

# POLIO GLOBAL ERADICATION INITIATIVE

# Strategic Plan 2010-2012



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Strategic Plan  
2010-2012





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# Acronyms and abbreviations

<b>ACPE</b>	Advisory Committee on Poliomyelitis Eradication
<b>AFP</b>	Acute flaccid paralysis
<b>BMGF</b>	Bill and Melinda Gates Foundation
<b>bOPV</b>	Bivalent oral polio vaccine
<b>BPHS</b>	Basic package of health services
<b>CDC</b>	US Centers for Disease Control and Prevention
<b>cVDPV</b>	Circulating vaccine-derived poliovirus
<b>EB</b>	Executive Board
<b>EPI</b>	Expanded Programme on Immunization
<b>eSTOP</b>	Expanded Stop Transmission of Polio
<b>EU</b>	European Union
<b>FATA</b>	Federally Administered Tribal Area
<b>FRR</b>	Financial Resource Requirements
<b>GAPIII</b>	Third edition of the Global Action Plan to minimize post eradication poliovirus facility-associated risk
<b>GIVS</b>	Global Immunization Vision and Strategy
<b>GPEI</b>	Global Polio Eradication Initiative
<b>GPLN</b>	Global Polio Laboratory Network
<b>GPMT</b>	Global Polio Management Team
<b>ICC</b>	Inter-agency Coordinating Committee
<b>ICRC</b>	International Committee of the Red Cross
<b>IFRC</b>	International Federation of Red Cross and Red Crescent Societies
<b>IPD</b>	Immunization Plus Day
<b>IPV</b>	Inactivated polio vaccine
<b>iVDPV</b>	Immunodeficiency-associated vaccine-derived poliovirus
<b>KAP</b>	Knowledge, Attitudes and Practices
<b>LGA</b>	Local Government Area
<b>LQAS</b>	Lot Quality Assurance Sampling
<b>MDGs</b>	Millennium Development Goals
<b>mOPV</b>	Monovalent oral polio vaccine
<b>NGO</b>	Non-governmental organization
<b>NID</b>	National Immunization Day
<b>NWFP</b>	North West Frontier Province
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>OPV</b>	Oral polio vaccine
<b>PAG</b>	Polio Advocacy Group
<b>PRC</b>	Polio Research Committee
<b>RCC</b>	Regional Certification Commission
<b>RED</b>	Reaching Every District
<b>SAGE</b>	Strategic Advisory Group of Experts on Immunization
<b>SIA</b>	Supplementary Immunization Activity
<b>SIAD</b>	Short Interval Additional Dose
<b>SNID</b>	Sub-national Immunization Day
<b>STA</b>	Supplementary Technical Assistance
<b>TAG</b>	Technical Advisory Group
<b>tOPV</b>	Trivalent oral polio vaccine
<b>UNICEF SD</b>	UNICEF Supply Division
<b>VAPP</b>	Vaccine-associated paralytic polio
<b>VDPV</b>	Vaccine-derived poliovirus
<b>VPD</b>	Vaccine-preventable disease
<b>WHA</b>	World Health Assembly
<b>WHO</b>	World Health Organization
<b>WPV</b>	Wild poliovirus
<b>WPV1</b>	Wild poliovirus type 1
<b>WPV3</b>	Wild poliovirus type 3

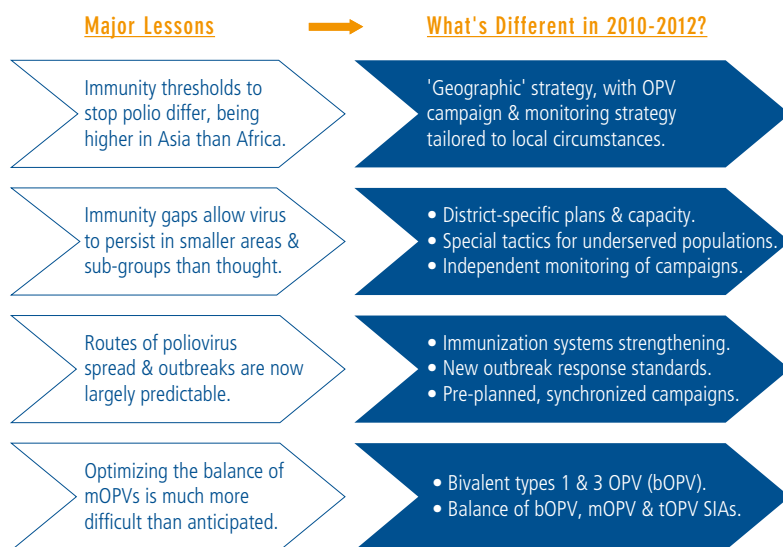
# Executive summary

Alarmed that polio remained entrenched in the four countries that had never stopped transmission<sup>1</sup>, and that an increasing number of polio-free areas were becoming re-infected, in May 2008 the World Health Assembly (WHA) called for a new strategy to complete polio eradication.

The multi-year planning process of the Global Polio Eradication Initiative (GPEI) was subsequently replaced with a one-year 2009 Programme of Work which: examined the major barriers to interrupting wild poliovirus (WPV) transmission in each of the remaining endemic areas (through an *Independent Evaluation*)<sup>2</sup>; fast-tracked the development and clinical trials of four new vaccines or vaccine approaches<sup>3</sup>; and assessed new approaches to reach children previously missed by vaccination efforts due to weak operations management, insecurity or other factors.

The new GPEI Strategic Plan 2010-2012 builds on the special 2009 Programme of Work and incorporates the myriad lessons learnt since the GPEI began. These lessons underpin the new approaches for achieving each of the Strategic Plan's major objectives: interrupting wild poliovirus transmission in Asia; interrupting wild poliovirus transmission in Africa; enhancing global surveillance and outbreak response; and strengthening immunization systems.

Figure 1 – Major Lessons Learnt



Four major lessons have had the most substantive implications for the new GPEI Strategic Plan 2010-2012 (figure 1). First, mathematical modeling has supported programme experience that the population immunity thresholds needed to interrupt WPV

1 Afghanistan, India, Nigeria, Pakistan

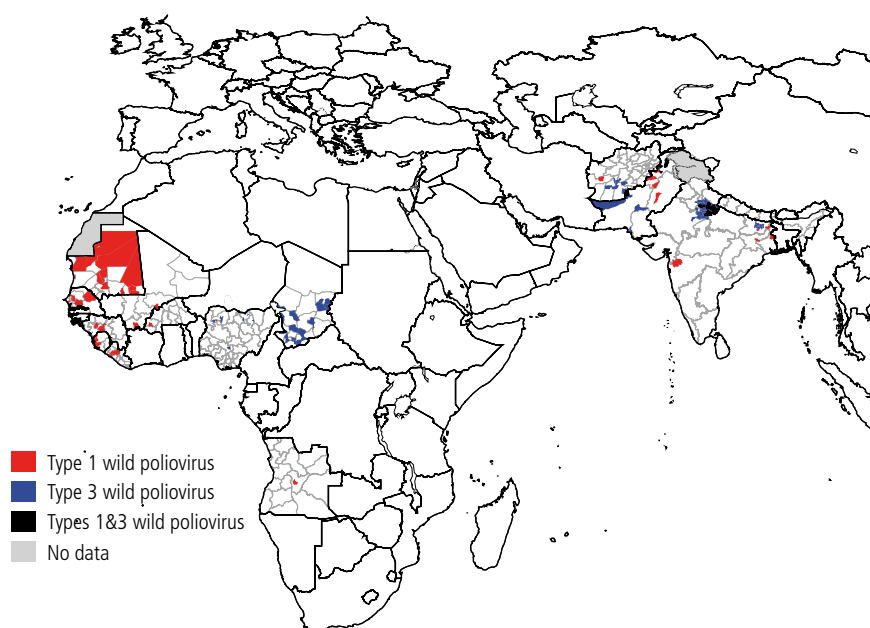
2 *Independent Evaluation of Major Barriers to Interrupting Poliovirus Transmission*. 2009. Report available at [www.polioeradication.org](http://www.polioeradication.org).

3 Clinical trials were conducted in 2009 on bivalent OPV, a higher-titre monovalent OPV type 1, and two inactivated polio vaccines (IPV - administered whole-dose intramuscularly and at a fractional dose given intradermally by needle-free device).

transmission differ in the remaining infected areas, being substantively higher in Asia, particularly in northern India and parts of Pakistan, than Africa. This has allowed the tailoring of polio campaign strategy and monitoring processes to each area, improving programme efficiency. Secondly, it is now clear that endemic WPV transmission can persist, and imported viruses be re-established, in areas and among sub-populations that are much smaller than previously understood. This has led to the systematic development of district- and population-specific strategies and capacity to address heterogeneity in oral polio vaccine (OPV) coverage. Thirdly, in polio-free areas the routes of WPV spread, and the risk of subsequent outbreaks, are now largely predictable, following known migration routes and exploiting evidently weak health systems; while outbreaks can occur in other geographic areas where there are gaps in OPV coverage (as evidenced by the large outbreak confirmed in April 2010 in Tajikistan), this knowledge allows for sharper targeting of both supplementary immunization activities (SIAs) and immunization systems strengthening efforts to reduce such risks. Finally, optimizing the impact of the new monovalent OPVs has proven more complicated than anticipated and in some settings contributed to alternating outbreaks of the remaining wild poliovirus type 1 (WPV1) and wild poliovirus type 3 (WPV3) serotypes. The fast-tracked development and introduction of a bivalent OPV formulation in 2009, and its scale-up globally in 2010, directly addresses this problem with a new vaccine that complements the existing armamentarium of monovalent and trivalent OPVs.

Although epidemiologic data as of May of 2010 must be interpreted cautiously due to reporting lag times and the seasonality of WPV transmission, the aggressive application of the operating principles of the new GPEI Strategic Plan 2010-2012 appears to be showing positive results (figure 2). Among the four endemic countries, WPV1 had not been detected for four months in northern Nigeria and the northern Indian states of Uttar Pradesh and Bihar. As importantly, two of the four countries with probable 're-established' transmission of an imported virus, the Democratic Republic of the Congo and Sudan, had not reported cases within the previous six months. Similarly, 10 of the 15 previously polio-free countries that were re-infected in 2009 had already stopped their outbreaks<sup>4</sup>.

Figure 2: Polio-reporting districts, Q4 2009-Q1 2010



<sup>4</sup> Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Côte d'Ivoire, Kenya, Niger, Togo and Uganda.

Recognizing the fragility of this progress given the substantial financing gap for eradication activities and the setbacks that have been encountered in the past, the new GPEI Strategic Plan 2010-2012 details seven major enabling factors that are designed to more proactively mitigate key risks: (1) A coordinated advocacy agenda has been established to help national governments ensure their commitment to polio eradication is translated into local action to improve the quality and coverage of mass polio immunization campaigns. (2) Programme communications is being revitalized by enhancing the data and evidence base for tailoring activities and by increasing capacity to sustain community engagement in, and acceptance of, OPV campaigns in priority areas. (3) A process for real-time monitoring and management of the global OPV supply is in place to optimize supply-demand, especially for new bivalent OPV products. (4) The technical assistance deployed by WHO and UNICEF to assist national capacity-building efforts is being expanded, particularly in areas of re-established transmission. (5) The GPEI research agenda is being tailored to address country-specific issues, systematically engaging national research and academic institutions in the process. (6) Given the chronic financing challenges the GPEI has faced, a more robust system has been established for prioritizing eradication activities, based on epidemiological risks, in the event of insufficient resources. (7) Intensified engagement of the core GPEI donor partners will expand the GPEI's capacity to mobilize sufficient domestic and international financing to implement the full schedule of activities called for in the new GPEI Strategic Plan 2010-2012. Accompanying this Strategic Plan is the GPEI Financial Resource Requirements 2010-2012 (FRR) document. Updated on a quarterly basis the FRR explains the full budget for the three-year period as well as the current financing gap which at April 2010 was approximately 50% of the 2010-2012 budget.

The four major milestones of the new GPEI Strategic Plan 2010-2012 (figure 3) will be internationally analyzed every quarter and graded as 'on-track', 'progressing but with issues of concern' or 'at risk for completion' to alert countries and stakeholders as to emerging risks and guide mid-course corrections. For milestones which are 'progressing but with issues of concern' or 'at risk for completion', the appropriate national or international Technical Advisory Group (TAG) will be asked to work with the relevant national authorities to establish a corrective plan within two weeks. A new global advisory body will evaluate the milestones and major process indicators, monitor corrective action plans and provide overall guidance on policy, strategy and priorities. This body will work closely with the Strategic Advisory Group of Experts on Immunization (SAGE), consulting on its findings at each of the six-monthly SAGE meetings.

Figure 3 - GPEI global milestones 2010-2013

By mid-2010	By end-2010	By end-2011	By end-2012	By end-2013
Cessation of all polio outbreaks with onset in 2009*	Cessation of all 're-established' poliovirus transmission**	Cessation of all polio transmission in at least two of the four endemic countries***	Cessation of all wild poliovirus transmission†	Initial validation of 2012 milestones††

\* validated when ≥ six months without a case genetically linked to a 2009 importation (i.e. by end-2010). The target for stopping any new outbreaks (i.e. with onset in 2010, 2011 or 2012) will be within six months of the confirmation of the index case.

\*\* validated when ≥ 12 months without a case genetically linked to the re-established virus (by end-2011).

\*\*\* validated when ≥12 months without a case genetically linked to an indigenous virus (by end-2012); the year-to-year change in the number of polio cases will be monitored quarterly for each endemic country to guide the assessment of progress towards this global milestone.

† validated when ≥ 12 months without a case genetically linked to an indigenous virus (by end-2013).

†† 'certification' will require at least three years of zero polio cases in the presence of appropriate surveillance across an entire epidemiologic region.

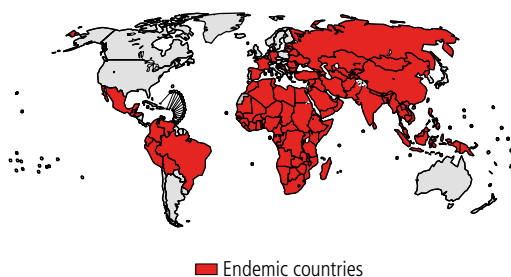
The aggressive, time-bound programme of work elaborated in this new GPEI Strategic Plan 2010-2012 exploits the lessons learnt from 20 years of experience in polio eradication. The GPEI Strategic Plan 2010-2012 was developed through an extensive consultative process with all major GPEI stakeholders, especially the endemic and re-established transmission countries. This process has led to a broad consensus that - with full financing and implementation - this Strategic Plan can lead to the interruption of the remaining reservoirs of WPV worldwide by 2013, setting the stage for eventual certification of that achievement and cessation of OPV use globally. The world now has its best opportunity ever to eradicate this devastating disease.

# 1. Global context

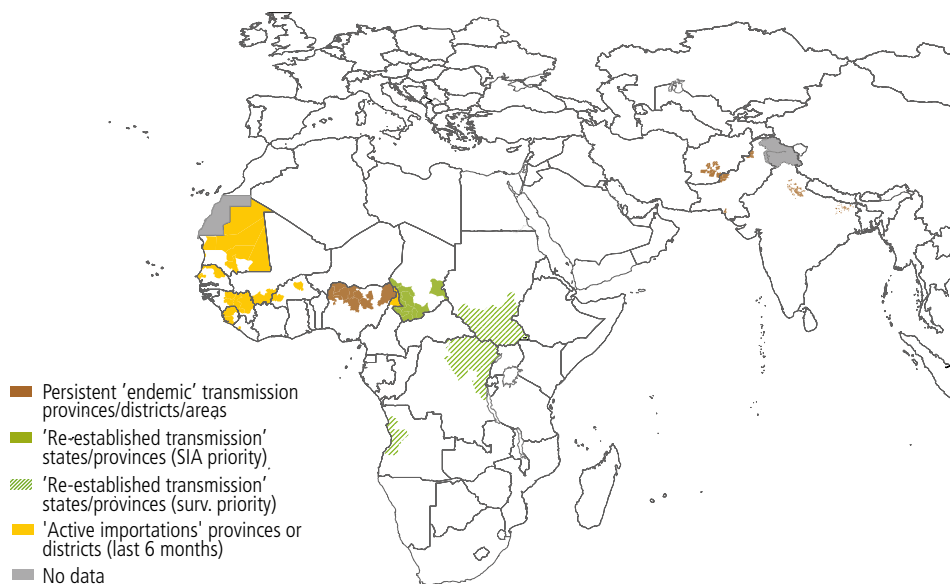
When the World Health Assembly (WHA) launched the Global Polio Eradication Initiative (GPEI) in 1988, over 125 countries were considered to be endemic for the disease (i.e., ongoing circulation of indigenous wild polioviruses - WPVs), with an estimated 350,000 children paralysed each year. Application of the four-pronged eradication strategy<sup>5</sup> developed in the Americas had by 2004 resulted in the eradication of one of the three serotypes of WPVs (WPV type 2 - last isolated in 1999), a 99% drop in the annual incidence of the disease globally, and the elimination of the remaining indigenous virus serotypes from all but six countries in the world.

**Worldwide there has been a 99% reduction in polio since 1988 – but progress had levelled out by 2005.**

Polio in 1988



Polio in 2010



**Since 2005: persistence of indigenous polio in four countries has been complicated by repeated re-infection of polio-free areas.**

<sup>5</sup> Overview available at <http://www.polioeradication.org/strategies.asp>

**2008: alarmed by stalled progress, WHA called for new plan to complete polio eradication.**

**An Independent Evaluation in 2009 assessed major barriers to reaching all children and a range of innovative approaches.**

Despite the development, licensure and widespread application of new monovalent oral poliovirus vaccines (OPVs) in 2005 to enhance the impact of supplementary immunization activities (SIAs) in key remaining reservoirs, and the intensification of the global eradication effort in 2007<sup>6</sup>, indigenous wild poliovirus type 1 (WPV1) and 3 (WPV3) transmission has continued in geographically limited areas of four countries: Nigeria, India, Pakistan and Afghanistan. The challenge of interrupting the residual WPV transmission in these areas has been compounded by the recurrent exportation of WPV from northern Nigeria and northern India into previously polio-free areas within and outside their borders. Many of these re-infected countries, particularly in sub-Saharan Africa, suffered substantial and recurrent polio outbreaks due to low routine immunization coverage (<80%), suboptimal outbreak response and weak health systems, together constituting a 'WPV importation belt' that stretched from west Africa, into central Africa and to the Horn of Africa. In four of these countries, the imported WPV was either known (Angola, Chad) or suspected (Democratic Republic of the Congo, southern Sudan) to have persisted for >12 months as of mid-2009, leading to their designation as having 're-established' transmission. In addition to these four 're-established transmission' countries, in 2009 a further 15 countries suffered new importations.

At its 61<sup>st</sup> session in May 2008, the WHA called for a new plan to complete the eradication effort. Consequently, a special one-year GPEI Programme of Work in 2009 was developed and implemented, to examine new vaccine formulations and delivery routes, test new operational approaches to reach children who were repeatedly being missed during SIAs in the endemic areas, and undertake a comprehensive *Independent Evaluation of Major Barriers to Interrupting Poliovirus Transmission* (hereafter referred to as *Independent Evaluation*). The 2009 Programme of Work also focused on supporting the rapid scale-up of those innovations that each endemic-country government deemed most important to raise the SIA coverage levels to those necessary to achieve the required 'threshold'. By end-2009, encouraging serologic, programmatic and epidemiologic data demonstrated that substantial progress had been made towards attaining these thresholds, particularly in the key reservoir areas of northern Nigeria and northern India.

In northern Nigeria, eight of twelve states had reduced the proportion of '0-dose' children (i.e. children who had previously never been immunized) to <10% by end-2009, with a subsequent 90% decline in polio cases due to WPV1, as a result of new engagement of state politicians and traditional leaders. In western Uttar Pradesh, India, serological surveys demonstrated that >95% of very young children were now protected against type 1 polio; and the government's rapid scale-up of health infrastructure in the Kosi river areas of Bihar, combined with the identification and systematic vaccination of more than five million children from migrant groups, had by end-2009 eliminated all but one genetic lineage of WPV1. In Pakistan and Afghanistan, the systematic application of objective SIA monitoring criteria, combined with environmental sampling in Karachi and Lahore (Pakistan), facilitated accurate identification and heightened political oversight of the remaining 'reservoir' districts, while the piloting of a range of new strategies in conflict-affected areas of Afghanistan demonstrated the feasibility of reaching sufficient children to interrupt the residual WPV transmission in these areas. Furthermore, by the first quarter of 2010, 10 of the 15 countries which had suffered new outbreaks due to WPV importations in late 2008 and 2009 had again stopped transmission, while two of the four 're-established transmission' countries (Democratic Republic of the Congo and southern Sudan) had not had a new case due to their re-established virus for >six months.

<sup>6</sup> WHA Resolution 60.40

The *Independent Evaluation* proposed a number of additional actions that could improve the prospects for interrupting the remaining WPV transmission globally in the near term, while reducing the long-term risks associated with the possible re-introduction of WPVs or the emergence of circulating vaccine-derived polioviruses (cVDPVs)<sup>7</sup>. In particular, the *Independent Evaluation* stressed the need to enhance the GPEI resources dedicated to interrupting WPV transmission in the re-established transmission countries (e.g. equivalent to the attention given to the four endemic countries), more systematically contribute to immunization systems strengthening, particularly across the 'WPV importation belt' of sub-Saharan Africa, and continue the rapid conduct and application of new research.

In October and November 2009, the outcomes of the 2009 Programme of Work were evaluated by the Strategic Advisory Group of Experts on Immunization (SAGE) and by a special consultation of the Advisory Committee on Poliomyelitis Eradication (ACPE) with technical experts, polio-infected country health authorities and major stakeholders, including implementing and donor partners. Both groups concluded that major developments in 2009 demonstrated that with stronger political and financial commitments the remaining barriers to achieving eradication could be addressed, warranting the development of a new three-year GPEI Strategic Plan 2010-2012 that aimed for the interruption of all WPV transmission in that period. In January 2010, the Executive Board of the WHA strongly supported the development of the new Strategic Plan.

The following sections of the GPEI Strategic Plan 2010-2012 summarize how the outcomes of the 2009 Programme of Work and recommendations of the *Independent Evaluation* will be combined with the core eradication strategies and, if appropriate, additional activities, to achieve and sustain the population immunity levels needed to detect and interrupt WPV transmission in each of the remaining infected areas. It sets out aggressive activities to achieve milestones which are measurable, time-bound and realistic. Significantly, the GPEI Strategic Plan 2010-2012 recognizes and exploits the differences in the epidemiology and broader health systems contexts in which the programme is operating in Asia and Africa (e.g. necessitating a different number and extent of SIAs in each area). Country-specific details can be accessed at [www.polioeradication.org](http://www.polioeradication.org).

As at the start of 2010, there were five major cross-cutting risks to the successful implementation of the full GPEI Strategic Plan 2010-2012. First, there is a risk of complacency in areas where virus transmission dropped rapidly in 2009 but where population immunity levels still remain below the threshold needed to ensure interruption of WPV and prevent its re-emergence (e.g. Kano, Nigeria). Secondly, the combination of new OPV products and a marked increase in the number of planned SIAs now threatens vaccine supply, requiring very close management through at least end-2010. Thirdly, with repeated SIAs, communities in some areas are displaying fatigue for repeated polio vaccination. Fourthly, the limited or lack of engagement by political leaders at the state/province and district levels to redress chronic problems of polio campaign quality in some polio-infected areas could remain suboptimal. Finally, although forthcoming economic research makes a strong case for investing heavily to finish the job of eradication<sup>8</sup>, insufficient international and domestic financing has required a prioritization of 2010 activities and a possible scaling back of the timeline for introducing some of the innovations that were developed in 2009.

**The new Strategic Plan couples the most promising new approaches to reach all children with a powerful new vaccine.**

**Full financing of new plan will be a major factor in its success.**

<sup>7</sup> *Independent Evaluation of Major Barriers to Interrupting Poliovirus Transmission - Executive Summary*. 20 October 2009. Available at [www.polioeradication.org](http://www.polioeradication.org).

<sup>8</sup> Thompson K and Tebbens RD, *The Economic Case for Polio Eradication*. Presentation to Financing the GPEI Strategic Plan 2010-2012 meeting, 24 February 2010, Geneva, Switzerland. More at <http://www.kidsrisk.harvard.edu/>

The GPEI Strategic Plan 2010-2012 includes key enabling factors designed to mitigate these risks. Ensuring sufficient domestic and international financing is foremost among the major enabling factors that are critical to fully implementing the GPEI Strategic Plan 2010-2012 (see section 4). The financial costs of the GPEI Strategic Plan 2010-2012 are presented in the accompanying *Financial Resource Requirements (FRR)* document which presents the corresponding three-year budgets for the activity plans of each country as well as the supporting functions of WHO and UNICEF. Reviewed and updated quarterly, the FRR is available at [www.polioeradication.org](http://www.polioeradication.org).

## 2. Guiding principles

### 2.1 Major lessons learnt

With the goal of interrupting the remaining chains of WPV transmission globally, the GPEI Strategic Plan 2010-2012 builds on the numerous important lessons that have been learnt through 20 years of polio eradication activities, particularly in the recent 'intensified' eradication effort of 2007-2009. Four of these lessons are fundamentally important to the new approaches outlined in the GPEI Strategic Plan 2010-2012 given their specific operational implications for finishing polio eradication (figure 1).

First, the evolving epidemiology of polio, supported by mathematical modelling, demonstrates that the population immunity thresholds needed to interrupt WPV transmission differ between the remaining infected areas, being higher in Asia, particularly northern India and parts of Pakistan, than Africa. This has allowed a tailoring of eradication strategy to local circumstances, improving programme efficiency. Secondly, it has become clear that endemic WPV transmission can persist, and imported WPVs be re-established, in much smaller geographic areas and population subgroups, than had been previously thought based on the progress in countries and Regions which are currently polio-free. This has led to the systematic development of district- and population-specific strategies and capacity to address heterogeneity in OPV coverage. Thirdly, the national and international spread of WPVs, and risk of subsequent outbreaks, now appears to be largely predictable, following known migration routes and exploiting weaknesses in health systems. While outbreaks can occur in other geographic areas where there are gaps in OPV coverage (as evidenced by the large outbreak confirmed in April 2010 in Tajikistan), this knowledge has facilitated a better targeting of efforts to improve population immunity in highest-risk areas by enhancing the quality of both SIAs and routine immunization systems. Fourthly, while monovalent OPVs have provided the GPEI with much more potent tools for rapidly building population immunity, optimizing the balance of monovalent OPVs has proven much more difficult than originally anticipated and may have contributed to alternating outbreaks of WPV1 and WPV3 in certain settings. The fast-tracked development and introduction of a completely new bivalent OPV formulation in 2009 directly addresses this problem.

The guiding principles of the GPEI Strategic Plan 2010-2012, in terms of its tailored geographical and common operational approaches, derive directly from these major lessons - resulting in a multi-pronged strategy for addressing the longstanding barriers to interrupting the remaining WPV transmission globally. Particular attention is given to the areas with persistent transmission of endemic or imported polioviruses<sup>9</sup>, as well as those at highest risk of re-infection, as together these areas hold the key to the GPEI's success.

**Four major lessons are fundamentally important to the new Strategic Plan.**

**Particular attention given to "persistent transmission" districts.**

<sup>9</sup> Persistent transmission area: areas in endemic and re-established transmission areas, which have either never interrupted WPV transmission or with sustained circulation for a period >12 months.

**Tactics are tailored to population immunity thresholds for stopping polio, which are higher in Asia than Africa.**

## 2.2 Geographic approaches

The differential progress by country towards polio eradication globally has long suggested that the population immunity thresholds at which WPV transmission stops can differ substantially between geographic areas, with implications for programme strategy, planning, and prioritization<sup>10,11</sup>. By late-2008, understanding of the efficacy of the different OPVs (trivalent OPV and monovalent OPVs) in different settings had improved to the point where the GPEI could quantify these thresholds<sup>12</sup>. Most significantly, it now appears that population immunity of >95% in children under five years of age is required to stop transmission in certain districts of India and Pakistan, while transmission in sub-Saharan Africa seems to cease soon after immunity exceeds a threshold of approximately 80%-85%.

Persistent transmission in Asia is now highly localized in a limited number of districts and sub-districts (e.g. 'blocks' in India), many of which have a very high population immunity threshold (>95%) for stopping transmission. Consequently, the approach in Asia focuses on district/block-specific plans to achieve exceptionally high coverage, with very frequent SIAs to exceed the necessary immunity thresholds (both humoral and mucosal). Given the very high immunity thresholds in these areas, the GPEI Strategic Plan 2010-2012 will also pilot or research a range of supplementary strategies (e.g. water/sanitation interventions, zinc supplementation, inactivated polio vaccine - IPV) to improve the effectiveness of vaccines in these settings and/or reduce the thresholds required to stop circulation.

By contrast, in sub-Saharan Africa, virus transmission persists over a much broader area and the population immunity threshold for interrupting transmission is significantly lower (i.e. approximately 80%-85%). The approach in Africa therefore focuses on high SIA coverage but in a lower number of campaigns over a substantially wider area, with state/province, national and even multi-country plans. Recognizing the problems of recurrent outbreaks following importations into previously polio-free areas, as well as the risk of emergence of cVDPVs<sup>13</sup>, in areas with weak health infrastructure the GPEI Strategic Plan 2010-2012 includes the implementation of pre-planned SIAs across the 'WPV importation belt' each year, enhanced technical assistance to re-established transmission areas, and further efforts to strengthen immunization systems.

While the primary emphasis of the GPEI Strategic Plan 2010-2012 is on interruption of the remaining chains of WPV transmission globally, it also gives renewed attention to enhancing surveillance outbreak response activities globally, including in polio-free areas which have been certified as such.

**The Plan also gives renewed attention to protecting polio-free areas**

10 New strategies for the elimination of polio from India. Grassly NC et al. *Science*. 2006 Nov 17; 314(5802):1150-3.

11 Effectiveness of immunization against paralytic poliomyelitis in Nigeria. Jenkins HE et al. *N Engl J Med*. 2008 Oct 16;359(16):1666-74.

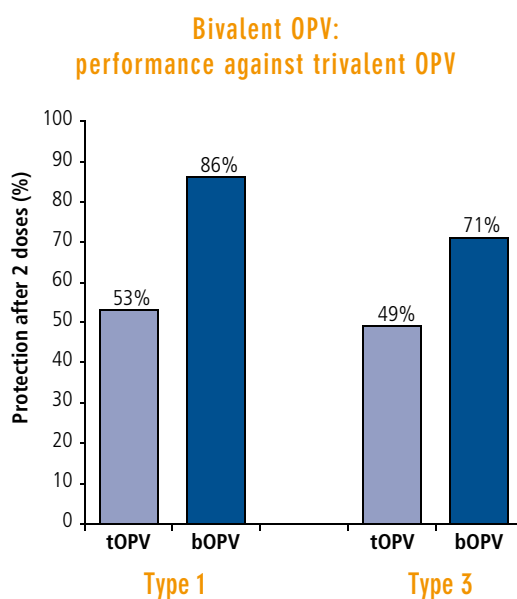
12 The vaccine efficacy estimates used in these threshold analyses were generated using case-control analyses and, in general, corroborated with subsequent seroprevalence studies.

13 A cVDPV is a live virus of Sabin origin, which has changed and reverted to a form that is able to cause paralysis in humans and has developed the capacity for sustained circulation.

## 2.3 Common operational approaches

In addition to employing and assessing a range of new country and area-specific tactics in 2009, the GPEI developed and/or refined a number of cross-cutting technical innovations and operational approaches that will be institutionalized through the GPEI Strategic Plan 2010-2012 to improve programme performance. These include the following:

- **Bivalent OPV:** first developed and licensed in 2009, this new vaccine offers substantial programmatic advantage by simultaneously generating immunity to both of the remaining WPV serotypes (types 1 and 3) which is 35%-40% higher per dose than that of trivalent OPV and similar to that of the respective monovalent OPV<sup>14</sup>. The large-scale use of bivalent OPV in SIAs would complement the continued use of trivalent OPV in some SIAs and in routine immunization, as well as of monovalent OPVs in some mop-ups and SIAs where appropriate.
- **State/district/block-specific plans:** the development of area-specific plans proved critical to finally establishing a consolidated approach to addressing the chronic and often unique operational challenges in a number of endemic areas. This approach will be institutionalized for both endemic and re-established transmission areas with updating on a four-to-six monthly basis. Implementation of these plans will be enhanced through refresher training of vaccinators and SIA workers wherever needed to optimize their skills.
- **Special teams and tactics for underserved populations:** special teams and tactics have proven to be essential for addressing the special needs of some population sub-groups and communities. In some settings, such groups play a particularly important role in sustaining polio transmission due to their highly mobile nature (e.g. nomads, migrant labourers), their being 'underserved' by or under-utilizing public services (e.g. minorities, Koranic schools), or a combination of both. Tailored plans and approaches for these populations will be developed in concert with local leaders and implemented with special teams, as appropriate.
- **Sub-national advocacy:** in a number of countries, including Pakistan, Nigeria and India, new mechanisms and criteria have been developed to measure and track the engagement of sub-national (e.g. state/province, district, union-council levels) political and administrative leaders to ensure that the full resources of state/provincial governments are applied to improve SIA performance and accountability. These approaches will be applied in the context of the above-mentioned 'district-specific' plans, particularly in other endemic and re-established transmission areas.



**New bivalent OPV increases campaign impact by simultaneously tackling types 1 & 3 polio with a higher efficacy vaccine.**

**District-specific plans and special approaches for underserved populations tackle chronic challenges to reaching sufficient children.**

<sup>14</sup> Randomized clinical trial of bivalent type 1 and 3 oral poliovirus vaccine. In press.

**There is a new role for serosurveys, environmental sampling and research to guide strategy.**

- *Short Interval Additional Dose (SIAD) strategy:* this strategy exploits the availability of monovalent OPVs to shorten the interval between SIAs in selected high-risk, infected and/or insecure areas, thereby building population immunity and terminating outbreaks and endemic transmission more rapidly. In 2009, new work to refine the SIAD operations will be applied to stop transmission more rapidly following new importations, optimize access opportunities in insecure areas, and improve operations in some re-established transmission areas.
- *Monitoring of SIA coverage:* the gap in credible and timely SIA coverage data to assess risks and guide improvements has been a continuing constraint, in both endemic and in re-infected countries. In response, in late-2009, new protocols and criteria were established to allow improved, real-time independent monitoring of SIAs, with validation through Lot Quality Assurance Sampling (LQAS) where needed (i.e. in areas of discordant epidemiologic and SIA monitoring data). From 2010, the results of independent SIA monitoring will be internationally posted within two weeks of each campaign. Areas identified as having <90% coverage will be immediately re-covered, with corrective measures implemented in advance of the subsequent SIA.
- *Expanded environmental sampling:* the expansion of environmental sampling to areas such as Karachi and Lahore (Pakistan) reaffirmed the utility of this tool in endemic areas, particularly to differentiate reservoir areas (i.e. those with persistent transmission) from those which are repeatedly re-infected, and to maintain programme intensity in such reservoirs in the absence of paralytic polio cases.
- *Serologic surveys:* in India, serologic surveys proved particularly valuable to document programme status, assess prospects and adjust plans by more accurately determining population immunity. New techniques to simplify serologic survey logistics will be exploited in the new GPEI Strategic Plan 2010-2012 to extend this approach to other key endemic areas.
- *Enhanced AFP surveillance:* in 2008-2009, major progress was made in closing persistent gaps in acute flaccid paralysis (AFP) surveillance by enhancing the scrutiny of standard performance indicators, conducting targeted surveillance reviews and deploying additional human resources to priority areas such as Chad and southern Sudan. This experience will guide further investments in 2010-2012.
- *Area and issue-specific research:* operational research that is tailored to the specific challenges of each remaining endemic area (e.g. optimizing mucosal immunity in India; LQAS in Nigeria) and key eradication issues (e.g. SIADs for outbreak response) will be applied more systematically in 2010-2012.
- *Enhancing communications/social mobilization in priority areas:* the use of AFP and SIA data to systematically identify underserved and under-immunized populations allowed much more accurate targeting of communications interventions in northern Nigeria, northern India and parts of Pakistan. This approach will be complemented by regular assessments of community perceptions and knowledge to guide strategies for demand creation, periodic evaluations of communication outcomes and impact, exploration of options for externally contracting specific activities, and scaling-up of UNICEF's communications capacity at global, regional and country levels.

- *Rehabilitation of polio-affected individuals*: people affected by polio can be isolated and excluded from experiences enjoyed by others in their communities. To help address this inequity, the GPEI will pilot an initiative to assess and improve access to rehabilitation services. This will include using health and surveillance personnel to provide simple advice to parents to minimize the physical impairments of polio, identifying mechanisms to support early intervention for children with AFP, developing rehabilitation referral networks, and implementing pilot projects to strengthen country rehabilitation capacity.

The relative importance and emphasis of each of these common operational approaches differs by country, depending on the local programmatic barriers to reaching all children with OPV and interrupting WPV transmission. Consequently, these differences are reflected in the country-specific sections (3.1 and 3.2) of the Strategic Plan and in the national plans of action (available at [www.polioeradication.org](http://www.polioeradication.org)).

## 2.4 Major process indicators:

The GPEI Strategic Plan 2010-2012 includes major process indicators for each polio-infected country (see objectives 3.1 and 3.2). These process indicators reflect estimates of the minimum level of polio campaign performance (e.g. 'missed children') or OPV coverage among young children (e.g. '0-dose children') that must be achieved and sustained to interrupt WPV transmission in that setting. These performance indicators and targets are based on a combination of (a) OPV coverage and SIA performance data from areas which are currently (or were previously) polio-free within the same country, and (b) the estimated minimum population immunity thresholds needed to stop transmission in the remaining endemic areas. Recognizing the particular challenges to achieving such coverage levels in the remaining polio-endemic areas, the 2010 process indicators primarily track whether such a coverage level has *ever* been achieved in that year, while the 2011 process indicators track whether the coverage level is *sustained* long enough to exceed the minimum estimated population immunity threshold for 12 consecutive months. These indicators will be complemented with additional SIA process indicators in the country-specific plans and tracked and updated by national technical advisory bodies. Recognizing that the first major milestone for the interruption of endemic poliovirus transmission is measured only at end-2011, the year-to-year change in the number of reported polio cases in each endemic country will also be monitored internationally on a quarterly basis to guide the assessment of progress towards this global milestone.

**Independent, quarterly assessments of major milestones will enable mid-course corrections.**