country office	WHO regional offices
Within 14 days of notification	Outbreak response plan and budget	**Finalize outbreak response plan and six-month budget** (see template and budget SOPs for guidance and timing); country team to finalize within one week.	National health authorities with support from WHO and UNICEF country offices	OPRTT to coordinate GPEI partner review and feedback and budget
	Outbreak response plan and budget	Initiate outbreak response plan activity monitoring to track implementation (e.g. tracker, dashboard).	National health authorities with support from WHO and UNICEF country offices	
	Partner coordination	Establish a weekly meeting with key stakeholders in the country to coordinate and monitor implementation of the outbreak response plan.	National health authorities with support from WHO and UNICEF country offices	
	Outbreak response operations plan	Initiate development of the national operations macro plan for "Round 0" detailing strategy, coordination structure, vaccine, logistics, human resources, supervision, social mobilization, communication and training needs, etc. Revise macro plan for subsequent SIA 1/SIA 2 and additional mop-up round.	National health authorities with support from WHO and UNICEF country offices	WHO/UNICEF regional office

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
	Micro plan development	Develop tools and training for development of micro plans for "Round 0", detailing strategies, coordination structure, vaccine, logistics, human resources, supervision, social mobilization, communication and training needs, etc. (Best practice for microplanning available for guidance.) Revise micro plans for subsequent SIA 1/SIA 2 and additional mop-up round.	National health authorities, with support from WHO and UNICEF country offices	WHO/UNICEF regional office
	C4D, social mobilization and communication	Implement the advocacy and communication plan to engage all relevant stakeholders at the national and subnational levels in outbreak response activities.	National health authorities, with support from WHO and UNICEF country offices	OPRTT to facilitate support from partners
Within 14 days of notification	Communication	Ensure that joint WHO/UNICEF situation report (SITREP) is generated and circulated among partners.	WHO and UNICEF country offices	
	Complex emergency settings (If applicable)	Initiate process to fill vacant positions in infected and high-risk areas.	National health authorities, with support from WHO and UNICEF country offices	WHO/UNICEF regional office to provide support
		Deploy a field security officer.	National health authorities	WHO headquarters to provide technical support
		Implement access plan (examples of strategies listed below): • Engage the community leaders and identified influencers • Negotiate access through key players, influencers and stakeholders • Implement a permanent/transit vaccination point strategies surrounding inaccessible areas • Implement opportunistic vaccination strategies to reach populations in inaccessible areas.	National health authorities, with support from WHO and UNICEF country offices	WHO regional office
	Immunization	**Within 14 days, implement "Round 0" immunization response.**	National health authorities, with support from WHO and UNICEF country offices	WHO/UNICEF regional offices
	Vaccine management	**For mOPV2 response ensure comprehensive management of all vials.** Detailed monitoring and reporting of vials deployed, retrieved, remaining and unaccounted for at the end of each immunization activity is required. (See vaccine management guidance.)	National health authorities, with support from WHO and UNICEF country offices	UNICEF regional office and headquarters

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
14 days until completion of immunization activities (75–90 days)	Finances	OPRTT and EOMG to provide endorsement of outbreak response plan and budget (within 20 days) and initiate mechanisms to release funds. Within 28 days funds should be available in country.		OPRTT to facilitate process
	Monitoring preparedness	Develop SIAs preparedness monitoring dashboards to be used to assess SIAs readiness at national and subnational levels.	National health authorities with support from WHO and UNICEF country offices	
	Monitoring preparedness	Conduct readiness assessments two weeks, one week and three days prior to SIA implementation to inform targeted technical support for SIAs quality assurance.	National health authorities with support from WHO and UNICEF country offices	
	Monitoring advocacy	Track the implementation of the internal and external advocacy plans. Taking note of successful interventions and communicating further needs to OPRTT.	National health authorities with support from WHO and UNICEF country offices	OPRTT to facilitate support from GPEI partners
	Monitoring immunization	**Establish campaign monitoring for SIAs:** • Supervision • Independent monitoring (intra- and post-campaign) • Daily review meetings (team performance, daily reporting) • Lot quality assurance sampling (LQAS) • SIA reviews, including vaccine refusals, issues related to mistrust, etc.	National health authorities with support from WHO and UNICEF country offices	WHO regional office/headquarters to provide support
	Monitoring communication	Establish monitoring of communication interventions.	National health authorities with WHO and UNICEF country office	UNICEF regional office and headquarters to provide support
	Micro plan development	Develop tools and training for development of micro plans detailing strategies, coordination structure, vaccine, logistics, human resources, supervision, social mobilization, communication and training needs etc. (Best practice for microplanning is available for guidance.)	National health authorities with support from WHO and UNICEF country offices	

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
14 days until completion of immunization activities (75–90 days)	Training	Conduct trainings of front-line workers (vaccinators, supervisors and social mobilizers) on technical skills, communication and interpersonal skills for SIA 1 and SIA 2 targeted areas.	National health authorities with support from WHO and UNICEF country offices	
	Information management	Liaise with in-country data managers to identify and resolve data format and completeness issues.	National health authorities with support from WHO and UNICEF country offices	WHO regional office
	Vaccine management	Assess cold-chain capacity and vaccine management capabilities and take urgent steps to fill gaps prior to SIA 1.	National health authorities with support from WHO and UNICEF country offices	UNICEF regional office and headquarters to provide support
	Partner coordination	Conduct regular donor meetings and advocacy activities.	National health authorities with support from WHO and UNICEF country offices	
	Partner coordination	Ensure in-depth discussion and alignment with other health partners to consider additional interventions alongside OPV, such as providing vitamin A and deworming tablets, where feasible, particularly for type 1 and 3 outbreaks. (Integration for type 2 outbreaks should only be considered exceptionally.)	National health authorities, with support from WHO and UNICEF country offices	OPRTT to provide support
	Immunization	**Implement subsequent immunization activities (SIA 1, SIA 2, mop-up round) as per outbreak response plan.**	National health authorities, with support from WHO and UNICEF country offices	OPRTT to facilitate support from GPEI partners
	Immunization	**Conduct activities to improve the quality of SIAs with each subsequent round:** • Triangulation of data including: low performing areas, social data on refusals/missed children or other observed social barriers, surveillance data etc. • Conduct additional vaccinator and supervisor training for interpersonal skills • Strengthen supervision, monitoring and regular review meetings during campaign • Initiate special strategies to reach missed, high-risk or mobile populations • Conduct activities to improve the quality of SIAs, including detailed microplanning supported by GIS mapping where appropriate and feasible.	National health authorities, with support from WHO and UNICEF country offices	OPRTT, WHO/UNICEF regional offices and headquarters

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
14 days until completion of immunization activities (75–90 days)	Outbreak response plan	Review and adapt the outbreak response plan, including immunization, surveillance and communication activities for subsequent phases. Track progress made and/or support needed to close any remaining gaps.	National health authorities with support from WHO and UNICEF country offices	OPRTT to provide recommendations
	Information management	Ensure surveillance, SIA and monitoring data are completed and sent to WHO and UNICEF regional offices and headquarters, according to agreed timelines (within 14 days for all SIAs, and weekly for AFP data).	National health authorities with support from WHO and UNICEF country offices	
	Vaccine reporting and accountability	Complete vaccine utilization and accountability reports after each round, including round 0 (see vaccine management guidance).	National health authorities, with support from WHO and UNICEF country offices	UNICEF regional office and headquarters to provide support
	Vaccine disposal	Disposal of used, and partially used vaccine vials for type 2 immunization response. Unopened vials should be securely stored in strategic stores with access control facilities until the outbreak is considered closed (see vaccine management guidance).	National health authorities, with support from WHO and UNICEF country offices	UNICEF regional office and headquarters to provide support
Until close of outbreak	Data analysis	Analyse and triangulate all data to assess population immunity, sensitivity of surveillance and progress towards interrupting transmission.	National health authorities, with support from WHO and UNICEF country offices	OPRTT to facilitate support from GPEI partners
	Routine immunization: recovery and strengthening	Extend support to immunization during the outbreak response period, maximizing use of surge capacity to strengthen programme management, microplanning, community mobilization and performance monitoring. The EOC should effectively maximize the benefit of time-limited support to RI, through selected actions in line with the operational components of the Reaching Every District (RED)*approach. (See end of Chapter 7, and RED strategy for detailed guidance.)	National health authorities, with support from WHO and UNICEF country offices and polio surge resources in country	

Timeline	Function	Activities	Responsibility	
			Country	Regional/Global
Until close of outbreak	Surveillance enhancement	Continue surveillance enhancement activities (see chapter 8 for detailed guidance): • Notify and sensitize health care workers at national and subnational surveillance units about notification requirements • Review and reclassify reporting sites in the AFP active surveillance network.	National health authorities, with support from WHO and UNICEF country offices	Surveillance Task Team (STT)
	OBRA - 3 months	Conduct an independent outbreak response assessment (OBRA) (detailed guidance available in OBRA Aide-Mémoire). Continue surveillance enhancement activities (See chapter 8 for detailed guidance): • Notify and sensitize health care workers at national and subnational surveillance units about notification requirements • Review and reclassify reporting sites in the AFP active surveillance network 1. Assess and strengthen efforts to increase population immunity 2. Assess and strengthen surveillance sensitivity 3. Assess progress towards interrupting transmission.	National health authorities, with support from WHO and UNICEF country offices	OPRTT to coordinate
	OBRA - 6, 9, 12 months etc.	Complete vaccine utilization and accountability reports after each round, including round 0 (see vaccine management guidance).	National health authorities, with support from WHO and UNICEF country offices	OPRTT to coordinate
	Grading review - 3 months	A review of the grading is conducted every three months; if the grade changes, the response will be adapted accordingly.		WHO headquarters to coordinate, WHE HQ to grade in consultation with regional office
	Lessons learnt	**Document the response and share lessons learned.**	National health authorities, with support from WHO and UNICEF country offices	

www.polioeradication.org

ISBN 978-92-4-000299-9