Global Polio Eradication Initiative

ANNUAL REPORT 2007

Impact of the intensified eradication effort

World Health Organization

CDC Centers for Disease Control and Prevention

unicef

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During 2007, 81% decline in incidence of type 1 polio; 59% decline in type 1-infected districts.

1 Executive summary

Since the creation in 1988 of the Global Polio Eradication Initiative (GPEI), the incidence of polio has been cut by 99%. Between 2003 and 2006, polio eradication faced several serious challenges: four countries continued to have transmission of wild poliovirus; international spread from two of these countries resulted in the re-infection of previously polio-free areas; and both these developments generated questions about the feasibility of polio eradication. The year 2007 marked a turning point for the GPEI. Aided by the development of new-generation tools and tactics, an intensified polio eradication effort was launched, sequentially targeting type 1 polio-virus (the most paralytic), then type 3. By the end of the year, type 1 polio was reduced by 81% over 2006, the sharpest-ever drop in a single year.

The intensified eradication effort was the outcome of a consultation of GPEI stakeholders in February 2007 to determine the collective capacity of the international community to overcome the remaining hurdles to stopping wild poliovirus transmission globally. Engaging the Heads of Government and local leaders in polio-affected countries in a sustained dialogue, this intensified effort optimized the use of powerful monovalent oral polio vaccines (mOPV), enhanced social research and new, tailored tactics to ensure that all children were reached with the vaccines.

Two of the key landmarks at the end of the year encapsulate more clearly than any other the recent progress and re-affirm the technical feasibility of polio eradication. In India, the western end of Uttar Pradesh state has been at the heart of polio outbreaks in that country since 2000 and is the only area which has never stopped wild poliovirus transmission. By the end of 2007, no cases of type 1 poliovirus had been reported from the core "polio-reservoir" districts of western Uttar Pradesh for over 12 months. On the international arena, six re-infected countries continued to report polio cases in the second half of 2007.

In Afghanistan and Pakistan, creative local solutions in conflict situations helped vaccinators reach children in insecure areas. In Nigeria, the bundling of polio vaccine with other health interventions and improvements in campaign operations halved the proportion of children missed in the highest-risk areas during vaccination campaigns.

Engagement from top political leaders, stronger local ownership and community involvement resulted in greater visibility of polio eradication efforts, re-energizing local workers and contributing to higher-quality immunization activities. The Director-General and Regional Directors of the World Health Organization (WHO) travelled to transmission hot-spots in all four endemic countries within 12 months of the stakeholder consultation and discussed polio eradication with Heads of Government and leaders in the highest-risk areas.

The gains against polio were underpinned by intensified surveillance work at field and laboratory levels, particularly in areas with known gaps in surveillance sensitivity. Most notably, the number of laboratories capable of using the new specimen testing algorithm was doubled, allowing the Global Polio Laboratory Network (GPLN) to detect poliovirus twice as fast in 2007 as in 2006 and enhancing rapid

In November 2007, the SAGE reviewed the intensified polio eradication effort; affirmed that interruption of wild poliovirus transmission globally was possible, although risks remained in northern Nigeria.

response capacity. With the continued prospect of eradication, research to broaden the current knowledge base for post-eradication risk management was accelerated.

To finance the intensification of polio eradication activities, contributions from traditional development partners were substantially complemented by domestic financing from the Government of India and an extraordinary re-programming of International Finance Facility for Immunization (IFFIm) funds previously earmarked for a post-eradication vaccine stockpile. Advances made in the course of the year catalysed a vote of confidence from Rotary International and the Bill and Melinda Gates Foundation, which in November 2007 announced a partnership to inject US$ 200 million into the GPEI over the next four years. At the request of stakeholders, the GPEI has published, for the first time, a five-year budget (2008-2012), requiring US$ 1.8 billion. The 2008-09 funding gap is US$ 490 million (US$ 135 million for 2008), as of May 2008.

In November 2007, the principal advisory group to WHO for vaccines and immunization, the Strategic Advisory Group of Experts (SAGE), reviewed the intensified polio eradication effort and affirmed that interruption of wild poliovirus transmission globally was possible, noting that northern Nigeria presented a risk to this goal.

In the same month, the Advisory Committee on Poliomyelitis Eradication (ACPE), the global body providing strategic guidance to the polio eradication effort, stated that the progress achieved during the year warranted an extension of the intensified activities.

In 2008, GPEI focus is on stopping all transmission of type 1 polio, while controlling the upsurge of type 3 polio in India, before moving on to address remaining type 3 poliovirus in 2009. As of March 2008, the single greatest risk to the end-2008 goal appears to be the situation in northern Nigeria, where more than a fifth of children continue to be missed during vaccination activities in key areas, resulting in a new outbreak that threatens progress both in the country and globally.

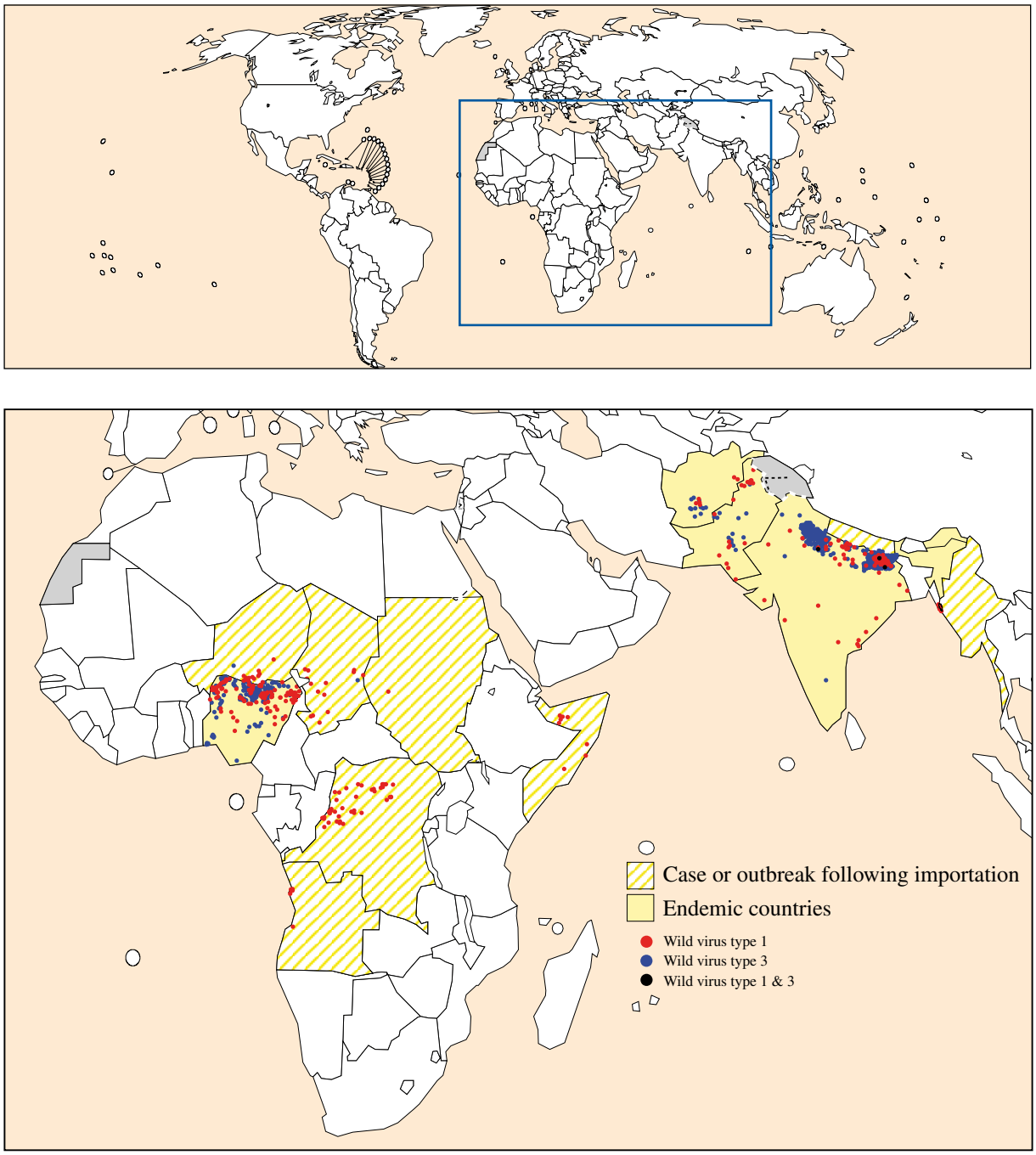
In each of the four countries, the continued assessment, refinement and introduction of a range of new innovations will be essential to improving operations and creating an optimal environment to interrupt the remaining chains of transmission. The impetus to create this environment must come from sustained political dialogue at all levels and local accountability for reaching all children.

The world has a unique chance to deliver a public good – a polio-free world for future generations. The attainment of this public health goal can create momentum for the achievement of other important health initiatives and the Millennium Development Goals (MDGs).

In 2007, 1310 children were paralysed by wild poliovirus. Millions more were protected by vaccination. More than five million children and young adults are walking today because of the polio eradication effort; future generations will join them only if the eradication of polio is realized, once and for all.

Focus in 2008: Stopping all transmission of type 1 polio, with continued innovation and local accountability for reaching all children.

Figure 1: Wild poliovirus cases in 2007



Excludes viruses detected from environmental surveillance and vaccine derived polioviruses.
Data in WHO/HQ as of 22 Apr 2008

2 Key events 2007

Intensified polio eradication effort fuelled by top political leadership

JANUARY

> New WHO Director-General (DG) Margaret Chan pledges to eradicate polio and writes to heads of states of remaining polio-endemic countries.

> Carl-Wilhelm Stenhammar, past Rotary International President, meets Nigeria's Minister of Health and other key officials to discuss polio eradication efforts in the country.

FEBRUARY

> Intensified polio eradication effort launched a stakeholder consultation in Geneva. Heads of state of endemic countries personally represented.

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Spearheading partners in polio eradication (left to right): Rotary International President Bill Boyd, US CDC Director Dr Julie Gerberding, UNICEF Deputy Executive Director Kul Gautam, WHO Director-General Dr Margaret Chan.

> Government of India announces US$ 290 million domestic contribution to national polio eradication effort.

> Wilf Wilkinson, President of Rotary International, meets with Pakistan's President General Pervez Musharraf to request additional engagement and support for polio eradication efforts in the country.

MARCH

> WHO DG Margaret Chan meets with Organization of the Islamic Conference (OIC) Secretary-General Prof. E. Ihsanoglu, seeking continued engagement of OIC, Islamic religious leaders and communities to support polio eradication efforts.

> Commonwealth Secretary-General Hon. Donald McKinnon meets WHO DG Margaret Chan, who advocates for Commonwealth's continued engagement with leaders of India, Nigeria and Pakistan to complete polio eradication.

APRIL & MAY

> WHO DG Margaret Chan visits President Hamid Karzai in Afghanistan and Prime Minister Shaukat Aziz in Pakistan; both leaders re-affirm their personal and political commitment to eradicating polio in their countries.

© WHO/C.Black

WHO DG Margaret Chan greeted by President of Afghanistan Hamid Karzai in Kabul.

MAY

> World Health Assembly endorses intensification of polio eradication efforts. *Case for Completing Polio Eradication* published, outlining key activities and milestones for the intensified programme.

> Ministers of Health of the Commonwealth member states, at their annual meeting, highlight their support for completing polio eradication.

JUNE

> G8 leaders urge "utmost efforts" for polio eradication at their annual summit in Heiligendamm, Germany.

> To cover acute cash shortage, Global Alliance for Vaccines and Immunization (GAVI Alliance) Fund re-programmes to intensified polio eradication effort US$ 104 million in funds earmarked for post-eradication era.

> At first-ever conference of Health Ministers of OIC member states, held in Malaysia, ministers unanimously adopt strong resolution in support of polio eradication.

JULY

> New First Lady of Nigeria Hajia Turai Yar'adua states, "We will do whatever we can to make Nigeria polio-free," and inaugurates Immunization Plus Days (IPDs) in polio-endemic north.

© WHO/Nigeria

First Lady of Nigeria Hajia Turai Yar'adua in Kebbi state, Nigeria.

SEPTEMBER

> On International Peace Day, 80 000 previously inaccessible children reached with polio vaccine in southern Afghanistan.

NOVEMBER

> Rotary International and Bill and Melinda Gates Foundation announce partnership to inject US$ 200 million into polio eradication.

© Courtesy of the Bill & Melinda Gates Foundation

Bill Gates Jr. vaccinates a child against

> Based on type 1 decline and other progress, global advisory bodies re-affirm feasibility of polio eradication and recommend continued intensification activities.

> UN Secretary-General Ban Ki-moon writes to Heads of State of Afghanistan, India, Nigeria and Pakistan, congratulating them for progress in their polio eradication efforts and urging them "to spare no effort until the historic goal is achieved" in their countries.

DECEMBER

> WHO DG Margaret Chan visits India to discuss polio eradication in the country with Prime Minister Manmohan Singh and Chief Ministers of Uttar Pradesh and Bihar states.

© Courtesy PBI/Government of India

WHO DG Margaret Chan and Prime Minister of India Manmohan Singh in New Delhi.

JANUARY 2008

> UNICEF Goodwill Ambassador David Beckham administers oral polio vaccine to two-day-old Mariatsu, during a visit to the newborn's home by community health workers in Sierra Leone.

© UNICEF/D.Turnley

David Beckham giving polio vaccine to a newborn.

FEBRUARY 2008

> Completing her tour of endemic countries, DG Margaret Chan meets with President Umaru Yar'Adua and the First Lady of Nigeria, as well as the Sultan of Sokoto Mohammed Saad Abubakar.

© Rotary/R.Hendry

23 February 2008 - a giant Rotary wheel and the words 'End Polio Now' were beamed onto the side of the House of Commons in London, UK, on Rotary International's 103rd Birthday.

3 Interruption

of wild poliovirus transmission

Since 1988, the GPEI has reduced the global incidence of polio by 99%. Between 2003 and 2006, polio eradication faced significant challenges: continued transmission in four endemic countries and international spread of poliovirus from two of these.

Consequently, 2005-2006 was a period of unprecedented innovation to address these challenges. New tools were generated, most notably monovalent vaccines and refined laboratory procedures which allowed the confirmation of poliovirus twice as fast as previously. Tactics were tailored to reach missed children in each of the four remaining polio-endemic countries, such as an accelerated monovalent oral polio vaccine (mOPV) Supplementary Immunization Activities (SIAs) schedule in India, the Immunization Plus Days (IPDs) strategy of bundling polio vaccine with other health interventions in Nigeria and the synchronization of campaigns in Afghanistan and Pakistan along with initiatives to negotiate access in security-compromised or semi-autonomous areas of the two countries.

At the end of 2006, it was clear that only large-scale application and high-level promotion of these new tools and tactics would result in the successful eradication of polio. In 2007, stakeholders in polio eradication launched a new, intensified effort to determine the collective capacity of the international community to clear the final hurdles to global polio eradication. This report covers the first period of the intensified effort, which has seen both wide application of the new tools and tactics and an elevation in the levels of political attention to and oversight of polio eradication.

At the end of 2007, less than half way through the intensified eradication effort, the incidence of polio had been reduced by 35% and cases due to type 1 wild poliovirus – the more dangerous of the two remaining serotypes – had fallen by 81%. The 12-month period without type 1 in western Uttar Pradesh state – the only area in India never to have interrupted transmission of this serotype – was a particularly striking development. Most outbreaks in re-infected countries had been stopped; in the second half of 2007, six re-infected countries continued to report cases. Cases declined by 75% in northern Nigeria and there was further geographic restriction of the virus in Afghanistan and Pakistan.

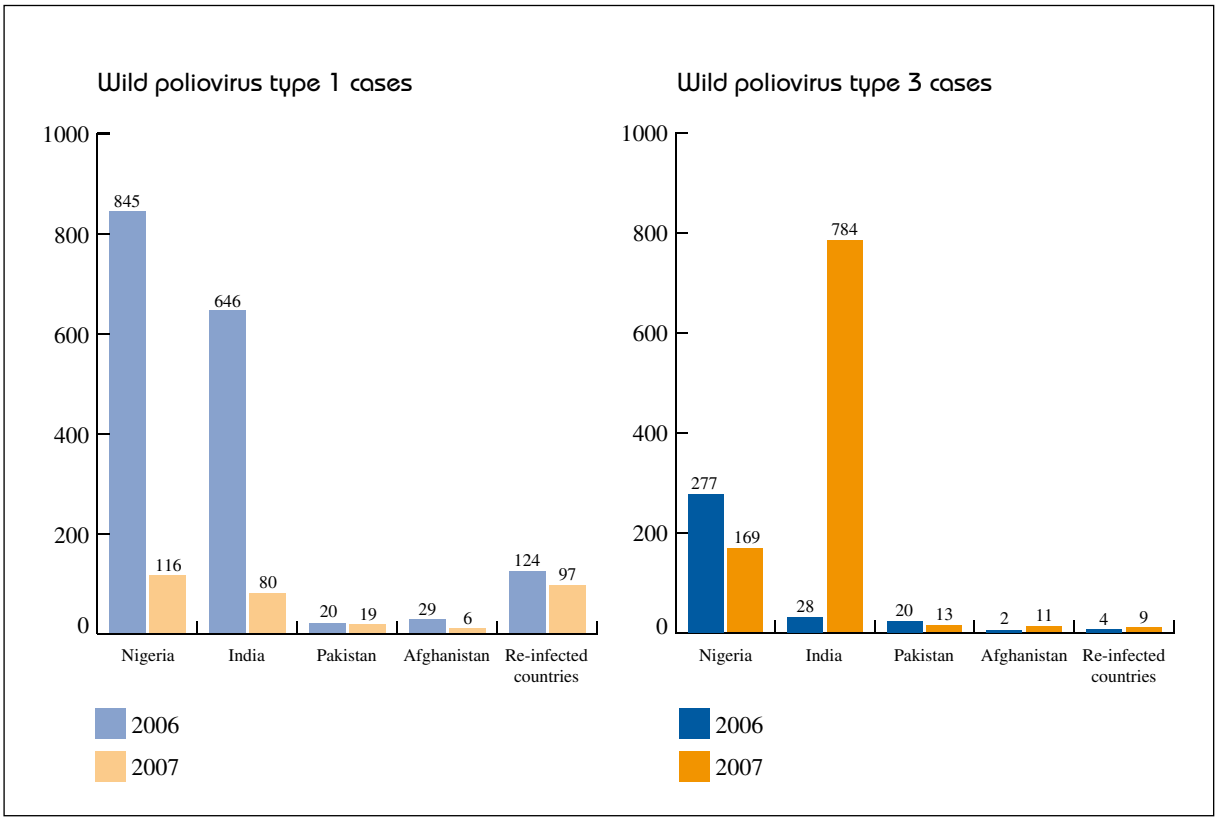
In November 2007, the principal advisory group to WHO for vaccines and immunization, the SAGE,

New intensified eradication effort, to determine global collective capacity to overcome final hurdles to polio eradication.

Overall, polio cases decreased by 35% and type 1 wild poliovirus by 81% from 2006 to 2007.

reviewed the intensified eradication effort and affirmed that with the new tools, tactics and commitments, interruption of wild poliovirus transmission globally was possible. In the same month, the ACPE, which provides strategic guidance specifically to the GPEI, concluded that in order to capitalize on this progress, the intensification would need to be sustained for at least two years. In January 2008, the Executive Board (EB) to the World Health Assembly (WHA) endorsed further intensification of eradication activities and recommended that discussions begin on management of long-term risks after wild poliovirus eradication.

Figure 2: Wild poliovirus type 1 and 3 cases, 2006 and 2007



Data in WHO/HQ as of 22 April 2008. Does not include W1W3 (2 cases in Nigeria in 2006 and 3 cases in India in 2007)

Type 1 polio cases in India declined by 88% from 2006 to 2007. Persistent focal transmission of type 1 in Bihar, tailored plan to increase coverage.

3.1 Endemic countries

3.1.1 India

Accelerated mOPV1 campaigns cause marked reduction in type 1; efforts focus on finishing in Bihar.

In 2006, wild poliovirus type 1 caused an outbreak in India which spread from western Uttar Pradesh across several states and paralysed 648 children. The majority of cases were in children under the age of two years, indicating that they were not being vaccinated often enough, early enough in life. To rapidly stop type 1 poliovirus transmission and close this "immunity gap" in the very young, India in 2007 pursued a three-pronged strategy of type-specific vaccines, increased campaign frequency and tracking of newborns and young infants.

Consequently, the interval between polio immunization campaigns was reduced from eight weeks to as little as three weeks, using mOPVs and reaching each time between 70 and 170 million children. Type 1 polio cases subsequently dropped by 88 % from 2006 to 2007. In the final quarter of 2007, only one type 1 polio case was reported in the entire state of Uttar Pradesh, despite the onset of the high transmission season. In the core districts of western Uttar Pradesh – where polio transmission had never been stopped before – no type 1 polio cases have been reported in more than 12 months (since October 2006).

However, type 1 transmission continued in Bihar throughout 2007, at low levels: in the final quarter of the year, 12 cases were reported, the lowest-ever count for the final three months of a year. Careful epidemiological analysis revealed that transmission was largely confined to parts of 72 high-risk blocks (out of a total of 433 administrative blocks in the state), constituting what appear to be the last reservoir of type 1 poliovirus in India. Further field investigation identified accessibility challenges that many of these areas have in common: they are served by few roads or consist of riverine communities isolated from main population centres. A tailored plan was developed to increase coverage in these blocks – particularly in the Kosi River basin – centred on strengthening human resources and streamlining logistic arrangements. The Social Mobilisation Network in Bihar was expanded to enhance the programme's access to children most vulnerable to ongoing polio transmission. In December, WHO DG Dr Margaret Chan travelled to Bihar and met with Chief Minister Nitish Kumar, commending his steadfast commitment to polio eradication and the dedication of Bihar's

India innovations 2007

JANUARY

> The first vaccination campaign of the year kick-starts India's most intense schedule ever. In parts of Uttar Pradesh and Bihar, campaigns will be as often as every three weeks.

FEBRUARY

> Minister of Finance Palaniappan Chidambaram announces in parliament the Government of India's US$ 290 million domestic contribution to its national polio eradication effort.

APRIL

> The Lancet publishes studies demonstrating efficacy of mOPV in Uttar Pradesh is three times that of trivalent OPV.

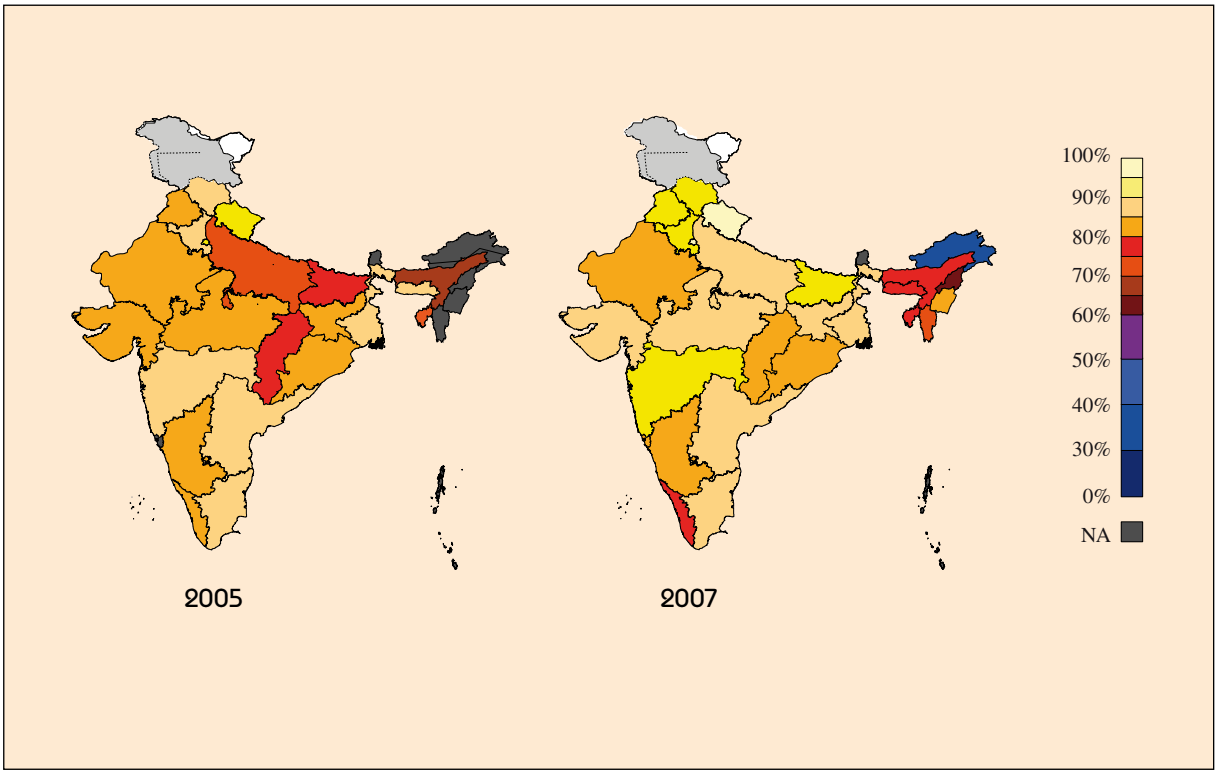
> Enhanced newborn tracking procedures and analyses rolled out in Bihar, enabling vaccinators to track all identified newborns until they have had eight doses of OPV.

© NPSP/D.Orr

A newborn is vaccinated against polio at home in Uttar Pradesh, India.

Focus in 2008: stopping type 1 poliovirus in Bihar, while controlling type 3 polio and protecting rest of India from re-infection with type 1 polio.

Figure 3: Impact of intensified eradication effort on direct protection by vaccine against type 1 polio in children aged 0-4 years in India



Source data: WHO
Analysis: Imperial College London, Grassly and Jenkins

MAY

> New Chief Minister of Uttar Pradesh Mayawati calls polio eradication a priority for her state as she launches vaccination campaigns.

> High risk block analysis conducted in Bihar, identifying 16% of the blocks in the state as responsible for over 70% of type 1 polio cases in the last 5 years; these areas then prioritized with additional staffing support and oversight.

JUNE

> Union Minister of Health and Family Welfare Dr Anbumani Ramadoss calls urgent meeting of state health ministers of Bihar and Uttar Pradesh to keep collective focus on polio eradication.

JULY

> Systematic identification of large migrant populations from Uttar Pradesh and Bihar residing in polio-free states, enabling immunization of these groups whenever vaccination activities are conducted in those two endemic states.

AUGUST

> Experienced "special mission" Surveillance Medical Officers from polio-free states volunteer to serve six months in Bihar to strengthen activities in high risk blocks.

OCTOBER

> One year passes without type 1 polio in core districts of western Uttar Pradesh; first state-wide mOPV3 campaign in Bihar.

health workers in the face of challenging circumstances. In January 2008, there was a visible increase in active monitoring of preparations and implementation on the part of state health officials, especially at the district level.

The advances against type 1 in Uttar Pradesh and Bihar were concomitant with a foreseen and unfortunate large type 3 polio outbreak in both states. In Uttar Pradesh, this was controlled with two large-scale campaigns using type 3 monovalent oral polio vaccine (mOPV3). In the latter half of the year, type 3 poliovirus from Uttar Pradesh re-infected Bihar, triggering an outbreak which led to a 22 % increase in new cases in the country over 2006. An initial mOPV3 vaccination response in early October in Bihar was geographically limited, with state-wide response not undertaken until late October and again in December. In total, 451 cases due to type 3 polio were reported from Bihar. By early 2008, the outbreak in Bihar had peaked.

The overriding strategic priority in 2008 is the rapid interruption of type 1 polio in the final reservoirs in riverine Bihar, before the onset of the monsoon in July. First steps have been taken to implement the tailored "Kosi River plan" to improve quality of operations in high-risk blocks of Bihar: staff are being recruited or redeployed from non-endemic areas. Campaigns are staggered: those in high-risk blocks take place after the rest of the state or the country to enable resources from other areas to be concentrated on these localities.

The operational priority will be intensive mop-up strategies in 2008, with rapid large-scale mOPV responses to detection of any virus in polio-free areas. At the same time, campaigns will be held to stop the type 3 outbreak and prevent its spread, both nationally and internationally: type 3 polio-from Bihar was detected in late 2007 across the border in Nepal.

NOVEMBER

> Indian pilgrims of all ages seek immunization in response to Saudi Arabia's polio vaccination requirements for travellers to the Hajj.

> Launch of Moradabad serosurvey to compare the level of immunity in youngest children – at high risk for polio – to levels in older, lower-risk children, in order to guide vaccine use.

DECEMBER

> WHO DG Margaret Chan visits India and discusses polio eradication with Prime Minister Manmohan Singh and the Chief Ministers of Bihar and Uttar Pradesh. Initial actions taken on "Kosi River plan" to stop polio transmission in Bihar.

© WHO/F.Caillette

A vaccinator in Bihar identified by his yellow Rotary vest packs polio vaccine in cooler boxes.

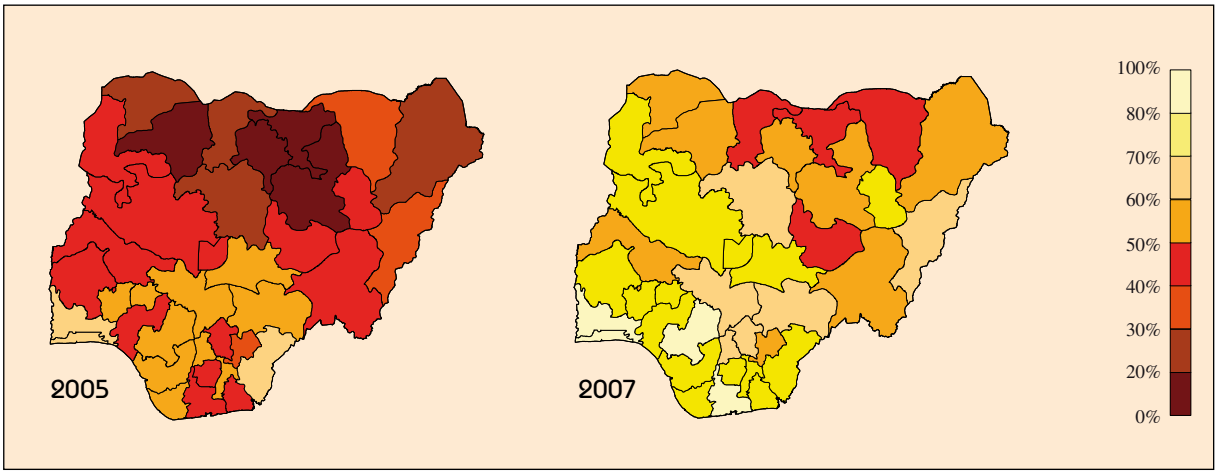
Across northern Nigeria, the proportion of 'zero-dose' children was halved.

3.1.2 Nigeria

Local ownership leads to decline in missed children; operational improvements essential

At the beginning of 2007, Nigeria led the world in polio cases, with 1122 children paralysed in 2006. States had been classified by risk status in 2006, enabling resources to be prioritized and activities to be state-driven: in the three states designated "very high risk", some 50 % of children had never been vaccinated ("zero-dose"). The introduction of Immunization Plus Days (IPDs) – which offered additional health interventions during polio vaccination campaigns – had both enhanced community engagement and generated political support at

Figure 4: Impact of intensified eradication effort on direct protection by vaccine against type 1 polio in children aged 0-4 years in Nigeria



Source data: WHO
Analysis: Imperial College London, Grassly and Jenkins

Nigeria innovations 2007

JANUARY TO MARCH

> Two nationwide IPDs are conducted in the first quarter, targeting 41 million children each time.

FEBRUARY

> President of Nigeria sends his special adviser on the MDGs as his envoy to the Stakeholder Consultation on Polio Eradication.

MARCH

> In the eight urban districts of Kano, 21 % of the target population – over 100 000 children – are immunized in more than 2 300 Quranic schools, which are systematically involved in the IPDs.

© WHO/A. J. Jide

A young girl taking oral polio vaccine in Kano state, Nigeria.

JUNE

> As part of WHO cross-regional collaboration, 20 consultants from EMRO are deployed to high-risk states of northern Nigeria.

> High-level Forum of Traditional and Religious Leaders and Media – attended by eminent leaders the Emirs of Zamfara and Dikwa and personal envoys of the Emir of Kano and of the Sultan of Sokoto – pledges to continue championing immunization.

Focus in 2008: reduce "zero-dose" children in high-risk LGAs to less than 10 %, establish tighter accountability mechanisms for vaccinator performance and mobilize governors of highest risk states.

federal and state levels. However, both the quality of campaigns and community demand remained weak: the immunity status of children had not improved consistently or sufficiently across the north: in the "very high risk" states, the proportion of "zero-dose" children was still as high as 32 %.

The 2007 tactics combined a scale-up of IPDs with a further refinement of risk-classification, from the state down to the Local Government Area (LGA) or district level – enabling authorities to identify the LGAs with persistent virus transmission and prioritize the improvement of operations in these areas. With decisions on the "Plus" in IPDs resting at the state level, interventions ranged across states from measles and diphtheria-tetanus-pertussis (DTP) vaccination to de-worming tablets and insecticide-treated bed-nets (ITNs). As local authorities took greater ownership of the eradication programme, they engaged with influential groups such as teachers in the Quranic schools of Kano. In the eight urban LGAs of Kano, a fifth of the target population of children under five years of age were vaccinated in Quranic schools. Systematic operational improvements were instituted in vaccinator training, supervision, micro-planning and targeted social mobilization. Consequently, the proportion of "zero-dose" children in the north was halved to an average of 16 % across the very high risk states.

Technical strategies were regularly adjusted to the evolving epidemiological situation: mOPV1 was used aggressively, interspersed strategically with trivalent OPV (tOPV) and – for the first time in Nigeria – mOPV3 (in July 2007). By the end of 2007, polio cases were reduced in Nigeria by 75 % over 2006. In the northern state of Kano – historically the highest poliovirus burden area in the country – only ten type 1 cases were reported in all of 2007, compared with 304 cases in 2006.

Despite this progress, the overall planning, implementation and evaluation of IPDs in key high-risk LGAs remained low-quality. Insufficient improvements in micro-planning and supervisor and vaccinator training yielded a significant remaining vaccination gap – across the ten high risk northern states, an average of 16 % of children remain unimmunised – allowing continued transmission of poliovirus, with the risk of new outbreaks.

© WHO/A.J. Jide

A girl shows her finger marked with indelible ink to prove that she has been vaccinated against polio.

JULY

> mOPV3 licensed in Nigeria, allowing expansion of type-specific vaccination tactics.

NOVEMBER

> Travellers of all ages throughout northern Nigeria are vaccinated before embarking on the Hajj, as per Saudi Arabian polio vaccination requirements for the pilgrimage.

FEBRUARY 2008

> Completing her tour of polio-endemic countries, WHO DG Margaret Chan meets President of Nigeria Haji Umaru Yar'Adua. Launching IPDs in the company of the Sultan of Sokoto and Nigeria's First Lady, Dr Chan says: "In every country, success against polio comes when local government leaders, community leaders and elders make the health of children a top priority. It is local ownership that solves the problems and ensures success."

© WHO/Nigeria

The Sultan of Sokoto Muhammed Sa'adu Abubakar, spiritual leader of Nigeria's Muslim community, with WHO DG Margaret Chan.

Stopping polio in Nigeria depends on filling the remaining coverage gap during vaccination campaigns.

Further evidence of this vaccination coverage gap was the emergence of a type 2 circulating vaccine-derived poliovirus (cVDPV[1]) in 2006, which continued to circulate and paralysed 68 children in 2007.

Stopping polio in Nigeria depends on filling the remaining vaccination coverage gap during IPDs, especially in the identified high-risk LGAs in the northern states of – in order of urgency – Kano, Borno, Sokoto, Jigawa, Katsina and Kebbi. The first five of these have now been designated the very high risk states, from which virus continues to be exported to both polio-free areas within the country and neighbouring countries (Chad and Niger in 2007). The governors of these states are being alerted to the urgency of the situation so that they may oversee next steps.

The focus in 2008 is on expanding and systematically applying the new tactics in order to reduce the proportion of "zero-dose" children in the highest-risk LGAs of infected states to less than 10%. A related priority is to establish mechanisms in each LGA for holding vaccinators and supervisors accountable to achieving coverage targets, as assessed by independent monitoring.

The highest-risk LGAs will be receiving more technical support, both from polio-free areas of Nigeria and as part of inter-regional collaboration with the WHO Regions of the Americas and the Eastern Mediterranean, which have deployed experienced consultants to assist. In other parts of the country, authorities are focusing on protecting gains made in 2007 by conducting rapid mOPV responses around any cases. Throughout 2008, IPDs will be supplemented with large-scale mop-ups to stop imported virus in polio-free areas, and to deal with final chains of transmission in areas on the verge of eradication, with a primary focus on type 1.

1 See also Section 5.1

Conflict demands flexible and creative solutions to reach children remaining unvaccinated in southern Afghanistan and Pakistan's tribal areas.

3.1.3 Afghanistan and Pakistan

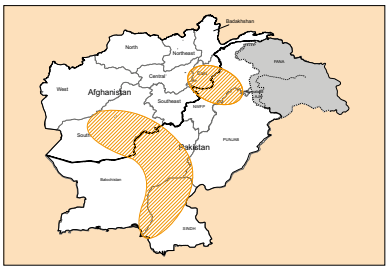
Polio restricted geographically; separate challenges to reaching all children in northern and southern transmission zones

Afghanistan and Pakistan, considered a single epidemiologic block, ended 2006 with increasingly restricted transmission of both poliovirus serotypes. No cases of polio were reported from Afghanistan in the first quarter of 2007. In Pakistan, the bulk of cases were restricted to discrete high-risk zones.

Genetic sequencing of polioviruses confirms the ongoing epidemiological links between these two countries, facilitated by extensive population movements across their common porous border. The northern transmission zone consists most of North West Frontier Province (NWFP) in Pakistan and parts of the eastern region of Afghanistan. The southern transmission zone forms a corridor from the southern region of Afghanistan into Pakistan through Balochistan and southern Punjab into Sindh (including Karachi).

Despite a promising start to the year in Afghanistan, deteriorating security conditions in the middle of the year in the southern region had a serious impact on operations. Cases rose in the second half of 2007, particularly in Hilmand and Kandahar – 12 of the year's 17 cases occurred after June. The proportion of "zero-dose" children rose to 12% in the southern region. With children nearly impossible to reach in these conditions, safe access negotiations involved all parties – whether government or anti-government, military, religious, non-governmental or tribal. In August, following a breakthrough in this dialogue, antigovernment groups proffered their support in writing, which opened up more areas to vaccinators: 80 000 children who could not be reached during SIAs for nearly a year in the southern region were finally vaccinated in September 2007 following this letter of support. In addition, the programme recruited more local staff – who were more easily able to access homes – and carried out phased activities, concentrating resources for a campaign on one area before moving on to another. By the end of the year, the proportion of "zero-dose" children in southern region was reduced to 9% from 12%.

Figure 5: Northern and southern transmission zones in the joint Afghanistan-Pakistan reservoir of wild poliovirus



Afghanistan & Pakistan innovations 2007

DECEMBER 2006

> Setting the tone for 2007, Ministers of Health of both countries launch cross-border coordination at historic health *jirga*, unprecedented collaboration that will ease access to populations throughout the year on both sides of the border.

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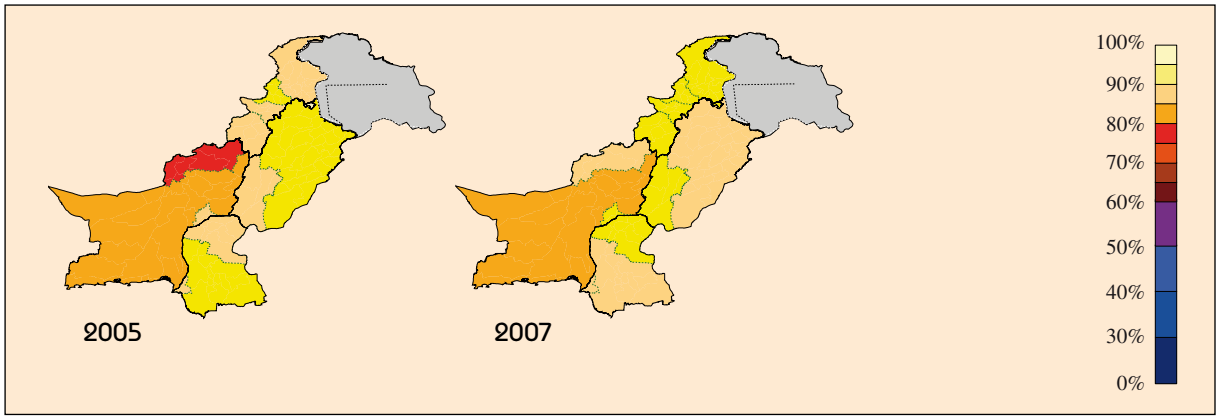
A child is given oral polio vaccine at a cross-border immunization activity between Afghanistan and Pakistan.

MARCH & APRIL

> Both countries host high-visibility discussions to increase access in security-compromised border areas, involving President Hamid Karzai's Special Advisor on Health and Governor of Kandahar in Afghanistan, Governor and Chief Minister of NWFP in Pakistan and eminent religious scholars representing a network of thousands of village imams and local leaders in both countries.

Poor-quality SIAs in southern Pakistan trigger plan for operational improvements and objective monitoring.

Figure 6: Impact of intensified eradication effort on direct protection by vaccine against type 1 polio in children aged 0-4 years in Pakistan



Source data: WHO
Analysis: Imperial College London, Grassly and Jenkins

SIAs throughout the year were synchronized between Afghanistan and Pakistan on an unprecedented scale, largely to optimize simultaneous, comprehensive coverage of border areas and of children in transit. Priority was placed on reaching children in high-risk areas and identifying and mapping mobile populations. Vaccination posts were set up at all formal border crossings and at traditional gathering points of nomadic communities. A mix of mOPV1 and mOPV3 was used during SIAs to maximize the impact of each vaccination contact.

As a result of these activities, case numbers declined in 2007 in both countries, compared with 2006 (17 cases compared with 31 cases in Afghanistan; and 32 cases compared with 40 cases in Pakistan). The geographic reach of polio was further restricted : in Afghanistan, 13 districts were infected in 2007, down from 17 in 2006; in Pakistan, 18 were infected, compared to 22 in 2006). In neither country were any cases reported outside of identified high-risk areas, demonstrating the accuracy of delineation of these areas, which were preferentially targeted during SIAs.

APRIL & MAY

> WHO DG Margaret Chan, on her first official visit to a polio-endemic country, meets Afghanistan's President Hamid Karzai, who reiterates his commitment to polio eradication in his country.

> Dr Chan travels on to Pakistan to meet Prime Minister Shaukat Aziz, who assures her of his country's commitment to eradicating polio.

JUNE

> Islamic countries call for urgent action on polio and for access to children in conflict areas, at first-ever OIC health ministers meeting in Malaysia.

SEPTEMBER

> All parties in the conflict in Afghanistan state their support for polio eradication: resultant safe passage allows vaccinators, on the occasion of International Peace Day, to reach 80 000 children who were missed for nearly a year because of security conditions.

Focus 2008: Improving operations and ensuring correct tracking of missed children in parts of Pakistan, guaranteeing access to all populations in southern Afghanistan.

However, polio transmission continued in the same areas of Pakistan as in previous years despite implementation of 11 SIAs. In the southern transmission zone, which reported the bulk of the country's cases (21 of 32) and where security and access concerns do not prevail, poor-quality SIAs resulted in inadequate vaccination of children and continued poliovirus transmission of both types. Analysis of polio cases in 2007 shows that 40% of the children had received three or fewer doses of OPV. Reported SIA coverage rates of 95% masked sub-district coverage gaps and operational weaknesses in high-risk areas, such as parts of Sindh (including Karachi, the country's largest city and the locus for many migrants from the border areas). A tailored plan has now been developed for these areas, including improvements in operations and reliance on independent monitoring and objective indicators such as finger-marking.

As Afghanistan and Pakistan jointly account for only 4% of total global polio cases, they may be closer to final interruption of polio transmission than the other endemic countries. Looking forward, the primary objective in Pakistan is to support the new government in implementing the country's intensified eradication efforts, with particular attention to independent monitoring and local accountability for campaign operations, particularly in Sindh. Major innovations planned for 2008 include the introduction of environmental surveillance in Karachi to help clarify the city's role in sustaining polio in the joint Afghanistan-Pakistan southern transmission zone.

Communications and social mobilization activities in Pakistan were focused on ensuring the development of locally appropriate activities to address the local challenges, including deployment of communications staff to district level and the use of data generated from community attitudes studies. The rapid scale-up of communication and social mobilization activities will continue with broader implementation in 2008.

Reaching children during SIAs in insecure areas remains one of the greatest challenges in both Afghanistan and parts of Pakistan and will need continued engagement of civil administration and local communities and firm support from tribal and religious leaders. Discussions will continue with all parties in Afghanistan, including the government, the North Atlantic Treaty Organization, the International Security Assistance Force and anti-government groups to explore ways of negotiating pauses in conflict during polio campaigns. Local innovations such as the Short Interval Additional Dose – one round of vaccination quickly followed by another, during windows of access opportunity informed by sustained dialogue with local influencers – are being systematically adopted in 2008.

At the same time, both countries plan to coordinate large-scale SIAs in the border areas and to protect polio-free areas with mop-ups with type-specific mOPV in response to any detected poliovirus.

OCTOBER

> Prime Minister Shaukat Aziz convenes award ceremony for districts of Pakistan which have been polio-free for over two years.

NOVEMBER

> Analysis of polio cases in 2007 shows that 40% of affected children had received three or fewer doses of OPV, indicating operational weaknesses in high-risk areas, such as Karachi, the country's largest city and the locus for many migrants from border areas.

DECEMBER

> In the course of this year, President Hamid Karzai has personally inaugurated five SIAs in Afghanistan.

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President Hamid Karzai of Afghanistan adminsters polio vaccine to a child.

3.2 Re-infected countries

Large international outbreaks stopped, risk remains in central Africa

Importations of poliovirus into polio-free areas have been a key challenge for the GPEI in recent years and have given rise to new international response strategies and mechanisms. Between 2003 and 2007, 20 countries suffered importations of wild poliovirus due to virus of Nigerian origin and seven due to virus of Indian origin. Most of these outbreaks have been successfully stopped. Minimizing the risk and consequences of importations of poliovirus into polio-free areas plays a critical role in successful global polio eradication, and the year 2007 saw intensified use of outbreak response guidelines endorsed by the World Health Assembly (WHA) in May 2006.

In the course of 2007, eight re-infected countries reported polio cases: in the Horn of Africa, Somalia; in central and west Africa, Angola, Chad, the Democratic Republic of the Congo (DRC), Niger and Sudan (in the west of the country); and in South Asia, Myanmar and Nepal. By the end of the year, Somalia and Myanmar had stopped their outbreaks and six re-infected countries continued to report polio cases. In two of these – Chad and DRC – the original importation of poliovirus occurred before 2007 and continued through that year. In the four other re-infected countries, polio cases in 2007 were a result of new importation events.

Horn of Africa

Somalia, re-infected in July 2005 with virus of Nigerian origin, reported eight cases in 2007. Health authorities intensified the SIA schedule despite escalating conflict, used every opportunity to conduct SIAs with short intervals between doses of mOPV and increased surveillance sensitivity. No cases of polio have been reported in Somalia since 25 March 2007.

Central and west Africa

A new threat to polio eradication in this part of Africa is the detection, again, of poliovirus of Nigerian origin in Chad (21 cases in 2007), where poor quality SIA coverage, inconsistent surveillance and recurrent insecurity are the primary constraints to stopping transmission. In late 2007, polio campaign operations were suspended due to a renewed wave of conflict. Neighbours such as Cameroon, the Central African Republic and Sudan are vulnerable to exportations of poliovirus from Chad: whether due to low population immunity, surveillance gaps or security challenges. In the latter part of 2007, Sudan reported a case in the west of the country, genetically linked to poliovirus of Nigerian origin circulating in Chad.

Sub-provincial surveillance gaps in eastern Chad appear to have allowed the virus to circulate undetected for nearly 18 months; the risk of further international spread is magnified by large-scale population movements following conflict in the country. In 2007, Chad was the only re-infected country with active, concurrent transmission of both types 1 and 3.

In Africa, DRC had the highest number of cases (41) in 2007 of any re-infected country. While four separate importation events occurred in DRC since 2006, transmission continues with only one of these lineages. A refined SIA schedule in 2008 is targeting the route of poliovirus transmission along the Congo River in order to finally stop the outbreak and prevent international spread, a risk heightened by the detection of

Most outbreaks between 2003 and 2007 stopped, including Somalia.

Chad outbreak represents a serious international health risk – full implementation of outbreak guidelines is imperative

poliovirus in 2008 in the far east of the country and in the Central African Republic to the north.

In Angola, with eight cases in 2007, improvements were introduced in the quality of both SIAs and subnational surveillance. Angola suffered two separate importations of type 1 poliovirus, in 2005 and 2007, the first of which has been stopped. As this report went to press, a third importation of type 3 poliovirus had also been reported in early 2008. Although surveillance indicators at provincial level are adequate, these may mask gaps[2]. An international surveillance and administrative review in Angola in 2007 led to changes in administration, staffing and tactics which are expected to improve both surveillance and vaccination campaign quality. As part of WHO inter-regional collaboration, Cuba agreed in 2007 to send one consultant to each of Angola's 21 provinces to support the outbreak response effort and strengthen surveillance. These consultants arrived in the country at the beginning of 2008.

In 2007, Niger has dealt with limited local transmission following several importations from Nigeria. The country continues to be at increased risk of importations, until endemic transmission of polio has been interrupted in neighbouring northern Nigeria.

South Asia

Myanmar conducted rapid and repeated SIAs in 2007 following detection of imported poliovirus in the early part of the year (importation of poliovirus of Indian origin, via Bangladesh). Myanmar reported 11 cases in 2007, but stopped its outbreak in less than three months, with the last case reported in May.

Although Nepal reported five polio cases in 2007 due to new importations from neighbouring India, strong outbreak response has limited local spread of the virus and built an immunological firewall, albeit fragile, preventing further international spread of virus across the region. Nepal continues to be at increased risk of importations until endemic transmission of polio has been interrupted in neighbouring India.

The intensification of eradication activities in the remaining endemic countries helped limit the number of importations of poliovirus in 2007, as did preventive activities in bordering and vulnerable countries. Rapid implementation of outbreak response guidelines was critical to stopping those importations that did occur, in most of the re-infected countries. In addition, some countries have adopted special protective measures, such as the Saudi Arabian directive on polio vaccination for pilgrims to Mecca. However, as demonstrated by the international outbreaks of 2003-2007, importation of poliovirus into polio-free areas will remain a risk until completion of global polio eradication. The recurrent re-infection of Niger and Nepal underscores the vulnerability of areas bordering polio-endemic countries, which need to maintain – along with sensitive surveillance – high population immunity and an intense SIA schedule. All other countries will require strong routine immunization against polio and the ability to respond rapidly to an importation.

2 See also Section 4.1

Table 1: Status and response activities in countries with importations of poliovirus in 2007

Re-infected country	Number of SIAs in 2007	Number of cases in 2007
Angola	4	8
Chad	7	21
Democratic Republic of the Congo	13	41
Myanmar Outbreak stopped	7	11
Nepal	4	5
Niger	5	11
Somalia Outbreak stopped	10	8
Sudan	6	1

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Polio vaccination in Chad

4

Surveillance and certification

of global polio eradication

4.1 Surveillance

Monitoring of sub-national level indicators enables targeted improvements

In the intensified polio eradication effort, surveillance work is focused on optimizing sensitivity in the known and highest-risk infected areas while maintaining the levels necessary for global certification elsewhere. The overall sensitivity and reliability of acute flaccid paralysis (AFP) reporting – the global surveillance system to measure progress towards interrupting poliovirus transmission – remained very high in 2007. All regions maintained AFP surveillance at or above certification quality [3]. In a handful of critical countries, areas for improvement at sub-national level were clearly identified in 2007 and actions initiated to address these weaknesses.

AFP reporting in the polio-endemic WHO regions – the African (AFR), Eastern Mediterranean (EMR) and South-East Asia (SEAR) Regions – remained very sensitive in 2007 (Table 2), with all regions achieving or exceeding international performance indicators. However, surveillance sensitivity in the certified polio-free regions declined slightly compared to 2006. Continued sensitive AFP surveillance in polio-free countries and areas is critical for the detection of, and response to, possible wild poliovirus importations from endemic areas or the emergence of a cVDPV.

Sub-national surveillance gaps key to intensified eradication effort – Chad, Angola and Afghanistan-Pakistan border.

3 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.

Table 2: Quality of AFP reporting, by WHO region, 2006 and 2007 [4]

WHO region	Reported AFP cases		Non-polio AFP rate		% AFP with adequate specimens	
	2006	2007	2006	2007	2006	2007
African Region	12472	12077	4	4	89	90
Region of the Americas	2151	2151	1.3	1.28	78	78
Eastern Mediterranean Region	8739	9396	3.89	4.19	89	91
European Region	1481	1445	1	0.98	81	82
South-East Asia Region	36665	46133	5.96	7.37	83	84
Western Pacific Region	7011	6231	1.83	1.62	89	90
Global total	68519	77433	3.67	4.19	85	86

A country-by-country analysis of AFP surveillance quality in the endemic regions shows improvements at national and subnational levels in most countries. The majority (89 %) of the population of endemic regions now lives in countries with AFP reporting levels of 2 per 100 000 or more: 76 % of AFR, 90 % in EMR and 96 % of the population in SEAR[5]. In endemic and high-risk countries, the entire population lives in countries with this level of AFP reporting or above.

Despite adequate AFP surveillance at the national level, some countries have given cause for further investigation of sub-national surveillance quality, as gaps at this level could allow undetected wild virus circulation for prolonged periods. Following further analysis of genetic sequencing data and surveillance indicators at provincial and sub-provincial levels in key countries in 2007, the focus in 2008 is to rapidly address any gaps with a combination of measures.

In Chad, genetic analysis of wild poliovirus isolates found in 2007 suggested that detection of transmission in that country was delayed by poor sub-national surveillance in the east of the country. The 2007 AFP indicators in Chad exceeded certification quality at the national level, but were sub-optimal in six of 18 provinces, home to over a third of the country's population. Clear geographic delineation of the gaps has enabled the programme to focus its efforts on improvements to surveillance in these areas, though next steps were briefly stalled by security conditions.

The possibility of sub-national surveillance gaps is also acute in Angola: although the most recent case when this report went to press was related to virus detected only six months before, the ongoing transmission may belie apparently adequate indicators. Following an international surveillance review in 2007, new administrative procedures have been recommended to ensure objective quality-control of surveillance reporting. To assist with strengthening the reliability of the surveillance indicators, 24 international consultants have been deployed to the subnational level in 2008.

Another area where surveillance at the sub-national level will be watched more closely in 2008 is the border along Afghanistan and Pakistan, where a spurt of cases in late 2007 confirmed ongoing transmission.

4 Data in WHO/HQ as of 29 April 2008.

5 A small number of countries in each endemic region, most with small populations, did not reach certification-quality AFP surveillance in 2007: Guinea-Bissau in AFR, Bhutan, Timor-Leste and Maldives in SEAR, and Bahrain and Lebanon in EMR. Indicators were marginally below the certification cut-off in a few other countries, which are still considered to have maintained certification-quality AFP surveillance: Algeria, Malawi, Thailand and Zimbabwe.

4.2 Laboratory network

All endemic-region laboratories equipped for virus isolation in cell culture; number of laboratories capable of ITD by ELISA doubles

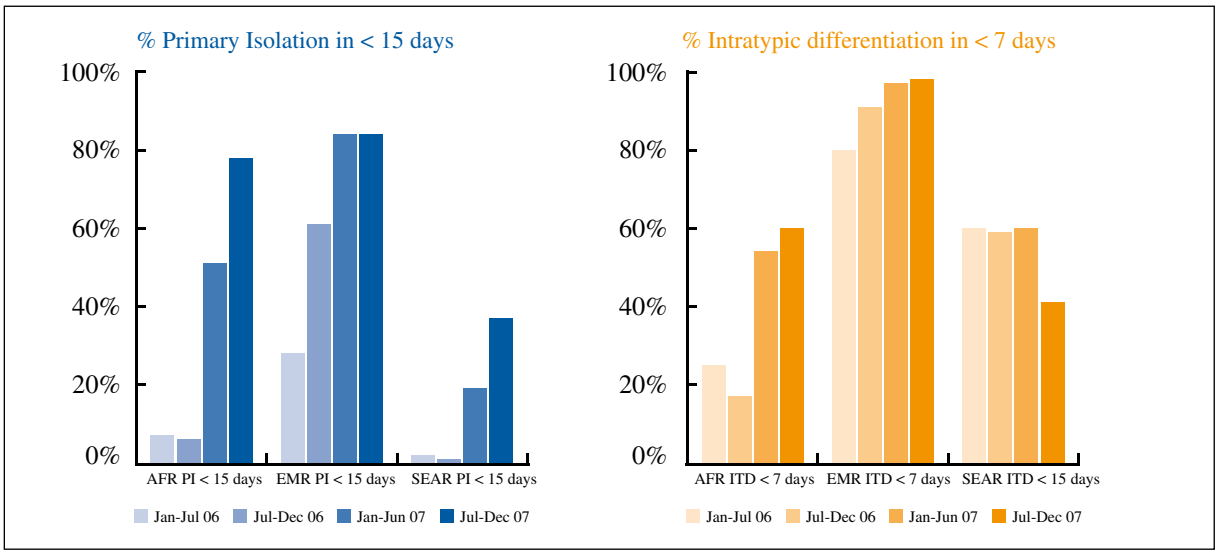
The Global Polio Laboratory Network (GPLN) comprises 145 [6] laboratories that underpin the GPEI. In 2007, the GPLN tested approximately 167 600 faecal samples, mostly from persons with AFP, a 20 % increase in workload compared to 2006. Wild polioviruses were identified in 1310 AFP cases from 13 countries in 2007: indigenous viruses were detected in four countries and imported viruses in nine [7].

After the 2006 adoption of a new testing strategy to reduce reporting times by 50 % – from 42 days to within 21 days of receipt of samples in laboratories – the GPLN worked during 2007 to strengthen capacity and fill relevant administrative, equipment, technical and data management gaps in priority areas so that all 44 laboratories in the three endemic regions were capable of using the new testing strategy by the end of the year.

The network established a goal of testing at least 75 % of faecal samples from polio-endemic regions in laboratories with on-site capacities for both virus isolation in cell culture and intratypic differentiation (ITD) of polioviruses by polymerase chain reaction (PCR) and Enzyme Linked Immunosorbent Assay (ELISA). An additional benefit of increasing the number of ITD-capable laboratories is that fewer isolates need to be shipped, contributing to shorter confirmation times for poliovirus. In 2006, only 14 (32 %) of the laboratories in endemic regions had functioning appropriate ITD capacity. During 2007, the number of such laboratories was doubled to 28 (63 %); by the end of the year, 68 % of samples were being tested in facilities with virus isolation, ELISA and PCR capacities.

This progress was accomplished – against the backdrop of a growing workload for sample processing

Figure 7: Speed of primary isolation & intratypic differentiation in labs in polio-endemic regions



6 Laboratories in Guatemala and Papua New Guinea are no longer members of the network and specimens from these countries are now tested in other countries with WHO-accredited laboratories. Cuba and Chile have been added to the network.

7 Indigenous wild poliovirus in Afghanistan, India, Nigeria and Pakistan; viruses of Nigerian origin in Cameroon, Chad, Niger, Somalia and Sudan; viruses of Indian origin in Angola, Democratic Republic of the Congo, Myanmar and Nepal.

Number of laboratories capable of faster testing doubles.

– by several streams of activity. Five laboratories with existing capacity for ELISA and probe hybridization were shifted to ELISA and PCR, with training for their personnel to perform PCR. The Mumbai, India laboratory – damaged in a 2006 fire – was re-equipped and brought back online in the second quarter of 2007, with support from national authorities, WHO, Rotary International and development partners.

Six additional laboratories [8] were upgraded for the first time to on-site capacity for both ELISA and PCR. These six laboratories continue to perform ITD tests in parallel with reference laboratories. Four have already passed key proficiency tests successfully in December 2007.

A WHO-administered accreditation programme requires each laboratory to meet established performance targets for accuracy and timeliness of results. Ninety eight per cent of laboratories were fully accredited by WHO in 2007, and arrangements were made for parallel testing of samples from poorly-performing laboratories in accredited facilities, where necessary. Following proficiency testing, six laboratories were identified with performance weaknesses; solutions were easily achieved in four [9] of these. The network laboratory in Dhaka, Bangladesh received staffing and supervisory assistance; the laboratory in Maiduguri, Nigeria was supported through parallel testing of samples with an accredited reference laboratory and several consultant visits: both facilities attained full accreditation by the end of 2007.

Among the priorities in 2008 will be the process of accreditation of the six newly-upgraded laboratories and the implementation of the new testing strategy in laboratories in the polio-free regions.

4.3 Containment of wild poliovirus

Completion of Phase I in polio-free regions – only three countries left

Minimizing the risk of reintroduction of poliovirus after interruption of wild poliovirus transmission requires countries to coordinate the application of appropriate safeguards and bio-containment conditions for the handling and storage of residual polioviruses (wild, Sabin-strain and vaccine-derived) and poliovirus-infectious materials. After one year has passed without isolation of a naturally occurring wild poliovirus anywhere in the world, containment measures for facility-based wild polioviruses will be required. These measures will include a combination of destruction of unneeded[10] wild polioviruses, replacement of wild polioviruses with Sabin strains where possible and implementation of primary and secondary safeguards in all facilities and countries continuing to retain wild polioviruses.

Over 80% of countries have completed survey and inventory activity for Phase I.

8 Network laboratories upgraded to perform ITD tests are in Cameroon, Kenya, Madagascar, Morocco, Syrian Arab Republic, and Uganda.
9 Kazakhstan, Papua New Guinea, Ukraine and Venezuela.
10 I.e., excepting those required for research, diagnostics, vaccine production (IPV) and vaccine quality assurance and control.

Achievement of effective post eradication wild poliovirus containment starts with identification of facilities with wild poliovirus infectious and potentially infectious materials through implementation of national laboratory surveys in all countries, known as Phase I activities. By the end of 2007, over 80 % of countries had completed the survey and inventory activity. The majority of those not completing the work are located in AFR where the priority remains interrupting wild poliovirus circulation and, furthermore, the risk posed by facility-based polioviruses is low due to limited laboratory infrastructure.

Containment activities for Phase I were a priority in 2007 in three critical countries with more significant laboratory infrastructure – Brazil, China and Japan. All three countries reported significant progress towards completion of this Phase. Japan completed all activities and submitted a report to the Regional Certification Committee (RCC) of the WHO Region of the Western Pacific (WPR) for review and China expanded its national survey to include facilities in all relevant government ministries. Brazil held meetings to finalize the plan for activities that will start in early 2008. All three of these priority countries are now well positioned to complete Phase I in 2008, potentially leading to full regional completion in the WHO Regions of the Americas (AMR), Europe (EUR) and the Western Pacific (WPR).

Progress in Phase I and developments in long-term containment planning continue to be an integral component of the eradication effort and a topic of interest to many stakeholders, including the global bio-safety community: in 2007, keynote presentations were invited and delivered for meetings of both the Asia Pacific Biosafety Association and the Brazilian Biosafety Association.

In 2008, emphasis will be on Regional completion of Phase I in the polio-free regions of AMR and WPR, requiring an intense programme of work in AMR with focus on Brazil. WPR can complete Phase I once China has fully implemented planned activities and the RCC approves the process in Japan following its review, bringing Phase I to completion in all three of the WHO Regions now certified as polio-free.

Long term containment planning in 2008 will feature finalization of the 3rd edition of the *Global Action Plan to minimize post eradication poliovirus facility-associated risk (GAP II)* after a process of public comment and review by the ACPE and continued briefing of stakeholder groups, including delivery of an invited presentation at the meeting of the European Biosafety Association.

4.4 Certification of global polio eradication

Increase in polio-free countries with final certification documentation

To prepare for eventual regional certification of the eradication of wild polioviruses, National Polio Certification Committees (NCCs) and RCCs in endemic regions regularly review national documentation submitted by eligible countries, i.e. those where no wild poliovirus has been found for at least three years in the presence of certification quality surveillance. In 2007, RCCs met in each of the three endemic regions and in two of the polio-free regions.

The number of eligible countries for which RCCs accepted final certification documentation increased from 14 to 21 in AFR (of 46 member states), and from 8 to 9 in SEAR (of 11 member states); it remained at 15 (of 23 member states) in EMR. Overall, the percentage of countries which successfully submitted final

certification documentation increased again, from 80% in 2006 (169 out of 209) to 86% in 2007 (179 out of 209). While short of reaching the milestone[11] of 100% set in the *Global Polio Eradication Initiative Strategic Plan 2004-2008*, this increase occurs in the context of international outbreaks from 2003-2006, when countries which could have presented documentation for certification were re-infected by poliovirus from two of the four endemic countries. Those countries which have stopped their outbreaks in 2007 are now concentrating their resources on protecting themselves from future importations in order to prepare for submission of their documentation once three years have passed with adequate surveillance and no evidence of poliovirus circulation.

Recognizing the increasing restriction of poliovirus transmission in the remaining endemic areas, and the speed with which outbreaks of imported poliovirus have been stopped, the Chairman of the Global Certification Commission (GCC) in November 2007 convened the chairs of all six RCCs for a meeting in Geneva. After examining certification activities in the endemic regions, activities to maintain polio-free status in certified regions and advances towards laboratory containment of wild poliovirus, the group confirmed that consistent progress had been made towards eventual certification of wild poliovirus eradication and outlined relevant priorities to the Director-General of WHO.

The percentage of countries which successfully submitted final certification documentation increased to 86%.

11 See Appendix II.

5 Management of long-term risks

after wild poliovirus eradication

Once wild poliovirus (WPV) transmission has been interrupted globally, WPV stocks have been contained and eradication has been certified, the primary long-term risks of polio will derive from the continued re-introduction into the human population of the attenuated polioviruses contained in OPV, resulting in vaccine-associated paralytic polio cases (VAPP) and outbreaks due to vaccine-derived polioviruses (VDPVs).

In 2007 – spurred by progress towards polio eradication – the Global Polio Eradication Initiative (GPEI) further intensified its programme of work to manage the long-term risks of polio following interruption of WPV transmission. This work focused on three areas, described in the following sections: the characterization of long-term polio risks, strategies to manage those risks and the international coordination of such strategies.

5.1 Characterization of long-term polio risks (VAPP and VDPVs)

Activities in 2007 significantly advanced the characterization of the long-term risks following polio eradication, helping to further formulate and refine risk management strategies. Central to managing the risks of VAPP and VDPVs is to stop use of OPV in routine immunization, as endorsed by the Strategic Advisory Group of Experts (SAGE) and the Advisory Committee on Poliomyelitis Eradication (ACPE), and presented in January 2008 to the Executive Board to the World Health Assembly (WHA).

Low population immunity remains the main known risk factor for the emergence and spread of cVDPVs. New molecular reagents and methods have enhanced the sensitivity of laboratory screening for all VDPVs.

Vaccine-associated paralytic polio (VAPP)

The risk of VAPP is already well-characterized. VAPP cases occur at a rate of approximately 1 in 2.5 million doses administered, almost exclusively at the first administered dose. At current usage-levels of OPV, an estimated 250-500 VAPP cases occur annually. In 2007, many low- and middle-income countries initiated processes to further investigate the burden of VAPP, particularly in EMR, SEAR and WPR.

Vaccine-derived polioviruses (VDPVs)

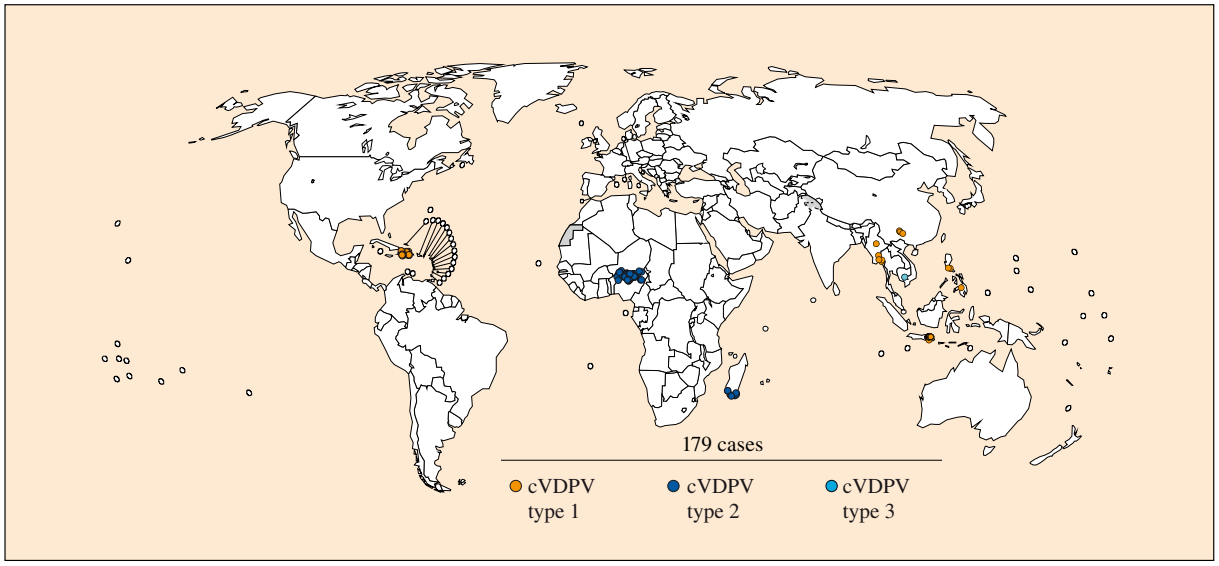
Circulating VDPVs (cVDPVs)

On rare occasions, in areas where polio immunization coverage has been low, VDPVs have regained the ability to circulate in a population and cause paralysis. Between 2000 and 2007, over 10 billion doses of OPV were administered worldwide. In the same period, eleven cVDPV episodes in ten countries were confirmed, resulting in 179 polio cases, with a median of five cases per outbreak.

In 2007, the emergence of cVDPVs in Myanmar and Nigeria and their detection by the Global Polio Laboratory Network (GPLN) further increased the understanding of cVDPVs. In Myanmar, four cases of polio associated with a type 1 cVDPV were identified. In response, three SIA rounds were conducted with mOPV1. In Nigeria, 68 cases associated with a type 2 cVDPV were identified in northern states. In response, SIAs were conducted throughout the year, using different vaccines (mOPV1, mOPV3 and trivalent OPV, to address circulation of WPV1, WPV3 and type 2 VDPV). In particular, the temporal and geographical clustering of vaccine-related type 2 poliovirus isolates in northern Nigeria prompted the further laboratory investigations which led to the eventual confirmation of the cVDPV. To close the gap in laboratory detection of VDPVs, new molecular reagents and methods have been developed, with the goal of substantially increasing the sensitivity of laboratory screening for all VDPVs, especially those of type 2.

In November 2007, the ACPE was presented with a detailed review of the epidemiology of cVDPV outbreaks, the impact of control measures and the risks of cVDPVs. Low population immunity remains the main known risk factor for the emergence and spread of cVDPVs. Although cVDPVs result on average in fewer polio cases and respond more rapidly to SIAs than WPV

Figure 8: Circulating vaccine-derived polioviruses, 2000-2007



outbreaks, reviewing all available data, the ACPE concluded that cVDPVs should be subject to the same control measures as WPVs. Collaboration continues between the GPEI and Harvard University/ Massachusetts Institute of Technology to conduct mathematical modelling of cVDPVs and outbreak response following interruption of WPV transmission.

Immunodeficiency-associated VDPVs (iVDPVs)

Immunodeficiency-associated excretion of VDPVs (iVDPVs) is currently the least characterized risk. Such extended intestinal replication of OPV viruses has been observed in 33 individuals with rare immune deficiency disorders, who are classified into two separate categories: those with 'prolonged' excretion (individuals excreting virus for a period >6 months); and, chronic excretion (individuals excreting virus for a period of >5 years).

Five of the 33 individuals – from industrialized countries – were categorized as 'chronic' excretors; two continue to excrete. In no instance has this been associated with secondary cases. In 2007, a review was conducted of all known iVDPVs to date. Subsequently, to more accurately estimate the scale of this risk following interruption of WPV transmission, a protocol has been established and studies set up for 2008 in six low- to middle-income countries: Bangladesh, China, Russian Federation, Senegal, Sri Lanka and Tunisia.

Ambiguous VDPVs (aVDPVs)

Ambiguous VDPVs (aVDPVs) are VDPVs with a currently unclassifiable source (either an iVDPV or another source). In 2007, further molecular study and genetic sequencing of numerous aVDPVs isolated (through environmental sampling or from an individual without diagnosed immune deficiency disorders) provided further insight, suggesting biological links of isolated aVDPVs to either iVDPVs or VDPVs from another source. Further review is ongoing to determine if a clear epidemiological connection exists, to allow a precise classification. As understanding of VDPVs grows, a clearer characterization of aVDPVs should become possible.

5.2 Management of VAPP and VDPV risks: role of eventual OPV cessation

Eliminating the long-term risks of VAPP and VDPVs following interruption of WPV transmission would require the eventual cessation of the use of OPV in routine immunization, as endorsed by the SAGE and the ACPE and presented in January 2008 to the Executive Board to the WHA.

Over the past ten years and following numerous expert consultations, the ACPE has elucidated the following six prerequisites to prepare for the cessation of OPV use in routine immunization programme, and to ensure that the risks associated with OPV cessation are minimized:

Prerequisite 1: Wild poliovirus certification and containment

Before the cessation of OPV, the interruption of WPV transmission must be confirmed and certified globally, and all WPVs must be under appropriate, final bio-containment, to minimize the risk of WPV re-introduction. Meeting this prerequisite begins with identification of facilities with wild poliovirus-infectious and potentially infectious materials, through the implementation of national laboratory surveys in all countries. By the end of 2007, over 80% of WHO Member States had completed the survey and inventory activity [12].

12 See also section 4.3

Prerequisite 2: Global surveillance and notification

Highly sensitive disease surveillance is required before and after OPV cessation, to rapidly detect the potential reintroduction of any poliovirus and/or emergence of a cVDPV.

To maintain disease surveillance worldwide, active surveillance for acute flaccid paralysis (AFP) is increasingly aligned with long-term roadmaps for surveillance, notably with the Global Framework for Immunization Monitoring and Surveillance (GFIMS) and the International Health Regulations (IHR 2005). Since mid-2007, cases due to wild poliovirus in polio-free areas have already been notified successfully through the IHR (2005) framework, which came into force only in June 2007, re-affirming the important role this mechanism may have for rapid detection of circulating polioviruses, should they occur after OPV cessation.

Prerequisite 3: Monovalent OPV stockpile and response

To optimize the response to cVDPV events immediately following synchronized OPV cessation, an international stockpile of monovalent OPVs (mOPVs) must be maintained and managed. By end-2007, five mOPV1s and three mOPV3s were licensed and used in more than 20 countries and four countries respectively. In close collaboration with the Imperial College of London, studies were undertaken to better estimate the efficacy of mOPV 1 & 3 in different field settings (India, Nigeria and Pakistan). In addition, two manufacturers took steps towards the licensing of mOPV type 2 (mOPV2), with licensing applications submitted in India and Belgium. UNICEF issued a request for commercial indication in 2007 for mOPV stockpiles of type 1, 2 and 3 for the post-eradication era, with four manufacturers expressing interesting in producing the stockpile of mOPV following interruption of WPV transmission. To examine the assumptions underpinning current planning for the mOPV stockpile, a Harvard University/Massachusetts Institute of Technology collaboration continues to conduct mathematical modelling of outbreak response activities for polioviruses following OPV cessation.

Prerequisite 4: Appropriate IPV coverage in all countries retaining polioviruses and affordable IPV options for any country desiring to continue polio immunization

While the full role of inactivated polio vaccine (IPV) following OPV cessation is still being evaluated, at a minimum IPV will be needed in all countries that store poliovirus stocks[13]. For countries which are not storing poliovirus, but perceive that the long-term poliovirus risks warrant continued routine immunization, IPV will be the only option with which to do this. Recognizing that current costs of IPV are substantially higher than OPV, the Global Polio Eradication Initiative is studying a range of approaches to establish 'affordable' strategies for IPV-use (i.e., to achieve immunity at a cost similar to that achieved through OPV) in low-income settings, following OPV cessation. In 2007, research focused on:

- fractional dosing, to evaluate the serologic response to 1/5th of a standard dose of IPV (two ongoing studies in Cuba and Oman);
- reduced dosing, to determine if fewer doses administered at different ages could result in the same serological response as with the current routine EPI schedule (a literature review has been completed and a study will be initiated in 2009);
- safer IPV production processes, using less neuro-virulent seed strains (such as a Sabin poliovirus seed strain), to facilitate manufacturing at low-cost production sites (three ongoing studies);
- IPV adjuvants, to evaluate the feasibility of reducing the viral content in IPV through the use of adjuvants;
- process optimization in IPV manufacturing to improve viral yields.

Initial results of this ongoing research suggest that low- and middle-income countries that want to maintain population immunity with IPV after OPV cessation may be able to do so at a cost similar to that of OPV.

Prerequisite 5: Synchronization of OPV cessation

To minimize the risk of a country being inadvertently put at risk of importing a cVDPV from a country that continues to use OPV, all countries should simultaneously stop the use of OPV in routine immunization. This prerequisite requires international coordination. An IPV

13 IPV following OPV cessation, Weekly Epidemiological Record, 14 April 2006, Vol. 81, 15 (pp 137-144).

introduction project was launched in 2007 in Yogjakarta province, Indonesia, to ascertain the technical and operational challenges of stopping OPV and introducing IPV and to determine the effect of IPV-induced immunity in preventing emergence of cVDPVs in tropical settings. The ongoing evaluation of this project is expected to help develop appropriate strategy for eventual global, synchronized OPV cessation.

Prerequisite 6: Containment of Sabin polioviruses

Following OPV cessation, all countries will need to implement appropriate 'interim' conditions for the storage and handling of Sabin polioviruses (as the absence of VAPP and VDPVs is verified), followed eventually by the 'final and full' containment of Sabin polioviruses. In 2008, the 3rd edition of the *Global Action Plan to minimize post eradication poliovirus facility-associated risk (GAPIII)* will be finalized, to integrate projections of programmatic needs for polioviruses, risk assessment findings, risk consequence models and new risk management strategies. *GAP III* will reflect Sabin poliovirus strains in phases that correspond to the changing risk profile.

5.3 International coordination of strategies for the management of long-term polio risks

Minimizing long-term polio risks requires international cooperation and coordination of three particular aspects of the overall strategy: the synchronized cessation of OPV; the containment of wild and Sabin polioviruses; and internationally-agreed processes for the use of OPV in response to new outbreaks of polio.

In January 2008, the Executive Board to the WHA was presented with potential mechanisms for establishing international consensus on strategies to manage the long-term polio risks.

Discussions will continue at the WHA in May 2008 on the most appropriate mechanisms for the international coordination of these three areas of risk management.

6 Mainstreaming

of the Global Polio Eradication Initiative

The mainstreaming of the GPEI infrastructure – to transfer the long-term use of the infrastructure to other health objectives – is an important element of the eradication programme. The polio infrastructure encompasses human resources, communication networks, operational guidelines and standards, independent strategic guidance bodies and partnership mechanisms, along with offices, vehicles and equipment. All of these components are real assets to the countries concerned, and often play an important role in reaching their immunization and other health goals.

Globally, the polio infrastructure in 2007 consisted of more than 3,000 technical and support staff whose day-to-day work includes rapidly responding to surveillance reports, micro-planning at the district-level to reach previously un-reached children and helping to train health workforces, all of which actively support the strengthening of health systems. As the final infected countries become polio-free, these polio-funded staff are already gaining much experience in surveillance for other diseases and delivery of other health interventions such as insecticide treated bed-nets, Vitamin A and de-worming tablets.

Countries have been using these substantial assets of the polio infrastructure to systematically strengthen the Expanded Programme on Immunization (EPI) and – on an ad-hoc basis – for other purposes. With the recent adoption of three major strategies and frameworks to strengthen health systems and security – the Global Immunization Vision and Strategy (GIVS), the Global Framework for Immunization Monitoring and Surveillance (GFIMS) and the International Health Regulations (IHR 2005) – all countries now have the opportunity to more systematically plan for the long-term use of the assets of the polio infrastructure under the strategic guidance of these frameworks.

Contribution of polio eradication infrastructure to 60% decline in measles death is a concrete step towards Millenium Development Goal 4 for child survival.

6.1 Global Immunization Vision and Strategy (GIVS)

Developed jointly by WHO and UNICEF, with broad stakeholder consultative input, GIVS has two crucial medium term goals to be achieved by 2010: a 90% reduction in measles mortality (compared with 2000), and an increase in vaccination coverage to at least 80% at district-level. In 2005, the World Health Assembly (WHA) adopted a resolution welcoming the launch of GIVS, and urged all Member States to adopt GIVS as the framework for strengthening national immunization programmes from 2006 to 2016.

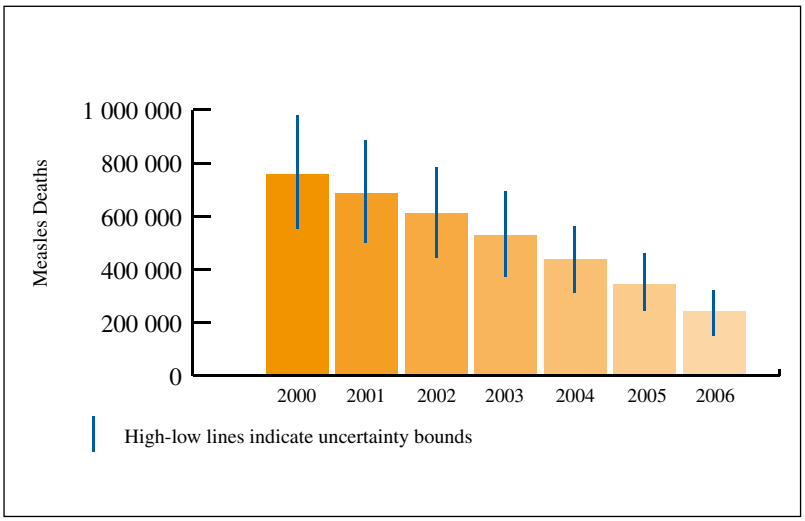
The framework has four strategic areas, each with detailed strategies and activities:

1) protecting more people in a changing world;
2) introducing new vaccines and technologies;
3) integrating immunization, other health interventions and surveillance in the health system context; and,
4) immunizing in the context of global interdependence.

Since 2006, the GIVS strategic framework is being used to guide national strategic plans for routine immunization and set agendas for global and regional expert advisory groups. The assets of the polio infrastructure, especially the expertise of the human resources, are being used in many countries to implement the GIVS strategies. By end-2007, substantial evidence had accumulated to vindicate this approach. The implementation of the 'Reaching Every District' (RED) approach – based on the polio eradication model for reaching entire populations with routine immunization services through a 5-pronged, district-based approach – has resulted in significant gains in routine immunization levels, particularly in Africa and South-East Asia. An evaluation of eleven countries in Africa that had implemented RED found that immunization coverage had increased, as the proportion of districts attaining DTP3 coverage above 80% had more than doubled. At the same time, the number of children immunized increased from 4.8 million to 7.3 million. GPEI-funded staff have been instrumental in the implementation of RED in many areas, working in close coordination with national immunization authorities and key partners, such as the GAVI Alliance.

Measles SIAs in all WHO regions are regularly planned, implemented, monitored and evaluated using the polio model and building on its infrastructure. This has been integral to the 60% reduction in measles deaths since 2000 and represents a concrete GPEI contribution towards the global effort to achieve Millennium Development Goal 4 for child survival.

Figure 9: Global measles mortality



Source: WHO/IVB measles deaths estimates, November 2006

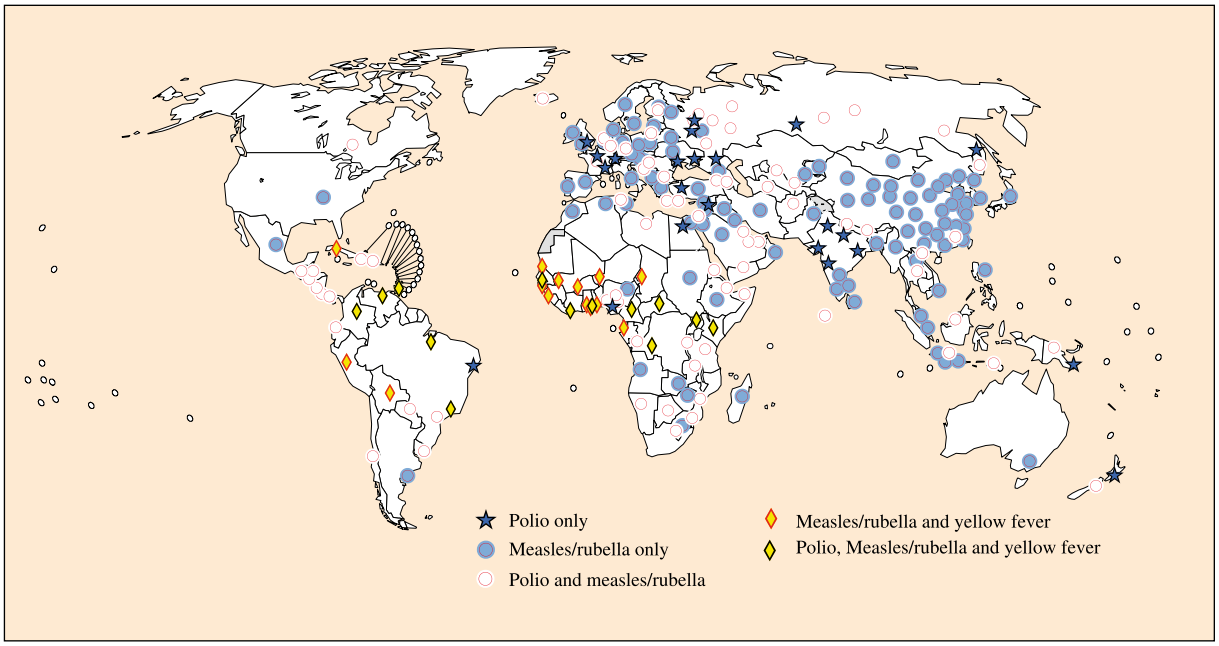
More than 50% of all National Influenza Centres are located in polio laboratories.

6.2 Global Framework for Immunization Monitoring and Surveillance (GFIMS)

The extensive active polio disease surveillance network for acute flaccid paralysis (AFP) is already being used by many countries to help detect other diseases of public health importance, especially vaccine-preventable diseases (VPDs). More than two-thirds (66%) of countries with AFP case-based reporting also report other VPDs on a case-base, most notably measles and neonatal tetanus. This integration is being stepped up, particularly in areas which are now polio-free, guided by GIVS. Given that AFP surveillance will need to continue beyond certification of interruption of wild poliovirus transmission, the world has a strong opportunity to ensure the broader benefits of AFP surveillance are maintained, even in the demonstrated absence of wild poliovirus transmission.

One of the key components of achieving the GIVS goals is the need for strong systems for disease surveillance and monitoring. To address this need, WHO, together with its global immunization partners, developed the Global Framework for Immunization Monitoring and Surveillance (GFIMS) and released it in 2007. GFIMS provides a strategic framework to systematically integrate the existing AFP surveillance network with other existing surveillance networks for VPDs into a broad, unified system drawing on the substantial assets and

Figure 10: Global laboratory capacity to detect vaccine-preventable diseases



The polio laboratory network serves as model for nearly 700 facilities: In addition to helping detect a variety of vaccine-preventable diseases, polio laboratories are integral for surveillance of pandemic avian influenza. More than 50% of all National Influenza Centres are located in polio laboratories.

resources of the various individual networks.

GFIMS aims to optimize the worldwide surveillance and control of VPDs by integrating epidemiological, laboratory and programme monitoring networks. This will help provide the high quality information needed to measure the impact of vaccines and maximize their safe, effective and equitable use, in order to reduce the global VPD burden.

In many countries, AFP surveillance is already being linked to epidemiological surveillance for VPDs such as diphtheria, influenza, Japanese encephalitis, measles, meningococcal meningitis, mumps, pertussis and rubella. The combined surveillance provides programmatic data to monitor ongoing immunization coverage trends, in order to maintain coverage achievements and reach additional children.

At the same time, the Global Polio Laboratory Network of 145 laboratories is addressing a wide range of public health problems. Today 83 % of these laboratories assist in rapid diagnosis of a wide range of VPDs and serve as a model for developing broader VPD laboratory capacity to detect measles, rubella, yellow fever and Japanese encephalitis.

6.3 International Health Regulations 2005 (IHR 2005)

In June 2007, the IHR (2005) came into force, following adoption of the Regulations by the World Health Assembly in May 2005.

The IHR (2005) is the only international legal treaty on communicable diseases, aimed to prevent, protect against, control and provide a public health response to the international spread of disease. While any number of detected disease events may lead to notification depending on given situations, the IHR (2005) stipulates the mandatory international notification following detection of four specific pathogens: smallpox, human influenza caused by a new subtype, severe acute respiratory syndrome (SARS), and poliomyelitis caused by wild poliovirus.

To meet the rigorous surveillance, notification and response requirements stipulated by the IHR (2005), the first priority is to strengthen capacity in countries at all levels. This will entail significant development of specialized staff, laboratory capacity and logistics and communications capability. Countries that are State Parties to the Regulations have two years to fully assess their capacity and develop national action plans, followed by three years to meet the requirements of the IHR (2005) regarding their national surveillance and response systems.

As countries are just beginning the process of assessing their capacities to comply with the newborn IHR (2005), the value of the Regulations is already becoming evident. Existing national resources and structures – such as the extensive AFP surveillance network – are being utilized to detect, investigate and respond to events of international public health importance. While the rapid international detection and response to confirmed polio in polio-free areas has been a proven and historic standard operating procedure within the GPEI, the AFP surveillance capacity has – within the framework of the IHR (2005) – proved an invaluable resource in detecting and helping respond to avian influenza, measles, yellow fever and other outbreaks.

Going forward, it is expected that such existing infrastructures as the AFP surveillance network will be maintained and further built upon, to help countries create the capacities necessary over the next five years to fully comply with the IHR (2005).

Much more than 'just' polio

Polio staff respond to bird flu outbreak

© NPSP India

A team from India's National Polio Surveillance Project conducting active surveillance for avian influenza in West Bengal.

In addition to investigating more than 40,000 AFP cases and supporting the Government of India in planning, implementing and monitoring polio campaigns, the more than 300 polio-funded Surveillance Medical Officers (SMOs) of the National Polio Surveillance Project play an integral part in strengthening broader public health, conducting active surveillance for other vaccine-preventable diseases, improving immunization coverage, assessing epidemiology and training district health staff and supervising performance.

In January 2008, during an avian influenza outbreak in West Bengal, the Government of the state and federal-level requested the assistance of the polio SMO network. Local SMOs:

- adapted polio eradication, district-level microplans to ensure house-to-house case searches for Avian Influenza;
- activated surveillance for human cases using AFP reporting sites;
- strengthened surveillance for poultry deaths;
- assisted with health risk communications, promoting safety measures to health workers and behaviour modification messages to communities; and,
- assisted in logistical support, providing transportation, telecommunications capacity, as well as administrative and data analysis and transfer capabilities.

These activities are indicative of how the polio infrastructure worldwide functions and assists with public health interventions. With local knowledge of communities, health systems and government structures, the polio network can swiftly mobilize its technical capacity to plan large-scale operations in response to local, national and international public health emergencies and humanitarian relief efforts.

GPEI 2007 financing and 2008-09 pledges bring total financial commitments to the 20-year polio eradication effort to more than US$ 6 billion since its 1988 launch.

7 Financing

To implement the 2007 intensified eradication activities, traditional development partner financing had to be substantially complemented by domestic funding, most notably from the Government of India, as well as a US$ 104 million re-programming of International Finance Facility for Immunization (IFFIm) funds previously earmarked for a post-eradication era vaccine stockpile. This one-time IFFIm gesture freed up much-needed funding for eradication and ensured that intensified polio eradication activities in polio-endemic and high-risk countries in the second half of 2007 could go ahead as planned. The reprogramming was also designed to provide time for other donors to firm up pledges for 2008-09 activities.

In June, G8 leaders meeting at Heiligendamm, Germany re-affirmed their commitment to "work with others to close urgent funding shortfalls" and the GPEI is working with individual G8 members to follow up on this – and previous – G8 polio promises.

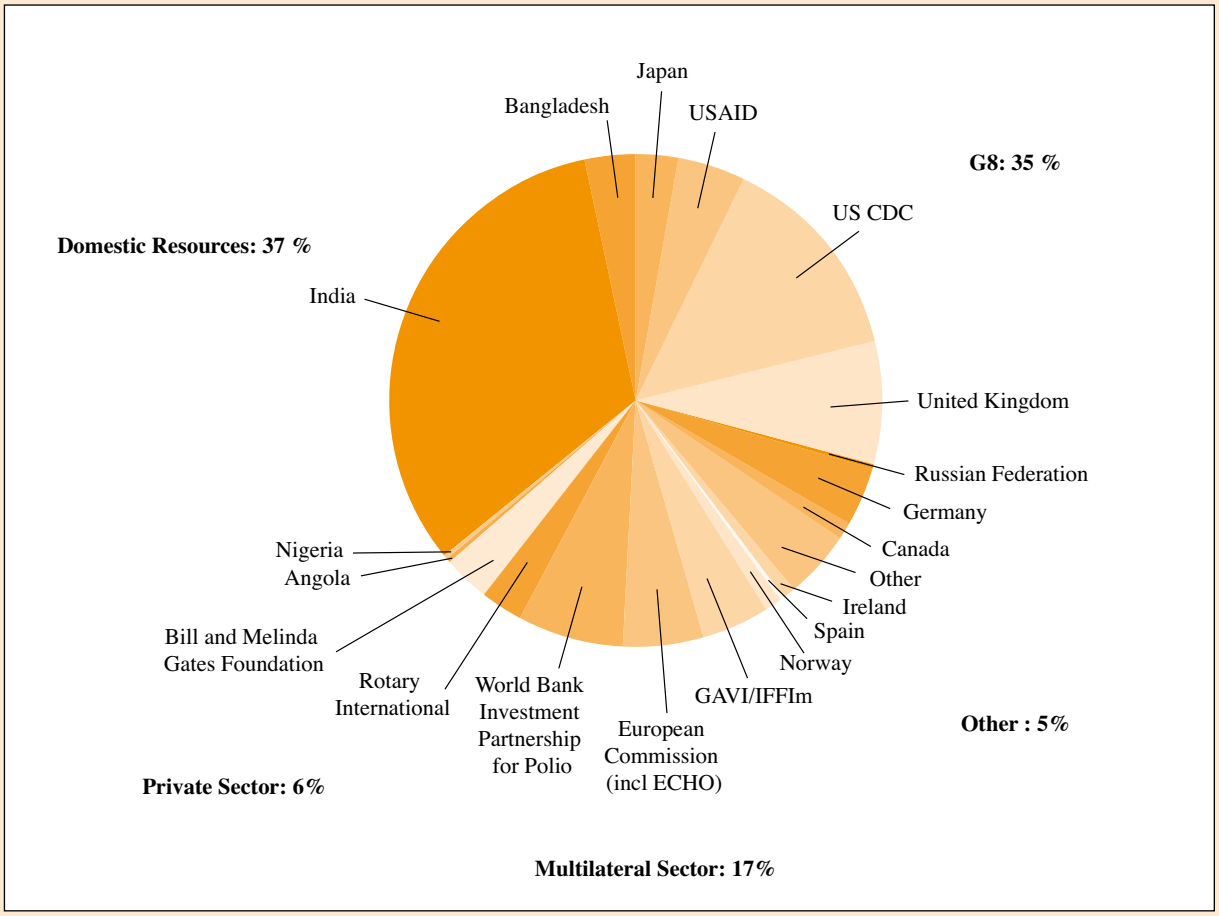
Global Polio Eradication Initiative 2007 financing of US$ 712 million, together with 2008-09 pledges, brought total financial commitments to the 20-year polio eradication effort to more than US$ 6 billion since its 1988 launch.

Forty-five public and private sector donors have contributed more than US$ 1 million each to polio eradication. Of these, 28 have contributed more than US$ 5 million and 18 have contributed more than US$ 25 million.

Recognizing the potential impact of the intensified polio eradication effort, Rotary International and the Bill and Melinda Gates Foundation in November 2007 announced a partnership that will inject US$ 200 million into the Global Polio Eradication Initiative over the next four years. The Bill and Melinda Gates Foundation awarded The Rotary Foundation with one of its largest-ever challenge grants of US$100 million, which will be expended in 2008, and which Rotary will match dollar-for-dollar over the next three years. As they announced their partnership, the two organizations called on other financial partners to follow their lead and ensure that the time-limited intensification of eradication activities is fully funded.

Rotary International and the Bill and Melinda Gates Foundation in November 2007 announced a partnership that will inject US$ 200 million into the GPEI over the next four years.

Financial contributions for 2007 to GPEI



'Other' includes: the Governments of Austria, Hungary, Iceland, Kuwait, Luxembourg, New Zealand, the Netherlands, the United Arab Emirates; Saudi Arabian Red Crescent Society, United Arab Emirates Red Crescent Society, UNICEF National Committees, UNICEF Regular and Other Resources and WHO (incl. impact of reduced programme support costs)

The Global Polio Eradication Initiative would like to thank donors who provided financial support in 2007.

Austria

Austria continued its support to polio eradication by committing US$ 840 000 in 2007 for Ethiopia's polio eradication efforts, bringing its total contributions to the Initiative to US$ 2.51 million.

Azerbaijan

The Republic of Azerbaijan made its first-ever contribution of US$ 23 000 to WHO in support of polio eradication efforts in the Organization of the Islamic Conference (OIC) Member States.

Bill and Melinda Gates Foundation

In addition to announcing in November 2007, together with Rotary International, a partnership that will inject US$ 200 million in new polio funding between 2008 and 2012, the Foundation provided US$ 23.16 million in the second year of a two-year contribution for Nigeria and surrounding countries, bringing its total contributions to US$ 250 million.

Canada
Canada provided US$ 7.82 million to the GPEI in 2007 for Afghanistan and Pakistan's polio eradication efforts, bringing its total contribution to more than US$ 205 million.

US Centers for Disease Control and Prevention (CDC)
In addition to its role as a Global Polio Eradication Initiative spearheading partner, CDC in 2007 provided funding for OPV, operational costs and programme support to UNICEF and WHO and continued its support for the international assignment of epidemiologists, virologists and technical officers who assist polio-endemic countries in implementing polio eradication activities. US Congress appropriations to CDC for polio eradication in its fiscal year 2007 totalled US$ 101.25 million, bringing its total polio contributions to more than US$ 1 billion.

European Commission
EC-Nigeria in 2007 signed a US$ 28.8 million (€20 million) three-year agreement for polio eradication activities in Nigeria and provided US$ 16 million (€13.1 million) in 2007 funding to support Ethiopia's polio outbreak response activities. These new contributions bring total EC polio eradication funding to US$ 192 million.

Germany
In 2007, Germany's core OPV funding for India and Nigeria was complemented by global unspecified funding. Its 2007 contributions of US$ 26.2 million, together with funds pledged for 2008 and 2009, bring Germany's total contributions to more than US$ 223 million.

Hungary
Hungary followed its first-ever contribution in 2006 with a second contribution of US$ 10 000 in 2007, bringing its total funding to US$ 30 000.

Iceland
Iceland contributed US$ 100 000 to polio eradication in 2007, doubling its 2005 and 2006 contribution levels, and bringing its total contribution to US$ 200 000.

Italy
Italy in 2007 contributed US$ 11.7 million as it paid the final instalment on the 2004-06 €14 million pledge it made ahead of the 2004 G8 Summit at Sea Island. Italy's total polio contributions are more than US$ 22 million.

Ireland
Ireland in 2007 complemented its existing US$ 10.4 million 2006-08 pledge with an additional US$ 2 million respectively in 2007 and 2008, bringing its total polio contributions to more than US$ 20 million.

Japan
Japan provided US$ 20.3 million in OPV funding for priority countries Afghanistan, Angola, Democratic Republic of the Congo, India, Myanmar, Nigeria, Pakistan and Sudan. Japan's 2007 contributions bring its total contributions to more than US$ 330 million.

Kuwait
The State of Kuwait made a first-ever contribution of US$ 1 million in support of global polio eradication efforts.

Luxembourg
At part of its 2006-08 pledge, Luxembourg in 2007 contributed US$ 920 000 in global unspecified funding, bringing its total polio contributions to more than US$ 9 million. Luxembourg is the GPEI's largest per capita donor.

Monaco
Monaco continued its support for Niger's polio eradication activities by providing US$ 78 000 in 2007, bringing its total contributions to US$ 288 000.

Netherlands
The Netherlands Ministry of Health provided US$ 210 000 in 2007 to support polio work at the Dutch National Institute of Public Health and the Environment. Dutch contributions to polio eradication total US$ 113 million.

New Zealand
New Zealand in 2007 provided US$ 200 000 for global polio eradication efforts through its partnership with local Rotary clubs in the country, bringing its total contributions to US$ 2.2 million.

Norway
Norway continued its support of polio eradication in 2007 with a global contribution of US$ 7.6 million, bringing its total polio contributions to US$ 49.33 million.

Portugal
At the end of 2007, Portugal provided US$ 290 000 to help respond to the polio outbreak in Angola, bringing Portugal's total contribution to US$ 860 000.

Spain
Spain continued its strong, consist-

ent support for polio eradication by providing US$ 3.2 million to the Initiative in 2007, including funding for surveillance activities in Angola, Cape Verde, Guinea-Bissau, Ethiopia and Namibia through its Agencia Espanola de Cooperacion International, and unspecified funding for the WHO African region. Including funds pledged also for 2008, Spain's contributions to polio eradication total US$ 7.7 million.

Rotary International

In addition to announcing in November 2007, together with the Bill and Melinda Gates Foundation, a partnership that will inject US$ 200 million in new polio funding between 2008 and 2012, Rotary International contributed US$ 20.19 million in 2007 for surveillance, operations, social mobilization and staff support in all three polio-endemic regions. Rotary International, a GPEI spearheading partner, is also the Initiative's largest private sector donor, having contributed US$ 700 million, a figure that will rise to US$ 850 million by the time the world is certified polio-free.

Russian Federation

In 2007, the Russian Federation contributed US$ 3 million, as part of its US$ 10 million St Petersburg G8 commitment for 2006-08. Russia's total contributions to polio eradication add up to US$ 18 million.

United Arab Emirates

The United Arab Emirates continued its support for polio eradication by pledging to provide US$ 1 million to support intensified polio eradication activities.

United Kingdom's Department for International Development (DFID)

DFID's US$ 57.46 million in 2007 global funding and country-specific contributions to India and Pakistan, brought its total polio contributions to more than US$ 726 million.

United Nations Foundation

The United Nations Foundation in 2007 provided US$ 280 000, as it continued to support for the GPEI's resource mobilization efforts and provided partial funding for the DG's Stakeholder Consultation on Polio Eradication. This latest contribution brought its total contributions to US$ 42.9 million.

USAID

US Congress in its fiscal year 2007 allocated US$ 32 million to USAID for polio eradication. Funds were used for social mobilization, surveillance, laboratory support, outbreak response and monitoring in priority countries in all three polio-endemic regions. Its total contributions to polio eradication are US$ 326 million.

World Bank Investment Partnership for Polio

Melinda Gates Foundation, Rotary International, the US CDC and UNF providing funding that "buys down" countries' World Bank loans for the purchase of OPV to zero, in effect turning them into grants. The 2007 OPV funding of US $46.19 million brought total World Bank Investment Partnership for Polio funding to US$ 186.6 million.

8

Appendix I

GPEI performance against objectives in Strategic Plan 2004-2008

Objectives	Milestones for 2007	Status	Comment
Interrupt poliovirus transmission	No countries will be polio-endemic at the end of 2007	PARTIALLY ACHIEVED Endemic polio transmission has been restricted to specific, geographically-limited areas in four countries (India, Nigeria, Pakistan and Afghanistan).	The intensified polio eradication effort launched at the stakeholder consultation on polio eradication in February 2007 resulted in significant progress, in particular in curbing type 1 polio transmission, with over 80% decrease in type 1 cases over previous year, including in some of the most historically-entrenched type 1 reservoirs in the world.
	All planned SIAs will be implemented in highest risk polio-free areas	ACHIEVED SIAs were implemented as planned in all highest risk polio-free areas.	Highest-risk polio-free areas are those bordering endemic reservoir areas i.e. Bangladesh, Benin, Cameroon, Chad and Niger and/or those recently infected i.e. Somalia and Sudan
	60% of countries will achieve GAVI targets for DTP3/OPV3.	ACHIEVED (2006 data, target: 50%)[14] In 2006, 42/72 (58%) countries had national OPV3/DPT3 coverage greater than 80% 20/72 (28%) countries had national OPV3/DPT3 coverage greater than 90%.	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 2006, 8/72 (11%) eligible countries had reached this target.
	All emergency mop-ups will begin within four weeks of case confirmation.	ACHIEVED	All emergency mop-ups were begun within four weeks of case confirmation, in all newly-infected countries in 2007[15] (Angola (2 events), Chad (4 events), Myanmar (1 event), Nepal (2 events), Niger (3 events), Sudan (1 event). Average response time was 24 days[16].
	All non-certified countries will have certification-standard surveillance.	PARTIALLY ACHIEVED 63/77 (81%) of non-certified countries have met certification-standard targets[16].	The following countries and territories did not meet the required standards: AFR: Algeria, Cape Verde, Comoros, Guinea-Bissau, Malawi, Reunion, St Helena, Zimbabwe. EMR: Djibouti, Lebanon, West Bank and Gaza Strip. SEAR: Buthan, Timor- Leste, Thailand.

14 2007 data not yet available
15 Excludes DRC and Somalia where outbreaks commenced in 2006
16 This excludes small island nations with populations of less than 200,000

Objectives	Milestones for 2007	Status	Comment
Achieve certification of global polio eradication	8.1.1.1 All AFP specimens will be processed in a WHO-accredited laboratory.	ACHIEVED All AFP specimens were processed in a WHO-accredited laboratory.	The network tested approximately 167 000 faecal samples from AFP cases and 10 600 non-AFP samples in 2007.
	8.1.1.2 All countries will have completed each laboratory biocontainment phase (phase II)	IN PROGRESS Certified regions (95%) Non-certified (endemic) regions (65%)	Implementation of Phase II is linked to progress towards completion of Phase I. By the end of 2007, 90% of countries in polio certified regions completed Phase I, setting the stage for implementation of Phase II in member states of polio-free regions. In endemic regions, even though focus remains on interrupting transmission in polio infected countries, 70% of member states have completed Phase I.
	8.1.1.3 60% of manufacturers will produce wild-type IPV under BSL-3/polio	IN PROGRESS	Implementation of BSL-3 in wild-type IPV production facilities is planned to commence one year after the last case of wild type poliovirus 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.
	All countries will submit final regional certification documentation	IN PROGRESS > AFR, 21/46 countries (45%) > EMR, 15/22 countries (68%) > SEAR, 9/11 countries (82%)	The number of eligible countries for which RCCs 'accepted' final certification documentation increased from 14 to 21 in the African Region, and from 8 to 9 in the South-East Asian Region; it remained at 15 in the Eastern Mediterranean Region
Develop products for the global OPV cessation phase	Protocols for cVDPV response in post-OPV era will be introduced	ACHIEVED	Protocols for outbreak response to any circulating poliovirus (wild or vaccine-derived) are available, and adaptable for the post-OPV era. Standard operating procedures (SOP) for use of a mOPV stockpile have been established.
	8.1.1.4 Environment sampling (if/where appropriate), for detection and immediate notification of circulating polioviruses will begin.	IN PROGRESS Environmental sampling introduced in Indonesia (in 2005) and Haiti	This process is ongoing, as progress towards global interruption of wild poliovirus transmission continues.
	8.1.1.5 Contracts for mOPV stockpile will be established.	IN PROGRESS	A Request for Commercial Indication (RCI) was issued and successfully completed by UNICEF with four companies expressing interest. Tender requests have been issued and negotiations are ongoing with various manufacturers.

Objectives	Milestones for 2007	Status	Comment
	8.1.1.6 At least one IPV product from Sabin strains will be licensed.	IN PROGRESS License application pending in Japan.	An extensive programme of work is ongoing to establish affordable strategies for IPV use (i.e to achieve immunity at the same cost as achieved with OPV). This includes at least three sabin IPV development projects targeting licensure in 2009-10.
Mainstream the Global Polio Eradication Initiative	All joint GAVI/Polio priority countries will implement integrated plans.	ACHIEVED 43/52 (83%) joint GAVI/Polio priority countries have drafted or finalized comprehensive multi-year plans.	> AFR 33/37 (excludes Angola, Mauritania, Sao Tome and Principe and Zambia) > EMR: 6/6 > SEAR: 8/9 (excludes Timor-Leste) Joint GAVI/Polio priority countries are defined as all GAVI eligible countries in polio-endemic regions (i.e. AFR, EMR, SEAR).
	100% of countries will have integrated or expanded AFP reporting, as appropriate (especially for measles and neonatal tetanus).	PARTIALLY ACHIEVED 118/181 (66%) countries with AFP case-based reporting also have measles case-based reporting.	> AFR, 26/46 countries (57%) > AMR, 29/33 countries (88%) > EMR, 18/22 countries (86%) > EUR, 20/43 countries (47%) > SEAR, 5/11 countries (45%) > WPR, 20/26 countries (77%). 180/193 (93%) countries have AFP case-based reporting systems
	All countries will have GAVI-supported ICC and if appropriate, TAG.	ACHIEVED 43/52 (83%) 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.	Joint GAVI/Polio priority countries are defined as all GAVI eligible countries in polio-endemic regions (i.e. AFR, EMR, SEAR).
	90% of polio-funded "human resources" formally contribute to multi-disease programmes.	ACHIEVED 100% of polio-funded staff contributes formally to multi-disease programmes.	This function continues to be included in all post descriptions.
	All countries will have polio operations which are fully integrated with those for measles.	PARTIALLY ACHIEVED 85% of the institutions performing polio laboratory surveillance are also involved in National Measles laboratory surveillance.	

9

Appendix II

GPEI performance against Milestones in Intensified Eradication Effort set by Stakeholder Consultation of February 2007

9.1 Milestone 1 – endemic countries

Reduction in infected districts

By end-2007 there should be a 50% reduction in the number of polio-infected districts relative to 2006.

Status: Overall reduction of 24%: 59% decline in type 1 polio-infected districts; 37% increase in type 3 polio-infected districts. The interruption of type 1 polio is the first priority of the Global Polio Eradication Initiative due to its higher paralytic rate and propensity towards international spread compared to type 3 polio.

Country	Total # districts in country*	2006 infected districts	2007 infected districts	Overall decrease in infected districts	Decrease in type 1-infected districts	Decrease in type 3-infected districts
Afghanistan	329	17	13	24%	65%	+350%
Pakistan	132	22	18	18 %	0	36 %
India	594	114	98	14 %	61 %	+1 000 %
Nigeria	774	233	163	30 %	62 %	14 %
TOTAL	1829	386	292	24 %	59 %	+37 %

*Data in WHO/HQ as of 08 Apr 2008 - * source: WHO/UNICEF 2006 Joint Reporting Form (2005 for India)*

9.2 Milestone 2 – endemic countries

Parity in vaccination status between transmission zones and polio-free zones

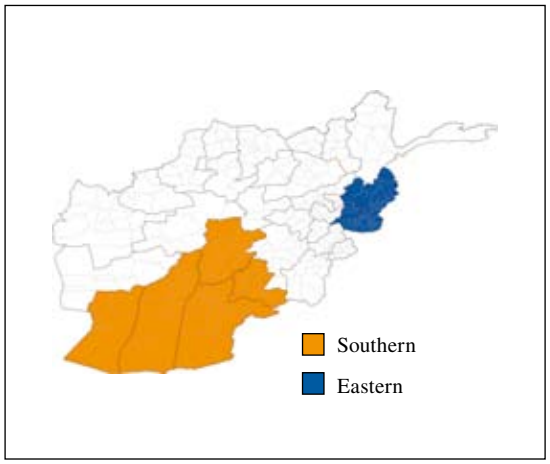
By end-2007 the level of immunity against polio among children aged 6-35 months in infected districts should be at least at the level in polio-free districts.

Two of the four endemic countries are on track to achieve immunity parity between their infected and polio-free zones. Five of the nine transmission zones within the countries have achieved population immunity equal to or greater than the polio-free zones; the notable exceptions are in northern Nigeria and southern Afghanistan. In Nigeria, the proportion of zero-dose children in high-risk states was halved from an average of 32% to an average of 16%. In Afghanistan's southern transmission zone, the proportion of zero-dose children rose from 4% in 2006 to 12% in mid-2007, before dropping back to 9%.

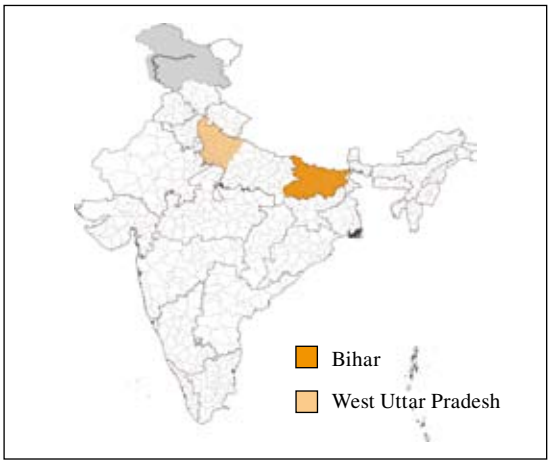
		0-dose children (never vaccinated)		Average doses/child	
Country	Transmission zone	Endemic zones	Polio free zones	Endemic zones	Polio free zones
Afghanistan	Southern	9 %	< 1 %	8	10
	Eastern	< 1 %		15	
Pakistan	Northern	1 %	< 1 %	13	11
	Southern	1 %		12	
Nigeria	Very high risk	28 %	2 %	2	4
	High risk	11 %		3	
	Medium high risk	11 %		3	
India	West Uttar Pradesh	< 1 %	1 %	12	10
	Bihar	< 1 %		14	

NPAFP case-based data in WHO/HQ as of 01 Apr 08 for AFR, 04 Mar 08 for EMR and 31 Mar 08 for SEAR

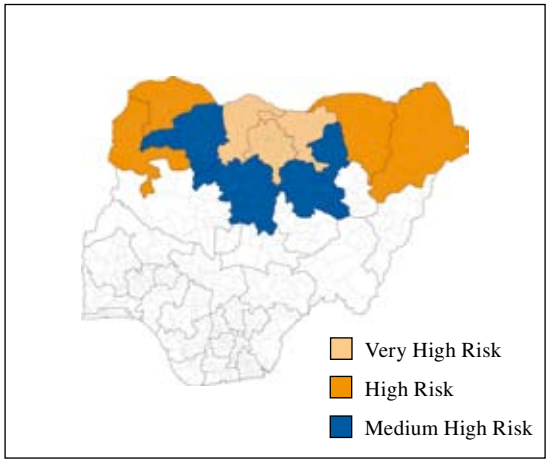
Transmission zones delineation in polio-endemic countries



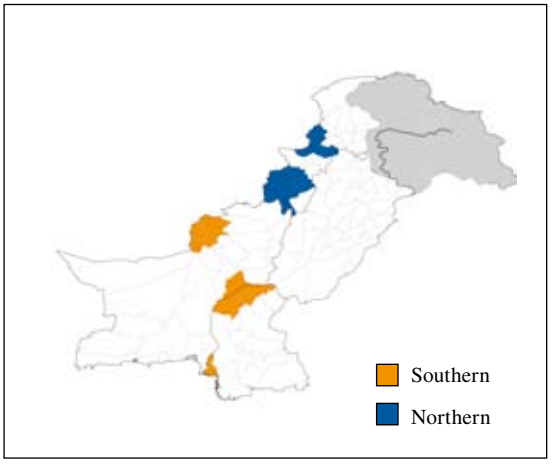
Afghanistan



India



Nigeria



Pakistan

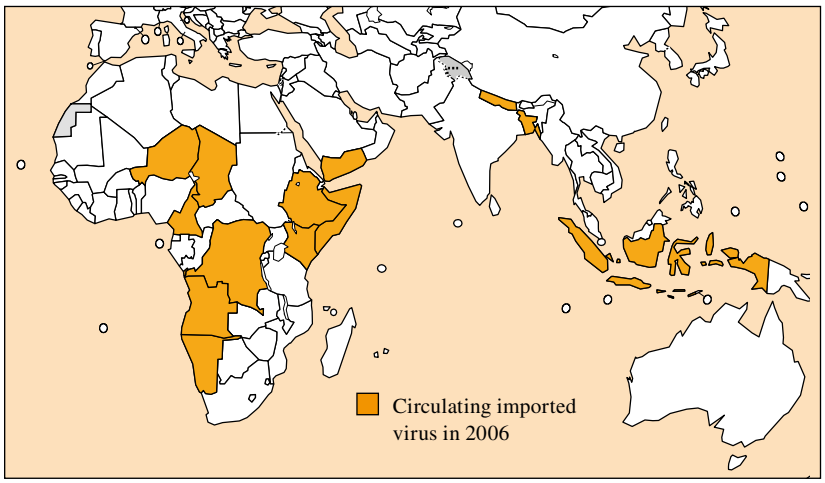
9.3 Milestone 3 – countries with importations

Interruption of transmission

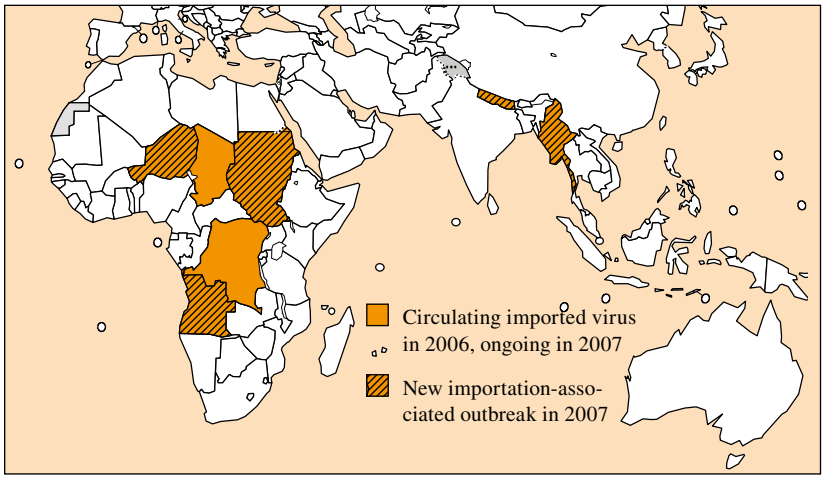
By end-2007, interruption of outbreaks in countries with circulation of imported poliovirus in 2006.

Status: outbreaks stopped* in 11 of 13 countries**.

Countries with circulating imported poliovirus, 2006



Countries with circulating imported poliovirus, 2007



** i.e. most recent case was before 01 October 2007*
*** 33 of 35 separate importations have been stopped in the 13 countries*
Source: data in WHO/HQ as of 01 April 2008

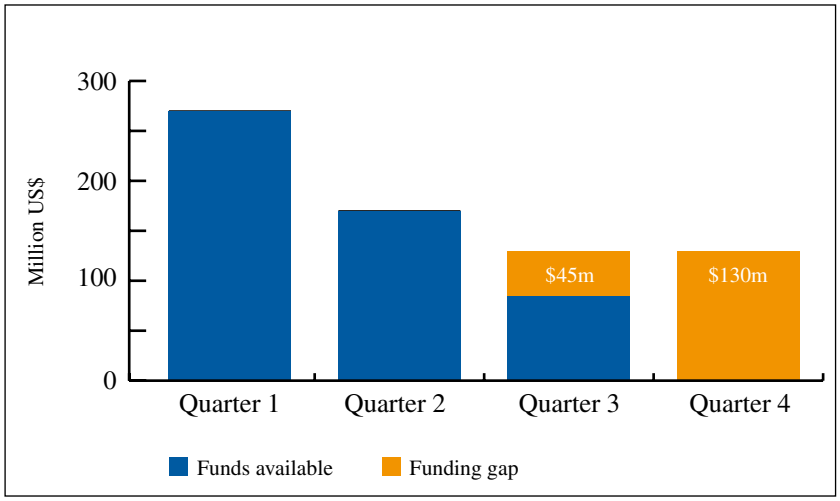
9.4 Milestone 4 – financial partners

Sufficient funding

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

Status: US$ 490 million available in funding, leaving US$ 135 million gap for essential polio eradication activities in 2008.

Polio eradication budget & funding gaps by quarter, 2008



10 Acronyms

ACPE	Advisory Committee on Poliomyelitis Eradication
AFP	Acute Flaccid Paralysis
AFR	WHO African Region
AMR	WHO Region of the Americas
aVDPV	Ambiguous vaccine-derived poliovirus
CDC	US Centers for Disease Control and Prevention
cVDPV	Circulating vaccine-derived poliovirus
DFID	UK Department for International Development
DTP	Diphtheria-tetanus-pertussis vaccine
EB	Executive Board
EC	European Commission
ELISA	Enzyme-Linked Immuno-Sorbent Assay
EMR	WHO Eastern Mediterranean Region
ERC	Expert Review Committee
EUR	WHO European Region
EPI	Expanded Programme on Immunization
GAP III	Third edition of the Global Action Plan to minimize post eradication poliovirus facility-associated risk
GAVI	Alliance Global Alliance for Vaccines and Immunization
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
IFFIm	International Financing Facility for Immunization
IHR (2005)	International Health Regulations (2005)
IPDs	Immunization Plus Days
IPV	Inactivated polio vaccine
ITD	Intra-typic differentiation
ITN	Insecticide treated net
iVDPV	Immunodeficiency-associated vaccine-derived poliovirus
mOPV	Monovalent oral polio vaccine
NCC	National Certification Committee
NID	National Immunization Days
OIC	Organization of the Islamic Conference
OPV	Oral polio vaccine
PCR	Polymerase chain reaction
RCC	Regional Certification Committee
RED	Reaching Every District
SAGE	Strategic Advisory Group of Experts on Immunization
SEAR	WHO South-East Asia Region
SIA	Supplementary immunization activity
SNID	Sub-national Immunization Days
tOPV	Trivalent oral polio vaccine
UN	United Nations
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
VPDs	Vaccine-preventable diseases
WHA	World Health Assembly
WHO	World Health Organization
WPR	WHO Western Pacific Region
WPV	Wild poliovirus