

Polio Endgame Strategy 2019–2023

Eradication, integration,
certification and containment



WHO/Polio/19.04

Published by the World Health Organization (WHO) on behalf of the Global Polio Eradication Initiative (GPEI). This report reflects contributions from a process led by the GPEI agency partners: Rotary International, WHO, the US Centers for Disease Control and Prevention (CDC), the United Nations Children's Funds (UNICEF) and the Bill & Melinda Gates Foundation.

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

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Printed in Switzerland.

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UNICEF



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Foreword

“Reaching every last child” has been the guiding principle of the Global Polio Eradication Initiative (GPEI) since its establishment. Thanks to unwavering commitment from countries, partners, stakeholders, donors, and countless health workers around the world, wild poliovirus now survives in just a handful of districts in only two countries.

Looking back, the [Polio Eradication & Endgame Strategic Plan 2013–2018](#) enabled the world to achieve critical wins in cornering the disease by pursuing wild poliovirus and circulating vaccine-derived poliovirus in parallel. From cold chain to surveillance to new vaccine development to increased community-based collaboration, polio eradication efforts have spurred innovations in immunization systems and practices.

While over 18 million people who would have been paralysed by polio are walking today as a result of the eradication programme, we have not yet reached zero – and our mission to reach every last child remains as urgent as ever. If we stop our efforts now, within ten years we could see as many as 200,000 new cases each year, all over the world. Simply put, children everywhere remain at risk until polio is eradicated.

The Polio Endgame Strategy 2019–2023 will take us through the final challenges to eradication and lay the groundwork for a sustainable future free of polio.

The Polio Endgame Strategy 2019–2023 is a document that builds on lessons learned, taking stock of all the knowledge, tools, and approaches the programme has built over the years. The strategy is a critical, self-reflective review that addresses ongoing challenges, prepares countries to respond to unexpected challenges as they arise, and looks to leverage opportunities ahead – all as we continue adapting our strategies to defeat this virus.

We have the proven tools for eradication, and all the building blocks are in place that have helped make 99% of the world polio-free. The 2019–2023 Strategy also builds on these time-tested tools and tactics with a renewed focus on innovation – technological, social, management, and organizational.

And the 2019–2023 Strategy calls for increased collaboration with other health actors to help strengthen immunization systems and address the broader needs of communities deprived of basic services in addition to the polio vaccine, as part of our collective efforts to support polio-affected countries in moving towards universal health coverage. We are committed to weaving together best practices, programmatic improvements, and innovations across the partnership, including with Gavi, the Vaccine Alliance, governments, and civil society partners.

With full implementation and financing, the Polio Endgame Strategy 2019–2023 can consign polio to the history books. But to achieve this, all of us – country, GPEI partner, donor, community leader, parent, vaccinator – must promise to dedicate ourselves fully and irrevocably to one clear goal: a world free of polio for all children everywhere.

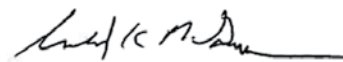
Lastly, as the Polio Endgame Strategy 2019–2023 was developed through a consultative process, we are glad to share that this strategy incorporates input from you – the stakeholders in eradication.

We look forward to doubling down on polio eradication efforts together with a renewed sense of urgency and spirit of collaboration, investment, and innovation. Together, we can successfully eradicate this disease once and for all and secure a decisive and sustainable win for humanity: a world where no child needs to worry about being paralysed by polio ever again.

The GPEI Polio Oversight Board



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Acronyms and abbreviations

AFP	Acute flaccid paralysis	mOPV	Monovalent oral polio vaccine
bOPV	Bivalent oral polio vaccine	mOPV1, 2, 3	Monovalent oral polio vaccine types 1, 2, 3
C4D	Communications for development	MTR	Midterm Review
CBV	Community-based vaccination	NAC	National authority for containment
CCS	Containment Certification Scheme	NEAP	National Emergency Action Plan
CDC	US Centers for Disease Control and Prevention	NEOC	National Emergency Operations Centre
CRTT	Cessation Risk Task Team	NERICC	National Emergency Routine Immunization Coordination Centre
CSO	Civil society organization	NGO	Nongovernmental organization
cVDPV	Circulating vaccine-derived poliovirus	nOPV	Novel oral polio vaccine
cVDPV1	Circulating vaccine-derived poliovirus type 1	nOPV2	Novel oral polio vaccine type 2
cVDPV2	Circulating vaccine-derived poliovirus type 2	OBRA	Outbreak response assessment
cVDPV3	Circulating vaccine-derived poliovirus type 3	OPV	Oral polio vaccine
DTP3	Diphtheria–tetanus–pertussis vaccine third dose	PCA	Post-campaign assessment
EOC	Emergency operations centre	PCM	Post-campaign monitoring
EPI	Expanded Programme on Immunization	PCS	Post-Certification Strategy
ES	Environmental surveillance	PEESP	Polio Eradication & Endgame Strategic Plan 2013–2018
GAPIII	Global Action Plan to minimize post-eradication poliovirus facility-associated risk, third edition	PEF	Poliovirus-essential facility
GCC	Global Commission for the Certification of the Eradication of Poliomyelitis	PEI	Polio Eradication Initiative
GCC-CWG	Containment Working Group of the Global Commission for the Certification of the Eradication of Poliomyelitis	PEOC	Provincial emergency operations centre
GIS	Geographic information system	PHEIC	Public Health Emergency of International Concern
GPEI	Global Polio Eradication Initiative	PID	Primary immunodeficiency disorder
GPLN	Global Polio Laboratory Network	PIRI	Periodic intensification of routine immunization
GPSAP	Global Polio Surveillance Action Plan 2018–2020	POB	Polio Oversight Board
GVAP	Global Vaccine Action Plan	POLIS	Polio information system
H2H	House to House	POSE	Polio outbreak simulation exercise
HSS	Health system strengthening	PV2, 3	Poliovirus types 2, 3
ICC	Interagency Coordinating Committee	RATT	Risk Assessment Task Team
ICN	Immunization Communication Network	RCC	Regional Certification Commission
IDP	Internally displaced population	RES	Reaching Every Settlement
IDSR	Integrated Disease Surveillance and Response	RIC	Reaching Inaccessible Children
IHR	International Health Regulations	RRT	Rapid Response Team
IMB	Independent Monitoring Board	SAGE	Strategic Advisory Group of Experts on Immunization
IPV	Inactivated polio vaccine	SIA	Supplementary immunization activity
iVDPV	Immunodeficiency-associated vaccine-derived poliovirus	SNID	Subnational immunization day
LQAS	Lot quality assurance sampling	SOP	Standard operating procedure
		STOP	Stop Transmission of Polio
		STT	Surveillance Task Team
		TAG	Technical Advisory Group
		tOPV	Trivalent oral polio vaccine
		TORs	Terms of reference

UHC	Universal health coverage	WHE	WHO Health Emergencies Programme
UNICEF	United Nations Children's Fund	WHO	World Health Organization
VAPP	Vaccine-associated paralytic poliomyelitis	WIISE	WHO immunization information system
VDPV	Vaccine-derived poliovirus	WPV	Wild poliovirus
VPD	Vaccine-preventable disease	WPV1	Wild poliovirus type 1
WASH	Water, sanitation and hygiene	WPV2	Wild poliovirus type 2
		WPV3	Wild poliovirus type 3



The greatest risks to reaching eradication are not a matter of science, biology or virology, but of reorienting efforts to current realities that impede the delivery of critical health interventions – and realigning so that the GPEI is fit for purpose and is poised to act with urgency, effectiveness, and efficacy in order to achieve this historic goal.

EXECUTIVE SUMMARY

The world is on the brink of a historic achievement: the eradication of wild poliovirus (WPV).

In 1988, when the World Health Assembly declared its commitment to eradication and the Global Polio Eradication Initiative (GPEI) was formed in pursuit of this goal, there were 350 000 annual cases of WPV in 125 countries. By the end 2018, only 33 cases were identified – all from two neighbouring countries (Afghanistan and Pakistan).

The GPEI's achievements are evident not just in the retreat of WPV to geographic corners of the world, but also in the successive elimination of WPV types. In 2015, WPV type 2 was declared eradicated; WPV type 3 has not been seen since 2012; and while WPV1 has yet to be interrupted, its incidence has been reduced by over 90% since 2014 (see **Annex A**).

The promise of a polio-free world

In a joint statement, the chairs of independent advisory bodies that provide expert recommendations and oversight to the GPEI put forward a bold claim: “There is no reason why polio should persist anywhere in the world.”¹ This statement echoes the singular ambition of the GPEI, grounded in a vision of global health equity where no country and no child would be endangered by poliomyelitis. The statement also reflects the inherently simple principle beneath eradication – that of delivering life-saving vaccines to every last child. This principle works, as more than 200 countries and territories have eliminated the virus.

Risks to success

The greatest risks to reaching eradication are not a matter of science, biology or virology; they are instead a matter of reorienting efforts to current realities that impede the delivery of critical health interventions – and realigning so that the GPEI is fit for purpose and is poised to act with urgency, effectiveness and efficacy in order to achieve this historic goal.

The primary underlying challenge in the last mile to WPV eradication is missing children in the delivery of polio vaccines.

In the last two countries with reported ongoing WPV transmission, the programme has not been able to immunize every child for several reasons. Often, frontline workers find steep challenges in areas that are hard to reach due to geographical isolation. Mobility and mass migration, particularly across the borders of these two neighbouring countries, also confound the programme's ability to reach children during supplementary immunization activities (SIAs) and through house-to-house campaigns. In Afghanistan, the programme encountered bans on house-to-house campaigns in 2018, which compounded the problem of inaccessibility. In Nigeria, areas of Borno state remain totally inaccessible to vaccinators. However, even when the programme does have access, pockets of vaccine refusals are growing where, due to misinformation, mistrust, cultural beliefs, fatigue or other priorities, caregivers turn vaccinators away at the door.

The *Polio Endgame Strategy 2019–2023* addresses three key risks towards achieving global WPV eradication:

- 1. Insecurity and conflict:** The last remaining polio-affected regions are often plagued by conflict. Insecurity may motivate families to move en masse to refugee or internally displaced population (IDP) camps. Such movement can make them accessible – or pose new challenges. For those who remain, ongoing conflict makes it difficult and even dangerous to access critical health interventions. Across these geographies, the programme must safeguard health workers who are the human face of the eradication effort while working to reach all children.
- 2. Weak or fragile health systems:** Both endemic and non-endemic countries are often beset by weak or fragile health systems, where communities live in extreme poverty and families lack access to basic services. In these settings, large pockets of children are unimmunized or under-immunized, and consequently the risk is high for continued circulation and outbreaks due to the importation of poliovirus or an emergence of vaccine-derived poliovirus (VDPV). As in WPV endemic countries, VDPV outbreaks tend to affect vulnerable communities that face multiple systemic challenges and that may not prioritize polio vaccination.
- 3. Operational, management and resource risks:** The programme also faces internal risks related to ensuring that the GPEI is fit for purpose – for example, its capacity to maintain an emergency posture, provide flexibility in decision-making, sustain peak performance with clear accountability and full transparency, and achieve programme quality in all places at the same time. While the programme has benefited from commitment at the highest echelons of government, officials at all levels face multiple, competing priorities in areas at risk of poliovirus transmission. Operational risks related to securing sufficient resources – of financial backing, vaccine stocks and supplies, and human resources – remain critical to the GPEI's success.

¹ See *To succeed by 2023 – Extraordinary joint statement to polio eradicators*, issued by the chairs of the Strategic Advisory Group of Experts (SAGE) on Immunization, Independent Monitoring Board (IMB), Emergency Committee of the International Health Regulations (IHR) and Global Commission for the Certification of the Eradication of Poliomyelitis (GCC), on 23 January 2019 (<http://polioeradication.org/news-post/to-succeed-by-2023-extraordinary-joint-statement-to-polio-eradicators/>).

What it will take

The *Polio Endgame Strategy 2019–2023* is not intended to supersede the *Polio Eradication & Endgame Strategic Plan* (PEESP), as the four objectives and the core strategies to achieve eradication have proven effective around the world.² Rather, the current strategy offers a review of what activities should continue, what improvements will be implemented, and what innovations will be introduced to ensure that the GPEI successfully addresses the risks to eradication (see **Table 1** and **Figure 1**).

The strategy also supports the *Strategic Action Plan on Polio Transition* and provides a bridge to the *Polio Post-Certification Strategy* (PCS).³ As such, it lays the groundwork for both the transition currently under way in polio-free countries and the post-certification period of a polio-free world yet on the horizon.

Table 1. Goals of the *Polio Endgame Strategy 2019–2023*

Goal One: Eradication	<ul style="list-style-type: none"> • Interrupt transmission of all wild poliovirus (WPV) • Stop all circulating vaccine-derived poliovirus (cVDPV) outbreaks within 120 days of detection and eliminate the risk of emergence of future VDPVs
Goal Two: Integration	<ul style="list-style-type: none"> • Contribute to strengthening immunization and health systems to help achieve and sustain polio eradication • Ensure sensitive poliovirus surveillance through integration with comprehensive vaccine-preventable disease (VPD) and communicable disease surveillance systems • Prepare for and respond to future outbreaks and emergencies
Goal Three: Certification & Containment	<ul style="list-style-type: none"> • Certify eradication of WPV • Contain all polioviruses

Source: WHO

Key elements

Figure 1 highlights the key activities the programme will carry out from 2019 to 2023 across the goals and enabling areas. The programme will continue many of the activities that have proven successful to interrupt WPV, while making necessary adjustments and implementing new innovations.

Key innovations to focus efforts on the endemic countries and provide support to prevent and stop outbreaks in the Eastern Mediterranean and African regions include:

- *Afghanistan–Pakistan hub:* A partnership hub is being established in the Eastern Mediterranean region to consolidate support to the Pakistan and Afghanistan National Polio Eradication Initiatives in their strategic planning and implementation of the National Emergency Action Plans (NEAPs), working in close collaboration with the national and subnational emergency operations centres (EOCs). The hub will ensure enhanced coordination across the epidemiological block and within each of the countries. The focused effort of the hub will increase technical and analytical capacity, provide flexibility for staff rotation and support real-time, data-driven action.
- *Expanded partnerships:* The programme will collaborate within and beyond the health sector through development efforts (e.g. health, nutrition, and water, sanitation and hygiene [WASH]) and civil society (nongovernmental organizations [NGOs] and civil society organization [CSOs]) to increase community demand for immunization and provide broader health benefits to endemic areas. To help sustain eradication by strengthening the Expanded Programme on Immunization (EPI), particularly in other high-risk countries and areas that are vulnerable to further spread after importation of WPV or an emergence of VDPV, the GPEI will pursue expanded partnerships with other public health actors – including Gavi, the Vaccine Alliance. Collaboration with the WHO’s Health Emergencies Programme (WHE), Global Health Security Agenda and other broader emergency networks will increase the capacity and effectiveness of polio outbreak response. In non-endemic countries where the GPEI continues to have a large footprint, the GPEI infrastructure will be channelled to fully support the national EPI programme, with the immediate objective of increasing

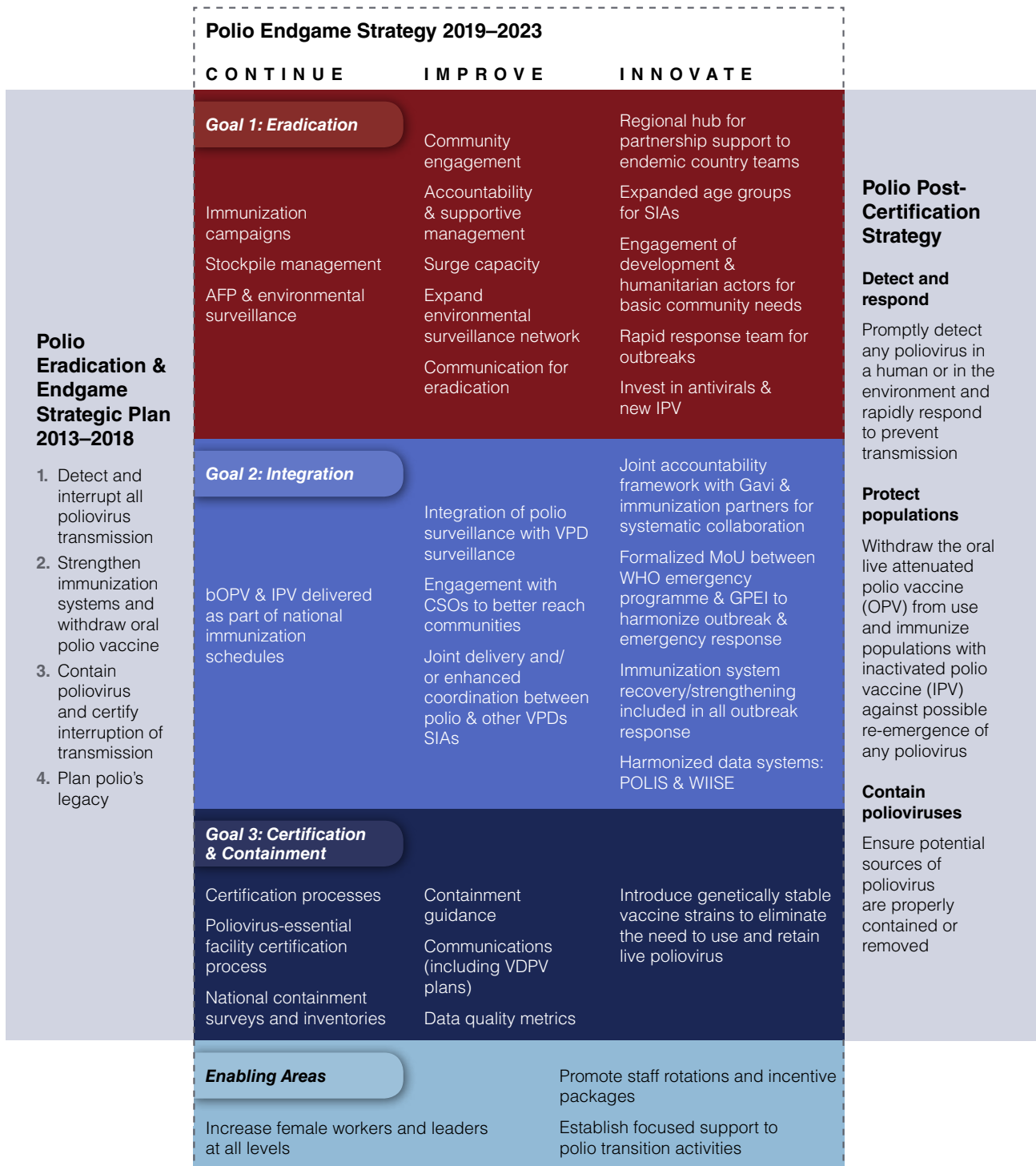
² Global Polio Eradication Initiative. *Polio Eradication & Endgame Strategic Plan 2013–2018*. Geneva: WHO; 2013 (http://polioeradication.org/wp-content/uploads/2016/07/PEESP_EN_A4.pdf).

³ *Strategic Action Plan on Polio Transition*. Geneva: WHO; 2018 (<https://www.who.int/polio-transition/strategic-action-plan-on-polio-transition-may-2018.pdf>), and *Global Polio Eradication Initiative. Polio Post-Certification Strategy*. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-post-certification-strategy-20180424-2.pdf>).

immunization coverage to minimize the risk of cVDPV outbreaks, and the long-term objective of strengthening the health system and building local capacity.

- **Rapid response teams:** To increase the speed and effectiveness of response to polio outbreaks, the GPEI has established a global outbreak response team from WHO and United Nations Children’s Fund (UNICEF) in Geneva and will set up a similar multi-agency Rapid Response Team (RRT) for Africa. RRTs will be composed of experienced GPEI staff who are dedicated to providing surge support for any polio event in the region. In addition, the GPEI will continue to identify and train a roster of experts within high-risk countries who can rapidly respond to outbreaks in their own or nearby countries. The RRTs will also help to prevent further outbreaks by supporting efforts to strengthen national immunization systems.

Figure 1. Summary of the key strategy elements



AFP: Acute flaccid paralysis; SIA: Supplementary immunization activity; bOPV: Bivalent oral polio vaccine; VPD: Vaccine-preventable disease; CSO: Civil society organization; MoU: Memorandum of understanding; GPEI: Global Polio Eradication Initiative; POLIS: Polio information system; WIISE: WHO immunization information system; VDPV: Vaccine-derived poliovirus.

Source: WHO.



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Other key activities that will be modified as part of the Polio Endgame Strategy 2019–2023 include:

- improved campaign quality;
- dedicated action plans for high-risk subnational areas;
- updated management structure and expanded membership of the GPEI Polio Oversight Board (POB) with the inclusion of Gavi, the Vaccine Alliance;
- expanded use of polio vaccinators to strengthen demand for essential immunization and other health services at the community level; and
- more contextualized strategies within NEAPS to focus proven strategies on specific local challenges.

Above all, the *Polio Endgame Strategy 2019–2023* reflects the urgency accorded to polio eradication through its declaration as a Public Health Emergency of International Concern (PHEIC) in 2014, as declared under the International Health Regulations (IHR). The confirmation of polio's status as a PHEIC signals the importance of eradication as a public health goal and a matter of global health security.

Budget and financial resources

In September 2018, the POB approved a multiyear budget that defines the resource requirements of the GPEI from 2019 to 2023. The GPEI budget totals US\$ 4.2 billion and includes US\$ 3.27 billion in incremental costs (beyond what has already been secured for 2013–2019) that must be mobilized to achieve eradication and certification. Another US\$ 935 million beyond the GPEI budget will be needed, to ensure an ongoing supply of inactivated polio vaccine (IPV) through 2023 (US\$ 814 million) and to build a stockpile of oral polio vaccine (OPV) by 2023 (US\$ 121 million) for use in case of outbreaks after certification and the global withdrawal of OPV. Together, IPV, OPV and the GPEI budget bring the overall cost of the strategy to US\$ 5.1 billion. The GPEI partners have committed to advocating and raising resources for the full financing of this strategy.

Next steps

The *Polio Endgame Strategy 2019–2023* will be noted for the Seventy-second World Health Assembly in May 2019. The Strategy Committee will initiate implementation planning and monitor progress. As the GPEI advances towards each goal, a midterm review will be planned in 2021 to assess the strategy and ensure smooth transition planning and deliberate inroads to the post-certification period.

The purpose of the Polio Endgame Strategy 2019-2023 is to address ongoing risks, leverage best practices, introduce improvements that will have an impact on the last mile, and put forward innovations that, taken together, can achieve and sustain WPV eradication and stop circulating vaccine-derived polio outbreaks.



INTRODUCTION

Background

The *Polio Eradication & Endgame Strategic Plan* (PEESP) addressed the GPEI programme period from 2013 to 2018.⁴ It identified four objectives towards the goal of achieving eradication: (1) to detect and interrupt all poliovirus transmission; (2) to strengthen immunization systems and withdraw OPV; (3) to contain poliovirus and certify the interruption of transmission; and (4) to begin to plan for the responsible transition of the polio eradication effort.

Under the PEESP, the GPEI achieved many remarkable successes:

- wild poliovirus type 2 (WPV2) declared eradicated in 2015;
- wild poliovirus type 3 (WPV3) last reported in November 2012, giving high confidence that global circulation has ceased;
- overall reduction in wild poliovirus type 1 (WPV1) cases since 2013:
 - no WPV detection anywhere outside of the three endemic countries since 2014;
 - no WPV detection outside of Afghanistan/Pakistan since 2016; and
- major circulating vaccine-derived poliovirus type 2 (cVDPV2) outbreak in the Syrian Arab Republic controlled despite ongoing war.

The PEESP was updated after a *Midterm Review* (MTR) in 2015, and the milestone for eradication was later extended to 2019 due to ongoing circulation (WPV1).⁵

Current epidemiological context

At the beginning of 2019, Afghanistan and Pakistan are the only two countries in which WPV transmission continues to be reported. Environmental surveillance (ES) and genetic sequencing have revealed that WPV1 has primarily persisted along two corridors crossing the Pakistan–Afghanistan border: one in the north and one in the south. Evidence of the virus thus suggests that while WPV1 remains in the two countries, Afghanistan and Pakistan are so closely linked that they constitute one epidemiological block. They need to address their remaining challenges in a coordinated manner to simultaneously interrupt transmission.

Nigeria has seen no further cases since September 2016. Once the surveillance network is sensitive and expansive enough to provide confidence of interruption in Nigeria and Lake Chad (and more broadly throughout the region), the African region has the potential to be certified WPV-free.

The GPEI must confront a dual emergency: interrupting WPV1 and stopping outbreaks of VDPVs, rare strains that have genetically mutated from the poliovirus contained in the OPV. Global certification of WPV eradication will require at least three years without a WPV isolate being detected with certification-standard surveillance.⁶ Because OPV cessation is set for approximately one year following the global certification of WPV1 eradication, the absence of any circulating vaccine-derived poliovirus (cVDPV) outbreaks will be verified separately and as part of the sequential steps towards achieving and sustaining a polio-free world (see **Annex A**).

Purpose

The purpose of the *Polio Endgame Strategy 2019–2023* is to address ongoing risks, leverage best practices, introduce improvements that will have an impact on the last mile, and put forward innovations that, taken together, can achieve and sustain WPV eradication and stop cVDPV outbreaks. The strategy builds upon the PEESP by reorienting the GPEI to current realities that may impede the delivery of immunization, surveillance and other health interventions – and realigning the GPEI to act with urgency, effectiveness and efficiency.

Scope

The *Polio Endgame Strategy 2019–2023* is high-level and focused on endemic, outbreak and high-risk countries and districts (see **Annex B**). It is intended for a wide range of stakeholders, including agency partners, regional and country leadership, and donors. It is not an action plan. Endemic country-level implementation planning is found in National Emergency Action Plans (NEAPS) that are developed by national polio eradication initiatives (PEIs).

⁴ Global Polio Eradication Initiative. *Polio Eradication & Endgame Strategic Plan 2013–2018*. Geneva: WHO; 2013 (http://polioeradication.org/wp-content/uploads/2016/07/PEESP_EN_A4.pdf).

⁵ Global Polio Eradication Initiative. *Polio Eradication & Endgame Midterm Review*. Geneva: WHO; 2015 (http://polioeradication.org/wp-content/uploads/2016/07/GPEI-MTR_July2015.pdf).

⁶ For details on certification-standard surveillance, see Global Polio Eradication Initiative. *Surveillance Indicators* [website] (<http://polioeradication.org/polio-today/polio-now/surveillance-indicators/>).



Female volunteer community mobilizers distribute mosquito bed nets in Kano State, Nigeria as part of their visits to local communities where they initiate dialogue on the value of polio immunization.

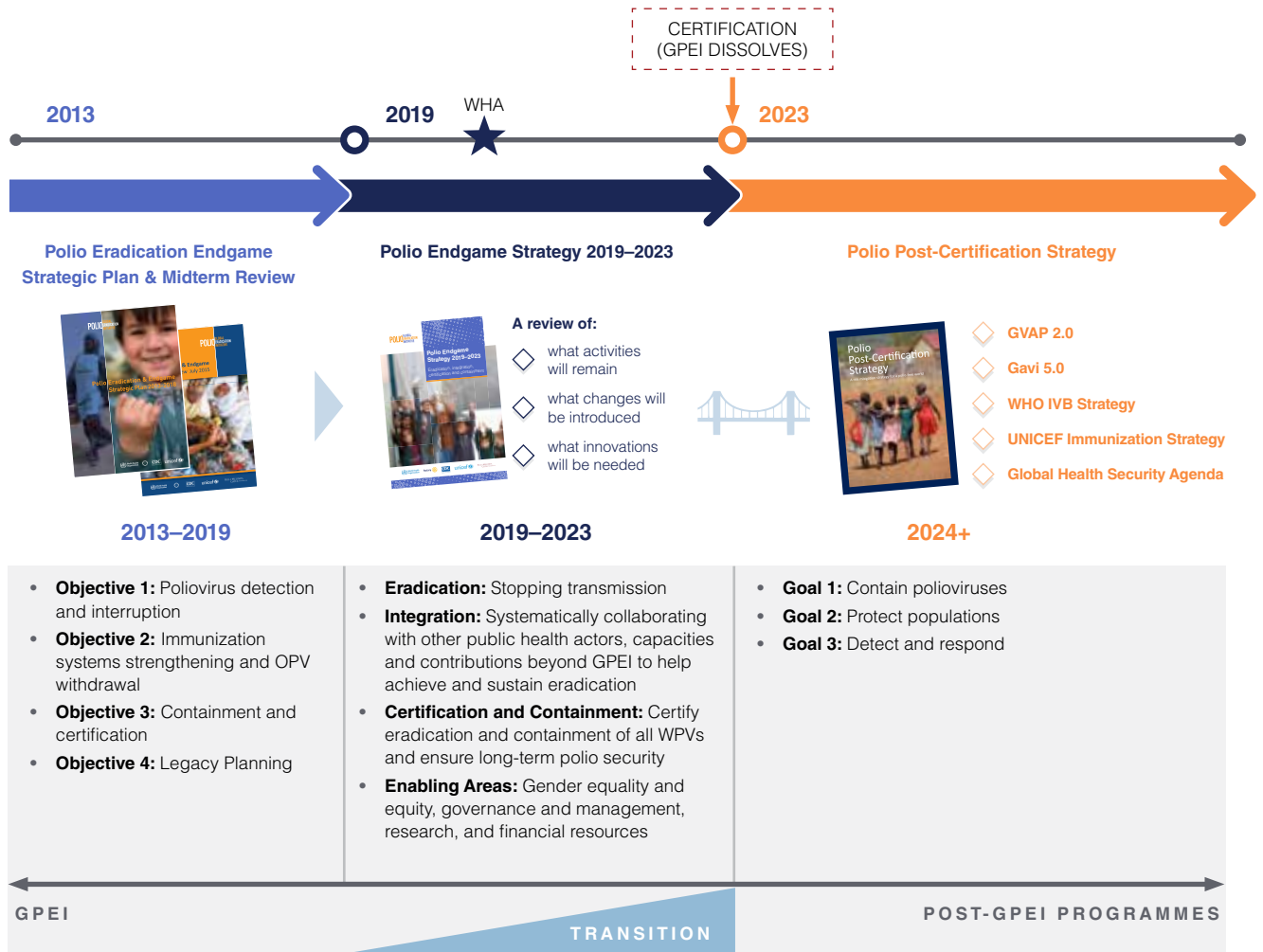
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The activities for the three goals of the *Polio Endgame Strategy 2019–2023* – eradication, integration and certification/containment – are closely interlinked. The activities aimed at strengthening immunization, covered under the Integration goal, will also contribute to achieving eradication and maintaining a polio-free world after the last virus is reported. Similarly, the efforts to ensure populations reached for polio campaigns are also able to access much-needed basic services, such as clean water, sanitation, and nutrition, will help eradication, but will clearly also require integration with other programmes, such as nutrition, WASH and the Partnership for Maternal, Newborn and Child Health. Efforts to strengthen governance and management are designed to improve the GPEI’s emergency posture and affect the efficiency and effectiveness of multiple programme areas.

The strategy was developed in consultation with stakeholders from polio eradication and immunization teams, donors, partners, regional colleagues and other health initiatives, as well as the WHO Executive Board and the POB. (See **Annex C** for a stakeholder engagement list.)

Lastly, the development of the 2019–2023 strategy overlapped with two other emerging global health strategies: Gavi 5.0 and the post-2020 immunization agenda that is a revision of the Global Vaccine Action Plan (GVAP). The synchronous timing of these critical global health strategies provided a unique opportunity to pursue the kind of synergies targeted in this strategy’s Integration goal, through improved collaboration and efficiency to deliver broader impact.

Figure 2. GPEI strategic plan timeline



OPV: Oral polio vaccine; GPEI: Global Polio Eradication Initiative; WPV: Wild poliovirus; GVAP: Global Vaccine Action Plan; IVB: Immunization, vaccines and biologicals.
 Source: WHO.

The GPEI will address the ongoing challenges that slowed progress towards interrupting WPV transmission by continuing the core strategies, building on best practices, and adopting further innovative approaches, with a concentrated geographic focus by individualizing strategies for each at-risk subdistrict, community, and street.



Goal One: Eradication

OBJECTIVES

The ultimate goal of the GPEI is to attain a world in which no child is paralysed by a poliovirus. To achieve this overarching goal, the two core eradication objectives are:

1. to interrupt transmission of all WPV; and
2. to stop all cVDPV outbreaks within 120 days of detection and eliminate the risk of emergence of any further VDPVs.

1. INTERRUPT WILD POLIOVIRUS TRANSMISSION

Challenges and solutions

The GPEI will address the ongoing challenges that slowed progress towards interrupting WPV transmission. It will continue the core strategies to interrupt WPV transmission (e.g. maintaining acute flaccid paralysis [AFP] surveillance and ES; providing polio vaccines through supplementary immunization activities [SIAs] and the EPI), but will build on best practices and adopt further innovative approaches, with a concentrated geographic focus by individualizing strategies for each at-risk subdistrict, community and street.

In Pakistan and Afghanistan, the essential requirement for interrupting WPV transmission is to simultaneously achieve high coverage for at least five consecutive SIAs in all core reservoirs across the epidemiologic block. In Nigeria/Lake Chad, polio vaccine coverage is essential, but achieving certification of WPV eradication will require focused surveillance strategies that assure the efforts to interrupt WPV transmission have been successful.

The key challenges and proposed solutions to interrupt WPV transmission include:

CHALLENGE 1:

Ensuring emergency focus

Polio was declared a Public Health Emergency of International Concern (PHEIC) under the International Health Regulations (IHR) in 2014 in recognition of the international spread of poliovirus to a range of polio-free countries after more than two decades of efforts to eradicate polio.⁷ In response, the GPEI concentrated staff and resources to support endemic countries through national emergency operations centres (NEOCs).

WPV cases have dropped considerably and international spread has not occurred since 2014; however, WPV circulation persists in Afghanistan and Pakistan – and the GPEI now confronts a dual emergency: interrupting WPV transmission and stopping cVDPV outbreaks (see **objective 2. Stop circulating vaccine-derived poliovirus outbreaks**).

This persistence of both wild and circulating polioviruses has created obstacles to sustaining an emergency focus and urgency. Challenges have included maintaining staff motivation and recruitment, securing financial resources and sustaining political commitment. While national government ownership of polio eradication efforts – the core tenet of the global programme – has remained high in endemic countries, national and subnational political leaders are accountable for multiple and competing priorities, including disasters or other disease outbreaks (such as Ebola), long-term development needs or ongoing political turmoil.

Solutions

Enhance the commitment to an emergency posture by:

- deploying additional GPEI implementing partner staff to endemic regions and countries and restructuring governance and oversight to empower decision-making as close as possible to the endemic regions. This effort will include centring the partnerships' operational management and technical support for Pakistan and Afghanistan in a hub to coordinate inputs across the transmission corridors of these countries (see the **Governance and management** section);
- prioritizing accountability frameworks for programme implementation at all levels, especially subnationally; and
- continuing to act on the PHEIC declaration and raising its visibility as a global emergency requiring urgent multinational action. Even though WPV transmission has been limited to only two countries since 2016, the potential for international spread represents a continued threat to global public health.

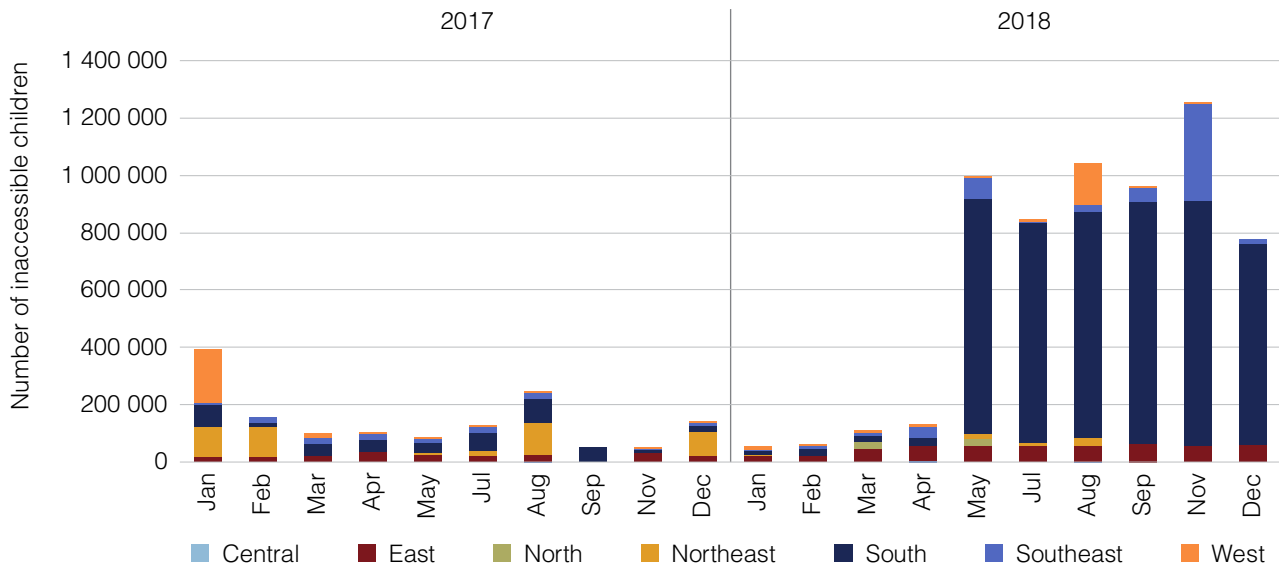
⁷ WHO statement on the meeting of the International Health Regulations Emergency Committee concerning the international spread of wild poliovirus. Geneva: WHO; 2014 (<https://www.who.int/mediacentre/news/statements/2014/polio-20140505/en/>).

CHALLENGE 2:

Overcoming inaccessibility, insecurity and active conflict

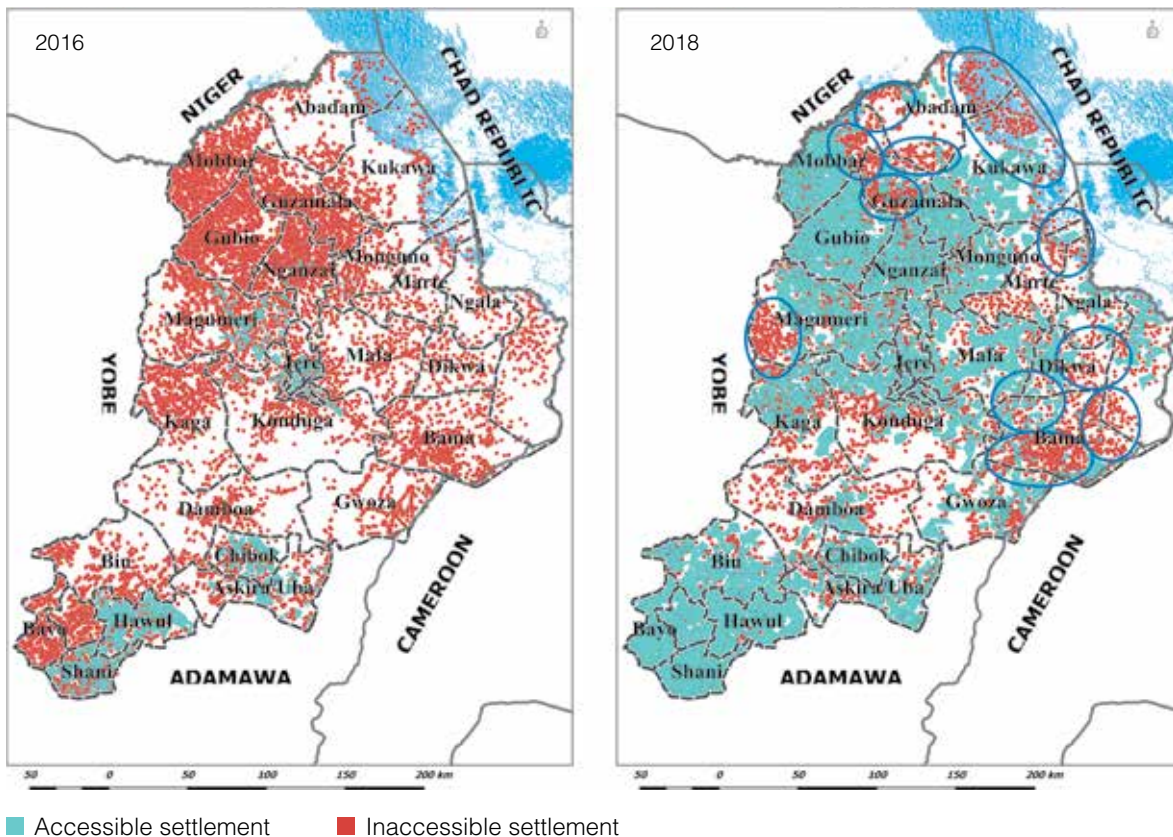
Insecurity and conflict present a challenge to reaching populations for vaccination, surveillance and programme monitoring and management while maintaining frontline worker safety. Insecure environments also require outreach strategies that adapt rapidly to changing conditions of accessibility and social or geographic isolation. The number of inaccessible children in Afghanistan has increased markedly since May 2018, particularly in areas where house-to-house strategies have been prohibited (see **Figure 3**). In Borno state, Nigeria, new approaches have reached more settlements (see **Figure 4**); however, many areas throughout northern Nigeria/Lake Chad can only be reached infrequently and still lack consistent reporting.

Figure 3. Inaccessible children in Afghanistan by region, 2017 and 2018



Source: National Emergency Operations Centre, Afghanistan. Presentation to Technical Advisory Group; January 2019.

Figure 4. Inaccessible settlements in Borno, Nigeria, August 2016 and December 2018



Note: Blue circles represent clusters of inaccessible areas with a high probability of habitation.
 Source: National Emergency Operations Centre, Nigeria.

Solutions

Ensure maximum security for frontline workers and increase reach into inaccessible areas by:

- generating sufficient political will among all parties throughout endemic areas through a high-level advocacy strategy, implemented under the leadership of the POB;
- building on lessons learned to scale up or rapidly adapt to changing ground-level conditions for implementing outreach strategies (see the panel); and
- enhancing surveillance by ensuring alignment with the *Guidelines for Implementing Polio Surveillance in Hard-to-Reach Areas & Populations*.⁸

CHALLENGE 3:

Reaching persistently missed and under-immunized children

WPV transmission in Pakistan and Afghanistan, detected through cases of AFP and positive environmental samples, indicates that overall population immunity has not been consistently high enough to reach interruption, even in accessible areas. Post-campaign monitoring has demonstrated that, while SIA quality has improved, coverage has not been sustained at levels above 95% across all core polio reservoirs. In 2018, surveys indicated the proportion of children who continue to miss polio vaccination (even after repeated follow-up) remains about 6% in the highest-risk areas of Pakistan and about 4% in accessible high-risk areas of Afghanistan.

The reasons for persistently missed children can be traced to several factors: gaps in SIA quality, challenges with reaching highly mobile populations, and overt or covert refusals (see **Figure 5**).

Operational gaps, such as inadequate microplans, have been linked with deficiencies in management, oversight and accountability. These issues have been magnified by the difficulties in tracking and vaccinating mobile populations, particularly across borders, or following up with children who are not home during campaigns.

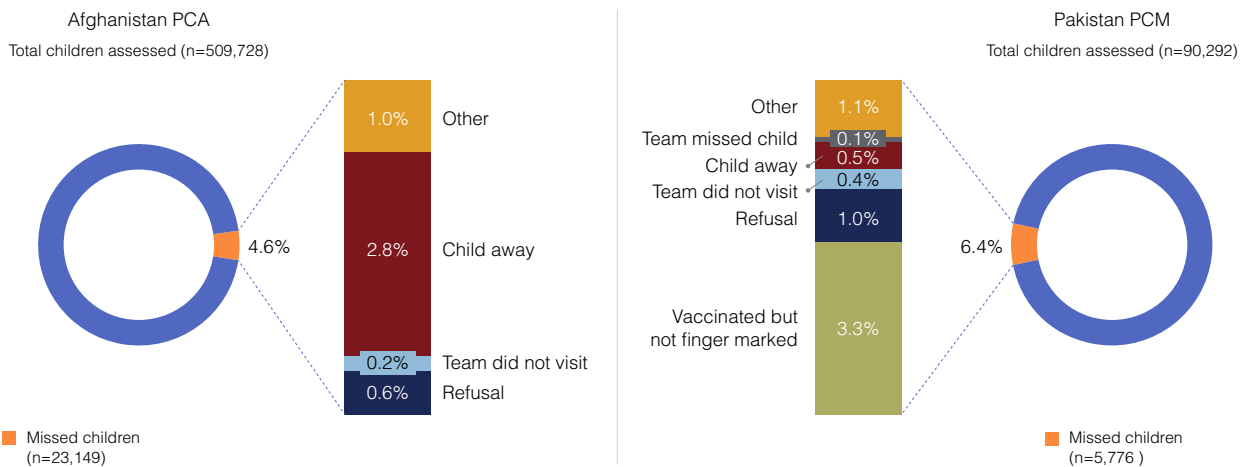
Most parents accept vaccines for their children, but when refusals occur they tend to be clustered within communities with ongoing transmission. While more can be done to appreciate the reasons behind resistance to polio vaccination, local focus group interviews and anecdotal evidence indicate that communities affected by profound deprivation and poverty express fatigue from repeated SIAs, dismiss polio vaccines as inconsequential to their basic needs and may mistrust the government.⁹

LESSONS LEARNED IN INSECURE AND INACCESSIBLE AREAS

Country-level planning has often provided the lead on innovating to reach children and families in security-compromised areas. Country teams have developed a host of strategies:

- in Afghanistan, optimizing flexibility in negotiation and conducting innovative contingency strategies, such as site-to-site vaccination until house-to-house campaigns are permitted;
- in Pakistan, expanding community-based vaccination (CBV) teams and collaborating with law enforcement agencies to maintain frontline worker safety and gain access for monitoring; and
- in Nigeria/Lake Chad, expanding outreach strategies, including house-to-house campaigns and the Reaching Every Settlement and Reaching Inaccessible Children interventions, with the aim of achieving at least three contacts in all settlements.

Figure 5. Reasons children were missed in the highest-risk, accessible areas in Afghanistan and Pakistan, 2018



PCA: Post-campaign assessment; PCM: Post-campaign monitoring.

Note: "Vaccinated but not finger marked" is based on a caregiver report that could not be validated and thus is assessed as a missed child.

Sources: National Emergency Operations Centre, Pakistan. National Emergency Action Plan for Polio Eradication 2018/2019. Islamabad: NEOC; September 2018, and National Emergency Operations Centre, Afghanistan. Presentation to Technical Advisory Group; January 2019.

⁸ Global Polio Eradication Initiative. *Guidelines for Implementing Polio Surveillance in Hard-to-Reach Areas & Populations*. Geneva: WHO; 2018.

⁹ See National Emergency Operations Centre for Polio Eradication, Pakistan. National Emergency Action Plan for Polio Eradication 2018/2019. Islamabad: NEOC; September 2018 (<http://www.endpolio.com.pk/images/Stories/NEAP-2018-2019.pdf>), and National Emergency Operations Centre, Afghanistan. National Emergency Action Plan 2019, January 2019 (<http://polioeradication.org/wp-content/uploads/2016/07/NEAP-AFG-2019-A4.pdf>), as well as Global Polio Eradication Initiative. Independent Monitoring Board. How to cut a long story short: Sixteenth report; October 2018 (<http://polioeradication.org/wp-content/uploads/2018/11/20181105-16th-IMB-Report-FINAL.pdf>).

Solutions

Increase SIA quality and impact by:

- implementing data-driven action plans and accountability frameworks for each core reservoir and high-risk subareas. In addition to NEAPs and key provincial plans, performance plans will be developed in each district with persistent ES positive samples or that is a source of poliovirus amplification. New ES positive sample detections will be treated with the same priority as a newly detected AFP case. Extended surge support will be provided by NEOC RRTs for any new detections in Pakistan's Tier 2–4 districts;
- providing supportive management and synchronization of Afghanistan–Pakistan cross-border corridor action plans. Collaboration between these two countries has improved over the last year. Further efforts will include integrating activities along the border and mapping migrants and nomads to anticipate health delivery needs at their destination. High-risk mobile population (HRMP) strategies will be updated to focus on new internally displaced populations (IDPs) in Afghanistan and to account for any revised migration patterns between Pakistan and Afghanistan;
- raising overall population immunity in high-risk areas. Pakistan and Afghanistan will target monovalent oral polio vaccine type 1 (mOPV1) use to outbreak response SIAs and designated subnational immunization days (SNIDs). Alternative vaccination strategies (such as expanded age groups or a wider geographic use of IPV, including fractional-dose intradermal IPV delivered with newly available needle-free injectors) will be used on a case-by-case basis in select high-risk areas and border crossings;
- prioritizing national and subnational dashboard feedback loops to identify and promptly respond to poorly performing Union Councils or subdistricts. Post-campaign monitoring will be improved by standardizing lot quality assurance sampling (LQAS) cut-offs, updating sampling frames and exploring further options for third-party monitors. Technical assistance will be provided mostly, though not exclusively, from the hub to support endemic country focus on essential data collection, the automation of data analysis and analytical training for frontline polio teams; and
- scaling up innovative strategies. These include geographic information systems (GIS) mapping to locate catchment areas, the tracking of vaccinators to ensure quality vaccination campaigns and remote monitoring with mobile phones, in order to improve the monitoring of SIAs and estimating vulnerable populations in inaccessible areas.

Address refusals by:

- better understanding the drivers for polio vaccine acceptance and leveraging community-specific communication strategies to increase the demand for immunization. New communication strategies in Pakistan and Afghanistan have emphasized coordination between operations and social mobilization teams,¹⁰ which will be enhanced through engagement with CSOs, particularly women's groups and religious organizations (see the **Enabling areas: Gender equality and equity** section);
- expanding convergence programming (i.e. the use of polio vaccinators to strengthen demand for essential immunization and other health services). Vaccinators will continue to provide additional health commodities (such as zinc or vitamin A) to address some chronic childhood health issues. Training and monitoring will also be provided to support community-based vaccination workers (in Pakistan) and Immunization Communication Network (ICN) workers (in Afghanistan) in identifying young children, newborns and pregnant women who require preventive or curative services and referring them to local health facilities;
- addressing basic needs in communities highly vulnerable to polio by engaging development initiatives. At the national level, the GPEI will meet with development agencies and NGOs to see how development projects in complementary service sectors, such as WASH, nutrition and primary care, can be prioritized to districts at high risk of polio transmission. In highly vulnerable districts, the GPEI will engage with local governments, development partners and CSOs (particularly female-led) to identify other private and public non-polio resources that can be integrated and tailored to meet local needs; and
- collaborating with global and regional humanitarian and development partners to raise funds outside of the polio budget to directly target basic needs in communities at high risk of poliovirus transmission. In addition to GPEI-driven efforts, UNICEF has proposed leading the fundraising efforts for integrated service delivery in multiply-deprived and polio-vulnerable communities in Afghanistan and Pakistan.¹¹ While the implementation of service projects will be the responsibility of local governments supported by CSOs and local development agencies, the GPEI will assist by drawing attention to community needs and contributing to a sustainable infrastructure and basic support.

CHALLENGE 4:

Bolstering immunity or sustaining protection in areas with weak health systems

Immunization services provided through the EPI in endemic countries have shown gradual improvements. However, substantial gaps in capacity to deliver both IPV and bivalent oral polio vaccine (bOPV) through the EPI in the core reservoirs have limited the programme's ability to bolster immunity and perpetuated a reliance on SIAs.

¹⁰ See the communication for eradication strategies in National Emergency Operations Centre, Pakistan. National Emergency Action Plan for Polio Eradication 2018/2019. Islamabad: NEOC; September 2018 (<http://www.endpolio.com.pk/images/Stories/NEAP-2018-2019.pdf>), and Morry C et al., (Presentation) Final report: Strengthening evidence-based communication for polio eradication; December 2018.

¹¹ See UNICEF. Integrated Services Delivery in selected polio high-risk union councils of polio core reservoir districts; November 2018 (in preparation), and UNICEF. Integrated Response Plan to support Polio Eradication in Afghanistan – "Getting to Zero"; October 2018 (in preparation).

Solution

Reinforce synergies between the EPI and the Polio Eradication Initiative (PEI) and broaden collaboration with multiple partners to strengthen overall immunization systems (see **Goal Two: Integration**).

CHALLENGE 5:

Increasing knowledge of poliovirus epidemiology in the remaining core reservoirs

AFP and ES networks generally provide a comprehensive picture of poliovirus transmission. However, additional efforts are needed to fully understand the dynamics of poliovirus epidemiology, especially in areas that have ES evidence of WPV transmission with no AFP cases. Genetic sequencing analysis, which has been instrumental in tracing transmission patterns and genetic diversity in Afghanistan and Pakistan, demonstrates the persistence of multiple poliovirus lineages throughout the epidemiologic block – a signal of the consistent difficulties in reaching specific groups of population and containing the virus. Prolonged, undetected WPV1 transmission is now increasingly unlikely in Nigeria/Lake Chad. Nevertheless, achieving active surveillance in inaccessible areas, particularly Borno state, presents an ongoing challenge.

Solutions

Provide more granular analyses of ongoing epidemiology and enhance surveillance among highly vulnerable populations by:

- expanding serological studies and adding ES sites where feasible in high-risk areas, particularly those with persistent ES positive samples, to better understand transmission dynamics (e.g. the role of older age groups) and to pinpoint neighbourhoods harbouring poliovirus. Additional efforts will concentrate on conducting further genetic analysis and triangulation with monitoring data from high-risk subdistrict areas with known vulnerable or highly mobile populations; and
- ensuring certification-level surveillance with strategies outlined in the NEAPs. Pakistan and Afghanistan will focus on the early identification of AFP cases through reporting by either the first health provider or community informant contact. Nigeria will continue to prioritize surveillance in security-challenged states and expand the monitoring of active reporting sites in other high-risk areas.

2. STOP CIRCULATING VACCINE-DERIVED POLIOVIRUS OUTBREAKS: PREVENTION/ PREPAREDNESS, DETECTION AND RESPONSE

Challenges and solutions

Effectively preventing, detecting and responding to cVDPV outbreaks include many of the same challenges as interrupting WPV transmission. cVDPV outbreaks have often emerged in fragile or insecure states beset by conflict, limited access, highly mobile populations and weak health infrastructures, especially poorly performing EPI systems. As in WPV endemic countries, cVDPV outbreaks tend to affect vulnerable communities that face multiple systemic challenges and may not perceive polio vaccination as a priority.

While the challenges to interrupting WPV now appear limited to two countries, the risk of cVDPV emergence exists for any country using OPV that has limited immunization coverage and a high risk of faecal-oral transmission. Both the number of emergences and incidence of cVDPV cases since the switch from the trivalent oral polio vaccine (tOPV) to bOPV in April–May 2016 have been higher than anticipated, and cVDPV cases have exceeded the number of WPV in 2017–2018.

CHALLENGE 1:

Maintaining effective prevention and preparedness

Although poor immunization systems are a common denominator underlying all cVDPV outbreaks, the future risks of new emergences (and thus challenges for stopping outbreaks) differ by poliovirus type.

Twelve of 15 new cVDPV outbreaks (80%) and over 75% of VDPV cases detected from April 2016 to February 2019 have been attributed to type 2. The cVDPV2 outbreaks initially detected post-switch can be traced to viruses already circulating undetected at the time of the switch. However, some recent outbreaks are likely to have been seeded either by uncontrolled, continued use of tOPV or by monovalent oral polio vaccine type 2 (mOPV2) used following tOPV cessation for cVDPV2 outbreak control. The risk of further seeding is variable, but countries (or their neighbouring areas) that have poor coverage in mOPV2 SIAs represent the highest risk of future VDPV2 emergences.

Outbreaks of circulating vaccine-derived poliovirus type 1 (cVDPV1) and circulating vaccine-derived poliovirus type 3 (cVDPV3) have been far less frequent but can be traced to low OPV coverage. Pre-emptive SIAs with bOPV to bolster poliovirus immunity in countries with low coverage have generally been successful, but have not always achieved high coverage (e.g. in Somalia) or have not been conducted in areas that have proven vulnerable to cVDPV emergence (e.g. Papua New Guinea).

Initially following tOPV cessation, limited global supplies of IPV were prioritized to countries considered at high risk of poliovirus transmission. However, chronic systemic gaps in essential immunization programmes have precluded achieving high IPV coverage in these countries. Fortunately, none of the lower-risk countries impacted by supply shortages have had cVDPV2 outbreaks and global IPV supplies have gradually improved. Until global supply is sufficient, available IPV will be prioritized according to the following needs: (1) strengthening the EPI; (2) interrupting WPV transmission and stopping cVDPV outbreaks in limited areas; (3) reaching children who missed vaccination since April 2016 due to supply limitations; followed by (4) other exceptional cases.

Additional challenges with OPV vaccine management, which have arisen since 2016, have implications for preventing or preparing for cVDPVs. The tracking and disposal of tOPV immediately post-switch proved problematic in a few countries, and a similar challenge with managing mOPV2 used in outbreak response continues to represent a risk of cVDPV2 emergence in some areas. Although sufficient supplies of mOPV2 have been provided to respond in a timely manner to all cVDPV2 detections so far, ensuring adequate mOPV2 supplies in the immediate future is complicated by uncertainties in predicting the number and scope of any additional outbreaks. Providing sufficient supplies of bOPV for pre-cessation SIAs and mOPV stockpiles of all types of OPV for future outbreaks is critically important, but also problematic due to long lead times required for initiating vaccine manufacture, the lack of designated funding to initiate the production of vaccines for the stockpiles and uncertainties surrounding future requirements.

Solutions

Enhance preparedness capacity at all levels and implement a comprehensive prevention strategy to eliminate the risk of future cVDPV emergence in high-risk countries by:

- establishing multi-agency Rapid Response Teams (RRTs) in Geneva and Africa composed of experienced GPEI staff who are solely dedicated to responding quickly to any VDPV outbreak to support initial assessment and planning. The GPEI will also identify and train a roster of individuals in high-risk countries who can rapidly respond to outbreaks in their own or nearby countries;
- taking steps to expand the availability of mOPV2 supply and to provide adequate stocks of polio vaccines for future outbreak response. In addition to immediate action to increase mOPV2 supply, the GPEI will conduct more robust, early assessments of vaccine needs, secure financing for stockpile needs, and continue discussions with vaccine manufacturers to ensure a healthy market with sufficient supply to meet programme requirements (see the **Preparing for the implementation of the Post-Certification Strategy** section);
- providing targeted, intensive technical support to augment multi-stakeholder initiatives for strengthening the EPI in selected high-risk districts (see **Goal Two: Integration**);
- focusing the risk assessment for outbreaks of cVDPV1 and cVDPV3 on subnational areas to prioritize pre-emptive bOPV SIAs in the 2019–2024 calendar to populations at highest risk. Preparedness dashboards and increased onsite monitoring will be rigorously used to ensure the effective implementation of these bOPV SIAs;
- ensuring national polio outbreak preparedness plans are up to date and have been tested; and
- implementing the measures to eliminate the long-term risk of future VDPV emergences (see **Challenge 4**).

CHALLENGE 2:

Achieving early detection

AFP and ES networks have detected multiple VDPVs around the world. Follow-up epidemiologic investigations and genetic sequencing by the Global Polio Laboratory Network (GPLN) have further contributed to extensive knowledge about the dynamics of VDPV emergences. Nevertheless, as with recent outbreaks in the Syrian Arab Republic and the Horn of Africa, a combination of low prevalence and undetected transmission from poor surveillance has contributed to the delayed identification of outbreaks with long-chain viruses whose origin has been difficult to pinpoint. Delayed detection, especially for cVDPV2 outbreaks, will present an even greater risk with time as population immunity further declines.

Solutions

Maximize early detection through an enhanced risk-based approach to surveillance by:

- focusing GPEI monitoring and supportive supervision for surveillance on high-risk countries and districts, especially those in hard-to-reach areas;¹² and
- expanding ES sites in all high-risk countries in close collaboration with the GPLN to increase the sensitivity of detection and enhance the monitoring of SIA performance.¹³

¹² For detailed strategies, see Global Polio Eradication Initiative. Global Polio Surveillance Action Plan, 2018–2020. Geneva: WHO; February 2019 (<http://polioeradication.org/wp-content/uploads/2016/07/GPEI-global-polio-surveillance-action-plan-2018-2020.pdf>), and Global Polio Eradication Initiative. Guidelines for Implementing Polio Surveillance in Hard-to-Reach Areas & Populations. Geneva: WHO; 2018.

¹³ See Global Polio Eradication Initiative. Environmental Surveillance and Implementation Working Group. Polio Environmental Surveillance Enhancement Following Detection of Vaccine-Related Type-2 Poliovirus; 9 May 2018. These guidelines specifically apply to type 2 but will be extended to other types as well.

CHALLENGE 3:*Implementing rapid, effective response*

National efforts using standard operating procedures (SOPs), alongside GPEI technical and resource (e.g. vaccines, financial) support, have been able to control multiple VDPV outbreaks.¹⁴ Often, this has been accomplished in spite of insecurity (Syrian Arab Republic), weak health infrastructure (Democratic Republic of the Congo) or concurrent WPV transmission (Pakistan). However, few outbreaks have been controlled within 120 days of detection. Initial vaccination responses have often been delayed due to a lack of accountability and political will, multiple health priorities or ineffective outbreak management. Poor coverage in response SIAs, coupled with inadequate immunization system coverage in outbreak areas, has fostered transmission for prolonged periods or, as with mOPV2, even seeded new outbreaks.

Solutions

Enhance the effective implementation of SOPs and the quality of all outbreak responses by:

- ensuring the rapid declaration of a national emergency immediately following outbreak detection and increasing accountability at all levels (global, regional and national). The newly established RRT will be deployed within 48 hours of an outbreak. The outbreak response assessment (OBRA) will be overhauled to focus on providing constructive supervision of operational gaps, including a critical review of the initial SIA, to allow adjustments to improve quality;
- strengthening and formalizing arrangements between the GPEI and emergency programmes at the global and national levels to ensure greater predictability in delivery and to address a broader range of risks (see **Goal Two: Integration**);
- reviewing SOPs regularly and revising strategies to ensure that recommendations (related to SIAs or the scope of response) are updated to reflect changing epidemiology and best practices; and
- integrating the tracking and disposal of mOPV2 into the same supervision, monitoring and reporting mechanisms required for vaccine coverage in order to enhance the validation of vaccine management and mitigate the risk of vaccine misuse.

CHALLENGE 4:*Addressing the potential long-term challenges of VDPV emergence*

Although further cVDPV2 outbreaks due to pre-switch tOPV use are unlikely, ongoing transmission in northern Nigeria, the Democratic Republic of the Congo and Somalia raises concerns about the potential for protracted cVDPV2 outbreaks in expanded geographic areas due to post-switch seeding from poor coverage with mOPV2. Increasing the quality of SIAs has been difficult to achieve in countries with fragile infrastructure, conflict and multiple systemic problems.

Fully ameliorating the primary driver of other cVDPV outbreaks – low immunization coverage in poor sanitation environments – requires interventions beyond the scope of the GPEI. Consequently, the risk of cVDPV emergence will persist as long as OPV use continues, and OPV use cannot be stopped globally until after WPV eradication.

An additional long-term challenge is presented by immunodeficiency-associated vaccine-derived poliovirus (iVDPV), generated by individuals with primary immunodeficiency disorders (PIDs). Although to date there has been no sustained community transmission from iVDPVs, in light of this potential risk, the GPEI has already initiated steps to create new surveillance platforms to detect iVDPVs and is supporting the development of antiviral therapies for treating PID patients infected with poliovirus.¹⁵

Solutions

Address the potential long-term implications of VDPV outbreaks by:

- developing a contingency plan with near-term systemic actions and policies that could address the risks of sustained (i.e. uncontrolled) cVDPV2 transmission;
- accelerating an understanding of cVDPV emergence through models addressing the risks of cVDPV2 seeding and Sabin-like viruses;
- expediting the development and regulatory approval of new vaccines that could significantly contribute to stopping or preventing VDPV outbreaks, including the development of a new, more genetically stable OPV, such as novel oral polio vaccine type 2 (nOPV2), adjuvanted IPV able to confer mucosal immunity, and antivirals to treat persons with immunodeficiencies who are infected with poliovirus (see the **Research** section);
- establishing sensitive global surveillance for iVDPV (see the surveillance section in **Goal Two: Integration**); and
- supporting immediate and long-term strategies to strengthen immunization (see **Goal Two: Integration**).

¹⁴ Global Polio Eradication Initiative. Standard Operating Procedures: Responding to a poliovirus event or outbreak. Version 3. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/12/sop-polio-outbreak-response-version-3-dec-2018-20181220.pdf>).

¹⁵ For further details on this risk, see Global Polio Eradication Initiative. Polio Post-Certification Strategy. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-post-certification-strategy-20180424-2.pdf>).

The factors that put a community at risk for polio – insecurity, inaccessibility, poverty, and weak systems – also put them at risk for other diseases, outbreaks, and emergencies. The GPEI commits to working in a new, systematic, and integrated way to protect populations. Such integration will help to build a sustainable polio-free world.

During a polio campaign, a girl receives de-worming tablets. Azuretti Fishing Village, Côte d'Ivoire.

Goal Two: Integration

As the GPEI moves closer to the goal of eradicating polio, laying the groundwork for a sustainable future becomes more critical – and will depend increasingly upon strong immunization, health and disease surveillance systems, as well as emergency response capacities. This will require closer collaboration with other health programmes. The GPEI commits to working in a new, systematic and integrated way to protect populations. Such integration will help to build a sustainable polio-free world by capitalizing on the strengths and mechanisms of immunization and emergency programmes at the country, regional and global levels. In turn, the GPEI will contribute its assets, knowledge and expertise to protect populations by strengthening immunization, health and disease surveillance systems and emergency response capacity.

OBJECTIVES

Integration provides a means to shape a sustainable polio-free world. Through systematic collaboration with other public health actors, capacities and contributions beyond the GPEI can help achieve and sustain eradication, while GPEI assets, knowledge and expertise can be channelled to protect populations by supporting immunization, health systems and emergency response.

Systematic collaboration will focus on three objectives:

1. to contribute to strengthening immunization and health systems to help achieve and sustain polio eradication;
2. to ensure sensitive poliovirus surveillance through integration with comprehensive vaccine-preventable disease (VPD) and communicable disease surveillance systems; and
3. to prepare for and respond to future outbreaks and emergencies.

1. CONTRIBUTE TO STRENGTHENING IMMUNIZATION AND HEALTH SYSTEMS TO HELP ACHIEVE AND SUSTAIN POLIO ERADICATION

The GPEI infrastructure already contributes to broader immunization activities in many countries through active support to national immunization programmes and health systems. Staff working on polio eradication and immunization often function as one team.

In this new phase, coordination between polio eradication and immunization teams will be strengthened in all countries and interventions will become more targeted and systematic with a clearer accountability framework to track and measure specific outputs. This new way of working will drive country-level impact for the mutual gains of achieving polio eradication while also strengthening immunization and health systems.

Collaboration efforts will follow a targeted approach:

- In **endemic countries**, the focus will be on stopping WPV transmission in the core reservoirs.
- In **outbreak countries**, stopping the cVDPV outbreak will be the immediate priority, while also building capacity for long-term sustainability to prevent future outbreaks.
- In **non-endemic, non-outbreak countries with weak immunization systems**, improving immunization coverage in the highest-risk districts will be the immediate priority to minimize the risk of cVDPV outbreaks, with a longer-term objective of strengthening immunization and health systems. This will also support the eventual aim of mainstreaming polio functions and funding into country health systems and budgets as they prepare for the eventual closure of the GPEI.

See **Annex D** for illustrations of potential collaborations and GPEI contributions.

Challenges and solutions

CHALLENGE 1:

Addressing low population immunity in the endemic countries

Afghanistan, Nigeria and Pakistan are among the top 10 countries with the highest number of unvaccinated and under-vaccinated children. Low immunization coverage continues to be a challenge in all three endemic countries, perpetuating a reliance on SIAs.

Solutions

Reinforce synergies between the Polio Eradication Initiative (PEI) and the national Expanded Programme on Immunization (EPI) to stop poliovirus circulation, whereby:

- The national EPI programme, with support from immunization partners, will take the lead in increasing population immunity in core reservoirs and select high-risk districts to help achieve eradication.
- The GPEI will support national efforts by directly leveraging its human resources, expertise and best practices to support EPI implementation in a variety of areas, such as microplanning and mapping high-risk and mobile populations. The details of GPEI contributions to the EPI in each of the endemic countries will be outlined in the respective National Emergency Action Plans (NEAPs).

SYNERGIES WITH THE EXPANDED PROGRAMME ON IMMUNIZATION

- In Pakistan, EPI/PEI synergies will be enhanced in all community-based vaccination (CBV) areas by integrating the management and coordination of all polio SIA and immunization system activities through provincial emergency operations centres (PEOCs).
- In Afghanistan, the GPEI will support national efforts to strengthen EPI services and to increase vaccine acceptance in polio high-risk districts in the six provinces in southern and eastern Afghanistan.
- In Nigeria, the GPEI will extend collaboration with the National Emergency Routine Immunization Coordination Centre (NERICC).

CHALLENGE 2:

Addressing low population immunity in outbreak countries

Inadequate immunization coverage is one of the main causes of cVDPV outbreaks and their continued transmission for prolonged periods. As the world moves closer to eradication, it becomes imperative not only to effectively respond to poliovirus outbreaks, but also to help establish a sustainable system to prevent future outbreaks.

Solutions

Stop active outbreaks while providing the building blocks to prevent future outbreaks by:

- ensuring a high-quality outbreak response, including the rapid national declaration of an emergency and the deployment of a surge team (see also **Goal One: Eradication**); and
- revising outbreak standard operating procedures (SOPs) to identify how the surge team and EOC can actively support immunization activities through close coordination, planning and the implementation of the national EPI programme. The terms of reference (TORs) of GPEI surge staff will identify specific roles and responsibilities to strengthen programme management, microplanning, community mobilization and performance monitoring, and to help build capacity to implement immunization recovery plans.

CHALLENGE 3:

Sustaining eradication in countries with weak or fragile health systems

Non-endemic countries with weak or fragile health systems, where large pockets of children are unimmunized or under-immunized, are at high risk of cVDPV outbreaks or the importation of poliovirus from neighbouring countries.

Solutions

Improve immunization coverage and contribute to systems strengthening by:

- channelling the GPEI infrastructure to fully support the national EPI programme in countries where the GPEI continues to have a large footprint. The immediate to midterm objective will be to increase immunization coverage and equity to minimize the risk of cVDPV outbreaks. The long-term objective will be to strengthen the health system and build local capacity, which will contribute to the successful transition of activities required to maintain eradication after the closure of the GPEI;
- focusing on the subnational level and on the lowest performing districts, in particular. Country-specific activities will be incorporated in all staff TORs, including those of the Stop Transmission of Polio (STOP) consultants, and will be tracked by regular performance monitoring;
- pursuing synergies and cost-saving efficiencies between polio SIAs and other immunization campaigns. These consist of joint planning for multi-antigen SIAs, the harmonization of SIA calendars, and the development of guidance documents and processes, including support for the periodic intensification of

routine immunizations (PIRIs). Joint campaigns will also identify concrete follow-up activities to link SIAs to immunization strengthening by using SIA microplans and independent monitoring data to identify and follow up on persistently missed children and drop-outs;

- engaging actively with CSOs, where appropriate, to build a bridge between communities and national programmes, especially in fragile, high-risk and border areas. Community-based structures and civil society networks established through the GPEI will be leveraged to generate demand for immunization and contribute to tracking defaulters and drop-outs;
- engaging strategically in country health-sector planning processes (e.g. the development of national health plans and annual operational plans), to align with national efforts to sustainably strengthen health systems to attain universal health coverage (UHC); and
- capitalizing on synergies with complementary initiatives focused on strengthening health systems and improving immunization coverage. Examples include the health systems strengthening investments of Gavi, the Vaccine Alliance in eligible countries, and the Bill & Melinda Gates Foundation effort to increase essential immunization coverage in select subnational areas of polio high-risk geographies in Asia and Africa.¹⁶

CHALLENGE 4:

Addressing the ad hoc and inefficient coordination with the immunization community

GPEI collaboration with the immunization community has largely been ad hoc and on an as-needed basis, rather than systematic with clear accountability structures. Objectives have not always been fully aligned.

Solutions

Improve coordination with the immunization community by:

- establishing more effective, results-oriented collaboration mechanisms with clear accountability structures. The addition of Gavi, the Vaccine Alliance, to the POB provides a valuable opportunity for more systematic collaboration both at the strategic and operational levels:
 - Gavi and other immunization partners have been closely engaged in the development of the *Polio Endgame Strategy 2019–2023*. In turn, the GPEI will actively engage in the development of Gavi 5.0 and the post-2020 immunization strategy to succeed the Global Vaccine Action Plan (GVAP);
 - The development of national annual operating plans will be the anchor point for the GPEI's engagement. The GPEI will help to ensure that they are data-driven, practical, prioritized, budgeted against available resources and defined with clear indicators:
 - The GPEI will systematically participate in immunization fora and platforms, such as the Interagency Coordinating Committee (ICC), EPI Reviews, EPI Managers meetings, Gavi Joint Appraisals and Gavi Regional Working Groups. Similarly the GPEI will reinforce mechanisms for Gavi and other immunization partners to regularly participate in GPEI Technical Advisory Group (TAG) meetings and outbreak response assessments (OBRAs);
 - As much as possible, existing mechanisms will be used to coordinate and track outcomes; and
- developing a joint results and accountability framework with Gavi and the immunization community to operationalize the strategies outlined in this document. The GPEI and Gavi will jointly identify country-specific activities that GPEI staff can support to improve immunization coverage and equity that can be supported through Gavi health system strengthening (HSS) and cash grants. The result will be monitored through in-country EPI planning processes and Gavi joint appraisals.

2. ENSURE SENSITIVE POLIOVIRUS SURVEILLANCE THROUGH INTEGRATION WITH COMPREHENSIVE VACCINE-PREVENTABLE DISEASE AND COMMUNICABLE DISEASE SURVEILLANCE SYSTEMS

Achieving sensitive poliovirus surveillance around the world remains a critical priority to reach certification and ensure the world remains polio-free. To meet this objective in the short to medium-term, poliovirus surveillance in Pakistan and Afghanistan will continue to rely on a GPEI platform that also includes targeted vaccine-preventable diseases (VPDs) and links to the national surveillance system. In other countries, poliovirus surveillance is already incorporated within VPD or broader communicable disease national surveillance systems (as is the case with the Integrated Disease Surveillance and Response [IDSR] system in Africa) with varying degrees of GPEI support.

¹⁶ The collaboration aims to complement both GPEI efforts to interrupt WPV transmission and cVDPV, and Gavi efforts to address low immunization coverage in areas most at risk of cVDPV emergence. Geographies have been selected based on current and historical WPV and cVDPV risk, as well as persistently low diphtheria–tetanus–pertussis (DTP3) coverage. In initiating this work, the foundation will coordinate closely with national governments, Gavi and Alliance partners to fully use available funding and proven strategies and approaches, particularly in terms of building government ownership and delivery capabilities, as well as improved approaches to immunization service delivery in fragile and conflict-affected settings.



WHO / PAHO / Harold Ruiz

Implementing the *Global Polio Surveillance Action Plan 2018–2020* (GPSAP) presents an opportunity for country-level synergies between polio and other VPD surveillance, and long-term integration with other communicable disease surveillance.¹⁷ This will facilitate sustaining polio surveillance within national systems, as well as strengthening other surveillance systems by building on the polio platform where it proves beneficial. The long-term vision of integrated surveillance at both the national and global levels from the polio perspective is further outlined in the *Post-Certification Strategy* (PCS).¹⁸

Challenge and solutions

CHALLENGE:

Ensuring polio surveillance sensitivity while integrating it within VPD/communicable disease surveillance systems

The pace of integrating poliovirus surveillance within comprehensive VPD/communicable disease surveillance systems at both the global and national levels will vary – and potentially presents a challenge to maintain sensitive poliovirus surveillance, especially in endemic and high-risk areas.

Solutions

Ensure sensitive poliovirus surveillance and further integration by:

- implementing an appropriate mix of poliovirus surveillance strategies (e.g. AFP surveillance with community-based surveillance, ES and enterovirus surveillance) by all countries to achieve and sustain certification standards within the framework of comprehensive VPD/communicable disease surveillance. Strategies for endemic and high-risk countries are noted above (see **Goal One: Eradication**) and specifically outlined in the GPSAP. Other countries should implement a mix of strategies compatible with meeting certification standards and national/regional priorities. The integrated capacities required to sustain poliovirus surveillance will be reflected in the new wide-ranging *Global Strategy on Comprehensive VPD Surveillance*, which WHO is currently drafting, and all regional comprehensive surveillance plans;¹⁹ and

¹⁷ Global Polio Eradication Initiative. *Global Polio Surveillance Action Plan, 2018–2020*. Geneva: WHO; February 2019 (<http://polioeradication.org/wp-content/uploads/2016/07/GPEI-global-polio-surveillance-action-plan-2018-2020.pdf>).

¹⁸ Global Polio Eradication Initiative. *Polio Post-Certification Strategy*. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-post-certification-strategy-20180424-2.pdf>).

¹⁹ Conceptual Framework for vaccine-preventable diseases surveillance in Africa 2019–2030. Presentation at the Regional Immunization Technical Advisory Group; 17 January 2019.

- expanding the current ES network and developing a global strategy that includes the integration of surveillance with other epidemic-prone pathogens or VPDs through the full implementation of strategies outlined in the GPSAP and building upon the current *Polio Environmental Surveillance Expansion Plan*.²⁰ Although ES is already used in some countries to detect enteroviruses, technical innovations hold the promise to extend detection to other diarrhoeal diseases (such as typhoid) and allow integration with broader communicable disease control efforts and public health initiatives (such as cholera control, antimicrobial resistance gene surveillance, WASH initiatives and others);
- developing surveillance among PID patients to detect and treat poliovirus excretors, with new guidelines that will include specific strategies for countries assessed as being at high risk of iVDPVs;²¹
- maintaining core capacity to rapidly and reliably detect poliovirus through the GPLN at the global, regional and national levels. As detailed in a new action plan,²² the GPLN structure and capacity will adapt to meet the endgame needs for rapid detection and sequencing of polioviruses in stool and environmental samples under increasing containment requirements. To sustain local detection capacity, national poliovirus laboratories will be integrated with other viral or infectious diseases platforms wherever feasible; however, separate polio-specific capacity for quality control and reference testing will need to be maintained at the global and regional levels; and
- increasing the efficiency of the global polio information system (POLIS) and ensuring alignment with comprehensive global reporting and monitoring networks for VPD and epidemic-prone diseases. The current case-based AFP surveillance information management system will be upgraded to facilitate use by other VPD and epidemic-prone diseases. POLIS will systematically evolve to openly communicate and share data with the new WHO immunization information system (WIISE) that is being developed to provide a comprehensive global immunization programme and surveillance data management system.

3. PREPARE FOR AND RESPOND TO FUTURE OUTBREAKS AND EMERGENCIES

The factors that put a community at risk for polio – insecurity, inaccessibility, poverty and weak systems – also put it at risk for other outbreaks and emergencies. From plague outbreaks in Madagascar to cholera prevention and control in Somalia and South Sudan, the GPEI and other emergency teams often work closely together on the ground. Stronger, systematic collaboration across the GPEI and emergency programmes is a critical step to protecting populations. In addition to ensuring a rapid response to any polio event, the GPEI can leverage its knowledge, staff and mechanisms to respond to public health emergencies and infectious disease outbreaks. At the same time, the GPEI can benefit from the systems, expertise and operational capacities of emergency and humanitarian partners. Ensuring a rapid and effective response to outbreaks and emergencies helps the Eradication goal, as protracted outbreaks and emergencies negatively affect the priority and resources available for polio eradication, especially at the national and subnational levels.

Challenge and solutions

CHALLENGE:

Tackling the lack of systematic collaboration between polio and emergency programmes

The lack of systematic coordination between polio eradication and emergency programmes means that potential synergies are often not identified, cost-efficiencies may not be realized and the full health and humanitarian needs of populations cannot be met.

Solutions

Strengthen and formalize coordination between the GPEI and emergency programmes to ensure greater predictability in delivery and to address a broader range of risks by:

- systematically evaluating populations with polio outbreaks for other gaps in the provision of basic needs and sharing information for action with humanitarian and emergency partners;
- aligning polio outbreak response processes and deployments with the standard set of emergency response protocols and mechanisms, including the current practice of activating the emergency grading system (Level I-III emergency). Such alignment will help ensure the polio programme is working on an emergency footing and will allow for internal emergency procedures to be activated within WHO and UNICEF (for example, for recruitments, financing flows and travel), thereby enabling the GPEI to respond more rapidly and efficiently to outbreaks;
- systematically exploring where GPEI response efforts can benefit from the emergency programme platforms and mechanisms. These can include using the UN security environment and aviation programmes and benefiting from health cluster coordination where they are operational. While not all polio eradication and emergency/

²⁰ Global Polio Eradication Initiative. Polio environmental surveillance expansion plan: Global expansion plan under the Endgame Strategy 2013–2018. Geneva: WHO; 2015 (http://polioeradication.org/wp-content/uploads/2016/07/9_6_13IMB.pdf).

²¹ Global Polio Eradication Initiative. Guidelines for Implementing Poliovirus Surveillance among Patients with Primary Immunodeficiency Disorders (in preparation).

²² Global Polio Eradication Initiative. Global Polio Laboratory Network. GPLN Action Plan 2019–2023 (in preparation).

POLIO TRANSITION

As the GPEI advances towards eradication, the eventual closure of the initiative must be carefully planned so core functions and capacities can be sustained after certification. Polio transition is the process of transferring the necessary functions and funding from the GPEI to maintain a polio-free world and, where feasible and appropriate, to help achieve other health priorities.

The *Strategic Action Plan on Polio Transition*, presented to the World Health Assembly in 2018, sets the global framework for managing the transition and identifying the capacities and assets that are required, especially at the country level, to sustain a polio-free world after eradication, as well as to maintain and accelerate progress in other health programmatic areas.* With a 2020–2023 budget of US\$ 667 million, the action plan has three objectives:

1. Sustaining a polio-free world after poliovirus eradication;
2. Strengthening immunization systems, including surveillance for vaccine-preventable diseases, in order to achieve the goals of WHO's Global Vaccine Action Plan;
3. Strengthening emergency preparedness, detection and response capacity in countries to fully implement the International Health Regulations (2005).

Starting in 2016, the GPEI has provided tools, guidance, technical assistance and advocacy support to 16 countries that represent the largest GPEI footprint to help these countries develop national plans to gradually mainstream GPEI assets, capacities and infrastructure into their national health system. The majority of these transition plans have been approved by national authorities and are in the execution phase.

Implementation will be a complex process, requiring tailored support based on country priorities, needs and capacities, as well as continuous dialogue with country governments. The oversight of this process lies with the two implementing agencies, WHO and UNICEF, which are best placed to provide support through their country and regional offices. In tandem, all five GPEI partner agencies are developing agency-specific transition plans to ensure the smooth transfer of functions before the closure of the GPEI.

The GPEI will continue to actively engage in polio transition planning by:

- helping to ensure that the core capacities necessary to reach and sustain eradication are maintained or strengthened during transition, especially surveillance;
- advocating for the mainstreaming of polio functions within the appropriate sectors of the national health system;
- coordinating with WHO to align the GPEI and WHO's Thirteenth General Programme of Work (GPW13) budget and to shift costs for functions that should continue after certification onto WHO's base budget;
- engaging in the stakeholder consultation process, launched under the WHO's leadership in November 2018, to reach agreement on the future governance, financing and oversight of the implementation of the *Post-Certification Strategy*; and
- continuing to collect and disseminate the history and lessons learned from polio eradication until the closure of the GPEI. Transitioning countries can use GPEI funding to re-orient their polio-supported activities in accordance with their transition plans, provided that polio-essential functions necessary for certification are not weakened.

In addition, the implementation of many new strategies outlined under the Integration goal in the *Polio Endgame Strategy 2019–2023* will contribute to a successful transition.

* Strategic Action Plan on Polio Transition. Geneva: WHO; 2018 (<https://www.who.int/polio-transition/strategic-action-plan-on-polio-transition-may-2018.pdf>).

humanitarian response activities lend themselves to being delivered together, more regular collaboration will help identify where joint planning and implementation are beneficial and where joint work will help to build upon each programme's strengths;

- supporting non-polio outbreak and emergency activities and taking part in RRTs, where possible and appropriate. GPEI staff are often on the ground when outbreaks and emergencies strike and they have critical local knowledge and information that can make a significant contribution to non-polio outbreaks and emergencies. Formalizing the systematic collaboration between polio eradication and emergency programmes is an important step;

- transferring the responsibility to assess risks, develop risk mitigation plans and respond to polio outbreaks from WHO and UNICEF to the respective emergency programmes, in alignment with the PCS. To start this process, the GPEI and WHO's Health Emergency Programme (WHE), the global lead for the health emergency incident management system, will develop a memorandum of understanding to ensure collaboration in responding to emergencies and outbreaks;
- implementing the US Centers for Disease Control and Prevention (CDC) Global Immunization Division ongoing collaboration with the CDC's global emergency and response system to respond to international requests for technical assistance and outbreak response for polio, measles and other epidemic-prone VPDs through the Global Rapid Response Team; and
- ensuring that stronger collaboration at both WHO and UNICEF with humanitarian and emergency programmes, including joint risk assessments, the development of mitigation and preparedness plans, and communication for development and immunization, become standard practice to mitigate risks at the global, regional and country levels, especially in the post-certification period.



To make progress towards the ultimate goal of certifying the global eradication of all polioviruses, the GPEI will ensure that quality standards are in place to meet all criteria for certification – including containment, which becomes increasingly critical. Indeed, even as polio eradication programmes are ramping down, polio containment programmes are ramping up into the foreseeable future.

Goal Three: Certification and containment

OBJECTIVES

This goal focuses on near- and long-term activities critical to sustaining a polio-free world. Preparatory work is needed now, in advance of the global certification of WPV. The two objectives are:

1. to certify the eradication of WPV; and
2. to contain all polioviruses.

1. CERTIFY THE ERADICATION OF WILD POLIOVIRUS

To make progress towards the ultimate goal of certifying the global eradication of all polioviruses, the GPEI will ensure that quality standards are in place to meet all criteria for certification (e.g. for surveillance and containment). The GPEI will also support the remaining regional certification efforts as the initiative plans for the sequential certification of global WPV eradication.

Challenges and solutions

The Global Commission for the Certification of the Eradication of Poliomyelitis (GCC) declared the global eradication of WPV2 in 2015. In October 2018 and in review of the epidemiology of the remaining WPV types, the GCC recommended that global certification adopt a sequential approach.²³ Given that the last case of WPV3 was reported in 2012, the GCC will next consider when it can certify eradication of this virus. Subsequently, the GCC will consider WPV1 certification three years after the last reported isolate. The verification of the absence of each type of cVDPV will only be possible after the total withdrawal of type-specific OPV at an interval to be determined by modelling and surveillance data.

The GPEI will review the programmatic implications of sequential certification and seek further recommendations from the Strategic Advisory Group of Experts (SAGE) on Immunization and its Polio Working Group on any required actions.

Four of the six WHO regions have already been declared free from all WPV transmission. The African Region has not reported WPV since September 2016, and the African Regional Certification Commission (RCC) has outlined priority interventions and actions for ensuring certification in a timely manner.²⁴ The other remaining non-certified region, the Eastern Mediterranean Region, has ongoing WPV1 transmission in 2019.

CHALLENGE 1:

Attaining sufficiently sensitive surveillance, particularly in inaccessible areas, to have confidence that global WPV transmission has been interrupted

As of February 2019, the GPEI had identified 28 countries (mostly in the non-certified WHO regions of Africa and the Eastern Mediterranean) that pose a threat to global certification due to persistent gaps in surveillance or chronic vulnerability to poliovirus transmission.²⁵ Often the primary challenges to sustaining adequate surveillance standards arise from countries with ongoing insecurity, weak infrastructure, limited technical capacity or inaccessible pockets of vulnerable populations.

Solutions

Increase poliovirus surveillance sensitivity in areas at high risk of poliovirus emergence by:

- prioritizing GPEI technical support for surveillance over the next two years to the endemic and outbreak countries, as well as other high-risk countries in Africa and the Eastern Mediterranean regions;²⁵ and
- providing the GCC with regular, in-depth analyses of WPV1 epidemiology and surveillance in endemic countries, as well as additional data on the quality of surveillance in key non-endemic, conflict-affected and inaccessible areas. RCCs in certified regions will continue to monitor polio surveillance quality in their respective areas and interact with countries as necessary.

CHALLENGE 2:

Fully achieving goals outlined in the Global Action Plan for Containment (GAPIII)

The synchronization of global certification of WPV2 and the implementation of the Global Action Plan to minimize post-eradication poliovirus facility-associated risks (GAPIII) has proven problematic.²⁶ Globally, the establishment

²³ Global Commission for the Certification of the Eradication of Poliomyelitis. Report from the Eighteenth Meeting. Amman; 29–31 October 2018 (<http://polioeradication.org/wp-content/uploads/2016/07/GCC-report-29-31-Oct-20181031.pdf>).

²⁴ Framework for certification of polio eradication in the African Region. Regional Committee for Africa. Dakar: WHO; August 2018 (<http://www.who.int/iris/handle/10665/275135>).

²⁵ Global Polio Eradication Initiative. Global Polio Surveillance Action Plan, 2018–2020. Geneva: WHO; February 2019 (<http://polioeradication.org/wp-content/uploads/2016/07/GPEI-global-polio-surveillance-action-plan-2018-2020.pdf>). The plan will be updated continually to reflect the GPEI's support for achieving certification-standard surveillance in all countries.

²⁶ GAPIII: WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use, Third edition. Geneva: WHO; 2015 (http://polioeradication.org/wp-content/uploads/2016/12/GAPIII_2014.pdf).

of national and international oversight bodies, certification of poliovirus-essential facilities (PEFs) and completion of national surveys for poliovirus infectious and potentially infectious materials have required more time than anticipated. As such, the certification and containment timelines are moving forward independently until the time final eradication is declared, when all WPV is expected to come under containment in PEFs.

Solution

Reduce the global number of facilities handling and storing polioviruses to those actually essential for maintaining eradication, and implement and monitor appropriate safeguards for the long-term containment of polioviruses (see the **Contain all polioviruses** section).

CHALLENGE 3:

Addressing communication challenges

With the sequential certification of WPVs and staggered verification of the absence of cVDPVs, concurrent detection of WPVs and cVDPVs, albeit of different types, could be possible. This situation will present a communication challenge for both upcoming regional and global certification. Since paralysis from WPV or VDPV is indistinguishable, explaining ongoing cVDPV cases in spite of declaring the eradication of WPV will be difficult. Even explaining the origins of VDPVs and the necessity to further respond with additional polio vaccines can complicate messaging around eradication strategies and long-term certification issues.

Solution

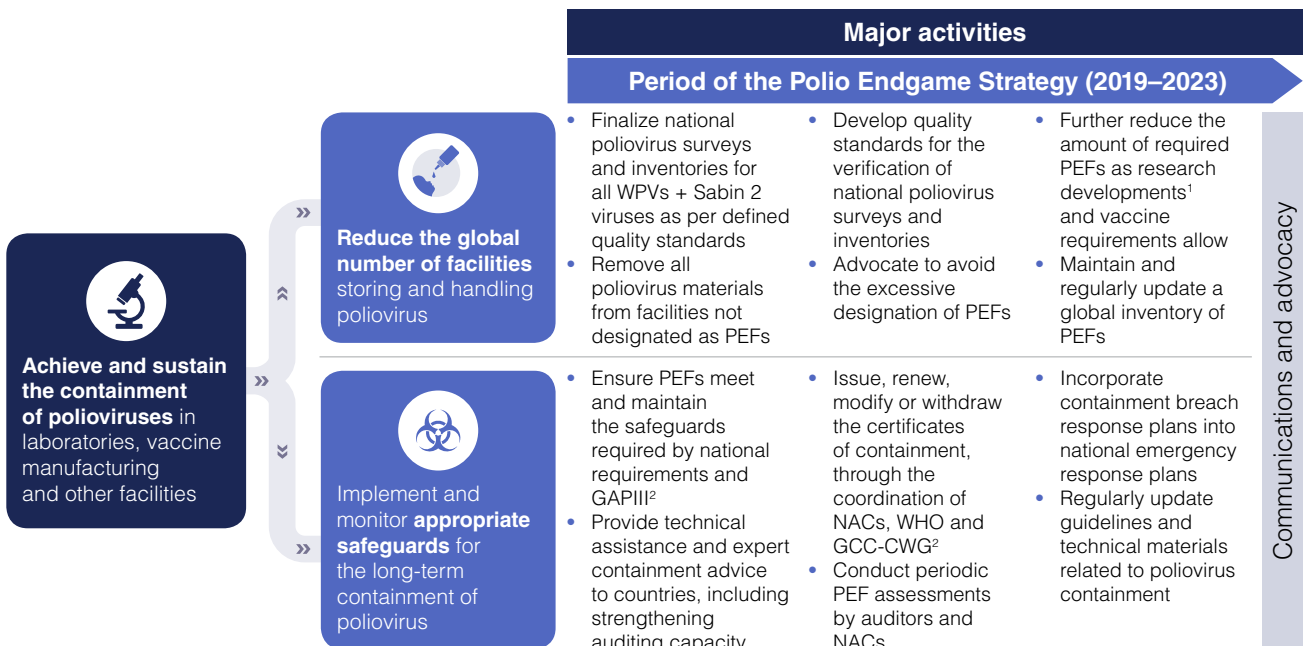
Directly tackle the communication issues surrounding global certification by:

- effectively coordinating and aligning clear, cogent messages that define the scope and programme implications of certification through a “VDPV communications plan”, developed in close collaboration with regions and countries.

2. CONTAIN ALL POLIOVIRUSES

As the world nears the global interruption of WPV transmission and bOPV cessation, achieving the containment of all polioviruses and monitoring laboratory, manufacturing facility and biomedical facility compliance with containment requirements will be increasingly critical. Indeed, even as polio eradication programmes are ramping down, polio containment programmes are ramping up into the foreseeable future. The importance of containment for certification is reflected in past GPEI strategies. In the PEESP, containment was part of

Figure 6. Containment overview



WPV: Wild poliovirus; GCC-CWG: Containment Working Group of the Global Commission for the Certification of the Eradication of Poliomyelitis; NAC: National authority for containment; PEF: Poliovirus-essential facility.

¹ Possible developments include the replacement of virus cultures with other assays for the diagnosis of poliovirus infection or the production of vaccines using genetically modified poliovirus strains or virus-like particles.

² The GCC-CWG will continue to implement the Containment Certification Scheme (CCS) until global WPV certification, at which time this oversight will be taken on by the appropriate body.

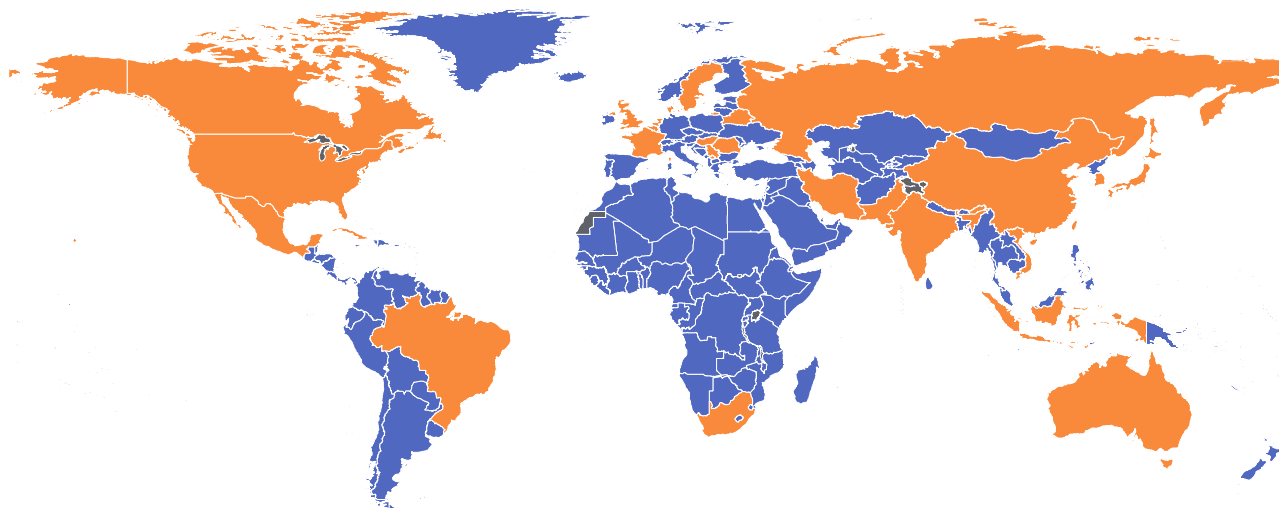
Source: WHO.

Objective 3. In the PCS, it is the first goal for sustaining a polio-free world. Containment is also integral in the latest draft of the Technical Report Series 926, which outlines requirements for polio vaccine manufacturers.²⁷

Laboratories and manufacturing facilities currently handle polioviruses for vaccine production, quality control, diagnostics and research. To mitigate the risk of releasing poliovirus from a facility into a population, which could lead to the re-establishment of poliovirus transmission in polio-free regions and countries, GAPIII outlined strategies and mechanisms to achieve effective poliovirus containment, which was endorsed by the World Health Assembly in May 2015.²⁸

Global actions to contain all WPVs prior to the declaration of global eradication fall under two major activities: (1) reducing the global number of facilities storing and handling poliovirus; and (2) implementing and monitoring appropriate safeguards for the long-term containment of poliovirus (see **Figure 6**).

Figure 7. Countries retaining poliovirus type 2 materials



■ No WPV2/VDPV2 Retained (n=179)
 ■ Countries with plans to designate poliovirus-essential facilities for containment of PV2 materials (n=26)

Source: Data reported by WHO regional offices as of 22 January 2019 (subject to change).

Challenges and solutions

CHALLENGE 1:

Tackling the lack of prioritization of poliovirus containment

The GCC's October 2018 recommendation to pursue WPV3 type-specific eradication highlights the need to expedite containment activities for poliovirus type 3 (PV3) materials to ensure full containment early in the time period of the new strategic phase. Nevertheless, the political and technical hurdles that countries face may extend the timeline into 2020. In addition, the number of proposed poliovirus type 2 (PV2) PEFs is much larger than anticipated – and the number of PEFs will likely only increase upon eradication of types 1 and 3, thereby compounding the work required by national authorities for containment (NACs).

Solutions

Continue advocacy among GPEI partners and governing bodies, global and regional committees, as well as the World Health Assembly and other convenings to increase awareness of the scope and magnitude of work involved in poliovirus containment. At the Seventy-first World Health Assembly, Member States adopted a resolution that underscores the need to urgently accelerate progress towards poliovirus containment globally.²⁹

- WHO headquarters and regional offices are working with countries on strategies for creating functional equivalents of NACs, as political and financial hurdles are being addressed.
- GPEI partners will continue to engage in global advocacy, communication efforts and country-specific visits to raise awareness of the risks and costs associated with hosting a PEF.
- The GPEI will continue to pursue technological innovations that will reduce or eliminate the need to retain wild or vaccine poliovirus strains for use in vaccine manufacturing, research or diagnostics.

²⁷ Global Polio Eradication Initiative. Polio Eradication & Endgame Strategic Plan 2013–2018. Geneva: WHO; 2013 (http://polioeradication.org/wp-content/uploads/2016/07/PEESP_EN_A4.pdf), and Global Polio Eradication Initiative. Polio Post-Certification Strategy. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-post-certification-strategy-20180424-2.pdf>), as well as Guidelines for the safe production and quality control of poliomyelitis vaccine. Technical Report Series, No 926. Geneva: WHO; 2018 (https://www.who.int/biologicals/expert_committee/POST_ECBS_2018_Polio_Web_9_Nov_2018.pdf).

²⁸ GAPIII: WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use, Third edition. Geneva: WHO; 2015 (http://polioeradication.org/wp-content/uploads/2016/12/GAPIII_2014.pdf).

²⁹ World Health Organization, Seventy-first World Health Assembly. Resolution WHA71.16. Poliomyelitis – containment of polioviruses. Geneva: WHO; May 2018 (http://apps.who.int/ebwha/pdf_files/WHA71/A71_R16-en.pdf).

CHALLENGE 2:

Consistently verifying and validating national containment surveys

Many countries have delayed implementing type 2 surveys for potentially infectious materials in order to include WPV1 and WPV3 materials, which may delay the completion of surveys beyond April 2019. The national surveys and inventories conducted to date have been heterogeneous in quality across countries and regions. To ensure the containment of PV2 materials during and after cVDPV2 outbreak responses, mOPV2 vials and other type 2 infectious and potentially infectious materials must be tracked. Additionally, updated PV2 facility surveys and national inventories will be required along with attestations of destruction of all PV2 materials, including unused mOPV2 vials.

Solution

Work with regions and countries to expedite national containment surveys and inventories. The recent GCC recommendation to pursue type-specific eradication of WPV3 underscores the importance of including WPV3 in these activities and offsets potential timeline extensions.

- WHO is developing standardized templates, minimum reporting requirements and assessment metrics for use by countries and oversight bodies. GPEI partners will coordinate with countries to keep inventories up to date and ensure the timely and complete destruction of relevant materials.

CHALLENGE 3:

Identifying how the sequential certification of poliovirus will impact containment timelines

The GPEI is currently outlining the implications of WPV3 certification in terms of the acceleration of type 3 containment (PV3 inventories/destruction, PV3-retaining PEF certification) and the associated implications on vaccine production. Potential type-specific certification of WPV3 eradication will require countries and facilities to accelerate timelines for type 3 containment.



WHO / Darcy Levison

Solution

Coordinate with countries to keep inventories up to date and ensure the timely and complete destruction of relevant materials. GPEI partners are coordinating with the GCC to identify what effect the certification of WPV3 eradication will have on the global polio containment programme.

CHALLENGE 4:

Establishing management and global standards to support long-term certification

Although the management of poliovirus containment will be required long term in the post-certification era, many areas of work have yet to be established to promote compliance with containment standards and to support monitoring and oversight. Regulatory bodies have not yet defined the use of poliovirus after certification, which will meet with challenges as poliovirus is required by multiple international manufacturing standards for the quality control of some medical and sanitation products. Additionally, there is a global shortage of trained and qualified GAPIII auditors to provide oversight and fulfil containment certification processes.

Solutions

Support long-term certification by:

- developing a strategy to communicate the urgent need to amend requirements to industry and regulatory bodies;
- collaborating with partners on national biosecurity regulations;
- building national capacity through the recent launch of an international programme and continue to explore possibilities of sharing auditors among countries; and
- continuing to implement the strategies addressed in the PCS for long-term containment issues and mechanisms.



The GPEI is committed to advancing gender equality and fostering a safe, inclusive and respectful work environment. This impact is especially relevant as the 16 countries that represent the largest footprint for GPEI support are countries with the widest gaps in gender equality.

In Pakistan, locally-recruited and community-based female health workers are central to progress against polio in the country's complex environment and play increasingly important roles in their communities.

ENABLING AREAS

GENDER EQUALITY AND EQUITY

As eradication nears, the GPEI has been transforming its strategies through an increased focus on gender as a determinant of health-seeking behaviours and a critical variable in vaccination outcomes.³⁰ In applying a gender lens, the GPEI has stepped up the collection and analysis of sex-disaggregated data and the use of gender analysis to guide programming, create opportunities for women's leadership, and affirm that all women, men and people of non-binary gender identities have a right to equal, meaningful participation in polio eradication.³¹

Gender-responsive strategies for reaching populations

The GPEI has developed a strategy to guide its work on effective gender mainstreaming across the programme. The *Technical Brief: Gender* delineates how gender norms, roles, relations and inequality can construct barriers to communication, immunization and surveillance.³² To overcome such barriers, gender-responsive strategies have been effective at addressing refusals, establishing trust and reaching every last child, particularly in endemic countries.

Female frontline workers and social mobilizers play a role in relaying the importance of vaccines. Most are hired on a full-time basis to conduct activities at the local level: from registering, vaccinating and tracking all children aged under 5 years, to developing microplans and mobilizing their communities to reach campaign goals. In the endemic countries, women now represent 99% of all frontline workers in Nigeria, 68% in Pakistan and 34% in Afghanistan.

With community-based surveillance the programme engages volunteers to monitor and report suspected AFP cases in hard-to-reach areas or with special populations, some of whom prefer traditional healing practices over receiving care from health facilities. Country teams consult local leaders to identify individuals suited to cultural norms for age and gender to ensure volunteers will be less likely to encounter barriers to case investigation and sample collection.

The GPEI regularly collects, analyses and uses sex-disaggregated data to ensure that girls and boys are reached equally with vaccines and through AFP surveillance. The GPEI will continue to ensure that gender analysis informs all programmatic activities by allocating the financial and human resources needed for gender-responsive approaches to planning, implementation, monitoring and evaluation.

Increasing women's equal and meaningful participation

Through increasing women's participation, the GPEI has not only increased the effectiveness of health service delivery, it has also contributed to increasing the number of women in the public health workforce, empowering them with a range of transferable skills. The GPEI is committed to advancing gender equality and fostering a safe, inclusive and respectful work environment. This impact is especially relevant, as the 16 countries that represent the largest footprint for GPEI support are countries with the widest gaps in gender equality. The programme also enforces a strict zero tolerance policy to all forms of sexual harassment and exploitation, misconduct and abuse.³³

To build upon the achievements of the programme, the GPEI will increase its emphasis on women's meaningful and equal participation at all levels, including in the composition of governance, oversight and advisory bodies, and in country office teams. The GPEI will collaborate with broader health and immunization communities to share lessons learned and ensure that special attention is paid to ensuring women's equal participation, especially in leadership and decision-making positions – and it will reinforce these collaborations as the programme transitions. The GPEI is committed to reaching gender parity (50%-50%) in all governance, technical advisory and oversight bodies by 2020.

GOVERNANCE AND MANAGEMENT

GPEI governance and management structures have been one of the key factors in the success of programme efforts to eradicate polio. Clear, proven programmatic and technical strategies are important, but how the GPEI implements them is equally important. Periodically, changes to partnership structures are required to:

- address epidemiological risks;
- equip the partnership to respond effectively and efficiently; and
- help the front line avoid burnout by ensuring skills and capacities are transferred quickly.

³⁰ Gender refers to the socially constructed characteristics of women and men – such as norms, roles and the relationships of and between groups of women and men. It varies from society to society and can be changed. For a detailed definition of gender, see WHO, Gender, equity and human rights (<https://www.who.int/gender-equity-rights/understanding/gender-definition/en/>).

³¹ Global Polio Eradication Initiative. FAQs: Gender & Polio Eradication. Geneva: WHO; 2018 (http://polioeradication.org/wp-content/uploads/2018/07/polio-vaccination-gender-FAQ-Frequently-Asked-Questions-GPEI_Gender-and-Polio_20180710.pdf).

³² Global Polio Eradication Initiative. Technical brief: gender. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/03/GPEI-Gender-Technical-Brief-2018-ver-3.0.pdf>).

³³ Global Polio Eradication Initiative. Polio Oversight Board Secretariat. Statement on sexual misconduct. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-oversight-board-statement-on-sexual-misconduct-20180426.pdf>).

The current GPEI management structure came from a 2014 comprehensive review that followed the PEESP to provide recommendations for implementation (see **Annex E**). It was also precipitated by an increase in WPV cases across eight countries in 2013. Several key findings from the review, which were approved by the POB in December 2014, helped the programme focus its efforts.³⁴

The partnership needs to operate swiftly and nimbly to interrupt WPV transmission within the two remaining countries. The best way to do this is to ensure the programme has strong structures at the regional and country levels for Afghanistan and Pakistan by:

- pushing down the delegation of authority from the global to the regional/country level to respond quickly to changes at the district, subnational and national levels;
- providing the funding and staff capacity needed at the country level to streamline implementation in priority geographies (the northern and southern corridors and Karachi); and
- bringing partnership coordination and technical expertise to the frontline to reach remaining missed children in common reservoir areas and populations.

The Afghanistan–Pakistan partnership hub being established will work in close collaboration with the national and state-level EOCs to support the two country teams with strategic planning and implementation of the National Emergency Action Plans (NEAPs). The primary areas of support will be: (1) campaign and surveillance quality; (2) management strengthening; (3) data analytics; (4) communications and advocacy; (5) resource mobilization; (6) grant management; and (7) enhanced coordination on cross-border initiatives. Hub staff will include representatives from the four implementing partners.

The 2018 Independent Monitoring Board (IMB) report cites fatigue and the lack of incentives for WHO and UNICEF country-level staff in Afghanistan and Pakistan as factors that fundamentally detract from the strong engagement needed in each country.³⁵ Both agencies are reviewing staff rotation practices, length of assignments and incentive packages, so staff stay fresh, engaged and motivated to reach the finishing line.

A review of GPEI management groups and task teams is also under way, in consideration of new areas for the partnership proposed by this 2019–2023 strategy. The Strategy Committee is developing a mechanism to ensure that new strategies outlined in the three goals receive accountability frameworks, milestones and communication plans. It will also be vital to update current joint accountability frameworks with partners such as Gavi, the Vaccine Alliance, immunization groups and emergencies groups, so they can incorporate new areas of collaboration.

The partnership will continue to assess and make adjustments, as needed, to ensure the GPEI and its monitoring and advisory groups remain fit for purpose.

RESEARCH

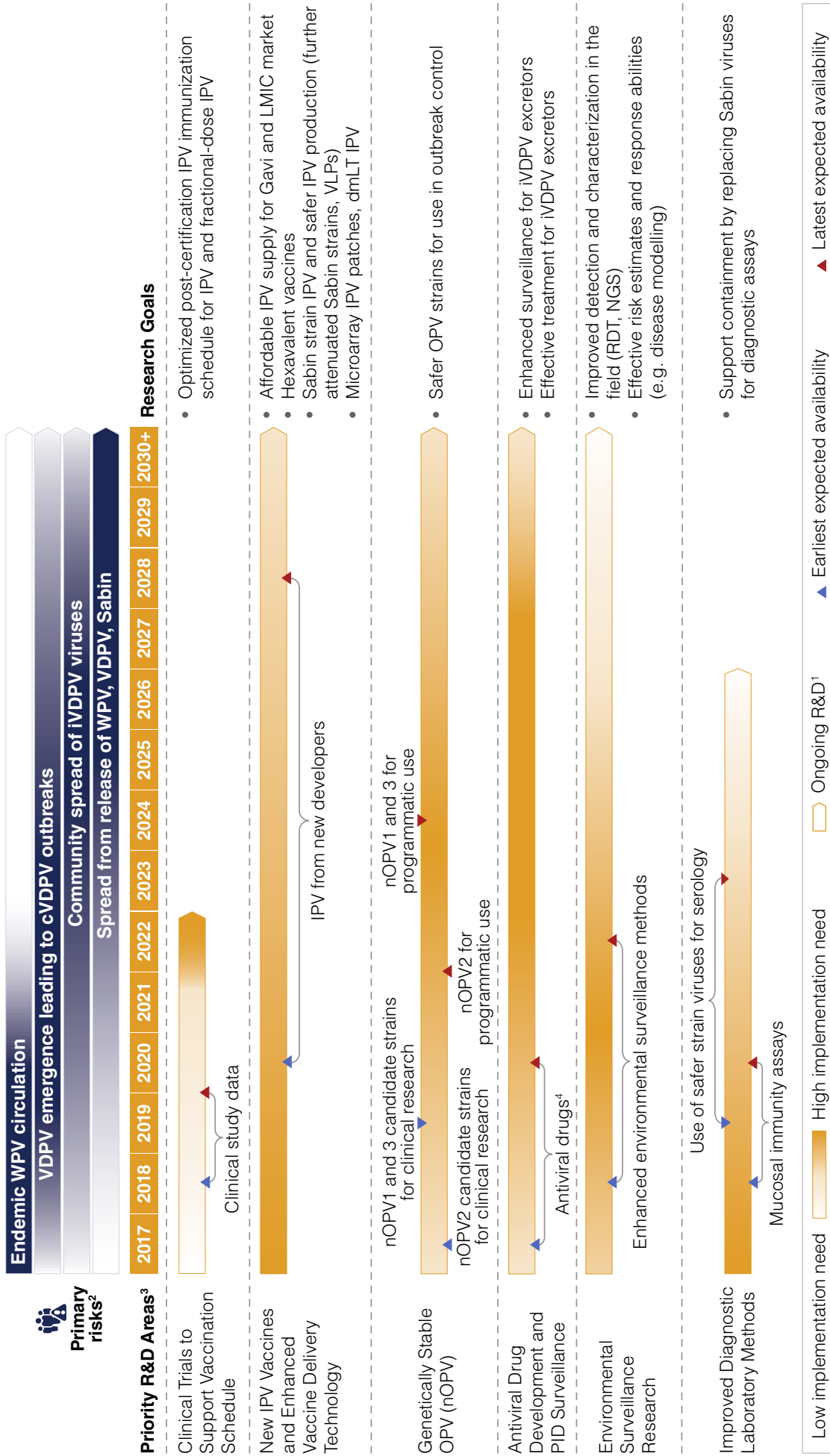
The polio research agenda includes projects that will address near-term needs as well as those that may take years to complete. The development of genetically stable new OPVs has progressed into Phase 2, and testing of two novel antiviral drugs continues in human volunteers and in iVDPV-infected infants and children. Continued progress in these critically important initiatives will be necessary to reduce the risk of VDPV emergence both before and after certification. Other broad areas of investigation include the development of new IPVs to reduce costs, improve coverage and reduce risks from the use of live polioviruses in vaccine manufacturing; serological surveillance to assess population immunity; infectious disease modelling to estimate post-cessation risks and support environmental surveillance; the development of new laboratory assays to enhance virus detection, comply with containment requirements and measure mucosal immunity; new IPV delivery technologies; and clinical research on new vaccines and vaccine schedules to inform public health policy (see **Figure 8**).

While research facilities will need to come into compliance with containment requirements, the benefits of research to containment include the potential for the development and deployment of alternative poliovirus strains that are safe to use in the community and can be produced outside of containment. The primary goal of containment is the reduction in the number of facilities storing or handling poliovirus, and advances in research can help the GPEI reach this goal, which in turn helps keep the world polio-free.

³⁴ Global Polio Eradication Initiative. Meeting of the Polio Oversight Board. Meeting Minutes; 12 December 2014 (http://polioeradication.org/wp-content/uploads/2016/07/POB_Minutes_Mtg20141212.pdf).

³⁵ Global Polio Eradication Initiative. Independent Monitoring Board. How to cut a long story short: Sixteenth report; October 2018 (<http://polioeradication.org/wp-content/uploads/2018/11/20181105-16th-IMB-Report-FINAL.pdf>).

Figure 8. Research agenda overview



WPV: Wild poliovirus; VDPV: Vaccine-derived poliovirus; cVDPV: Circulating vaccine-derived poliovirus; iVDPV: Immunodeficiency-associated vaccine-derived poliovirus; IPV: Inactivated polio vaccine; OPV: Oral polio vaccine; nOPV: Novel oral polio vaccine; LMIC: Low- and middle-income countries; VLP: Virus-like particles; dmLT: Double mutant heat-labile toxin; PID: Primary immunodeficiency disorder; RDT: Rapid diagnostic test; NGS: Next generation sequencing.
¹ R&D to introduce new products may not always be complete before implementation need begins. ² The timeline of risks assumes the current certification timeline; research will continue regardless of certification timeline changes. ³ Specific research projects that are listed are examples, not an exhaustive list. ⁴ Earliest availability by way of emergency use authorization.
 Source: WHO.

FINANCIAL RESOURCES

What funding is needed to achieve and sustain eradication

In September 2018, the Polio Oversight Board (POB) approved a multiyear budget that defines the resource requirements of the GPEI from 2019 to 2023. The five-year duration of the budget (and this strategy) is based on the estimate that the interruption of transmission will occur in 2020, though every effort will be made to stop transmission before then.

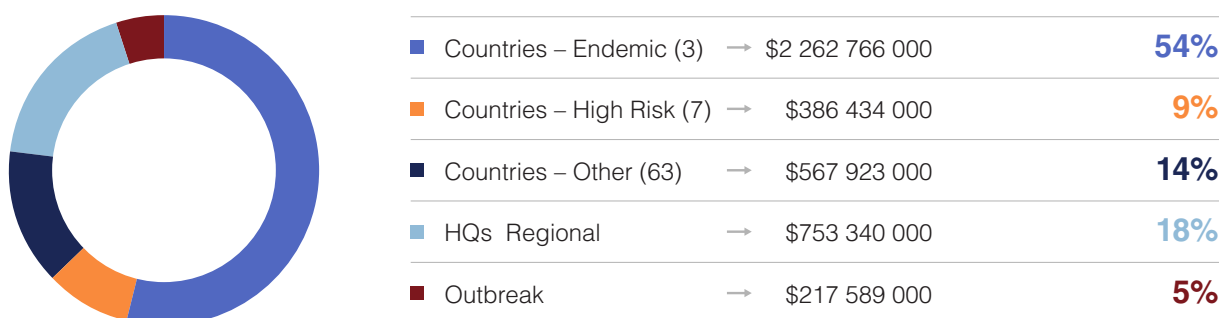
The five-year GPEI budget is the strategy’s main, though not sole, cost component to achieve eradication (additional non-GPEI costs are discussed below). The budget strikes a balance between making investments to sustain and intensify key interventions, and making targeted reductions to contain costs. The total cost of the budget is US\$ 4.2 billion, including US\$ 3.27 billion in incremental costs (beyond what has already been secured for 2013–2019) that will need to be mobilized to fully finance the plan. Resource mobilization will be guided by an investment case for the GPEI that will be put in place in May 2019.

The 2019–2023 budget declines year-on-year from 4% to 9% – and a total of 25% over five years from US\$ 942 million in 2019 to US\$ 704 million in 2023 (see **Figure 10**). The reductions begin in 2020 in polio-free and lower-risk countries, where country transition plans build towards taking greater responsibility for sustaining core functions as GPEI support declines. In some countries, national contributions are expected to fully compensate for the withdrawal of GPEI funding; other countries with limited resources and capacities may need plans that attract non-GPEI sources of support.

The GPEI will continue to encourage and enable complementary programmes, partners and Member States to adapt the polio programme’s considerable assets and know-how for other health objectives as polio nears eradication.

How the GPEI budget is allocated

Figure 9. GPEI multiyear budget by location, 2019–2023



Source: WHO.

- The budgets for Afghanistan and Pakistan are maintained from 2019 and begin to decline only from 2022, after poliovirus transmission is interrupted.
- While the budget for Nigeria declines sooner because it is nearer to certification, the reductions are largely offset by non-GPEI sources and include in-country support for essential functions needed to keep the country polio-free and for transitional activities.
- The budget also contains a provision for responding to cVDPV outbreaks.
- Among activities, immunization campaigns absorb nearly one third of the budget and continue to be the largest single expense. The share of the budget for surveillance increases as the overall budget declines, which reflects the continuing need for surveillance even as the programme nears certification (see **Annex F**).

The budget could be modified if new or intensified interventions in this strategy – for example, expanding the age of the target population for immunization – require additional investments. While the value of new approaches are still being analysed, it is expected that any additional costs will be absorbed within the US\$ 4.2 billion GPEI budget envelope, and new costs will be incorporated into a recently adopted allocation prioritization matrix meant to ensure that the most impactful and cost-effective interventions are funded first.

What additional costs will be needed to achieve and sustain polio eradication

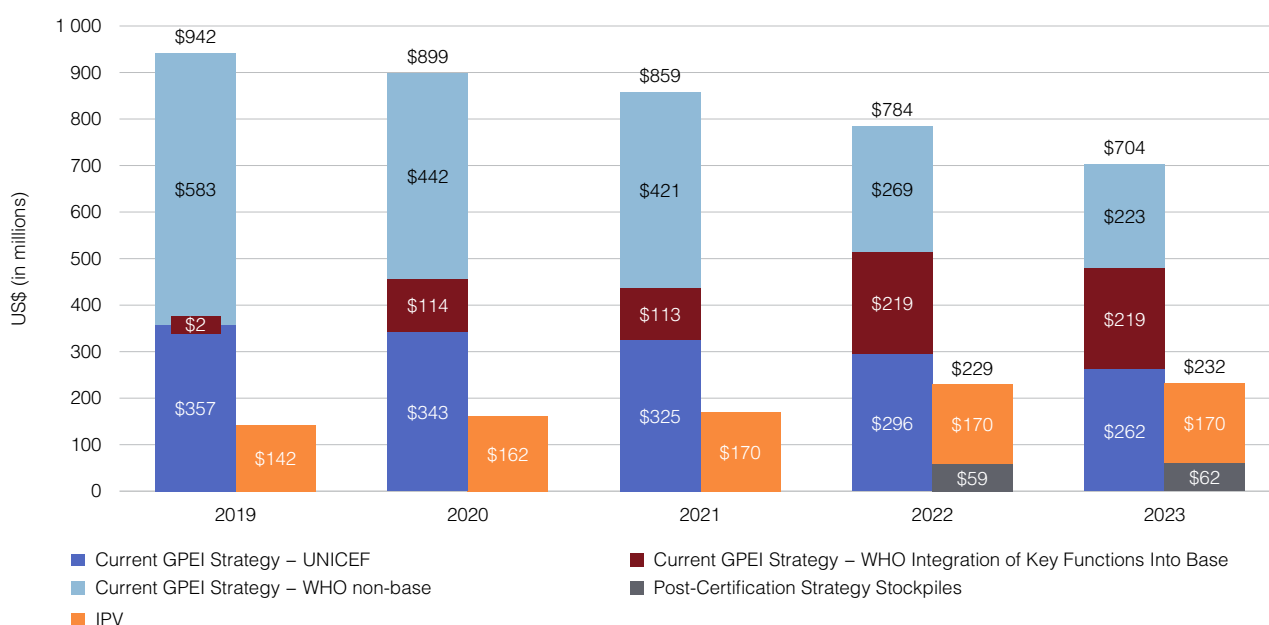
The GPEI budget will not be sufficient by itself to achieve and sustain eradication and implement this strategy. For example, between US\$ 100 million and US\$ 200 million per year will be needed from 2019 through 2025 for IPV in 70 Gavi-supported countries, a key ingredient to both achieve and sustain eradication. The GPEI and Gavi, the Vaccine Alliance have collaborated over the years in a wide variety of areas, including the introduction and roll-out of IPV in national immunization schedules, while managing global supply constraints. In 2018, at the request of the

POB, the Gavi Board exceptionally approved the use of core funding to support IPV through 2020. The Gavi Board also approved continued support for the 2021–2025 period, subject to the availability of funding (approximately US\$ 850 million) and country financing arrangements to be aligned with the final parameter setting for Gavi 5.0. The GPEI and Gavi have committed to work together to advocate to ensure future funding for IPV.

In addition, an estimated US\$ 121 million will be required for OPV stockpiles, to use in outbreak response in case any WPV is detected after certification. As these stock-outs will only be used after certification – and after the closure of the GPEI – they are outside of the current GPEI budget. However, as they are also essential for the sustainability of eradication, the GPEI has committed to advocating and raising resources for them as part of implementing the *Post-Certification Strategy* (PCS).³⁶

The projects outlined in the Integration section (see **Goal Two: Integration**), where the GPEI will collaborate with other health actors to deliver a combined package of services to reach and protect populations to achieve and then sustain eradication, are not separately costed in this strategy. Many of these initiatives are or will be financed outside of the GPEI budget through existing mechanisms, initiatives and collaborations (such as the UNICEF-led Integrated Services Delivery Initiative, the Bill & Melinda Gates Foundation’s immunization initiative, and Gavi health system strengthening/cash grants).

Figure 10. Overall cost to achieve eradication, 2019–2023



GPEI: Global Polio Eradication Initiative; IPV: Inactivated polio vaccine.
Source: WHO.

The GPEI budget of US\$ 4.2 billion comprises the costs for the two implementing partners, WHO and UNICEF. Additional, non-GPEI costs consist of IPV and the one-time cost of OPV stockpiles to be used post-certification. Together, the GPEI and non-GPEI components bring the total cost to achieve and sustain polio eradication from 2019 to 2023 to US\$ 5.1 billion (slightly less than US\$ 1 billion beyond the GPEI).

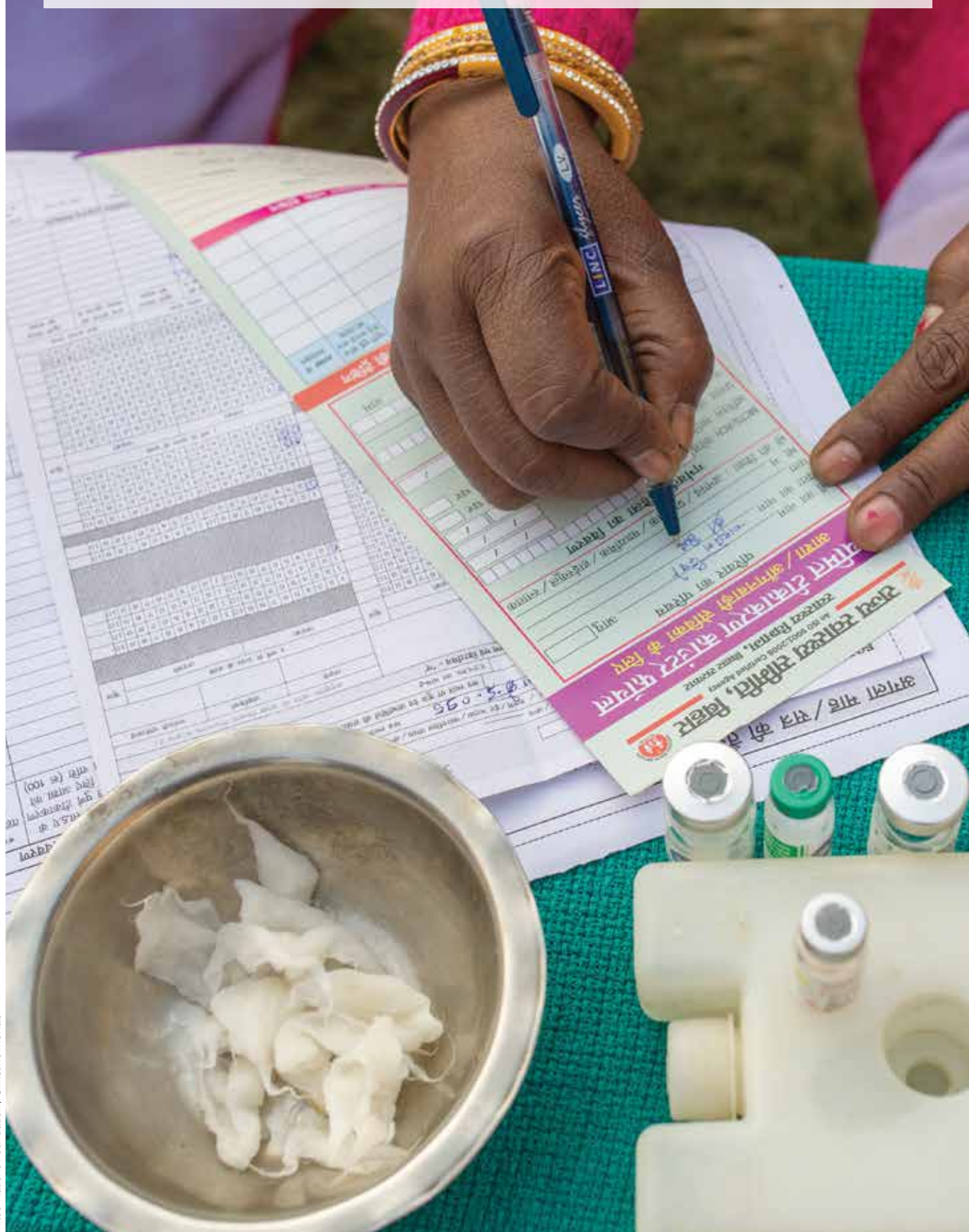
From 2020 onwards, polio-supported costs for essential public health functions will be shown in the WHO base budget (e.g. US\$ 114 million in 2020). This reflects WHO’s commitment to mainstream and sustain core capacities long term, such as sensitive and widespread surveillance and reference laboratories that will be needed to ensure the world remains polio-free post-certification. At the same time, keeping this segment within the GPEI budget is an indication of the GPEI’s commitment to fundraise for and preserve the foundational assets and activities the programme has put in place until eradication is achieved.

UNICEF has identified the polio assets and functions, such as communication and social mobilization as well as vaccine supply and management, that have yielded contributions and lessons learned in reaching and delivering services to some of the hardest-to-reach and marginalized children around the world. Given the well-recognized value of these assets, the potential to leverage them to strengthen immunization and increase coverage rates, and to avert the risk of losing them, UNICEF is working with governments to absorb these functions into national immunization and health plans and strategies. These are now gradually being incorporated, both technically and financially, into immunization, health, communication for development and other programmes. This transition will continue throughout the 2019–2023 period.

³⁶ Global Polio Eradication Initiative. Polio Post-Certification Strategy. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-post-certification-strategy-20180424-2.pdf>).

While the implementation of the Post-Certification Strategy will start after certification, preparations must start now for a smooth transition before the closure of the GPEI.

A health worker fills out an immunization card during a multi-antigen campaign in Tilkeshwar village in the remote Kosi River Basin area of Bihar State, India.



PREPARING FOR THE IMPLEMENTATION OF THE POST-CERTIFICATION STRATEGY

Key activities must take place in 2019–2023 to ensure the successful implementation of the *Post-Certification Strategy* (PCS), which will start once polio eradication is certified.³⁷ The PCS describes the technical functions and standards needed to maintain a polio-free world. WHO initiated the process to define these activities and their associated costs in November 2018.

While the implementation of the PCS will begin after certification, preparations must start now for a smooth transition before the closure of the GPEI. Many activities have been included in relevant sections of this 2019–2023 strategy; for example, stronger collaboration with the immunization community and emergency programmes to prevent and respond to outbreaks are addressed in the Integration goal.

Several critical areas of work must start in the 2019–2023 period. Some of these include:

MINIMIZING POST-CERTIFICATION RISKS

Containing poliovirus

Implementing and monitoring long-term poliovirus containment in facilities with appropriate safeguards will be key to maintaining a polio-free world. Bridging activities are needed now for containment to be in full force in the PCS.

Facilities retaining poliovirus materials and designated as PEFs will need to meet and maintain the safeguards required by GAPIII and allow periodic assessment by auditors and national authorities for containment (NACs). The NACs will renew, modify or withdraw the certificates of containment, in coordination with WHO and the GCC-CWG, or other oversight bodies. The NACs are relatively new bodies and, as such, require political support within their Member States and often new legislative mandates. Advocacy remains critical to the process, and all bodies, from the national to the international level, need a common understanding of the global containment certification process and requirements.

In preparing for a possible breach, WHO has developed guidance for managing exposed persons in PEF-hosting countries. The containment breach scenario has also been incorporated in polio outbreak simulation exercises (POSE). These two-day tabletop exercises have proven informative in identifying differences in national authorities and mandates for isolation and quarantine.

OPV cessation

Full OPV withdrawal will take place approximately one year after WPV eradication is certified. OPV cessation is critical to stop the occurrence of vaccine-associated paralytic poliomyelitis (VAPP) and to remove the primary risk of emergence of all types of VDPVs. Planning for OPV withdrawal will start two years in advance, building on the lessons learned from the switch from tOPV to bOPV. Pre-cessation SIAs may also be considered for high-risk areas in the year prior to withdrawal.

VACCINE MANAGEMENT

OPV stockpiles

OPV remains the most effective tool for responding to polio outbreaks, even after certification. To prepare for full OPV withdrawal and to ensure rapid and effective response after OPV cessation, the GPEI has initiated the establishment of mOPV stockpiles for types 1 and 3, building on its experience from the mOPV2 stockpile. The day-to-day management of these stockpiles will be carried out jointly by WHO and the UNICEF Supply Division. Stockpiles will be tightly regulated with sole authority given to the WHO Director-General to approve the release of OPV.

Commitments for OPV type 1 and 3 stockpiles must be made now. Several vaccine manufacturers are starting to ramp down OPV production in anticipation of eradication. The GPEI must give clear and firm signals on its OPV needs and commit to regularly engaging with the vaccine industry. In addition to putting in place the necessary contracts to secure adequate supply, the GPEI will explore providing incentives, if needed, to ensure manufacturers stay in the market through cessation and stockpile development. A diversified supplier base will remain critical to enable rapid outbreak response.

³⁷ Global Polio Eradication Initiative. Polio Post-Certification Strategy. Geneva: WHO; 2018 (<http://polioeradication.org/wp-content/uploads/2018/04/polio-post-certification-strategy-20180424-2.pdf>).

IPV supply for immunization programmes

IPV has a key role to play in maintaining a polio-free world by building up population immunity to all three types of polioviruses. New IPV manufacturers will come online in the coming years, boosting supply and reducing costs. Working closely with Gavi, the Vaccine Alliance, the GPEI will continue its focus on a healthy market for IPV, which includes sufficient availability, a diversified supplier base and affordable prices. This requires close collaboration with the vaccine industry through, for example, timely demand information. The collaboration will also cover operational aspects, such as prioritizing supply allocation and planning for catch-up activities to reach missed cohorts, either through immunization programmes or campaigns.

Gavi, the Vaccine Alliance's commitment to strengthen its collaboration with the GPEI, including its commitment to fund IPV for 2019–2020 and possibly beyond, will allow IPV to be managed holistically as part of overall immunization system vaccine procurement efforts – whether as a stand-alone vaccine or as part of an IPV-containing hexavalent vaccine – and ensure IPV supply continues to benefit from Gavi's market-shaping strategies and accountability mechanisms for tracking IPV coverage. Ensuring IPV remains affordable and available for self-procuring middle-income countries must also be explored.

Guidance from advisory bodies, including the Cessation Risk Task Team (CRTT), SAGE and its Polio Working Group, will be critical to proposing appropriate, evidence-based strategies for mitigating risks through prioritized IPV allocation, where needed.

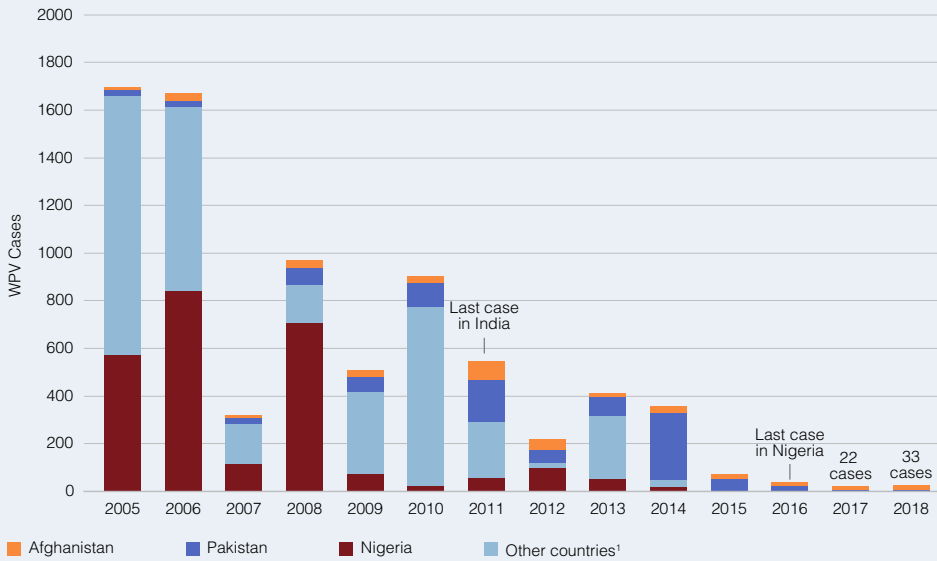


UNICEF

CURRENT EPIDEMIOLOGY

The GPEI has continued to see a dramatic decline in the number of annual WPV cases worldwide, with significant progress under the Polio Eradication & Endgame Strategic Plan, 2013–2018. As of February 2019, only one type of WPV continues to be reported from one epidemiological block: Pakistan and Afghanistan. Nigeria has not reported any WPV since September 2016 – and the world has not witnessed any WPV outbreaks outside the three endemic countries since 2014. Enabling this success were major strides in the leadership, capacity and structures of the polio eradication programmes in Pakistan and Afghanistan.

2005–2018 WPV1 cases in endemic and outbreak countries



KEY HIGHLIGHTS

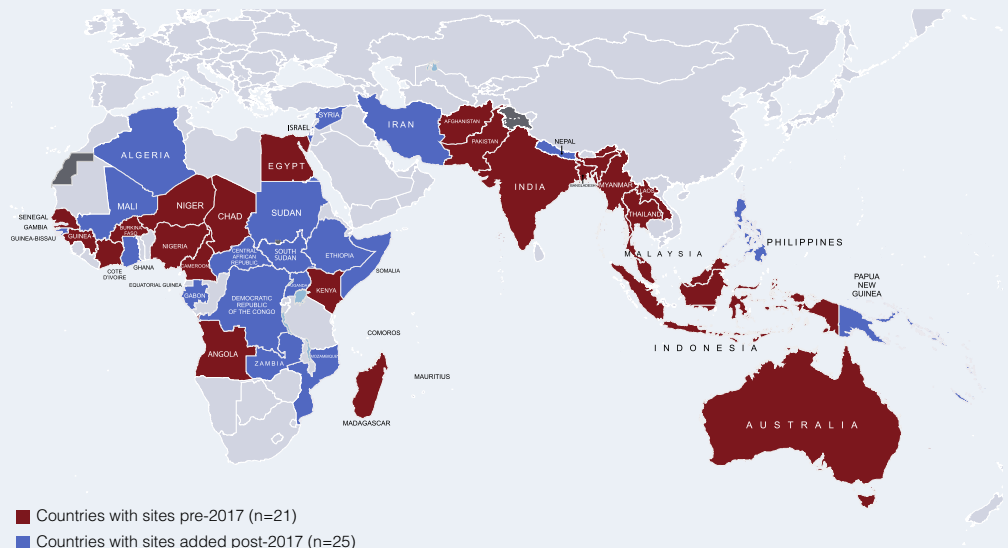
- In 2017 and 2018, only Afghanistan and Pakistan reported WPV1 transmission with WPV2 declared eradicated in 2015 and WPV3 not seen since 2012
- No WPV outbreaks seen globally since 2014

¹ Includes outbreak countries and India

GPEI-Supported countries that contribute environmental surveillance sites to the Global Polio Laboratory Network (GPLN), 2017–2018

SURVEILLANCE HIGHLIGHTS

- During 2017 and 2018, 104 new environmental (sewage) surveillance sites were established in 22 out of 34 target countries
- As of Nov 2018, there were 5,075 environmental surveillance results available coming from 32 countries compared to 4,260 results from 24 countries in 2017
- Acute flaccid paralysis (AFP) surveillance remains strong and well established globally

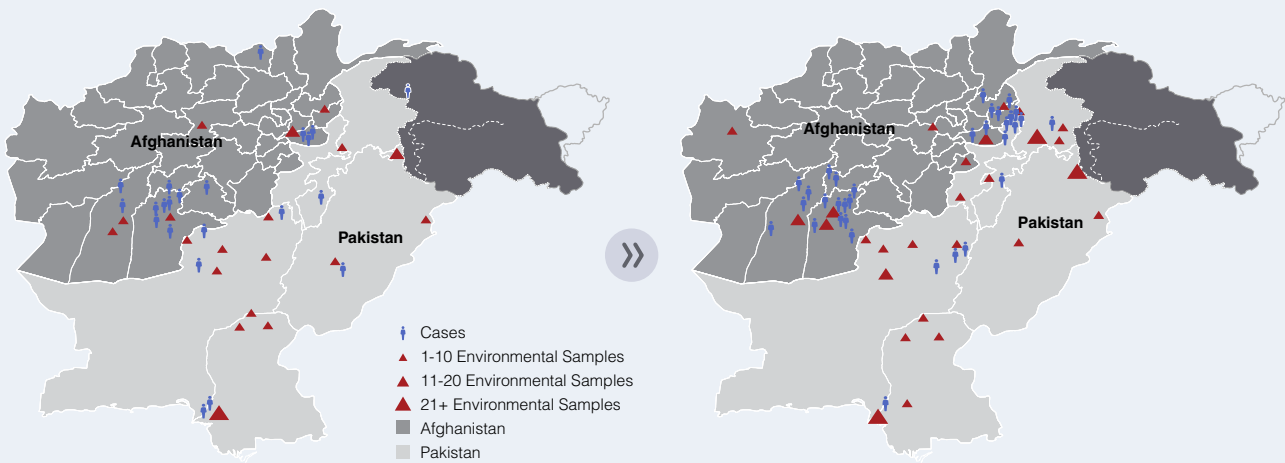


Source: All data is from WHO POLIS and is up to date as of 28 January 2019.

However, endemic WPV1 transmission continues into 2019, requiring intensified efforts, concentrated resources and close attention, especially in the shared northern and southern transmission corridors and Karachi. The 16th report of the Independent Monitoring Board (IMB) was conducted through an external review process of the three endemic countries. IMB recommendations were used as one of the inputs for this new strategy.

AFP surveillance continues to be sustained globally, and the environmental surveillance network was substantially expanded in 2018. This enabled the programme to better detect new outbreaks and VDPV emergences. The GPEI has responded to 15 cVDPV outbreaks since 2014, with 11 of those cVDPV outbreaks ongoing as of February 2019.

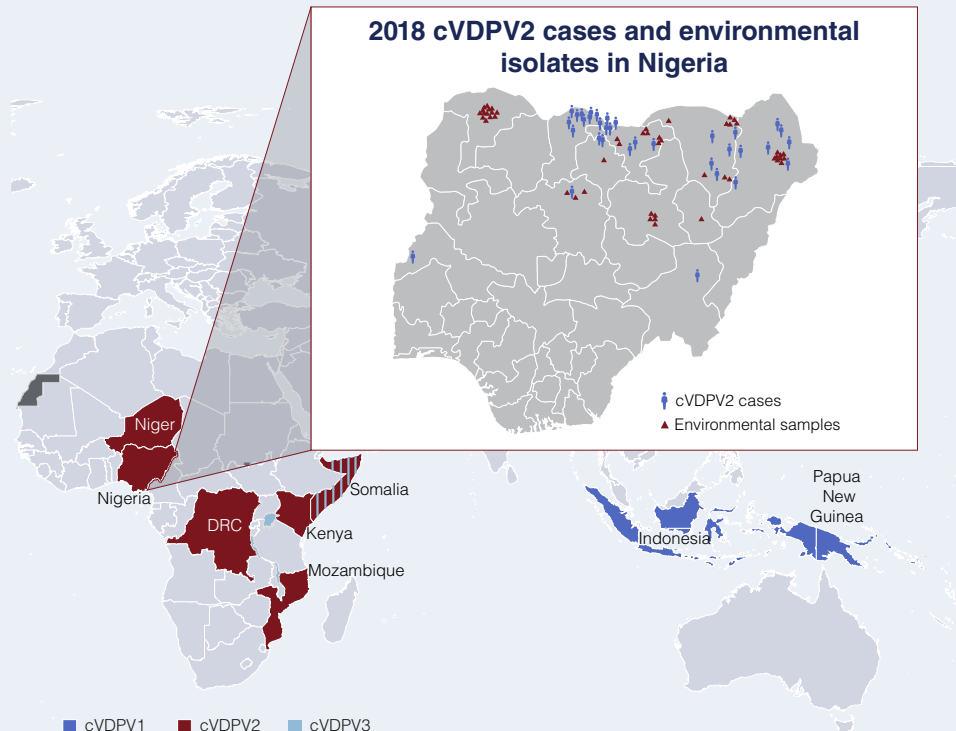
WPV1 cases and environmental isolates in Pakistan and Afghanistan, 2017 vs. 2018



Ongoing cVDPV outbreaks, 2018

NIGERIA SPOTLIGHT

- No WPV cases have been reported from Nigeria since September 2016
- Significant efforts have been made to successfully reach and vaccinate children in Borno and the Lake Chad Basin, decreasing the number of inaccessible children to approximately 70,000 children under five years of age
- Nigeria had two active cVDPV2 outbreaks in 2018. Despite multiple response activities with mOPV2 and IPV, the outbreak originating from Jigawa has spread north into Niger and south into Taraba and Kwara



Source: All data is from WHO POLIS and is up to date as of 28 January 2019. Please note: the location of cases and environmental isolates have been approximated to local provinces. For more information, please consult POLIS or contact the respective National Emergency Operations Centre.

ANNEX A

Status as of 2018

Remarkable progress has been made since the World Health Assembly declared a commitment in 1988 to eradicate poliomyelitis. By 2018, the Global Polio Eradication Initiative (GPEI) had achieved a 99.99% reduction in the annual numbers of cases of paralysis. The *Polio Eradication & Endgame Strategic Plan 2013–2018* (PEESP) and the *Midterm Review* (MTR) completed in 2015 have been instrumental in identifying the key strategies and mid-course corrective actions that the GPEI and partners continue to implement.³⁸ As part of the recommendations generated by the MTR, the programme extended the timeline for the PEESP to 2019.

The PEESP outlined four objectives to reach polio eradication. They are listed below with an update on the status of each objective as of February 2019.

Table A1. Objective 1: Poliovirus detection and interruption

Main objective	Outcome indicators	Status
Complete the interruption of WPV transmission globally and more rapidly detect and interrupt any new outbreaks due to vaccine derived polioviruses	All WPV stopped by the end of 2014	<ul style="list-style-type: none"> Significant progress has been achieved in improving the quality of activities in the endemic countries, leading to a dramatic reduction in the global count of WPV cases since the launch of the PEESP. WHO South-East Asia Region became the fourth region to certify WPV eradication in 2014. WPV2 was declared eradicated in 2015. WPV3 has not been reported since November 2012 (Borno, Nigeria). By 2014, all multicountry WPV outbreaks in the Middle East, Central Africa and Horn of Africa had been successfully stopped. No WPV outbreaks have been detected there since August 2014. The detection of endemic WPV1 in Nigeria in 2016 led to an aggressive multicountry response. No WPV1 has been detected in Africa since September 2016. WPV1 transmission continued in Pakistan and Afghanistan into 2019, especially in the shared northern and southern transmission corridors and Karachi.
	All new cVDPV outbreaks stopped within 120 days	<ul style="list-style-type: none"> Twelve cVDPV outbreaks have successfully been stopped since the launch of the PEESP.³⁹ Six were stopped within 120 days of detection. Responses to cVDPV outbreaks continued in the Democratic Republic of the Congo, Nigeria/Niger, the Horn of Africa (Somalia and Kenya), Mozambique, Papua New Guinea and Indonesia.

WPV: Wild poliovirus; cVDPV: Circulating vaccine-derived poliovirus.

Source: WHO.

³⁸ Global Polio Eradication Initiative. *Polio Eradication & Endgame Strategic Plan 2013–2018*. Geneva: WHO; 2013 (http://polioeradication.org/wp-content/uploads/2016/07/PEESP_EN_A4.pdf).

³⁹ This includes cVDPV outbreaks in Guinea, the Lake Chad Basin, Laos People's Democratic Republic, Madagascar, Myanmar, Nigeria (2), Pakistan (2), South Sudan, the Syrian Arab Republic and Ukraine.

Table A2. Objective 2: Immunization systems strengthening and OPV withdrawal

Main objective	Outcome indicators	Status
Strengthen immunization services in “focus countries”, introduce IPV and withdraw OPV type 2 globally	OPV type 2 withdrawn globally by the end of 2016	<ul style="list-style-type: none"> The successful implementation of the globally synchronized withdrawal of tOPV and its replacement with bOPV in 155 countries occurred over two weeks in 2016. Despite challenges with vaccine production that led to supply shortages, by the end of 2018, sufficient IPV supply was available for all 126 countries to introduce at least one dose of IPV into their national immunization programmes and ensure continuous supply.⁴⁰ An mOPV2 stockpile of finished product and bulk stockpiles of mOPV1 and mOPV3 have been built, under the oversight of the WHO Director-General.
	At least 10% annual increase in DTP3 coverage achieved in 80% of the high-risk districts in all focus countries from 2014 to 2018	<ul style="list-style-type: none"> In collaboration with immunization partners, all 10 countries developed “one immunization plan”, which allowed the training of polio staff on routine immunization and the use of polio assets and tools, such as LQAS for rapid coverage monitoring, for immunization activities. Studies conducted to review the level of support provided by the GPEI to bolster immunization strengthening activities showed that support varied by region and country; while some progress was made in improving immunization systems and coverage, more must be done to further strengthen immunization systems, especially in high-risk countries.

IPV: Inactivated polio vaccine; OPV: Oral polio vaccine; DTP3: Diphtheria–tetanus–pertussis vaccine third dose; tOPV: Trivalent oral polio vaccine; bOPV: Bivalent oral polio vaccine; mOPV: Monovalent oral polio vaccine; LQAS: Lot quality assurance sampling.

Source: WHO.

Table A3. Objective 3: Containment and certification

Main objective	Outcome indicator	Status
Certify the eradication and containment of all WPV by the end of 2018 and enhance long-term global security for poliomyelitis	Global polio eradication certified by the end of 2018	<ul style="list-style-type: none"> WPV2 was declared eradicated in 2015 and WPV3 has not been reported since November 2012 (Borno, Nigeria). Containment activities have been implemented for WPV2 and are accelerating in preparation for WPV3 and WPV1 certifications. Plans have been made to revise GAPIII and country and regional containment readiness has started.⁴¹ The World Health Assembly passed a resolution in May 2018 underscoring the need to accelerate global activities for containment. The SAGE endorsed the CCS, which defines the global approach to PEF certification. The Containment Advisory Group endorsed guidelines for the identification and mitigation of materials at risk of containing poliovirus. Interim guidance in managing exposed persons due to containment breaches for countries hosting facilities that maintain live polioviruses has been completed. All Member States are engaged in poliovirus containment activities: <ul style="list-style-type: none"> To date, WHO has been informed of the establishment of 24 of 26 NACs. The deadline for countries to inform WHO of their NAC membership was March 2019. Five facilities have currently been recognized by their NACs and the GCC as suitable candidates to become PEFs and have been issued certificates of participation.

WPV: Wild poliovirus; GAPIII: Global Action Plan to minimize post-eradication poliovirus facility-associated risk, third edition; SAGE: Strategic Advisory Group of Experts on Immunization; CCS: Containment Certification Scheme; PEF: Poliovirus-essential facility; NAC: National authority for containment; GCC: Global Commission for the Certification of the Eradication of Poliomyelitis.

Source: WHO.

⁴⁰ Mongolia and Zimbabwe introduced at least one dose of IPV in April 2019.

⁴¹ GAPIII: WHO Global Action Plan to minimize poliovirus facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of oral polio vaccine use, Third edition. Geneva: WHO; 2015 (http://polioeradication.org/wp-content/uploads/2016/12/GAPIII_2014.pdf).

Table A4. Objective 4: Legacy/Transition planning

Main objective	Outcome indicators	Status
Develop a plan to ensure polio investments contribute to future health goals through the documentation and transition of the GPEI's lessons, processes and assets	All WPV transmission stopped by the end of 2014	The major activities under way are: <ol style="list-style-type: none"> 1. mainstreaming polio functions; 2. leveraging the knowledge and lessons learned; and 3. transitioning assets and infrastructure.
	All new cVDPV outbreaks stopped within 120 days	<ul style="list-style-type: none"> • Since the development of the PEESP, the partnership evolved its thinking on legacy planning to rename this work "transition planning". It focuses on two work streams: (1) support 16 priority countries to develop their national plans to ensure that the functions needed to keep the world polio-free are appropriately sustained and transitioned to bolster other health goals; and (2) capture and disseminate the lessons learned from polio eradication. The GPEI Transition Management Group, responsible for overseeing these two work streams from 2013 to 2018, was dissolved in June 2018, and the first work stream was transferred to WHO and UNICEF country and regional offices. The GPEI will continue to support the activities of the second work stream. • All non-endemic countries have country plans, and seven have been endorsed by appropriate national mechanisms: Angola, Bangladesh, Cameroon, Chad, the Democratic Republic of the Congo, Ethiopia and South Sudan. Work on the lessons learned is continuing and includes the Polio History Project and the lessons learned collaboration project with Johns Hopkins University.

WPV: Wild poliovirus; cVDPV: Circulating vaccine-derived poliovirus.
 Source: WHO.

ANNEX B

Comparison of risk assessments and list of countries at “high risk” for poliovirus

The GPEI uses multiple assessment tools to target resources and set priorities in the face of a dynamically changing poliovirus risk landscape. Each approach uses categories of variables relevant to the specific parameter of risk under assessment (e.g. new emergence, detection, spread) and the time frame of analysis (see **Table B1**). The current endemic countries (Pakistan, Afghanistan, Nigeria) and those with ongoing VDPV outbreaks require priority focus to stop ongoing poliovirus transmission. Table B2 presents a list of non-endemic countries deemed “high risk” by each assessment tool. These analyses will be updated as required to determine risk mitigation priorities. Future Risk Assessment Task Team (RATT) and Surveillance Task Team (STT) assessments will focus on identifying specific subnational geographic areas or populations that require targeted support.

Table B1. Summary information of key variables included in risk assessment grading

Risk Assessment	Description	Category 1	Category 2	Category 3
Imperial College	To assist with long-term poliovirus surveillance planning by identifying countries at future risk of VDPV emergence and containment breach from 2017 to 2028	Population immunity <ul style="list-style-type: none"> Type-specific estimates of OPV and IPV-induced immunity based on the SIA calendar and vaccination history of children with non-polio AFP Forward projections from 2017 to 2028 available 	Transmissibility <ul style="list-style-type: none"> Under-five mortality rates as proxy for the efficiency of poliovirus transmission 	Potential exposure <ul style="list-style-type: none"> cVDPV exposure based on current epidemiology and data on international movement iVDPV exposure based on analysis of surveillance data and cohort model Potential for containment failure based on WHO assessment of PEFs
RATT	To estimate the risk of poliovirus spread in the coming 12 months, for immunization activity allocation; combines IDM, CDC and WHO/Imperial College assessments	Poliovirus exposure <ul style="list-style-type: none"> Proximity to ongoing outbreaks History of VDPV emergence, or WPV importation 	Immunization indicators <ul style="list-style-type: none"> Reported doses (non-polio AFP cases) Routine immunization 	Fragility and other indicators <ul style="list-style-type: none"> Migration Humanitarian emergencies
STT	To identify countries requiring additional surveillance review and support in the coming 12 months	Poliovirus risk <ul style="list-style-type: none"> RATT assessment Countries neighbouring VDPV outbreaks 	Surveillance indicators <ul style="list-style-type: none"> Non-polio AFP rate Stool adequacy Data quality assessment 	Surveillance reviews <ul style="list-style-type: none"> Field assessments Expert opinion
Gavi, the Vaccine Alliance	To assess country-level risk of poliovirus re-emergence from 2021 to 2025 for the purposes of guiding IPV funding support scenarios	Risk of poliovirus re-emergence <ul style="list-style-type: none"> Routine immunization Infant MR PEFs Endemicity Consanguinity # cVDPV outbreaks 	Country ability to cost share <ul style="list-style-type: none"> Standard cofinancing indicator Vaccine cofinancing costs as a % of domestic general government health expenditure 	

RATT: Risk Assessment Task Team; STT: Surveillance Task Team; VDPV: Vaccine-derived poliovirus; OPV: Oral polio vaccine; IPV: Inactivated polio vaccine; SIA: Supplementary immunization activity; AFP: Acute flaccid paralysis; cVDPV: Circulating vaccine-derived poliovirus; iVDPV: Immunodeficiency-associated vaccine-derived poliovirus; PEF: Poliovirus-essential facility; IDM: Institute for Disease Modeling; CDC: US Centers for Disease Control and Prevention; WPV: Wild poliovirus.

Source: WHO.

Table B2. All countries receiving a “high-risk” rating in at least one assessment (excluding Pakistan, Afghanistan and Nigeria)

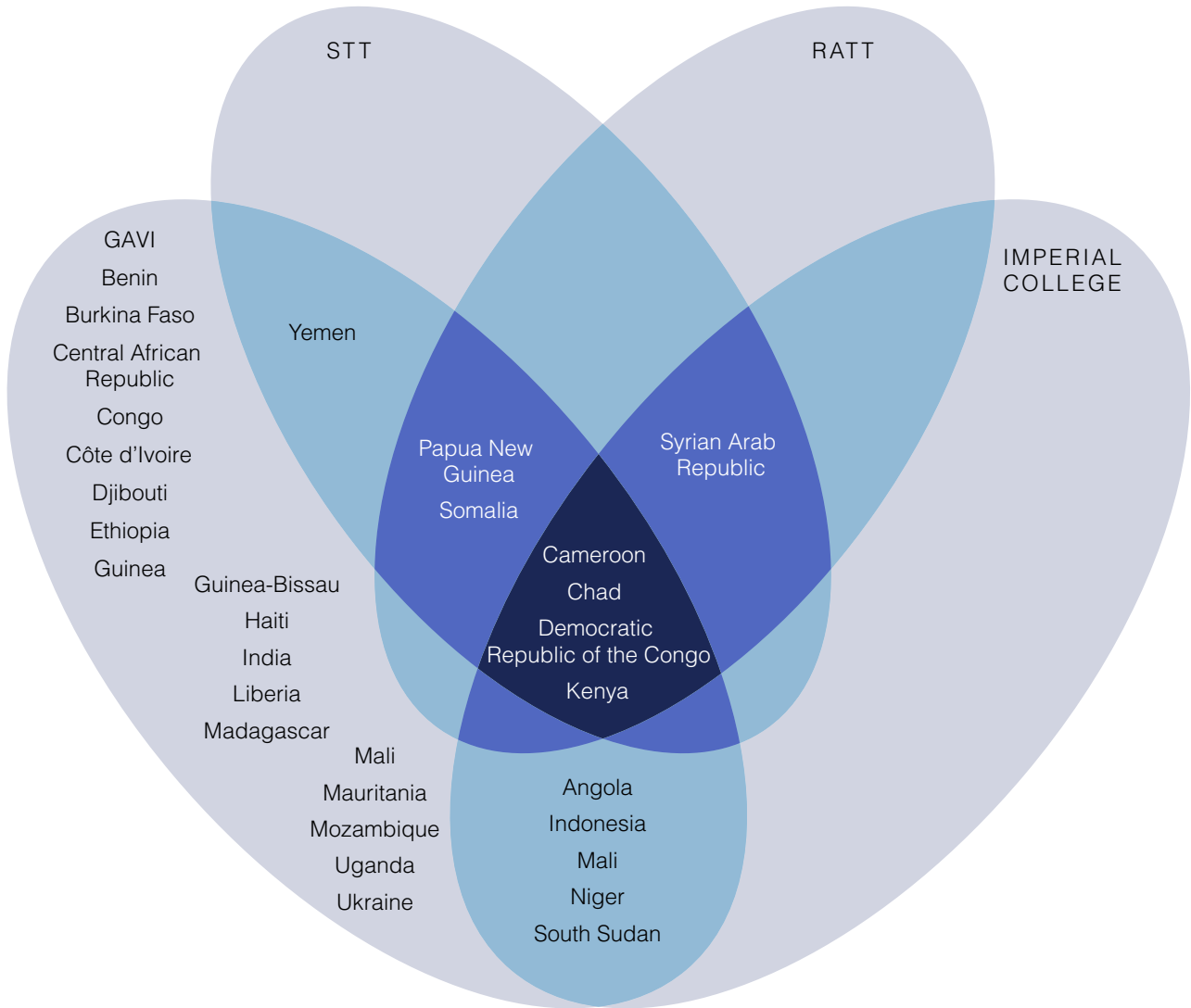
Country	RATT (October 2018 update)	STT (August 2018 update)*	Gavi (August 2018 update)	Imperial College (2017)**
DEMOCRATIC REPUBLIC OF THE CONGO	High	High	High	High
CHAD	High	High	High	High
KENYA	High	High	High	High
PAPUA NEW GUINEA	High	High	High	
SOMALIA	High	High	High	
CAMEROON	High	High	High	High
GUINEA			High	
SOUTH SUDAN			High	High
SYRIAN ARAB REPUBLIC	High	High		High
YEMEN		High	High	
ANGOLA			High	High
CENTRAL AFRICAN REPUBLIC			High	
DJIBOUTI			High	
ETHIOPIA			High	
GUINEA-BISSAU			High	
INDIA			High	
LIBERIA			High	
MADAGASCAR			High	
MALI			High	High
MAURITANIA			High	
MOZAMBIQUE			High	
UGANDA			High	
BENIN			High	
BURKINA FASO			High	
CONGO			High	
CÔTE D’IVOIRE			High	
HAITI			High	
INDONESIA			High	High
NIGER			High	High
UKRAINE			High	

* Risk Assessment Task Team (RATT) used for Surveillance Task Team (STT) rating unless otherwise indicated as dictated by STT documentation.

** Overall geographic distribution of poliovirus risk for 2017 for types 1, 2 and 3 combined (Nigeria, Pakistan, India and Afghanistan are not included in the analysis).

Source: WHO.

Figure B1. Countries assessed as “high risk” by each assessment tool



STT: Surveillance Task Team; RATT: Risk Assessment Task Team.

Note: This figure shows the overlap in countries assessed as "high risk" by different assessment tools. This approach could be used as an initial screen to identify countries that warrant a priority for integrated interventions. It provides a cross-sectional analysis at a national level and should be periodically updated, ideally with a more granular, subnational assessment.

Source: WHO.

ANNEX C

Strategy engagement

Throughout the process of drafting the *Polio Endgame Strategy 2019–2023*, the GPEI requested input from a broad set of stakeholders to shape the work of the programme as the world moves towards the anticipated goal of polio eradication. These stakeholders and organizations include:⁴²

- Bill & Melinda Gates Foundation Polio and Vaccine Delivery Teams
- Centre for Global Health, WHO Collaborating Centre
- Civil Society Group
- CORE Group
- Emergency Committee under the International Health Regulations (IHR) regarding the International Spread of Poliovirus
- Gavi, the Vaccine Alliance
- Global Commission for the Certification of the Eradication of Poliomyelitis (GCC)
- Global Vaccine Action Plan (GVAP) Working Group
- Government of Australia
- Government of Canada
- Government of France
- Government of Germany
- Government of Japan
- Government of Norway
- Government of the United Kingdom
- Government of the United States of America
- GPEI Management Groups and Task Teams
- GPEI Partners (immunization and emergency teams at the global and regional levels)
- Imperial College London
- Independent Monitoring Board (IMB)
- Institute for Disease Modeling (IDM)
- International Federation of Pharmaceutical Manufacturers & Associations (IFPMA)
- Member States
- Pakistan Country Team
- Polio Partners Group (PPG)
- RESULTS UK
- Rotary
- Strategic Advisory Group of Experts (SAGE) on Immunization and its Polio Working Group (SAGE-WG)
- Technical Advisory Groups (TAGs) for endemic countries and regions
- Transition Independent Monitoring Board (TIMB)
- UNICEF Health Section
- UNICEF Immunization Unit
- UNICEF Supply Division
- United Nations Foundation (UNF)
- US Centers for Disease Control and Prevention (CDC) Polio and Immunization Teams
- Vaccine manufacturers
- WHO and UNICEF regional office focal points for polio and the Expanded Programme on Immunization (EPI)
- WHO Cholera Team
- WHO Global Health Workforce Network Gender Equity Hub
- WHO Health Emergencies Programme
- WHO Health System Strengthening

⁴² A full list by organization and focal point is available upon request.

- WHO Immunization, Vaccines and Biologicals
- WHO Meningitis Team
- WHO Polio Transition Team
- WHO Resource Mobilization

The *Polio Endgame Strategy 2019–2023* working group held information and consultation sessions throughout the development process. One round of written consultations was conducted from December 2018 through February 2019, during which a wide range of stakeholders were given the opportunity to review and provide comments on a draft of the strategy. Some groups were consulted at multiple touch points beyond the consultation rounds, and several in-person meetings and teleconferences were held with stakeholders to gather input throughout the drafting process. In all, the working group received over 1100 comments from respondents representing more than 40 organizations and groups. Additional details on the comments and the consultation process can be found in the *Polio Endgame Strategy 2019–2023* stakeholder consultation report.⁴³

⁴³ To view or download the consultation report, visit the GPEI website: (<http://polioeradication.org/wp-content/uploads/2019/03/stakeholder-consultation-report-20191004.pdf>).

ANNEX D

Illustrative examples of how the GPEI can contribute to strengthening immunization and health systems to help achieve and sustain polio eradication*

Table D1. Examples of GPEI contributions to strengthening immunization to help achieve and sustain eradication

Topic	Function(s)	Illustrative example(s) of activities
Immunization strengthening	<ul style="list-style-type: none"> Use polio expertise and tools to identify high-risk districts 	<ul style="list-style-type: none"> Use data on unvaccinated children to drive decisions Use GIS and satellite mapping Provide support to microplanning by devoting a certain percentage of time to this activity Use microplanning, technology platforms
	<ul style="list-style-type: none"> Use polio resources to help build capacity to vaccinate: <ul style="list-style-type: none"> chronically unreached children under-vaccinated children 	<ul style="list-style-type: none"> Enhance supportive supervision in healthcare facilities Channel STOP consultants towards specific immunization systems strengthening, VPD surveillance activities Draw lessons from CDC START work (i.e. Strengthening Technical Assistance for Routine Immunization Training) Engage in targeted capacity building, focused on immunization in SIA trainings Align polio response activities in EOCs with immunization coverage improvement Ensure all capacity-building activities include women and make specific efforts to enhance equal participation
	<ul style="list-style-type: none"> Deliver other health interventions (especially vaccines) in the national immunization schedule to polio-affected districts where SIAs are ongoing 	<ul style="list-style-type: none"> Support PIRIs and other mechanisms Perform other non-vaccine interventions, in line with the country's national health programme
	<ul style="list-style-type: none"> Identify select districts where polio-funded staff can support targeted interventions funded through Gavi HSS/cash grants 	<ul style="list-style-type: none"> Involve polio-funded staff in identifying needs, developing the Gavi HSS application process, supporting implementation, etc.
Joint planning	<ul style="list-style-type: none"> Collaborate on joint planning of SIAs 	<ul style="list-style-type: none"> Ensure broad applicability: measles, rubella, yellow fever, meningitis, cholera Harmonize calendars and guidance at the country level Engage in joint microplanning for integrated SIA processes Identify concrete activities from joint SIAs that will be implemented to strengthen essential immunization Avoid conflict in schedules of activities beyond SIAs, including the planning for and the implementation of SIAs
	<ul style="list-style-type: none"> Engage in the development of national operational plans 	<ul style="list-style-type: none"> Provide specific expertise to ensure that plans are data-driven, practical, prioritized and budgeted against available resources, with specific indicators
	<ul style="list-style-type: none"> Ensure the coherence of periodic immunization outreach activities and the accountability framework 	<ul style="list-style-type: none"> Monitor performance Track the monetary resources required Execute in conjunction with overall planning processes including immunization microplan development

*This list was compiled through consultations between GPEI and immunization partners. It does not constitute an exhaustive or final list of activities, but demonstrates illustrative examples of how GPEI staff, resources and mechanisms can contribute to strengthening immunization to help achieve and sustain eradication. This list can constitute a potential basis for further discussions to develop a joint accountability framework between the GPEI and the immunization community.

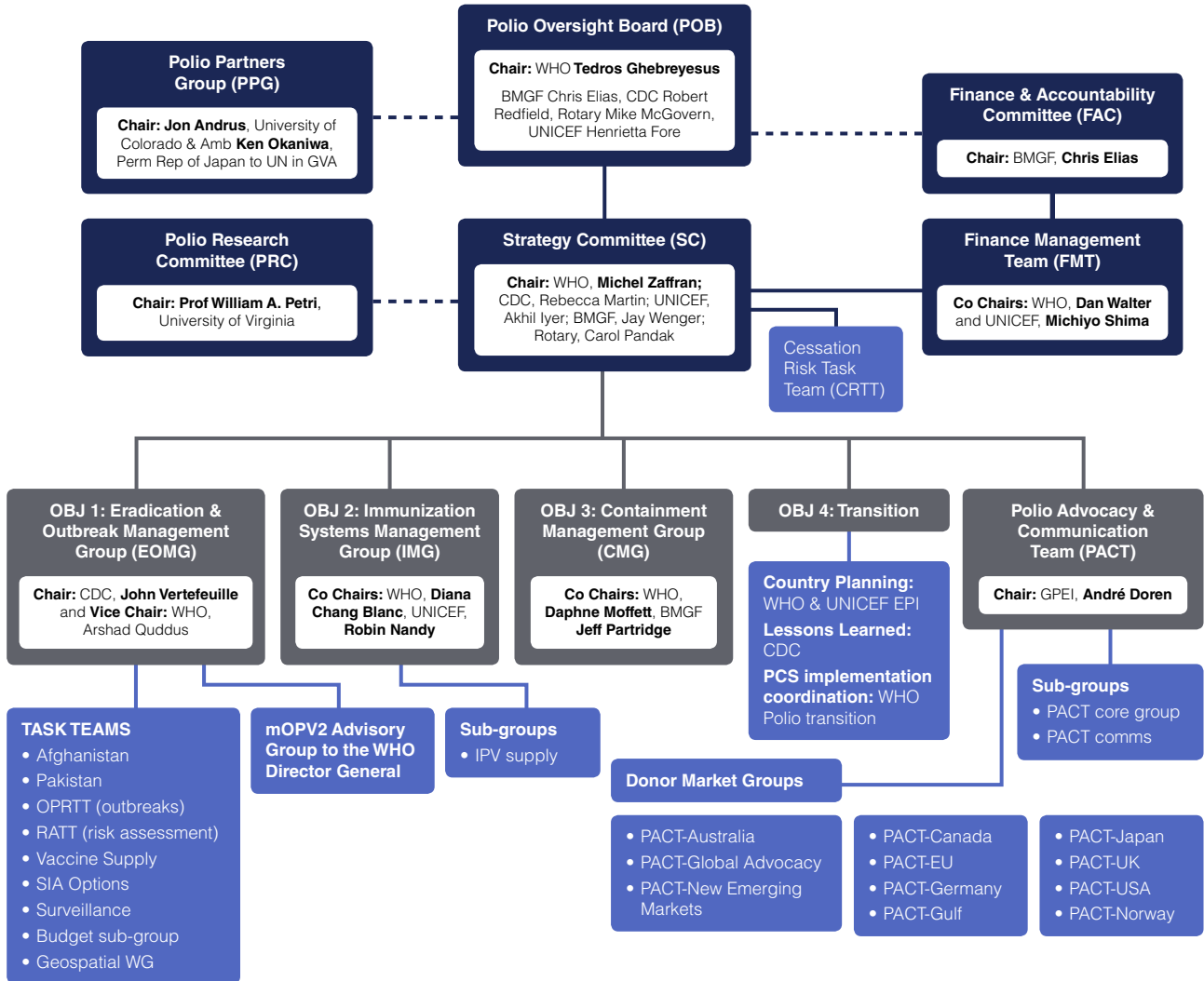
Topic	Function(s)	Illustrative example(s) of activities
Monitoring and supervision	<ul style="list-style-type: none"> Ensure polio supervision visits are linked with immunization support plans, supportive supervision and follow-up 	<ul style="list-style-type: none"> Bring polio's culture of using data and evidence to drive decisions Ensure sex-disaggregated data are regularly collected, analysed and used to inform programming Include government staff counterparts in supervision/monitoring visits by polio staff Ensure equal participation of women and men in supervision teams
	<ul style="list-style-type: none"> Integrate measles/polio post-SIA monitoring 	<ul style="list-style-type: none"> Include coverage surveys, infectious material, LQAS Perform essential immunization session site monitoring coupled with rapid convenience assessments to provide "real-time" information to managers and decision-makers
Outbreaks	<ul style="list-style-type: none"> Align processes to ensure polio outbreak surge personnel systematically build national capacity to strengthen immunization systems 	<ul style="list-style-type: none"> Ensure surge personnel have the skills required Ensure a gender balance of surge personnel Include immunization systems strengthening/national capacity building in TORs of polio surge staff Develop and disseminate messages and create effective demand generation strategies based on social research, including a focus on gender Integrate specific recommendations on immunization systems strengthening into OBRA, integrated VPD response plans and immunization recovery plans Consider how to deliver other immunizations/antigens during outbreak response activities Link integrated VPD outbreak detection and response to polio emergency operations
Political advocacy	<ul style="list-style-type: none"> Align advocacy efforts for immunization strengthening and polio eradication 	<ul style="list-style-type: none"> Integrate immunization systems strengthening messaging into the GPEI globally and nationally Ensure that polio task forces/Expert Review Committee meetings include immunization/primary healthcare advocacy
	<ul style="list-style-type: none"> Align polio resources to facilitate broad ownership for immunization results and accountability 	<ul style="list-style-type: none"> Implement strategies to engage community and religious leaders, community-based organizations and professional organizations, including women's groups and organizations Draw on civil society to support advocacy for immunization, including for women's meaningful and equal participation
Community engagement and demand generation	<ul style="list-style-type: none"> Collaborate on strategy and guidance for demand generation 	<ul style="list-style-type: none"> Develop and disseminate consistent messages and strategies to drive community demand for immunization, based on solid social research, with a focus on gender
	<ul style="list-style-type: none"> Explore how C4D lessons from polio can support immunization systems strengthening Build on CSO networks operating in fragile, high-risk, border areas 	<ul style="list-style-type: none"> Bring C4D work streams together for polio and immunization, particularly at the country level Use social data (with a focus on sex-disaggregated data and gender analysis), monitoring and evaluation frameworks and other best practices to strengthen C4D for accelerated disease control and immunization
	<ul style="list-style-type: none"> Use historical polio data to improve segmented outreach activities 	<ul style="list-style-type: none"> Share data on hesitant households/communities with immunization systematically
	<ul style="list-style-type: none"> Leverage community-based polio structures and assets to strengthen immunization systems 	<ul style="list-style-type: none"> Explore how community health workers and civil society networks can contribute meaningfully
Training/capacity building	<ul style="list-style-type: none"> Ensure capacity building for polio staff 	<ul style="list-style-type: none"> Develop training materials and courses to train polio staff on enhancing the overall immunization/surveillance system Conduct refresher trainings for national immunization staff

STOP: Stop Transmission of Polio; VPD: Vaccine-preventable disease; CDC: US Centers for Disease Control and Prevention; SIA: Supplementary immunization activity; EOC: Emergency operations centre; PIRI: Periodic intensification of routine immunization; HSS: Health system strengthening; LQAS: Lot quality assurance sampling; TORs: Terms of reference; OBRA: Outbreak response assessment; GPEI: Global Polio Eradication Initiative; C4D: Communications for development; CSO: Civil society organization.

Source: WHO.

ANNEX E

Figure E1. GPEI management and advisory structure



Source: Global Polio Eradication Initiative. Who We Are, Governance and Structure [website] (<http://polioeradication.org/who-we-are/governance-and-structure/>).

GPEI 2019–2023 multiyear budget overview

A mapping that will apply the existing budget structure to the new strategy is in progress and will be completed in 2019.

Figure F1. GPEI 2019–2023 multi-year budget overview

Objective	2019	2020	2021	2022	2023	Grand total
Objective 1: Poliovirus detection and interruption	807 234 000	750 838 000	718 872 000	628 652 000	574 496 000	3 480 092 000
Campaigns - SIAs	328 308 000	299 802 000	286 030 000	234 802 000	187 767 000	1 336 709 000
Core functions and infrastructure	161 028 000	149 168 000	141 145 000	125 205 000	119 430 000	695 976 000
Non-campaign immunization activities	100 762 000	93 950 000	92 365 000	91 263 000	90 391 000	468 731 000
Surveillance	217 136 000	207 918 000	199 332 000	177 382 000	176 908 000	978 676 000
Objective 2: Immunization systems strengthening and OPV withdrawal	17 736 000	9 902 000	18 402 000	38 807 000	18 730 000	103 577 000
IPV introduction	502 000	0	0	0	0	502 000
OPV withdrawal - SWITCH	12 500 000	5 502 000	14 002 000	32 784 000	12 631 000	77 419 000
Technical assistance	4 734 000	4 400 000	4 400 000	6 023 000	6 099 000	25 656 000
Objective 3: Containment and certification	9 501 000	9 501 000	9 501 000	9 501 000	9 501 000	47 505 000
Certification	2 650 000	2 650 000	2 650 000	2 650 000	2 650 000	13 250 000
Containment	6 851 000	6 851 000	6 851 000	6 851 000	6 851 000	34 255 000
Objective 4: Transition planning	4 818 000	4 539 000	3 409 000	2 842 000	2 712 000	18 320 000
Outbreak-emergency operations	27 894 000	52 106 000	40 000 000	40 000 000	40 000 000	200 000 000
Other contingency and indirect costs	74 958 000	71 878 000	69 214 000	64 005 000	58 503 000	338 558 000
Contingency	10 000 000	10 000 000	10 000 000	10 000 000	10 000 000	50 000 000
Indirect	64 958 000	61 878 000	59 214 000	54 005 000	48 503 000	288 558 000
GPEI 2019–2023 multi-year budget overview	942 141 000	898 764 000	859 398 000	783 807 000	703 942 000	4 188 052 000

Source: WHO.

Figure F2. Additional polio costs not included in the GPEI Financial Resource Requirements

Objective	2019	2020	2021	2022	2023	Grand total
IPV	142 000 000	162 000 000	170 000 000	170 000 000	170 000 000	814 000 000
Vaccine stockpile for post-certification				59 000 000	62 000 000	121 000 000
Additional polio costs not included in the GPEI Financial Resource Requirements	142 000 000	162 000 000	170 000 000	229 000 000	232 000 000	935 000 000

Grand total 2019–2023 Multi-year budget overview (GPEI and non-GPEI)	1 084 141 000	1 060 764 000	1 029 398 000	1 012 807 000	935 942 000	5 123 052 000
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Note: These are estimates for IPV and stockpile costs after global certification and after the GPEI has dissolved. Funding for these activities, however, must be secured prior to certification. In the specific case of IPV, this will be done in close collaboration with Gavi, the Vaccine Alliance.

Source: WHO.

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