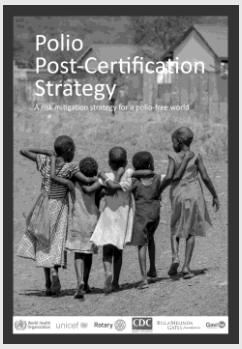
POLIO GLOBAL ERADICATION INITIATIVE

Sustaining a Polio-free World:
A strategy for long-term success

Draft v3.5

Revision (in development) of the
Polio Post-Certification Strategy



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Foreword

Since the *Polio Post-Certification Strategy* was presented to the Seventy-first World Health Assembly in 2018 to define the essential functions needed after eradication of the last remaining wild poliovirus (type 1, or WPV1), the path toward achieving a polio-free world has become more complex.

The eradication strategy of the Global Polio Eradication Initiative (GPEI) was revised to include the elimination of circulating vaccine-derived poliovirus type 2 (cVDPV2) in addition to WPV1 eradication. This change of approach, driven by the epidemiology, impacts not only the pathway for polio eradication but also future planning toward protecting the gains of the eradication effort.

Global health has also undergone seismic shifts. The COVID-19 pandemic disrupted routine immunization programmes. Worldwide, we're seeing a surge in outbreak-prone diseases that are compounded by health hazards due to climate change and health emergencies among fragile, vulnerable and conflict-affected communities. Global health is also facing unprecedented funding reductions that force difficult prioritization exercises and prompt new efficiency measures through stronger collaboration or innovations.

Within this context, it's clear that delivering on the promise of a polio-free world will require sustained commitment from all stakeholders: country governments, immunization and health emergency programmes, global health initiatives, civil society organizations, donors and other partners.

We must expand our vision to ensure that our collective efforts work to safeguard polio eradication for generations to come and help to shore up global health security that will be critical to success.

Sustaining a Polio-free World: A strategy for long-term success offers critical updates to the 2018 strategy. It maintains the three goals – protecting populations, detecting and responding to polio events or outbreaks and containing polioviruses – while accounting for new tools and frameworks, revised risk analyses and mitigations, and the latest policies and priorities. Importantly, it also includes early thinking on the future evolution of the GPEI partnership, which will require dynamic governance and accountability structures. Indeed, the revised strategy is offered now not only to reflect the changing programmatic environment but also to highlight the substantial planning efforts that will be required to implement this strategy. To guide the way, the strategy introduces a phased roadmap to thoughtfully and deliberately consider all the necessary stakeholders, approaches and activities that will be required to successfully sustain polio eradication.

This future is the outcome of the mission that the world embraced when it first resolved to achieve polio eradication. Let's leverage our excitement at what this historic achievement will represent – and let's take the first step together.

The Polio Oversight Board

Dedication

For their invaluable contributions to global health by vaccinating children and delivering essential services to their communities, the GPEI dedicates this strategy to frontline workers, particularly those who have lost their lives. It is also dedicated to polio-affected children, adolescents and adults who have used their voices to communicate the true stakes of the polio eradication effort.

The GPEI also dedicates this strategy to the enduring legacy of Aidan O'Leary, former Director of the Polio Eradication Programme of the World Health Organization (WHO), whose sudden passing occurred as this strategy underwent revision. Aidan's determination to deliver the promise of polio eradication to the world's most vulnerable communities provided a laudable model of public service. To those who had the privilege of working with him, Aidan represented the very best values and virtues of partnership that lie at the heart of the GPEI.

Acknowledgements

The GPEI engaged a broad set of stakeholders to gather input, review and revise the critical functions that will be needed after achievement of the Eradication Strategy goals.

- Civil society organizations via the United Nations (UN) Foundation and Gavi, the Vaccine Alliance
- Disease modelling agencies: Imperial College, Institute for Disease Modeling, Kid Risk and the London School of Hygiene and Tropical Medicine
- Gates Foundation teams, including Immunization, Polio, Vaccine Development, and Policy, Advocacy and Communications teams
- Gavi, the Vaccine Alliance
- Global Commission for Certification of the Eradication of Poliomyelitis (GCC)
- GPEI Global Programme Support (GPS) teams, including Gender Mainstreaming, Surveillance, Vaccine Supply, Finance, Containment, Polio Research & Analytics, Outbreak Response and Preparedness, Resource Mobilization, Global Communications and Political Advocacy teams
- Immunization Agenda 2030 (IA2030) Coordination Group (IACG) and relevant working groups (e.g. Essential Immunization, Monitoring and Evaluation, Outbreak Preparedness and Response), with representation from US Centers for Disease Control and Prevention (CDC), Gates Foundation, Gavi, John Snow Inc., United Nations Children's Fund (UNICEF) and the World Health Organization (WHO)
- Independent Monitoring Board (IMB) / Transition Independent Monitoring Board (TIMB)
- Donors including: Australia, Canada, European Commission, France, Germany, Islamic Development Bank, Japan, Monaco, Saudi Arabia, United Arab Emirates, United Kingdom and the United States of America
- Other country-level stakeholders: the National Certification Committees (NCCs) of Bhutan and India
- Other global health initiatives (e.g. Measles and Rubella Partnership, Yellow Fever Initiative)
- Other regional stakeholders: Chinese Center for Disease Control and Prevention
- Regional technical advisory groups
- Rotary International
- Strategic Advisory Group of Experts on Immunization (SAGE) and the SAGE Working Group on Polio
- UNICEF, including Immunization, Supply Division, Polio, Health Emergencies Preparedness and Response team at UNICEF headquarters; Regional Office Immunization and Polio teams
- UN Foundation
- US Centers for Disease Control and Prevention (CDC), Polio and Immunization Teams
- WHO, including regional offices and relevant departments (e.g. immunization and health emergencies programme teams)

Details on consultations for the revised strategy are available in a companion report.

Acronyms and abbreviations

AFP	Acute flaccid paralysis
aVDPV	Ambiguous vaccine-derived poliovirus
bOPV	Bivalent oral polio vaccine
CAG	Containment Advisory Group
CCS	Containment Certification Scheme
cVDPV	Circulating vaccine-derived poliovirus
cVDPV1	Circulating vaccine-derived poliovirus type 1
cVDPV2	Circulating vaccine-derived poliovirus type 2
cVDPV3	Circulating vaccine-derived poliovirus type 3
EOCs	Emergency operations centres
EPI	Essential Programme on Immunization
ERF	Emergency Response Framework
ES	Environmental surveillance
fIPV	Fractional-dose inactivated polio vaccine
GAP	Global Action Plan for Poliovirus Containment
GAPIV	Global Action Plan for Poliovirus Containment, 4th edition
GCC	Global Commission for Certification of the Eradication of Poliomyelitis
GHSA	Global Health Security Agenda
GPEI	Global Polio Eradication Initiative
GPLN	Global Polio Laboratory Network
GPSAP	Global Polio Surveillance Action Plan
HR	Human resources
IA2030	Immunization Agenda 2030
ICG	International Coordinating Group on Vaccine Provision
IHR	International Health Regulations
IPV	Inactivated polio vaccine
IPV1	First-dose inactivated polio vaccine
IPV2	Second-dose inactivated polio vaccine
iVDPV	Immunodeficiency-associated vaccine-derived poliovirus
MAP	Microarray patch
mOPV	Monovalent oral polio vaccine
mOPV1	Monovalent oral polio vaccine type 1
mOPV3	Monovalent oral polio vaccine type 3
NAC	National authorities for containment
NCC	National Certification Committee
NGO	Nongovernmental organization
NITAG	National Immunization Technical Advisory Group
nOPV	Novel oral polio vaccine
nOPV1	Novel oral polio vaccine type 1
nOPV2	Novel oral polio vaccine type 2
nOPV3	Novel oral polio vaccine type 3
OPV	Oral polio vaccine
OPV2	Oral polio vaccine type 2
PEF	Poliovirus-essential facility
PHEIC	Public Health Emergency of International Concern
PID	Primary immunodeficiency disorder
PIM	Potentially infectious material
POLIS	Polio Information System
PRAG	Polio Research and Analytics Group
PRC	Polio Research Committee
R&D	Research and development
RCC	Regional Commission for the Certification of the Eradication of Poliomyelitis
RITAG	Regional Immunization Technical Advisory Group
SAGE	Strategic Advisory Group of Experts on Immunization
SIA	Supplementary immunization activity
sIPV	Sabin strain inactivated polio vaccine
SOPs	Standard operating procedures
TAGs	Technical advisory groups
tOPV	Trivalent oral polio vaccine
UNICEF	United Nations Children's Fund
VAPP	Vaccine-associated paralytic polio
VDPV	Vaccine-derived poliovirus
VLP	Vaccine-like particles
VPD	Vaccine-preventable disease
WHO	World Health Organization
WPV	Wild poliovirus
WPV1	Wild poliovirus type 1

Executive summary

As the Global Polio Eradication Initiative (GPEI) works towards accomplishing its mission in an increasingly complex environment, a clear vision of what will be required to sustain a polio-free world can serve to not only inspire its achievement, but also to affirm the efforts of countless individuals whose dedication to the cause has protected millions of children worldwide. This vision of a polio-free world can also help guide the programme through changes that are anticipated as the polio eradication effort moves from its current state as a vertical programme to a future state in which polio activities are embedded within routine immunization, integrated disease surveillance, global health security, emergency response frameworks and programmes across a changing global health architecture.

What is the strategy for *Sustaining a Polio-free World?*

Sustaining a Polio-free World: A strategy for long-term success defines the technical standards that will be needed at a global level after certification of both the eradication of wild poliovirus type 1 (WPV1) and the elimination of circulating vaccine derived poliovirus type 2 (cVDPV2).[1] The strategy encourages the integration of polio-essential functions into national health programmes and other health and immunization initiatives, which may include the support of the current GPEI partners as well as other future owners.

How does this strategy fit into planning for a polio-free world?

The strategy is the first step in a phased planning process that begins by outlining what essential functions will be needed to support a polio-free world, with additional phases focused on how they will be transferred or transitioned and who will become critical partners to implementing future efforts. This broader approach to planning aims to prepare a host of partners, from national governments to other programmes, for the future evolution of the global partnership which has organized efforts since 1988.[2]

To ensure a smooth transfer from the current structure and GPEI-led accountability mechanisms to a future governance structure with new and different accountability mechanisms, planning will progress through four phases (**Fig. 1**).

Fig. 1. Phased planning process to sustain eradication

- ***The What (Phase 1)****:* As a technical strategy and not an implementation plan, this document defines *what* goals, objectives and activities will be essential to sustain polio eradication. As a revision of the *Polio Post-Certification Strategy*,[3] this strategy aims to trigger the development or support of robust transition plans and implementation efforts across the global, regional and country levels.

- ***The How (Phase 2):*** Polio transition, as set forth in the *Polio transition strategic framework: global vision to use polio investments to build strong, resilient and equitable health systems,* defines *how*

[1] See Goals One and Two of the Polio Eradication Strategy. Global Polio Eradication Initiative (GPEI). Polio Eradication Strategy 2022–2026: Delivering on a promise. Geneva: World Health Organization; 2021 (https://iris.who.int/handle/10665/345967). In October 2024, the eradication strategy was extended to cover the period from 2022 to 2029. See Polio Eradication Strategy 2022–2026: delivering on a promise, extension to 2029. Geneva: World Health Organization; 2024 (https://polioeradication.org/wp-content/uploads/2024/11/GPEI-Strategy-extension-20241113.pdf).

[2] The Polio Oversight Board took the decision to evolve the partnership model as the GPEI gets closer to the implementation of the strategy for Sustaining a Polio-free World.

[3] Global Polio Eradication Initiative (GPEI). Polio Post-Certification Strategy: A risk mitigation strategy for a polio-free world, Geneva: World Health Organization; 2018 (https://iris.who.int/bitstream/handle/10665/379034/WHO-POLIO-18.06-eng.pdf).

polio-essential functions will be transitioned to global and regional partners and national governments.[4] Based on lessons learned from the *Strategic action plan on polio transition*,[5] the purpose of the polio transition strategic framework and its global vision is to ensure that countries integrate polio functions into national health systems through a flexible approach facilitated by the World Health Organization (WHO), in collaboration with other key stakeholders.

- ***The Who (Phase 3):*** As national governments and partners in polio, immunization, global health security, emergency response and other programmes define *how* polio-essential functions should be transitioned, Phase 3 focuses on determining *who* will be best positioned for long-term implementation of these functions as part of a well-defined governance structure. Country programmes and regional bodies should work together to ensure polio functions are well-integrated within national health systems. Concurrently, as GPEI partners reorganize within their own agencies and develop stronger ties with other internal departments, new forms of collaboration – and new partners – will emerge to further define how polio functions will be maintained. Phases 2 and 3 will thus happen iteratively.
- ***Sustain (Phase 4)***: In Phase 4, the future governance structure will support monitoring and evaluation to sustain polio eradication. This core structure will oversee the ongoing review of *what* functions need to continue, *how* well they are implemented, and *who* should continue to support these essential functions. This process should be dynamic, allowing for changes over time as polio eradication shifts to a new governance model.

No reason to delay implementation planning
While the revised strategy will be finalized in 2026 and presented to the Seventy-ninth World Health Assembly, there is no reason to wait to begin discussions on *how* activities will be transitioned and *who* will be responsible for implementing essential functions. Indeed, transition to national governments has and will continue to take place in different countries and regions at different times with the successful interruption of the virus.

The goal of this planning process is for activities essential to sustaining polio eradication to become integrated into national health systems at the country level and to ensure they are embedded in routine immunization efforts and global health security and emergency preparedness and response frameworks at the global level instead of sitting outside of them as a separate vertical programme.

Why is this strategy needed before GPEI Eradication Strategy goals are achieved?

The strategy for Sustaining a Polio-free World will begin after the achievement of the current GPEI Eradication Strategy (certification of WPV1 eradication [Goal One] and certification of cVDPV2 elimination [Goal Two]) and extend for 10 years after the withdrawal of the bivalent oral polio vaccine (bOPV) from routine immunization programmes. If the GPEI Eradication Strategy timeline changes or if Goal Two is achieved before Goal One, this strategy for Sustaining a Polio-free World will still begin after both goals are achieved. However, as some activities and commitments must be started now to ensure a successful transition to a new governance structure, implementation planning must begin before the completion of the two goals of the Eradication Strategy.[6]

The GPEI suggests a three-year period of overlap with the Eradication Strategy (**Fig. 2**), during which time the phased planning process will be completed with national governments, relevant partners and agencies.

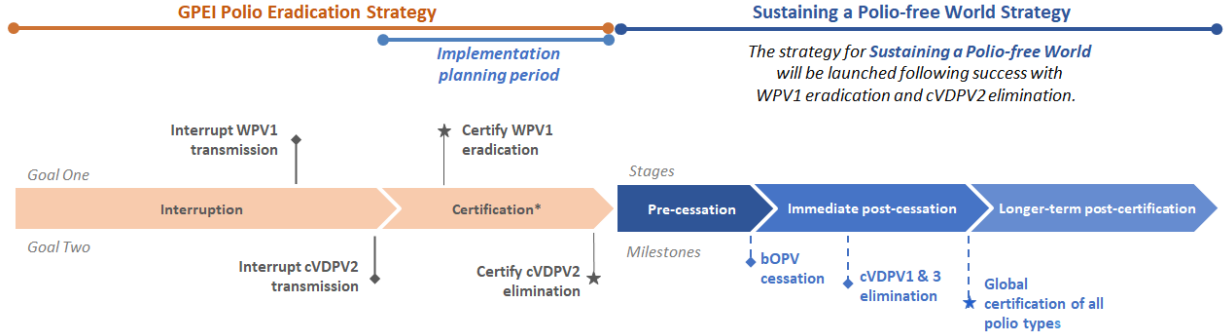
[4] Polio Transition Strategic Framework: global vision to use polio investments to build strong, resilient and equitable health systems. Geneva: World Health Organization; 2024 (https://iris.who.int/bitstream/handle/10665/380282/9789240100633-eng.pdf).

[5] Draft strategic action plan on polio transition, Report by the Director-General. In: Seventy-first World Health Assembly, 24 April 2018. Geneva: World Health Organization; 2018 (https://iris.who.int/bitstream/handle/10665/276315/A71_9-en.pdf).

[6] Planning discussions can begin as the strategy is being revised; formal implementation activities, however, should begin after the strategy is presented to the World Health Assembly in May 2026.

Defining the accountability mechanisms and funding to support the goals, objectives and activities of this strategy for Sustaining a Polio-free World will also be prioritized during the implementation planning period.

Fig 2. Milestones for the Polio Eradication Strategy and the strategy for Sustaining a Polio-free World



* Criteria for certification include: (1) achieving certification-standard surveillance; (2) ensuring access to a WHO-accredited laboratory; (3) ensuring containment of wild polioviruses and vaccine-derived polioviruses; and (4) completing the certification process in coordination with National Certification Committees (NCCs), Regional Certification Commissions (RCCs) and the Global Commission for the Certification of Eradication of Poliomyelitis (GCC).
bOPV = bivalent oral polio vaccine; cVDPV1 = circulating vaccine-derived poliovirus type 1; cVDPV2 = circulating vaccine-derived poliovirus type 2; cVDPV3 = circulating vaccine-derived poliovirus type 3; WPV1 = wild poliovirus type 1.

What risks inform the strategy for *Sustaining for a Polio-free World*?

This strategy outlines three key epidemiological risks over a 10-year period: (1) vaccine-derived poliovirus (VDPV) emergence potentially leading to outbreaks of circulating vaccine-derived poliovirus (cVDPV) through continued use of the oral polio vaccine (OPV); (2) undetected transmission; and (3) unsafe handling of polioviruses. Important operational risks, such as wavering political and financial commitment, are also discussed across the strategy. As a distinct risk, polio transition, if not sufficiently planned and managed, may impact polio immunization and surveillance quality, particularly for countries with weak health systems which may be put at risk by the withdrawal of polio eradication resources.

How is the strategy for *Sustaining a Polio-free World* organized?

The strategy has three goals: *Goal One* to protect populations, *Goal Two* to detect and respond to a polio event or outbreak, and *Goal Three* to contain polioviruses (**Table 1**). Risk mitigation plans are addressed within each goal. A chapter on research activities related to the strategy's goals details ongoing investments that are led by the Polio Research and Analytics Group (PRAG). As part of its work, the PRAG is working to define a process and timeline for introducing novel OPVs for type 1 and type 3 (nOPV1, nOPV3), as well as other innovative tools and projects.

Table 1. Goal summaries for the strategy for Sustaining a Polio-free World

Goal One: Protect populations	
Objective 1.1	**Activity 1.1**
To prepare and implement a globally synchronized cessation of bOPV use in routine immunization.	Implement vaccination activities to achieve and maintain high population immunity before bOPV cessation.
	Activity 1.2
	Prepare and implement the withdrawal of bOPV from routine immunization.

bOPV = bivalent oral polio vaccine.

Table 1 (continued)

Goal One: Protect populations (continued)	
Objective 1.2	**Activity 1.2.1**
To provide access to safe, effective polio vaccines for the long-term protection of global populations.	Develop and implement future immunization policy to protect populations against poliovirus.
	Activity 1.2.2
	Support the availability of affordable polio vaccines and their effective delivery to facilitate high immunization coverage.
Goal Two: Detect and respond	
Objective 2.1	**Activity 2.1.1**
To promptly detect any poliovirus in a human or in the environment through a sensitive surveillance system.	Establish and maintain an integrated and sustainable surveillance system capable of rapidly detecting polioviruses.
	Activity 2.1.2
	Sustain adequate, technically competent laboratory and surveillance infrastructure (including human capacity) and information systems to rapidly detect poliovirus transmission.
Objective 2.2	**Activity 2.2.1**
To develop and maintain adequate global and regional capacity and resources to support national efforts to contain any detected poliovirus and stop transmission.	Enhance country readiness to adequately respond to future outbreaks, develop and implement preparedness plans and prepare response strategies.
	Activity 2.2.2
	Sustain trained human capacity and create, maintain and manage adequate stockpiles of polio vaccine to appropriately respond to outbreaks.
Goal Three: Contain polioviruses	
Objective 3.1	**Activity 3.1.1**
To sustain safe and secure poliovirus containment in facilities retaining polioviruses.	Support the reduction in the number of facilities retaining polioviruses globally.
	Activity 3.1.2
	Support safe storage and handling in facilities retaining polioviruses.
	Activity 3.1.3
	Support national and international structures for long-term poliovirus containment.

What chapters are new to the strategy for *Sustaining a Polio-free World*?

Two new chapters are offered in the revised strategy:

- ***Governance and accountability:*** In review of different governance options, stakeholders have expressed preference for a governance model that evolves over time based on the risks and milestones of the strategy, shifting from centralized to more decentralized leadership over time. A decision on governance will be made once stakeholders, including national governments, partners and agencies within and outside of the GPEI partnership, come together to assess how best to sustain a polio-free world.

- ***Cost estimate:*** The cost estimate benchmarks historical and current funding trends while integrating updated assumptions. A point estimate is not provided, but a range has been developed based on three scenarios (a total of US$ 6.9–8.7B for the ten-year period). Some costs, such as procurement for vaccine stockpiles, will be incurred before this strategy starts. The Polio Oversight Board, partners and donors will thus need to consider these needs toward future fundraising efforts.

How was the strategy revised?

The first version of this strategy (the *Polio Post-Certification Strategy*) was presented to the Seventy-first World Health Assembly in 2018. To revise the strategy, experts across polio, immunization, emergencies and other health initiatives, as well as donors and key partners in finance, resource mobilization and communications, were convened to review lessons learned and gather input on the technical standards needed now to sustain a polio-free world. A first draft was circulated among a broad set of stakeholders for their input. After incorporating and responding to feedback from this first round of consultations, a revised draft was disseminated to Member States through an engagement process led by WHO. This engagement included national experts at the regional and country levels in WHO and the United Nations Children's Fund (UNICEF), particularly in the polio-affected regions of Africa, the Eastern Mediterranean and South-East Asia. A final draft of the revised strategy was shared with the GPEI Strategy Committee ahead of review by the Polio Oversight Board, planned for early 2026.

What is the way forward?

In December 2025, the Polio Oversight Board took the decision to address the evolution of the partnership model closer to the start of the strategy for Sustaining a Polio-free World.

In February 2026, this strategy will be presented to the 158th WHO Executive Board and then presented to the Seventy-ninth World Health Assembly in May 2026.

Beyond 2026, the strategy will remain a living document and updated, if necessary, as the world nears WPV1 eradication and cVDPV2 elimination. It should, however, be retired once the new governance and accountability model and implementation plans are in place and once the strategy's technical standards are incorporated into country national plans, agency strategies and other global health initiatives.[7]

Decisions on the horizon
Following review by the GPEI Strategy Committee, this strategy will be updated to reflect decisions related to the phased planning process. Other decisions, such as the requirements and process for certification of the elimination of circulating vaccine-derived polioviruses types 1 and 3 (cVDPV1 and cVDPV3) as defined by the Global Commission for Certification of the Eradication of Poliomyelitis (GCC), may not be made prior to the finalization of the strategy.

[7] Such global health initiatives include: Gavi 6.0 (https://www.gavi.org/our-alliance/strategy/phase-6-2026-2030); WHO Immunization, Vaccines and Biologicals (IVB). Immunization Agenda 2030: A strategy to leave no one behind. Geneva: World Health Organization; 2020 (https://www.who.int/publications/m/item/immunization-agenda-2030-a-global-strategy-to-leave-no-one-behind); and World Health Organization, Emergency response framework (ERF), Edition 2.1. Geneva: World Health Organization; 2024 (https://www.who.int/publications/i/item/9789240058064).

Introduction

Purpose

Sustaining a Polio-free World: A strategy for long-term success **provides recommendations to preserve the gains of the GPEI after the achievement of its two strategic goals: (2) the certification of WPV1 eradication and (2) the certification of the elimination of cVDPV2.[8] It extends for 10 years after stopping the use of bOPV in routine immunization programmes.**

As global commitment will be critical to success, the strategy for Sustaining a Polio-free World is situated within global health frameworks. These include: the International Health Regulations (IHR), as revised by the World Health Assembly in the aftermath of the COVID-19 pandemic; the Global Health Security Agenda (GHSA); the Immunization Agenda 2030 (IA2030); the Lusaka Agenda; and other frameworks for health emergency preparedness and response.

Strategy engagement and audience

The strategy for Sustaining a Polio-free World was developed through iterative consultations with experts within and beyond the GPEI. This engagement process provided opportunities for stakeholders at the global, regional and national levels to offer input on elements of the strategy.

This strategy is intended for use by GPEI technical advisory groups, national and regional stakeholders, private- and public-sector partners and the future owners of the strategy more broadly, including some current agencies, donors and ministries of health, which remain critical partners to the mission of achieving and sustaining polio eradication.

The IHR provides the foundation that a health threat anywhere is a health threat everywhere.[9] With globalization and the risk of the international spread of dangerous pathogens, the IHR puts forward global regulations that direct countries to detect, report, assess and respond to public health events. The IHR calls for multilateral, multisectoral and international coordination to strengthen country, regional and global capacity for public health concerns and health security risks. As an initiative for implementing the IHR, the GHSA supports global health security through reviews to bridge gaps and bolster country capacity.[10] IA2030 positions immunization as a core component of health and well-being.[11] It aims to maintain hard-won gains in immunization, recover from disruptions caused by the COVID-19 pandemic and achieve greater progress by reaching the unreached. The five-year strategies of Gavi, the Vaccine Alliance, are critical to this strategy's success by supporting access to polio vaccines for the long-term protection of global populations.[12] Lastly, the Lusaka Agenda aims to ensure global health initiatives complement country-led priorities through key shifts that include integrated health service delivery, gradual transitions to sustainable domestic financing, and enhanced collaboration across initiatives to reduce administrative burden and promote access to health innovations.[13]

[8] See Goals One and Two. Global Polio Eradication Initiative (GPEI). Polio Eradication Strategy 2022–2026: Delivering on a promise. Geneva: World Health Organization; 2021 (https://iris.who.int/handle/10665/345967).

[9] World Health Organization. International Health Regulations (2005), Third Edition. Geneva: WHO; 2016 (http://www.who.int/ihr/publications/9789241580496/en). In June 2024, the World Health Assembly agreed to a package of amendments to the IHR. They are available online: (https://apps.who.int/gb/ebwha/pdf_files/WHA77/A77_ACONF14-en.pdf)

[10] Global Health Security Agenda [website] (https://ghsagenda.org/about/).

[11] WHO Immunization, Vaccines and Biologicals (IVB). Immunization Agenda 2030: A strategy to leave no one behind. Geneva: WHO; 2020 (https://www.who.int/publications/m/item/immunization-agenda-2030-a-global-strategy-to-leave-no-one-behind).

[12] Gavi, the Vaccine Alliance. Phase V Strategy (2021–2025). Geneva: Gavi; 2019 (https://www.gavi.org/our-alliance/strategy/phase-5-2021-2025). A new Gavi phase VI strategy will be released in 2026. GPEI Vaccine Supply Group. Polio Vaccine Security Framework. Geneva: World Health Organization; 2025 (https://polioeradication.org/wp-content/uploads/2025/01/Polio-Vaccine-Security-Framework-20250115.pdf).

[13] Future of Global Health Initiatives (FGHI), The Lusaka Agenda: Conclusions of the Future of Global Health Initiatives Process, December 2023 (https://futureofghis.org/final-outputs/lusaka-agenda/).

These regulations and frameworks are foundational to this strategy as they provide global mechanisms to achieve and sustain a polio-free world. The strategy has drawn upon them in outlining the activities, initiatives, research and developments that will need to be in place by the time the strategy begins.

The strategy for Sustaining a Polio-free World provides a bridge from the eradication effort to a polio-free world. Once the two goals of WPV1 interruption and cVDPV2 elimination are certified, ownership and accountability could begin to shift from the current GPEI partnership to a new governance structure, the concept for which is outlined in the ***Governance and accountability*** chapter.

Strategy timing

The strategy for Sustaining a Polio-free World is set to begin after the achievement of both GPEI eradication goals: the certification of the interruption of WPV1 (Goal One) and certification of the elimination of cVDPV2 (Goal Two).

The owners of the strategy for Sustaining a Polio-free World, many of whom are already involved in the polio eradication effort, will include national governments (ministries of health and finance), nongovernmental organizations (NGOs), technical advisory groups (the Global Commission for Certification of the Eradication of Poliomyelitis [GCC], the Strategic Advisory Group of Experts on Immunization [SAGE]), global immunization and other public health partnerships (Gavi, the Measles and Rubella Partnership), donors and development banks, alongside the current implementing partners of the GPEI.[14]

Scope

The strategy for Sustaining a Polio-free World is the first phase of a broader process to plan for changes associated with the certification of WPV1 eradication and cVDPV2 elimination and with the future evolution of the GPEI.

Sustaining a Polio-free World outlines functions required to sustain polio eradication.

The GPEI has identified polio-essential functions that must continue after the certification of WPV1 eradication and cVDPV2 elimination to achieve and sustain eradication. These ongoing functions include immunization with appropriate polio vaccines, poliovirus surveillance, outbreak preparedness and response, and containment.

Sustaining a Polio-free World is a global strategy that should inform country planning.

This strategy presents the goals, activities, functions and mechanisms required to achieve certification of elimination and eradication of all types of polio and to sustain a polio-free world. Its focus is on global and regional requirements that country programmes can expect to address after the two goals of GPEI Eradication Strategy are achieved.

Because not all countries share the same risks, the strategy for Sustaining a Polio-free World does not provide detailed guidance on how these functions should be incorporated within national health systems. National health plans should propose how to mainstream the implementation of the required functions both by building long-term capacity and assuming a progressively greater percentage of costs within the national health budget. They should ensure the national management of polio-essential functions within integrated immunization, surveillance, outbreak preparedness and response systems, as well as the national oversight of containment, is strong enough to adopt and implement the high-level guidance provided by this strategy.

[14] This may also include groups from other areas or departments (beyond polio) within each agency partner.

The GPEI recognizes that many countries have historically relied on polio networks and infrastructure for the delivery of broader health functions. This reliance is significant in fragile and conflict-affected settings, where polio eradication networks ensure continued access to life-saving services. These countries may not have the capacity to fully mainstream polio functions in absence of donor and partner support. In these cases, dedicated time-limited and sustainable support should be provided as part of the *Polio Transition Strategic Framework*.[15] The framework aims to help countries remain polio-free while leveraging polio assets and infrastructure to strengthen their national health systems and bolster broader functions, including routine immunization services and outbreak preparedness and response.

Addressing fragile, high-risk settings

The strategy for Sustaining a Polio-free World anticipates the need for financial support for some countries that will not be able to transition and sustain key functions within national health systems. As one way to mitigate this challenge, the cost estimate builds in assumptions related to support for fragile, high-risk settings. The future evolution of the GPEI partnership and the broader global health community will need to identify funding streams, likely requiring a variety of resource mobilization approaches, to support countries that cannot self-finance the maintenance of polio-essential functions.

The technical standards of this strategy are provided independent of future ownership.

The intent of the strategy for Sustaining a Polio-free World is to provide the information needed to support defining governance and accountability for the functions required to achieve and sustain a polio-free world.[16] A globally and regionally coordinated effort to implement the strategy is critical. Planning should start well before certification of WPV1 eradication and cVDPV2 elimination, with the transfer of ownership responsibly shifted as part of the future evolution of the GPEI partnership to a new governance structure with strong representation of immunization, health emergencies and containment stakeholders (see ***Governance and accountability*** chapter).

Assumptions

To define activities needed to achieve and sustain polio eradication, the strategy builds on four assumptions.

1. Global eradication of all wild poliovirus (WPVs) will be certified, and certification of the elimination of cVDPV2 in all regions will have met the criteria set by the GCC, including for surveillance and population immunity.[17]

[15] Polio Transition Strategic Framework: global vision to use polio investments to build strong, resilient and equitable health systems. Geneva: World Health Organization; 2024 (https://iris.who.int/bitstream/handle/10665/380282/9789240100633-eng.pdf).

[16] The revised strategy begins with the achievement of GPEI eradication goals: WPV1 eradication and cVDPV2 elimination. While all WPVs will be certified by the start of the revised strategy, only cVDPV2 elimination will be certified. Because elimination of cVDPV1 and cVDPV3 will not be possible as long as bOPV is in use, this revised strategy includes milestones related to bOPV cessation, cVDPV1 and cVDPV3 elimination and the eradication of all cVDPVs. See the timeline (**Fig. 2**) in the Executive Summary.

[17] See Global Polio Eradication Initiative (GPEI). Summary Report from the Twenty-fourth Meeting of the Global Commission for Certification of Poliomyelitis Eradication. Geneva: World Health Organization; 2023 (https://www.archive.polioeradication.org/wp-content/uploads/2024/05/Twenty-fourth-Meeting-of-the-Global-Commission-for-Certification-of-Poliomyelitis-Eradication.pdf). As of 2023, the GCC has defined two stages: certification of cVDPV *elimination* followed by certification of VDPV *eradication*. This strategy makes no assumption on whether WPV1 interruption will happen before cVDPV2 elimination.

2. The likelihood of the re-appearance of poliovirus will decrease with time, but the severity of the consequences will increase with time.[18] Furthermore, for the purposes of future risk management, WPVs and VDPVs will be treated as an equal risk for community transmission.
3. Under the IHR, detection of any poliovirus (WPV, VDPV or OPV virus more than four months after the last use of OPV or post-bOPV cessation) must be notified to WHO. Depending on the risk of international spread and other factors, the detection could constitute a Public Health Emergency of International Concern (PHEIC) that requires a prompt, globally coordinated response.
4. Implementation planning will begin before the launch of this strategy to support defining the future governance, management and coordinating structures with clear ownership for polio-essential functions. The strategy for Sustaining a Polio-free World envisions a three-year implementation planning period that will overlap with the current GPEI Eradication Strategy, as national governments, relevant partners and agencies work together to define governance and accountability mechanisms needed to achieve and sustain polio eradication (see **Executive Summary, Fig. 2**).

The strategy for Sustaining a Polio-free World does not offer contingency scenarios for eradication as such an exercise would require a different approach and different activities for risk mitigation if Member States and the GPEI are not able to achieve certification of WPV1 eradication and cVDPV2 elimination as defined in the current strategy.

Risks

Understanding key epidemiological and operational risks can help to provide confidence in the objectives outlined across each goal of the strategy for Sustaining a Polio-free World. The strategy focuses on three epidemiological risk categories: continued OPV use, undetected transmission and unsafe handling.[19] The severity of each risk is expected to fluctuate over time and at different stages of the strategy (**Fig. 3**, p. 6). Operational risks are also outlined below.

Epidemiological risks

Risk category 1: Continued OPV use

While OPV is an extremely safe, effective tool for producing mucosal and humoral immunity against poliovirus, continued OPV use creates risks that will gradually decline with time after the last use of OPV.

Potential risks that may emerge continued OPV use include:

- **VDPVs**: In populations with low immunization coverage, OPV viruses may revert to a neurovirulent form capable of causing paralysis (vaccine-derived poliovirus, or VDPV) and regain the capacity for sustained circulation through community transmission (circulating vaccine-derived polioviruses, or cVDPVs). Low routine immunization coverage elevates the risk of outbreaks where OPV is in use. Additionally, immunodeficiency-associated vaccine-derived polioviruses (iVDPVs) can result when patients with a primary immunodeficiency disorder (PID) who are exposed to OPV excrete the virus for prolonged periods. Lastly, isolated mutated vaccine viruses detected in humans or the environment with no evidence of circulation (ambiguous vaccine-derived poliovirus, or aVDPVs) may spontaneously die out or become cVDPVs.

[18] While there is an epidemiological difference between “emergence” (in the case of a new VDPV), “re-emergence” (from previously identified cVDPVs), and “reintroduction” (of WPV, VDPV, or OPV viruses from release), for the purposes of this strategy and to suit a more general readership beyond the GPEI, “re-appearance” or “re-emergence” are used to signal the return of polioviruses (WPV, VDPV, and OPV viruses) into a country or region that had eliminated or eradicated the virus.

[19] Aylward RB, Cochi SL. Framework for evaluating the risks of paralytic poliomyelitis after global interruption of wild poliovirus transmission. Bulletin of the World Health Organization. 2004;82(1):40–6.

- **VAPP**: After receiving OPV, an individual will usually shed OPV viruses for a limited period of time. Very rarely, the vaccine virus can cause vaccine-associated paralytic poliomyelitis (VAPP) either in a vaccine recipient or a close unvaccinated or non-immune contact of the recipient.

To address the risk of reversion to neurovirulence, novel oral polio vaccines (nOPVs) such as the novel type 2 OPV (nOPV2) are engineered to reduce the risk of VAPP and the risk of reversion to VDPVs; however, while nOPVs can lower these risks, they do not completely eliminate them.

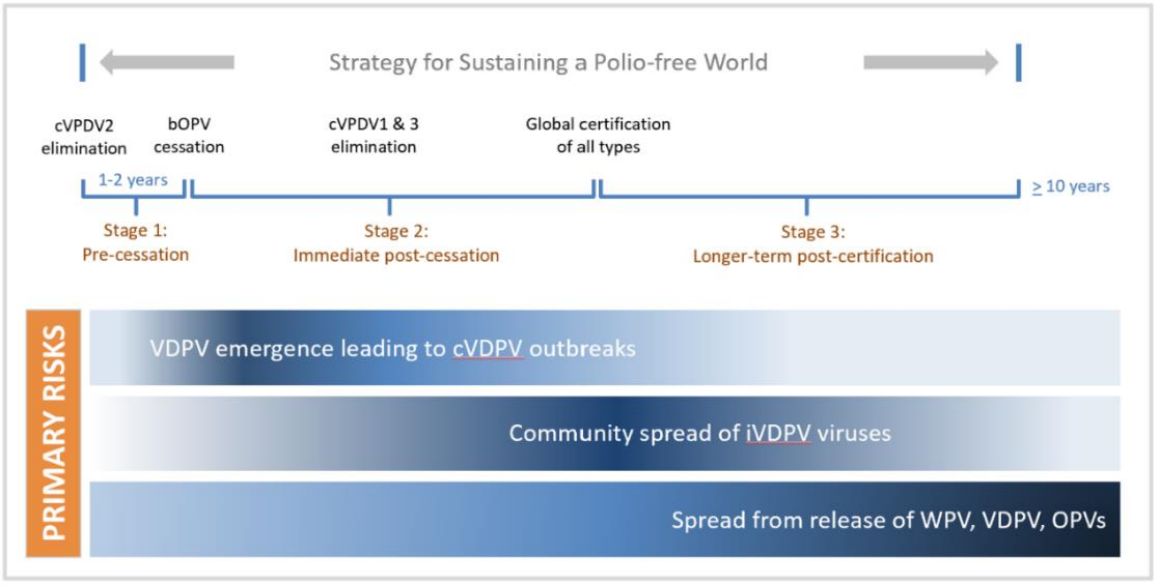
Risk category 2: Undetected transmission

The risk of undetected transmission also remains since poliovirus can circulate for several years in certain communities at low levels without resulting in cases of paralysis. As certification is type-specific (i.e. certification of WPV1 eradication is separate from certification of cVDPV2 elimination), and as sensitive global surveillance and other criteria will be confirmed at the time of certification, confidence will be high that transmission will have been interrupted. The risk of undetected or more likely delayed detection of cVDPV transmission will be low but persists, depending on the time that has passed since cVDPV was last detected and since OPV was last used. Sustaining sensitive global surveillance for poliovirus will be required indefinitely, as the risk of any re-appearance of polioviruses will persist, especially while live viruses are still used in vaccine production.

Risk category 3: Unsafe handling of any polioviruses

Unsafe storage and handling of materials that harbour poliovirus may result in unintentional or accidental release of the virus into the environment from a vaccine manufacturer or a research or diagnostic laboratory. Facilities may also retain forgotten stores of materials harbouring poliovirus, such as unaccounted-for vaccine vials or specimens, that also may result in the release of polioviruses. The intentional release of poliovirus is also possible, though the epidemiological impact and associated response strategies are the same as with accidental release. The potential consequences of accidental or intentional releases will increase with time as transmission-mitigating population immunity declines after bOPV withdrawal.

Fig. 3. Risk of poliovirus re-emergence over time



bOPV = bivalent oral poliovirus vaccine; cVDPV = circulating vaccine-derived poliovirus; cVDPV1 = circulating vaccine-derived poliovirus type 1; cVDPV2 = circulating vaccine-derived poliovirus type 2; cVDPV3 = circulating vaccine-derived poliovirus type 3; iVDPV = immunodeficiency-associated vaccine-derived poliovirus; OPV = oral polio vaccine; VDPV = vaccine-derived poliovirus; WPV = wild poliovirus.

Assessing epidemiological risk over time

The primary risk and source of re-emergence is expected to vary over time after bOPV cessation. While **Fig. 3** (above) shows the intensity or likelihood of specific risks over time, their importance relative to other risks can vary. The consequences of each risk also may vary depending on when and where re-emergence occurs. An analysis of the projected magnitude and frequency of each risk is presented in **Annex A**.

Evolution of risk across time

- **Pre-cessation to immediate post-cessation period**

  VDPVs will be the primary risk of a poliovirus re-emergence in the pre-cessation and immediate post-cessation periods due to the prior use of OPV and the need to use OPV in any outbreak responses. While the precise risk of a VDPV (either aVDPV or cVDPV) being detected and resulting in further community transmission will depend on multiple local circumstances, the risk of a cVDPV emergence is highest in the two-year period after bOPV withdrawal. This risk will decline with time except in areas where OPV is used in cVDPV outbreak response. The consequences and risk of wider transmission in areas of poor sanitation, however, will steadily accelerate as population immunity declines due to waning mucosal immunity and the growing number of OPV-naïve birth cohorts.[20]

- **Intermediate post-cessation period**

  As the risk of cVDPV wanes, the primary risk for poliovirus re-emergence in the intermediate post-cessation period will come from an iVDPV spreading within a community. Although rare, iVDPV-related transmission is expected to constitute an important risk of community spread after all other circulating polioviruses have been controlled. This is a high risk given declining population mucosal immunity after bOPV cessation, which underscores the need for sustained surveillance for long-term excretors. The highest risk for iVDPVs is among under-immunized populations in a few middle-income countries with a history of OPV use and a relatively high prevalence of PID patients.[21]

- **Longer-term post-certification period**

  Assuming appropriate containment requirements are met and maintained, a release of any category of poliovirus (WPV, VDPV or OPV) from a laboratory or a manufacturing or research facility is unlikely. However, such events have happened, and the possibility of a new occurrence will persist as long as facilities retain materials harboring or potentially harboring poliovirus.[22] Intentional or unintentional release becomes a primary risk in the longer-term post-certification period after the global certification of all polio types, when the risks of VDPV emergence will be reduced.

Securing the world from the re-appearance of poliovirus is dependent on recognizing and addressing these risks. In general, a country's risk profile and most likely source of poliovirus re-emergence will be determined by its history of OPV use and cVDPV outbreaks, health and sanitation infrastructure capacity, immunization coverage, and the presence of one or more poliovirus-essential facility (PEF) handling or storing poliovirus materials. (See **Annex B** for more on country risk.)

[20] Grassly NC. The final stages of the global eradication of poliomyelitis. Phil Trans R Soc B. 2013;368. 20120140; Duintjer Tebbens RJ, Pallansch MA, Cochi SL, Wassilak SG, Thompson KM. An economic analysis of poliovirus risk management polio options for 2013–2052. BMC Infect Dis. 2015;15:389. doi: 10.1186/s12879-015-1112-8.

[21] Kalkowska DA, Pallansch MA, Thompson KM. Updated modelling of the prevalence of immunodeficiency-associated long-term vaccine-derived poliovirus (iVDPV) excreters. Epidemiol Infect 2019;147:e295. doi:10.1017/S095026881900181X. Estivariz CF, Krow-Lucal ER, Mach O. Immunodeficiency-related vaccine-derived poliovirus (iVDPV) infections: a review of epidemiology and progress in detection and management. Pathogens 2024;13(12)1128 (https://doi.org/10.3390/pathogens13121128).

[22] Duizer E, Ruijs WL, van der Weijden CP, Timen A. Response to a wild poliovirus type 2 (WPV2)-shedding event following accidental exposure to WPV2, the Netherlands, April 2017. Eurosurveillance. 2017;22(21).

Operational risks

Identifying known operational risks can help to inform the development and implementation of critical interventions and mitigating actions to reduce the consequences if such risks do occur. Operational risks that may materialize across this strategic period include:

- **Wavering political and financial commitment**
  Today, as the GPEI works to achieve eradication, keeping polio a priority among countries, donors, immunization groups, partners and other stakeholders requires constant work given political, financial and environmental challenges. Once certification is achieved for WPV1 eradication and cVDPV2 elimination, waning commitments may impede the success of this strategy. It is critical that the future governance structure and broader global health community stay vigilant and committed to protect the gains that have been achieved by the steadfast efforts of many polio healthcare workers, polio-affected communities and polio eradication partners.

- **Inconsistent application of global standards**
  The essential functions outlined in this document should be performed with rigor, quality and urgency, using the technical standards and guidelines set forth by technical and advisory groups and incorporated into regional and country plans. Without consistent application of these global standards, the hard-won gains of polio eradication could see severe setbacks and elevated risks of re-emergence and re-established community transmission.

- **Insufficient vaccine supplies**
  The risk of insufficient supply may affect polio vaccines critical to this strategy's success, including the inactivated polio vaccine (IPV), hexavalent vaccine and antivirals. This risk is, however, more pronounced for bOPV. Once bOPV cessation dates are established, Sabin OPV manufacture will be limited in time and amount and it will be extremely difficult to re-start. While the plan is to have at least two manufacturers that can supply type-1 and type-3 nOPVs or monovalent Sabin OPVs to control post-cessation outbreaks, there is a risk of supply interruptions due to manufacturing issues.[23]

- **Destabilizing conditions**
  Many kinds of unpredictable events may impact the implementation of these essential functions. Abrupt changes across the geopolitical landscape due to conflict and insecurity may give rise to large-scale population displacement and economic migration across national and international borders, creating risks for polio-free countries and regions. Climate change and an increase in environmental risks such as natural disasters may also impede the implementation of immunization and surveillance activities. Future pandemics or shifts in development assistance may create disruptions within the global health architecture.

Each operational risk will need to be assessed and responded to, possibly with new approaches, as part of this strategy's implementation.

[23] To help secure vaccine supplies, the GPEI Vaccine Supply Group developed the Polio Vaccine Security Framework (https://polioeradication.org/wp-content/uploads/2025/01/Polio-Vaccine-Security-Framework-20250115.pdf).

Goals

The strategy for Sustaining a Polio-free World addresses mitigations to the epidemiological risks through three goals:

1. **Goal One: Protect populations** by preparing and implementing a globally synchronized cessation of bOPV use in routine immunization and by providing access to safe, effective vaccines for the long-term protection of global populations;

1. **Goal Two: Detect and respond** by promptly detecting poliovirus in a human or in the environment through a sensitive surveillance system and maintaining adequate capacity and resources to effectively contain or respond to a polio event or outbreak; and

2. **Goal Three: Contain polioviruses** by achieving and sustaining safe and secure containment of polioviruses in laboratories, vaccine manufacturers and other facilities (such as research institutions) to prevent reintroduction in a polio-free world. The key focus areas will be to reduce the number of facilities retaining poliovirus, to support safe storage and handling in facilities retaining poliovirus, and to support national and international structures for long-term poliovirus containment.

The way forward

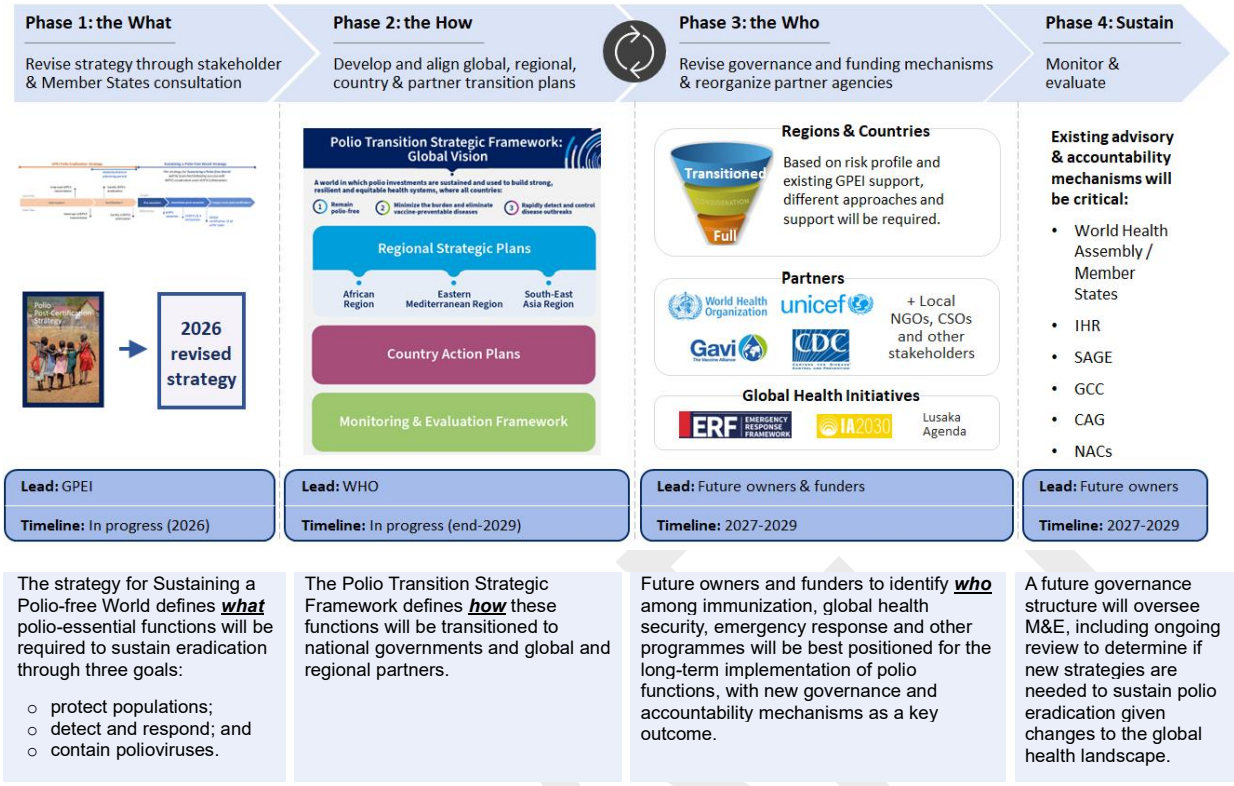
The strategy for Sustaining a Polio-free World is a call for leadership from groups within and beyond the GPEI partnership who are committed to preserving the gains of the polio eradication effort. It builds on GPEI Polio Eradication Strategy, starting after certification of WPV1 eradication and certification of cVDPV2 elimination and extending for 10 years after bOPV cessation.[24] Depending on the epidemiology of poliovirus transmission after 2026, GPEI partners, donors and country governments will identify the need for adjustments to this strategy and its timeline.

Planning for this strategy will need to start before its launch to ensure a smooth transfer from the current GPEI partnership to a new governance structure. This strategy thus represents only the first step of a larger phased planning process (**Fig. 4**, next page), which leads to a future governance structure where the functions required to sustain polio eradication are integrated within routine immunization programmes and embedded in global health security and emergency response frameworks.

The second phase, transition, is already underway at the agency level for each of the GPEI partners and at the country level, with a focus on priority countries that represent the largest footprint for GPEI support. As of 2025, GPEI provides support to 18 countries, including fragile and conflict-affected countries which will require support to fully or partially integrate polio activities into national health systems.[25] In addition, each year the programme provides targeted support to a further subset of countries for outbreak response. These transition efforts are guided by the *Polio Transition Strategic Framework: Global vision to use polio investments to build strong, resilient and equitable health systems*,[26] which addresses the operational aspects of transition by assessing country readiness, tracking progress and providing transition support to countries that meet standardized criteria.

[24] To illustrate the time to certification and the duration of the strategy: if WPV circulation is interrupted in 2026, global certification of WPV could be declared in 2028; and if cVDPV2 is interrupted in 2026, certification of the elimination of cVDPV2 would be declared in 2029; therefore, this strategy would begin on or about 2030 and continue until 2040.
[25] As new outbreaks may require GPEI resources, the number of countries receiving GPEI funding and support will vary.
[26] World Health Organization. Global Vision to use polio investments to build strong, resilient and equitable health systems. Geneva: WHO; 2024 (https://www.who.int/publications/m/item/global-vision--to-use-polio-investments-to-build--strong--resilient-and-equitable--health-systems).

Fig. 4. Roadmap of the phased planning process



The strategy for Sustaining a Polio-free World defines ***what*** polio-essential functions will be required to sustain eradication through three goals: ○ protect populations; ○ detect and respond; and ○ contain polioviruses.	The Polio Transition Strategic Framework defines ***how*** these functions will be transitioned to national governments and global and regional partners.	Future owners and funders to identify ***who*** among immunization, global health security, emergency response and other programmes will be best positioned for the long-term implementation of polio functions, with new governance and accountability mechanisms as a key outcome.	A future governance structure will oversee M&E, including ongoing review to determine if new strategies are needed to sustain polio eradication given changes to the global health landscape.

CAG = Containment Advisory Group; CSOs = civil society organizations; GCC = Global Commission for Certification of the Eradication of Poliomyelitis; GPEI = Global Polio Eradication Initiative; IHR = International Health Regulations; M&E = monitoring and evaluation; NACs = national authorities for containment; NGOs = nongovernmental organizations; SAGE = Strategic Advisory Group of Experts on Immunization; WHO = World Health Organization.

Taken together with agency and country transition plans, the strategy for Sustaining a Polio-free World will be critical to future planning as national governments, advisory groups, agencies, global partners and donors continue to work together to plan, coordinate and eventually mainstream or integrate the functions and activities that are essential to sustaining a polio-free world.

A note on methodology

The first version of this strategy (the *Polio Post-Certification Strategy*) was presented to the Seventy-first World Health Assembly in 2018. To revise the strategy, experts were convened to review lessons learned and gather input on the technical standards needed now to achieve and sustain a polio-free world. After consultation with stakeholders from polio, immunization and emergency teams, donors, partners, regional colleagues, containment stakeholders and other health initiatives, a draft was shared with WHO Member States through an engagement process led by WHO. This engagement included national experts at the regional and country levels in WHO and UNICEF, particularly in polio-affected regions of Africa, the Eastern Mediterranean and South-East Asia. A final draft of the strategy will be reviewed by the Polio Oversight Board in early 2026, with the final strategy presented to the 158th WHO Executive Board in February 2026 and the Seventy-ninth World Health Assembly in May 2026.

Goal One: Protect populations

Main objectives	Major activities
Objective 1.1	**Activity 1.1.1**
To prepare and implement a globally synchronized cessation of bOPV use in routine immunization.	Implement vaccination activities that achieve high population immunity before bOPV cessation.
	Activity 1.1.2
	Prepare and implement the withdrawal of bOPV from routine immunization.
Objective 1.2	**Activity 1.2.1**
To provide access to safe, effective polio vaccines for the long-term protection of global populations.	Develop and implement future immunization policy to protect populations against poliovirus.
	Activity 1.2.2
	Support the availability of affordable polio vaccines and their effective delivery to facilitate high immunization coverage.

Introduction

The elimination of all paralytic polio disease will require transitioning away from the oral poliovirus vaccine (OPV) and stopping its use in national immunization programmes. OPV protects against paralysis and induces intestinal immunity that prevents transmission through the fecal-oral route, which plays a major role in outbreaks in areas with poor sanitation. However, continued OPV use may cause vaccine-associated paralytic poliomyelitis (VAPP) in a vaccine recipient or an unvaccinated or non-immune contact and may lead to outbreaks of circulating vaccine-derived poliovirus (cVDPV) in areas with poor vaccination coverage. Lessons from the 2016 switch from the trivalent OPV (tOPV) to the bivalent OPV (bOPV) demonstrate that the GPEI and its partners will need to carefully prepare for bOPV cessation with vaccination activities that increase population immunity (humoral and mucosal) before implementation of bOPV withdrawal.

To ensure long-term protection after ending bOPV use, all countries will need to sustain high immunization coverage with the inactivated poliovirus vaccine (IPV). IPV does not lead to VAPP or cVDPV outbreaks, but it is less effective than OPV for stopping asymptomatic poliovirus transmission in areas with suboptimal sanitation and high population density. Therefore, countries must be supported by policies which ensure the availability, affordability and effective and efficient delivery of IPV alone or as part of the hexavalent vaccine in routine immunization.

Description of the goal

Protecting populations from paralytic polio disease following certification of WPV1 eradication requires stopping all bOPV use in routine immunization programmes globally and continuing to immunize with safe, effective polio vaccines. These dual efforts – stopping bOPV use and maintaining high coverage with IPV (stand-alone or combination vaccines) after bOPV cessation – will help to maintain population immunity and mitigate the risks of VAPP, VDPVs and possible undetected circulation or re-introduction of poliovirus from laboratories or vaccine manufacturing facilities.

Objective 1.1: Cessation of bOPV use in routine immunization

Context

To successfully implement bOPV withdrawal and sustain polio eradication gains, it is critical to reduce the risks of cVDPV emergence and transmission around the time of withdrawal. Based upon modelling analysis and lessons learned from the tOPV-to-bOPV switch, high levels of population immunity before cessation will be key to preventing uncontrolled post-cessation outbreaks, especially in high-risk countries, and ensuring rapid responses to new VDPV emergences.[27,28,29]

Maintaining high coverage with at least two doses of IPV given on a recommended schedule in routine immunization after bOPV cessation will reduce the consequences of cVDPV emergence or poliovirus reintroductions from other sources (**Objective 1.2**).

Changes to the objective since the 2018 strategy

The context for bOPV cessation has become more complex as timing for cessation is dependent on the certification of both WPV1 eradication and cVDPV2 elimination, with uncertainty around whether both goals will be achieved around the same time or several years apart.

In support of bOPV cessation, countries have more tools to protect populations against polio.

- **Novel oral polio vaccines (nOPVs)** for use in outbreak response with a lower risk of causing polio disease and cVDPVs. Novel oral polio vaccines for types 1 and 3 (nOPV1 and nOPV3) are currently in clinical development with a goal to have them available ahead of cessation.
- **Inactivated polio vaccine (IPV):** All countries have at least one dose of IPV (full or fractional) in their routine immunization schedules, and the majority have two (2) or more doses, as recommended by SAGE in 2020. The production capacity for stand-alone IPV is now sufficient to cover all OPV-using countries with at least two (2) doses in routine immunization.

Despite IA2030 policies and related strategies that prioritize hard-to-reach and zero-dose children, global vaccination coverage with three doses of OPV and one dose of IPV has been stagnant at 83–86% for the last 10 years, with very low levels in some countries with bOPV and IPV in their routine immunization schedules (**Figs. 5a and 5b**, next page). In 2024, coverage for one dose of IPV was below 50% in two countries (Angola and the Central African Republic). For another 36 countries, which represent 19% of all WHO Member States, coverage reached between 50 and 79%. For most of these countries, coverage has been low for many years, resulting in large pools of susceptible individuals that facilitated cVDPV emergence and led to widespread transmission in the last decade. Most of the countries with cVDPV2 outbreaks have low polio routine immunization coverage compared to those without cVDPV2 outbreaks.[30]

Efforts to enhance immunization services and reach under-immunized children through outreach and catch-up activities will need to start several years before the planned date for bOPV withdrawal in very high-risk countries in order to have a significant impact on population immunity. In addition, conducting high-quality national and/or subnational immunization campaigns with bOPV in countries with low or medium-low routine immunization coverage will be necessary to close remaining immunity gaps and reach high population immunity before the cessation of all bOPV use.

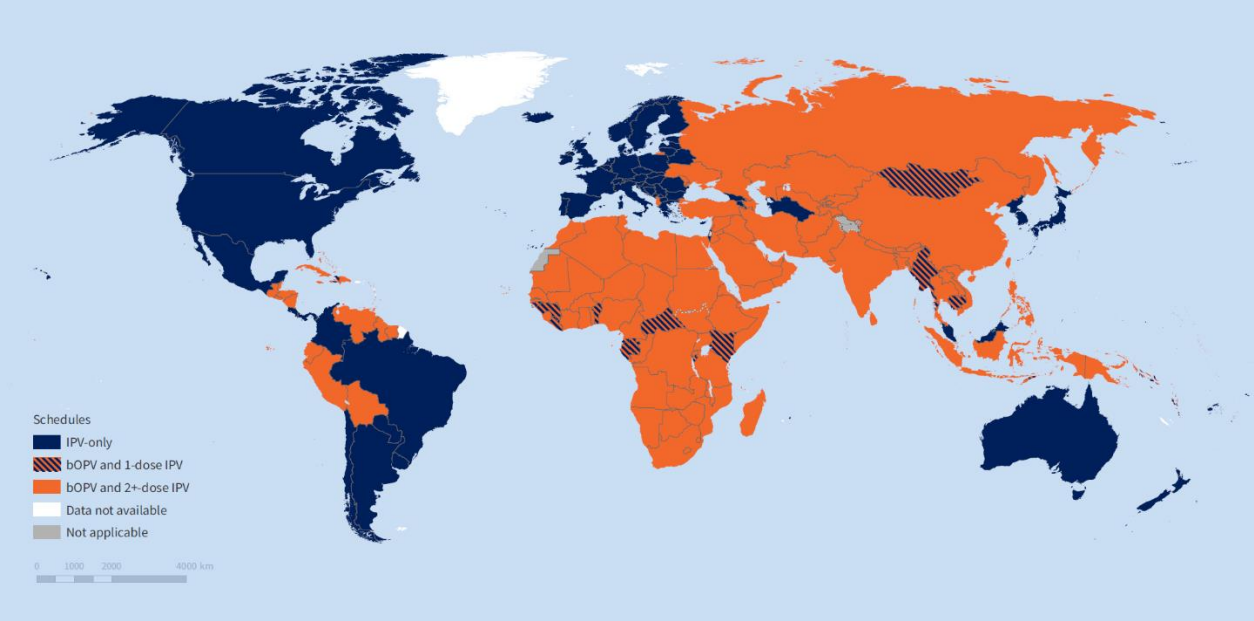
[27] Sutter RW, Molodecky N. Evaluation of the 2016 switch from tOPV to bOPV: Lessons learned for an anticipated bOPV cessation. Available at: https://polioeradication.org/wp-content/uploads/2024/11/Switch-Report-20240930.pdf.

[28] Badizadegan ND, Wassilak SGF, Estivariz, CF, Wiesen E, Burns CC, Bolu O, Thompson KM. Increasing population immunity prior to globally coordinated cessation of bivalent oral poliovirus vaccine (bOPV). Pathogens 13(9) 804 https://doi.org/10.3390/pathogens13090804.

[29] Meeting of the Strategic Advisory Group of Experts in Immunization. Wkly Epidemiol Rec. 2020, 92, 301-320.

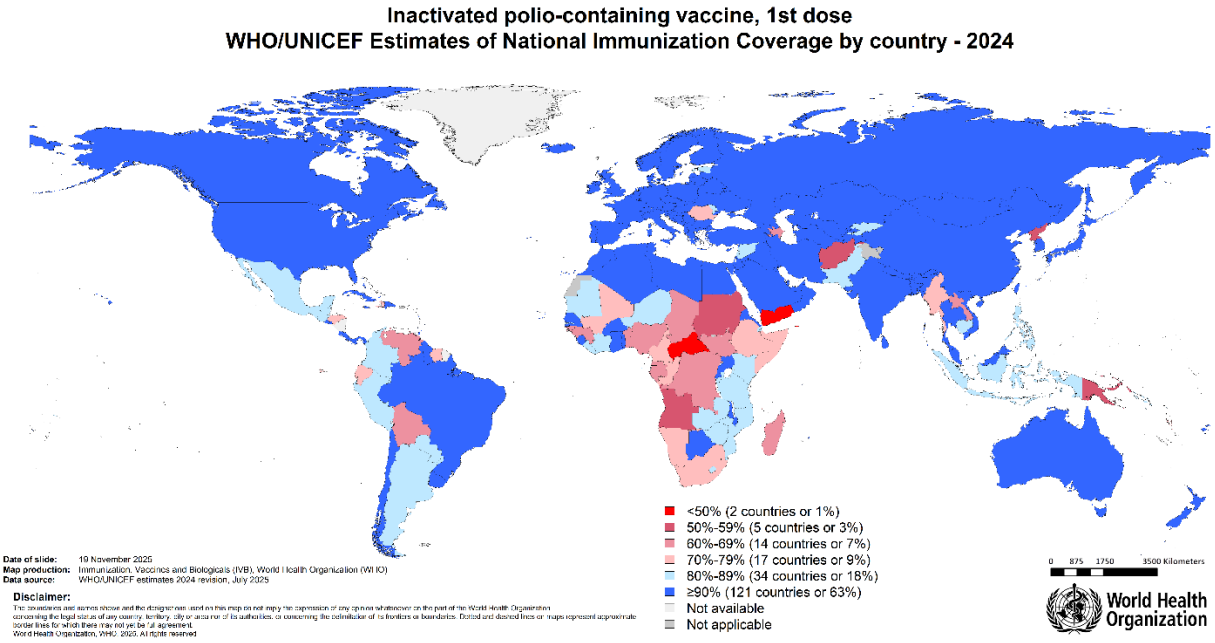
[30] WHO-UNICEF National Immunization Estimates, 2024: Namageyo-Funa A, Greene SA, Henderson E, et al. Update on Vaccine-Derived Poliovirus Outbreaks - Worldwide, January 2023-June 2024. MMWR Morb Mortal Wkly Rep 2024; 73(41): 909-16. doi: 10.15585/mmwr.mm7341a1.

Fig. 5a. Polio vaccine schedules by country in 2025



As of December 2025, 123 countries use bOPV; 19 with one IPV dose and 104 with ≥2 IPV doses in addition to bOPV.
bOPV = bivalent oral polio vaccine; IPV = inactivated polio vaccine.
Source: WHO. Data as of December 2025.

Fig. 5b. Coverage estimates with one dose of IPV in 2024



IPV = inactivated polio vaccine.
Source: WHO. Data as of 19 November 2025.

What activities are part of bOPV cessation?

The globally synchronized withdrawal of bOPV from all OPV-using countries and territories will require an intense, coordinated effort across global health technical agencies and donors, vaccine manufacturers, regulatory agencies, WHO and UNICEF regional offices and national governments. Key activities include:

Improve population immunity	Assess bOPV inventories	Prepare for bOPV withdrawal	Remove and properly dispose of bOPV	Validate absence of bOPV
Improve IPV2 coverage. Conduct pre-cessation bOPV supplementary immunization activities (SIAs) in bOPV-using countries with suboptimal immunization coverage, in accordance with recommendations.	Conduct national bOPV inventories and review plans for procurement; coordinate with national regulatory authorities and manufacturers to map and register vaccines; cease bOPV production and shipment at an appropriate time (not too early in case cessation must be postponed, with a buffer stockpile for a period of time).	Assemble national and subnational coordination committees to develop, operationalize and oversee national withdrawal plans, including training health workers and logisticians; secure funding to support implementation; develop and disseminate technical guidance and communications materials.	Stop administering bOPV; recall and destroy remaining stocks at selected waste manage-ment sites according to risk management plans developed in consultation with containment stakeholders.	Review monitoring data and validate that facilities across the country are free of bOPV following withdrawal window.

Planning for implementation

Several policy decisions and programmatic actions must be prepared for and endorsed by advisory groups to WHO and the GPEI. These decisions and activities include formally engaging bOPV-using countries to commit to cessation, defining clear conditions for launching the global withdrawal of bOPV, and monitoring conditions that may require course corrections or contingency plans.

1. Obtain commitment from all OPV-using countries to cease bOPV use through the World Health Assembly

Formal coordination of and alignment across global, regional and country levels through the World Health Assembly will be critical to implement activities to achieve and maintain high population immunity before bOPV cessation and throughout this strategy.

Global and country-level stakeholders must be engaged in the preparation, implementation and validation of a synchronous global withdrawal based upon the complexity of the pathway to bOPV cessation, the reduction in GPEI footprint since 2016 and lessons learned from transition (see **Lessons learned from polio transition** in **Governance and accountability**).

Ongoing modelling and analysis of post-switch cVDPV2 outbreaks in countries that did not use

Principles to guide bOPV cessation policy

To avoid repeating errors of the tOPV-to-bOPV switch, the GPEI and SAGE endorsed four principles to guide global policy decisions on bOPV cessation.

1. The risks of failure to control cVDPVs following bOPV cessation are similar to those following the tOPV switch, but the consequences may be much higher as type 1 poliovirus has a 10-fold higher ratio of infection to paralysis than type 2.
2. Cessation planning and implementation must follow a 'do no harm' principle to avoid thousands of children paralyzed with cVDPV.
3. It is preferable to delay implementation of bOPV cessation until the world is fully prepared rather than implementing hastily and risking failure.
4. GPEI leadership, partners and countries must acknowledge that considerable programmatic commitment, financial resources and partner engagement will be required to implement cessation.

type 2 OPV (OPV2) suggest that a globally synchronized cessation is a better strategy than cessation phased by region or risk.[31] However, if global WPV1 eradication continues to be delayed, more countries may choose to drop bOPV from routine immunization schedules before global bOPV cessation.[32] To help guide countries in this decision, SAGE endorsed a proposed risk-grading framework for transitioning to IPV-only routine immunization schedules in advance of a global bOPV withdrawal.[33]

2. Implement programmatic conditions to minimize and manage the risks associated with cessation

Two types of conditions have been endorsed by SAGE to manage cessation risks. These include:

- **Triggers**: non-negotiable conditions that MUST be met prior to bOPV withdrawal. The absence or inadequate achievement of these triggers will lead to the cancellation or postponement of bOPV cessation (see **Triggers for bOPV cessation** as approved by SAGE, at right).[34]
- **Enablers of success**: conditions with less rigid targets that, if achieved, will minimize risk of cessation failure. The GPEI and its partners will try to achieve the targets, but bOPV withdrawal may proceed even if targets are not completely fulfilled globally. Four "enablers" of a successful OPV cessation have been identified based upon prior experience with the tOPV-to-bOPV switch:
    a. high population immunity for types 1 and 3 pre-cessation (**Goal One: Protect populations**);
    b. sensitive surveillance to detect active cVDPV circulation pre-cessation (**Goal Two: Detect and respond**);
    c. effective outbreak response capacity to quickly stop post-cessation emergences/outbreaks (**Goal Two: Detect and respond**); and
    d. sufficient vaccines to achieve high population immunity pre-cessation and to control outbreaks post-cessation (**Goals One and Two**).

Triggers for bOPV cessation as approved by SAGE

1. Certification of the eradication of WPV1 by the GCC.
2. Certification of elimination of cVDPV2 by the GCC.
3. Absence of cVDPV1 or cVDPV3 outbreaks lasting ≥ 6 months for 24 months.
4. Adequate stockpiles of type-specific OPVs (novel or Sabin).
5. Establishment of IPV schedules with two (2) or more doses for a minimum of two (2) years in all countries. In places where IPV coverage is <80%, a risk-tiered approach for pre-cessation SIAs with bOPV and/or IPV should be used to boost immunity.

Advisory groups such as SAGE will review and endorse these conditions, will provide guidance on policy issues related to their implementation and will monitor whether the triggers and enablers are met prior to launching bOPV cessation.

[31] Duintjer Tebbens, R.J.; Hampton, L.M.; Thompson, K.M. Implementation of coordinated global serotype 2 oral poliovirus vaccine cessation: risks of potential non-synchronous cessation. BMC Infect Dis 2016;16: 231.
[32] SAGE reiterated that only low-polio-risk countries with high coverage with at least two IPV doses in routine immunization schedules should consider transitioning to IPV-only vaccination schedules ahead of planned synchronized bOPV cessation. Meeting of the Strategic Advisory Group of Experts on Immunization, March 2024: conclusions and recommendations. Wkly Epidemiol Rec 2024;99(22) 285-306 (https://www.who.int/publications/i/item/WER-9922-285-306).
[33] Meeting of the Strategic Advisory Group of Experts on Immunization, March 2025: conclusions and recommendations. Wkly Epidemiol Rec. 2025;100(23) 219-238 (https://iris.who.int/server/api/core/bitstreams/8dc2e79a-343e-460e-addc-eb0c0983fb94/content).
[34] Meeting of the Strategic Advisory Group of Experts on Immunization, September 2024: conclusions and recommendations. Wkly Epidemiol Rec. 2024;99(49) 719-740 (https://www.who.int/publications/i/item/who-wer9949-719-740).

The implementation of cessation-related activities – which range from pre-cessation SIAs to bOPV stockpiles for use in outbreak response during a predetermined allowable period, to the removal and destruction of bOPV from delivery and storage sites – will be planned and monitored under a single integrated oversight arrangement with harmonized milestones and risk management.

3. Monitor outcomes to implement additional mitigation strategies

Before bOPV cessation, a plan for monitoring progress and implementing timely mitigation measures will be prepared and endorsed by global oversight bodies (SAGE and others) and by OPV-using countries in the event that large cVDPV outbreaks in multiple countries appear after cessation. This plan will include: the identification of stakeholders responsible for monitoring bOPV cessation implementation and sensitivity of poliovirus surveillance; the periodicity of monitoring; clear criteria that will trigger mitigation strategies (i.e. number of countries infected, number of paralytic cases, time with persistent transmission); and specific mitigation strategies, including the re-introduction of OPV in routine immunization (nOPV or other strains).

Challenges

Reaching high population immunity prior to bOPV cessation and maintaining it until and beyond global certification will require considerable resources. For countries where polio has not been seen for many years, commitment may wane over time, especially amidst competing public health priorities. Countries with weaker health systems, large-scale migration due to economic conditions, climate- or disaster-related events, and large populations that are geographically isolated or inaccessible due to conflict or insecurity may face challenges identifying and providing polio vaccination in a timely manner to all high-risk populations. Misinformation may also contribute to vaccine hesitancy. Slower economic growth may lead to reduced government budgets and competition for scarce resources. Regions and countries at the highest risk often have limited domestic resources to contend with these challenges and are reliant on partner support. To achieve and maintain high population immunity in these conditions will thus require the commitment and accountability of both countries and partners, as well as global and country financing.

Risks and risk mitigation

Potential risks related to bOPV cessation are outlined in **Table 2**.

Table 2. Risks and risk mitigations for Objective 1.1

Risk	Causes	Risk mitigation
Failure to achieve high coverage and sufficient population immunity	Poor quality and quantity of pre-cessation SIAs	• Provide support for planning and monitoring of routine immunization activities and pre-cessation SIAs in high-risk countries. • Improve capacity in data-driven microplanning and use coverage data from Immunization Information Systems to identify at-risk populations and optimize vaccine delivery at the subnational level. • Engage with other programmes to add bOPV and/or IPV to catch-up activities (PIRIs and others) or campaigns delivering other antigens to increase population immunity and enhance country capacity to conduct high-quality vaccination campaigns • Provide technical assistance and vaccines to allow repetition of rounds in areas with poor quality SIAs.

bOPV = bivalent oral polio vaccine; IPV = inactivated polio vaccine; IPV1 = first dose of the inactivated polio vaccine; IPV2 = second dose of the inactivated polio vaccine; PIRI = periodic intensifications of routine immunization; SIAs = supplementary immunization activities.

Table 2 (continued)

Risk	Causes	Risk mitigation
Failure to achieve high coverage and sufficient population immunity (continued)	Slow introduction and scale-up of IPV2 and low coverage with IPV1 and IPV2	• All countries to have at least two (2) doses of IPV in their routine immunization schedules for at least two (2) years before bOPV cessation. • Increase advocacy and country dialogue to ensure timely introductions of the second dose of IPV (IPV2) as stand-alone or introductions of hexavalent, along recommended schedules. • Monitor country progress to achieve appropriate coverage targets for IPV2 or three doses of hexavalent.[35] • Market-shaping to reduce the cost of hexavalent vaccine.
	Funding constraints	• Work with countries and partners to develop investment cases and sustainable domestic financing strategies for routine immunization and pre-cessation campaigns. • Integrate planning and budgeting for polio control and prevention within National Immunization Strategies.
	Insufficient bOPV supply	• Plan for bOPV use for all pre-cessation campaigns up to bOPV cessation. • Ensure sufficient capacity (bulk and finished product) by establishing contracts with manufacturers in advance. • Support preventative SIAs in high-risk areas years before the pre-cessation surge to sustain manufacture. • Implement a detailed plan to manage supply risks, drawing on the processes and mechanisms outlined in the Polio Vaccine Security Framework.
	Inaccessible populations (hard-to-reach areas or populations, conflict-affected groups or social isolation, cross-border populations)	• Identify and map hard-to-reach populations and implement strategies to reach them. • Strengthen microplanning to tailor vaccine delivery strategies to the type of high-risk population (e.g. conflict, urban poor, remote rural, nomads, migrants). • Integrate polio vaccination into other health services for hard-to-reach populations. • Advocate at national, subnational and community level (working with local champions) to reach socially isolated and conflict-affected populations. • Support efforts to increase vaccine confidence, ensure strong vaccine demand generation and implement gender-responsive strategies. • Strong cross-border coordination where there is economic, conflict, or climate and disaster-related migration important for identifying and reaching vulnerable populations.

bOPV = bivalent oral polio vaccine; cVDPV = circulating vaccine derived poliovirus; IPV = inactivated polio vaccine; IPV1 = first dose of the inactivated polio vaccine; IPV2 = second dose of inactivated polio vaccine; OPV = oral polio vaccine; SIAs = supplementary immunization activities.

[35] Meeting of the Strategic Advisory Group of Experts (SAGE) on Immunization, March 2025: conclusions and recommendations, Wkly Epidemiol Rec 2025;100(23) 219-238 (https://iris.who.int/server/api/core/bitstreams/8dc2e79a-343e-460e-addc-eb0c0983fb94/content).

Table 2 (continued)

Risk	Causes	Risk mitigation
Weak implementation of bOPV removal from routine immunization	Poor-quality training and management of bOPV removal from distribution points	• Early planning and sufficient allocation of resources and time to conduct cascade training of staff at all levels. • Provide independent tracking for the planning and implementation of the removal of bOPV vials.
	Asynchronous bOPV cessation that results in cVDPV importations into countries not using bOPV in routine immunization	• Early advocacy, communication and engagement of countries in the process. • Provide funding and technical assistance to implement activities in low-income and fragile countries. • Strong global coordination for Go / No-Go decision on bOPV withdrawal.
Emergence of cVDPV after bOPV cessation	Undetected cVDPV before bOPV withdrawal, or cVDPV emergence seeded with pre-cessation SIAs or last doses in routine immunization	• Maintain surveillance performance and response capacity in all countries, particularly in high-risk countries to ensure rapid and effective response after the detection of any poliovirus (see **Goal Two**). • Ensure adequate vaccine supply for outbreak response in stockpiles (see **Goal Two**). • Select sample of facilities, develop procedures for monitoring withdrawal of bOPV vials (see **Goal Three**).

bOPV = bivalent oral polio vaccine; cVDPV = circulating vaccine derived poliovirus.

Activity 1.1.1 – Achieve and maintain high population immunity before bOPV cessation

High population immunity before bOPV cessation is essential to successful withdrawal of the vaccine. Risk analysis and modelling should be used to guide holistic, effective and sustainable approaches to raising routine coverage and implementing targeted, high-quality SIAs. Adequate planning, funding and operational management will be required to ensure that vaccination activities reach sufficient children to achieve the necessary threshold.

SAGE has recommended a two-prong approach to achieve high population immunity before cessation:

1. the introduction of a second dose of IPV (IPV2) in all countries and the introduction of the combination hexavalent vaccine; and
2. the establishment of catch-up vaccination policies and strategies to reach children with bOPV and IPV, particularly in areas with high numbers of unvaccinated or under-vaccinated children.

Approach #1: Enhance delivery of polio vaccines in routine immunization

SAGE requested that IPV2 introduction occur at least two years before bOPV cessation to ensure parity with coverage of other routine vaccines. Achieving high coverage with IPV2 is important to ensure population protection, but routine coverage data from the last 20 years has shown that achieving >90% coverage globally, and even >70% in certain countries, is extremely difficult (**Fig. 5b**, above). Delaying bOPV cessation until all OPV-using countries reach >90% coverage with IPV2 would likely result in additional VDPV paralytic cases. For this reason, specific IPV2 coverage targets were not a trigger for cessation by SAGE; however, national and global stakeholders should aim for high coverage as part of broad system strengthening and monitor delivery to hard-to-reach and under-immunized populations.

Because achieving high population immunity through routine immunization systems takes longer, interventions should start early, should continue for at least four to five years before cessation and should include strategies to map, track and deliver vaccines to hard-to-reach, under-immunized populations. Given

the critical importance of these activities, strong ownership and accountability will be defined as part of the implementation planning period before the launch of this strategy.

Approach #2: Implement pre-cessation SIAs in areas with large immunity gaps due to chronic low routine immunization coverage.

Despite their best efforts, some countries or subnational areas will be unable to reach >90% coverage with three (3) doses of bOPV in routine immunization.

In these cases, additional SIAs will need to be conducted before cessation to drive population immunity levels above the threshold required to interrupt cVDPV1 and cVDPV3 around the time of bOPV withdrawal. Conducting too few SIAs in areas with large immunity gaps or achieving low coverage with SIAs could seed new cVDPVs before bOPV withdrawal.

To mitigate these risks, the number and extent of pre-cessation SIAs should be determined using evidence-based epidemiological and modelling analysis. In September 2024, SAGE endorsed country risk tiers based on defined parameters: estimated population immunity from coverage estimates of DTP3 (vaccine for diphtheria, tetanus toxoid and pertussis) and bOPV campaigns in the previous three to five years; history of cVDPV outbreaks; and proximity to or population flow from outbreak areas. Country risk tiers will help to estimate the need for national and subnational campaigns.[36]

Considerations for pre-cessation SIA planning

Timing: Pre-cessation SIAs should be conducted as close as possible to bOPV cessation (i.e. within one year) to help stop potential undetected transmission. In countries or areas requiring a high number of SIAs (i.e. greater than four), activities should start two to three years before bOPV withdrawal. This will limit interference with other health activities, allow for campaign quality to improve with subsequent rounds and allow for more SIAs, if necessary, to compensate for poor quality of initial rounds.

Target age group: The target age group should be based on prior routine immunization and preventative bOPV campaign performance, with the inclusion of children older than five years of age if they were potentially missed.

Vaccine: The vaccine of choice will be bOPV. Full or fractional dosing of IPV (fIPV) may be used in the last round for hard-to-reach or very high-risk areas to raise immunity.*

High-risk populations: Pre-cessation SIAs should achieve high coverage and reach marginalized and under-immunized populations. Advocacy and support will be important to ensure adequate microplanning and monitoring of activities, with the recommendation for conducting additional rounds or mop-ups if coverage targets are missed.**

* Meeting of the Strategic Advisory Group of Experts on Immunization. September 2025: conclusions and recommendations. Wkly Epidemiol Rec 2025;100(49) 605-626 (https://iris.who.int/server/api/core/bitstreams/37c33e7e-d8c2-488f-b39a-b69e482d7d75/content)..

** Pons-Salort, M.; Burns, C.C.; Lyons, H.; Blake, I.M.; Jafari, H.; Oberste, M.S.; Kew, O.M.; Grassly, N.C. Preventing Vaccine-Derived Poliovirus Emergence during the Polio Endgame. PLoS Pathog 2016;12(7): e1005728.

[36] See SAGE tiering criteria in Meeting of the Strategic Advisory Group of Experts on Immunization, September 2024: conclusions and recommendations. Wkly Epidemiol Rec 2024;99(49) 719-740 (https://www.who.int/publications/i/item/who-wer9949-719-740).

Activity 1.1.2 – Prepare for the planning and implementation of bOPV withdrawal from routine immunization

The withdrawal of bOPV from routine immunization will involve a complete cessation, not simply a switch of live polio vaccines. In addition to the complexity of coordinating removal of bOPV from distribution and storage sites in multiple countries simultaneously, it will be essential to maintain close coordination with bOPV manufacturers to ensure sufficient production until cessation (see panel).

Vaccine supply requirements must be communicated to manufacturers two to three years before bOPV is needed in-country for pre-cessation SIAs, depending upon the scale and manufacturing capability available. This planning will include securing the raw material for finished product and/or bulk production, which needs to be planned much earlier. Part of the planning will also involve facility maintenance or upgrades to ensure production until cessation. All of this is dependent on the GPEI providing accurate forecasts for bOPV needs, especially for the spike in demand that will be generated by pre-cessation campaigns. It is also dependent on possible scenarios for the interruption of WPV1 and cVDPV2, which may affect the overall timeline for bOPV cessation.

Based upon the experience with the tOPV-to-bOPV switch, the coordinated global withdrawal of bOPV from routine immunization systems will require starting preparations at least 16–24 months before the established date for bOPV cessation.

Preparations for cessation should include:

1. the development of global, regional and country-level guidelines with communications plans to disseminate information through webinars and workshops;
2. cascade training of health and immunization staff in each country;
3. resource mobilization, including domestic financing of all activities required; and
4. monitoring in a representative sample of facilities to ensure the removal and destruction of bOPV vials in storage and distribution facilities following safe and secure handling practices.

A dedicated bOPV Cessation Team (BOCeT) is working to guide global policy decisions on bOPV withdrawal in coordination with SAGE. National and regional stakeholders should refer to BOCeT materials and SAGE recommendations. Future consultations on bOPV cessation will also be held with Member States and regional committees.

Securing vaccines for a polio-free world

In 2025, the GPEI launched the Polio Vaccine Security Framework as a comprehensive, dynamic approach to ensure the timely, sustained and uninterrupted supply of polio vaccines.

Polio eradication presents unique challenges to vaccine supply. A changing epidemiology and shifting timelines, alongside new product rollouts and regulatory requirements, contribute to an environment where vaccination policies undergo constant change. These dynamics can also create supply vulnerabilities, especially during transitions like bOPV cessation where the withdrawal of a vaccine from routine immunization will require supplies that cover pre-cessation campaigns, stockpile planning and longer-term use.

To bridge gaps and avert supply disruptions, the framework brings together three workstreams: (1) polio vaccine supply management, which oversees forecasting and communicating demand and monitoring and mitigating supply risks; (2) containment, which oversees biorisk management requirements for research facilities, vaccine manufacturers and suppliers; and (3) research and development which oversees a product pipeline that impacts vaccine policy and manufacture.

Under the framework, all three workstreams engage in annual consultations with vaccine manufacturers, modelers, countries and regions. The annual consultations provide greater visibility into the polio eradication effort which then allows manufacturers to make informed decisions on vaccine production. The Polio Vaccine Security Framework thus aims to sustain long-term access to polio vaccines through deliberate planning.

Objective 1.2: Access to safe, effective polio vaccines for long-term protection

Context

Changes to the objective since 2018

The 2018 Post-Certification Strategy was focused on IPV supply constraints that have been largely resolved.

Whole-cell pertussis (wP) hexavalent: With WHO prequalification of the hexavalent vaccine, countries now also have the option to use three doses of this vaccine instead of two doses of IPV.

New immunization policies and strategies that focus on health equity by prioritizing hard-to-reach and zero-dose children have been adopted by most countries and global partners. IA2030 advocates for strengthening national immunization infrastructure and integrating it into primary health care as a means to achieve and sustain elimination and eradication goals.[37] In the sixth phase of its strategy (Gavi 6.0) that covers the years 2026–2030, Gavi also focuses on: introducing and scaling-up vaccines (including IPV and hexavalent vaccines); strengthening health systems; improving programme and financial sustainability; and ensuring healthy markets in countries eligible for Gavi support.[38]

As part of the GPEI Polio Eradication Strategy and Gavi and GPEI joint planning, Gavi supports IPV1 and IPV2 introduction into routine immunization in eligible countries. As of December 2023, countries eligible for Gavi support can apply to switch from IPV to the hexavalent vaccine: a six-in-one vaccine that combines IPV with the pentavalent vaccine (diphtheria, tetanus, whole-cell pertussis [DTwP], hepatitis B, and *Haemophilus influenzae* type b).[39] While Gavi currently fully financially supports IPV and the IPV portion of the hexavalent vaccine, Gavi 6.0 vaccine co-financing and transition policies indicate that high income, upper-middle income and lower-middle income countries will gradually assume greater financial responsibility for IPV and the IPV portion of hexavalent vaccines. Over time, high income and upper-middle income countries will move to full self-financing, and lower-middle-income countries will begin co-financing and fully financing these vaccines as part of the broader sustainability and transition framework.[40]

Planning for implementation

Challenges

Maintaining high population immunity after WPV1 eradication and cVDPV2 elimination will be a challenge, particularly as the visibility of the disease diminishes and as other health conditions and diseases of national concern compete for limited attention and resources. Competing priorities for development assistance may also contribute to a constrained funding landscape. Continued advocacy and resourcing will be critical.

Furthermore, demand for stand-alone IPV may decline if community fatigue and resistance to polio vaccination increase. One viable way to maintain high coverage and population immunity to poliovirus is by bringing polio vaccines along with other childhood immunization schedules through the introduction of IPV combination vaccines, including the hexavalent vaccine.

[37] WHO Immunization, Vaccines and Biologicals (IVB). Immunization Agenda 2030: A strategy to leave no one behind. Geneva: WHO; 2020 (https://www.who.int/publications/m/item/immunization-agenda-2030-a-global-strategy-to-leave-no-one-behind).
[38] A new Gavi phase VI strategy will launch in 2026 (https://www.gavi.org/our-alliance/strategy/phase-6-2026-2030).

[39] Gavi, the Vaccine Alliance. Gavi expands portfolio, introduces new vaccine programmes to save more lives and support child health. Geneva: Gavi; 2023 (https://www.gavi.org/news/media-room/gavi-expands-portfolio-introduces-new-vaccine-programmes).

[40] Refer to the summary review of decisions from the 24–25 July 2025 Gavi Board meeting, accessible on the Gavi website (https://www.gavi.org/sites/default/files/%20/board/minutes/2025/24-25-julyBoard-2025-Mtg-01-Review-of-Decisions.pdf).

Risks and risk mitigation

Potential risks related to achieving and maintaining high population immunity through the long-term delivery of polio vaccines after bOPV cessation are outlined in **Table 3**.

Table 3: Risks and risk mitigation for Objective 1.2

Risks	Causes	Risk mitigation
Weakened domestic, political or financial commitment to routine immunization during the post-cessation period	Diminishing visibility of the need for maintaining polio vaccination at high levels	• Maintain continued global visibility through commitments made at the World Health Assembly and other fora. Develop a specific risk communication to position polio within national agendas. • Link country and global commitments to pandemic preparedness and health security frameworks. • Align with national health priorities and build on synergies with donor-funded programmes. • Conduct high-level advocacy with countries and heads of state through regional and global coordination mechanisms. • Disseminate clear, agreed-upon rationale for continued use of IPV or IPV-containing vaccines to all parties involved.
	Diminishing community demand for polio vaccination	• Support demand creation by designing and implementing social and behavioural change communication for EPI. • Engage community leaders and local champions to ensure continued support and acceptance for polio vaccination.
	Weak country decision-making around use of available polio vaccines (IPV, hexavalent) in routine immunization programmes	• Provide continued support to NITAGs, sharing relevant evidence and policy recommendations from RITAGs and SAGE to inform decision-making. • Develop sound investment cases around continued polio vaccination.
	Affordability of polio vaccines	• Ensure full costing of polio activities within the National Immunization Strategy. • Support countries with domestic resource mobilization and sustainability planning and implementation. • Improve efficiency of service delivery through integrated approaches. • Provide access to more affordable IPV (stand-alone and in combination) through market-shaping and product innovations. • Develop innovative financing mechanisms to cover some of the cost of continuing IPV vaccination.

EPI = Essential Programme on Immunization; IPV = inactivated polio vaccine; NITAGs = National Immunization Technical Advisory Groups; RITAGs = Regional Immunization Technical Advisory Groups; SAGE = Strategic Advisory Group of Experts on Immunization.

Table 3 (continued)

Risks	Causes	Risk mitigation
Inadequate protection of higher-risk populations	Low coverage of polio vaccination within routine immunization	• Global, regional and national policies focused on reaching unreached populations and maintaining high polio vaccination coverage through sustained domestic immunization financing, replication of proven innovative good practices, and implementation of accountability frameworks at all levels. • Continue to support and advocate for the introduction of hexavalent. • Maintain community demand and engagement with the National Immunization Programme for polio vaccination. • Enhance monitoring of routine immunization coverage to identify pockets of lower polio immunization coverage and enhance vaccination in those areas. • Collaborate with governments, Gavi, civil society, NGOs and other partners to reach un- and under-vaccinated children. • Continue the integration of immunization programmes, health systems strengthening and primary health care.

NGOs = nongovernmental organizations.

Activity 1.2.1 – Develop and implement future immunization policy to protect populations against poliovirus

Future immunization policy to achieve and maintain protection against poliomyelitis in the post-cessation era will be derived from a consensus of guidelines and recommendations from advisory groups, most notably SAGE, and global immunization objectives outlined in future updates to IA2030.

While updated recommendations from SAGE are forthcoming, the current recommendation for maintaining high coverage of IPV1 and IPV2 for at least 10 years after bOPV cessation addresses the need for long-term protection in the post-cessation and post-certification eras.[41] The recommendation serves as a signal to vaccine manufacturers of the potential demand for IPV (see also **Activity 1.2.2**). IA2030 goals for the reduction of zero-dose children also serve to uphold a global commitment by all countries to protect populations against poliomyelitis.[42] For Gavi-eligible countries, Gavi Alliance partners that include WHO and UNICEF have a key role to play in developing and implementing the policies, strategies and funding guidelines that will support high polio population immunity.

The implementation of future polio immunization policy will require national government commitments, domestic funding, resource mobilization, advocacy efforts and accountability frameworks. The ongoing integration of polio-specific immunization functions, activities and services within the National Immunization Programme will be an essential step to ensure greater efficiency and sustainability of polio vaccination efforts. To prioritize polio immunization coverage, countries will need to integrate approaches for maintaining high IPV coverage into their National Immunization Strategies. Aligning donor support (a Lusaka Agenda principle) will be essential to sustain these efforts.[43]

[41] World Health Organization. Meeting of the Strategic Advisory Group of Experts on Immunization, April 2017 – conclusions and recommendations. Wkly Epidemiol Rec. 2017;92:301-20 (https://www.who.int/publications/i/item/WER9222). World Health Organization Meeting of the Strategic Advisory Group on Immunization October 2020—Conclusions and recommendations. Wkly Epidemiol Rec. 2020;48:585–608 (https://www.who.int/publications/i/item/WER9548).
[42] IA2030 recommends 90% global coverage of life-saving vaccines across the life course and increasing coverage in the lowest 20% of districts. Immunization Agenda 2030: A strategy to leave no one behind. Geneva: World Health Organization; 2020 (https://www.who.int/publications/m/item/immunization-agenda-2030-a-global-strategy-to-leave-no-one-behind).
[43] Future of Global Health Initiatives. Lusaka Agenda: Conclusions of the Future of Global Health Initiatives Process. 12 December 2023 (https://futureofghis.org/final-outputs/lusaka-agenda/).

In fragile, conflict-affected or other high-risk countries, regional and/or country commitments, policies and financing may be needed. This is particularly true for countries with weaker health systems and significant financial constraints. Continued global financial support for Gavi-eligible countries and those at higher risk will be critical to maintain immunity coverage and protect vulnerable populations.

Activity 1.2.2 – Support the availability of affordable polio vaccines and their effective delivery to facilitate high immunization coverage

After bOPV cessation, countries will need to maintain high IPV coverage for a period of at least 10 years, under the current SAGE recommendation. To sustain protection against poliomyelitis, IPV vaccination should be well-integrated within routine immunization systems and integrated within the five-year plans of National Immunization Strategies.

The combined efforts of national governments and Gavi in financing IPV will be fundamental to sustaining progress and ensuring the long-term success of this strategy after bOPV cessation and beyond certification of the eradication of all polioviruses.[44] Efforts are ongoing both to reduce the cost of the IPV vaccine to increase affordability and to ensure its timely, sustained and uninterrupted supply through the processes outlined in the Polio Vaccine Security Framework.[45] A two-pronged approach aims to shape the market and increase IPV affordability by both bringing in new manufacturers which can supply at a lower cost and prioritizing innovation with new products expected to reach the market in 2025.

The hexavalent vaccine will play a role in continued effective delivery of high polio immunization coverage.[46] With its rollout, efforts are ongoing to ensure healthy markets for both IPV and hexavalent, so countries will have a choice of whether to remain with the IPV stand-alone vaccine or switch to a hexavalent vaccine.

The coming decade will also see further innovations in IPV manufacturing technologies, with transitions from Salk and Sabin strain–based production to novel vaccine-like particles (VLP) and synthetic platforms. Oversight of the transitions to new vaccine technologies should be part of future governance to anticipate potential disruptions and to secure access to affordable vaccines throughout the transition.

[44] Continued Gavi support leading up until bOPV cessation will be contingent on future decisions of the Gavi Board.

[45] UNICEF Supply Division, 2024. See also the Polio Vaccine Security Framework, which can be accessed on the GPEI website (https://polioeradication.org/wp-content/uploads/2025/01/Polio-Vaccine-Security-Framework-20250115.pdf).

[46] While recent SAGE recommendations have indicated IPV use (full or fractional) in outbreak settings as a supplement to OPV (the primary tool for outbreak response due to its ability to induce mucosal immunity), the recommendations only apply to stand-alone IPV and not hexavalent. Meeting of the Strategic Advisory Group of Experts on Immunization, June 2023: conclusions and recommendations. Wkly Epidemiol Rec. 2023;98(22):239-256 (https://iris.who.int/server/api/core/bitstreams/385e9e4f-f82a-4c4f-8524-456e1ec58083/content).

Goal Two: Detect and respond

Main objectives	Major activities
Objective 2.1	**Activity 2.1.1**
To promptly detect any poliovirus in a human or in the environment through a sensitive surveillance system.	Establish and maintain an integrated and sustainable surveillance system capable of rapidly detecting polioviruses.
	Activity 2.1.2
	Sustain adequate and technically competent laboratory and surveillance infrastructure (including human capacity) and information systems to rapidly detect poliovirus transmission.
Objective 2.2	**Activity 2.2.1**
To develop and maintain adequate global and regional capacity and resources to support national efforts to contain any detected poliovirus and stop any poliovirus transmission.	Enhance country readiness to adequately respond to future outbreaks, develop and implement preparedness plans, and prepare response strategies.
	Activity 2.2.2
	Sustain trained human capacity and create, maintain and manage adequate stockpiles of polio vaccine to appropriately respond to outbreaks.

Introduction

Since the GPEI's inception, comprehensive acute flaccid paralysis (AFP) surveillance and rapid response vaccination campaigns have been two core strategies for polio eradication. Under a post-GPEI governance structure, minimizing the risks of delayed detection or inadequate response will require building upon existing capacity while linking polio-specific surveillance activities within vaccine-preventable disease (VPD) surveillance and through international instruments, such as the IHR, GHSA, IA2030 and the pandemic agreement under development for ratification by WHO Member States.[47] Countries will need to maintain surveillance capacity, prompt notification and outbreak preparedness and response capacity as required under the IHR 2005 (or an updated version) and according to their assessed risk under the WHO Emergency Response Framework (ERF).[48,49]

The sensitivity, specificity and technical capacity for poliovirus surveillance will need to be maintained throughout the stages that anchor this strategy's key milestones: from certification of WPV1 eradication and cVDPV2 elimination to bOPV cessation; from bOPV cessation to the certification of the elimination of cVDPV1 and 3; and from the certification of all poliovirus types to the post-certification era. Across these stages, surveillance systems will need to adjust to reflect the likelihood of missed transmission according to risk. Although risks may decrease with time, essential surveillance functions should continue as a systematic and ongoing process given that the severity of the consequences of any emergence of poliovirus will increase with time.

[47] Updates on the WHO Pandemic Agreement are available online (https://www.who.int/health-topics/who-pandemic-agreement).

[48] World Health Organization. International Health Regulations (2005), Third Edition. Geneva: WHO; 2016 (http://www.who.int/ihr/publications/9789241580496/en). In June 2024, the World Health Assembly agreed to a package of amendments to the IHR (https://apps.who.int/gb/ebwha/pdf_files/WHA77/A77_ACONF14-en.pdf).

[49] World Health Organization. Emergency response framework (ERF), Edition 2.1. Geneva: WHO; 2024 (https://www.who.int/publications/i/item/9789240058064).

Description of the goal

Polio surveillance leading up to and beyond the future evolution of the GPEI will take a risk-based approach by prioritizing risks, clarifying risk tolerance and developing risk mitigation measures to ensure prompt detection of any poliovirus in a human or in the environment through a sensitive surveillance system. Using this approach, surveillance recommendations will be modified by risk.

1. **For high-risk countries (with a need for highly sensitive surveillance)**, especially countries that recently stopped persistent poliovirus transmission, the primary focus will be maintaining a highly sensitive surveillance system able to rapidly detect transmission or new emergences of cVDPV1, cVDPV3 and iVDPV through surveillance systems that have transitioned from GPEI support and are fully integrated into broader VPD surveillance systems with strong linkages to outbreak response mechanisms. To address areas of greatest risk, dedicated strategies will be needed for subnational areas with vulnerable un- and under-immunized populations, including hard-to-reach nomadic, displaced or conflict-affected communities.

2. **For polio-free countries using bOPV (with a need for very sensitive surveillance)**, the primary focus will be maintaining a very sensitive surveillance system to detect new emergences of cVDPV1, cVDPV3 and iVDPV based on country risk. A mix of strategies will be used to identify paralytic cases and viruses in the environment with supplemental strategies for vulnerable un- and under-immunized populations. The system should also ensure strong linkages with outbreak response mechanisms.

3. **For polio-free, IPV-only using countries (with a need for sensitive surveillance)**, the primary focus will be ensuring that surveillance systems can identify importations of polioviruses with continued circulation and containment breaches through a mix of strategies that can detect paralytic cases and viruses circulating in the environment. (See **Table 5**, p. 30, and **Annex B** for more details.)

Surveillance lessons learned since 2018

Opportunities where poliovirus surveillance can be included in existing systems will be important to sustainably uphold standards to detect poliovirus. The integration of case-based poliovirus surveillance into existing surveillance systems (VPD and non-VPD) can streamline processes and increase efficiencies. *The Global Strategy on Comprehensive Vaccine-Preventable Disease Surveillance* provides a useful framework for integrating surveillance support functions and operations across diseases.*

The programme has rapidly expanded the number of countries with environmental surveillance (ES) and the total number ES sites globally from 38 countries in 2018 to 65 countries in 2024. Under the Global Polio Surveillance Action Plan (GPSAP), the GPEI is optimizing the global network so sites are appropriately located and adequately sensitive to detect polioviruses in the environment. To further optimize ES for the post-GPEI era, the programme will explore integration with wastewater surveillance programmes. Notably, in IPV-only countries with high vaccination coverage, poliovirus infection is less likely to result in paralytic cases. ES detections through wastewater surveillance can thus serve as important early warning signals of silent transmission.

* World Health Organization. Global Strategy on Comprehensive Vaccine-Preventable Disease Surveillance. Geneva: WHO; 2020 (https://www.who.int/publications/m/item/global-strategy-for-comprehensive-vaccine-preventable-disease-(vpd)-surveillance).

The public health and surveillance infrastructure required to support rapid detection, notification and information-sharing should be well-linked with national and international outbreak response mechanisms and decision-support instruments, such as the IHR and the ERF or a new global pandemic accord, to provide a robust response to stop transmission or prevent circulation. Although primary responsibility rests with national governments, regional and global capacities and resources should be adequate to support national efforts, especially in high-risk areas that are unlikely to be able to fully support all polio-related activities independently.

Objective 2.1: Prompt detection through sensitive surveillance

Context

As a key criterion for certifying the eradication of polio,[50] sensitive surveillance is essential for providing confidence in WPV1 eradication and cVDPV2 elimination. To support the development and maintenance of surveillance sensitivity, the GPEI has outlined priority actions on the path toward WPV1 eradication and cVDPV2 elimination in the Global Polio Surveillance Action Plan, or GPSAP.[51] Objective 2.1 extends the GPSAP by describing the strategies needed to detect new cVDPV emergences and to provide confidence in the elimination of all cVDPVs, while planning for the integration of polio surveillance with VPD surveillance and response to health emergencies. The function of global surveillance guidance, such as the GPSAP, that is currently provided by the GPEI Surveillance Group will need to be maintained throughout the evolution of future governance structures to help sustain a polio-free world.

Planning for implementation

Challenges

Securing the funding required to maintain polio surveillance activities will be a fundamental challenge to the prompt detection of poliovirus after WPV1 eradication and cVDPV2 elimination. Activities that need dedicated funding, especially in high-risk countries, include:

- active AFP surveillance (integrated with active surveillance for other VPDs);
- stool collection kits;
- environmental sampling (integrated with wastewater sampling, where feasible);
- transportation for samples collected through AFP and environmental surveillance (ES) and shipped both domestically and internationally to poliovirus laboratories;
- laboratory equipment and reagents with sufficient human resource (HR) capacity to test samples; and
- global data system for AFP and ES data, including laboratory testing and genetic sequencing.

Sustaining global technical capacity will also be a challenge after core surveillance functions are integrated into other programmes. Maintaining technical staff with robust knowledge of AFP case diagnostic criteria, case investigation procedures and case reporting will be key. Additionally, human resources for conducting poliovirus testing, including genetic sequencing and interpretation, will be critical to address potential iVDPVs and/or containment breaches.

Risks and risk mitigation

Five key surveillance risks must be addressed in the strategic period:

1. missed transmission or silent transmission of polioviruses;
2. delayed detection (or delayed confirmation) of polioviruses;
3. failure to detect a containment breach in a poliovirus-containing facility or surrounding community;
4. loss of surveillance sensitivity throughout the evolution of future governance structures; and
5. loss of surveillance sensitivity due to poorly implemented integration of polio surveillance into broader VPD or other national surveillance systems.

[50] See Annex 2 of Summary Report from the Twenty-fourth Meeting of the Global Commission for Certification of Poliomyelitis Eradication: Geneva, Switzerland, 22–23 November 2023. Geneva: World Health Organization; 2024 (https://polioeradication.org/wp-content/uploads/2024/09/Report-from-the-Twenty-Fourth-Meeting-of-the-Global-Commission-for-Certification-of-Poliomyelitis-Eradication-20240926.pdf).

[51] Global Polio Eradication Initiative (GPEI). Global Polio Surveillance Action Plan 2025–2026. Geneva: World Health Organization; 2025 (https://polioeradication.org/wp-content/uploads/2025/01/Global-Polio-Surveillance-Action-Plan-2025-2026.pdf).

Mitigation strategies to address these risks are provided in **Table 4**.

Table 4. Risks and risk mitigations for Objective 2.1

Risk	Causes	Mitigation measure
Missed transmission or silent transmission	Lack of sustained poliovirus surveillance within high-risk communities or in areas with access issues (inaccessibility, conflict or insecurity)	• Increase AFP surveillance sensitivity through integrated active surveillance visits to high-priority facilities in high-risk geographies immediately before and after bOPV cessation. • Optimize the ES site network with a special focus on high-risk populations. • Develop and maintain strategies such as community-based surveillance to support active case search among hard-to-reach populations and cross-border communities. • Develop a sustainable iVDPV surveillance system in high-risk areas to provide early detection of iVDPVs among patients with primary immunodeficiency disorders (PIDs).
	Polio surveillance gaps created by constrained resources (human or financial)	• Identify and implement ways to support sustainability: o integrate ES with broader wastewater surveillance. o strengthen enterovirus surveillance to detect paralytic polio cases, especially in high-income, IPV-only using countries; o use event-based surveillance as a supplemental strategy to indicator-based AFP surveillance, particularly in the post-certification era.
Delayed detection	Suboptimal implementation of polio surveillance activities	• Continue active, case-based AFP surveillance in high-risk areas, then gradually transition to focus on sentinel sites and passive AFP surveillance. • Ensure ES sites are monitored with poor-performing sites moved or closed as needed. • Sustain the flow of polio surveillance data (AFP and ES) into a global data repository (POLIS, xMart, WIISE).
	Insufficient training or misaligned capacity to sustain high-quality surveillance systems	• Ensure surveillance workforce is well-trained in AFP surveillance, including case identification, notification, investigation and stool collection. • Maintain laboratory capacity to address a potential decrease in AFP samples and a potential increase in ES samples, especially immediately before and after bOPV cessation.
	Lack of country prioritization for polio surveillance activities	• Develop a risk communication to position polio as a priority within national agendas. • Ensure all Member States report poliovirus detections as required by the IHR regulations.
Failure to detect a containment breach	Suboptimal implementation of poliovirus surveillance / containment activities	• Develop comprehensive detection plans specifically targeted to the environments of poliovirus-containing facilities. • Ensure effective containment certification.

AFP = acute flaccid paralysis; bOPV = bivalent oral polio vaccine; ES = environmental surveillance; IHR = International Health Regulations; iVDPV = immunodeficiency-associated vaccine-derived poliovirus; PIDs = primary immunodeficiency disorders; POLIS = Polio Information System; WIISE = WHO Immunization Information System.

Table 4 (continued)

Risk	Causes	Mitigation measure
Loss of polio surveillance sensitivity during / after evolution to a new governance structure	Poor transition of polio surveillance to future partners	• Systematically build on synergies through active collaboration across country systems and agency departments that support surveillance and outbreak preparedness and response.
	Weak polio surveillance in high-risk countries	• Ensure dedicated funding is available to sustain essential polio surveillance functions for high-risk countries as part of comprehensive VPD surveillance.
	Weak accountability mechanisms for agency partners and country systems	• Develop strong accountability with national governments, regional frameworks and partners. • Advocate for at least an annual reporting of polio surveillance system by global advisory groups (SAGE), regional and national Technical Advisory Groups (TAGs). • Keep polio surveillance as a standing agenda in WHO regional committees and to the World Health Assembly every year for at least a decade after WPV1 eradication, cVDPV2 elimination.
Loss of polio surveillance sensitivity due to integration	Failure to integrate poliovirus surveillance activities into broader infectious disease initiatives	• Ensure AFP surveillance is well integrated into broader VPD surveillance training and active surveillance visits in high-priority countries and is included in peridoic surveillance reviews. • Sustain scope and sensitivity of the ES footprint through integration with wastewater surveillance.

AFP = acute flaccid paralysis; cVDPV2 = circulating vaccine-derived poliovirus type 2; ES = environmental surveillance; SAGE = Strategic Advisory Group of Experts on Immunization; TAGs = Technical Advisory Groups; VPD = vaccine-preventable disease; WHO = World Health Organization; WPV1 = wild poliovirus type 1.

Activity 2.1.1 – Establish and maintain an integrated and sustainable surveillance system capable of rapidly detecting polioviruses

Beyond the minimum capacity to provide early warning of global public health security threats as required for all countries under the IHR, poliovirus surveillance systems will need to integrate, sustain or expand current strategies to address future risks.

Six strategies to ensure the timely detection of poliovirus as a global health security issue after its integration with VPD surveillance

1. Maintain a sustainable, sensitive system to detect poliovirus in humans by using an appropriate mix of AFP surveillance, enterovirus surveillance and supplemental activities for high-risk and hard-to-reach populations or areas. AFP should remain a priority condition with a standardized syndromic definition under a comprehensive VPD surveillance system or early warning surveillance system. Enterovirus surveillance is primarily a passive, laboratory-based surveillance system that collects stool, respiratory specimens or cerebral spinal fluid from patients with clinical symptoms of enterovirus infection that include AFP. The use of AFP surveillance within enterovirus surveillance will depend on the global and country-level risks of cVDPV1 and cVDPV3. The higher the risk, the more active surveillance should be used with strategies such as community-based surveillance. In lower risk, higher income countries, enterovirus surveillance will be a more common strategy.

2. Maintain a sustainable, sensitive system to detect low-level transmission of polioviruses in the environment. Leading up to and throughout the future evolution of the partnership, the existing ES network will need to be optimized and sustained, likely through integration with wastewater surveillance. An optimized ES network is one where each environmental site is sensitive enough to detect enteroviruses among high-risk populations. Under this strategy, ES will be used to:

- quickly detect low levels of circulation of polioviruses in high-risk geographies and polio-free bOPV-using countries;
- detect importations and low levels of circulation of polioviruses in IPV-only using countries;
- ensure that all OPV viruses have stopped circulating after bOPV cessation; and
- detect a containment breach for a poliovirus-essential facility (PEF).

3. Use event-based surveillance to supplement comprehensive VPD surveillance system for early warning of potential poliovirus circulation. Event-based surveillance is the organized collection, monitoring, assessment and interpretation of mainly unstructured ad hoc information regarding health events that may represent an acute risk to human health.[52] Triggers relevant to the re-appearance of polioviruses (such as media reports of clusters of paralyzed children) will need to be introduced or strengthened in event-based surveillance algorithms that track ad hoc, informal sources.[53] Event-based surveillance can assist with early warning and detection of possible re-emergence, thereby increasing the overall sensitivity of polio surveillance. The relative importance of event-based surveillance will increase after cVDPV1 and cVDPV3 elimination.

4. Expand iVDPV surveillance in countries at high risk for iVDPV incidence. Surveillance for iVDPV excretors without paralysis relies on two principles: (1) establishing sentinel site surveillance in countries at risk of iVDPVs to identify and screen for poliovirus among patients with primary immunodeficiency disorders (PIDs), particularly B-cell deficiencies or combined immunodeficiencies; and (2) identifying iVDPV excretors among patients with PIDs through professional societies that capture primary immunodeficiencies in the remaining countries. Countries prioritized for iVDPV surveillance are predominately polio-free bOPV-using countries with high rates of consanguineous marriages and with the ability to detect and treat patients with PIDs. A failure to implement iVDPV surveillance in countries identified as at-risk will lead to missed transmission that could jeopardize the gains of the polio eradication effort.

5. Develop plans to detect any containment breach with potential community exposure. Given the potential consequences of a breach, global guidance on environmental testing requirements has been developed by WHO.[54] (See also **Goal Three chapter**).

6. Facilitate strong linkages between poliovirus surveillance and outbreak response. The post-GPEI landscape will require the development of strong linkages between integrated VPD surveillance, ES, the Global Polio Laboratory Network (GPLN) and WHO health emergencies programme. Poliovirus detections from paralysis cases and the environment will need to be immediately reported and flagged for rapid risk assessment and, if needed, emergency response. Additionally, alerts picked up by event-based surveillance will need to be flagged for further investigation and stool sample collection by VPD surveillance staff. Outbreak responses after detection of a poliovirus will vary based on the epidemiological risk of further spread and time since eradication/elimination. Details of poliovirus response needs can be found in **Objective 2.2**.

Table 5 details these surveillance strategies across the epidemiological stages of this strategy for the three different risk groups. **Annex B** provides a country risk classification.

[52] World Health Organization. Early detection, assessment and response to acute public health events: Implementation of early warning and response with a focus on event-based surveillance. Geneva: WHO; 2014 (https://www.who.int/publications/i/item/WHO-HSE-GCR-LYO-2014.4).

[53] An example of the efficacy of EBS for the detection of poliovirus circulation was a 2006 WPV1 outbreak in Namibia. See Yusuf N, de Wee R, Foster N, Watkins MA, Tiruneh D, Chauvin C, et al. Outbreak of type 1 wild poliovirus infection in adults, Namibia, 2006. J Infect Dis. 2014 Nov 1;210 Suppl 1(Suppl 1):S353-60.

[54] World Health Organization. Public health management of facility-related exposure to live polioviruses. Geneva: WHO; 2024 (https://iris.who.int/server/api/core/bitstreams/56437b8f-b003-4a32-bbc0-2df5a082116b/content).

Table 5. Risk-based operational framework for polio surveillance

	Stage 1: cVDPV2 elimination to bOPV cessation	Stage 2: bOPV cessation to cVDPV1 & 3 elimination	Stage 3: post-cVDPV1 & 3 elimination
High risk (highly sensitive surveillance)			
Case-based surveillance	Active AFP surveillance with CBS for special populations	Active AFP surveillance with CBS for special populations	Predominately passive AFP surveillance and EVS
Environmental surveillance	Optimized ES network targeting high-risk populations	Optimized ES network targeting high-risk populations	ES fully integrated into wastewater surveillance
Event-based surveillance	Supplementary strategy	Supplementary strategy	Key strategy to identify paralytic cases needing investigation
Surveillance standards	Annual NPAFP ≥2 NPAFP per 100 000 under 15 at every subnational area with <15 population ≥100,000; 80% stool adequacy subnational; 49 days from onset to final diagnosis; ≥50% EV detection for 80% of permanent sites; high-priority sites visited weekly	Annual NPAFP ≥2 NPAFP per 100 000 under 15 at every subnational area; 80% stool adequacy subnational; 49 days from onset to final diagnosis; ≥50% EV detection for 80% of permanent sites; high-priority sites visited weekly	Annual NPAFP ≥1 NPAFP per 100 000 under 15 nationally; 80% stool adequacy nationally
Polio-free bOPV-using countries (very sensitive surveillance)			
Case-based surveillance	Mix of active and passive AFP surveillance, CBS for special populations as needed, EVS where possible	Increased use of active AFP surveillance, CBS for special populations as needed, EVS where possible	Predominately passive AFP surveillance and EVS
Environmental surveillance	Optimized ES network targeting high-risk population	Optimized ES network targeting high-risk population	ES fully integrated into wastewater surveillance
Event-based surveillance	Supplementary strategy	Supplementary strategy	Key strategy to identify paralytic cases needing investigation
Surveillance standards	Annual NPAFP ≥1 NPAFP per 100 000 nationally; 80% stool adequacy nationally; 49-day turnaround; optimize network 50% EV detection for 80% of permanent sites	Annual NPAFP ≥2 NPAFP per 100 000 nationally; 80% stool adequacy nationally; 49-day turnaround; optimize network 50% EV detection for 80% of permanent sites	Annual NPAFP ≥1 NPAFP per 100 000 nationally; 80% stool adequacy nationally
Polio-free IPV-only countries (sensitive surveillance)			
Case-based surveillance	Mix of passive AFP surveillance and EVS to detect paralytic cases	Mix of passive AFP surveillance and EVS to detect paralytic cases	Mix of passive AFP surveillance and EVS to detect paralytic cases
Environmental surveillance	ES integrated into wastewater surveillance and targeting PEFs	ES integrated into wastewater surveillance and targeting PEFs	ES integrated into wastewater surveillance and targeting PEFs
Event-based surveillance	Key strategy to identify paralytic cases needing investigation	Key strategy to identify paralytic cases needing investigation	Key strategy to identify paralytic cases needing investigation
Surveillance standards	Annual NPAFP ≥1 NPAFP per 100 000 and 80% stool adequacy nationally in countries using AFP surveillance	Annual NPAFP ≥1 NPAFP per 100 000 and 80% stool adequacy nationally in countries using AFP surveillance	Annual NPAFP ≥1 NPAFP per 100 000 and 80% stool adequacy nationally in countries using AFP surveillance

AFP = acute flaccid paralysis; CBS = community-based surveillance; cVDPV1 = circulating vaccine-derived poliovirus type 1; cVDPV2 = circulating vaccine-derived poliovirus type 2; cVDPV3 = circulating vaccine-derived poliovirus type 3; ES = environmental surveillance; EV = enterovirus; EVS = enterovirus surveillance; NPAFP = non-polio acute flaccid paralysis (indicator); PEF = poliovirus-essential facility.

Activity 2.1.2 – Sustain adequate, technically competent laboratory and surveillance infrastructure (including human capacity) and information systems to rapidly detect poliovirus transmission

Integrating AFP surveillance into VPD surveillance

Case-based (AFP) poliovirus surveillance can be synergized with other VPD surveillance platforms to build comprehensive systems that meet country needs. Activities or functions that are common across AFP and other VPD surveillance can be undertaken together with optimized staff strength, training programmes, and data reporting, analyses and dissemination systems to achieve economies of scale and greater cohesion between VPDs and other disease-specific initiatives. Examples include: bringing all VPD surveillance systems under a common oversight mechanism; training and engaging the same frontline workforce; and using the same specimen transport system (i.e. vehicles) and electronic information systems (including hardware) for data collection, management and use.

Integrating ES into broader wastewater surveillance

To sustain a comprehensive network, ES for polioviruses should be integrated with multi-pathogen wastewater surveillance, where feasible. Countries will need to assess the pathogens they wish to test for along with the appropriateness of the site and collection methodologies. Furthermore, GPLN-validated laboratory techniques will need to be developed for processing wastewater samples for poliovirus testing.

Sustaining technical capacity to support countries

***Global and regional technical capacity**:* The scope and intensity of global support for general polio surveillance activities will gradually decrease over time, but the capacity to monitor surveillance quality and provide technical advice must be maintained for AFP surveillance, ES and polio laboratory diagnostic testing. Regional capacity and support will depend on risk. Regions with multiple high-risk countries should pay attention to cross-border areas and may need to directly support active sentinel site surveillance for at least three years post-bOPV cessation. Additionally, global and regional technical expertise will be required for extended periods in fragile, conflict-affected or other high-risk countries that are unable to transition polio surveillance functions.

***National surveillance responsibilities**:* In keeping with the IHR expectation that each country should have capacity to detect any potential PHEIC, primary responsibility for poliovirus surveillance lies at the country level. However, under this strategy, surveillance capacity required beyond this core level will depend on country risk. If fragile or high-risk countries are unable to fully transition to government-led programmes, regional and global support will be needed to ensure surveillance is maintained.

***Information management**:* Access to reliable and timely AFP, ES and laboratory data, currently provided by the web-based polio information system (POLIS), will continue to be a priority. Future public health staff will need ready-access to AFP reporting, ES data, linked laboratory/case-based data, IPV coverage data and streamlined SIA indicators. Especially wherever passive AFP is the primary mode of surveillance, clinicians and community informants will need to be linked to central public health infrastructures to report suspected AFP cases. Maintaining globally standardized polio surveillance reporting and a repository of poliovirus sequences will be key to quickly identifying new emergences and outbreaks.

Global options for meeting these requirements include but are not limited to: (1) using POLIS as a platform for other VPDs with common data requirements, such as measles and rubella; (2) integrating polio data into an “EPI Information System” for all VPDs, such as WHO Immunization Information System (WIISE); or (3) relying on broader communicable disease monitoring under integrated disease surveillance and response (IDSR) case-based systems. Some combination of approaches may be an option, though data

validation will be required and a centralized global database for AFP and poliovirus detections should be maintained.

At the country level, any information system should account for specific data requirements related to country risk. High-risk countries should continue reporting case-based AFP data to regional and global offices at least three years after bOPV cessation.

Sustaining the Global Polio Laboratory Network

Polio laboratory testing conducted within WHO-accredited laboratories of the GPLN has been informally integrated with testing for VPDs and other viral pathogens for years. To ensure sustainability, laboratories should build upon early successes.

Global level

Global coordination of the GPLN will need to be integrated with the coordination of other global laboratory networks (specifically, the Global Measles Rubella Laboratory network, or GMRLN) while ensuring the global quality assurance system is maintained to accredit diagnostic laboratories. Institutional knowledge of poliovirus laboratory methods and interpretation of sequencing results will be critical up to the post-certification period and beyond. Additionally, the global level will need to monitor the timely referral patterns for samples from countries without polio laboratories to countries with polio laboratories, potentially with samples crossing regions for testing. As part of the future governance structure, global experts should continue annual reviews to ensure quality assurance and control.[55]

Regional level

In all WHO regions except the European Region, GPLN coordination at the regional level has always integrated polio laboratory surveillance with other VPDs. Under this strategy, it will be necessary to continue regional support to laboratories for accreditation and for referrals of samples from countries without polio laboratories. Regional support will also be needed to strengthen coordination between laboratories and health emergency reporting.

Laboratory level

Government-led laboratories and private institutional laboratories will need to identify financial resources to sustain the human resources, equipment, consumables and appropriate containment measures needed to test a decreasing number of AFP cases and a potential increase in ES samples. Maintaining or improving laboratory efficiency will require innovations in the concentration and processing of ES samples, especially to facilitate integration of poliovirus testing with the testing of other antigens in broader wastewater surveillance programmes. At laboratory locations without ES, appropriate containment requirements will need to be met to mitigate risk while facilitating diagnostic and surveillance needs globally. All polio laboratories should continue to follow WHO-recommended, standardized diagnostic methodologies which will be continually updated to reflect the changing epidemiology of polio.

[55] For additional details and proposed operational strategies for the post-certification period, see Global Polio Laboratory Network Strategic Plan (currently under development).

Objective 2.2: Adequate response capacity to stop transmission

Context

Under the GPEI Eradication Strategy, national governments and agency partners have gained valuable experience in responding to polio outbreaks (see **Post-switch lessons to inform post-cessation outbreak response**). Under the strategy for Sustaining a Polio-free World, robust outbreak response capacity will help to ensure quality response operations, even as resources may decrease following WPV1 eradication and cVDPV2 elimination and throughout the future evolution of the GPEI partnership. As these changes occur, country readiness will be critical to safeguard polio eradication.

Changes to the objective since the 2018

- A more detailed description of risks and mitigation strategies based on lessons learned from post-switch outbreak response
- More clarity on vaccine type, stock management and releases mechanisms for future coordination
- A clear description of HR capacities in high-risk countries and areas
- Outbreak response standard operating procedures (SOPs) aligned with SAGE recommendations
- Contingency funding

To ensure outbreak preparedness for bOPV cessation through to the global certification of all polio types, a multi-disciplinary team of regional and global experts will update the standard operating procedures (SOPs) for outbreak response. The updated SOPs will incorporate lessons learned to mitigate risks. National outbreak response plans will be updated based on the SOPs, and training will be developed to build and sustain a skilled national workforce. Vaccine stockpile needs will be defined to ensure sufficient quantities of vaccines for future outbreaks. Lastly, efforts are also underway to integrate polio outbreak response into WHO Emergency Response Framework (ERF).[56]

Post-switch lessons to inform post-cessation outbreak response

- **Epidemiology, not supply constraints, should drive response.** To support success:
  - OPV vaccines must continue to be manufactured at pre-cessation levels with a continually increasing stockpile in the event a reversal of bOPV cessation is needed.
  - Monovalent OPVs for type 1 and type 3 (including nOPV1 and nOPV3, if available, which will be used as a first choice) must be ready before bOPV cessation, with sufficient manufacture capacity, robust supply security and regulatory approvals.
  - IPV supply must support routine immunization for OPV-using countries and outbreak response across all countries, even those deemed lower risk. This may include the adoption of new strategies that are especially suited for outbreak control, such as fIPV.
- **Epidemiology, not resource constraints, should determine guidelines**. Guidelines should support a continuous evaluation of progress with effective course corrections. To guide countries on the appropriate scope, timing and frequency of SIAs, protocols must be clear and comprehensive.
- **Strong routine immunization systems prevent case burden from outbreaks.** Collaboration and coordination today between the GPEI and the Essential Programme on Immunization (EPI), especially in high-risk geographies, will be a critical enabler to post-cessation outbreak response.
- **Lessons in ensuring capacity amidst transition will be key to retaining existing functions** under this strategy. Ensuring sensitive and timely surveillance systems amidst risks related to transition and integration will be critical to successful outbreak response in the pre- and post-cessation periods.

[56] World Health Organization. Emergency response framework (ERF), Edition 2.1. Geneva: WHO; 2024 (https://www.who.int/publications/i/item/9789240058064).

Planning for implementation

Challenges

Sustaining resources – both human and financial – will be a primary challenge for outbreak response, especially during the post-cessation period. As diminished cVDPV transmission will lead to diminished surge capacity, there may be difficulties in retaining and deploying polio experts, as many will transition to other roles or areas of focus. Continued funding to support a range of global roles for outbreak response will be critical to this strategy's success (see panel at right).

Global support for outbreak response

Global resources support outbreak response through a range of functions:

- ✓ **coordination** across regions and partners to ensure alignment and operational coherence;
- ✓ **strategic oversight and accountability** by updating normative guidance, promoting alignment with IHR, ensuring adherence to SOPs and monitoring response quality and timeliness;
- ✓ **emergency grading and activation** to escalate support where needed, in collaboration with regional offices;
- ✓ **vaccine stockpile management** by forecasting needs, maintaining the global stockpile and coordinating release through the WHO Director-General;
- ✓ **resource mobilization** to ensure funding for preparedness and response activities; and
- ✓ **resource allocation and budgeting**, particularly for surge deployments and SIAs.

Some countries may face steep challenges, as the re-appearance of polioviruses in fragile, conflict-affected and vulnerable settings will pose a risk of long-lasting outbreaks. Complex challenges, such as insecurity, inaccessibility and logistical difficulties, severely impact the timeliness and quality of responses. Furthermore, countries that must allocate resources across multiple outbreak-prone diseases will face challenges in maintaining a robust response to polio outbreaks amid competing health priorities. Areas in the African and Eastern Mediterranean Regions, including the Horn of Africa, Lake Chad Basin and Sahel countries, are particularly vulnerable to these challenges. As such, outbreak preparedness plans within these geographies will require special attention and tailored strategies.

Risks and risk mitigation

Three key potential risks related to outbreak preparedness and response must be addressed as part of the strategy for Sustaining a Polio-free World:

1. failure to prevent cVDPV transmission and seeding of new cVDPVs;
2. failure to rapidly control outbreaks; and
3. poor management.

Mitigation strategies to address these risks are provided in **Table 6**. Each of these risks requires careful attention and long-term commitment to preparedness. Continued vigilance, robust surveillance systems and strategic planning for outbreak preparedness and response will be key to maintaining global polio eradication and preventing a resurgence of the disease.

Table 6. Risks and risk mitigation for Objective 2.2

Risks	Causes	Mitigation
Failure to prevent cVDPV transmission and seeding of new cVDPVs	Inadequate pre-cessation campaigns	• Ensure implementation of high-quality pre-cessation SIAs) in areas with low immunity levels (enough number of rounds and appropriate scope).
	Inadequate surveillance	• Maintain and strengthen environmental and AFP surveillance for early detection. • Ensure continuous monitoring in both endemic and at-risk regions/geographies.
	Weak healthcare systems in high-risk settings	• Deploy targeted vaccination campaigns in conflict zones and underserved regions • Prioritize mobile and outreach services. • Establish partnerships with humanitarian organizations and local stakeholders to effectively navigate logistical and security challenges.
	Under-immunized populations at risk of cVDPVs	• Continue the use of IPV to reduce the risk of seeding, especially in high-risk areas with persistent cVDPV circulation. • All countries should meet the requirement for pre-cessation of two (2) doses of IPV in routine immunization programmes.
Failure to rapidly stop outbreaks	Delayed detection	• Maintain core surveillance systems and ensure sensitivity to detect poliovirus circulation early.
	Inadequate response efforts with delays, low-quality SIAs or long intervals between rounds	• Adhere to SOPs. • Update outbreak response protocols to align with this strategy and ensure compliance. • Ensure the availability of resources (vaccines and funds at operational level) for timely outbreak response.
	Insufficient resources through a lack of vaccines, funds, personnel or access in conflict zones or remote areas	• Maintain sufficient vaccine stockpiles and contingency funds for outbreak responses. • Partners, led by the UNICEF Supply Division, to work on vaccine forecasts with relevant polio groups and manufacturers to ensure stockpiles are available in sufficient quantities. • Build and sustain surge capacity pools at global, regional and national levels for quick resource mobilization. • Establish and support rapid response teams with pre-deployed resources, including vaccines, trained personnel and logistics.
	Failure to accurately assess outbreak scale and urgency	• Use ERF to coordinate the response. • Leverage advanced risk assessment tools and surveillance data to identify high-risk areas and prioritize actions. • Conduct quarterly regional polio risk assessments.

AFP = acute flaccid paralysis; cVDPV = circulating vaccine-derived poliovirus; ERF = Emergency Response Framework (WHO); IPV = inactivated polio vaccine; SIAs = supplementary immunization activities; SOPs = standard operating procedures; UNICEF = United Nations Children's Fund.

Table 6 (continued)

Risks	Causes	Mitigation
Failure to rapidly stop outbreaks (continued)	Weak collaboration between governments, international bodies and local health authorities	• Improve coordination frameworks: – Establish robust frameworks for national and global coordination with pre-arranged funding and logistics. – Strengthen communication among governments, WHO, UNICEF and other partners to ensure a unified and effective response.
	Country-level challenges: competing health emergencies, insecurity and inaccessibility.	• Advocate for national ownership. • Engage governments to prioritize polio response as a critical agenda item.
Poor management of outbreak response	Poor decision-making and a lack of accountability due to weak national/international governance	• Build stronger governance frameworks with clear roles, responsibilities and accountability mechanisms. • Empower national health authorities to take ownership and lead polio response efforts effectively.
	Inefficient resource allocation or misallocation of financial and human resources	• Develop and implement resource tracking and allocation systems. • Use surge mechanisms established for other outbreaks, such as GOARN and Global Medical Corps, at regional and country levels.
	Lack of training and insufficient capacity-building at the local level	• Provide targeted training for IMST/OBR teams on preparedness and outbreak response, vaccine delivery and surveillance • Support countries to develop and implement national outbreak preparedness and response plans. Ensure plans are tested in high-risk countries. • Include continuous professional development programmes.
	Fragmented healthcare systems, political instability or lack of infrastructure	• Decentralize decision-making. • Empower local health authorities to address specific challenges such as conflict-affected or remote access.
	Lack of capacity to prevent and address sexual exploitation, abuse and harassment	• Build capacity for preventing and responding to sexual exploitation, abuse and harassment (PRSEAH): – Develop and implement training, establish clear policies and strengthen accountability mechanisms for all stakeholders in polio outbreak responses. – Ensure reporting and response systems are accessible, confidential and survivor-centred.

GOARN = Global Outbreak Alert and Response Network; IMST = Incident Management Support Team; OBR = outbreak response; PRSEAH = preventing and responding to sexual exploitation, abuse and harassment; UNICEF = United Nations Children's Fund; WHO = World Health Organization.

Activity 2.2.1 – Enhance country readiness to adequately respond to future outbreaks, develop and implement preparedness plans, and prepare response strategies

To ensure polio outbreaks are effectively managed under a future governance structure, countries must invest in sustained preparedness and response mechanisms, continuously adapt strategies based on emerging risks and integrate polio eradication efforts into broader health systems. Long-term success will depend on early detection, rapid response and continuous global and local collaboration.

Risk assessment

Polio outbreak risk varies across countries due to a range of factors, including immunity profiles, routine immunization coverage and surveillance indicators, as well as population movements, conflict and insecurity, and national capacities for public health emergency management. To assess the potential for the re-appearance of poliovirus in specific regions, a risk assessment will be conducted to categorize countries based on their level of risk. This assessment will support identifying where to strengthen outbreak preparedness and how to effectively allocate resources for outbreak response and preparedness. A multi-disciplinary global and regional team will be tasked with updating the risk assessment quarterly.

Polio outbreak response standard operating procedures

Outbreak response SOPs will be updated following bOPV cessation to provide clear guidance to affected countries on how to respond to polio outbreaks with the goal of stopping outbreaks within 120 days of confirmation.[57] They will also be revised to reflect any future changes in SAGE recommendations.

The updated SOPs will address key elements such as:

- definitions of polio outbreaks and events;
- types of polio events that require a response;
- response strategies for breakthrough polio transmission;
- the number of vaccination rounds;
- vaccine selection; and
- targeted age groups, among others.

The SOPs will support national governments and country-level public health decision-makers in coordinating timely and effective responses to poliovirus events and outbreaks, in close collaboration with global and regional partners. To ensure their relevance and applicability, countries will receive additional guidance through webinars and technical support. WHO will work with national ministries of health to update and test their national preparedness and response plans.

Maintaining outbreak response readiness

Based on the findings of the risk assessment, countries will be required to develop national outbreak preparedness and response plans and submit them to their respective Regional Certification Commission (RCC). Regional teams will oversee the regular updating of country preparedness plans and provide support as needed. For high-risk countries, it will be essential to test these preparedness plans through polio outbreak simulation exercises (POSEs). Each country should identify a roster of national-level technical staff who can conduct initial investigations and serve as the first responders on the ground, while regional and global teams deploy additional resources. National and regional workforce training on outbreak response SOPs will be conducted.

Integration of polio outbreak response operations

Polio outbreak response will likely be integrated into WHO health emergencies programme using the ERF.[58] The ERF provides guidance for WHO and ministry of health staff on assessing, grading and responding to public health emergencies with health consequences. This framework complements the WHO emergency, polio and national SOPs and aligns with inter-agency emergency protocols and commitments. Many of its elements are consistent with the internal guidance of partner agencies involved in emergency response

[57] Updated outbreak SOPs will be posted on the GPEI website as they become available (https://polioeradication.org/polio-today/polio-now/outbreaks/).

[58] See Annex 5. World Health Organization. Emergency response framework (ERF), Edition 2.1. Geneva: World Health Organization; 2024 (https://www.who.int/publications/i/item/9789240058064).

and best practices from the humanitarian community and the Inter-Agency Standing Committee (IASC). For polio outbreaks, the ERF will define the parameters for developing and updating risk assessments, grading polio outbreaks and events, coordinating with countries and partners, deploying polio surge teams, assessing outbreak responses and ensuring outbreak closure.

Work is currently underway to further refine this integration. Integrating polio outbreak response with other health interventions, such as measles and other targeted VPDs or malaria control, will also be applied whenever possible and required.

Activity 2.2.2 – Sustain trained human capacity and create, maintain and manage adequate stockpiles of polio vaccine to respond to outbreaks

Sustain adequate outbreak response HR capacity

High-risk countries with a history of polio outbreaks may experience the re-appearance of polio, and evidence suggests that managing outbreaks in these settings is complex and costly.

Guided by the risk assessment, high-risk countries will need to maintain core outbreak response capacity within the country. This will enhance preparedness and ensure timely initiation of response activities until additional surge workforce can be deployed from regional rosters and/or global teams, as necessary. In addition, platforms such as the Global Outbreak Alert and Response Network (GOARN), the SURGE initiative (Strengthening and Utilizing Response Groups for Emergencies), Global Emergency Corps and STOP (Stop Transmission of Polio) teams will be leveraged when needed.

At the country level, national Emergency Operation Centres (EOCs), which are used for all-hazard emergency responses, will also be employed for polio outbreak responses, as there will be no stand-alone polio-specific EOCs. At the regional level, it will be critical to retain a minimum regional capacity to support countries in preparedness, capacity building, initial response and outbreak coordination even as human resource capacity (e.g. Rapid Response Teams and the Regional Incident Management Support Team [IMST]) may be reduced following the cessation of cVDPV outbreaks. At the global level, a lean team will need to be maintained to support coordination and resource management.

Vaccine stockpiles

Establishing post-cessation stockpiles will require reliable forecasting to ensure the availability of vaccines for the elimination of all cVDPVs. The forecasting will rely on modelers to estimate the scale of the outbreak response needed so that the stockpile can be established with at least two manufacturers which will reduce the risk of supply interruptions. Stockpiles will be established for IPV, nOPV2, nOPV1 and nOPV3 (when available), as well as monovalent OPV (mOPV) for types 1 and 3 (mOPV1 and mOPV3) for use in the event there are delays in the availability of nOPV1 and nOPV3. All stockpiles should be a combination of bulk and finished product. A bOPV stockpile may be maintained for a predetermined allowable period after its withdrawal from routine immunization as it could be used in areas with co-circulation of polio strains.[59]

Vaccine stockpile management will follow established procedures, with oversight provided by WHO and shipment coordination provided by the UNICEF Supply Division. The use of outbreak response vaccines (such as nOPVs or mOPVs) will be authorized by the WHO Director-General, upon the recommendation of the OPV Release Group. For further details, see the current Global OPV Stockpile Strategy 2022–2026.[60] In the post-certification era, the global OPV stockpile will be integrated with Smallpox and International

[59] Stockpiles may be also established for antivirals, with decisions on their oversight and management to be determined.
[60] Global Polio Eradication Initiative (GPEI). Global OPV Stockpile Strategy 2022–2026. Geneva: World Health Organization; 2022 (https://polioeradication.org/wp-content/uploads/2023/06/Global-OPV-Stockpile-Strategy-31052023.pdf).

Coordinating Group (ICG) on Vaccine Provision under the broader global stockpile operations led by the WHO health emergencies programme. Thus, WHO will lead global OPV stockpile vaccine forecasting.

Table 7 provides an overview of outbreak response strategies across for different risk groups.

Table 7. Risk-based operational frameworks for outbreak response

	Stage 1: cVDPV2 elimination to bOPV cessation	Stage 2: bOPV cessation to cVDPV1 & 3 elimination	Stage 3: post cVDPV1 & 3 elimination
High risk (large scale and high-quality response)			
HR capacity / funding	*Accountability and funding (partners and/or national governments) will need to be determined as part of phased implementation.*		
Event / outbreak	All events and outbreaks	All events and outbreaks	All events and outbreaks
Scope	Large scope to be considered (NIDs)	Large scope to be considered (NIDs)	Medium scope (SNIDs)
Vaccines to consider	OPV (n OPV2 or bOPV) plus IPV concomitant	OPV (nOPV or mOPV or bOPV) plus IPV last round	IPV (plus novel OPV if necessary)
Outbreak response standards	• Minimum three (3) large-scale rounds • 95% coverage	• Minimum three (3) large-scale rounds • 95% coverage	• Minimum three (3) large-scale rounds • 95% coverage
Polio-free bOPV-using countries (large/medium scale and high-quality response)			
HR capacity / funding	*Accountability and funding (partners and/or national governments) will need to be determined as part of phased implementation.*		
Event / outbreak	All events and outbreaks	All events and outbreaks	All events and outbreaks
Scope	Large scope to be considered (NIDs)	Large scope to be considered (NIDs)	Medium scope (SNIDs)
Vaccines to consider	OPV (novel OPV2 or bOPV) plus IPV concomitant	OPV (nOPV or mOPV or bOPV if monovalent is unavailable) plus IPV last round	IPV (plus novel OPV if necessary)
Outbreak response standards	• Minimum three (3) large-scale rounds • 90% coverage	• Minimum three (3) large-scale rounds • Inclusion of IPV on the last round • 90% coverage	• Minimum two (2) medium-scale rounds • 90% coverage
Polio-free IPV-only countries (focus response and sensitive surveillance)			
HR capacity/ funding	*Accountability and funding (partners and/or national governments) will need to be determined as part of phased implementation.*		
Event / outbreak	All events and outbreaks	All events and outbreaks	All events and outbreaks
Scope	Focus scope to be considered (SNIDs)	Focus scope to be considered (SNIDs)	Focus scope (SNIDs)
Vaccines to use	IPV	IPV	IPV
Outbreak response standards	• Minimum two (2) rounds focus scale • 90% coverage	• Minimum two (2) rounds focus scale • 90% coverage	• Catch-up zero-dose and under-immunized children and high-risk populations with two (2) IPV doses

bOPV = bivalent oral polio vaccine; HR = human resources; IPV = inactivated polio vaccine; NID = National Immunization Day; mOPV = monovalent oral polio vaccine; nOPV = novel oral polio vaccine; OPV = oral polio vaccine; SNID = Subnational Immunization Day.

Goal Three: Contain polioviruses

Main objectives	Major activities
Objective 3.1	**Activity 3.1.1**
To sustain safe and secure poliovirus containment in facilities retaining polioviruses.	Support the reduction in the number of facilities retaining polioviruses globally.
	Activity 3.1.2
	Support safe storage and handling in facilities retaining polioviruses.
	Activity 3.1.3
	Support national and international structures for long-term poliovirus containment.

Introduction

The role of containment is to minimize the risk of reintroducing polioviruses into an increasingly susceptible population through the implementation of policies that help to uphold biosafety and biosecurity requirements for any facilities that handle or store eradicated polioviruses. In view of the substantial financial investments, human resources and effort contributed by countries and GPEI partners to achieve polio eradication, the global health community must recognize and adhere to poliovirus containment requirements as established through the WHO Global Action Plan for Poliovirus Containment (GAP), now in its 4th edition (GAPIV),[61] which was endorsed by the Poliovirus Containment Advisory Group (CAG) in June 2022 and noted by WHO Governing Bodies in 2023.[62]

Description of the goal

Poliovirus containment is sustained through the implementation of measures to mitigate the likelihood and consequences of a reintroduction of poliovirus into communities from laboratories, vaccine manufacturers or other facilities that retain infectious materials or potentially infectious materials. The global strategy for the implementation of poliovirus containment includes both risk elimination through the destruction or transfer of poliovirus materials to a poliovirus-essential facility (PEF) and risk mitigation through the certified biorisk management of PEFs, both of which require strong national and international oversight to ensure adherence to GAP requirements and recommended safeguards.[63]

[61] World Health Organization (WHO). GAPIV: WHO Global Action Plan for Poliovirus Containment, Fourth edition (unedited). Geneva: World Health Organization; 2022 (https://polioeradication.org/wp-content/uploads/2022/07/WHO-Global-Action-Plan-for-Poliovirus-Containment-GAPIV.pdf). As further editions may be published in the years leading up to the post-certification era and beyond, this strategy refers to GAPIV and its future versions as "GAP."

[62] See Preparing for the Post-Certification World. In: 152nd session WHO Executive Board. Poliomyelitis - Poliomyelitis eradication, Report by the Director-General. Geneva: World Health Organization; 2022 (https://apps.who.int/gb/ebwha/pdf_files/EB152/B152_18-en.pdf) and Preparing for the Post-Certification World. In: Seventy-sixth World Health Assembly, Geneva, 11 April 2023. Geneva: World Health Organization; 2023 (https://apps.who.int/gb/ebwha/pdf_files/WHA76/A76_13-en.pdf).

[63] Global Polio Eradication Initiative (GPEI). Strategy for Global Poliovirus Containment. Geneva: World Health Organization; 2022 (https://polioeradication.org/wp-content/uploads/2024/06/Strategy-Global-Poliovirus-Containment.pdf).

Objective 3.1: Safe and secure poliovirus containment

Context

The risk of a facility-associated release of poliovirus could be eliminated if all poliovirus materials retained in laboratories, vaccine manufacturers and other facilities were destroyed. However, several critical functions that will require the retention of polioviruses, such as vaccine production, research and poliovirus surveillance diagnostics, must continue in the post-eradication era. Safe and secure containment can minimize the risk of release by setting targets for facilities and their host countries to achieve and sustain.

Planning for implementation

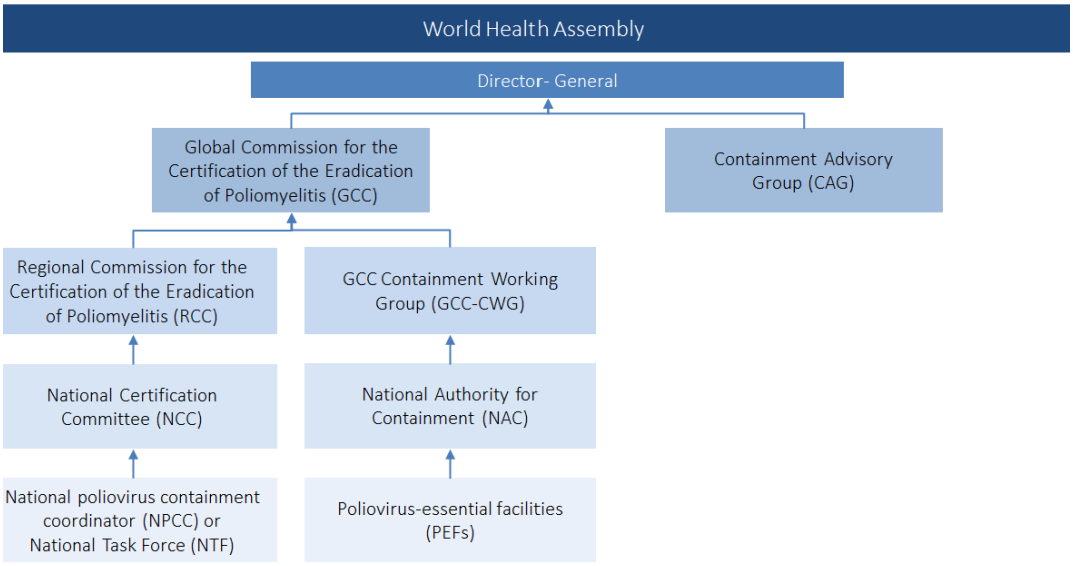
Changes to the goal since the 2018

- Development of GAPIV (2022) superseded GAPIII (2015).
- Global Containment Strategy and Action Plan established to complement the GPEI Eradication Strategy.
- Expected publication of the Containment Certification Scheme (CCS 2.0) in 2026 to replace CCS (2016).
- CAG and GCC recommendations on what polioviruses fall under containment requirements and the timeliness for containment.

In 2018, Member States passed a resolution that committed all countries to expedited containment implementation.[64] Poliovirus containment requires country-level implementation and compliance with requirements outlined through policies, such as GAP and the Global Containment Strategy. Activities that countries must perform include: annual national surveys of biomedical facilities that may have infectious or potentially infectious materials, national inventories of facilities retaining such materials, the establishment of national authorities of containment (NACs) in countries planning to retain poliovirus materials, and the designation of facilities as PEFs for certification through the Containment Certification Scheme (CCS).

Governance for sustaining safe and secure poliovirus containment includes global and national oversight bodies responsible for distinct aspects of containment implementation (**Fig. 6**), such as poliovirus surveys and inventories, technical issues associated with GAP implementation, containment certification and post-eradication polio vaccination policy.

Fig. 6. Governance structure for poliovirus containment



Source = WHO.

[64] Resolution WHA71.16. Poliomyelitis – containment of polioviruses. In: Seventy-first World Health Assembly, Geneva, 26 May 2018. Geneva: World Health Organization; 2018 (https://apps.who.int/gb/ebwha/pdf_files/WHA71/A71_R16-en.pdf).

Challenges

Reducing the number of facilities retaining poliovirus materials, supporting safe storage and handling in facilities retaining polioviruses, and supporting national and international mechanisms for long-term poliovirus containment will require sustained coordination and appropriate oversight.

As some containment activities are contingent on polio eradication milestones, planning for implementation presents distinct challenges. For example, national identification of poliovirus infectious and potentially infectious materials can only ever be completed after global cessation of all live polio vaccine use (OPV, nOPV). Furthermore, because containment is fundamentally a national responsibility, containment risk mitigation measures will necessarily be addressed differently in different country contexts, highlighting the need for global oversight. Compliance with containment certification requirements, such as continuous and robust immunization coverage and environmental safeguards which are critical to ensuring safe and secure containment in countries and facilities, may wane over time.

Given these challenges, it will be critical to ensure resources to develop and sustain national capacity in containment auditing, to define and contribute to an enabling environment for NACs, and to maintain alignment between the CCS and national containment certification processes. Ultimately, the appropriate global oversight structure to monitor containment in the post-certification era and beyond will be decided through the deliberative processes of a future World Health Assembly.

Risks and risk mitigation

Potential risks related to sustaining safe and secure polio containment in facilities are outlined in **Table 8**.

Table 8: Risks and risk mitigation for Objective 3.1

Risks	Causes	Mitigation
Inappropriate identification and control over retained poliovirus infectious or potentially infectious materials	Incomplete survey and inventories	• Ensure nation-wide and thorough inventories of poliovirus materials, follow the PIM Guidance.
Inappropriate (ineffective) GAP implementation post-certification	Uncertainty and evolution of containment requirements for various polioviruses, including novel strains and poliovirus potentially infectious materials	• Provide early communication to prepare facilities to future requirements. • Explore a market/academic advantage for facilities implementing containment requirements.
Inappropriate (ineffective) certification and oversight post-certification	Shortage of national staff competent in understanding and assessing against containment guidelines and procedures	• Discourage countries from hosting PEFs requiring containment certification. • Explore a market/academic advantage for facilities demonstrating compliance and holding appropriate containment certificates.
	Lack of resources to achieve and maintain effective NAC	• Maintain national resources to support NAC capacity-building. • Encourage NACs to develop in-house capacity.
	Uncertainty with global responsibility for containment oversight	• Ensure early clarification of future poliovirus containment governance through the World Health Assembly

GAP = Global Action Plan for Poliovirus Containment; NAC = national authority on containment; PIM = potentially infectious material.

Activity 3.1.1 – Support the reduction in the number of facilities retaining polioviruses globally

To ensure sustained progress is made in the reduction of the number of facilities retaining polioviruses globally, national poliovirus containment coordinators (NPCCs) and National Certification Committees (NCCs) prepare annual containment reports for the Regional Certification Commissions (RCCs) that provide national updates on poliovirus surveys and inventories of facilities retaining polioviruses. In collaboration with the NAC, progress made in facility poliovirus containment certification, including those that cease work with poliovirus, are also included in these reports.

In line with global requirements, facilities with no need to retain poliovirus materials post-eradication must destroy or transfer those materials to PEFs. For potentially infectious material, or PIM, that includes faecal, respiratory or concentrated wastewater samples originating from countries where WPV and VDPV was in circulation or where OPV was used, should be destroyed, transferred or inactivated or retained under conditions set out in the *Guidance to minimize risks for facilities collecting, handling or storing materials potentially infectious for polioviruses, 2nd edition*,[65] referred to as PIM Guidance, or contained as per GAP. Facilities that must adhere to PIM Guidance include those facilities that are likely to investigate new WPV, VDPV or OPV poliovirus isolates in the post-eradication era, as well as facilities that do not actively work with polioviruses but, in efforts related to other diseases, may retain clinical or environmental samples originating from countries where WPV and VDPV was in circulation or OPV was used. Such facilities must also implement a non-retention policy for poliovirus materials and ensure safe and secure working practices for the handling of PIM samples.[66] PEFs that need to retain polioviruses for the continuation of critical functions and their host countries should sustain compliance through the regularly re-certified implementation of biorisk management systems aligned to GAP requirements.

As noted in the GPEI Containment Strategy, the GPEI is involved in advocacy with countries to minimize the global number of facilities retaining polioviruses and reduce the global risk of reintroduction.

Activity 3.1.2 – Support safe storage and handling in facilities retaining polioviruses

Facilities designated by national authorities as PEFs due to critical functions that require the retention of polioviruses are responsible for sustaining the implementation of a biorisk management system aligned with GAP requirements and recommended safeguards. Once designated by their national authorities, PEFs must demonstrate compliance and achieve a certificate of containment (see right panel).

PEFs are responsible for maintaining their certificate status as evidence of compliance with the facility safeguards, provided their hosting countries meet and sustain immunization coverage and environmental safeguards as described in GAP. PEFs

Poliovirus Containment Certification Scheme (CCS)

The CCS defines the recommended global mechanism for containment certification associated with global confirmation of poliovirus containment within PEFs. Facilities designated by a national authority as serving a critical function requiring the retention of polioviruses that have long-term plans for retention into the post-certification era must demonstrate full compliance with GAP. PEF compliance is demonstrated through the award of a certificate of containment and is maintained by undergoing recertification full scope audits every three years.

[65] World Health Organization. Poliovirus containment: guidance to minimize risks for facilities collecting, handling or storing materials potentially infectious for polioviruses, second edition. Geneva: WHO; 2021 (https://iris.who.int/bitstream/handle/10665/341367/9789240021204-eng.pdf).

[66] World Health Organization. Sixth Meeting of the Poliovirus Containment Advisory Group (CAG): 23 to 25 January 2023. Geneva, WHO; 2024 (https://www.archive.polioeradication.org/wp-content/uploads/2023/05/CAG6-Jan-2023-Report-EN-FINAL.pdf).

failing to demonstrate compliance should be requested to stop work and if necessary, destroy or transfer their materials.

PEF oversight is the responsibility of the NAC. Following global certification of WPV1 eradication and cVDPV2 elimination, the NAC will continue to monitor and verify the PEF's compliance with GAP as long as poliovirus materials are retained. This includes audits and recertification of the PEF at regular intervals as described in GAP and the CCS. In addition, the NAC should coordinate with the PEF and relevant national authorities to ensure compliance with GAP safeguards. These include:

- **facility safeguards** for containment minimize the likelihood of a facility-associated release of poliovirus and are described in the biorisk management standard of GAP for PEFs retaining WPV/VDPV and OPV/Sabin polioviruses. Key elements include: commitment from management to sustain effective biorisk management and continually improve facility biosafety and biosecurity with appropriate design, construction and operation principles of the facility to address poliovirus biorisk, a worker health programme to reduce the risk of operator infection following exposure to poliovirus and community transmission, and contingency plans that address the potential release or operator exposure to poliovirus in line with available guidance;
- **immunization coverage safeguards** for containment set a threshold of population polio immunization coverage consistent with minimizing the consequence of a poliovirus release from a PEF through at least two doses of IPV in routine childhood immunization and high coverage (≥ 90%) among infants in areas surrounding the facility. The immunization coverage requirement for countries retaining polioviruses is required during this strategy;[67] and
- **environmental safeguards** for containment consist of environmental, sanitation and hygiene conditions that minimize the risk of re-establishing the circulation of highly transmissible poliovirus in the event of a release from a PEF.[68]

Activity 3.1.3 – Support national and international structures for long-term poliovirus containment

The importance of poliovirus containment will increase after global certification, particularly in countries hosting PEFs. Monitoring compliance with containment requirements will remain critical in the long term to safeguard against the reemergence of poliovirus into a polio-free world.

At the national level, PEF containment certification and oversight are the responsibility of the NAC. NACs or agencies with similar profiles and competence will need to be maintained with their activities sufficiently funded. Countries will also need to ensure that NPCCs or other appropriate mechanisms continue to be involved in annual reviews of facility inventories.

At the global level, sufficient technical support capacity must be maintained, including up-to-date technical international containment standards, guidance, and expertise. Current global oversight is provided by the GCC, the WHO advisory body that will ultimately declare certification of the eradication of all polioviruses, and its Containment Working Group which supports the certification of containment. In the post-certification era, WHO will continue supporting countries in their efforts to manage biosafety and health security risk through future, yet to be determined, mainstreamed organizational units.

[67] World Health Organization. Meeting of the Strategic Advisory Group of Experts on Immunization, April 2017 – conclusions and recommendations. Wkly Epidemiol Rec. 2017;92:301-20 (https://www.who.int/publications/i/item/WER9222). World Health Organization. Meeting of the Strategic Advisory Group of Experts on Immunization, June 2018 – conclusions and recommendations. Wkly Epidemiol Rec. 2018;93:329–344 (https://www.who.int/publications/i/item/WER9222).

Long-term national and international mechanisms (**Table 9**) and poliovirus containment governance structures will be critical throughout the future evolution of the partnership to:

- monitor compliance of PEFs and their host countries with the requirements and recommended safeguards described in GAP;
- address emerging issues associated with poliovirus containment requirements; and
- ensure sustainable mechanisms are in place to monitor continued effective national and global oversight aligned to the CCS.

Table 9: Technical and functional capacities of national and global stakeholders

National level	
NPCC	• Ensure annual inventories are updated, analyzed and mitigations measures taken to address risk assessment outcomes
PEFs	• Sustain implementation of WHO containment requirements by demonstrating compliance and obtaining containment certification and recertification as per CCS.
NAC	• Sustain national oversight function according to the CCS and maintain national level capacity in performing containment certification activities.
Global level	
WHO	• Ensure appropriate global governance and oversight for containment. • Ensure sustained technical assistance to Member States, including support for containment certification and the regular revision of containment guidance documents.

CCS = Poliovirus Containment Certification Scheme; NAC = national authority for containment; PEF = poliovirus-essential facility; WHO = World Health Organization.

Research activities

Polio-related scientific inquiry and new product development will, by necessity, continue through and beyond the global certification of all poliovirus, informing the development of relevant public health policies.

Partners of the GPEI maintain independent but highly collaborative polio research programmes. The partners interact with an extensive network of other organizations, including academic and government investigators, clinical research organizations, multinational and developing country vaccine developers, and infectious disease modellers. The **Polio Research Committee (PRC)**, which includes the GPEI partners and ex officio representatives from the National Institutes of Health (United States), the U.S. Food and Drug Administration, PATH and others, serves as a forum to identify research needs, review current research activities and support a competitive extramural research programme together with the **Polio Research and Analytics Group (PRAG)**. A key function of the PRAG is to provide internal GPEI coordination for priority research initiatives and guide the use of research data to inform policy.

Because of its unique mission, polio-focused research and development not only needs substantial resources but also a forum to identify knowledge gaps and research needs and a mechanism for the scientific review and translation of research data into public health and immunization policy. The current coordination structure that includes the PRAG and PRC serves this purpose.

The polio research agenda is forward-looking, includes projects that may take years to complete and considers projects or products that may impact both pre-certification and post-certification objectives.

Goal One: Protect populations

Protecting the global population against a re-appearance of poliomyelitis will require the optimization of individual protection with marketed vaccines and the development of new vaccines designed to improve coverage, reduce the transmission of live polioviruses through induction of mucosal immunity, and improve safety while reducing costs to Gavi, the Vaccine Alliance, and low- and middle-income markets. In addition, advances in vaccine delivery technology may facilitate vaccine administration and enhance coverage.

Optimization of individual protection with currently marketed IPV vaccines – The SAGE recommended a two-dose, delayed IPV schedule for the post-certification period. The SAGE also suggested that two full or fractional doses of inactivated poliovirus vaccine (fIPV) delivered intradermally in specific ages and intervals provide sufficient immunogenicity in an era when bOPV is removed from immunization schedules.[69]

New IPV-like vaccine development – Several new IPV development programmes that deploy different strategies to reduce costs (enhanced production technology, improved viral yield, antigen-sparing) are in progress. Sabin strain inactivated poliovirus vaccines (sIPV) are cheaper and equally immunogenic when compared with traditional IPV. Manufactured as a result of the WHO's technology transfer programme, sIPV have been prequalified and are in use in several countries in their routine immunization programmes (as of June 2024).

Discovery and translational-phase IPV projects also exist, designed to further reduce the risks of an industrial or laboratory containment breach, including vaccines produced from genetically modified Sabin strains or virus-like particles (VLPs), As of June 2024, Phase I trials with VLPs have started and so far have produced promising results. Because the timelines for vaccines incorporating any of these approaches will extend beyond 2029 and because the development costs will be significant, it is unlikely that any VLP

[69] World Health Organization Polio Vaccines: WHO position paper. Wkly Epidemiol Rec. 2022;25:277–300 (https://iris.who.int/bitstream/handle/10665/357167/WER9725-eng-fre.pdf).

vaccines will be available for global use either in stand-alone or combination vaccine formulations prior to 2029.

Enhanced IPV delivery technology – New vaccine delivery technologies have the potential to facilitate vaccine administration, reduce dose numbers, spare antigen and lower cold-chain requirements and storage costs, thereby facilitating both routine and campaign-based IPV immunization. Several disposable syringe jet injector devices that deliver vaccine either intramuscularly or intradermally have been clinically evaluated for IPV delivery.[70] Tropis injector produced by Pharmajet received WHO prequalification and is used for outbreak response. Its use in routine immunization is being explored.

Microarray patches (MAPs) that deliver vaccine directly into the dermis and can be applied quickly and easily by minimally trained healthcare workers have the potential to reduce vaccine costs by dose sparing and reduce shipping, storage, and cold-chain costs. MAP availability could facilitate IPV delivery for RI in addition to being used during campaigns for cessation or outbreak control. To date, MAPs suitable for clinical study have not been produced by any developer for polio immunization, and thus the future of MAP technology is uncertain. Given the development of MAPs for measles immunization, relevant lessons learned may inform their future use for polio immunization.

Goal Two: Detect and respond

Continued research and development will be required to support post-certification surveillance and outbreak response planning, including ongoing risk assessment and modelling, operational research, innovations in ES, and rapid diagnostics to identify and characterize polioviruses in the field and in the laboratory. Additional research on new poliovirus vaccines for outbreak response and the development of antiviral drugs and monoclonal antibodies to clear infection in long-term iVDPV excretors will also be critical to sustain a polio-free world.

Risk assessment and modelling – The forecasting of short- and long-term risks of outbreaks as well as modelling of different scenarios for bOPV cessation will require the development of models to predict the absolute and relative risks from WPV, cVDPV and iVDPV in all regions and over time until all credible threats to eradication are removed.[71] Post-certification, it will be critically important to maintain access to surveillance and operational data and to continuously re-evaluate assumptions and update models based on past and current experience.

As the programme adapts to changing risks over time and in different geographies, ongoing modelling can assist in bOPV cessation and surveillance planning by improving site selection, sampling frequency and

[70] Resik S, Tejeda A, Mach O, Fonseca M, Diaz M, Alemany N et al. Immune responses after fractional doses of inactivated poliovirus vaccine using newly developed intradermal jet injectors: a randomized controlled trial in Cuba. Vaccine. 2015;33(2):307–13. doi:10.1016/j.vaccine.2014.11.025; Clarke E, Saidu Y, Adetifa JU, Adigweme I, Hydara MB, Bashorun AO et al. Safety and immunogenicity of inactivated poliovirus vaccine when given with measles-rubella combined vaccine and yellow fever vaccine and when given via different administration routes: a phase 4, randomised, non-inferiority trial in The Gambia. Lancet Glob Health. 2016;4(8):e534–47. doi:10.1016/S2214-109X(16)30075-4; Anand A, Zaman K, Estivariz CF, Yunus M, Gary HE, Weldon WC et al. Early priming with inactivated poliovirus vaccine (IPV) and intradermal fractional dose IPV administered by a microneedle device: A randomized controlled trial. Vaccine. 2015;33(48):6816–22. doi:10.1016/j.vaccine.2015.09.039.

[71] For examples, see Duintjer Tebbens RJ, Pallansch MA, Cochi SL, Wassilak SG, Thompson KM. An economic analysis of poliovirus risk management policy options for 2013–2052. BMC Infect Dis. 2015;15:389; O'Reilly KM, Lamoureux C, Molodecky NA, Lyons H, Grassly NC, Tallis G. An assessment of the geographical risks of wild and vaccine-derived poliomyelitis outbreaks in Africa and Asia. BMC Infect Dis. 2017;17:367; Famulare M, Selinger C, McCarthy KA, Eckhoff PA, Chabot-Couture G. Assessing the stability of polio eradication after the withdrawal of oral polio vaccine. 2016 (http://dx.doi.org/10.1101/084012).

other operational facets of ES. Modelling can also inform outbreak response planning and assess the impact of new surveillance tools, new vaccines and vaccine strategies.

Serological analysis – Periodic, targeted serological surveys in high-risk countries may be needed to better inform the models and improve risk assessment. The continued development and validation of standardized serological assays that are easy to perform and do not require live virus should improve timeliness, reduce costs and mitigate the containment requirements of the current serum neutralization assay.

Environmental surveillance – The world will rely on ES to detect new outbreaks, monitor persistent transmission and provide evidence of the disappearance of vaccine-related poliovirus after the withdrawal of OPVs.[72] Improvements to ES will require research on the optimization of site selection through modelling, demography and the use of GIS technology, as well as continued innovations in specimen collection, sample concentration and molecular detection methods to distinguish and characterize poliovirus isolates from individual excretors in the sample population. It is critical to research and apply multi-pathogen environmental surveillance systems, including wastewater surveillance, for the integration and sustainability of poliovirus surveillance.

Molecular detection methods – The piloting, assessment, scale-up and sustainability of molecular direct detection methods, as well as the expansion of the viral sequencing network, is critical for improving the speed of detection, the cost of surveillance and response, the resilience of the surveillance network and the feasibility of multi-pathogen surveillance systems. These methods will also reduce the containment risks associated with viral culture methods.

Rapid diagnostic tests – The development of rapid diagnostic tests that can be applied in the field for quick, point-of-care testing could enhance both AFP surveillance and ES in the future.

Genetically stable novel OPVs – To mitigate the risk of mOPV use seeding a new VDPV outbreak, Sabin-derivative OPV strains modified to increase genetic stability and reduce neurovirulence compared with the Sabin viruses are under development. In March 2021, novel OPV2 (nOPV2) was rolled out under an Emergency Use Listing (EUL) for cVDPV2 outbreak response, with field data demonstrating a lower risk of seeding new emergences with the novel vaccine compared to Sabin mOPV2. Novel OPV1 (nOPV1) and OPV3 (nOPV3) strains are in Phase II clinical development.

Identification of iVDPV excretors – The risk from iVDPV excretors will be reduced only with effective surveillance and treatment protocols. Prevalence surveys found a 1% iVDPV excretion prevalence among patients with hereditary immunodeficiency syndromes in selected middle-income countries in Africa, the Middle East and Asia. A study assessing the feasibility of extending surveillance beyond the centralized immunology clinics in Egypt found mixed success. The objectives, scope, strategies and operational requirements for iVDPV surveillance are now under active review; iVDPV surveillance is part of the Global Polio Surveillance Action Plan and is transitioning into systematic poliovirus surveillance alongside AFP and ES.

Antiviral drugs – In 2007, the U.S. National Academy of Sciences recommended the development of at least two antiviral drugs to reduce the risk of outbreaks from iVDPV excretors and possibly to treat persons exposed to live polioviruses following a breach of containment at a manufacturing facility or laboratory. The furthest advanced antiviral candidates are a capsid inhibitor called pocapavir and the 3C protease inhibitor

[72] Hovi T, Shulman LM, van der Avoort H, Deshpande J, Roivainen M, de Gourville EM. Role of environmental poliovirus surveillance in global polio eradication and beyond. Epidemiol Infect. 2012;140(1):1–13. doi:10.1017/S095026881000316X.

imocitrelvir.[73,74] Pocapavir has demonstrated efficacy in a Phase II challenge trial, and the drug combination (pocapavir and imocitrelvir) has been tested in a Phase I trial showing acceptable safety, tolerability and a pharmacokinetic profile as expected. At the time of writing, pocapavir is available under a compassionate use protocol, and additional planning is underway to further evaluate the combination in a pediatric patient population. Several other preclinical antiviral candidates (with a variety of mechanisms of action) have been identified as back-up options, and the polio research community is also following preclinical development of antibody-based therapies. Research is being accelerated where possible, but it is likely that antiviral drug development will extend into the post-certification era.

Goal Three: Contain polioviruses

Restrictions on the use of all wild and Sabin polioviruses in clinical research may limit new research on polioviruses, as well as the use of tests essential to assess population immunity and the immunogenicity and efficacy of vaccines and antivirals at facilities not meeting containment requirements.

PEFs include vaccine manufacturers, public health testing facilities and academic laboratories that maintain stocks of wild and attenuated viral material for vaccine production, vaccine quality control and clinical assay requirements. In PEFs, the risks from inadvertent exposure or release can be reduced by replacing live polioviruses with non-replicating viral antigens or safer live viruses in laboratory protocols, reducing the need to maintain laboratory stocks of wild and attenuated viral material.

[73] McKinlay MA, Collett MS, Hincks JR, Oberste MS, Pallansch MA, Okayasu H. Progress in the development of poliovirus antiviral agents and their essential role in reducing risks that threaten eradication. J Infect Dis. 2014;210(S1):S447–53. doi:10.1093/infdis/jiu043.

[74] Collett MS, Hincks JR, Benschop K, Duizer E, van der Avoort H, et al. Antiviral Activity of Pocapavir in a Randomized, Blinded, Placebo-Controlled Human Oral Poliovirus Vaccine Challenge Model. J Infect Dis. 2017;215(3)335–43. doi:10.1093/infdis/jiw542.

Governance and accountability

Under the strategy for Sustaining a Polio-Free World, polio-essential functions will be delivered as an integral part of national health systems and broader health functions related to routine immunization, surveillance and laboratory diagnostics, outbreak preparedness and response, and containment. With responsibilities spread across sectors and areas of work within countries and partner organizations, a global governance structure will be critical to complement country-led delivery and ensure support for coordinated planning, financing and risk management. This structure must promote ownership and accountability, monitor the delivery and performance of polio-essential functions, and facilitate corrective measures in support of country and regional efforts.

In shaping future governance and accountability to sustain polio eradication, smallpox eradication offers lessons learned related to:

- Member State accountability;
- adaptivity to changing risks;
- small agile structures;
- global technical oversight and monitoring; and
- political will and advocacy.

Annex D provides details on the lessons of smallpox eradication.

While a decision on future governance is beyond the scope of this document, this chapter presents early thinking on governance and accountability to engage countries and both new and existing partners across polio, immunization, health emergencies and broader health systems strengthening on aspects that must be considered in determining a final approach.[75]

Country ownership and polio transition support

Strong, well-defined ownership and accountability will be critical to this strategy's success. In most countries, polio-essential functions are already delivered as an integral part of national health systems. As GPEI funding to countries currently receiving support winds down, all countries will need to assume primary responsibility for the delivery of polio-essential functions.

As countries assume greater responsibility, a review and assessment of country-level capacity and funding will be required. For activities that require broader coordination and are beyond national responsibility, global and/or regional governance and technical expertise will remain necessary, particularly for those activities that will begin prior to the start of the strategy such as bOPV cessation planning and the establishment of vaccine stockpiles.

Experience from previous and ongoing polio transition efforts suggests, however, that some countries – in particular those in fragile and conflict-affected settings – will continue to need time-limited and sustainable financial, technical and operational support from partners. In these contexts, existing health systems and accountability mechanisms alone may not be sufficient. Strong monitoring and, where necessary, exceptional or longer-term arrangements may be required to ensure programmatic quality, manage risks and prevent a loss of sustained progress, referred to as backsliding[76] (see ***Lessons learned from polio transition***, next page). This external support will be complemented by continuous efforts to strengthen national health systems, domestic financing and targeted technical assistance for key national coordination mechanisms.

[75] GPEI will also commission a governance review, which will be an important input for future planning decisions.

[76] In the WHO African and Eastern Mediterranean Regions, countries with weak and fragile systems continue to receive substantial GPEI support for immunization and surveillance activities. The GPEI also continues to fund the GPLN across all regions and finances a significant portion of polio outbreak response activities.

As part of the Polio Transition Strategic Framework,[77] criteria were established to guide decisions on which countries may require polio transition support. The criteria, which will undergo regular re-evaluation, define eligibility for entry into and readiness for exit from a priority list for receiving support. Countries that qualify to exit are placed on a "watch list" for three years to ensure there is no backsliding in the performance of polio-essential functions. As of 2025, these criteria are based on indicators across the following areas:

- **polio**: dependency on GPEI funding, classification as a consequential geography, cVDPV trends;
- **immunization**: IPV1 coverage, number of zero-dose children;
- **emergencies**: presence of grade 3 emergencies and fragile, conflict-affected or vulnerable populations; and
- **health system strengthening and financing**: Gavi eligibility status, universal health care coverage index.

Lessons learned from polio transition

- **Country ownership** should be at the centre of efforts to sustain eradication and should be aligned with country context, needs and priorities.
- **Clear roles and accountabilities** of both countries and partners are essential for success. Regular mechanisms to review progress and hold all parties accountable for their commitments are critical to avoid gaps such as vaccine stock-outs or reduced coverage.
- **Long-term, predictable and sustainable funding** is critical**,** ideally through existing mechanisms including domestic financing. Where country health systems are fragile, longer-term partner support will be required to sustain eradication and to strengthen health systems (which are often reliant on the 'back-bone' provided by GPEI).
- **Strong monitoring and evaluation** is needed to identify risks, take appropriate mitigation measures and ensure the quality of functions as countries transition out of GPEI support.
- **Realistic timelines for transition** should be aligned with national health planning and budget cycles and account for shifts in epidemiology that may affect feasibility. Where relevant, simultaneous transitions from other support (e.g., Gavi) should be factored into planning approach and timelines, including contingency plans.

Mandatory elements for a governance structure

In consideration of a governance structure to succeed the current GPEI partnership as it evolves, some elements and mechanisms must be in place to ensure the sustained achievement of a polio-free world. These mandatory elements uphold accountability by Member States, with some partner support based on national context, alongside technical oversight and monitoring (**Table 10**, next page).

[77] Polio Transition Strategic Framework: global vision to use polio investments to build strong, resilient and equitable health systems. Geneva: World Health Organization; 2024 (https://iris.who.int/bitstream/handle/10665/380282/9789240100633-eng.pdf).

Table 10. Mandatory elements for future governance beyond the GPEI

Member State accountability	Technical oversight and monitoring
National governments hold primary accountability to their people for the delivery of essential health functions, including those related to polio. This may be supported by national coordination mechanisms or committees composed of public and private sector agencies and stakeholders to strengthen multisectoral engagement and ensure robust country-level oversight. Global accountability mechanisms complement these efforts by providing oversight, guidance, and support. Two global mechanisms have legitimacy with Member States and build upon historic cases (e.g. smallpox). **1. International Health Regulations** • Oversight through the IHR mechanisms, since the detection of polio will trigger a PHEIC. • Amendments to IHR strengthen oversight at the global, regional and national level (e.g. establishment of State Parties Committee, national IHR authorities).[78] **2. The World Health Assembly** Oversight through the WHO governance mechanisms (annual reporting to the EB, Health Assembly and RCs).	While key technical oversight mechanisms should be used whenever possible, new structures and mechanisms may be established in future, ensuring that they are informed by robust technical expertise. *Global level* • GCC • SAGE • IA2030 governance mechanisms *Regional level* • RCCs • Technical advisory groups (e.g. RITAGs) *Country level* • National bodies (e.g. NITAGs, NCCs, ICCs)

EB = Executive Board (WHO); GCC = Global Commission for Certification of the Eradication of Poliomyelitis; IA2030 = Immunization Agenda 2030; ICC = Interagency Coordinating Committee; IHR = International Health Regulations; NCCs = National Certification Committees; NITAGs = National Technical Advisory Groups on Immunization; PHEIC = Public Health Emergency of International Concern; RC = Regional Committee; RCC = Regional Certification Commission; RITAGs = Regional Technical Advisory Groups on Immunization; SAGE = Strategic Advisory Group of Experts on Immunization; WHO = World Health Organization.

Prerequisites for shifting to a new governance and accountability model

Before shifting to a new governance and accountability model, the following prerequisites must be met.

- **Clarity on roles, responsibilities and accountability among stakeholders**: Country-level and partner stakeholders accountable for managing and supporting the workforce, funding and delivery of polio-essential functions must be clearly identified. A well-defined execution plan, mechanisms to address potential issues and success criteria for monitoring and oversight will be required.
- **Readiness**: Before handing over the responsibility from the GPEI to countries and other partners, capacity and resource needs or gaps should be clearly identified and addressed so that institutions taking over these functions are fully prepared and ready to assume responsibility.
- **Realistic timelines and "co-ownership"**: A phased approach to handing over responsibility should be pursued with realistic timelines and a possible "co-ownership" phase throughout the evolution of the GPEI. This would allow for training, knowledge transfer and the establishment of processes and policies to take place while the GPEI remains available to provide assistance.
- **Sustaining core capacities and continued advocacy**: As urgency will decrease over time, sustaining core capacities and high-level advocacy will be critical to keep polio as a priority, especially until the certification of the eradication of all poliovirus types.

[78] Amendments to International Health Regulations (2005) agreed to by Seventy-seventh World Health Assembly. Geneva: World Health Organization; 2024 (https://apps.who.int/gb/ebwha/pdf_files/WHA77/A77_ACONF14-en.pdf).

Options for future governance and accountability

This strategy does not suggest a specific governance structure but rather presents a set of options. Future global governance to sustain polio eradication may include current GPEI agency partners alongside new partners, such as other global health initiatives, public-private partnerships, development banks or other entities. The composition of partners should include representation of immunization, health emergencies and broader health systems strengthening stakeholders to best ensure the integrated delivery of polio-essential functions. Future governance arrangements should strengthen existing national coordination and monitoring and avoid the creation of parallel, vertical systems in order to promote efficiency and integration across surveillance, immunization, health emergencies and broader health programmes.

While governance options are discussed separately in order to highlight substantive points around the advantages of particular models, in practice the governance and accountability structure may evolve over time and incorporate different options at different stages (see **Fig. 6** below).

To complement country-led delivery of polio-essential functions, the future governance structure must fulfil the following critical functions:

- performance monitoring and oversight;
- technical assistance; and
- advocacy.

Ideally, the governance and accountability model to succeed the current GPEI partnership as it evolves will be strong in all of these areas, while recognizing that the roles and responsibilities of each partner will depend on their mandate, expertise, capacity and comparative advantage. As polio-essential functions become integrated into national health systems, the global governance structure will assume a reduced role in resource mobilization and technical assistance with the exception of fragile or conflict-affected countries, where continued external support will remain over the longer term.

Options for a future governance structure

Discussions across stakeholders internal and external to the partnership have examined potential options for a future governance structure and have focused on four illustrative examples (below and **Table 11**). These examples are not exhaustive, and other structures or hybrid models may also be identified in the future.

1. ***A centralized structure***

   This option is based on a centralized structure that provides the required representation and mechanisms to ensure the integration of polio-essential functions into the broader health system. It features strong joint accountability among partners, similar to the current GPEI, with the secretariat housed in one of the partner agencies. Possible governance and accountability bodies could include an entity like the Polio Oversight Board to ensure polio-focused oversight, a secretariat to streamline coordination, and technical groups to lead on bOPV cessation, routine immunization, surveillance, outbreak preparedness and response, and containment.

2. ***Existing global mechanisms***

   This option leverages existing global mechanisms, such as the IA2030 Immunization Agenda Partnership Council (IAPC), the Health Emergency Preparedness, Response and Resilience (HEPR) framework or the International Coordinating Group (ICG) on Vaccine Provision, with a possibility to create a dedicated polio group that may be similar to the Measles and Rubella Partnership that lives under IA2030. By using existing global mechanisms, this option ensures linkages between

immunization and health emergency governance, with strong regional platforms for operations and country-level support without creating parallel mechanisms.

3 ***Coordinated partner oversight***

This option distributes responsibility across partners as each agency is tasked with accountability for specific technical areas depending on their mandate and comparative advantage. Regional oversight is integrated within each partner, while global coordination is maintained for select functions, such as vaccine supply or containment. One agency will be responsible for coordination, likely WHO which has a mandate from Member States and the World Health Assembly.

4 ***Integrated regional oversight***

This option enables a more country-focused approach by concentrating oversight at the regional level. Regional platforms could facilitate structured peer learning, thereby enabling countries with similar contexts to share best practices, lessons learned and operational approaches for sustaining polio-essential functions. A regionally anchored approach may also offer greater flexibility and long-term sustainability by allowing actions to be adapted to specific regional and national capacities, while ensuring timely support for surveillance, outbreak response and vaccine access. Technical support would likely be intensified in WHO African and Eastern Mediterranean Regions, with a small secretariat at the global level to monitor and coordinate global functions, such as containment, vaccine supply and possibly resource mobilization.

Table 11. Pros and cons of governance models as part of an evolving structure

Option	Pros	Cons
1. Centralized structure	• Lowest risk option • Ideal for time-bound activities that require centralized coordination (e.g. bOPV cessation) • Preserves technical expertise and institutional knowledge • Keeps polio on the global health agenda • Reduces the time and effort needed to establish a new system by building on the existing infrastructure and governance • Mitigates reputational risk of pre-mature adjustments	• Verticality • May limit the involvement of new stakeholders if the structure relies upon current GPEI partners • Countries with strong health systems are more resistant to centralized approaches, favouring decentralized/regional and country-specific approaches • Hard to sustain dedicated financing for polio
2. Existing global mechanisms	• Recognizes that most partners are already participating in these mechanisms • Avoids duplication, encourages collaboration, builds efficiency and ensures synergy with broader health functions, including immunization and global health security	• Coordination could be difficult among partnerships with differing mandates, such as between immunization and emergency-focused partners. • Existing structures and entities may need to change to build expertise for polio-specific tasks • May dilute accountability as polio becomes one of many priorities • Mandate and funding challenges

bOPV = bivalent oral polio vaccine; GPEI = Global Polio Eradication Initiative.

Table 11 (continued)

Option	Pros	Cons
3. Coordinated partner oversight	• Leverages partner strengths and comparative advantages • Mainstreams polio in the partners' own agenda and frameworks • Allows for synergies and efficiencies	• Not fully defined roles and responsibilities across levels within agencies and partners • Fragmented oversight and accountability with inconsistent implementation and monitoring across agencies and partners • Possibly fragmented management and funding across global, regional and country levels
4. Integrated regional oversight	• Regions tailor strategies to country context • Enables structured peer learning and exchange of best practices among countries in the region • Enables differentiated support based on national capacity and risk level • May enhance sustainability of polio-essential functions through regionally adapted approaches • Leverages existing regional entities (e.g. RCs, TAGs, RWGs) with some modification. • Oversight and support are placed closer to high-risk countries • Easier alignment with country priorities, with stronger political accountability, commitment and advocacy. • Can be inspired by or built on already existing decentralized models • Aligns with global health trends (e.g. Lusaka Agenda)	• Possibly fragmented oversight and accountability or delayed decision-making • Uneven implementation due to varying regional capacity • Some global functions will still need central management • Need to designate main entities in each region (possibly WHO regional offices), with a small Secretariat hosted at the global level for monitoring and coordination

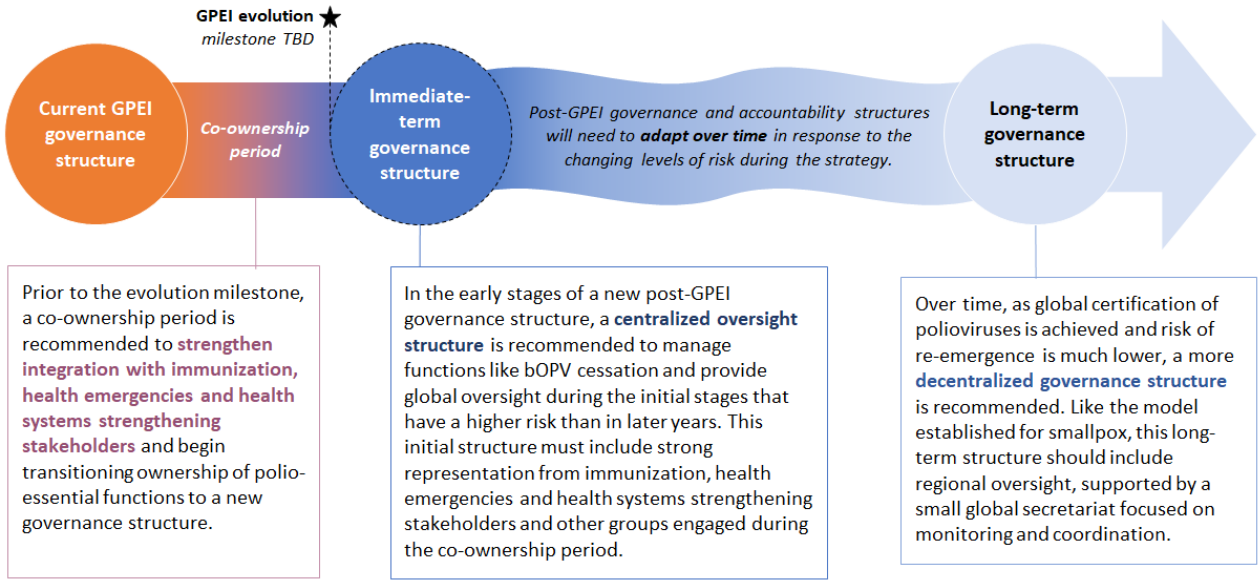
RCs = Regional Committees; RWG = Regional Working Groups; TAGs = Technical Advisory Groups; WHO = World Health Organization.

Evolving governance model

As the risk profile of some polio-essential functions will evolve over time and as more countries fully assume delivery, the governance model should also evolve dynamically and in relation to the needs of and milestones for specific functions (**Fig. 7**, next page). At the beginning of this strategy, centralized financial and technical support and oversight will likely be required (e.g., for achieving successful bOPV cessation), in addition to time-limited financial, technical and operational partner support to countries not yet able to fully take over polio-essential functions. Over time, this centralized support could be gradually reduced or other options for governance may emerge. Eventually, the national governments will lead the delivery of polio-essential functions, while the global focus will be on biosecurity and containment, with accountability mechanisms integrated into existing governance mechanisms, where feasible. The success of the evolving model will depend upon continued investment in workforce development, particularly in surveillance, laboratories and immunization personnel.

Governance details provided in the strategy for Sustaining a Polio-free World are not intended to define specific changes or timeframes for the governance model. The ultimate approach should be guided by the needs and priorities of partners with an overarching goal of achieving and sustaining polio eradication.

Fig. 7. An evolving governance and accountability model



bOPV = bivalent oral polio vaccine; GPEI = Global Polio Eradication Initiative.

Risk management

Risks related to both the shift to a new governance model and its implementation should be actively managed. Potential risks related to transition from GPEI to a different governance and accountability model are described in **Table 12**.

Table 12. Risks related to transition from GPEI to a different governance and accountability model

Risks	Causes	Risk mitigation
Insufficient national accountability to sustain quality of polio-essential functions	Complacency; polio is not perceived as a priority due to nearing or having achieved eradication, along with other competing priorities at the national level.	• Develop a clear accountability framework, as outlined in the Polio Transition Strategic Framework's global vision. • Advocate with national governments and other stakeholders, mobilize resources, and provide technical support to incorporate polio-essential functions into national health systems. • Align with national health priorities and build on synergies with donor-funded programmes. • Establish criteria for timely course-correction.
Countries are not ready to fully assume polio-essential functions	Insufficient government ownership of polio-essential functions. Legacy (dependency on GPEI) of centralized response and support.	• Conduct high-level political advocacy. • Engaging relevant ministries and agencies, including at subnational level. • Enhance the value proposition through integration and synergies with other health programmes. • Clarify roles of external partners to manage expectations.

GPEI = Global Polio Eradication Initiative.

Table 12 (continued)

Risks	Causes	Risk mitigation
Countries are not ready to fully assume polio-essential functions (continued)	Political and economic instability, conflict and insecurity.	• Establish a centralized governance structure immediately after current eradication strategy, utilizing mechanisms to provide financial, technical and operational partner support to fragile and conflict-affected settings, outlined in the Polio Transition Strategic Framework and guided by established criteria for countries to receive such support. • Leverage synergies with broader health functions to support fragile, conflict-affected settings. • Ensure long-term planning with phased approach, realistic timelines and milestones.
	Insufficient resources to deliver polio-essential functions at required quality in countries that have integrated them into national health systems.	• Continue to provide time-limited, sustainable financial partner support (i.e. bOPV cessation) with realistic timelines and criteria for exit. • Provide technical support to address obstacles in identifying and allocating domestic financial resources and managing workforce.
No agreement on a partnership model to succeed GPEI	No timely discussions to reach a consensus among a broader group of partners and donors. Focus on polio eradication impedes defining the future governance structure.	• Convene country-level stakeholders, partners and donors, including development banks, to: ○ agree on a future governance, along with criteria for transitioning to the next structure; ○ define partners' roles and accountability arrangements, financial and technical commitments.
Abrupt transition to a new governance structure	Lack of early and inclusive planning for the transition process, involving all key stakeholders.	• Ensure timely discussions with all key stakeholders to collaboratively begin a phased planning process that ensures strong buy-in and support. • Plan for a co-ownership stage to facilitate a period of shared responsibility between GPEI and the succeeding governance structure. • Ensure all the outlined prerequisites are met before the final transition takes place.

bOPV = bivalent oral polio vaccine; GPEI = Global Polio Eradication Initiative.

Risk analysis and management within a new governance model

A comprehensive risk analysis should be an integral part of the governance and accountability model. This analysis must account for current and emerging risks, including geopolitical instability, migration and other impacts due to climate change, including natural disasters and climate-sensitive diseases. Proactively addressing risks will help to ensure resilience and adaptability. At the same time, risk management can also aid in recognizing and leveraging opportunities, particularly those arising from new technologies and innovative partnerships. Such opportunities can enhance the effectiveness of integrated delivery and strengthen collaboration across sectors, contributing to the sustainability of polio-essential functions and long-term success of this strategy. Monitoring and evaluation mechanisms must also remain flexible and context-sensitive to allow for adaptation over time and alignment with national systems and their performance indicators. As part of the proposed evolving model, a structured evaluation process should be defined to inform future governance decisions, based on implementation progress, emerging risks and national and partner priorities.

The way forward

Successfully navigating the shift to a new governance and accountability structure will require early and inclusive planning, sustained commitment and continued partner engagement with stakeholders, including national governments and existing and new partners.

The way forward will take substantial effort. As part of implementation planning, special focus will be given to managing the phased transition from centralized to decentralized leadership and to defining transition triggers, decision-making processes, coordination, financing and accountability mechanisms. As the phased planning process advances (see **Fig. 4, Introduction**), it will be important to maintain momentum while deciding upon a future governance model to ensure a smooth transition from the current GPEI partnership and to sustain a polio-free world.

Cost estimate

The strategy for Sustaining a Polio-free World provides a framework for sustaining polio eradication gains through targeted investments in immunization, surveillance, outbreak preparedness and response, and containment. This cost estimate outlines resources required for these functions over the strategic period. It is provided to facilitate planning and advocacy with national governments, global partners, donors and other stakeholders and to support resource mobilization efforts aimed at securing funding for this strategy's implementation.

The cost estimate accounts for activities spanning from the pre-cessation period to the immediate post-cessation period and the longer-term post-certification phase as the strategy starts upon completion of the GPEI Eradication Strategy and continues for 10 years after bOPV withdrawal. While not a fixed dollar figure, it offers a directional range of **US$6.9 billion to $8.7 billion** that acknowledges inherent variability due to evolving timelines, operational strategies and funding decisions. The cost estimate reflects current assumptions and known costs, as final implementation decisions are still forthcoming. It benchmarks historical and current funding trends under the GPEI financial resource requirements (FRR) and surveillance funding from other donors outside of the GPEI (non-FRR), while also incorporating updated assumptions such as Gavi's investments in IPV and hexavalent vaccines. Lastly, this cost estimate recognizes that the long-term sustainability of the essential functions to sustain eradication relies on a gradual shift to country-led financing and the integration of polio-specific functions into broader health systems.

Scenario-based costing

The cost estimate is based on three scenarios that vary based on cessation timelines, vaccine adoption rates and outbreak risks (**Fig. 8**, next page).

Top cost drivers across all scenarios

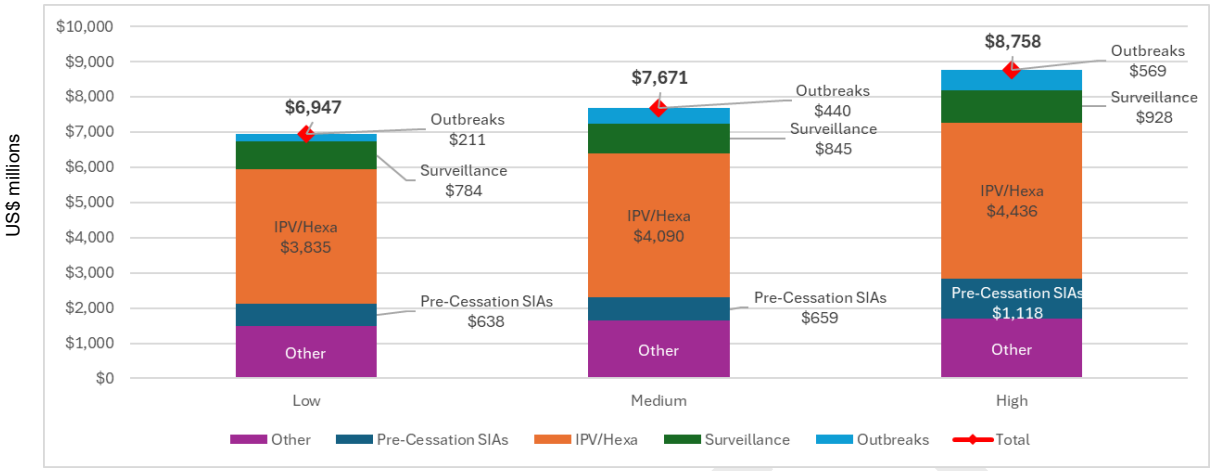
1. IPV/hexavalent vaccine procurement
2. Robust surveillance systems, vaccine stockpiles and rapid response campaigns

Based on these scenarios:

- a ***low estimate*** (US$6.9 billion) assumes cessation one year after the start of the strategy, with narrower SIAs in very high-risk countries and a slower hexavalent adoption rate of 4% on average annually;
- a ***medium estimate*** (US$7.6 billion) assumes cessation two years after the launch of the strategy and targets high- and very high-risk countries for SIAs starting in 2030, with a gradual 6% annual average hexavalent adoption rate; and
- a ***high estimate*** (US$8.7 billion) assumes cessation two years after the launch of the strategy and expands these efforts to medium-risk countries starting in 2029 and adopts a more aggressive hexavalent adoption rate of 8% on average annually, alongside a higher assumed burden of outbreak response activities.

Detailed assumptions and cost drivers that inform the scenarios are provided in **Annex C**.

Fig. 8. Cost estimates across low, medium and high scenarios*



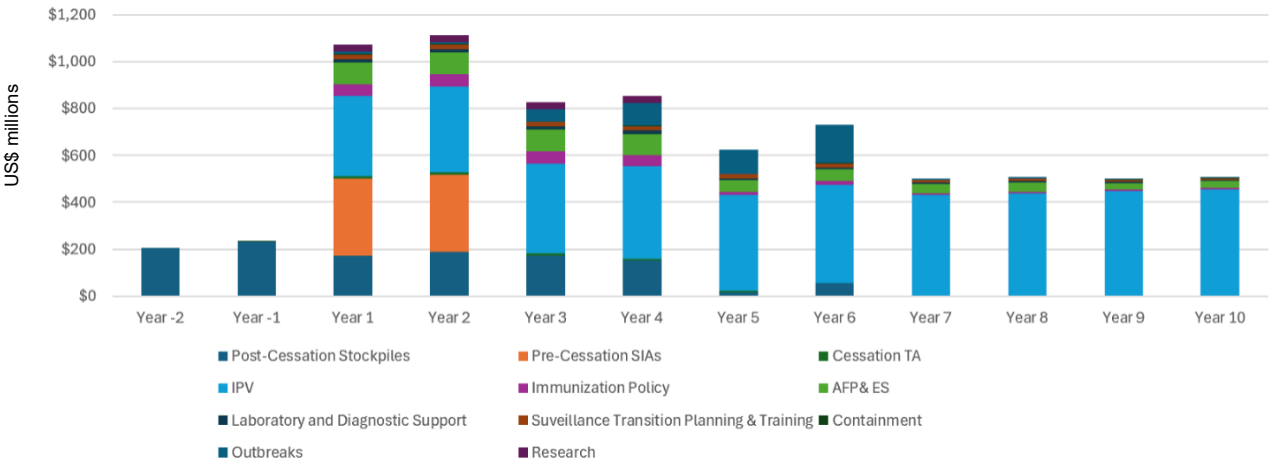
* Changes to SAGE-recommended immunization schedules may impact the strategy's cost estimate.

IPV = inactivated polio vaccine; Hexa = hexavalent vaccine; SIAs = supplementary immunization activities.

Trends across the cost estimate

Annual spending averages US$1.1 billion in the initial years of the strategy before tapering to approximately $500 million by Year 10 as the risks outlined in the goals chapters continue to decrease (**Fig. 9**). In the early years, costs peak as investments are front-loaded to fund essential activities, including SIAs, vaccine procurement and surveillance that prepare for bOPV cessation, mitigate post-cessation risks and enable sustainable transitions. During this strategy, post-cessation vaccine stockpile procurement is also critical to manage outbreak risks and will require dedicated funding outside of the GPEI's 2022–2029 multi-year budget.

Fig. 9. Year-by-year breakdown of the cost estimate (medium scenario)



Note: Costs stabilize by year 7 and will continue for 10 years after bOPV cessation, based upon the SAGE recommendation.

AFP = acute flaccid paralysis (surveillance); ES = environmental surveillance; IPV = inactivated polio vaccine; Hexa = hexavalent vaccine; SIAs = supplementary immunization activities; TA = technical assistance.

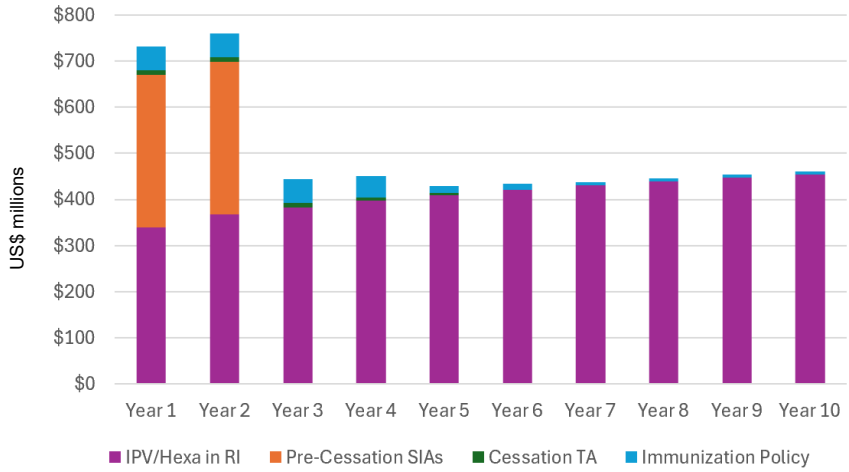
Cost estimates across the strategy for Sustaining a Polio-free World

Details on the cost estimate for each chapter are provided below. Estimates are based on the medium scenario, which reflects a balanced approach to risk mitigation and resource allocation. More information on the assumptions across all three scenarios can be found in **Annex C**.

Goal One: Protect populations

Goal One accounts for approximately US$5 billion in the medium scenario, or more than 65% of the total cost estimate (**Fig. 10**). This goal ensures high population immunity through pre-cessation SIAs and IPV/hexavalent vaccine adoption. Pre-cessation SIAs aim to address immunity gaps, while the gradual shift to hexavalent vaccines underpins sustained immunity. Achieving synchronized bOPV cessation will depend on reaching predefined eradication milestones, such as WPV1 eradication and cVDPV2 elimination. As a key assumption to costing Goal One, changes to SAGE-recommended immunization schedules may impact estimates.

Fig. 10. Goal One estimate (medium scenario)



IPV = inactivated polio vaccine; Hexa = hexavalent vaccine; RI = routine immunization; SIAs = supplementary immunization activities; TA = technical assistance.

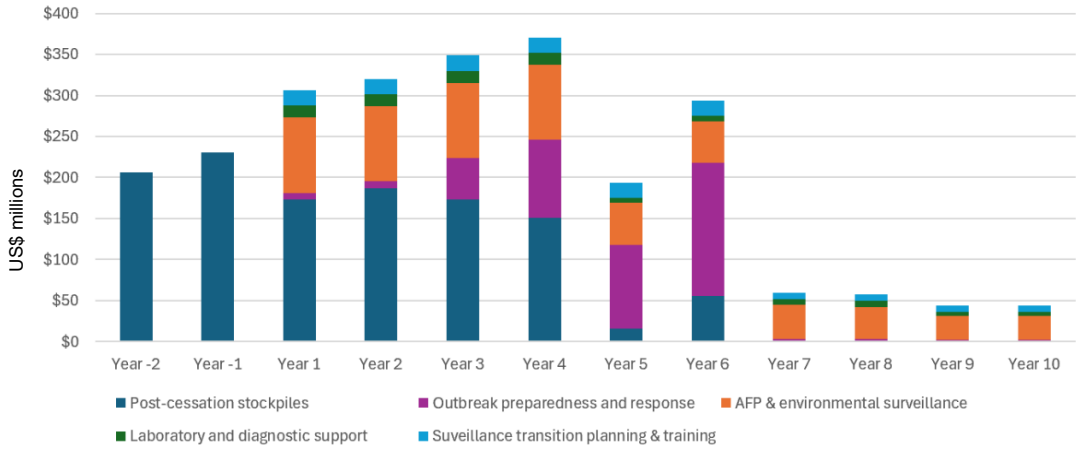
Cost drivers across Goal One include:

- IPV and hexavalent vaccines to sustain immunity, assuming a 6% annual average adoption rate of the hexavalent vaccine under the medium scenario;
- pre-cessation SIAs, estimated for high- and very high-risk countries under the medium scenario;
- cessation technical assistance at a set level across all scenarios; and
- immunization policy support through technical assistance to strengthen polio integration into health systems.

Goal Two: Detect and respond

Goal Two is allocated approximately US$2.5 billion in the medium scenario, or more than 32% of the total cost estimate (**Fig. 11**). This goal ensures robust surveillance systems remain active through Year 4 post-cessation before transitioning to more passive, country-led systems.

Fig. 11. Goal Two estimate (medium scenario)



AFP = acute flaccid paralysis (surveillance).

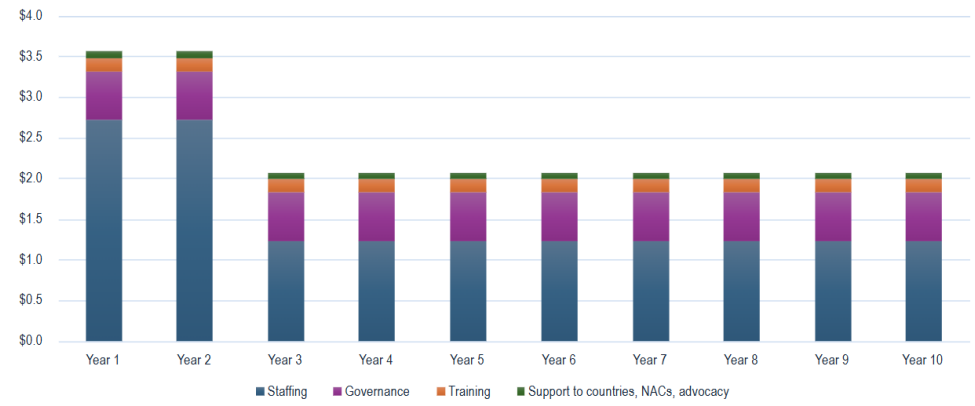
Cost drivers across Goal Two include:

- post-cessation stockpiles, with the medium scenario including IPV for outbreak response;
- outbreak preparedness and response, with the medium scenario addressing moderate risks of up to seven global outbreaks by Year 6;
- AFP and environmental surveillance support for medium- and high-risk countries;
- laboratory and diagnostic systems, with variability based on the duration of support; and
- surveillance transition planning and training, with scenarios built around different timeframes for support.

Goal Three: Contain polioviruses

Goal Three is a smaller but essential component with stable costs of US$27 million across all scenarios that represent approximately 0.4% of the total cost estimate. Activities include staffing to ensure compliance with GAP standards, governance mechanisms, training and field visits (**Fig. 12**). These efforts mitigate risks related to the unsafe handling of polioviruses by coordinating containment guidance and oversight to ensure that countries and facilities retaining poliovirus infectious materials demonstrate certified biorisk management in adherence with GAP safeguards.

Fig. 12. Goal Three estimate (medium scenario)



NACs = national authorities for containment.

Research activities

Research and development (R&D) efforts play a critical role in sustaining a polio-free world by advancing innovations that strengthen immunization efforts and outbreak response.

The estimated cost for R&D investments total US$120 million, or approximately 1.6% of the strategy's cost estimate, with stable costs across all scenarios at US$30 million per year through 2033 when investments in research taper off as key innovations are adopted and scaled globally. R&D investments include targeted interventions to ensure an affordable, stable supply of IPV for routine immunization, to support the development and refinement of novel oral polio vaccines (nOPVs) and to improve vaccine delivery. R&D efforts also focus on emerging technologies to enhance surveillance capabilities and enable early detection, for example through advanced diagnostic tools for surveillance and molecular methods for laboratory systems. These investments not only support polio eradication efforts but also align with broader public health goals.

Governance and accountability

Costs related to the transition to a future governance structure have not been included in this cost estimate, as the final structure is yet to be determined. Decisions on GPEI evolution will determine the level of global support required. By prioritizing country-led systems and reducing reliance on external funding, this strategy ensures the global community can secure a polio-free world while building resilient health systems for future generations.

Annex A.

Risk analysis

This annex provides additional technical explanation and analysis on the risk categories identified in the strategy for Sustaining a Polio-free World.

Beyond familiar outbreak risk factors, the future poses new challenges amidst uncharted terrain. After bOPV cessation, population mucosal immunity will eventually be low across all ages, a situation unprecedented in recorded history. Future birth cohort rates may translate into a continually growing number of children susceptible to polio. Placing further stress on health systems, a worldwide increase in political and economic migrants, who often live in urban areas without access to clean water, will have significant epidemiological effects. Climate change adds to these difficulties through extreme weather conditions and rising temperatures, and not only contributes to disease spread and geographic changes in disease distribution, but also produces famine and malnutrition, thereby weakening population immunity. Addressing the specifics of these risks and their impact are beyond the scope of this strategy.

The amount of time since bOPV cessation has already been identified as a key determinant of risk for poliovirus re-emergence in the post-certification period, which impacts the proposed mitigation strategies. Several other factors influence the likelihood of re-emergence and the severity of an outbreak. These include the misperception that polio is eradicated, virus category (transmissibility and neurovirulence differ by WPV and VDPVs vs OPV), population characteristics (size, density, mobility and accessibility), environmental variables (sanitation and climate), health infrastructure capacities, and the broader geopolitical context.[79]

Future outbreak risks

Risk category 1: Risks due to continued OPV use

VAPP and VDPV: The risk of vaccine-associated paralytic poliomyelitis (VAPP) following exposure to trivalent oral poliovirus vaccine (tOPV) has been well documented, but the risk from monovalent oral poliovirus vaccine (mOPV) in countries with high faecal-oral transmission of poliovirus is unknown.[80] Evidence shows that mOPV use can be associated with VAPP, particularly mOPV type 3, so the risk is expected to continue as long as any OPV is used in outbreak response.[81] However, vaccination with inactivated polio vaccine (IPV) as proposed for routine immunization (RI) use after certification could protect against VAPP.[82] Although novel oral polio vaccine type 2 (nOPV2) has been demonstrated to have an ~80% lower risk of seeding compared with mOPV type 2 in addition to a dramatically reduced risk of VAPP, these risks are still non-zero given that nOPV2 is a live vaccine. Novel OPV type 1 (nOPV1) and type 3 (nOPV3) are in clinical development, but their field performance is as yet unknown. Continued use of OPV also delays both the completion of containment-related inventories of poliovirus infectious material or potentially infectious material and the appropriate retention of these materials.

[79] For a detailed review, see Fine PEM, Ritchie S. Perspective: Determinants of the Severity of Poliovirus Outbreaks in the Post Eradication Era. Risk Anal. 2006;26(6): 1533–40.

[80] Bandyopadhyay AS, Garon J, Seib K, Orenstein WA. Polio vaccination: past, present and future. Future Microbiol. 2015;10(5):791‑808. doi: 10.2217/fmb.15.19.

[81] Estivariz CF, Molnar Z, Venczel L, Kapusinszky B, Zingeser JA, Lipskaya GY. Paralytic Poliomyelitis Associated With Sabin Monovalent and Bivalent Oral Polio Vaccines in Hungary. Am J Epidemiol. 2011;174(3):316–25.

[82] Bandyopadhyay AS, Garon J, Seib K, Orenstein WA. Polio vaccination: past, present and future. Future Microbiol. 2015;10(5):791–808. doi:10.2217/fmb.15.19.

Models and prior experience with vaccine-derived poliovirus (VDPV) emergence provides imperfect though useful estimates of the future number of VDPVs. Uncertain risk factors (e.g., type-specific population immunity, population mixing and mobility, and local environmental factors influencing the propensity for faecal-oral transmission) translate into wide ranges for predicted future emergences – though these ranges can be instructive for vaccine stockpile needs and other response strategies and requirements *(see **Activity 3.2.2**)*.

The number of type-2 emergences in the first year after withdrawal of the trivalent oral polio vaccine (tOPV) have been at the high end of what models predicted.[83] Furthermore, responses to circulating vaccine-derived poliovirus type 2 (cVDPV2) emergences seeded before and after tOPV withdrawal highlights the importance of high-quality surveillance and pre-cessation supplementary immunization activities (SIAs);[84] they also demonstrate the continued susceptibility of populations in insecure or inaccessible areas.

Experience to date with type 2 can help guide estimations of future risk from types 1 and 3, though differences in virulence, reversion patterns, transmissibility and secondary immunity benefits of OPV must be considered. Since cVDPVs were first characterized in 2000, 87% of cVDPVs detected through October 2017 have been type 2 with only 12% type 1 and 1% type 3.[85] (Prior to the shift from tOPV to mOPV and bOPV for SIAs starting in 2005, the majority of VDPVs were type 1.) The historical predominance of cVDPV2 may be attributed to several factors: (1) differences in OPV reversion rates (OPV2>OPV1>OPV3); (2) improved cVDPV surveillance accompanied by the change to a more sensitive case definition of cVDPV2 than types 1 and 3; and (3) the lack of competition for susceptible individuals given the global eradication of WPV2 in 1999.

While specifics surrounding future outbreaks are unknown, the risk of cVDPV types 1 and 3 post-bOPV cessation should be similar to, or even smaller than, the risk for type 2 after tOPV withdrawal.[86] Failure to maintain routine bOPV coverage until cessation, introduce IPV, or conduct high-quality pre-cessation SIAs in areas with low RI coverage could increase the risks of cVDPV (particularly type 1) emergences.[87]

***iVDPV*:** The global prevalence of patients with B-cell-related primary immunodeficiency disorder (PID) is uncertain due to variabilities in diagnosis, reporting and survival rates. PID patients are expected to have a lower survival rate in low-income countries, which tend to use OPV and would put these countries at the highest risk of immunodeficiency-associated vaccine-derived poliovirus (iVDPV). Although cases of iVDPV have been recently identified from these countries, decreased survival of these patients reduces the risk to communities. PID patients in high-income countries have much better survival rates but, as these countries stopped OPV use or are transitioning to IPV-only use, the risk for new iVDPVs is decreasing with time. The primary risk for iVDPVs and the source of most reported cases since 2005 has been from middle-income countries.

[83] Kroiss S et al. OPV2 cessation risks. Presentation to Cessation Risk Task Team, Atlanta, 13 June 2017.

[84] Macklin GR, O'Reilly KM, Grassly NC, Edmunds WJ, Mach O, et al. Evolving epidemiology of poliovirus serotype 2 following withdrawal of the serotype 2 oral poliovirus vaccine. Science. 2020 Apr 24;368(6489):401-405. doi: 10.1126/science.aba1238.

[85] Compiled from the WHO database of poliovirus cases, 17 October 2017.

[86] Lyons H et al. OPV1, 3 cessation and SIA planning. Presentation to Polio SAGE Working Group, Geneva, September 2017.

[87] Duintjer Tebbens RJ, Hampton LM, Wassilak SGF, Pallansch MA, Cochi SL, Thompson KM. Maintenance and Intensification of Bivalent Oral Poliovirus Vaccine Use Prior to its Coordinated Global Cessation. J Vaccines Vaccin. 2016;7(5):340.

A 2017 study from 13 OPV-using countries found approximately 2% of PID patients excreted poliovirus and only 0.8% of these PID patients (all with combined immunodeficiency) were iVDPV excretors.[88] The vast majority of reported OPV-infected PID patients spontaneously stop excreting in less than six months. Another summary of screening studies among PID patients reported 2.7% with poliovirus excretion and 0.1% with documented iVDPV excretion after six months.[89] Among 149 iVDPV cases in the World Health Organization's global registry of iVDPV cases detected between 1962 and 2019, the most common PIDs were combined B- and T-cell deficiencies (33%), followed by antibody disorders (28%).[90] Most patients (78%) had reported excretion duration between six months and five years, and only 5% had estimated excretion exceeding five years.

The risks for new iVDPVs should continue to decline as countries with the highest rates of PID survivability stop using OPV. Nevertheless, any iVDPV excretors present a potential reservoir for transmission of neurovirulent poliovirus and a potential threat to sustaining polio eradication.

Risk category 2: Risks due to undetected transmission

The last detected case of wild poliovirus type 2 (WPV2) was in 1999, and in September 2015 the Global Commission for the Certification of Poliomyelitis Eradication (GCC) confirmed that WPV2 has been globally eradicated. In June 2021, the GCC began the process of updating its recommendations for the certification of interruption of transmission of WPV1, previously based on a three-year period of non-detection.[91] An expert working group was appointed and asked to review the evidence from three separate modelling groups who worked independently on this question. In June 2022, the GCC adopted the recommendation of the expert group to replace the "three-year non-detection period" with a flexible period of non-detection no less than two years, with the ultimate decision taking into account surveillance quality, risk in sub-population groups that may not be represented in surveillance, and other data including molecular epidemiology.[92]

Given that the GCC is expected to require strict surveillance, immunity and containment standards prior to declaring global eradication, the magnitude of risk for continuing circulation of WPV type 1 (WPV1) or cVDPVs after certification should be quite small and diminish rapidly, as long as surveillance quality remains high. According to one analysis, after five years without detecting cases, the probability of undetected

[88] Aghamohammadi A, Abolhassani H, Kutukculer N, Wassilak, SG, Pallansch MA, Kluglein S et al. Patients with Primary Immunodeficiencies Are a Reservoir of Poliovirus and a Risk to Polio Eradication. Front Immunol. 2017;8:685.

[89] Duintjer Tebbens RJ, Pallansch MA, Thompson KM. Modeling the prevalence of immunodeficiency-associated long-term vaccine-derived poliovirus excretors and the potential benefits of antiviral drugs. BMC Infect Dis. 2015;15:379.

[90] Macklin G, Diop OM, Humayun A, et al. Update on Immunodeficiency-Associated Vaccine-Derived Polioviruses — Worldwide, July 2018–December 2019. MMWR Morb Mortal Wkly Rep 2020;69:913–917 (http://dx.doi.org/10.15585/mmwr.mm6928a4).

[91] Global Commission for Certification of Poliomyelitis Eradication. Report from the Twenty-second Meeting, Geneva, Switzerland, 28–29 June 2022. Geneva: World Health Organization; 2022 (https://polioeradication.org/wp-content/uploads/2022/09/22nd-GCC-report-20220907.pdf).

[92] Global Commission for Certification of Poliomyelitis Eradication. Report from the Sixteenth Meeting, Paris, France, 4-5 July 2017. For modelling to support their assessment, see Eichner M, Dietz K. Eradication of poliomyelitis: when can one be sure that polio virus transmission has been terminated? Am J Epidemiol. 1996;143(8):816–22, and Kalkowska DA, Duintjer Tebbens RJ, Pallansch MA, Cochi SL, Wassilak SG, Thompson KM. Modeling undetected live poliovirus circulation after apparent interruption of transmission: implications for surveillance and vaccination. BMC Infect Dis. 2015;15:66. doi:10.1186/s12879-015-0791-5; McCarthy KA, Chabot-Couture G, Shuaib F. A spatial model of Wild Poliovirus Type 1 in Kano State, Nigeria: calibration and assessment of elimination probability. BMC Infect Dis. 2016;16:521; Famulare M. Has Wild Poliovirus Been Eliminated from Nigeria? PLoS ONE. 2015 (https://doi.org/10.1371/journal.pone.0135765).

transmission drops to 0.1–1%.[93] Thus, maintenance of and improvement of immunization coverage and surveillance quality will be critical to mitigating this risk.[94]

Risk category 3: Risks due to unsafe handling

As explained in the context of Goal Three, the likelihood of poliovirus release from a facility depends on the number of facilities handling polioviruses and the adherence of those facilities to international biorisk management standards during storage and manipulation of poliovirus-harbouring materials. The potential for poliovirus released from facilities reinitiating circulation in surrounding communities will depend on the level of implementation of containment requirements, the type of material released and the presence of population and environmental factors that facilitate poliovirus transmission.[95,96]

Within the context on containment failures, the highest risk of community exposure is through facility personnel who are unknowingly contaminated or infected with poliovirus and initiate transmission through their contacts. Community exposure through ingestion of water or food contaminated with liquid effluents will depend on the poliovirus content of facility spill, the integrity and type of sewerage system, and the potential for human consumption.[97] Deliberate malicious or accidental release of wild, vaccine- or genetically-engineered polioviruses is also possible.[98] Although polioviruses are currently considered a low threat agent for a biological weapon because they cause low morbidity and mortality and are too fragile to disperse in an effective manner, the consequences of a deliberate release may be very serious with time.

Containment failures have been reported in the last 35 years, but only one was associated with paralytic cases. During the 1990s, WPV used for vaccine manufacturing was isolated in one child in the Netherlands and one in France. The father of one child worked in an IPV manufacturing plant but an epidemiological link could not be identified for the second child.[99] Between 2000 and 2003, a type 2 poliovirus used exclusively for IPV manufacture and quality control (MEF-1) was isolated from nine children with acute flaccid paralysis (AFP) in India. The same type was found in vials of a single batch of tOPV.[100] In 2014, a vaccine production plant in Belgium accidentally released into the sewage system 45 litres of vaccine concentrate containing 10^{13} infectious WPV type 3 particles, which subsequently discharged into rivers and the North Sea at concentrations high enough to cause infection from swimming or consuming raw shellfish for several days.[101] In 2016, a worker was infected following an accidental spillage in a Dutch vaccine

[93] Eichner M, Dietz K. Eradication of poliomyelitis: when can one be sure that polio virus transmission has been terminated? Am J Epidemiol. 1996;143(8):816–22.

[94] The Global Polio Surveillance Action Plan lays out required surveillance metrics. See Global Polio Eradication Initiative (GPEI). Global Polio Surveillance Action Plan 2025–2026. Geneva: World Health Organization; 2025 (https://polioeradication.org/wp-content/uploads/2025/01/Global-Polio-Surveillance-Action-Plan-2025-2026.pdf).

[95] Dowdle W, van der Avoort H, de Gourville E, Delpeyroux F, Desphande J, Hovi T et al. Containment of polioviruses after eradication and OPV cessation: characterizing risks to improve management. Risk Anal. 2006;26(6):1449–69.

[96] Fine PEM, Ritchie S. Perspective: Determinants of the Severity of Poliovirus Outbreaks in the Post Eradication Era. Risk Anal. 2006;26(6):1533–40.

[97] See Dowdle W, van der Avoort H, de Gourville E, et al.

[98] Cello J, Paul AV, Wimmer E. Chemical synthesis of poliovirus cDNA: generation of infectious virus in the absence of natural template. Science. 2002;297(5583):1016–8.

[99] Mulders MN, van Loon AM, van der Avoort HG, Reimerink JH, Ras A, Bestebroer TM et al. Molecular characterization of a wild poliovirus type 3 epidemic in The Netherlands (1992 and 1993). J Clin Microbiol. 1995;33(12): 3252–6.

[100] World Health Organization. Update on actions taken following the isolation of MEF-1 reference poliovirus associated with acute flaccid paralysis cases in India in late 2002 and early 2003. Wkly Epidemiol Rec. 2003;78(32): 284.

[101] Duizer E, Rutjes S, Husman AMR, Schijven J. Risk assessment, risk management and risk-based monitoring following a reported accidental release of poliovirus in Belgium, September to November 2014. Eurosurveillance. 2016;21(11): pii=30169.

manufacturing plant.[102] In 2022, environmental surveillance around an IPV manufacturing facility in the Netherlands picked up WPV3 isolates that were linked to an asymptomatic facility worker.[103]

A modelling analysis found that a poliovirus release from vaccine production sites into countries with high transmission risk several years after bOPV cessation could result in uncontrollable transmission that would require OPV restart.[104] This situation was found in one out of 100 iterations of the model, whereas introduction of VDPV1 by a long-term PID excretor caused the other iteration associated with an uncontrollable outbreak.

[102] Duizer E, Ruijs WL, van der Weijden CP, Timen A. Response to a wild poliovirus type 2 (WPV2)-shedding event following accidental exposure to WPV2, the Netherlands, April 2017. Eurosurveillance 2017;22(21).

[103] Duizer E, Ruijs W, Putri H, Hafkamp M, van der Veer M, te Wierik M. Wild poliovirus type 3 (WPV3)-shedding event following detection in environmental surveillance of poliovirus essential facilities, the Netherlands, November 2022 to January 2023. Euro Surveill. 2023;28(5):pii=2300049. https://doi.org/10.2807/1560-7917.ES.2023.28.5.2300049

[104] Duintjer Tebbens RJ, Pallansch MA, Cochi SL, Wassilak SG, Thompson KM. An economic analysis of poliovirus risk management policy options for 2013–2052. BMC Infect Dis. 2015;15:389.

Annex B.

Country risk classification

Goal One

A dedicated bOPV Cessation Team (BOCeT) is working with modellers to prepare bOPV cessation risk tiers to support country-level planning for pre-cessation supplementary immunization activities (SIAs). The model uses data on key risk factors associated with vaccine-derived poliovirus (VDPV) emergence across all poliovirus types (**Table B1**).

National and regional stakeholders should refer to BOCeT materials and recommendations from the Strategic Advisory Group of Experts on Immunization (SAGE). Future consultations on bOPV cessation will also be held with Member States and regional committees.

Table B1. Data categories informing bOPV cessation risk modelling

Data categories	Definition
History of VDPVs*	Past VDPV detections** by poliovirus type since 2010
Population immunity	Type-specific immunity based on routine immunization and SIAs at the subnational level (admin 1)
Population size	Population size under 5 years old at the subnational level (admin 1), per year
Under-5 mortality	Under-5 mortality rate at the national level, per year

* "History of cVDPV outbreaks or emergences is an important risk for emergences post-OPV cessation. It was used to calibrate the model.
** VDPV detections include data on both acute flaccid paralysis (AFP) and environmental surveillance.
bOPV = bivalent oral polio vaccine; SIA = supplementary immunization activity; VDPV = vaccine-derived poliovirus.

Goal Two

Table B2. Risks related to undetected VDPV transmission

Risk category	Country risk classification		
	High risk†	**Medium risk**	**Low risk**
Undetected VDPV transmission^	Countries that recently stopped persistent transmission *and* countries experiencing outbreaks of cVDPV1 or cVDPV3.	Polio-free countries using bOPV pre-cessation *and* countries that are at high risk for importation or emergence: ○ countries sharing borders with a high-risk country; ○ countries with population movement from high-risk transmission areas; and ○ countries with chronic poliovirus immunity gaps, nationally or subnationally.	Polio-free IPV-only countries *and* countries that are at low risk for importation or emergence.

^ A lack of surveillance quality is crosscutting across all risk categories.

† The Polio Transition Strategic Framework provides a mechanism for ongoing support for fragile high-risk countries to ensure surveillance functions aren't compromised.

cVDPV = circulating vaccine-derived poliovirus; cVDPV1 = circulating vaccine-derived poliovirus type 1; cVDPV3 = circulating vaccine-derived poliovirus type 3; VDPV = vaccine-derived poliovirus.

Goal Three

Table B3. Risks related to unsafe handing of polioviruses

Risk category	Country risk classification			
	High risk	**Medium risk**	**Low risk**	**Negligible risk**
Unsafe handling of polioviruses	No inventories completed by the country *and/or* PEF located in a country with inappropriate or ineffective NAC either: 1. delivering certificates to PEFs that do not meet all requirements; or 2. not delivering containment certificates based on lack of auditing capacity. This may also affect neighbouring countries.	Irregular inventories and/or mitigation solutions not implemented. Handling or storage of polioviruses by facilities without periodic recertification (i.e., not following Containment Certification Scheme). Handling or storage of polioviruses by facilities no longer meeting containment requirements but still holding a valid and appropriate certificate of containment. This may also affect neighbouring countries.	Countries take adequate action and maintain their inventories. Handling or storage of polioviruses by facilities with valid and appropriate certificate of containment, including regular recertification. This may also affect neighbouring countries.	Countries take adequate action and maintain their inventories. Country with no PEFs, located far away from countries with PEFs.

NAC = national authorities of containment; PEF= poliovirus-essential facility.

Annex C

Cost estimate scenario assumptions and cost drivers

The scenarios used to generate the cost estimate of the strategy for Sustaining a Polio-free World are anchored to activity areas that drive cost variability. The three scenarios (low, medium and high) illustrate how aspects related to implementation — such as campaign scale, vaccine adoption rates and surveillance support — shape overall resource requirements. Each scenario reflects a different balance between efficiency, readiness and risk mitigation.

Table C1 presents details on how the scenarios account for potential variability through assumptions related to timing, funding and the broader epidemiological context.

Table C1. Scenario assumptions by activity area

Activity area	Variable	Low scenario	Medium scenario	High scenario
bOPV cessation	Timing	Year 2	Year 3	Year 3
Pre-cessation SIAs	Criteria	2 years for very high-risk countries and 1 year for high-risk countries	2 years for very high- and high-risk countries	3 years for very high-, high- and medium-risk countries
IPV / hexavalent	Vaccine costs	$1.75 IPV average awarded price per dose. $2.85 hexavalent average awarded price per dose.		
	Hexa adoption	4% avg. increase / year	6% avg. increase / year	8% avg. increase / year
	Country co-financing	Includes shares of country co-financing and fully self-financing. No variation across scenarios.		
Post-cessation OBR stockpile	IPV for outbreaks	No	Yes	Yes
	nOPV	No variation across scenarios.		
Surveillance	AFP and ES surveillance	Gradual reduction in support to all but high-risk countries in year 4.	Gradual reduction in support to all but high-risk countries in year 5	Gradual reduction in support to all but high-risk countries in year 6.
	Laboratory support	Aligned to reduction in AFP & ES support. No variation across scenarios.		
	Transition support	Reduced two years after AFP & ES support ramps down. No variation across scenarios.		
Outbreaks	Outbreak intensity	Outbreaks quickly decline after cessation.	Moderate number of outbreaks mid-way, then taper off.	Sharp rise in outbreaks mid-period then contained.
	Response approach	Targeted responses in key countries.	Expanded campaigns in both core/non-core countries.	Intensive response efforts sustained.
Immunization policy support	Peak TA support	Ramps down in year 3.	Ramps down in year 4.	Ramps down in year 5.
	Advocacy	No variation across scenarios		
Containment	Support to countries			
Research	Investments in R&D			

AFP = acute flaccid paralysis; bOPV = bivalent oral polio vaccine; ES = environmental surveillance; hexa = hexavalent vaccine; IPV = inactivated polio vaccine; nOPV = novel oral polio vaccine; OBR = outbreak response; R&D = research and development; TA = technical assistance.

Scenario assumptions and cost drivers

Across all scenarios, the strategy's cost is estimated to be between **US$ 6.9 billion and US$ 8.7 billion** over ten years. Expenditures are front-loaded in the early years, driven by vaccination, surveillance and outbreak preparedness, before tapering off as countries transition to self-financing. The low, medium and high scenarios offer a directional understanding of the resource needs and potential trade-offs required to maintain the gains of the polio eradication effort and to sustain a polio-free world.

Pre-cessation SIAs

Timing for the withdrawal of the bivalent oral polio vaccine (bOPV) from routine immunization anchors the cost model. The low scenario assumes rapid achievement of certification criteria, with cessation implemented in Year 2. The medium and high scenarios place cessation in Year 3 but differ in the scale of pre-cessation campaigns. Scenario estimates for pre-cessation supplementary immunization activities (SIAs) expand progressively: one year in very high-risk countries for the low scenario; two years in high- and very high-risk countries in the medium scenario; and three years in very high-, high- and medium-risk countries in the high scenario. These variations represent a trade-off between lower costs and stronger assurance of high population immunity at the time of cessation.

IPV and hexavalent vaccines

Vaccine procurement is the dominant cost driver across all scenarios. Estimates assume an average price of US$ 1.75 per dose for the inactivated polio vaccine (IPV) and an average price of US$ 2.85 per dose for the hexavalent vaccine. The scenarios represent different assumptions for hexavalent uptake: from 4% per year in the low scenario to 8% per year in the high scenario, with the medium scenario assuming a 6% annual transition. Faster adoption rates raise near-term costs but also advance integration into routine immunization systems. Country co-financing and self-financing are applied consistently across scenarios and reflect a gradual shift toward domestic funding over the strategy's 10-year period.

Post-cessation outbreak response and vaccine stockpiles

Outbreak assumptions also account for variation between scenarios. The low scenario assumes limited outbreaks that would be indicative of early success with bOPV cessation. The medium scenario assumes up to seven global outbreaks at their peak, requiring moderate stockpiles. The high scenario represents a more conservative posture, assuming up to 19 concurrent outbreaks with a broader geographic spread that increases logistical and operational costs. The high scenario also includes a round of IPV in responses. Stockpile assumptions are otherwise consistent across all cases.

Surveillance, laboratory and transition support

Sustained surveillance and laboratory capacity remain critical in the early post-cessation years. Intensive acute flaccid paralysis (AFP) and environmental surveillance scale-down in Year 4 in the low scenario, Year 5 in the medium scenario and Year 6 in the high scenario. Laboratory support follows the same schedule. Transition assistance—training, data systems and workforce planning—extends two years beyond the surveillance draw-down in each case. These timelines balance cost efficiency with the need to maintain sensitivity and readiness.

Technical assistance, advocacy, containment and research

Technical assistance peaks early and tapers off as national capacity strengthens by Year 3 in the low scenario, Year 4 in the medium scenario and Year 5 in the high scenario. Advocacy and policy support remain steady across all scenarios to sustain commitment. Containment costs are constant, averaging US$ 2–4 million per year, while research investments remain US$ 30 million annually through 2033 when investments wind down as key innovations are scaled for global adoption.

Annex D.

Lessons from smallpox eradication

Table D1. Lessons learned from smallpox eradication

Member State accountability	Smallpox is a recurrent agenda item at the World Health Assembly, which regularly reviews policies related to the eradication legacy of smallpox, the retention of variola virus stocks, vaccine reserves and research directives. Assembly resolutions mandate the provision of an annual progress report by the WHO Secretariat. The Assembly also serves as a platform for global dialogue and decision-making for other orthopoxvirus-related disease such as mpox, as related to variola virus research. A governance gap remains with respect to consequences linked to smallpox eradication — i.e. emergence of related pathogens and evolving needs for countermeasures (diagnostics, vaccines, therapeutics) and their use.
Small and agile governance structures	A centralized group (WHO smallpox secretariat supported by other stakeholders, including technical expert advisory and working groups and Member States) proved to be effective for sustaining key functions while remaining agile. Especially in the first few years after eradication, an entity (Committee on Orthopoxvirus Infections) helped to coordinate post-eradication activities, monitor progress and ensure WHA resolutions are implemented. The WHO Strategic Advisory Group of Experts on Immunization (SAGE) remains actively involved in setting policy recommendations for use of smallpox and mpox vaccines.
Importance of technical oversight and monitoring	Throughout adjustments, technical expertise was maintained to provide continuing oversight and monitoring. Consisting of experts in public health, fundamental applied research and regulatory agencies, the WHO Advisory Committee on Variola Virus Research (ACVVR) oversees all research involving variola virus. As mandated by the Assembly, WHO monitors security measures in place at two authorized virus repository sites with onsite visits every two years, ensuring strict compliance with evolving biosafety and biosecurity standards. The committee meets annually and advises WHO on all actions to be taken with respect to variola virus.
Evolution over time due to changing risks	Even though key functions remain in the post-eradication era, focus has shifted from surveillance to biosafety, biosecurity inspections, evolving risks related to synthetic biology technologies and continued research limited to countermeasures development for public health needs. These shifts indicate changes in risks as post-eradication policies are consistently reviewed and adjusted. The long-standing debate on destroying variola virus stocks reflects the changing understanding of its value, driven by research and new technologies. Smallpox vaccine reserves held by WHO are regularly monitored for potency. While the vaccines remain potent even after 40 or more years, discussion of what to do with these reserves has been limited, influenced by factors such as lack of resources for procurement of high-cost newer products, limited production capacity, and long lead times and short shelf lives in relation to smallpox preparedness needs. The production of currently available newer smallpox vaccines (composed of live attenuated vaccinia virus) does not require the use of variola virus nor implementation of stringent containment requirements.
Maintaining political will and consistent advocacy	As time goes by, political will and available funding tend to wane. Maintaining smallpox eradication as a recurrent item on the World Health Assembly's agenda, together with mandated annual progress reports, helps ensure continuous focus. A pre-set regularity for full discussion, now proposed for every four years through the Executive Board, would ensure attention is not lost in future. Consistent advocacy with countries, combined with sufficient funding, is essential to sustaining political attention.