Global Polio Eradication Initiative

ANNUAL REPORT 2008

World Health Organization

CDC Centers for Disease Control and Prevention

unicef

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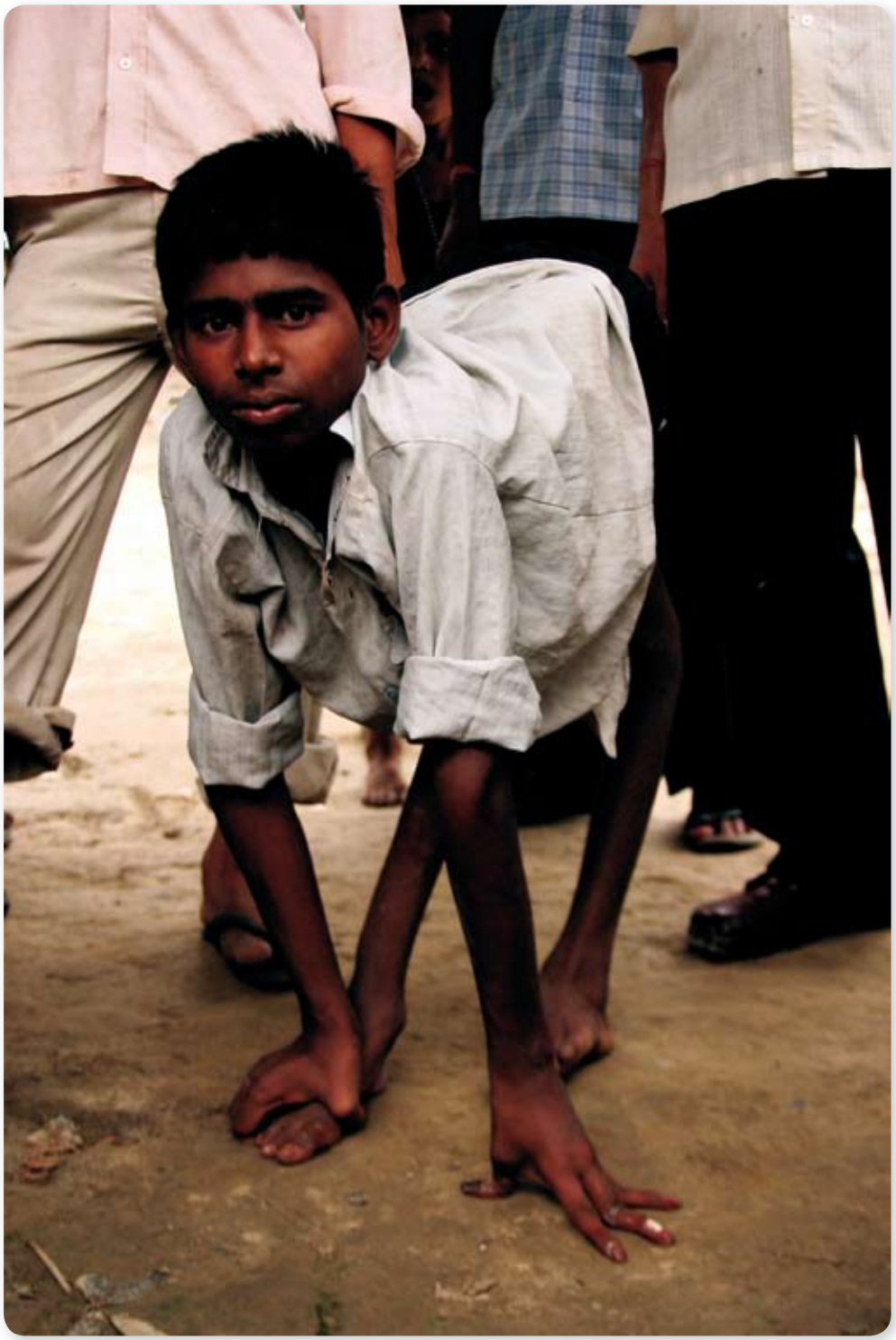

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Executive Summary

THE YEAR 2008 witnessed a polio outbreak in Nigeria, with new international spread to bordering countries, persistent importations in south-central Africa and Sudan and the largest outbreak of polio in eight years in Pakistan. Elsewhere, western Uttar Pradesh in India – historically the world's most entrenched reservoir of polio but free of indigenous poliovirus type 1 for more than a year – was re-infected by a virus from a neighbouring state. By the end of the year, the number of children paralysed by polio in 2008 had returned to 1999 levels. And yet 2008 has proved to be a turning point in the fight against polio.

To say 2008 was an arduous year in polio eradication is an understatement. To say it was a watershed for polio eradication is not. Against a sobering epidemiological backdrop, the progress made – in key political, technical, financial and operational areas – led the ACPE and SAGE[1] to conclude in November 2008 that the intensified eradication effort had shown that the remaining challenges in the four polio-endemic countries could be overcome.

First and foremost, all tiers of government in key polio-infected countries – from central to local levels – have realized the level of support and effort required to finish polio eradication and are engaging in the global effort as never before. In addition to financial and operational commitments, the remaining countries with indigenous polio – Nigeria, India, Pakistan and Afghanistan – now have special mechanisms to monitor the performance of eradication activities and hold local authorities accountable for their quality.

Secondly, these efforts are being closely watched and frankly assessed. Following the re-infection of West Africa, for example, the international community has refocused its attention on key polio-affected countries, especially Nigeria, with a World Health Assembly Resolution (WHA) in May 2008 tasking each endemic country – by name – to act.

Thirdly, the donor community has remained determined in the face of continued transmission of polio. Mindful that meeting established global health goals demands extraordinary perseverance, donors have redoubled efforts to finish the final lap. In January 2009, the Bill & Melinda Gates Foundation announced a further US$ 255 million grant for polio eradication to Rotary International, which the latter pledged to match with another US$ 100 million, bringing to US$ 200 million Rotary's matching funds in the past year alone. That same month, the United Kingdom announced a multi-year contribution of US$ 150 million, and Germany signalled its intention to provide US$ 130 million.

By the end of the year, these global developments and country-specific strategies were showing an impact on wild poliovirus transmission. In India, monthly vaccination campaigns in the highest-risk areas, using monovalent vaccine, have reduced wild poliovirus type 1 – the more dangerous of the two remaining strains – to record lows. In Nigeria, stronger leadership at state level brought about new commitments to accountability for the quality of vaccination campaigns. By early 2009, the proportion of children with no polio vaccination in the highest-risk states of northern Nigeria fell to under 10% for the first time ever.

In Afghanistan, teams exploited lulls in the conflict in the southern region to enter normally inaccessible areas and give children an additional dose of monovalent vaccine between large-scale campaigns. Pakistan started using finger-marking of vaccinated children to objectively measure coverage, thereby introducing real accountability of local authorities. With new multi-sectoral activities, the country laid the ground for the Prime Minister's Action Plan for Polio Eradication, launched in early 2009.

Meanwhile, ongoing research in social attitudes, the development of new vaccines and behaviour of the poliovirus is expanding the current state of knowledge. In March 2008, Somalia became polio-free once again, demonstrating that full application of international outbreak response guidelines can stop the virus even in the most difficult conditions.

This Annual Report of the Global Polio Eradication Initiative (GPEI) features progress made in 2008 towards the objectives defined in the *GPEI Strategic Plan for 2004-08* and reports on intensified eradication activities.

1 The Advisory Committee for Poliomyelitis Eradication and the Strategic Advisory Group of Experts on Immunization.

> "Eradicating a disease is hard, slow, painstaking work. But failure is no alternative at all – we don't let children die because it is fatiguing to save them."
>
> Bill Gates, Co-chair Bill & Melinda Gates Foundation, January 2009

While not all milestones have been met, the 2008 ACPE recommendations recognized the range of progress made and concluded that "the strategies of the GPEI are valid and can succeed".

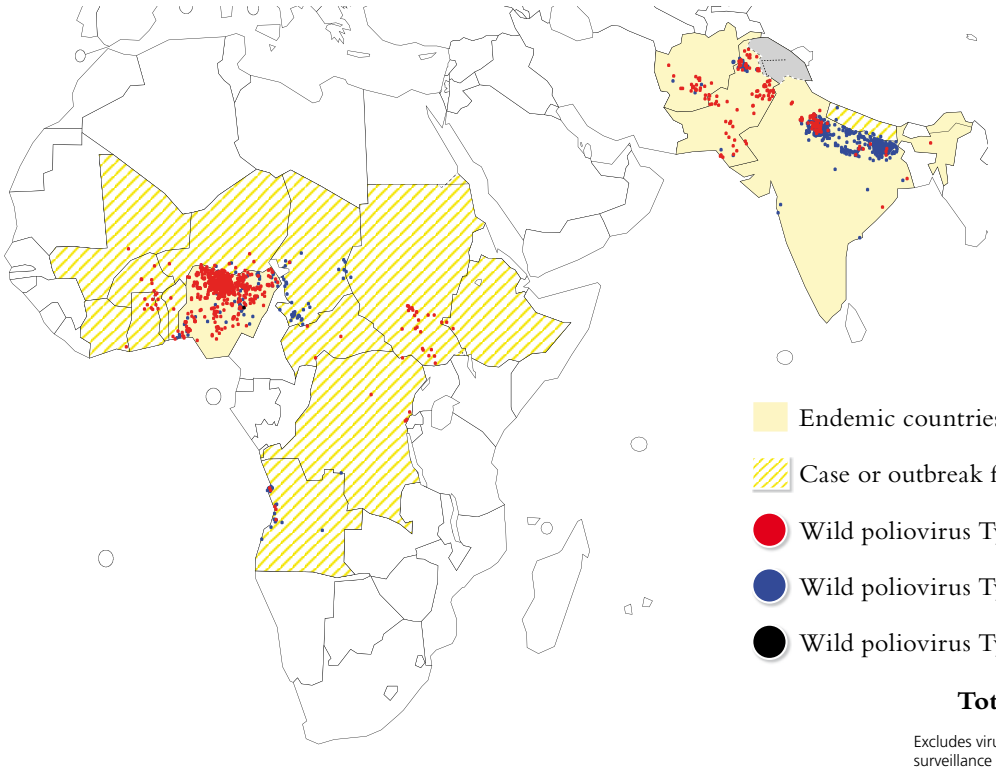
Consequently, the ACPE endorsed the framework for a new strategic plan for the GPEI, combining proven eradication strategies, recently-developed tools and tactics and new initiatives to stop polio transmission. This strategic plan will be informed by the outcomes of an independent evaluation in 2009 – to propose area-specific strategies to address the remaining barriers to stopping polio transmission – and by the results of clinical trials to assess the impact of new tools, such as a bivalent OPV formulation.

Polio eradication, when complete, will be an enduring gift to future generations. In the 21 years since the launch of the GPEI, the number of children paralysed by polio has fallen by more than 99% – from more than 350 000 children paralysed each year to 1652 in 2008.

The world has gone from more than 125 countries infected to 18, of which only four have never stopped polio. Some five million people are walking today who would otherwise have been paralysed.

The powerful combination of government commitment, tireless immunization efforts by health workers and communities, along with a keen understanding of the remaining country-specific challenges has paved the way for the GPEI to approach the final inch to polio eradication with confidence.

Wild poliovirus cases in 2008



Total cases: 1 652

Excludes viruses detected from environmental surveillance and vaccine derived polioviruses.
Data in WHO/HQ as of 12 May, 2009

Key Events 2008

January

UN Secretary-General Ban Ki-moon thanks Rotary International: "When the last chapter on polio eradication is finally written, it will… highlight your personal service to humanity. Your determination and generosity will drive us to the finish line in our race against polio."

February

Prime Minister Manmohan Singh of India writes to UN Secretary-General Ban Ki-moon, committing "all necessary resources" to eradicate polio from the country.

March

Somalia becomes polio-free again – a testament to the 10 000 health workers who stopped polio in one of the most dangerous places on earth.

Polio teams in Afghanistan use monovalent vaccines to boost immunity of children in inaccessible areas: whenever access is possible, teams deliver an additional dose of monovalent vaccine between larger-scale campaigns.

© WHO / Jean-Marc Giboux

April

Pakistan starts using finger-marking to objectively measure campaign quality.

© Jersey Rotary / Richard Wainwright

May

WHA passes resolution urging endemic countries – by name – to stop polio transmission. Confidence in polio eradication evident as WHO instructed to develop plans for post-eradication.

Leaders of all four spearheading partners jointly address Rotary International Convention, as WHO Director-General Margaret Chan announces: "I am making polio eradication the organization's top operational priority."

© Rotary / Alyce Henson

Spearheading partners in polio eradication (from left) Julie Gerberding, director of the US Centers for Disease Control and Prevention; Robert S. Scott, chair of The Rotary Foundation's Board of Trustees and Rotary's International PolioPlus, WHO Director-General Margaret Chan and Ann Veneman, Executive Director of UNICEF

June

First children paralysed in Benin, as new outbreak of polio spreads from Nigeria into West Africa.

> "I am making polio eradication the organization's top operational priority."
>
> Margaret Chan, WHO Director-General, June 2008

Studies showing increased efficacy of monovalent type 1 oral polio vaccine (mOPV1) over trivalent oral polio vaccine (tOPV) in Nigeria are published in New England Journal of Medicine, affirming the feasibility of rapidly stopping polio in that country.

Vaccination requirements for pilgrimage to Mecca include polio.

© NPSP

An Indian pilgrim to the Hajj receives polio drops before travelling to Saudi Arabia.

ACPE conclusion: intensified eradication effort demonstrates that all challenges in remaining endemic countries can be overcome.

July August September October November December

Polio workers are killed in the line of duty in southern Afghanistan when their UN-marked vehicle is car-bombed, a sombre reminder that volunteers and health workers around the world carry out their responsibilities in sometimes dangerous conditions.

36 State Governors sign *Abuja Commitments to Polio Eradication in Nigeria* as Bill Gates visits country. Proportion of children with no vaccination against polio in highest-risk states is halved over last year.

Leaders of G8 countries pledge at their Summit in Toyako, Hokkaido, Japan "to maintain momentum towards the historical achievement of eradicating polio, we will meet our previous commitments to maintain or increase financial contributions to support the Global Polio Eradication Initiative, and encourage other public and private donors to do the same". The Bill & Melinda Gates Foundation subsequently announces an additional US$ 150 million for polio eradication.

© Bill and Melinda Gates Foundation

Bill Gates immunizes a child during his visit to Nigeria in February, 2009.

1. Strategic Objective I

Interruption of wild poliovirus transmission

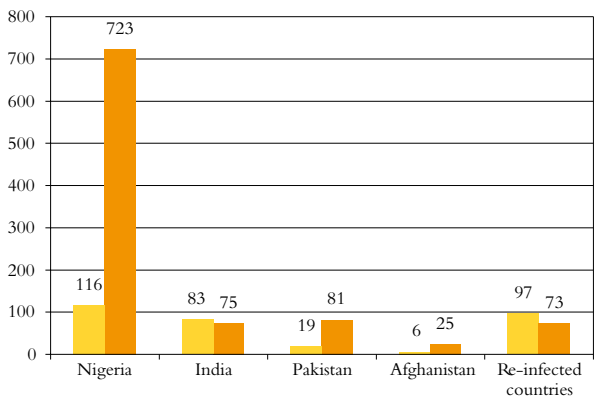
Milestone 2008[2]	Status
Milestone 1: No countries will be polio-endemic at the end of 2008.	Not achieved
Milestone 2: All planned Supplementary Immunization Activities (SIAs) will be implemented in highest-risk polio-free areas.	Achieved
Milestone 3: 70% of countries will achieve GAVI Alliance targets for DTP3/OPV3.*	Not achieved
Milestone 4: All emergency mop-ups will begin within four weeks of case confirmation.	Achieved
Milestone 5: All non-certified countries will have certification-standard surveillance.	Not achieved

* Immunization with three doses of vaccines against diphtheria, tetanus, pertussis and polio.

Wild poliovirus (WPV) transmission was detected in 18 countries[3] in 2008. Endemic transmission of types 1 and 3 continued in Afghanistan, India, Nigeria and Pakistan. New importations occurred in Angola, Benin, Burkina Faso, the Central African Republic, Chad, Côte d'Ivoire, the Democratic Republic of the Congo, Ethiopia, Ghana, Mali, Nepal, Niger, Sudan and Togo. Local transmission of viruses imported in previous years continued in Angola, the Democratic Republic of the Congo, and Sudan (see section 1.2). Type 2 circulating vaccine-derived poliovirus (cVDPV) was detected in the Democratic Republic of the Congo, Ethiopia and Nigeria.

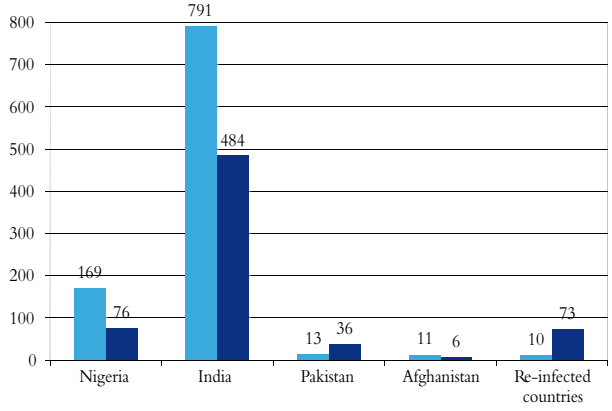
Wild poliovirus type 1 cases*

Comparison 2007 (yellow) & 2008 (orange)



Wild poliovirus type 3 cases

Comparison 2007 (blue) & 2008 (dark blue)



* Includes one case of type 1/type 3 polio in India in 2007 and one in Nigeria in 2008

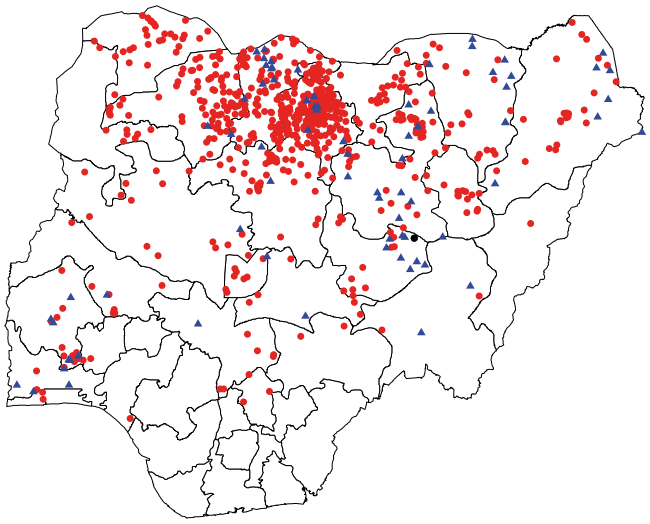
2 Details in Appendix A

3 Afghanistan, Angola, Benin, Burkina Faso, the Central African Republic, Chad, Côte d'Ivoire, the Democratic Republic of the Congo, Ethiopia, Ghana, India, Mali, Nepal, Niger, Nigeria, Pakistan, Sudan and Togo.

1. 1. Countries with indigenous wild poliovirus

Nigeria

Outbreak sparks deeper engagement of state governments



FACT BOX 2008

799 cases: 723 type 1*, 76 type 3

2 National Immunization Days

12 Sub-national Immunization Days

241 infected districts out of 774

* Includes one case of type 1/type 3 polio.

Wild poliovirus Type 1

Wild poliovirus Type 3

Wild poliovirus Type 1 & 3

After recording 1122 wild poliovirus cases in 2006, then 285 cases in 2007, Nigeria appeared to be heading in the right direction. Instead, the number of cases nearly tripled in 2008 – due to a rise in type 1 polio – and viruses of Nigerian origin re-infected seven countries in West Africa. This setback alarmed the international community, galvanized national leadership and deepened the engagement of state governors.

Epidemiological summary

The outbreak of type 1 cases in 2008, while concentrated in known highest-risk northern states, spread throughout the country. The incidence of type 3 poliovirus was reduced, from 169 in 2007 to 76 in 2008, but was also evident countrywide. Transmission of type 2 cVDPV declined slightly in 2008 (62 cases compared to 68 in 2007). Overall, the total number of infected districts increased from 155 in 2007 to 241 in 2008.

Failure to vaccinate in highest-risk areas

The primary challenge to Nigeria's polio eradication effort has been a failure to vaccinate: the number of children missed during vaccination campaigns was sufficient to allow poliovirus to circulate. In the main, this was due to weaknesses in the planning and implementation of immunization activities. These operational handicaps were coupled with inadequate efforts to engage communities in polio eradication activities. As a result, data showed that 29% of children with non-polio acute flaccid paralysis (AFP) were under-immunized, meaning they received fewer than three doses of oral polio vaccine (OPV).

In the 10 highest-risk states[4] in the first quarter of 2008, 50% of children aged under five years had received fewer than three doses of OPV. The situation allowed both wild and vaccine-derived poliovirus to survive.

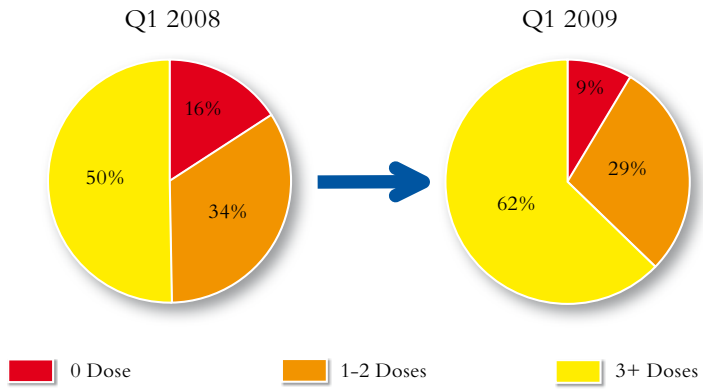
© WHO / Thomas Moran

Female immunization teams broadcast their arrival in a northern Nigerian township.

4 Bauchi, Borno, Jigawa, Kaduna, Kano, Katsina, Kebbi, Sokoto, Yobe, and Zamfara.

Of Nigeria's 36 states, six northern states – Bauchi, Jigawa, Kaduna, Kano, Katsina and Zamfara – contributed almost two-thirds of all polio cases in the country in 2008. Kano alone – where 30% of children had never been vaccinated – was responsible for almost one third of the national total. These figures indicated the acute need to increase national, state and local government area (LGA) political leadership.

Reduction in zero-dose children, in high-risk northern Nigerian states.



Polio immunization activities in 2008 were also hampered by the erratic availability of other antigens and the "Pluses" during most Polio Immunization Plus Days (IPDs) (activities which supplement OPV with additional health interventions, such as insecticide-treated bednets and de-worming tablets). Although the state and LGA governments did increase their overall contribution to the IPDs, the necessary mechanisms for tracking their contribution and measuring its impact on the quality of the activities were not institutionalized.

Year of crisis renews national and state leadership

The type 1 outbreak began in the first quarter of 2008. By May, delegates at the 62nd World Health Assembly (WHA) issued a resolution urging Nigeria to reduce the risk of international spread of polio by ensuring high vaccination coverage in key polio transmission areas. A Presidential Taskforce was assembled, headed by the Federal Minister of Health, which briefed President Umaru Yar'Adua in June. Subsequently, State-level Task Forces were established in the key northern states.

© WHO / Thomas Moran

Trained immunizers go to extraordinary lengths in Nigeria to deliver vaccine.

Meanwhile, the governors of some states began a process of deeper engagement with polio eradication – attending launches, making public statements of commitment and following up with local officials. These states – including Kebbi and Jigawa – were rewarded with significantly lower levels of polio circulation. In the latter state, the governor's engagement was echoed at the LGA level. As a result, SIA quality improved, as reflected in the immunization status of the population: the number of under-immunized children in Jigawa fell from 65% in January to 20% by year's end. Such developments show how rapidly progress can be achieved in the Nigerian setting, with systematic political engagement and oversight across all high-risk areas.

In February 2009, the state governors of Nigeria convened an urgent session on health and collectively signed the *Abuja Commitments to Polio Eradication in Nigeria,* pledging to provide active leadership to mobilize both the state and LGA civil administrations to eradicate polio in the country. Bill Gates, Co-chair of the Bill & Melinda Gates Foundation, was among the attendees. Mr Gates, whose itinerary took in a visit to the north and IPD field activities, noted: "If the country capitalizes on the commitments I've heard in the past two days, Nigeria can lead the way to a polio-free Africa." These *Abuja Commitments* appear to be bearing fruit: in Kano, the proportion of never-vaccinated children has been greatly reduced in the first quarter of 2009.

© WHO / Thomas Moran

Children dance at the Presidential Flag-Off to a National Immunization Day in Kaduna State, northern Nigeria.

The way ahead

Nigeria is the only polio-exporting country in the world with transmission of three serotypes of poliovirus (types 1 and 3 wild and type 2 vaccine-derived poliovirus) and poses the single biggest threat to the global eradication of polio. In June 2008, as the West Africa outbreak grew, the WHO warned its Member States under the International Health Regulations (IHR) of the threat Nigeria represents.

Key to success in the Nigerian programme is replicating and sustaining the operational improvements achieved in some areas of northern Nigeria in 2008 throughout all remaining high-risk states – given the clear correlation between the involvement of the state governor and local government chairpersons and improvements in operations – thus building on the *Abuja Commitments*. New mechanisms will therefore be put in place to monitor state and local government engagement and activities implemented to promote improved ownership and accountability.

Based on the recommendation of the Expert Review Committee for Polio Eradication in Nigeria, operational initiatives – such as the placement in 2008 of 12 international consultants in high-risk northern states for three-month periods – will be repeated in 2009, and funding has been made available to support additional teams in high-risk states.

Given the critical role that communities play in polio eradication, and the importance of high quality social mobilization in making sure that children receive vaccine, polio partners in the country will focus on strengthening communication capacity. Recruitment of polio-focused communication staff at LGA, state and zone levels (combining several states) has been prioritized, with appointments expected by mid-2009.

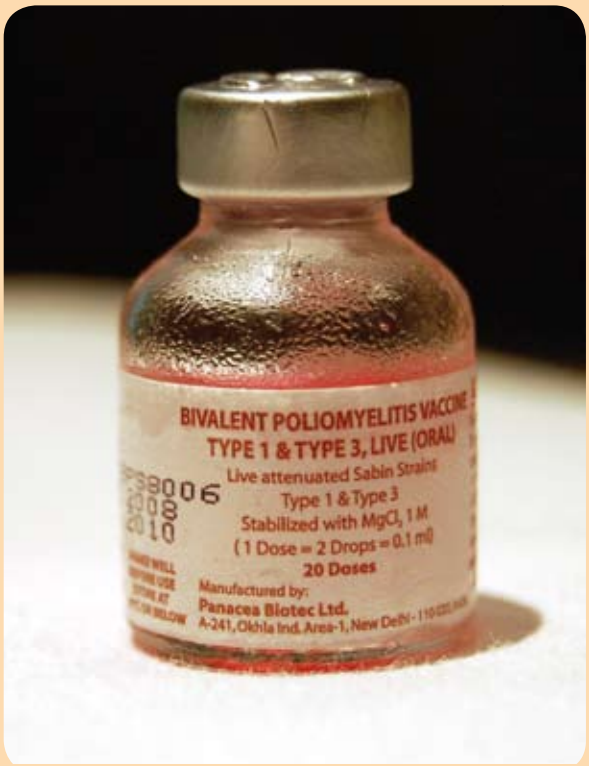
When available, a new bivalent OPV (bOPV), containing types 1 and 3, will be added to the mix of monovalent OPVs (mOPVs) and trivalent OPV (tOPV) during SIAs, as directed by the emerging epidemiology. Bivalent OPV has the potential to boost immunity to the WPVs currently in circulation in Nigeria.

Bivalent vaccine: two-in-one

Given the continued circulation of both type 1 and 3 wild polioviruses, a bivalent OPV (bOPV) – which targets both types at once – 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 (e.g. Angola, Chad and Sudan).

More efficacy data were needed before regulatory agencies could support licensure of bOPV – similar to the situation with mOPV just four years ago. Of particular importance was the degree to which bOPV would compromise seroconversion to each type. A clinical trial to shed further light on this question was launched in 2008, using bOPV as part of a seroconversion study in India.

If bOPV performs better than tOPV against types 1 and 3, it could supplement existing vaccination strategy by late 2009. The effectiveness of bOPV in field conditions would of course be dependent on SIA quality, as with other vaccines.

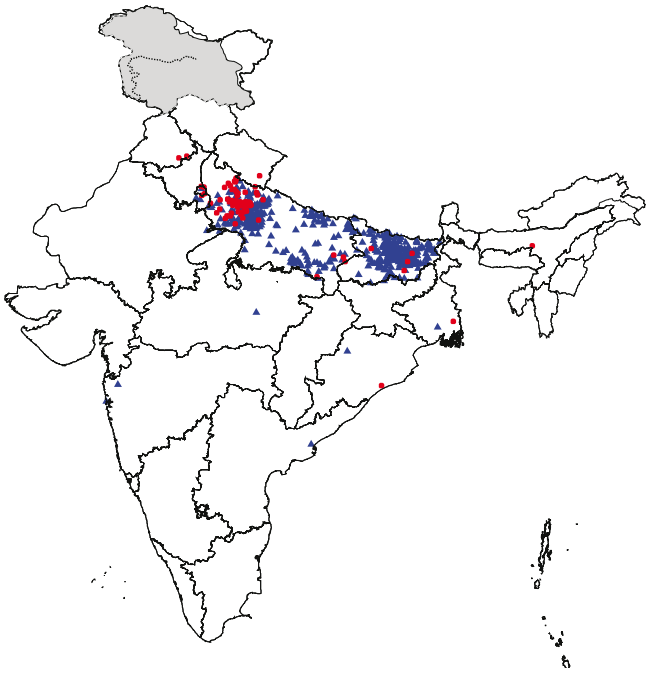


Bivalent wild poliovirus vaccine

© National Polio Surveillance Project / Harish Verma

India

Beating type 1 poliovirus



FACT BOX 2008

559 cases: 75 type 1, 484 type 3

3 National Immunization Days

23 Sub-national immunization activities

90 infected districts out of 604

In 2008, western Uttar Pradesh – historically the world's most entrenched global reservoir of wild poliovirus, in India's most populous state – stopped transmission of indigenous type 1 poliovirus. Transmission was stopped for a full 12 months, re-affirming the technical feasibility of global polio eradication. The subsequent re-infection from neighbouring Bihar was followed by a swift response, resulting in a further reduction in the overall number of poliovirus cases and bringing type 1 to the verge of eradication in both Uttar Pradesh and Bihar states.

Epidemiological summary

A large outbreak of type 3 WPV in central Bihar and western Uttar Pradesh resulted in a sharp rise in overall cases in 2008. Meanwhile, western Uttar Pradesh – free of indigenous type 1 polio for all of 2008 – was re-infected from neighbouring Bihar state. Virtually all type 1 polio reported from India since then has been related to this outbreak. In late 2008, polio continued to fall sharply, and by end-March 2009, India had recorded 21 cases overall, compared to 165 at the same time last year.

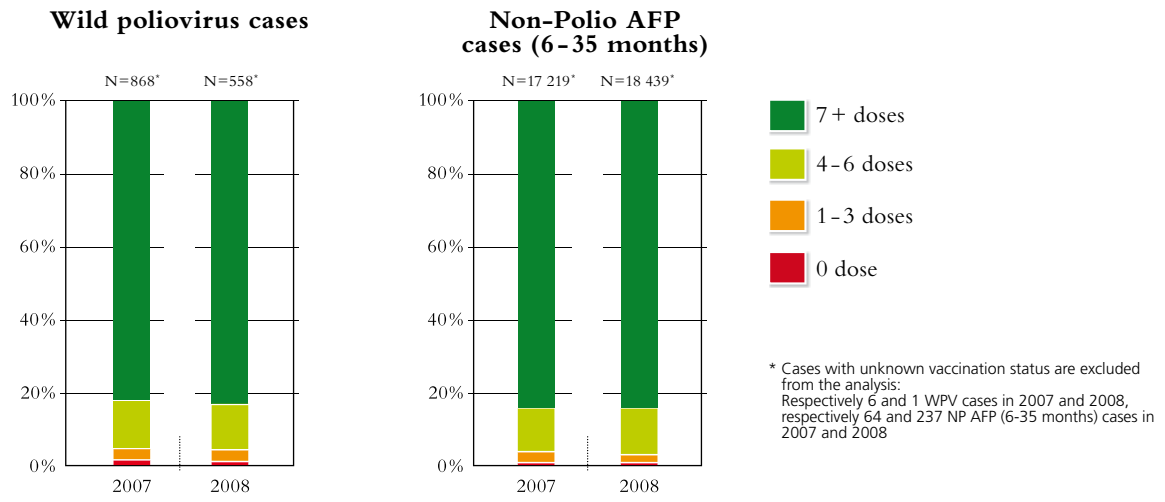
Highly-vaccinated children still get polio

The primary challenge to India's energetic and comprehensive polio eradication efforts is the failure of the vaccine to optimally protect children in the remaining infected areas of the country. Due to a unique combination of challenges (high population density, large birth cohorts, poor sanitation infrastructure and high enteric disease burden), OPV efficacy is sub-optimal, further complicated by the movement of people between Uttar Pradesh and Bihar and other states, including Punjab.

This mobility re-introduced type 1 poliovirus into western Uttar Pradesh in May 2008, at the beginning of the high-transmission season. On news of the initial importation case, an intense outbreak response was mounted, with monthly SIAs from June to December covering nearly all of western Uttar Pradesh. As a result, the outbreak peaked in August then declined. However, transmission of both type 1 and type 3 virus continues. The response to this outbreak may have been compromised by potency problems – discovered late in 2008 – with the main mOPV1 used in India.

The large number of type 3 cases in India in early 2008 was the tail end of an earlier outbreak that spiked in November-December 2007. From January 2008, state-wide campaigns using mOPV3 in Bihar and Uttar Pradesh

Non-Polio AFP vs polio cases vaccination status



reduced the numbers of affected children significantly, particularly in the second half of 2008, when the average number of type 3 cases per month was nearly halved (from 51 cases per month in January-June to 29 cases per month in July-December).

A well-oiled machine

In addition to Uttar Pradesh, type 1 polio from Bihar was exported into six polio-free states in 2008[5]. High quality, rapid large-scale mop-ups successfully restricted these outbreaks, limiting circulation to a single reported case in the first four of those states, five cases in Delhi and two in Punjab. These experiences highlighted two things: the significant risk posed by migrant communities in transporting the virus to polio-free states; and the success of swift application of outbreak response standards.

National and state ownership of India's polio eradication programme is strong, with financial and political commitment plainly evident. Chief Ministers of both endemic states made statements of support in 2008, and activities in India are largely self-financed. Communities remain determined to eradicate polio, as evidenced by the national immunization coverage rate of 95% of children aged under five, high public visibility and community knowledge about polio. India's strong community and government ownership will continue to be supported through surveys of social attitudes and monitoring of district-level official engagement.

5 Assam, Delhi, Orissa, Punjab, Uttarakhand and West Bengal.

The way ahead

As recommended by the India Expert Advisory Group, which lays out the national strategy, the polio programme in India continues to prioritize the elimination of type 1 circulation while maintaining control of type 3 circulation at a low level.

© Jersey Rotary / Richard Wainwright

Taking polio immunization to the street in Uttar Pradesh.

The immediate priority is to optimize the potency of mOPV1 by increasing the titre[6] and enhancing scrutiny at India's largest producer, while supplementing the vaccine available with higher-titre offshore product to increase the impact of each vaccination contact.

6 Expressed in infectious units per human dose, vaccine titre is basically the concentration of active ingredients in the vaccine.

Accelerated research to overcome compromised vaccine efficacy in northern India will further guide strategy in 2009. Understanding that India is unique among endemic countries in its quality of SIAs, the polio programme is conducting further research into enhancing immunity status and exploring innovative vaccine techniques. A serosurvey for polio immunity in western Uttar Pradesh was launched in 2008, using the AFP Surveillance System as a platform. Results will assist the programme in more accurately estimating immunity levels in western Uttar Pradesh and determining areas that require improvement. If data show that the use of higher-titre mOPV1 or inactivated polio vaccine (IPV) could help close residual immunity gaps in the highest-risk areas of western Uttar Pradesh, these could be introduced to supplement current vaccination tactics. Depending on the results of the ongoing bOPV trial, this product could be added to the armamentarium, to allow continued pressure on type 1 virus while intermittently boosting immunity to type 3.

A sub-continental scale of activity

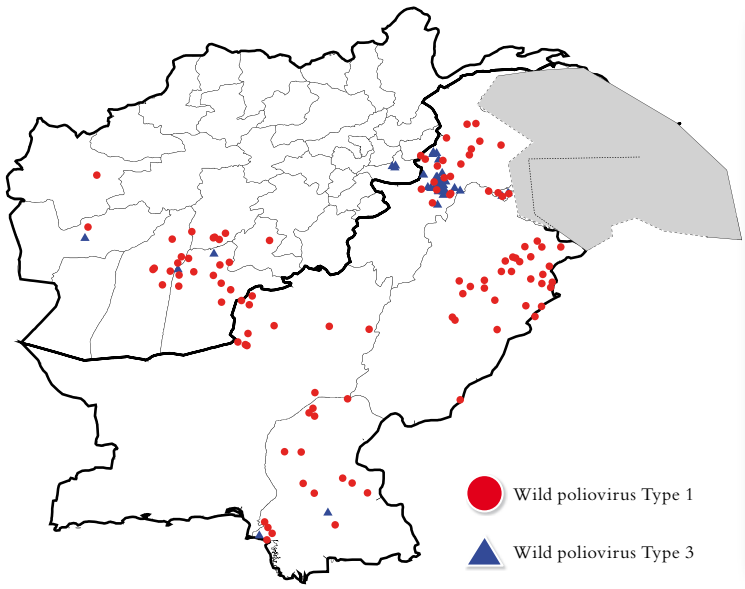
The sheer scale of the operation required to tackle polio in India is staggering, and yet India appears the most likely of the four remaining endemic countries to next eradicate polio. Consider the operational challenge: in 2008, India administered more than one billion doses of OPV during polio vaccination campaigns. In all, 692 million doses of mOPV1 were administered, 227 million doses of mOPV3 and 236 million doses of tOPV. On any given National Immunization Day (NID), more than 72 million children were immunized across a single weekend, making these regular occurrences repeatedly the largest immunizations in history. And somewhere in India, polio campaigns were conducted in 24 out of the 52 weeks in the year.

© Jersey Rotary / Richard Wainwright

Children line up to receive polio drops at a National Immunization Day in Saharanpur, Uttar Pradesh.

Afghanistan and Pakistan

The right to be vaccinated



FACT BOX 2008

Pakistan

117 cases: 81 type 1, 36 type 3

5 National Immunization Days

15 Sub-national Immunization Activities

49 infected districts out of 133

Afghanistan

31 cases: 25 type 1, six type 3

4 National Immunization Days

10 Sub-national Immunization Activities

16 infected districts out of 329

Despite intense eradication activities in Afghanistan and Pakistan – considered a single epidemiological block – wild poliovirus transmission expanded in Pakistan and persisted in the southern region of Afghanistan. Pakistan's polio programme suffers from managerial shortcomings – notably in Sindh province – while in the North West Frontier Province and tribal areas as well as in southern Afghanistan, immunization teams are unable to reach all children due to the unsettled security situation. In Pakistan, federal leadership has developed mechanisms for improved accountability from lower levels of government, including the use of finger-marking of vaccinated children as an objective measure of vaccination status after campaigns. In insecure areas of both countries, tactics for increasing safe access for vaccinators – including, but not limited to, negotiations with local authorities – have been key to improving coverage.

Epidemiological summary

In Afghanistan, transmission of indigenous types 1 and 3 WPV was limited to the south, with most of the country remaining polio-free, as confirmed by an external evaluation of the quality of AFP surveillance during the second half of the year.

In Pakistan in 2008, indigenous transmission of both types of WPV continued in Sindh and North West Frontier Province. Punjab – Pakistan's most populous province, which had been polio-free for almost two years – witnessed an outbreak of imported poliovirus due to the large movements of people triggered by insecurity in the North West Frontier Province and the Federally Administered Tribal Areas.

© Sahil/UNICEF AFG/2007

A boy is vaccinated at a polio immunization booth at a remote border crossing between Pakistan and Afghanistan.

Failure to vaccinate in safe areas – inability to vaccinate in insecure zones

In Pakistan, a confluence of factors – including management and operational issues – set back polio eradication efforts in 2008. In southern Sindh province of Pakistan (especially in the megacity of Karachi) and in parts of Balochistan, the need for improvements in SIA performance was evident in the number and vaccination status of children paralysed. As a first step, the Government of Pakistan began the systematic use of finger-marking of vaccinated children as an objective measure of coverage to complement parental recall and other methods.

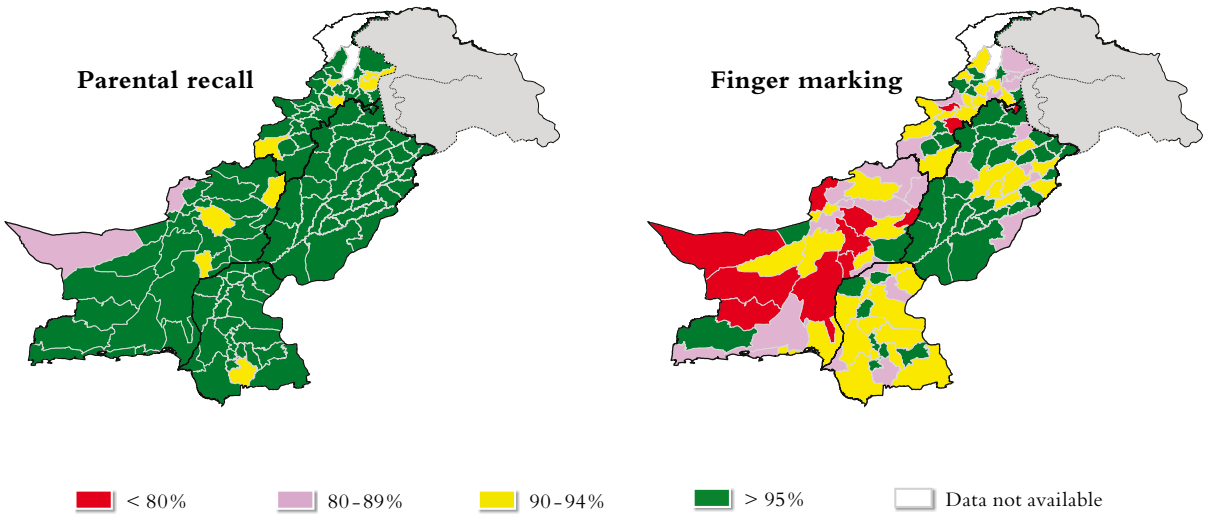
Use of finger-marking to gauge SIA quality enabled the programme to identify gaps in district-level accountability and develop mechanisms to address those gaps. Solutions proposed by the provincial and federal authorities ranged from improved supervision of campaigns to the development of province-specific strategies to increase district accountability.

Throughout 2008, the mobility of health workers became increasingly restricted in a growing proportion of the Federally Administered Tribal Areas and of central and southern North West Frontier Province districts, due to insecurity. While a supporting network of surveillance informants continued to identify AFP cases in these areas, the inability of staff to move around seriously compromised independent monitoring of campaigns. Of the total target population (of children above five years of age) in North West Frontier Province/ Federally Administered Tribal Areas, the percentage that could not be reached varied from 3% to 11% during the campaigns in 2008 (representing between 146 000 and 640 000 children). The most serious of these situations was in Swat district (with four cases in 2008 and a target population of over 350 000 children), where the last vaccination campaign of the year was in July.

In Afghanistan, the main reason for continued transmission of polio in 2008 was the inconsistent quality of campaigns in the southern region, with staffing and management challenges aggravated by the precarious security situation. An in-depth analysis of SIA data showed that the quality of campaigns, particularly in Kandahar, Helmand and Uruzgan provinces, was inconsistent. In an immunization campaign held on 1-3 June, nearly a quarter of districts in the southern region failed to reach the coverage target of 95% of all children aged less than five years. In subsequent campaigns, the proportion of such districts rose to as much as 40%. In conflict areas or where local anti-government groups blocked entry, the average number of children not accessed in each round of 2008 due to insecurity in the conflict zone ranged from 100 000 to 200 000 (of the total target population of 1.2 million in the southern region). While a comparatively small number, this is enough to sustain transmission, especially in view of the corridor of transmission of polio from Karachi into this region.

Disparity between parental recall of children being immunized and finger marking

Pakistan: coverage in children <5 years



January 2009

© UNICEF Pakistan

Pakistan's innovative national polio cell has united the country's media in the fight against polio, dramatically lifting the profile of National Immunization Days, while making immunizers more accountable and ultimately increasing the number of children being immunized.

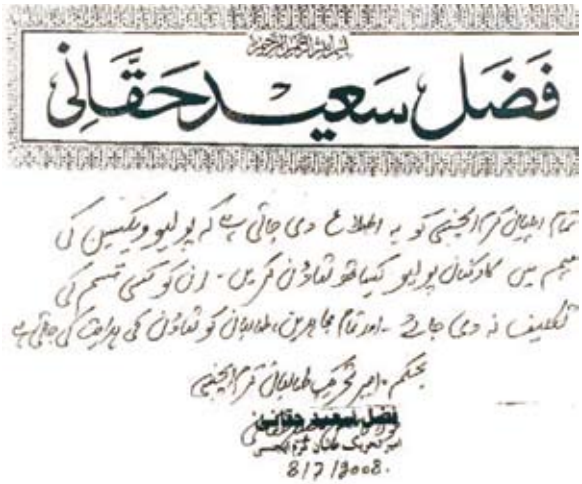
Strong government leadership encourages inter-sectoral approach in Pakistan and inventiveness in Afghanistan

Response to these challenges has been innovative in both countries, with growing commitment from political and health leaders at a variety of levels in Pakistan and strategies to adapt operations to the security environment in Afghanistan.

In Pakistan, provincial-level action plans were developed, with a view to increasing district-level leadership accountability. The Federal Ministry of Health launched an inter-provincial committee for polio eradication with the aim of bringing together the health leadership at province level to provide basic guidance and monitor and review implementation of national polio campaigns. Regular meetings of this committee are essential to its ultimate effectiveness. The federal leadership engaged other government sectors, such as the National Highway Authority, as well as the public and private television networks in support of polio eradication. By February 2009, the Prime Minister had endorsed a "Polio Action Plan" with concrete steps for collaboration with ministries beyond health.

In Afghanistan, a written letter of support from the appropriate Taliban *shura* or governing board was obtained prior to each SIA. To exploit the opportunity this created, several high-level missions from the capital Kabul to Kandahar province resulted in a plan for non-governmental organizations (NGOs) in the health sector to assume a much greater role in immunization campaigns in the southern region and for local religious and political leaders to negotiate access into areas not controlled by the government.

In districts with fluctuating security conditions, polio teams entered districts whenever they could, in order to boost immunity by vaccinating children with an additional dose of mOPV (which can be given with a shorter interval between doses than tOPV). These so-called Short Interval Additional Doses (SIADs) gave extra protection to an estimated 50 000 to 100 000 children repeatedly. Special communication strategies were designed for areas where conservatism restricted activities (in parts of the eastern, southern and south-eastern regions) through involvement of influential members of the community including religious leaders, teachers and elders, and by holding "courtyard" discussions with groups of women.


فضل سعید حقانی

8/7/2008.

A typical Fatwa issued prior to each immunization in Afghanistan

"All the residents of Kurram Agency are hereby required to extend their full cooperation with the teams working for Polio Vaccination and must not give them any harm. All Mujahdins and Talibans are also directed to cooperate with them."

Ordered by: Fazal Saeed Haqani - Ameer Taliban Movement - Kurram Agency.
Dated: 08/07/2008

Across the border, encountering similar access problems in the North West Frontier Province and Federally Administered Tribal Areas, polio teams obtained the support of local Taliban whenever possible.

Campaigns were conducted by religious organizations when feasible, using local vaccinators from the same religious sect. Teams merged with the community in dress and behaviour, giving vaccine after prayer and lunchtime to create the least disruption.

As part of cross-border coordination between Afghanistan and Pakistan, teams at border vaccination posts immunized 1.5 million children. The SIA schedule was synchronized, with the border areas generally covered on the same day.

The way ahead

In accessible areas of Pakistan, improving SIA quality will require converting the national inter-sectoral commitment to district level, with independent monitoring systems ensuring districts are actively working to cover at least 90% of their target populations, especially in Sindh. Provincial-level operational plans are being updated to improve district-level micro-plans and increase vaccinator and supervisor training and performance. Seroprevalence surveys are being initiated to verify programme performance and vaccine efficacy to guide strategy in areas where there is divergence between reported coverage and case numbers. Environmental surveillance is being introduced to refine understanding of the transmission zones.

In insecure areas, the priority will continue to be on area-specific tactics, adapting to fluctuating conditions and applying lessons learned from other conflict-affected, polio-free countries: negotiations for access using the most appropriate interlocutors, irrespective of affiliation, and with the goal of obtaining Days of Tranquillity for polio vaccination. Quarterly reviews of the security situation will guide these tactics, including the appropriate use of SIADs. Use of bOPV, possibly by late 2009, would help simplify the logistics of vaccination operations generally, boosting the effectiveness of the SIADs and other tactics in insecure areas. A risk model designed in 2008 will inform contingency plans, in order to ensure continuity of operations irrespective of security conditions.

Polio tragedy ends in Day of Peace

Traditionally marked as International Peace Day, 21 September is an occasion in Afghanistan to mark the desire for peace through activities nationwide.

A suicide car bombing on 14 September – killing two doctors and their driver on their way to supervise preparations for a polio vaccination campaign – threatened to derail the Peace Day immunization campaigns, but the national polio eradication team felt that the best way to remember their fallen colleagues was to continue their work.

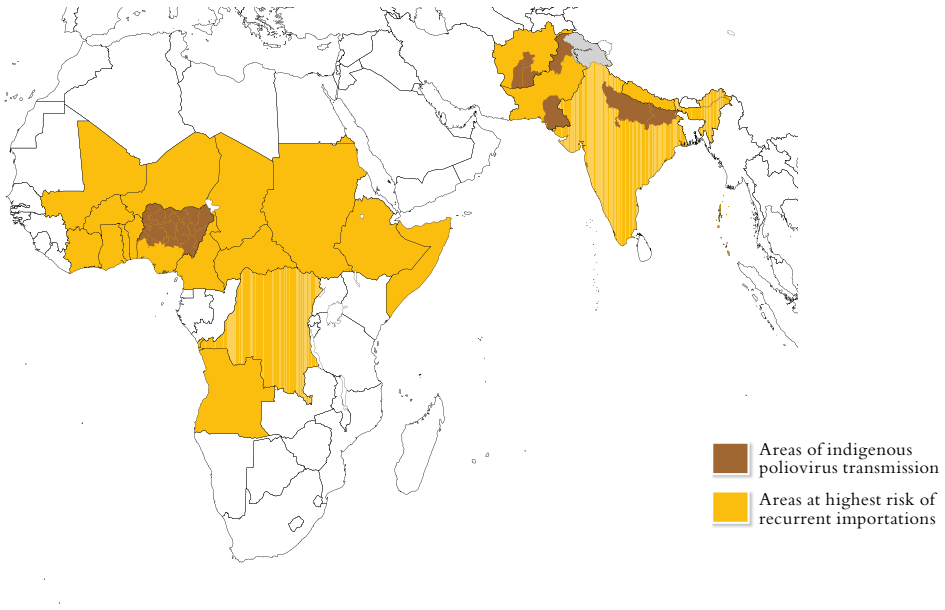
President Hamid Karzai issued a statement that government forces should refrain from attack on Peace Day, and anti-government elements were quoted in the media as being in support of the day. Following these statements, 14 000 vaccinators fanned out across the polio-affected provinces of Farah, Helmand, Kandahar, Kunar, Lagman, Nangarhar and Uruzgan to vaccinate 1.8 million children.

Dr Shams ul Haq Kakar

Dr Mamoon Tahiri

1.2. Countries with imported poliovirus

Endemic Areas and areas at highest risk of recurrent wild poliovirus importations



As long as indigenous wild poliovirus (WPV) transmission continues anywhere in the world, the risk of international spread remains. In 2008, 14 countries had circulation of imported poliovirus, all but one in Africa. Of these, 10 countries were infected by WPV of Nigerian origin and four by WPV of Indian origin. By year-end, Ethiopia appeared to have stopped WPV circulation. And at the time of going to print, Nepal and Ghana had not announced a WPV case for more than six months.

The experience of the past five years shows that for programmatic purposes, importations can be categorized as persistent, recurrent or sporadic and that prevention and response strategies can be adapted accordingly. Full implementation of international outbreak response guidelines[7] can help rapidly stop outbreaks due to importations. However, if these guidelines are not fully followed, there is a serious risk that transmission of imported poliovirus will persist. Such persistent importations pose a primary risk in the affected country as well as a significant secondary risk of onward spread to other destinations.

Areas at highest risk of recurrent importation are now well defined by proximity to or with trade and cultural ties to an endemic country: for example, countries close to Nigeria either physically or in terms of frequent contact.

Sporadic importations are those which periodically occur into countries that are not considered high-risk, because they are distant from endemic areas and do not have close links to such areas. Though most sporadic importations lead to few cases – as in Botswana in 2004 – larger outbreaks can occur, as evidenced by Indonesia in 2005 with 303 cases.

On rare occasions, outbreaks occur due to circulating vaccine-derived polioviruses (cVDPVs).[8] Circulating VDPVs are more likely to arise in a community where children have received limited vaccination against polio. Such cVDPVs can be swiftly stopped if outbreak response guidelines are fully followed. In 2008, cVDPVs were circulating in the Democratic Republic of the Congo, Ethiopia and Nigeria, all due to type 2 cVDPVs (type 2 poliovirus has been eliminated in the wild).

7 Adopted by the 59th World Health Assembly in May 2006.

8 See section 2.2

Countries with ongoing transmission in 2008, following an importation of wild poliovirus, by event*

Countries with persistent** transmission following importation

Country	Type	First case	Most recent case	# cases	Duration (in months)	Status***
Angola	WPV1	25-Apr-07	18-Feb-09	16	22	Ongoing
	WPV3	19-Mar-08	17-Nov-08	24	8	Ongoing
Chad	WPV3	15-Nov-07	1-Apr-09	29	14	Ongoing
	WPV1	18-May-07	13-Aug-08	6	15	Stopped
	WPV3	27-Nov-07	7-Nov-08	11	12	Stopped
	WPV1	18-Nov-08	18-Nov-08	1	0	Ongoing
Democratic Republic of the Congo	WPV1	17-Dec-06	5-Aug-08	40	20	Stopped
	WPV3	18-Oct-08	10-Feb-09	2	4	Ongoing
Sudan	WPV1	20-May-04	4-Apr-09	204	58	Ongoing
	WPV3	6-Jul-08	6-Jul-08	1	0	Stopped
	WPV3	16-Dec-08	16-Dec-08	1	0	Ongoing

Countries with recurrent importations

Country	Type	First case	Most recent case	# cases	Duration (in months)	Status***
Benin	WPV1	19-Mar-08	19-Mar-08	1	0	Stopped
	WPV1	30-Jun-08	30-Jun-08	1	0	Stopped
	WPV1	3-Nov-08	25-Mar-09	20	5	Ongoing
	WPV3	1-Dec-08	1-Dec-08	1	0	Ongoing
Nepal	WPV3	12-Jan-08	12-Jan-08	1	0	Stopped
	WPV3	17-Jan-08	17-Jan-08	1	0	Stopped
	WPV3	16-Feb-08	16-Feb-08	1	0	Stopped
	WPV3	28-May-08	28-May-08	1	0	Stopped
	WPV3	28-Jul-08	28-Jul-08	1	0	Stopped
	WPV3	15-Oct-08	15-Oct-08	1	0	Stopped
Niger	WPV1	5-Mar-07	5-Jan-08	6	12	Stopped
	WPV1	23-May-07	2-Apr-08	7	11	Stopped
	WPV3	10-Oct-08	11-Oct-08	1	0	Stopped
	WPV3	6-Dec-08	22-Mar-09	9	4	Ongoing
	WPV1	23-Jan-08	24-Jan-08	1	0	Stopped
	WPV3	10-Dec-08	25-Feb-09	2	3	Ongoing
	WPV3	16-Dec-08	1-Mar-09	2	3	Ongoing
	WPV1	25-Feb-08	12-Apr-08	2	2	Stopped
	WPV1	11-Apr-08	11-Apr-08	1	0	Stopped
	WPV1	20-May-08	20-May-08	1	0	Stopped

Countries with sporadic importations

Country	Type	First case	Most recent case	# cases	Duration (in months)	Status***
Central African Republic	WPV1	6-Apr-08	30-Dec-08	3	9	Ongoing
Ethiopia	WPV1	4-Apr-08	27-Apr-08	3	1	Stopped
Ghana	WPV1	20-Sep-08	8-Nov-08	7	2	Ongoing
	WPV1	15-Sep-08	15-Sep-08	1	0	Stopped
Mali	WPV1	30-Aug-08	4-Jan-09	2	4	Ongoing
Togo	WPV1	16-Oct-08	28-Feb-09	6	5	Ongoing
Burkina Faso	WPV1	6-Jun-08	6-Jun-08	1	0	Stopped
	WPV1	4-Nov-08	15-Jan-09	4	2	Ongoing
	WPV1	16-Nov-08	16-Mar-09	10	4	Ongoing
Côte d'Ivoire	WPV1	24-Dec-08	6-Apr-09	11	3	Ongoing

* An importation event is the detection of one or more cases of poliovirus that genetic analysis shows to be of external origin (i.e. originating from another country).

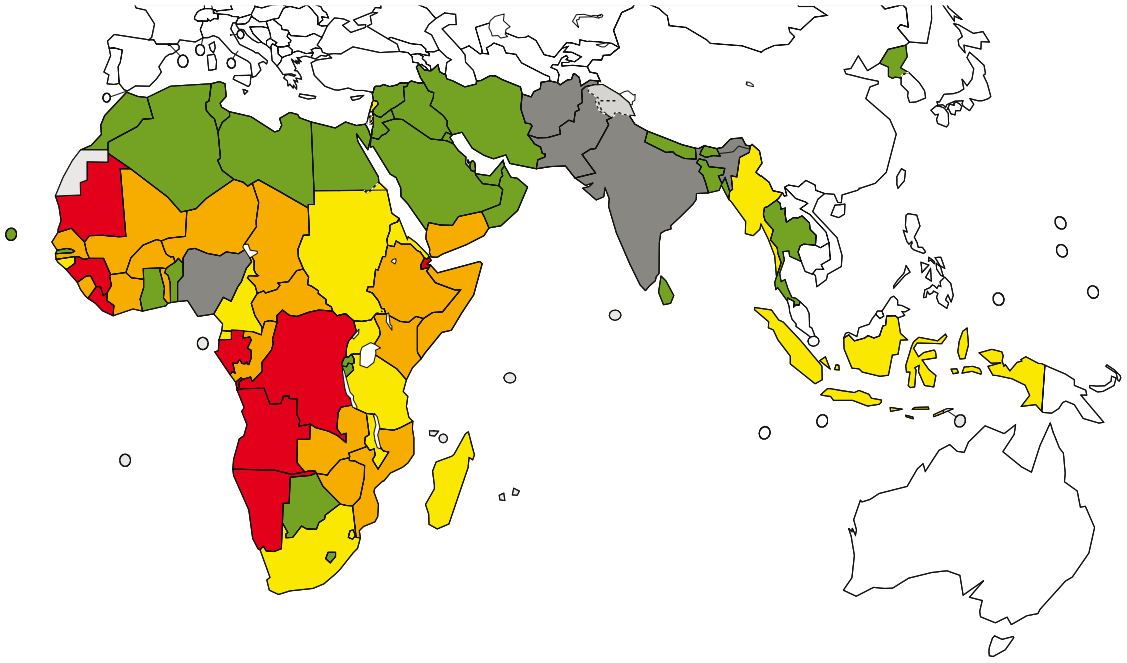
** Countries with transmission >12 months following an importation of the virus.

*** An outbreak is considered ongoing when poliovirus is detected whithin the last six months, otherwise considered stopped.

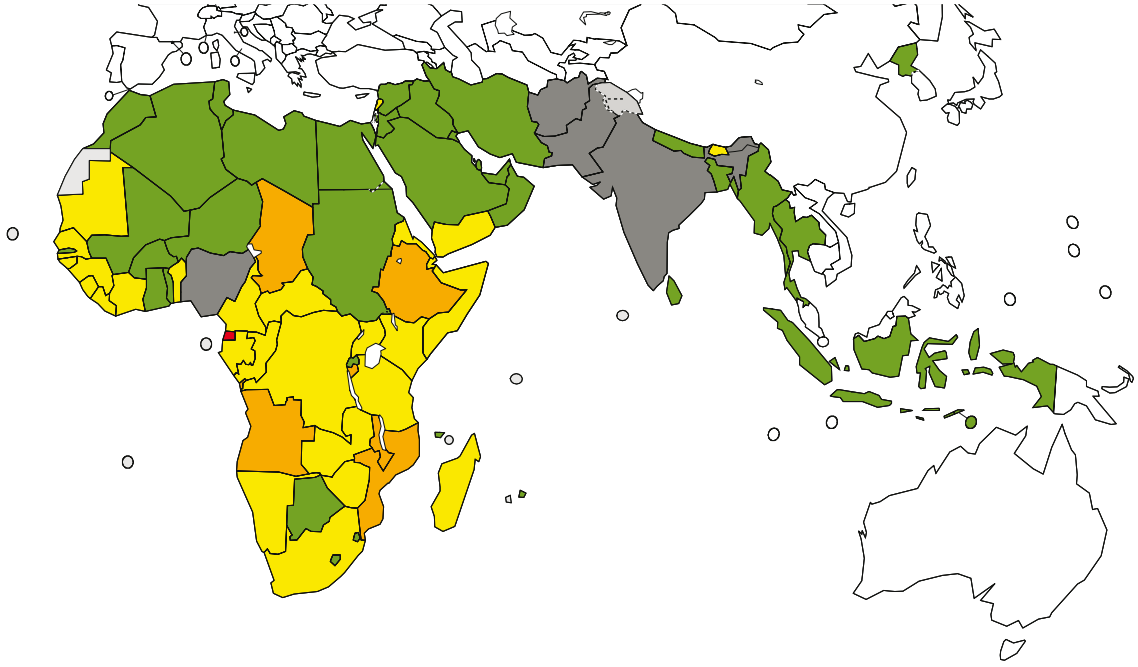
Data in WHO/HQ as of 12 May, 2009

Areas of persistent outbreaks: Insufficient improvement in immunity profile

Global immunization status in 2004



Global immunization status in 2008



% non-polio AFP, 6-59 months, with 3+ doses of OPV

0 - 39% | 40% - 59% | 60% - 79% | 80% - 100% | N/A Endemic countries

Data as of 12 of May, 2009

Horn of Africa

Persistent importation spreads

In the Horn of Africa, a persistent importation on the southern Sudan–western Ethiopia border was detected in 2008 and spread in early 2009 to northern Sudan, Kenya and Uganda.

Of Sudan's 26 recorded poliovirus cases in 2008, 24 were from southern Sudan, genetically linked to a virus that had circulated in Sudan in 2004[9]. This "missing link" highlights the importance of countries establishing not only sufficient routine immunization levels to reduce the consequence of an importation but also high-quality surveillance to rapidly detect poliovirus. Polio vaccination activities were hampered by management issues and civil unrest in parts of the country. In response, the Global Polio Eradication Initiative (GPEI) partnership sent in four STOP (Stop Transmission of Polio) team members to boost AFP surveillance (a further nine STOP team members were sent to Sudan in early 2009). Indeed, the increasing number of cases in Sudan in late 2008/early 2009 reflects improvements in AFP surveillance. By early 2009, the Government of Southern Sudan declared the polio outbreak a national health emergency and backed up these words by increasing the number of immunization activities. Maintaining this level of political commitment to polio eradication is essential in order to vaccinate enough children to finally stop this persistent outbreak.

In early 2008, Ethiopia reported three cases of polio on its border with southern Sudan. Following a series of outbreak response activities, no cases of WPV were reported in Ethiopia after April 2008.

By early 2009, however, both Kenya and Uganda were infected by imported WPV linked to Sudan. Kenya had previously suffered just two cases of polio in 25 years, both direct importations close to the Somalia border, while Uganda had been polio-free since 1996. As this report went to press, both countries were conducting international standard polio outbreak responses.

© UNMIS / Johann Hattingh

Children line up to receive oral polio vaccine at a school in Sudan.

9 Two were type 3 cases imported from Chad to Darfur

Central Africa

Persistent importations threaten progress

In central Africa, two persistent importations of WPV continued in 2008, the first encompassing Angola and Democratic Republic of the Congo – with virus of Indian origin – and the second in Chad, with virus of Nigerian origin.

Both countries have had an outbreak for more than 12 months, have reported both type 1 and type 3 viruses, and have contributed to cases in the Central African Republic. Immunization response to the persistent outbreak has not been to the standard of the internationally endorsed outbreak response guidelines, and surveillance indicators mask gaps at sub-national levels.

Angola and the Democratic Republic of the Congo

Angola was infected in 2008 by both type 3 and type 1 imported poliovirus, both of Indian origin. While the type 1 virus was the continuation of a 2007 importation, the type 3 cases were the result of a 2008 importation which subsequently moved into the Democratic Republic of the Congo.

With a view to interrupting the persistence of the importation, the Technical Advisory Group (TAG) for polio eradication in Angola met twice in 2008 and again in early 2009 to review strategies and implementation, recommending an intensified campaign schedule and specific activities to achieve high quality. To this end, 10 technical public health officers, seconded by the Government of Cuba, were deployed to "high-risk provinces" to work on improving SIA coverage and monitoring.

The Democratic Republic of the Congo saw a reduction in cases in 2008, but suffered a new importation of a type 3 poliovirus from India via Angola. Although no type 1 case has been reported since August 2008, the most recent type 1 cases were reported in the security-compromised provinces of South and North Kivu, where access is limited and low-level transmission may continue. As the Democratic Republic of the Congo also reported a cVDPV type 2 outbreak in Katanga Province, the 2009 campaign schedule comprises a mix of monovalent and trivalent OPV.

Following importations from the Democratic Republic of the Congo, the Central African Republic recorded three cases in 2008. Despite four NIDs, population immunity remains low due to the sub-optimal quality of the immunization activities, hampered by insecurity. The country has put in place a series of measures to improve the quality of immunization activities, including specific strategies to reach security-compromised areas. These include a directive from the Ministry of Health to provincial governors and health authorities to enhance their monitoring of eradication activities as well as systematic engagement with NGOs. Implementation of these activities – which were successful in stopping the Central African Republic's 2004 outbreak – is being monitored, and surveillance reviews will take place in the Central African Republic as well as the Democratic Republic of the Congo at end-2009.

Chad

In 2008, aside from Nigeria, Chad reported the highest number of cases of any African country (37). A major country-wide type 3 outbreak – comprised of two chains of transmission of viruses of Nigerian origin that have now been circulating in the country for 12 months – further exported virus into eastern Sudan and the Central African Republic. Chad also reported a small number of type 1 cases. The polio eradication effort in Chad has been hamstrung by poor quality immunization campaigns and sub-optimal surveillance standards, compounded by insecurity. In response, technical assistance was increased, with satellite offices set up in the provinces and AFP cases being regularly validated. Vaccination campaigns were staggered to adapt to security restrictions, and OPV was added to measles campaigns to improve coverage. By early 2009, the detection of AFP cases had nearly doubled in Chad (with 102 paralysed children found in the first four months of 2009, compared to 54 in the same period of 2008).

© UNICEF / Ghana / 2009 / Susheel Shrestha

A Ghanaian woman points to the tell-tale markings that her infant child has been immunized against polio.

West Africa

Recurrent importations provoke united response

Whereas in 2007 only Niger was repeatedly the destination of imported poliovirus from Nigeria, in 2008 WPV spread to six other West African countries.

Benin was first re-infected in April, with cases detected throughout the year in the north and south, each episode presenting as independent importations of virus from Nigeria. Burkina Faso was repeatedly infected with virus that had originated in Nigeria (one virus was directly linked to Nigeria, another arrived via Benin and a third via Togo). Poliovirus linked to Burkina Faso, in its turn, caused the reinfection of Mali in August. Ghana was infected by a virus of Nigerian origin via Burkina Faso and Nigeria directly, while Togo was infected via Ghana and Burkina Faso. The final country to be re-infected in West Africa in 2008 was Côte d'Ivoire in December.

Throughout much of 2008, Niger continued to report cases of WPV imported from Nigeria. The cases detected during the first quarter of 2008 were either genetically linked to 2007 circulation or a new importation. High quality campaigns interrupted this ongoing circulation, but could not prevent new importations in the last quarter of the year.

In response to the West African outbreak, four synchronized immunization activities were conducted in 2008, in seven countries[10], plus Nigeria. Previous experience – and notable gains in population immunity and speed of detection and response since the 2003-

10 Followed by three synchronized vaccination campaigns spanning the seven re-infected countries and Nigeria between February and 12 of May, 2009.

2006 outbreaks – argues that such a rapid, large-scale response will once again render this region polio-free. However, the ease of movement of WPV in West Africa underlines the extreme vulnerability of that region as long as there is polio in Nigeria.

Three-year-old Thomas of Tsévié, Togo, receives oral polio vaccine as part of West Africa's seven-country synchronized outbreak response.

Nepal

High-quality response reduces sporadic re-infection, stops outbreak

Nepal remains at constant risk of WPV re-importation due to its close proximity to the polio-endemic states of Bihar and Uttar Pradesh in northern India. This was borne out in 2008 when Nepal reported six type 3 cases – all single importations from either Bihar or Uttar Pradesh. Large-scale rapid-response mop-up immunization activities, along with one NID and four SNIDs, prevented any further spread in the country.

2. Strategic Objective II

Surveillance and certification of global polio eradication

Milestone 2008[11]	Status
Milestone 1: All AFP specimens will be processed in a WHO-accredited laboratory.	Achieved
Milestone 2: All countries will have completed each laboratory biocontainment phase (phase II+).	Not achieved
Milestone 3: All manufacturers will produce wild-type IPV under BSL-3/polio.*	Not achieved
Milestone 4: All countries will submit final certification documentation.	Not achieved

* Biosafety level 3 measures for safe handling of polio materials.

2.1. Surveillance for acute flaccid paralysis

Maintaining surveillance sensitive enough to detect poliovirus is critical in guiding the eradication of remaining indigenous poliovirus, in enabling rapid response to importations and in certifying the interruption of transmission. In 2008, all WHO regions maintained AFP surveillance at or above certification level[12]. While all polio-endemic regions and the majority of re-infected countries showed improvement in AFP surveillance levels compared with 2007 statistics, there was a slight decline in polio-free regions. In polio-endemic regions, 15 countries did not reach certification-quality AFP surveillance[13].

In polio-endemic WHO regions – the African (AFR), Eastern Mediterranean (EMR) and South-East Asian Regions (SEAR) – most countries recorded AFP-reporting levels of 2 per 100 000: double that of certification levels[14]. In AFR, 91% of countries achieved this level, compared with 93% in EMR and 97% in SEAR.

Quality of AFP reporting, by WHO region, 2007 and 2008

WHO region	Reported AFP cases		Non-polio AFP rate		% AFP with adequate specimens	
	2007	2008	2007	2008	2007	2008
African Region	12 080	14 256	4	4.44	90	90
Region of the Americas	2 111	2 059	1.27	1.24	78	79
Eastern Mediterranean Region	9 394	10 799	4.19	4.6	91	91
European Region	1 449	1 348	0.98	0.91	82	82
South-East Asia Region	46 124	50 511	7.66	7.97	84	84
Western Pacific Region	6 237	6 421	1.62	1.61	90	88
Global total	77 395	85 394	4.19	4.61	86	86

11 Details in Appendix A.

12 A non-polio AFP rate of at least 1 per 100 000 of the under-15-year-old population, with adequate stool specimens taken from at least 80% of AFP cases and all processed in a WHO-accredited laboratory.

13 AFRO: Algeria, Cape Verde, Guinea-Bissau, Mozambique, Namibia, Réunion, Saint Helena, Sao Tome and Principe and Seychelles. EMRO: Djibouti, Kuwait and Lebanon. SEARO: Bhutan, the Maldives and Thailand.

14 As per the 2005 ACPE recommendation of an operational target for AFP surveillance for countries with indigenous or imported poliovirus and those at high risk of importations.

Sub-national surveillance

While national AFP surveillance is generally adequate in proportion to the general population, province-by-province surveillance breakdowns show substantial discrepancies. The following three areas – all with persistent circulation of imported WPVs – showed evidence of such gaps in 2008, requiring corrective action.

- **Chad:** The 2008 AFP indicators in Chad exceeded certification quality at the national level but were sub-optimal in six of the 18 provinces. Genetic analysis reveals that some chains of poliovirus transmission were missed for periods of up to 15 months, confirming significant sub-national surveillance gaps. While the security situation in mid-2008 initially restricted the efforts of the programme to improve surveillance quality, data analysis and review of priorities are now carried out on a quarterly basis to assess the risks of missed transmission. Improvements by end-2008 include the establishment of three sub-national offices, allowing close supervision of surveillance focal points in the provinces.
- **Southern Sudan/Western Ethiopia:** At the national and provincial level, 2008 surveillance indicators exceeded certification quality in both Sudan and Ethiopia. However, detection in 2008 of a virus in the border area of southern Sudan and Ethiopia, which had circulated undetected for 36 months, confirmed that sub-national surveillance gaps persist. Following a surveillance review in southern Sudan in early 2009, improvements being undertaken include more systematic active surveillance visits to address the under-reporting of AFP cases, which is partly due to weak infrastructure. Technical support to southern Sudan has been stepped up with the deployment of over 20 WHO staff and consultants. Ethiopia conducted a review in late 2008 to identify high-risk zones in need of special attention, and these zones are now being targeted to improve the quality of surveillance and immunization activities.
- **Angola:** Angola's surveillance indicators at national and sub-national level were of certification standard in 2008, but were below the higher operational target set for countries with importations. To help strengthen the reliability of surveillance indicators, 24 international consultants were deployed in early 2008. This bore immediate results: by end-2008, Angola nationally met the higher operational target set for countries with importations, although gaps at sub-national level still remain.

2.2. Global Polio Laboratory Network

A global network of 145 laboratories continues to support the GPEI. The primary responsibilities of the Global Polio Laboratory Network (GPLN) are the analysis and characterization of polioviruses from AFP cases, although samples from non-AFP sources are also analysed on request. WHO continues to coordinate and administer a laboratory quality assurance programme that involves accreditation based on annual performance reviews, proficiency testing, and standardization of laboratory testing procedures.

In 2008, the network tested approximately 157 200 faecal samples from 79 740 AFP cases[15] and 13 000 samples from non-AFP sources such as sewage water. The AFP workload increased by 10% overall compared to 2007, due to improvement in surveillance in the three remaining polio-endemic regions where workload increases were 18%, 14% and 10% in AFR, EMR and SEAR, respectively.

In January 2008, WHO introduced a revised accreditation checklist for use in the GPLN. The main changes allow for review of laboratories using new test algorithms with target reporting times of seven and 14 days for virus isolation and Intra-typic Differentiation (ITD) respectively, and more detailed evaluation of management and biosafety. A new virus isolation proficiency test panel was also introduced in 2008 for evaluating performance with the new algorithm and used in four WHO regions. The accreditation status of laboratories[16] was: 140 (96.6%) fully accredited, four provisionally accredited, and one laboratory with accreditation pending the repeat of the virus isolation proficiency test. Laboratories in polio-endemic regions generally had little difficulty in meeting the 14-day timeline for reporting virus isolation results, but some with high workload or limited ITD experience did not meet the required standard for timely reporting of ITD results.

15 Data reported by WHO region up to 21 January 2009.

16 As of 21 January, 2009.

Detection and transmission links among wild polioviruses

Analysis of the genetic relationships among WPV was carried out in 2008. Endemic transmission of two genotypes continued in Afghanistan, Pakistan and India. New importations of WPV of Indian origin occurred in Angola and Nepal. Local transmission continued – of WPV that had been imported from India in previous years – in Angola and the Democratic Republic of the Congo, the latter infecting the Central African Republic in 2008 as well.

Endemic transmission continued in Nigeria in 2008. Additionally, 10 other countries[17] had new importations of WPV of Nigerian origin in 2008 and two (Chad and Sudan) had continued transmission of previously-imported WPV. Type 3 WPV in Sudan was most closely related to that found in Chad. Benin and Niger also had sporadic importations from neighbouring Nigeria.

The GPLN also identified WPV in non-AFP samples in 2008. In India, both types 1 and 3 WPV were isolated intermittently from sewage collected in Mumbai (Maharashtra Province), predominantly related to viruses circulating in Bihar.

In Egypt, two different type 1 WPVs were also isolated from single sewage samples collected in Giza in September 2008 and in Cairo in December 2008.

These two isolates represented separate introductions of viruses of Nigerian (transmitted via Sudan) and Indian origins, respectively. Thorough follow-up investigations found no polio cases in Egypt.

The new look of outbreak response: Faster and better lab work

In Africa, between the first quarters of 2008 and 2009, 15 countries suffered importations of poliovirus. The median interval between when a child first developed AFP to confirmation of polio in the laboratory was 31 days, as opposed to the 51 days it took in outbreaks in 2002-2005. The contribution of this rapidity of detection to rapidity of response is clear: from laboratory confirmation to the first large-scale vaccination response took 27 days in 2008, down from 37 days in the previous African outbreaks.

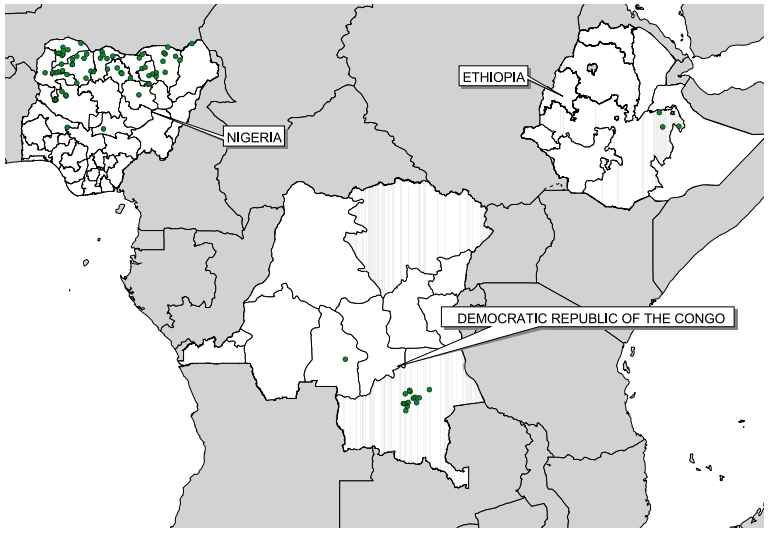
Detection of vaccine-derived polioviruses

The GPLN screens Sabin-related isolates to identify VDPVs (defined as > 1% VP1 nucleotide sequence divergence from the parental Sabin virus).

VDPVs were also found in sewage samples collected in Estonia, Israel, Finland and Switzerland in 2008, although no polio cases were found in any of these locations during follow-up investigations.

Progress in developing better laboratory diagnostics in 2008 appears to have led to better detection of VDPVs. Detection sensitivity was increased by as much as 30% over traditional tests in the Nigeria outbreak, using a new VDPV screening test developed by the United States Centers for Disease Control and Prevention (CDC). Programme experience of the real-time Reverse Transcriptase Polymerase Chain Reaction (rRT-PCR) test will be re-assessed in June 2009 and prior to introduction into all endemic regions by end-2009.

Circulating Vaccine-derived Poliovirus type 2 cases, 2008



Nigeria: 62; Democratic Republic of the Congo: 14; Ethiopia: 3

Data as of 12 May, 2009

17 Benin, Burkina Faso, Chad, Côte d'Ivoire, Ethiopia, Ghana, Mali, Niger, Sudan and Togo.

Catching cVDPVs

Detection sensitivity in the Nigeria cVDPV outbreak increased by as much as 30% over traditional tests by using the new rRT-PCR VDPV screening test developed by CDC.

The new method was evaluated through testing more than 4000 poliovirus isolates at the CDC and more than 1000 isolates under field conditions in reference laboratories in India, Pakistan and South Africa. These evaluations involved testing of wild type, vaccine-derived and Sabin-like poliovirus isolates of all three serotypes.

Preliminary results from prospective testing confirmed higher sensitivity for type 2 VDPV screening compared to traditional methods, finding close to 60 VDPV cases in Nigeria and 17 VDPV cases in other African countries. Additionally, some AFP cases were identified retrospectively as VDPVs previously missed by the traditional VDPV screening approach, including type 2 VDPV cases from the Democratic Republic of the Congo (two from 2005 and one from 2007) and Somalia (one from 2005). Implementation of the new screening method in all ITD laboratories of the network is planned for 2009 and 2010.

2.3. Containment of poliovirus

Containing polio: Western Pacific Region completes Phase 1

Once WPV is eradicated, viruses will remain only in facilities for research, diagnostics and vaccine production. Work has already begun on managing the post-eradication risk of WPV being re-introduced from such facilities, with identification of these facilities through nationwide surveys – known as Phase I of poliovirus laboratory containment activities.

In 2008, the WHO Western Pacific Region (WPR), encompassing 27 countries from South-east Asia to the South Pacific, became the second WHO Region to officially complete Phase I containment in all Member States.

Announcing this development, the WPR Regional Certification Commission (RCC) made special mention of both China and Japan for completing the Phase I activities. Both countries faced significant challenges due to their large number of biomedical laboratories, but nonetheless conducted surveys of more than 50 000 facilities across government and private sectors to identify those laboratories holding infectious or potentially infectious materials containing WPV. Surveying sectors of government not normally involved with polio eradication activities is a complex operation, testifying to the government commitment in China and Japan.

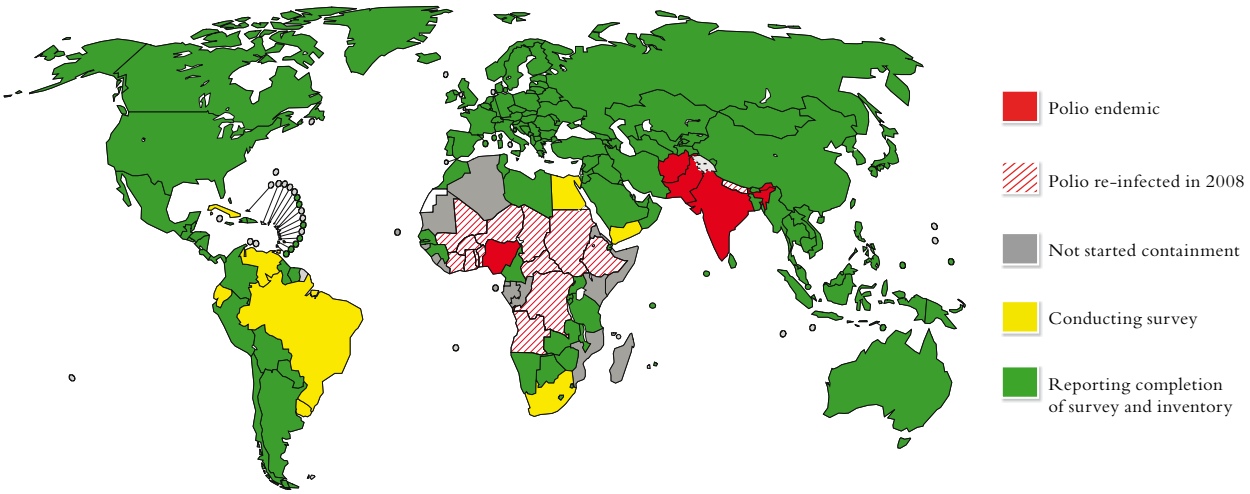
The China and Japan surveys, along with those of the other Member States of the WPR, resulted in official identification of 45 facilities containing WPV materials in 4 out of 27 countries in the region.

WPR follows EUR in completing Phase I of containment. The WHO Region of the Americas (AMR) has also made significant strides in 2008 towards completing Phase I. The AMR RCC has accepted as complete the reports on Phase I containment activities from 24 of the 35 Member States in the region. The remaining 11 countries will be reviewed at their meeting in 2009, clearing the way for AMR to complete this phase. Global completion of Phase I will occur only once WPV circulation has been interrupted and the Phase I activities are completed in the remaining four countries with indigenous poliovirus circulation.

The Phase I survey and inventory activities together establish the baseline for WPV risk. The strategy to manage this risk is provided in the *Global Action Plan to minimize poliovirus facility-associated risk in the post-eradication / post-OPV era (GAPIII)*. Based on risk assessments and wide consultation with experts in the fields of biosafety and risk management, GAPIII outlines a post-eradication strategy for both the minimization and the management of WPV risk at such facilities.[18]

18 See Section 3.3 for 2008 activities on GAPIII.

Progress towards Phase 1 of Global Containment, at end-2008



2.4. Certification of global polio eradication

To prepare for the eventual certification of the eradication of WPV in the three remaining WHO Regions with circulating WPV, Regional Certification Commissions (RCCs) and National Certification Committees (NCCs) continue to meet regularly to review submissions by eligible countries where no WPV has been found for at least three years in the presence of certification-quality surveillance.

In 2008, the number of eligible countries from which the RCCs accepted final certification documentation increased: in AFR, from 21 to 24 (of 46 Member States); in EMR, from 15 to 19 (of 23 Member States); while in SEAR, the number remained stable at nine (of 11 Member States), with India and Timor-Leste pending.

Furthermore, two fully certified regions – WPR and EUR – maintained their RCCs and NCCs to support activities to maintain polio-free status and to achieve/maintain laboratory containment in all countries[19]. RCCs in both these regions met in 2008 and reviewed annual update reports from all countries. As in the previous years since regional certification, the RCCs' close scrutiny of AFP and immunization data from all Member States was one of the main reasons why both polio-free regions were able to maintain certification-quality surveillance and adequate levels of immunity against polio, particularly in known high-risk groups and areas.

19 The Americas did not maintain their certification bodies following regional certification, but established a Regional Commission for Laboratory Containment and Verification of Polio-free Status in 2004, mainly to oversee laboratory containment activities.

3. Strategic Objective III

Management of long-term risks after wild poliovirus eradication

Milestone 2008[20]	Status
Milestone 1: Long-term immunization policies will be introduced.	Achieved
Milestone 2: Additional tools for the detection and immediate notification of circulating WPV will be finalized (where appropriate).	Achieved
Milestone 3: Assembly of mOPV stockpile will begin.	Not achieved
Milestone 4: Implementation and verification of GAPIII will begin.	Not achieved

Once global WPV transmission has been interrupted, WPV stocks contained and eradication certified worldwide, the greatest risk of polio being re-introduced will derive from the attenuated polioviruses contained in OPV, resulting in vaccine-associated paralytic polio (VAPP) and outbreaks due to VDPVs.

With these risks in mind, the WHA, in its May 2008 resolution, requested the WHO Director-General "to set, if and when appropriate, a date for the eventual cessation of use of OPV" in routine immunization programmes. In response to the WHA's directive, the GPEI intensified its programme of work to develop the most appropriate strategies for managing the post-eradication, long-term risks of polio.

The Polio Research Committee (PRC) was reconstituted in 2008, with experts in the fields of virology, epidemiology, sociology and public health from around the world. The PRC operates under the auspices of the ACPE and the SAGE. The group held its inaugural meeting in May 2008, and is now providing further guidance to the GPEI on long-term risk management by reviewing polio eradication-related research, identifying knowledge gaps, proposing appropriate studies, determining research priorities and funding levels, reviewing external research proposals and engaging potential new collaborators. This aspect of the GPEI research agenda is focused on three areas:

- Fully characterizing the long-term polio risks, especially VDPVs
- Developing tools to manage the long-term risks
- Contributing to policy frameworks to internationally coordinate the management of the long-term risks of polio.

3.1. Characterization of long-term polio risks

In 2008, significant new knowledge was gained on the post-eradication risks posed by OPV. The risks of VAPP being already well-known[20], research activities in 2008 focused on the risks relating to VDPVs.

Experience with circulating VDPV events in the past 10 years suggests that limited population immunity is the main risk for the spread of a cVDPV. In 2008, cVDPVs were reported in the Democratic Republic of the Congo, Ethiopia and Nigeria.

20 Details in Appendix A.

To better detect VDPVs (and further define the extent of this risk), the new state-of-the-art screening method known as rRT-PCR was piloted by the Global Polio Laboratory Network.[21] Initial data from the Nigeria outbreak shows the test increased cVDPV sensitivity by up to 30%.

A study series continues to measure the prevalence of VDPV excretion among people diagnosed with primary immune (B-cell) deficiency disorders (PIDs), with specific outcomes expected to be: an estimation of the prevalence of immunodeficiency-associated VDPV (iVDPV) excretion among PIDs in a broad geographical variety of middle- and low-income settings; genetic characterization of iVDPVs; and further insight into the duration of iVDPV excretion. This work is being carried out in Bangladesh, China, Egypt, Iran, the Philippines, the Russian Federation, Senegal and Tunisia. After study protocols were adapted to national contexts, ethical clearances were obtained through national and WHO processes for China, the Russian Federation and Tunisia in 2008, and implementation began in the latter two. The remaining countries are expected to implement their studies in 2009.

3.2. Developing tools to manage long-term risks

To reduce the potential risks associated with OPV cessation and to manage the long-term risks of stored polioviruses, new tools are being developed as called for by the PRC, ACPE and SAGE guidance bodies and mandated by the WHA.

Detection of VDPVs: faster and more sensitive

In addition to more sensitive detection, the advantages of the new rRT-PCR screening method for VDPVs include data output in computerized format and minimal risk of sample contamination. It is planned to fully implement rRT-PCR assays in 13 of the 17 ITD laboratories in EMR and SEAR and to hold a training workshop in AFR by end-2009.

Ensuring outbreak response capacity: monovalent OPV stockpiles

In 2008, more than 1.2 billion doses of type 1 mOPV were administered in 23 countries, and more than 370 million doses of type 3 mOPV administered in eight countries. This experience helps formulate policy on post-eradication immunization strategies. To ensure outbreak response capacity for cVDPVs detected immediately following OPV cessation, an international stockpile of monovalent OPVs must be established, maintained and managed.

By end-2008, six type 1 mOPVs and three type 3 mOPVs had been licensed, as a result of an expedited approach to licensure agreed by WHO and National Regulatory Authorities (NRAs) in monovalent OPV-producing countries. Additionally, one manufacturer licensed a type 2 mOPV and another application for licensure is pending. Before the end of 2009, an initial stockpile tender will be issued by UNICEF for the development and licensing of all three mOPVs and for the production of initial bulks for the stockpile.

Affordable IPV options

Following OPV cessation, IPV will be the only option with which to maintain population immunity against polio for those countries that need or choose to do so. While the full role of IPV following OPV cessation is still being evaluated, at a minimum IPV will be needed in all countries that continue to store and handle polioviruses. Other countries may perceive that the long-term poliovirus risks warrant continued routine immunization with IPV. Recognizing that the current costs of IPV are substantially higher than OPV, the development of affordable strategies for IPV use (i.e. ideally to achieve immunity at a cost similar to that achieved through OPV) in low-income settings was accelerated in 2008.

© Sephi Bergerson

A vial of temperature-sensitive monovalent oral polio vaccine in India.

21 See section 2.2

To this effect, the GPEI entered into a multi-year collaboration on Sabin-based IPV with the Netherlands Vaccine Institute in 2008. This collaboration encompasses a number of clinical development projects for IPV using Sabin-strain polioviruses to facilitate IPV production in developing country settings, including an assessment of alternative inactivation processes to improve the immunogenicity of these strains. By end-2008, projects already under way included an evaluation of Sabin-virus seed strains, one alternative inactivation process and production of master virus seed-lots.

Other collaborative research on affordable IPV strategies which took place or secured funding through the PRC in 2008 included four studies on alternate seed-strains of Sabin viruses, four on fractional dosing of IPV and three on the use of adjuvants.

To evaluate the role of IPV before and after OPV cessation and help develop long-term immunization policies, a SAGE working group on IPV was constituted in 2008. In November, the working group presented the SAGE with a framework to assess potential options for immunization in the post-eradication era in low- and middle-income countries. This framework will be completed through a combination of new clinical and operational research.

3.3. Coordinating the management of long-term poliovirus risks

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The Global Polio Eradication Initiative understands the need for agreed processes and policy for the handling of the mOPV stockpile after the final drop is administered.

Of the six major elements of the risk-management strategy for the post-eradication era,[22] three require international coordination: synchronization of eventual OPV cessation, use of vaccines from a mOPV stockpile in outbreak response after OPV cessation, and long-term containment of polioviruses.

Synchronization of eventual OPV cessation

Based on a series of expert technical consultations[23], in 2004 the ACPE recommended that use of OPV should cease as soon as possible after the interruption of WPV worldwide in order to minimize the long-term risks. In May 2008, the WHA resolution on polio eradication requested that

22 *Framework for National Policy Makers in OPV-using Countries: Cessation of routine OPV use after global polio eradication,* WHO, 2005.

23 WHO Informal Consultation on Identification and Management of Vaccine-derived Polioviruses, September 2003.

work begin to set a date for the eventual cessation of OPV use in routine immunization programmes, if and when appropriate. In November, the SAGE re-affirmed the ACPE recommendation, and the GPEI will now work on developing, as requested by the WHA, a comprehensive mechanism for managing the risks.

Use of a mOPV stockpile for outbreak response after routine OPV cessation

Given the small but real risk associated with even attenuated polioviruses (i.e. cVDPVs), it is essential that there be internationally-agreed processes governing the use of mOPV for outbreak response after the cessation of trivalent OPV use in routine immunization programmes. Documents such as the *Standard Operating Procedures for a mOPV stockpile* translate such policy advice into actionable guidelines. In 2008, the PRC made a grant to Kids Risk Inc., formerly part of a Harvard University and Massachusetts Institute of Technology collaboration, to continue mathematical modelling of outbreak response scenarios for polioviruses following OPV cessation to further inform policy in this area.

Long-term containment of polioviruses

Based on wide consultation with experts in biosafety and risk management, the *Global Action Plan to minimize poliovirus facility-associated risk in the post-eradication/post-OPV era (GAPIII)* outlines a post-eradication strategy of risk minimization through the destruction of unneeded poliovirus materials in all but a few essential facilities, as well as risk *management* in such facilities by strict adherence to required safeguards. A full list of facilities which will continue to store or handle poliovirus after eradication[24] is being compiled to clearly establish the baseline risks they present, which are to be managed by the strategies laid out in *GAPIII*.

Throughout 2008, ongoing consultation and further analysis of the difference in reproductive rates between wild and attenuated polioviruses resulted in refinement of *GAPIII*. After interruption of WPV transmission, facilities retaining WPV will need to meet three safeguards:

- **Primary safeguards:** facilities must retain all virus stocks under international standard containment specifications to minimize the risk of a containment failure

- **Secondary safeguards:** facilities must be located in areas of high IPV immunization coverage to minimize the consequences of any containment failure

- **Tertiary safeguards:** facilities must be located in areas of high standards of personal, domestic and environmental sanitation to minimize the risk of transmission following any containment failure.

Facilities retaining only OPV/Sabin materials will be required to meet only the primary and secondary safeguards, due to the lower potential for transmission of the attenuated strains as compared to WPV. This strategy may permit IPV production in tropical settings using Sabin or more attenuated strains, while at the same time maintaining the high levels of biosafety required. Following verification of VAPP/VDPV elimination, however, safeguards for Sabin IPV may also be enhanced, especially if safer, alternate seed strains for IPV have been developed, characterized and validated by that time.

GAPIII will be released for an extended period of public comment in 2009 before finalization.

© CDC

A laboratory worker at the US Centers for Disease Control and Prevention (CDC) facilities in Atlanta, USA.

24 See section 2.3

4. Strategic Objective IV

Mainstreaming of the Global Polio Eradication Initiative

Milestone 2008[25]	Status
Milestone 1: All joint GAVI/Polio priority countries will implement integrated plans.	Not achieved
Milestone 2: All countries will have integrated or expanded AFP reporting, as appropriate (especially for measles and neonatal tetanus).	Not achieved
Milestone 3: All countries will have a GAVI-supported Interagency Coordination Committee (ICC) and if appropriate, a Technical Advisory Group (TAG).	Achieved
Milestone 4: All polio-funded "human resources" will formally contribute to multi-disease programmes.	Achieved
Milestone 5: All countries will have polio operations which are fully integrated with those for measles.	Not achieved

As the world's single-largest internationally coordinated public health effort, the GPEI has developed a comprehensive public health infrastructure throughout some of the world's most under-served countries. Comprising human resources, communication networks, operational guidelines and standards, independent strategic guidance bodies and streamlined partner coordination mechanisms, together with the 'nuts and bolts' of the operation – the offices, vehicles and medical and non-medical equipment – this infrastructure is not only a living asset to the countries in which it operates, but is superbly placed to assist in disease surveillance, large-scale immunization operations, and public health or national emergencies as they occur.

In 2008 alone, GPEI staff and infrastructure responded to catastrophic floods in Bihar, India, were deployed to tackle the Ebola outbreak in the Democratic Republic of the Congo as well as outbreaks of cholera and avian influenza in Africa and Asia, and provided support for measles immunization in several countries, as well as immunization with DTP, yellow fever and tetanus toxoid (TT) vaccines in Nigeria.

In many areas of the world, polio staff constitute the single largest resource of technical assistance for immunization and surveillance in low-income countries. Of 999 WHO immunization staff in the AFR, for example, 914 (91%) are funded by the polio programme, with the vast majority spending a considerable proportion of their time on work related to immunization, surveillance and outbreak response for diseases other than polio. Polio employs more than 3000 technical and support staff globally. Their day-to-day work includes health staff training, district-level microplanning, refurbishment of vaccine cold chain systems, and scaling up the technical capacity of networks for surveillance and monitoring of vaccine-preventable diseases (VPDs). As human resources in the polio effort are scaled down with progress towards eradication, it will be essential that this does not create a vacuum for other health programmes.

Key decisions on post-eradication planning in 2008 – notably the WHA resolution in May – paved the way for more concrete planning for the mainstreaming of the GPEI in the long term. A key element of a new strategic plan for GPEI is a timeline to help countries in their long-term planning and preparation for integration and downscaling processes, once polio is eradicated. The timeline is of course dependent on interrupting WPV transmission in the remaining infected areas. The downscaling processes will eventually encompass all functions currently performed by polio-funded staff – such as immunization planning and monitoring, policy development, training and surveillance for other VPDs – with a view to transitioning these functions to other internationally- or nationally-funded immunization staff.

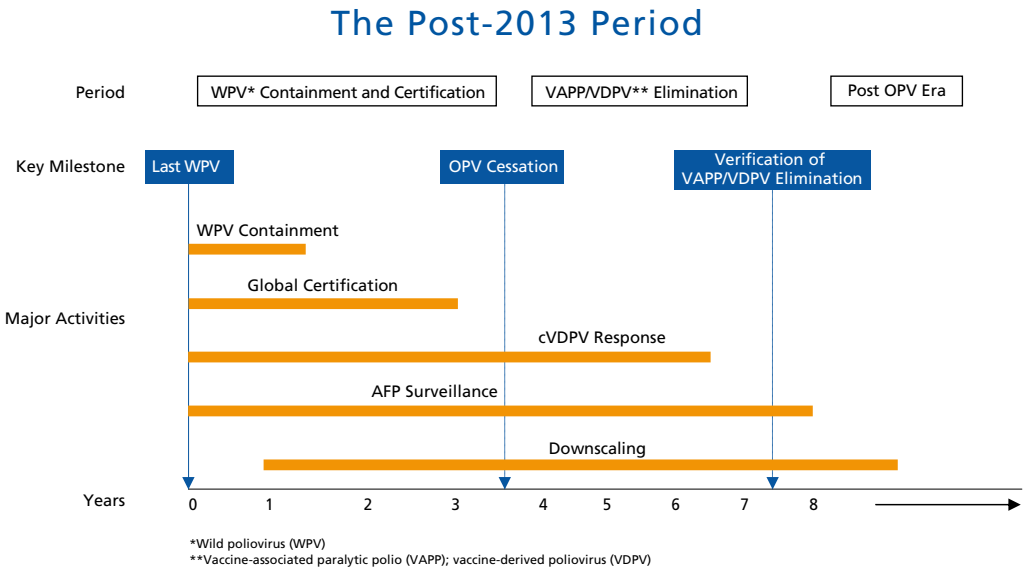
To minimize the risks associated with OPV cessation, international agencies and national governments will need to, inter alia: ensure sustained AFP surveillance for at least five years following OPV cessation; maintain long-term polio surveillance and outbreak response capacity;

25 Details in Appendix A.

implement full containment of Sabin polioviruses; and verify VAPP/VDPV elimination.

To this effect, work continued in 2008 to ensure that the long-term functions, including containment, surveillance and outbreak response capacity, would be managed in the long-term in other, non-GPEI institutions and oversight bodies (e. g. WHO's Global Alert and Response Network and the SAGE). In the near-term, a risk analysis will be conducted to ascertain how downscaling will affect other public health programmes, and a risk management plan developed in coordination and consultation with country-level programmes and appropriate stakeholders in other public health programmes, especially immunization.

Timeline to mainstream GPEI into a polio-free world



Counting every child – Because every child counts

In the teeming streets of India's Uttar Pradesh state, ensuring each of the estimated 38 million children in India's most populous state receives the optimum doses of polio vaccine remains one of the GPEI's greatest challenges.

For here, some 500 000 children are born every month and until recently, the names of up to half of those children were not making it onto the official medical registry.

Each month, mobile polio vaccination teams, which walk from house to house to ensure blanket immunization coverage, continued to find unregistered, unimmunized newborns. Not only are these infants susceptible to contracting and carrying polio, but their unregistered status skews immunization coverage figures, making planning for the immunization effort an unwanted guessing game.

Seeking a solution, the National Polio Surveillance Project established the Tracking Every Newborn initiative, where individual immunization teams recorded the details of each newborn infant on their house-to-house visits, moments before giving them their first dose of OPV.

In a 12-month pilot project undertaken across one block in each of eight districts of western Uttar Pradesh, the names of all newborns were added to the immunization registers held by the local Auxiliary Nurse Midwives (ANMs). After six months, the number of registered children had nearly doubled. While the ANM registers showed 16 569 newborn children, polio workers confirmed an *additional* 15 742 newborn children.

It was then possible to determine more accurate immunization coverage, which showed, for example, that of the 32 311 infants who now appeared on the official register, only 60% were fully immunized against diphtheria, tetanus and pertussis (DTP3).[26]

The Tracking Every Newborn project has also motivated the community – from ANMs and vaccinators to the parents themselves – to ensure that all newborn children are placed on the official register for routine immunization purposes.

The Uttar Pradesh Government subsequently requested that the successful initiative be expanded to other blocks, to ensure every child in Uttar Pradesh gets counted – because every child counts.

© WHO/JG Bouwer

Polio's determination to reach every newborn child in India has proved a boon for Uttar Pradesh's official immunization register.

26 DTP3 coverage is used as a measure of immunization coverage.

5. Financing

Financial commitments mark confidence in ending polio

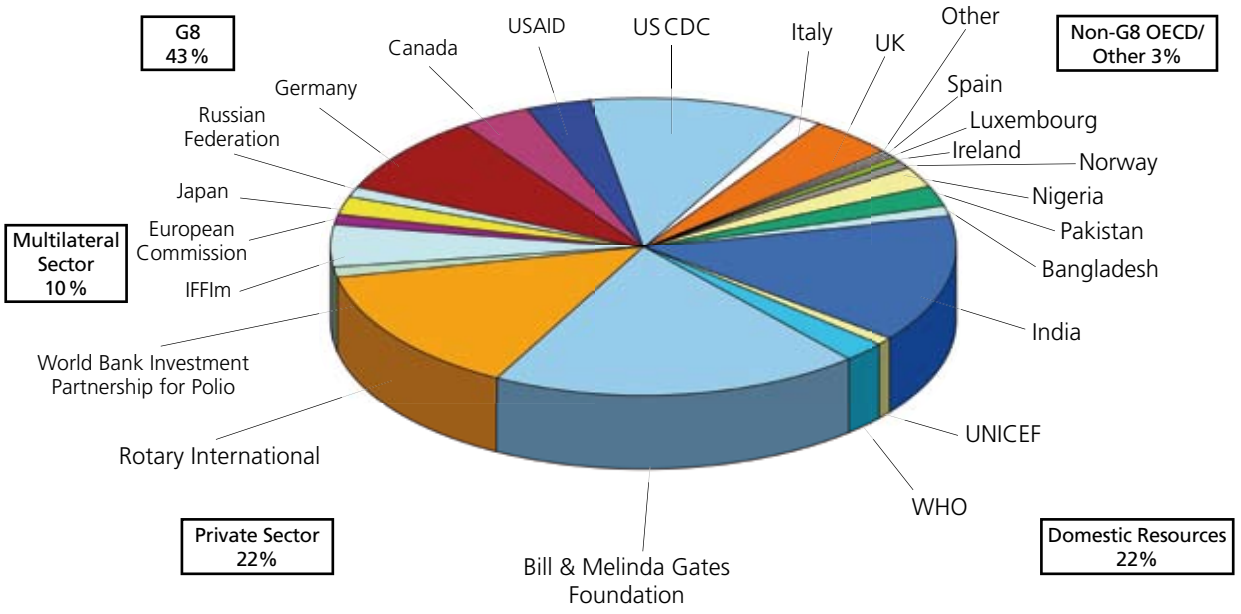
Renewed financial commitments by polio-endemic countries and donors, especially Rotary International, the Bill & Melinda Gates Foundation, the International Finance Facility for Immunization (IFFIm) and several G8 countries, assured the full financing of the 2008 planned budget.

The Government of India in early 2008 committed domestic resources of up to US$ 225 million for its polio eradication efforts. The Government of Nigeria in 2008 contributed US$ 21.3 million from its national coffers. The Government of Pakistan committed US$ 20 million in domestic financing for OPV for SIAs in 2008, while working out the modalities to provide additional OPV funding for 2009-2010. The Government of Bangladesh also provided US$ 10.8 million from the Health, Nutrition and Population Sector Programme (HNPSP) Pooled Funding mechanism for activities in 2008.

At its annual convention in June, Rotary International launched a US$ 100 million fund-raising campaign to match the US$ 100 million contributed to Rotary by the Bill & Melinda Gates Foundation. In July, on the eve of the G8 Summit in Toyako, Hokkaido, Japan, the Bill & Melinda Gates Foundation announced a US$ 150 million contribution to the GPEI and encouraged G8 countries to step up their support. At the Summit, G8 leaders highlighted polio eradication in their Summit communiqué for the seventh successive year: "To maintain momentum towards the historical achievement of eradicating polio, we will meet our previous commitments to maintain or increase financial contributions to support the Global Polio Eradication Initiative, and encourage other public and private donors to do the same." This commitment follows previous statements of support, at every Summit since Kananaskis, Canada, in 2002.

Financial Contributions for 2008

Total Contributions: US$ 775 Million



'Other' includes: the Governments of Angola, Australia, Azerbaijan, Brunei Darussalam, the Czech Republic, Hungary, Iceland, Kuwait, Liechtenstein, Malaysia, Monaco, Namibia, the Netherlands, Portugal, Qatar, the Republic of Korea, Turkey, the United Arab Emirates; the Oil for Food Programme, UN Foundation, OPEC Fund for International Development.

The Global Polio Eradication Initiative would like to thank donors who provided financial support in 2008

Australia provided US$ 280 000 to fill the funding gap for operational costs for the March and April SNIDs in the Terai area of southern Nepal. These activities were in response to an importation from Bihar, India, with which Nepal shares an extended border. This contribution brings Australia's total support to the GPEI to US$ 16.01 million.

Azerbaijan made its second contribution to polio eradication in 2008 in support of polio eradication efforts in the Organization of the Islamic Conference (OIC) Member States, bringing its total contributions to US$ 40 000.

The Bill & Melinda Gates Foundation announced US $150 million in new funding to be utilized in 2008 and 2009, and encouraged G8 leaders to translate polio their commitments into "real financial resources". This contribution brings the Foundation's total contribution to the GPEI, including matching grants provided to Rotary International, to US$ 655 million.

© Bill & Melinda Gates Foundation

Bill Gates Jnr (with Bill Gates Snr behind) witnesses a National Immunization Day in India. The Rotary cap he was wearing was later signed and sold at auction for $17 600.

Brunei Darussalam made its first ever contribution of US$ 150 000 in 2008, in response to the OIC's call for increased political and financial support for polio eradication.

Canada continued its strong support for the GPEI, disbursing US$ 32.5 million for Afghanistan, Nigeria, and sub-Saharan Africa as part of multi-year contributions totaling US$ 68.95 million. Canada is the fourth-largest public sector donor to the GPEI, providing more than US$ 260 million.

In addition to its role as a spearheading partner, **the Centers for Disease Control and Prevention (CDC)** in 2008 provided funding for OPV, operational costs and programme support to UNICEF and WHO and continued to dispatch its epidemiologists, virologists and technical officers to assist polio-affected countries in implementing polio eradication activities. US Congress appropriations to the CDC for polio eradication in its fiscal year 2008 totaled US $101.5 million, bringing the CDC's total contributions to more than US$ 1.2 billion.

The European Commission (EC) disbursed US$ 8.2 million in 2008 as part of its 2007 US$ 28.8 million (€20 million) three-year agreement for polio eradication activities in Nigeria, and signed a new 2009-2010 contribution for Bangladesh for US$ 2 million (€1.4 million). These new contributions bring total EC polio eradication funding to more than US$ 193 million.

In 2008, **Germany** provided US$ 80.96 million for OPV in India and Nigeria as well as global unspecified funding. These new contributions bring Germany's total support to the GPEI to US$ 224.7 million.

Iceland has been providing unspecified support to the Global Polio Eradication Initiative since 2005. Its 2008 contribution of US$ 100 000 brings Iceland's support to the Initiative to US$ 300 000.

Ireland in 2008 complemented an existing pledge with an additional US$ 3.73 million (€3 million), bringing Ireland's total contributions to the polio eradication effort to more than US$ 20.5 million.

Japan continued to provide critical support for the procurement of OPV. In 2008, it provided US$ 19.45 million in OPV funding for Angola, Afghanistan, India, Nigeria, Pakistan and Sudan. This new support brings Japan's total contribution to the GPEI to over US$ 353 million, making Japan the third-largest public sector donor to the Initiative.

Liechtenstein provided US$ 10 000 to the GPEI in 2008.

Luxembourg continues to be the GPEI's largest per capita donor. As part of a 2006-2008 pledge, Luxembourg contributed US$ 2.41 million in 2008, bringing its total contributions to more than US$ 10.5 million.

Malaysia almost doubled its previous contributions when, at the WHA in May, Malaysian Health Minister Datuk Liow Tiong Lai pledged US$ 1 million on behalf of his government, bringing Malaysia's total funding to US$ 2.13 million.

Monaco provided its fourth contribution to the Initiative, increasing its previous year's support to US$ 90 000 to support activities in Niger. This brings Monaco's total funding for polio eradication activities in Niger to US$ 300 000.

The Netherlands Ministry of Health in 2008 provided US$ 240 000 to support polio work at the Dutch Institute of Public Health and the Environment, bringing the Netherlands total contribution to polio eradication to US$ 113.1 million.

Norway has consistently provided important unspecified contributions to the GPEI. In 2008, it provided US$ 7.65 million, bringing its total contributions to the GPEI to US$ 57 million.

The OPEC Fund for International Development provided two grants of US$ 500 000 each for polio eradication activities in Afghanistan and Pakistan, raising its total contributions to the GPEI to US$ 1.75 million.

Spain contributed US$ 3.35 million, for surveillance activities in Angola, Cape Verde, Ethiopia, Guinea-Bissau and Namibia. Spain's total contribution to the GPEI totals US$ 9.6 million.

Rotary International, in addition to being a spearheading partner in the GPEI, also remains the largest private sector donor. At its annual convention in June, Rotary International launched a US$ 100 million fundraising campaign, to match the US$ 100 million contribution to Rotary International by the Bill & Melinda Gates Foundation in November 2007. In 2008, Rotary contributed US$ 130.5 million. By 2013, Rotary International will have contributed more than US$ 1 billion to the GPEI.

The Russian Federation, in response to the commitments made in the 2008 G8 communiqué, signed a three-year commitment to provide US$ 10 million for 2008-2010. In 2008, it disbursed US$ 8.94 million, including funding from a previous multi-year commitment.

Turkey made its second contribution to the GPEI in 2008. It provided US$ 100 000 for polio eradication activities in Afghanistan, bringing its total support to US$ 150 000.

The United Kingdom's Department for International Development (DFID) continued to play a critical financing role in the Initiative, providing global unspecified support as well as targeted needs in Pakistan. In 2008, DFID signed a five-year US$ 153 million (£100 million) agreement, as well as providing US$ 14 million (£7.5 million) for meeting operations and surveillance support to the programme in Pakistan. In 2008, DFID disbursed US$ 41.3 million (£27.5 million).

The United Nations Foundation (UNF) in 2008 provided US$ 210 000 for the GPEI's resource mobilization efforts. This funding brings the UNF's total support for the GPEI to over US$ 43 million.

US Congress in its fiscal year 2008 allocated US$ 32 million to the **United States Agency for International Development (USAID)** for polio eradication activities. Funds were used to support social mobilization, surveillance and laboratory support, outbreak response and monitoring in priority countries, bringing USAID's total support to US$ 358 million.

World Bank Investment Partnership for Polio

In 2001, an innovative financing mechanism, commonly referred to as 'IDA buy-downs', was developed to allow the use of credit issued by the International Development Association (IDA), the concessionary lending arm of the World Bank, for OPV procurement for polio eradication activities. Third-party donor funding (provided by the Bill & Melinda Gates Foundation, the CDC, Rotary International and the UNF) is used to "buy-down" IDA credits and turn them into grants. In 2008, US$ 10.72 million in World Bank IDA credit was provided to Nigeria and Pakistan for their current buy-downs and a new US$ 50 million buy-down for Nigeria was signed with funding to be disbursed in 2009 and 2010. The total amount of the World Bank Investment Partnership for Polio funding is US$ 210 million.

Appendix A

Performance against milestones in Strategic Plan 2004-2008

Objectives	Milestones for 2008	Status
Interrupt poliovirus transmission	No countries will be polio- endemic at the end of 2008.	**Not achieved** Four countries remain polio-endemic – India, Nigeria, Pakistan and Afghanistan – with poliovirus circulating in specific, geographically-limited areas in each country.
	All planned SIAs will be implemented in highest-risk polio-free areas.	**Achieved** In response to outbreaks in West Africa and the Horn of Africa, the GPEI has scaled up immunization rounds in highest-risk polio-free areas.
	70% of countries will achieve GAVI targets (>80%) for OPV3/ DPT3.	**Not achieved** In 2007[27], 41/72 (57%) countries had national OPV3/DPT3 coverage >80%; 19/72 (26%) countries had national OPV3/DPT3 coverage >90%.
	All emergency mop-ups will begin within four weeks of case confirmation.	**Achieved**
	All non-certified countries will have certification-standard surveillance.	**Not achieved** 67/77 (87%) of non-certified countries have met certification-standard targets[28].
Achieve certification of global polio eradication	All AFP specimens will be processed in a WHO-accredited laboratory.	**Achieved** All AFP specimens were processed in a WHO-accredited laboratory.
	All countries will have completed each laboratory biocontainment phase (phase II+).	**Not achieved** Certified regions (99%) Non-certified Regions (70%)
	All manufacturers will produce wild-type IPV under BSL-3/polio.	**Not achieved**
	All countries will submit final certification documentation.	**Not achieved** AFR, 22/46 countries remaining EMR, 3/22 countries remaining SEAR, 2/11 countries remaining
Develop products for the global OPV cessation phase	Long-term immunization policies will be introduced.	**Achieved**
	Additional tools for the detection and immediate notification of circulating WPV will be finalized (where appropriate).	**Achieved**
	Assembly of mOPV stockpile will begin.	**Not achieved**
	Implementation and verification of GAPIII will begin.	**Not achieved**
Mainstream the Global Polio Eradication Initiative	All joint GAVI/Polio priority countries will implement integrated plans.	**Not achieved** 49/51 (96%) joint GAVI/Polio priority countries have drafted or finalized comprehensive multi-year plans.
	All countries will have integrated or expanded AFP reporting, as appropriate (especially for measles and neonatal tetanus).	**Not Achieved** 157/182 (86%) countries with AFP case-based reporting also have measles case-based reporting.
	All countries will have GAVI-supported ICC and if appropriate, TAG.	**Achieved** 48/51 (94%) of joint GAVI/Polio priority countries have GAVI-supported ICC which work on broader issues as demonstrated by their development, approval, dissemination and implementation of comprehensive multi-year plans.
	All polio-funded "human resources" will formally contribute to multi-disease programmes.	**Achieved** 100% of polio-funded staff contribute formally to multi-disease programmes.
	All countries will have polio operations which are fully integrated with those for measles.	**Not Achieved** 90% (83/92) of the countries with WHO polio laboratories have utilized the same institutions for their national measles laboratory-based surveillance.

27 2008 data not available until August.

28 This excludes small island nations with populations of less than 200 000.

Comment

At end-2008, the ACPE and SAGE concluded that the intensified polio eradication effort launched by the GPEI stakeholders in February 2007 had demonstrated that the remaining technical, financial and operational challenges can be overcome.

The GPEI has adopted a more aggressive, broader approach in response to repeated outbreaks.

The GAVI target calls for all countries to have greater than 80% routine immunization coverage in every district and 90% routine coverage nationally by the year 2010. In 2007, 8/72 (11%) eligible countries had reached this target.

Median response time from official confirmation of a case to response: 28 days. Newly-infected countries in 2008: Angola (1 event), Benin (5 events), Burkina Faso (3 events), Central African Republic (1 event), Democratic Republic of the Congo (1 event), Ghana (1 event), Mali (1 event), Nepal (6 events), Niger (4 events), Sudan (2 events) and Togo (1 event).

The following countries did not meet the required standards: AFR: Algeria, Cape Verde, Guinea-Bissau, Namibia, Sao Tome and Principe. EMR: Djibouti, Kuwait. SEAR: Buthan, Sri Lanka, Thailand.

The network tested approximately 157 700 faecal samples from 79 740 AFP cases and 13 000 non-AFP samples in 2008 (representing a 10% increase in workload over 2007).

In 2008, both China and Japan reported completion of Phase I activities and submitted detailed reports on the quality of the work for review by the RCC, which fully accepted the work. All countries of the WPR have now completed Phase I, making it the second region, along with the EUR, to have achieved this goal. The AMR RCC is in the final stages of reviewing documentation from its Member States, all of which have reported completion of survey activities except Brazil. In non-certified regions, the majority of countries which have not completed the work are located in the AFR, where re-establishment of polio-free status in re-infected countries is necessary before containment activities can begin.

Implementation of BSL-3 in wild-type IPV production facilities is planned to commence one year after the last case of WPV is reported globally. WHO provides official updates to the vaccine manufacturers on the latest developments with containment during annual meetings. All IPV manufacturers report that they are prepared to meet post-eradication biosafety requirements when required.

The number of eligible countries for which RCCs 'accepted' final certification documentation increased from 21 to 24 in the AFR, from 15 to 19 in the EMR; it remained at 9 in the SEAR.

A SAGE working group has been constituted in 2008 to evaluate policy options for IPV in the pre- and post-eradication era.

In 2008, the systematic roll-out of new laboratory procedures continued, which reduces the time needed to confirm poliovirus by 50% (from 42 days to 21 days). At the same time, new rRT-PCR assays for ITD and screening for VDPVs were evaluated.

Following an issued tender request and ongoing negotiations with various manufacturers (four companies expressed interest), the assembly of a mOPV/bOPV stockpile is expected to begin in 2009.

GAPIII outlines requirements and procedures for implementation and verification, together with key events linked to significant changes in poliovirus epidemiology that will trigger implementation.

AFR 35/36 (excludes Zambia)
EMR: 5/6 (excludes Somalia)
SEAR: 9/9

Joint GAVI/Polio priority countries are defined as all GAVI eligible countries in polio-endemic regions (i.e. AFR, EMR, SEAR).

AFR, 38/46 countries (83%)
AMR, 33/33 countries (100%)
EMR, 18/21 countries (86%)
EUR, 39/45 countries (87%)
SEAR, 5/11 countries (45%)
WPR, 24/26 countries (92%).
182/193 (94%) countries have AFP case-based reporting systems

Joint GAVI/Polio priority countries are defined as all GAVI eligible countries in polio endemic regions (i.e. AFR, EMR, SEAR).

This function continues to be included in all post descriptions.

Appendix B

Performance against milestones in Intensified Eradication Effort 2007-2008

Endemic countries

Milestone 1: By end-2008 polio transmission should be interrupted or there should be at least a further 50% reduction in the number of infected districts relative to 2007.

Status: Not achieved. There was a 35% increase in infected districts overall; the reduction in type 3-infected districts was 26%. In India, the reduction in type 1-infected districts was 51%.

Country	total # districts in country*	2007 infected districts	2008 infected districts	overall decrease/ increase in infected districts	decrease/ increase in type 1-infected districts	decrease/ increase in type 3-infected districts
Afghanistan	329	13	16	23%	150%	-56%
Pakistan	133	18	49	172%	292%	11%
India	604	99	90	-9%	-51%	8%
Nigeria	774	163	241	48%	185%	-51%
TOTAL	1840	293	396	35%	117%	-26%

Data in WHO/HQ as of 12 May, 2009
* Source: WHO/UNICEF 2007 Joint Reporting Form

Milestone 2: By end-2008 the level of polio immunity among children aged 6-35 months in infected districts should have been at least as high as in polio-free districts, for at least 12 months.

Status: Not achieved. Substantial reductions in the proportion of zero-dose children were noted between the first quarter of 2008 and that of 2009 (see for example Section 1.1 on Nigeria).

		Zero dose children (never vaccinated)		Average doses/child	
Country	Transmission zone	Endemic zones	Polio free zones	Endemic zones	Polio free zones
Afghanistan	Southern Eastern	8% <1%	<1%	9 16	10
Pakistan	Northern Southern	4% 1%	1%	13 12	11
Nigeria	Very high High Medium high	24% 16% 8%	3%	2 3 3	4
India	West UP Bihar	<1% <1%	1%	13 15	10

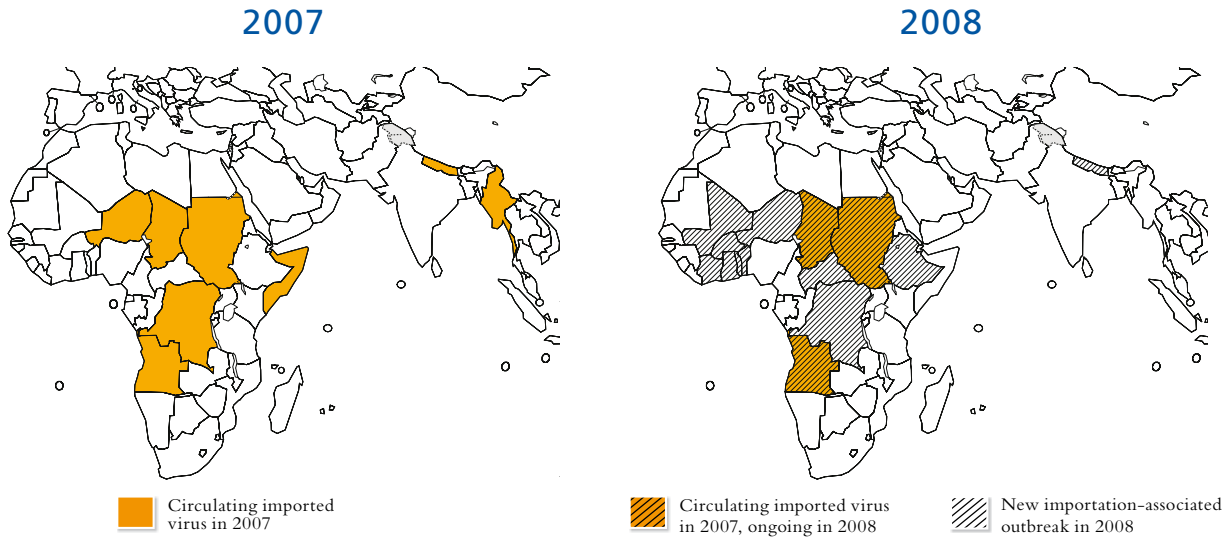
Calculation of average doses exclude 6-35 NPAFP cases with unknown doses - Source: NPAFP case-based data in WHO/HQ as of 12 May, 2009

Re-infected countries

Milestone 3: By end-2008, any country re-infected in 2007 will have implemented response activities and interrupted transmission of the imported poliovirus.

Status: Not achieved. Outbreaks were stopped in five of eight countries re-infected in 2007.

Outbreaks stopped* in 5 of 8 countries**



* i.e; most recent case was before 13 November, 2008
** 17 of 20 circulating viruses in 2007 have been stopped in the 8 countries
Source: Data in WHO/HQ as of 12 May, 2009

International stakeholders

Milestone 4: By end-2007 sufficient funding will have been pledged to finance all eradication activities planned through end-2008.

Status: Achieved. As of May 2009, the GPEI faces a funding gap of US$ 100 million for essential polio eradication activities in 2009.

Financial Contributions for 2009 (in US$ millions)

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Funds Available	$299	$172.89	$121.90	$89.46
Funding Gap			$31.24	$68.90

Acronyms and Abbreviations

ACPE	Advisory Committee on Poliomyelitis Eradication
AFP	Acute flaccid paralysis
AFR	WHO African Region
AMR	WHO Region of the Americas
ANM	Auxiliary Nurse Midwife
aVDPV	Ambiguous vaccine-derived poliovirus
bOPV	Bivalent oral polio vaccine
BSL-3	Biosafety level 3
CDC	US Centers for Disease Control and Prevention
cVDPV	Circulating vaccine-derived poliovirus
DTP	Diphtheria, tetanus, pertussis
EC	European Commission
EMR	WHO Eastern Mediterranean Region
EUR	WHO European Region
GAVI Alliance	Global Alliance for Vaccines and Immunization
GAPIII	Third edition of the Global Action Plan to minimize post-eradication poliovirus facility-associated risk
GCC	Global Commission for the Certification of the Eradication of Poliomyelitis
GFIMS	Global Framework for Immunization Monitoring and Surveillance
GIVS	Global Immunization Vision and Strategy
GPEI	Global Polio Eradication Initiative
GPLN	Global Polio Laboratory Network
ICC	Interagency Coordination Committee
IDA	International Development Agency
IFFIm	International Finance Facility for Immunization
IHR (2005)	International Health Regulations (2005)
IPD	Polio Immunization Plus Day
IPV	Inactivated polio vaccine
ITD	Intra-typic Differentiation
iVDPV	Immunodeficiency-associated vaccine-derived poliovirus
mOPV	Monovalent oral polio vaccine

CC	National Certification Committee
LGA	Local Government Area
NCC	National Certification Committee
NGO	Non-governmental organization
NIDs	National Immunization Days
OIC	Organization of the Islamic Conference
OPV	Oral polio vaccine
PID	Primary immune deficiency disorder
PRC	Polio Research Committee
RCC	Regional Certification Commission
RED	Reaching Every District
rRT-PCR	Real time Reverse Transcriptase Polymerase Chain Reaction
SAGE	Strategic Advisory Group of Experts on Immunization
SEAR	WHO South-east Asia Region
SIAs	Supplementary Immunization Activities
SIADs	Short Interval Additional Doses
SNIDs	Sub-national Immunization Days
STOP	Stop Transmission of Polio
TAG	Technical Advisory Group
tOPV	Trivalent oral polio vaccine
TT	Tetanus toxoid
UNF	United Nations Foundation
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VAPP	Vaccine-associated paralytic polio
VDPV	Vaccine-derived poliovirus
VPD	Vaccine-preventable disease
WHA	World Health Assembly
WHO	World Health Organization
WPR	WHO Western Pacific Region
WPV	Wild poliovirus

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