Global Polio Eradication Initiative

PROGRAMME OF WORK 2009 and FINANCIAL RESOURCE REQUIREMENTS 2009-2013

as of May 2009

World Health Organization

CDC Centers for Disease Control and Prevention

unicef

Design & Layout: Paprika

WHO/POLIO/09.02

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1. Context

2009 marks the end of the Global Polio Eradication Initiative (GPEI) Strategic Plan (2004-2008). It is characterised by the continuation of the *intensified polio eradication effort*, clinical trials on new eradication tools (eg bivalent OPV), assessments of new strategic approaches for endemic areas, additional activities to limit international spread, and - most importantly - a major independent evaluation of the *intensified polio eradication effort* at its 24-month mark.

As these activities will have major implications for the finalization of the new multi-year Strategic Plan, 2009 constitutes a 'bridge' year, during which the GPEI's one-year Programme of Work will be used to guide the work of the GPEI partnership and provide a reporting platform for stakeholders.

The new Strategic Plan, requested by the World Health Assembly in May 2008, will be fully aligned with the findings of the 2009 Programme of Work, with publication in January 2010.

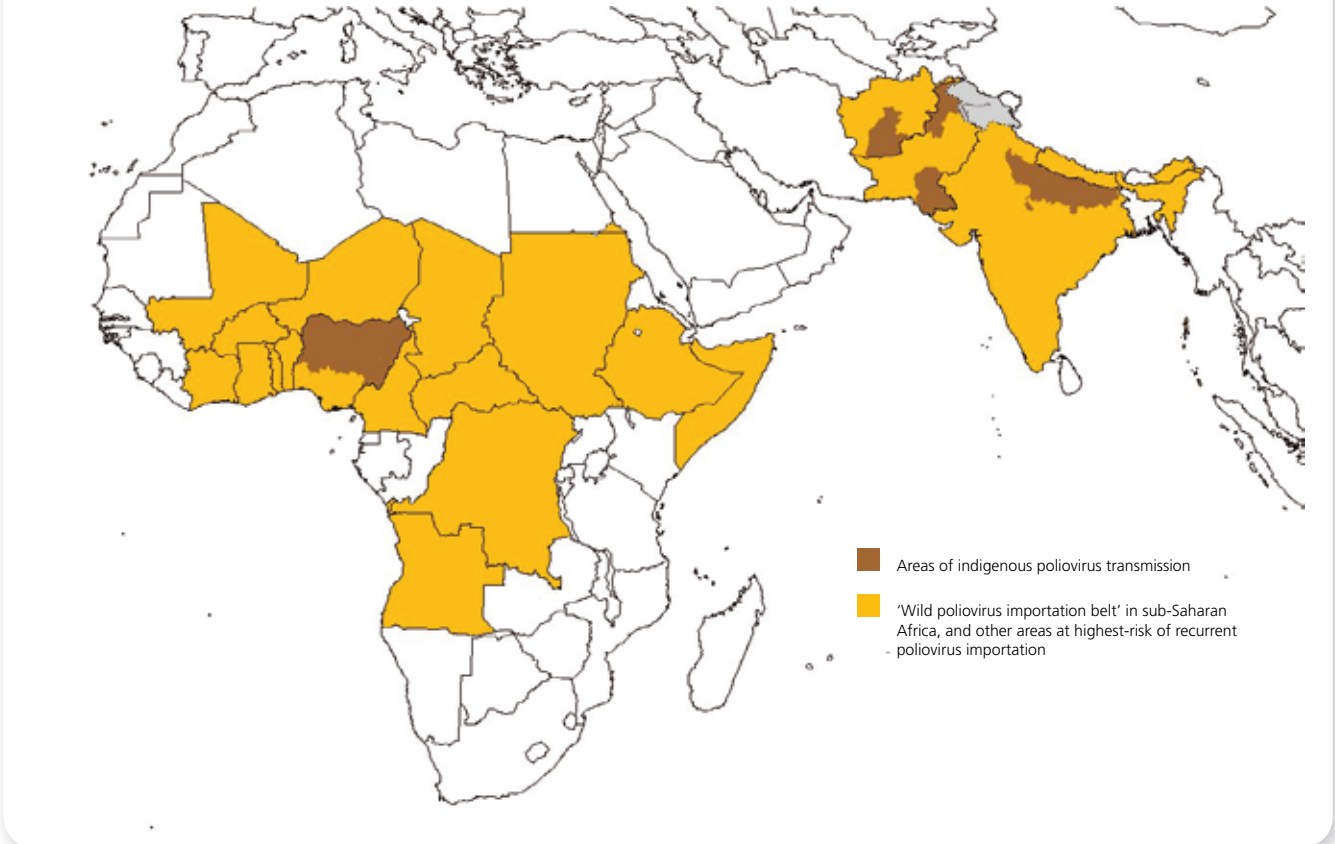
2. Situation analysis

At end-2008, indigenous type 1 and 3 wild poliovirus continued to circulate in focal areas of all four of the endemic countries (Nigeria, India, Pakistan and Afghanistan). Three re-infected countries (Angola, Chad and Sudan) still had ongoing circulation of imported poliovirus for >12 months. An additional eight countries were responding to new importation-associated outbreaks, most in the 'wild poliovirus importation belt' in sub-Saharan Africa.

Assessments of the *intensified eradication effort* in late 2008 by two advisory bodies to WHO - the Advisory Committee on Poliomyelitis Eradication (ACPE) and the Strategic Advisory Group of Experts on Immunization (SAGE) - concluded that the remaining technical, operational and financial challenges to interrupting wild poliovirus transmission globally can be overcome. However, the groups identified specific barriers that would need to be addressed in each of the remaining polio-infected areas to achieve the specific levels of population immunity required:
India: suboptimal efficacy of OPV in the remaining endemic states (Uttar Pradesh and Bihar).
Nigeria: suboptimal OPV coverage in northern states due to weak SIA planning, implementation and monitoring and weak community engagement.
Pakistan: inconsistent engagement/accountability of district-level leadership in Sindh province (especially Karachi), and access to children in insecure areas of North West Frontier Province (NWFP)/Federal Administered Tribal Areas (FATA).
Afghanistan: suboptimal OPV coverage in three provinces of the Southern Region due mainly to ongoing conflict.

In addition, the groups highlighted the need for full implementation of additional activities to limit international spread of polio from these areas and full implementation of the World Health Assembly's outbreak response standards (Resolution WHA59.1) to stop ongoing and new outbreaks, especially in Angola, Chad and Sudan.

Figure 1: Areas of indigenous transmission and 'wild poliovirus importation belt'



3. Programme of Work 2009

3.1 Sustained implementation of core eradication strategies

All polio-infected areas will continue to prioritize interruption of type 1 polio transmission, by continued implementation of large-scale supplementary immunization activities (SIAs), with an appropriate mix of monovalent OPVs and trivalent OPV. Depending on the outcomes of a clinical trial and tender, the SIA strategy will be complemented with bivalent OPV in late 2009 (see section 3.4, development and evaluation of new tools).

Critical to the success of this continued SIA strategy will be improving the quality of these activities through full political and societal engagement, to reach every child with OPV during every SIA. To help ensure quality of SIAs and adapt strategies as needed, international technical assistance will be supplemented, advocacy, social mobilization and communication plans will be closely monitored, and the entire national programmes will be regularly reviewed by joint national and international advisory bodies. Particular attention will also be given to ensuring optimal potency of all vaccine products used in the programme, particularly in the areas of suboptimal OPV efficacy in India.

Major expected result: >90% coverage in all infected and endemic areas, as verified by independent monitoring of finger-marked children.

3.2 Evaluation of major barriers identified in the *intensified eradication effort*

In 2009, an independent evaluation will be conducted to establish plans of action to address the major remaining barriers to achieving sufficient population immunity in each area, as identified by the ACPE and SAGE. The Executive Board of the World Health Assembly in January 2009 asked to be apprised on the outcomes of the evaluation by January 2010.

The evaluation will be overseen by an Oversight Committee, comprised of one senior representative of each of the four spearheading partners (WHO, Rotary International, the US Centers for Disease Control and Prevention and UNICEF), who are not directly involved in the GPEI implementation or oversight. Evaluation teams will be appointed by the Oversight Committee, and comprised of internationally-recognized experts in public health programme implementation and in the primary challenges identified in each endemic area, and a senior public health expert from each endemic country who is not directly implementing polio eradication activities.

An evaluation team will examine the primary barrier(s) in each endemic area, review the management, supervision and implementation of polio SIAs, and propose area-specific plans for addressing the primary barriers and any other major factors that are compromising population immunity. Another team will assess the risk and consequences of international spread of wild polioviruses, evaluate the quality of outbreak response activities and propose additional measures to stop further international spread.

Recommendations from the evaluation are expected by September, will inform the new multi-year Strategic Plan. The Strategic Plan will be reviewed by the ACPE and shared with SAGE in November, with finalization by end-2009.

Major expected result: Development and incorporation of area-specific plans to address the major barrier(s) to completing eradication in each endemic area and additional activities to limit international spread of polio.

3.3 Assessment of new strategic approaches in each endemic country

In each of the four countries with ongoing transmission of indigenous wild poliovirus, the core eradication strategies will be complemented by new country-specific approaches which will be assessed throughout 2009.

Nigeria

In February 2009, the governors of the 36 states collectively signed the 'Abuja Commitments to Polio Eradication in Nigeria', publicly committing themselves to provide the necessary leadership to mobilize the state- and Local Government Area (LGA) civil administrations to eradicate polio. Such action has been shown to significantly improve the quality of SIA operations, as seen in Jigawa in 2008, a previously high-risk state where the proportion of under-immunized children decreased from 58% to 20% in 12 months. The 'Abuja Commitments' provides a framework to improve SIA operations at the LGA level. A tracking system will be established by the Ministry of Health to monitor its implementation and identify and rectify any remaining gaps in quality due to suboptimal SIA planning, implementation and/or community engagement. These activities will be complemented by new research, to critically assess the impact of Immunization Plus Days (IPDs) and the risk factors for non-vaccination during both routine immunization and SIAs.

In addition, given the critical need to enhance community awareness and engagement in the polio eradication effort in northern Nigeria, UNICEF will lead a strengthening of the GPEI's technical assistance for communications in the highest-risk states.

Major expected result: By Q4 2009, the percentage of missed children during SIAs in each of the ten highest-risk states in northern Nigeria will be reduced to <10% (from 21% in 2008), while maintaining high levels of immunization coverage in the remainder of the country.

India

In 2009, a five-arm clinical trial will be conducted in India, to evaluate the residual immunity gap among young children in western Uttar Pradesh and adapt strategies to close this gap using a higher-titre mOPV1 and/or whole or fractional ($1/5^{th}$) IPV doses. 1,000 children aged 6-9 months will be enrolled between the April and May SIAs. Results of the clinical trial will be available by August, for review by the India Expert Advisory Group on Polio Eradication (IEAG).

In addition, a bivalent OPV formulation will be assessed as a potential complementary tool (see section 3.4, development and evaluation of new tools). Finally, the potency of mOPV1 products used in the India programme will be further scrutinized to ensure optimal potency.

Major expected result: Adaptation of India SIA strategy based on outcomes of clinical trial.

Pakistan

In February 2009, Prime Minister Syed Yousuf Raza Gilani launched a 'Polio Action Plan', to secure multi-sectoral engagement in polio SIAs and to establish greater provincial and district-level accountability for their quality. Full application of the 'Polio Action Plan' will be especially important in Sindh province, which is fully accessible and has been a long-standing poliovirus reservoir from where polio-free areas have been repeatedly re-infected. Karachi will be of particular importance, due to its large population size, frequent population movements and sub-optimal SIA quality in its highest-risk townships. To help ensure SIA operations in Karachi improve through full application of the Prime Minister's 'Polio Action Plan', a tracking system will be established by the Ministry of Health to monitor the engagement of township leadership in the ten high-risk townships, and guide corrective action as needed.

In NWFP/FATA, a multi-faceted approach will be implemented to reduce the proportion of missed children in the six high-risk districts which accounted for more than 25% of the missed children in NWFP/FATA at the start of 2009. In between large-scale SIAs, any lull in conflict will be used to deliver an extra dose of monovalent OPV to communities living in security-compromised areas (ie the Short Interval Additional Dose Strategy, or SIAD). Quarterly programme reviews will quantify and prioritize the districts based on the evolving security situation and the size and movements of the affected population. Accessibility and population movements will be mapped and special vaccination teams will track and immunize children at gathering sites and internally-displaced population (IPD) camps.

In addition to these programmatic activities, seroprevalence surveys will be conducted to validate programme performance and evaluate vaccine efficacy in Karachi, Lahore and Peshawar. Environmental sampling will be introduced in Karachi to supplement the capacity of AFP surveillance to track wild polioviruses and guide SIA strategy.

Major expected result:

- In all townships of Karachi, SIA coverage achieving 90% by Q4 2009, as verified by independent monitoring of finger-marked children.
- In six highest-risk districts of NWFP/FATA, proportion of zero-dose children reduced to <10% by Q4 2009, as verified per non-polio AFP data.

Afghanistan

In 2009, focus will be on increasing access to populations in security-compromised areas of the Southern Region, especially in the 11 highest-risk districts of three provinces - Hilmand, Kandahar and Uruzgan which together account for 18% of missed children at the start of 2009. Three potential options for Days of Tranquillity will be discussed with NATO/ISAF to increase access to these populations by vaccination teams during large-scale SIAs. The options are: Days of Tranquillity in all provinces of the Southern Region simultaneously during each SIA; Days of Tranquillity in the three provinces of Hilmand, Kandahar and Uruzgan; and, Days of Tranquillity in the 11 highest-risk districts during five National Immunization Days (NIDs) in 2009.

A further major goal for 2009 is to secure the full engagement in SIAs of the NGOs contracted by the Government of Afghanistan to deliver basic package of health services (BPHS) in the Southern Region.

Major expected result: By end-2009, proportion of missed children reduced to <10% in the 11 highest-risk districts of three provinces of Southern Region - Hilmand, Kandahar and Uruzgan (from 18% at the start of 2009).

3.4 Development and evaluation of new tools

In 2009, the development and evaluation of a number of new tools will be fast-tracked to maximise the impact of eradication efforts.

Bivalent OPV

Given the continued circulation of both type 1 and 3 indigenous polioviruses, a bivalent OPV (bOPV) could substantially simplify the logistics of polio eradication in at least three endemic areas (Nigeria, Pakistan and Afghanistan), bordering countries at high-risk of re-infection, and some re-infected areas (eg Angola, Chad and Sudan).

In 2009, clinical trial lots will be produced, a trial conducted (to evaluate the rate of seroconversion to each serotype in the bOPV, with that of the respective monovalent OPV and trivalent OPV), and a tender issued. The feasibility of fast-tracking regulatory processes will be explored, and each potential bOPV manufacturer (ie producers of at least one WHO pre-qualified OPV product) will be approached to ensure sufficient bOPV products and volumes can rapidly be made available to the GPEI if the clinical trial confirms a role for this product.

Intradermal IPV

Recognizing the need to explore all possible approaches to boosting immunity as rapidly as possible in infected areas, the GPEI will assess the impact of fractional dose and whole-dose IPV as a supplement to OPV. Given the operational challenges of administering an injectable vaccine on a large-scale, a clinical trial will be conducted to test the viability of using needle-free jet injectors to deliver the fractional doses intra-dermally (see 'India' in section 3.3, assessment of new strategic approaches in each endemic country).

Seroprevalence surveys

In areas of discordant programmatic performance and epidemiology, seroprevalence surveys will be implemented to verify programme performance and evaluate vaccine efficacy. In 2009, antibody levels will be assessed in 1,000 children as part of a clinical trial in western Uttar Pradesh, India, and in 1,200 children in three sites of Pakistan (Karachi, Lahore and Peshawar).

Real-time PCR

To further accelerate the identification of wild polioviruses and improve detection of VDPVs, a new state-of-the-art diagnostic method – real-time Reverse Transcriptase Polymerase Chain Reaction (RT-PCR) – is being introduced into the Global Polio Laboratory Network (GPLN). Piloted in 2008, the programme experience with the new methods will be re-assessed in June 2009 and prior to introduction into all endemic regions by end-2009.

Targeted environmental surveillance

Systematic environmental surveillance in multiple sites in Egypt and Mumbai, India provided important supplemental insights into the status of key poliovirus reservoirs and the adaption of eradication strategies in those settings. In 2009, environmental surveillance will be expanded to Karachi, Pakistan to supplement AFP surveillance in this key reservoir and guide eradication strategies.

Major expected result:

- Bivalent OPV: licensing and introduction of at least two bOPV products by Q4 2009, if superiority is demonstrated to trivalent OPV in clinical trial.
- Intradermal IPV: completion of clinical trial and review by ACPE.
- Seroprevalence surveys: seroprevalence surveys conducted in western Uttar Pradesh, India, and Karachi, Lahore and Peshawar, Pakistan.
- Real-time PCR: Roll-out of RT-PCR to all appropriate laboratories in the 3 WHO endemic regions by end-2009.
- Targeted environmental surveillance: environmental surveillance established in Karachi, Pakistan.

3.5 Implementation of additional activities to limit international spread and stop outbreaks

In 2009, additional activities will be implemented to minimize the risk and consequences of international spread of polio, as well as to stop new outbreaks and persistent outbreaks (ie where transmission of imported poliovirus has persisted for >12 months).

Institutionalizing 24-month SIA plans in highest-risk countries

Experience of the international spread of wild polioviruses since 2000 has clearly identified areas at highest-risk of importations and persistent outbreaks, from both Nigeria (ie west Africa, Chad and the Horn of Africa) and India (ie Angola, the Democratic Republic of Congo and Nepal).

While almost all highest-risk countries have conducted at least two SIAs in the last five years, SIA quality has been frequently sub-optimal, in part because of short timeframes for planning. In the highest-risk countries, particularly in the 'wild poliovirus importation belt' in sub-Saharan Africa (see figure 1 in section 2, situation analysis), a rolling 24-month SIA plan will be institutionalized, to improve the proportion of children immunized by enhancing the time for planning.

Independent, international assessment of outbreak response in countries where transmission persists for >6 months

To accelerate interruption of persistent transmission of imported polioviruses, independent international assessments will be introduced to monitor the quality of outbreak response activities and assess compliance with the international guidelines adopted by the World Health Assembly in May 2006 (Resolution WHA59.1). The Global Outbreak Alert & Response Network (GOARN) will be asked to undertake such assessments in any country where a) transmission persists for >6 months after identification of the index case, and/or b) there is 'breakthrough' transmission after three large-scale SIAs. Technical assistance will be scaled up as appropriate to support countries in outbreak response efforts, with priority to areas with weakest national and subnational capacity.

Country-specific outbreak response readiness plans

To ensure rapid detection of an importation and facilitate the most effective outbreak response, all countries in the 'wild poliovirus importation belt' in sub-Saharan Africa will be advised and requested to update their outbreak response readiness plans.

OPV recommendations for residents travelling from polio-infected areas

At end-2008, the ACPE examined new measures to reduce the risk of international spread of poliovirus. In 2009, the OPV immunization recommendations for residents travelling from polio-infected areas will be updated in WHO's *International Travel & Health*, in accordance with ACPE recommendations and in response to requests for such guidance from polio-free countries.

Major expected result:

- Institutionalizing 24-month SIA plans in highest-risk countries: financing in place for first 12 months of 24-month SIA plan.
- Independent, international assessment of outbreak response: independent assessments conducted in Angola, Chad and Sudan.
- Outbreak response readiness plans: plans updated in all 18 countries in the 'wild poliovirus importation belt' in sub-Saharan Africa.
- Polio immunization of travellers: ACPE recommendations published in WHO's *International Travel & Health*.

3.6 Assessment and strengthening of subnational surveillance sensitivity

The GPEI has established capacity for ongoing, active surveillance of acute flaccid paralysis (AFP) cases globally. Since 2005, surveillance sensitivity has increased in the three remaining endemic regions, following the ACPE recommendation of a new operational target of at least 2/100,000 for the non-polio AFP rate in endemic, re-infected and high-risk countries.

However, subnational surveillance gaps have persisted, most notably in key areas of central Africa and the Horn of Africa, as evidenced by the detection of 'long-chain' polioviruses in Angola, Chad, Ethiopia and Sudan, in 2007-2008.

Such subnational surveillance gaps will be rapidly addressed in 2009, and high-quality surveillance sustained in other countries deemed at high-risk of importations. At the same time, in polio-free regions increased attention will be given to revitalizing surveillance to ensure rapid detection of both importations and cVDPVs. In 2009, areas for enhancing AFP surveillance will be prioritised based on their programmatic importance, as follows:

Areas with >12 months of undetected wild poliovirus transmission in the past five years

Field-level surveillance reviews will be conducted to assess subnational AFP surveillance performance and gaps in Angola, Chad, Ethiopia and Sudan. Technical assistance and resources will be scaled-up as necessary in response to the review findings.

Areas at highest-risk of importations

Quarterly desk reviews will be conducted at the regional and global levels, to more closely monitor national and subnational surveillance and performance in such areas, and identify gaps for corrective action. As necessary, field-level surveillance reviews in areas identified as having performance deficits will be implemented. Priority will be given to areas in the 'wild poliovirus importation belt' in sub-Saharan Africa.

Rest of world

In polio-free regions and areas at lower risk of importations, annual reviews of surveillance will be undertaken at the regional levels to identify any performance gaps. Formal communications from Regional Certification Committees (RCCs) will be sent to countries where such gaps are identified.

Major expected result:

- Areas with >12 months of undetected wild poliovirus transmission in the past five years: achieve non-polio AFP rate >2 in all provinces/states.
- Areas at highest-risk of importations: completion of at least two desk reviews and initiation of corrective measures as needed.
- Rest of world: reviews conducted in each polio-free region, and results formally communicated to relevant Member States.

3.7 Development of post-eradication policy

In 2008, the World Health Assembly resolved that the cornerstone to the management of the long-term risks of VAPP and VDPVs must be the eventual cessation of the use of OPV in routine immunization programmes (Resolution WHA61.1). The World Health Assembly further requested that WHO set, if and when appropriate, a date for this eventual cessation of OPV in routine immunization programmes.

2009 will focus on accelerating activities for the development of the tools and policies needed to minimise and manage the long-term risks of polio, in particular those activities which will require international coordination: the eventual synchronization of OPV cessation; the containment of wild and Sabin polioviruses; and, internationally-agreed processes for the use of mOPVs in response to cVDPVs immediately following OPV cessation.

This work has been facilitated by the reconstitution in June 2008 of the Polio Research Committee, which provides guidance to the GPEI by identifying knowledge gaps, proposing studies, determining research priorities and engaging potential new collaborators.

Priorities for 2009 include the following:

Characterisation of VDPV risks

Studies will be initiated in low- and middle-income countries to better quantify and characterise the risks of immunodeficiency-associated excretion of VDPVs (iVDPVs). New laboratory procedures (RT-PCR) will be expanded to enable a further quantification of the incidence and prevalence of VDPVs.

Risk management strategies

To prepare for international consensus on the long-term containment of all polioviruses, the third edition of the *Global Action Plan to minimize post eradication poliovirus facility-associated risk* (GAPIII) will be updated, posted for public comment and finalized. Given this progress on GAPIII, an initial tender will be issued for bulk vaccine for a stockpile of monovalent OPV for use in the post-eradication era. In 2009, work will begin to evaluate to selected antiviral compounds for proof of concept with respect to their ability to reduce or stop virus shedding. If successful, such antiviral drugs may be used to treat chronic iVDPVs, and as a potential adjuvant to the management of cVDPVs.

'Affordable' IPV options and policy for low- and middle-income countries

In 2009, the research agenda on establishing affordable IPV options for low- and middle-income settings will be further expanded. A new clinical trial will be conducted to generate data on the protection conferred by 1- and 2-dose IPV schedules, delivered either intra-dermally (ie fractional dose) or intra-muscularly (ie whole-dose). The clinical development phase of the Sabin-IPV project will be initiated and four approaches will be evaluated for development of other alternate seed strains for IPV, to facilitate production in low-cost settings.

This research will inform the work of the SAGE IPV working group to fully evaluate policy options for IPV use in low- and low-middle income countries in the post-eradication era. The SAGE IPV working group will also review the scientific basis for a new WHO position paper on polio immunization in the pre-eradication era, covering the roles of both IPV and OPV.

Major expected result:

- Characterising VDPV risks: at least two studies initiated to quantify iVDPV risks in low- and middle-income settings.
- Risk management strategies: GAPIII finalized; initial mOPV stockpile tender awarded.
- 'Affordable' IPV options and policy for low- and low-middle income countries: initiation of clinical development phase of Sabin-IPV project; WHO position paper on polio immunization in the pre-eradication era drafted.

3.8 Finalization of multi-year Strategic Plan and budget

The finalization of the new five-year Strategic Plan will be based on the Framework of the Strategic Plan, developed in late 2008 (available at www.polioeradication.org), and informed by the 2009 Programme of Work.

The new Strategic Plan will have five objectives to achieve the ultimate goal of the GPEI: to ensure that no child will ever again be paralysed by either a wild or vaccine-derived poliovirus. The five objectives are:

1. to interrupt wild poliovirus transmission;
2. to ensure sustainable surveillance for polioviruses;
3. to achieve certification and containment of wild polioviruses;
4. to prepare for VAPP and VDPV elimination and the post-OPV era; and,
5. to re-structure the GPEI infrastructure for the VAPP/VDPV Elimination Phase.

Of the five objectives, the overriding priority will continue to be the interruption of wild poliovirus transmission, as achieving the expected results of the other objectives are in large part contingent on achieving this first objective.

Implementing all activities in the Strategic Plan requires full ownership and engagement of the political leadership at all levels in the remaining polio-infected countries. It also requires the continued support of the international development community to rapidly make available the necessary financial resources. To this effect, the GPEI has developed a five-year corresponding budget to the multi-year Strategic Plan, summarising the funding needed to successfully interrupt wild poliovirus transmission globally and prepare for the post-eradication era.

Major expected result:

- Multi-year Strategic Plan: finalization of new five-year Strategic Plan by end-2009, for publication in January 2010.
- Financing: full financing of the 2009 GPEI Programme of work by June.

4. Budget and Financial Resource Requirements 2009-2013

Funding commitments to the GPEI since the World Health Assembly resolution to eradicate polio in 1988 total US$7.5 billion. In addition to contributions by national governments to their own polio eradication efforts, 47 public and private sector funders have contributed more than US$1 million to polio eradication, with 20 of these having contributed US$25 million or more.

Table 1 highlights contributions/pledges by major donor to the GPEI for the period 1988-2013. Figure 2 presents the GPEI funding chart, highlighting the US$7.5 billion in financial commitments since 1988 and the 2009-2013 funding gaps.

External contributions to national polio eradication efforts have been complemented by in-country resources, including both financial expenditures and non-monetary, in-kind contributions such as the time spent by volunteers, health workers and others in the planning and implementation of SIAs. Funds are expended by governments, the private sector and non-governmental organizations at national, state/province, district and local community levels to cover petrol, social mobilization, training and other costs, and are estimated to have had a dollar value approximately equal to that of international financial contributions.[1] Of note, the Government of India set aside up to US$226 million in its 2008-2009 budget to support its polio eradication effort. In 2008, the Governments of Nigeria and Pakistan contributed US$22 million and US$20 million, respectively, to their polio eradication programmes.

Table 1: Donor profile for 1988-2013

Contribution (US$ million)	Public Sector Partners	Development Banks	Private Sector Partners
> 1,000	United States of America		Rotary International
500 - 1,000	United Kingdom	World Bank	Bill and Melinda Gates Foundation
250 - 499	Japan, Canada		
100 - 249	European Commission, Germany, Netherlands, GAVI/IFFIm, WHO Regular Budget		
50 - 99	Norway, UNICEF Regular Resources		
25 - 49	Denmark, France, Italy, Sweden, Russian Federation		United Nations Foundation
5 - 24	Australia, Ireland, Luxembourg, Spain		Sanofi Pasteur, IFPMA, UNICEF National Committees, American Red Cross, Oil for Food Program
1 - 4	Austria, Belgium, Finland, Kuwait, Malaysia, New Zealand, Saudi Arabia, Switzerland, United Arab Emirates	Inter-American Development Bank, African Development Bank	Advantage Trust (HK), De Beers, International Federation of Red Cross and Red Crescent Societies, Pew Charitable Trust, Wyeth, Shinnyo-en, OPEC Fund

1 Aylward R, et al, Politics and practicalities of polio eradication, Global Public Goods for Health. Health Economic and Public Health Perspectives, eds Smith R, Beaglehole R, Woodward D, Drager N, Oxford University Press, 2003.

Figure 2: Annual Expenditure, 1988-2008
Financial Resource Requirements, Contributions, Funding Gap, 2009-2013

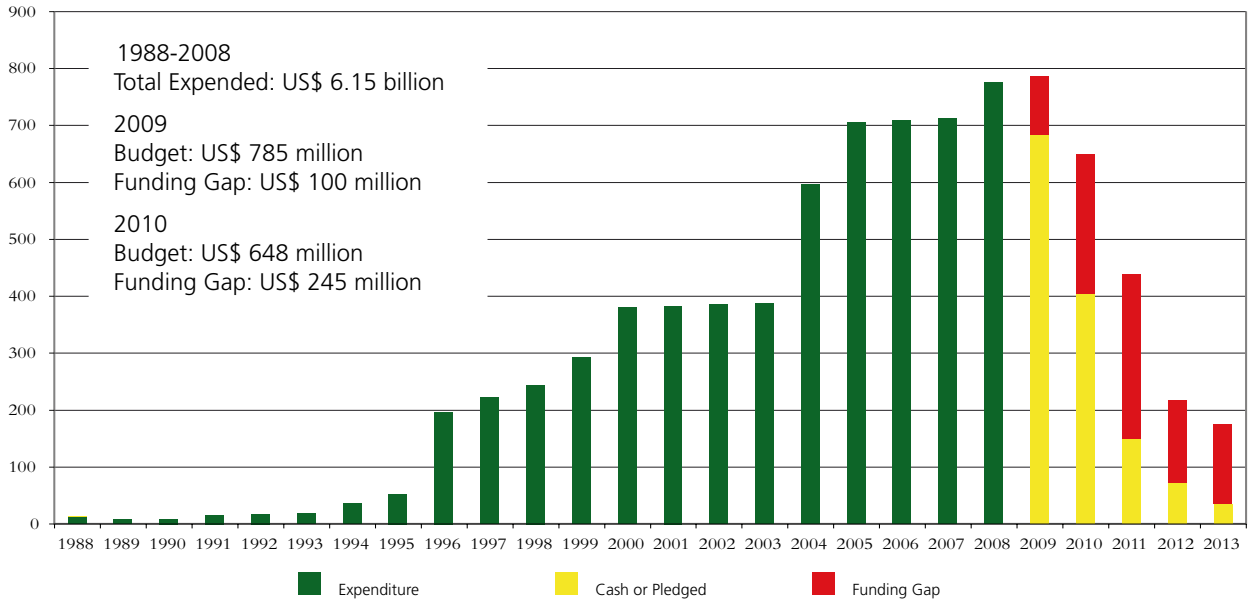
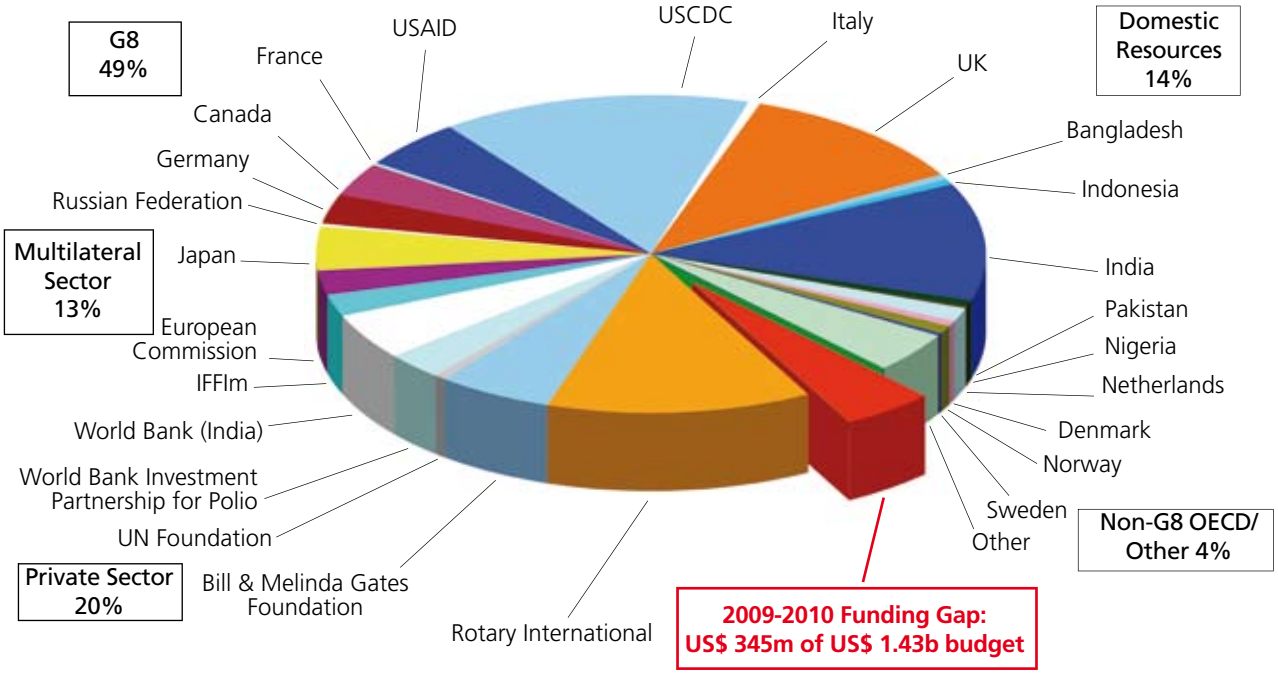


Figure 3: Global Polio Eradication Initiative Financing
1985 to 2013: US$7.49 billion
1985 to 2008: US$6.15 billion expenditure; 2009 to 2010: US$1.086 billion contributions



'Other' includes: the Governments of Angola, Australia, Austria, Azerbaijan, Belgium, Brunei Darussalam, Cyprus, Czech Republic, Finland, Hungary, Iceland, Ireland, Kuwait, Liechtenstein, Luxembourg, Malaysia, Malta, Monaco, Namibia, New Zealand, Oman, Portugal, Qatar, Republic of Korea, Saudi Arabia, Singapore, Spain, Switzerland, Turkey, the United Arab Emirates; African Development Bank; AG Fund; American Red Cross; British Airways, De Beers, Inter-American Development Bank, Central Emergency Response Fund (CERF), International Federation of Red Cross and Red Crescent Societies, Oil for Food Programme, OPEC Fund, Sanofi Pasteur; Saudi Arabian Red Crescent Society, Smith Kline Biologicals, UNICEF National Committees, UNICEF Regular and Other Resources, United Arab Emirates Red Crescent Society, Shinnyo-en WHO Regular Budget and Wyeth.

GPEI plans and budgets are developed jointly by WHO and UNICEF in close collaboration with Ministries of Health. Polio immunization campaigns are the main cost driver of the eradication effort, accounting for fully 75% of the 2009 budget. In 2009, 124 campaigns are planned, to reach more than 375 million children in 29 countries multiple times with OPV. (See 2009-2013 Supplementary Immunization Schedule, Annex A.)

4.1 Financial Resource Requirements, 2009-2013

The activities described in the GPEI Programme of Work for 2009 are costed at US$785 million, part of a two-year, US$1.43 billion budget, against which there is a US$345 million funding gap. Table 2 summarizes the projected resource requirements by major category of activity for 2009-2013. These budget estimates reflect an increase of US$128 million, or six percent, over January 2009 budget estimates. The main drivers of this increase are: the strategic decision to institutionalize SIAs in the 'wild poliovirus importation belt' in sub-Saharan Africa (see 2009-2013 Supplementary Immunization Schedule, Annex A); the introduction and use of bOPV; the implementation of tailored strategies in conflict-affected areas; and, enhanced international monitoring and increased technical assistance, in particular for outbreak settings.

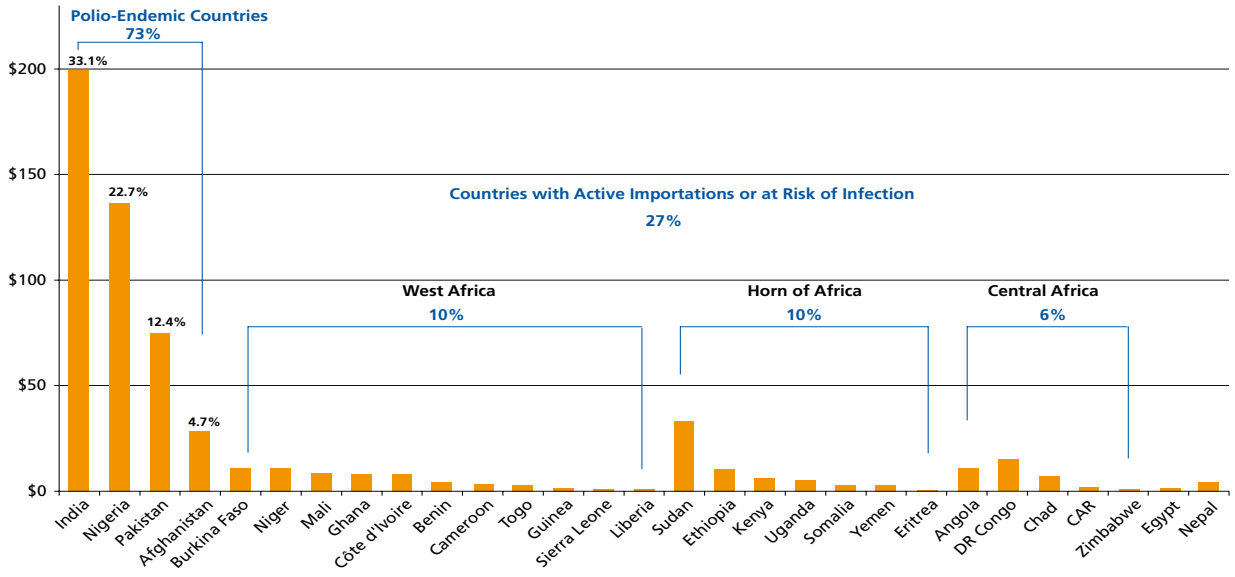
Table 2: Summary of external resource requirements by major category of activity, 2009-2013 (all figures in US$ millions).

Activity Category	2009	2010	2009-2010	2011-2013
Oral polio vaccine	$257.09	$199.56	$456.65	$121.99
NIDs/SNIDs operations*	$303.97	$220.50	$524.47	$135.46
Emergency response/ mOPV evaluation	$25.00	$45.00	$70.00	$85.00
Surveillance	$64.63	$61.76	$126.39	$144.72
Laboratory	$8.08	$8.21	$16.29	$19.79
Technical assistance	$101.60	$99.91	$201.51	$228.84
Certification and containment	$5.00	$5.00	$10.00	$30.00
Product development for OPV cessation	$20.00	$8.45	$28.45	$15.00
Vaccine for post-eradication era stockpile (finished product and bulk)	$0	$0	$0	$49.22
Subtotal	**$785.37**	**$648.40**	**$1 433.77**	**$830.03**
Contributions	$683.01	$403.93	$1 086.94	$258.00
Funding gap	**$102.36**	**$244.47**	**$346.83**	**$572.03**
Funding gap (rounded)	**$100.00**	**$245.00**	**$345.00**	**$570.00**

* Operations costs include manpower and incentives, training and meetings, supplies and equipment, transportation, social mobilization and running costs.

The four polio-endemic countries - India, Nigeria, Pakistan and Afghanistan - account for fully 73% of all countries' budgets.

Figure 4: Comparison of Country Budgets for 2009 (Vaccine, Operational Costs and Surveillance)



The programmatic underpinning of the SIA plans and budgets is national governments' targets to stop wild poliovirus transmission by end-2010. Given the challenges to stopping polio transmission, the GPEI has built in contingency plans and budgets should these targets not be met.

4.2 Budget implications of delays in interrupting wild poliovirus transmission

Contingency SIAs, which could be needed depending on how the transmission of polio evolves and if current national targets are not met, are highlighted in yellow in the 2009-2013 Supplementary Immunization Schedule, Annex A. Taken together, all of the contingency activities for 2009-2013, excluding India, would cost US$364 million. India's contingency costs are not included on the assumption that the country would continue to self-finance any additional activities.

Table 3: Cost of 2009-2013 Contingency Activities Presented in the Supplementary Immunization Schedule, Annex A (all figures in US$ millions)

	2009	2010	2011	2012	2013	Sub-Total 09-10	Grand Total 09-13
Polio endemic	$0	$24.94	$21.91	$98.97	$101.93	$24.94	$247.75
Afghanistan	$0	$3.56	$2.20	$9.89	$10.19	$3.56	$25.84
Nigeria	$0	$21.38	$13.24	$59.71	$61.50	$21.40	$155.83
Pakistan	$0	$0	$6.47	$29.36	$30.24	$0	$66.08
Sub-Saharan importation belt	$41.14	$12.51	$0	$26.41	$27.26	$53.65	$107.32
Nepal	$0	$0	$3.00	$3.07	$3.15	$0	$9.22
Total Contingency Cost of 2009-2013, (excluding India)	**$41.14**	**$37.45**	**$24.91**	**$128.45**	**$132.34**	**$78.59**	**$364.29**

As the GPEI's multi-year Strategic Plan is finalized in the second half of 2009, the indicative plans and budgets presented in Annex A and B, and in table 2, will be refined to reflect new information expected in the second half of 2009, including the recommendations of the independent evaluation and the outcomes of the research projects described earlier in the document.

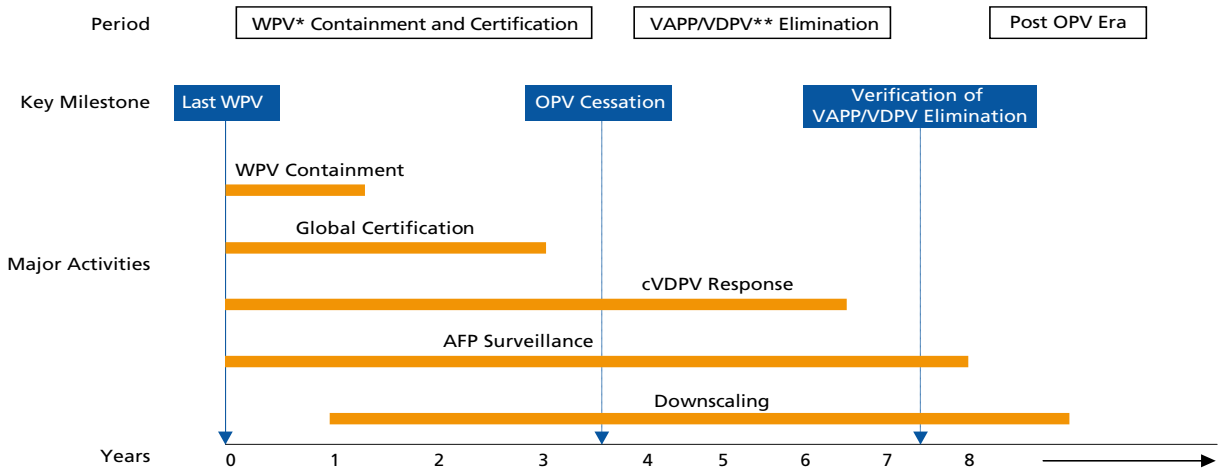
4.3 Planning for the Post-2013 Period

By 2013, wild poliovirus transmission will have been interrupted globally, containment of wild polioviruses will have been completed and the process towards global certification should be in its final stages.

Beyond 2013, the budget of the GPEI will relate primarily to the coordination of OPV cessation internationally (as soon as possible after certification of wild poliovirus eradication), and subsequent verification of VAPP and VDPV elimination. Annual financial resource requirements of the GPEI in the post-2013 period are estimated to be significantly lower than the (current) costs associated with the *intensified polio eradication effort* (eg the post-2013 costs will be approximately one-third of current annual financial resource requirements). The major cost drivers during this period will be maintaining laboratory and surveillance capacity globally to detect and respond to emerging cVDPVs, especially in the three years immediately following OPV cessation. The annual costs of these activities during the VAPP/VDPV Elimination Phase are estimated to be approximately US$150 million. The major uncertainty pertaining to GPEI costs during this period is the extent to which low- and low/middle-income countries will use IPV, how they will use it (eg fractional doses, reduced dose schedules) and how IPV will be produced at that time.

The costs of the GPEI will stop once VAPP/VDPV elimination is verified. All long-term functions will by that point have been incorporated into existing mechanisms for managing the residual risks associated with eradicated and/or dangerous pathogens (eg smallpox) and routine immunization programmes.

Figure 5: the Post-2013 Period



*Wild poliovirus (WPV)
**Vaccine-associated paralytic polio (VAPP); vaccine-derived poliovirus (VDPV)

ANNEX A: 2009-2013 Supplementary Immunization Schedule

Region/ Country	2009												2010												2011												2012												2013											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Priority 1 (Endemic countries)																																																							
Afghanistan	100	24	100	50	100	50	100			100	100	50		100	100	50	50			100	100	50	50			100	100	30	30			30	30					100	100				30	30					100	100				30	30				
India		100	40	20	50			40	40	40	40			100	100	40				40	40	40	40			100	100	40	40									100	100				40	40															
Nigeria	100	50	100		100		50	50		50	50			100	100	50	50			50	50	50	50			100	100	30	30			30	30					100	100				30	30					100	100				30	30				
Pakistan	100	14	100	50	100	50	100	50		100	100	50		100	100	50	50			100	100	50	50			100	100	30	30			30	30					100	100				30	30					100	100				30	30				
Priority 2 (Active importation at March 2009)																																																							
West Africa																																																						
Benin		100	100		100		100			100				100	100											100	100												100	100											100	100									
Burkina Faso	21	100	100		100		100			100				100	100											100	100																																	
Ghana		100	100		100					100				100	100											100	100																																	
Côte d'Ivoire		100	100		100		100			100				100	100											100	100																																	
Mali		100	100		100					100				100	100											100	100																																	
Niger		100	100		100					100	80			100	100							80	80			100	100											100	100											100	100									
Togo	100	100	100		100		100			100				100	100											100	100																																	
Horn of Africa																																																							
Sudan	25	100	100	100	100					100	100			100	100											100	100												100	100											100	100									
Kenya			35	35	35	35			100					35	35																																											
Uganda			35	35	100	35								35	35																																										
Ethiopia			7	31	26									20	20																																									
Somalia		100	100		100	100								100	100											100	100												100	100											100	100									
Central Africa																																																							
Angola				15		100	100	100										100	100																																								
Central African Republic*		100		100	100	100				100				100	100																																											
Chad	35	2	96		35	65				100	100			100	100							100	100			100	100											100	100											100	100									
DR Congo	2			27	23	40	40											35	35																																							
South-East Asia Region																																																							
Nepal		25	100	75					25	25				100	100											100	100												100	100											100	100									
Priority 3 (Areas at risk of infection)																																																						
West Africa																																																						
Cameroon					100		100							20																																												
Guinea					100	100				100																																														
Liberia					100	100				100																																													
Sierra Leone					100	100				100																																												
Horn of Africa																																																					
Ethiopia**						60	60																																																
Djibouti						100	100																																																
Eritrea					100		100																																																
Yemen						100	100																																																
Central Africa																																																					
Congo						100	100																																																
DR Congo**						50	50																																															
Zimbabwe						100																																																
Eastern Mediterranean Region																																																							
Egypt	18			100																																																			

All Actvities are expressed in percentage
NIDs: National Immunization Days
SNIDs: Subnational Immunization Days
IPDs: Immunization Plus Days

Activity

NID SNID IPD
OPV added to measles or Yellow Fever round
Contingency Plan***
Child health day

*February 2009 NID included in 2008 budget
**Areas of these countries not included in previous campaigns
***Contingency activities are not included in 2009-2013 Financial Resource Requirements (summary contingency budgets included on page 16)

ANNEX B: Details of Country-Level Funding Requirements for 2009-2010 (all figures in US$ millions)

Country	2009				2010				2009 to 2010			
	NIDs/ SNIDs: OPV	NIDs/ SNIDs: Op Costs	AFP Surveillance	Total Costs 2009	NIDs/ SNIDs: OPV	NIDs/ SNIDs: Op Costs	AFP Surveillance	Total Costs 2010	NIDs/ SNIDs: OPV	NIDs/ SNIDs: Op Costs	AFP Surveillance	Total Costs 2009 to 2010
Priority 1 Polio-Endemic												
Afghanistan	$9.19	$16.67	$2.54	$28.40	$6.49	$11.29	$2.54	$20.33	$15.68	$27.97	$5.08	$48.72
India	$107.80	$83.63	$7.88	$199.30	$106.56	$77.76	$8.19	$192.50	$214.36	$161.38	$16.07	$391.80
Nigeria	$47.53	$79.23	$9.66	$136.42	$28.72	$56.82	$9.66	$95.20	$76.25	$136.05	$19.32	$231.62
Pakistan	$42.42	$29.90	$2.45	$74.77	$34.92	$27.22	$2.71	$64.85	$77.34	$57.12	$5.16	$139.62
Priority 2 (Active Importation)												
West Africa												
Benin	$1.87	$2.32	$0.20	$4.39	$1.02	$1.18	$0.20	$2.40	$2.89	$3.49	$0.40	$6.78
Burkina Faso	$3.31	$7.36	$0.34	$11.01	$1.75	$3.84	$0.34	$5.93	$5.06	$11.20	$0.68	$16.94
Ghana	$2.78	$5.04	$0.40	$8.21	$1.90	$3.32	$0.40	$5.62	$4.67	$8.36	$0.80	$13.83
Côte d'Ivoire	$3.95	$3.67	$0.32	$7.94	$2.10	$1.83	$0.32	$4.25	$6.05	$5.49	$0.64	$12.19
Mali	$2.34	$5.70	$0.24	$8.28	$1.58	$3.80	$0.24	$5.62	$3.92	$9.50	$0.48	$13.90
Niger	$3.40	$6.84	$0.66	$10.90	$2.56	$5.37	$0.66	$8.59	$5.96	$12.21	$1.32	$19.49
Togo	$1.34	$1.29	$0.15	$2.78	$0.54	$0.66	$0.15	$1.35	$1.88	$1.94	$0.30	$4.12
Horn of Africa												
Kenya	$2.50	$3.07	$0.49	$6.06	-	-	$0.49	$0.49	$2.50	$3.07	$0.98	$6.55
Uganda	$1.95	$3.03	$0.44	$5.42	-	-	$0.44	$0.44	$1.95	$3.03	$0.88	$5.86
Ethiopia	$1.67	$5.14	$3.73	$10.54	-	-	$3.73	$3.73	$1.67	$5.14	$7.46	$14.27
Somalia	$0.74	$1.48	$0.76	$2.97	$0.65	$1.52	$0.76	$2.93	$1.39	$3.00	$1.52	$5.90
Sudan	$8.43	$22.19	$2.39	$33.01	$3.25	$8.26	$2.04	$13.55	$11.68	$30.45	$4.43	$46.56
Central Africa												
Angola	$3.99	$5.38	$1.80	$11.17	$2.17	$4.94	$1.80	$8.91	$6.16	$10.32	$3.60	$20.08
Central African Republic	$0.45	$1.04	$0.52	$2.01	$0.23	$0.73	$0.52	$1.48	$0.68	$1.77	$1.04	$3.49
Chad	$1.60	$4.83	$0.70	$7.13	$1.83	$6.04	$0.70	$8.57	$3.43	$10.87	$1.40	$15.70
DR Congo	$3.66	$8.76	$2.50	$14.92	$1.67	$4.10	$2.50	$8.27	$5.33	$12.86	$5.00	$23.18
South-East Asia Region												
Nepal	$2.07	$1.42	$0.61	$4.10	$1.62	$1.26	$0.61	$3.49	$3.69	$2.68	$1.22	$7.60
Priority 3 (Areas at risk of Infection)												
West Africa												
Cameroon	$1.54	$1.51	$0.44	$3.50	-	-	$0.44	$0.44	$1.54	$1.51	$0.88	$3.94
Guinea	$0.41	$0.99	$0.15	$1.54	-	-	$0.15	$0.15	$0.41	$0.99	$0.30	$1.69
Liberia	$0.15	$0.34	$0.30	$0.79	-	-	$0.30	$0.30	$0.15	$0.34	$0.60	$1.09
Sierra Leone	$0.20	$0.47	$0.30	$0.98	-	-	$0.30	$0.30	$0.20	$0.47	$0.60	$1.28
Horn of Africa												
Eritrea	$0.31	$0.09	$0.22	$0.62	-	-	$0.22	$0.22	$0.31	$0.09	$0.44	$0.84
Yemen	$0.92	$1.80	$0.18	$2.90	-	-	$0.18	$0.18	$0.92	$1.80	$0.36	$3.08
Central Africa												
Zimbabwe	$0.40	$0.16	$0.25	$0.80	-	-	$0.25	$0.25	$0.40	$0.16	$0.50	$1.05
Eastern Mediterranean Region												
Egypt	$0.55	$0.45	$0.37	$1.37	-	-	$0.37	$0.37	$0.55	$0.45	$0.74	$1.74

ANNEX C: Summary of Major Expected Results for 2009

Programme of Work	Major expected result
1. Sustained implementation of core eradication strategies	>90% coverage in all infected and endemic areas, as verified by independent monitoring of finger-marked children
2. Evaluation of major barriers identified in the *intensified polio eradication effort*	Development and incorporation of area-specific plans to address the major barrier(s) to completing eradication in each endemic area and additional activities to limit international spread of polio
3. Assessment of new strategic approaches in each endemic country:	
- Nigeria	By Q4 2009, the percentage of missed children during SIAs in each of the ten highest-risk states in northern Nigeria will be reduced to <10% (from 21% in 2008), while maintaining high levels of immunization coverage in the remainder of the country
- India	Adaptation of India SIA strategy based on outcomes of clinical trial
- Pakistan	- In all townships of Karachi, SIA coverage achieving 90% by Q4 2009, as verified by independent monitoring of finger-marked children - In six highest-risk districts of NWFP/FATA, proportion of zero-dose children reduced to <10% by Q4 2009, as verified per non-polio AFP data
- Afghanistan	By end-2009, proportion of missed children reduced to <10% in the 11 highest-risk districts of three provinces of Southern Region Hilmand, Kandahar and Uruzgan (from 18% at the start of 2009)
4. Development and evaluation of new tools	- Bivalent OPV: licensing and introduction of at least two bOPV products by Q4 2009, if superiority is demonstrated to trivalent OPV in clinical trial - Intradermal IPV: completion of clinical trial and review by ACPE - Seroprevalence surveys: seroprevalence surveys conducted in western Uttar Pradesh, India, and Karachi, Lahore and Peshawar, Pakistan - Real-time PCR: Roll-out of RT-PCR to all appropriate laboratories in the 3 WHO endemic regions by end-2009 - Targeted environmental surveillance: environmental surveillance established in Karachi, Pakistan
5. Implementation of additional activities to limit international spread and stop outbreaks	- Institutionalizing 24-month SIA plans in highest-risk countries: financing in place for first 12 months of 24-month SIA plan - Independent, international assessment of outbreak response: independent assessments conducted in Angola, Chad and Sudan - Outbreak response readiness plans: plans updated in all 15 countries in the 'wild poliovirus importation belt' in sub-Saharan Africa - Polio immunization of travellers: ACPE recommendations published in WHO's *International Travel & Health*

Programme of Work	Major expected result
6. Assessment and strengthening of subnational surveillance sensitivity	- Areas with >12 months of undetected wild poliovirus transmission in the past five years: achieve non-polio AFP rate >2 in all provinces/states - Areas at highest-risk of importations: completion of at least two desk reviews and initiation of corrective measures as needed - Rest of world: reviews conducted in each polio-free region, and results formally communicated to relevant Member States
7. Development of post-eradication policy	- Characterising VDPV risks: at least two studies initiated to quantify iVDPV risks in low- and middle-income settings - Risk management strategies: GAPIII finalized; initial mOPV stockpile tender awarded - 'Affordable' IPV options and policy for low- and low-middle income countries: initiation of clinical development phase of Sabin-IPV project; WHO position paper on polio immunization in the pre-eradication era drafted
8. Finalization of multi-year Strategic Plan	- Multi-year Strategic Plan: finalization of new five-year Strategic Plan by end-2009, for publication in January 2010 - Financing: full financing of the 2009 GPEI Programme of work by June