

WHO/POLIO/07.02

POLIO

ANNUAL REPORT 2006

GLOBAL POLIO ERADICATION INITIATIVE



World Health
Organization



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WHO document reference: WHO/Polio/07.02

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Photo front cover: A young girl takes oral polio vaccine during immunization campaigns in Baluchistan, Pakistan, November 2006. ©WHO/Rudi Tangermann.

Design and layout: L'IV Com Sàrl, Morges, Switzerland.

Printed in Switzerland.

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FOREWORD

FROM THE SPEARHEADING PARTNERS OF THE GLOBAL POLIO ERADICATION INITIATIVE

In February 2007, a pivotal gathering took place in Geneva. Heads of state of the four countries which have never before stopped indigenous polio – Afghanistan, India, Nigeria and Pakistan – sent envoys to an urgent stakeholder consultation on the future course of polio eradication. The context for the meeting was the scepticism expressed in various quarters during the course of 2006 about the achievability of eradication.

Although the widespread epidemics that followed the international spread of polio to previously polio-free areas in 2003-2006 had largely wound to an end – and Egypt and Niger had stopped endemic poliovirus – clear challenges remained in each remaining endemic country: security obstacles in Afghanistan, intense circulation of the virus in northern India, difficulty of access to communities in remote parts of Pakistan and low coverage during vaccination campaigns in northern Nigeria.

However, 2006 witnessed an unprecedented application of new tools – enhanced diagnostic procedures and vaccines to confirm polio and protect children more quickly – and new tactics to both prevent the international spread of polio and to immunize every child in endemic areas. In October 2006, the eradication initiative’s independent technical advisory group concluded that polio eradication is feasible, and recent independent economic analysis has shown that eradication is a better “buy” than intense control. In the wake of these developments, the outcome of the February 2007 consultation was a re-commitment to polio eradication by all key stakeholders.

Success will ensure
a gift in perpetuity
to children of future
generations.

Success is the
only option.

At its inception in 1988, the Global Polio Eradication Initiative faced a world where over 350,000 children were paralysed by polio every year in more than 125 countries. Armed with oral polio vaccine, meticulous planning and boundless energy, the unprecedented partnership conquered polio in the Americas, the Western Pacific, Europe and all but four countries of Africa and Asia. Country after country disappeared from the “polio map”. Since the launch of the Global Polio Eradication Initiative, an estimated five million people who would otherwise be paralysed are walking today; thanks to oral polio vaccine received when they were very young children.

The Global Polio Eradication Initiative developed highly-sensitive acute flaccid paralysis surveillance and genetic sequencing to detect and track the presence and movements of the stealthy polio virus. Vaccination campaign planning mapped every human settlement so that each child could be found. Vaccine manufacturers

adopted colour-changing stickers on vials that showed whether the vaccine – which requires low temperatures – was still potent at the moment of use. An elaborate laboratory network was established to pinpoint the virus, and aggressive outbreak response protocols were deployed as the world became largely polio-free. This vast surveillance and response network is indispensable to many emergencies, and is regularly called upon for other infectious disease outbreaks, including avian influenza.

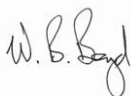
The eradication of a virus is a historical feat in itself, but more is within reach – and even more is at stake. The polio infrastructure has served to prevent and respond to other diseases and has trained millions of volunteers; polio eradication efforts have inspired warring factions to pause in their fighting so that vaccinators can reach all children; the cause of eradication has brought together experts in health with those in transport, security, tourism, education and beyond, spawning an unrivalled cross-sector partnership. The substantive and symbolic impact of polio eradication will build momentum for other health and development initiatives, including the achievement of the Millennium Development Goals.

Now that the world is only steps away from ridding itself of polio forever, we have an obligation to finish the task. With tailored strategies for each of the “final four” endemic countries, we must collectively, effectively and efficiently, apply the new and best tools the Global Polio Eradication Initiative has ever had. But success requires an unparalleled commitment across every echelon of society: from the governments of the endemic countries, starting with the head of state and including civic, religious, traditional and private sector leaders to motivate and inspire; from international development partners, to ensure funds are available; and from communities, to ensure that their children are vaccinated.

Success will ensure a gift in perpetuity to children of future generations. Success is the only option.



Margaret Chan, Director-General, World Health Organization



William B. Boyd, President, Rotary International 2006-07



Julie Gerberding, Director, US Centers for Disease Control and Prevention



Ann M. Veneman, Executive Director, UNICEF

1 EXECUTIVE SUMMARY

The year 2006 began with confirmation that indigenous wild poliovirus transmission had been stopped in Egypt and Niger, reducing the number of endemic* countries to a historic low of four. In the remaining countries – Afghanistan, India, Nigeria and Pakistan – intensification of immunization campaigns succeeded in geographically restricting virus transmission by the end of 2006.

The number of countries which had never stopped indigenous polio was reduced to a historic low of four.

In response to rising number of cases in the early part of the year, by May Nigeria rolled out “Immunization Plus Days”, adding other health interventions to polio vaccination campaigns and leading to improved coverage. An aggressive immunization response to a large outbreak in India made the outbreak far smaller than in previous years: analysis of the vaccination status of cases showed that children over two years of age were well-vaccinated, enabling a focus on the youngest children, to whom the ‘immunity gap’ is now limited. New epidemiological studies showed that unique demographic and sanitation conditions in northern India make trivalent oral polio vaccine less effective there than elsewhere, informing a decision to use the more efficacious monovalent vaccine on a larger scale.

The sustained poliovirus circulation between Pakistan and Afghanistan, aided by the frequent movement of people across a porous border, sparked closer synchronization of vaccination campaigns and activities at crossing points. In Afghanistan, President Hamid Karzai kept close oversight of polio eradication activities, prompted in part by an outbreak in the Southern Region during the first part of the year which was exacerbated by deteriorating security.

The Advisory Committee on Polio Eradication re-affirmed the technical and operational feasibility of polio eradication.

Only 10 of the 26 countries re-infected since 2003 were still reporting polio transmission in the second half of 2006, following rapid and intense immunization responses. An important success was the end of the Indonesia and Yemen outbreaks, the largest in case numbers. By the end of the year, high-risk outbreaks from imported virus were limited to central Africa, the Horn of Africa and Bangladesh.

Based on the progress in 2006, the Advisory Committee on Poliomyelitis Eradication (ACPE), which provides independent technical counsel to the Global Polio Eradication Initiative, re-affirmed in October the technical and operational feasibility of polio eradication. The ACPE noted that success depended on the remaining four countries, which now have the best tools available to complete eradication: the more potent monovalent oral polio vaccine (mOPV) to boost immunity faster than before and laboratory procedures which halve the time needed to confirm poliovirus and allow for a rapid immunization response.

* Countries that have never interrupted indigenous wild poliovirus transmission are referred to as endemic throughout this report.

The national technical advisory bodies of the four endemic countries convened in December 2006, to recommend new and tailored approaches for 2007 to overcome the specific operational challenges in each of these last four endemic areas. Success now hinges on rapidly raising the levels of vaccination coverage and immunity in the areas with endemic transmission to at least those levels attained in the polio-free areas of these countries.

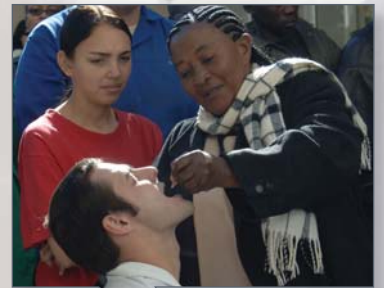
With polio geographically more restricted than ever before, and equipped with new-generation tools and tactics, the world now has the best-ever opportunity to assign this ancient scourge to the history books definitively, providing there is a collective global will and sustained political commitment from the highest levels. The key to success will be full implementation of the targeted new approaches, high-quality operations and the continued support of donors, most notably in urgently filling the global funding gap of US\$ 540 million for 2007–2008 (as of May 2007).

Equipped with new-generation tools and tactics, the world now has the best-ever opportunity to assign this ancient scourge to the history books.

Instrumental to success is urgently filling the global funding gap of US\$540 million for 2007–2008.

2 KEY EVENTS

In 2006, partners in the Global Polio Eradication Initiative vaccinated **375 million** children during **187** immunization campaigns in **36** countries, with **2.1** billion doses of vaccine.



Egypt and Niger confirm interruption of indigenous polio.

Bangladesh suffers importation of virus after five polio-free years.

Indonesia and Yemen outbreaks are stopped.

Outbreak begins in Uttar Pradesh state in India, peaking in September.

Fire in Mumbai polio laboratory necessitates reassignment of staff and stool samples.

Eradication loses a champion on the death of WHO Director-General LEE Jong-wook.

Outbreak from imported virus in Namibia is stopped in 50 days by following new outbreak response guidelines endorsed by World Health Assembly in May.

January

February

March

April

May

June



2006



Outbreak in southern region of Afghanistan is exacerbated by deteriorating security situation. In response to the outbreak, Afghan President Hamid Karzai launches National Polio Action Group.

Lab network launches procedures to halve poliovirus confirmation time.

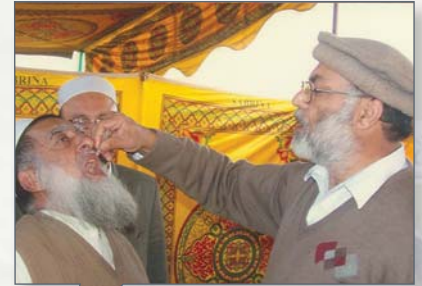
High-risk outbreaks continue in the Horn of Africa, central Africa and Bangladesh.

ACPE re-affirms feasibility of polio eradication.

Saudi Arabia begins requiring vaccination of travellers from polio-endemic countries.

Research published in *Science* magazine indicates monovalent OPV can boost immunity enough to stop polio in northern India.

While most of the territory of each endemic country is polio-free, tailored strategies are adopted in remaining endemic countries to raise immunity levels among children in the endemic areas to those in the polio-free areas.



July

August

September

October

November

December



3 STRATEGIC OBJECTIVES

3.1 INTERRUPTION OF POLIOVIRUS TRANSMISSION

Progress in polio eradication is measured against milestones set out in the *Global Polio Eradication Initiative Strategic Plan for 2004-2008*. The strategic objectives outlined in that plan form the foundation for eradication:

1. interruption of wild poliovirus transmission
2. global certification of eradication
3. development of products for potential OPV cessation
4. mainstreaming of the Global Polio Eradication Initiative.

The milestones set for each strategy are periodically reviewed and amended as necessary as per the recommendations of the Advisory Committee on Poliomyelitis Eradication (ACPE), which provides independent technical counsel to the Global Polio Eradication Initiative.

■ MILESTONES 2006

MILESTONE 1: NO COUNTRIES WILL BE POLIO-ENDEMIC AT THE END OF 2006.

STATUS: **NOT ACHIEVED** — Four areas of four countries remain polio-endemic. Transmission of endemic poliovirus is now concentrated in northern Nigeria, two states of India (Bihar and Uttar Pradesh), and border areas of Pakistan and Afghanistan.

Egypt and Niger are no longer polio-endemic. The ACPE in October 2006 reaffirmed that the global eradication of wild poliovirus is both technically and operationally feasible and concluded that the four remaining endemic countries now have the best tools ever to rapidly achieve polio eradication.

MILESTONE 2: ALL PLANNED SUPPLEMENTARY IMMUNIZATION ACTIVITIES (SIAs) WILL BE IMPLEMENTED IN HIGHEST-RISK POLIO-FREE AREAS.

STATUS: **ACHIEVED** — SIAs were implemented as planned in Bangladesh, Benin, Cameroon, Chad, Nepal and Niger.

Highest-risk polio-free areas are those bordering endemic reservoir areas (re-infected areas are considered under outbreak response below).

MILESTONE 3: 50% OF COUNTRIES WILL ACHIEVE GAVI ALLIANCE TARGETS FOR DTP3/OPV3.

STATUS: **ACHIEVED (2005 DATA)** — 43/72 (60%) of GAVI Alliance-eligible countries had national DTP3/OPV3 coverage greater than 80%; 22/72 (30%) of countries had national DTP3/OPV3 coverage greater than 90%.

The GAVI Alliance target calls for all countries to have greater than 80% routine immunization coverage in every district and 90% routine immunization coverage nationally by the year 2010. In 2005, 7/72 (10%) of GAVI Alliance-eligible countries had reached this target. The GAVI Alliance is focused on increasing children's access to vaccines in poor countries.

MILESTONE 4: ALL EMERGENCY MOP-UPS WILL BEGIN WITHIN FOUR WEEKS OF CASE CONFIRMATION.

STATUS: **PARTIALLY ACHIEVED** — Emergency mop-ups were conducted within four weeks of case confirmation in 5/6 (83%) importation events in 2006.

Cameroon, the Democratic Republic of the Congo (DR Congo), Kenya and Namibia conducted activities within four weeks of case confirmation. Bangladesh conducted activities within 39 days of case confirmation.

Note: In Chad, a late-2006 case was reported in January 2007, and an emergency mop-up was conducted within four weeks of confirmation. Additionally, emergency outbreak response activities continued in a number of countries with ongoing transmission of imported polioviruses from 2005, e.g. Angola, Ethiopia, Nepal, Niger and Somalia.

MILESTONE 5: ALL NON-CERTIFIED COUNTRIES WILL HAVE CERTIFICATION-STANDARD SURVEILLANCE.

STATUS: **PARTIALLY ACHIEVED** — 61/76 (80%) of non-certified countries have met certification-standard surveillance targets¹.

The following countries did not meet the required standards: Algeria, Bhutan, Cyprus, Djibouti, Gabon, Guinea-Bissau, Kuwait, Lebanon, Malawi, Maldives, Morocco, Saint Helena, Sri Lanka, Timor Leste and United Arab Emirates.

¹Excludes island nations with populations less than 300,000, e.g. Comoros, Mauritius, Reunion, Sao Tome and Principe and Seychelles.

COUNTRIES WITH INDIGENOUS POLIO: TAILORED STRATEGIES MONITORED BY TOP POLITICAL LEADERSHIP

The world's success in eradicating polio now depends on four countries – Nigeria, India, Pakistan and Afghanistan – according to the Advisory Committee on Polio Eradication, meeting in October 2006. These countries have at their disposal the best set of technical tools in the history of eradication.

Transmission of indigenous poliovirus is geographically restricted to limited areas of these four countries, in specific populations. In December 2006, all four countries convened national technical advisory body meetings to outline local tactics for reaching all children under five years of age with vaccine enough times to protect them from polio.

■ EGYPT AND NIGER: INDIGENOUS POLIO TRANSMISSION STOPPED

In January 2006, Egypt and Niger were removed from the list of polio-endemic countries, reducing the number of remaining countries with indigenous polio transmission to an all-time low of four. Neither country has experienced indigenous circulation of wild poliovirus since January 2005.

■ NIGERIA: "IMMUNIZATION PLUS DAYS" LEAD TO PROGRESS IN LATTER HALF OF 2006

In December 2005, President Olusegun Obasanjo of Nigeria set the tone for polio eradication activities in the following year, mandating the Ministry of Health and the National Programme on Immunization (NPI) to eradicate polio and strengthen routine immunization.

The number of cases of polio in Nigeria in 2006 rose to 1,123 from 830 in 2005. As the first quarter of the year signalled a three-fold rise in numbers over the same period in 2005, the Expert Review Committee for Polio Eradication (ERC) – Nigeria's technical advisory body – endorsed a strategy of 'Immunization Plus Days' (IPDs) in March 2006. Launched by the new management of NPI in May, IPDs offer other antigens and health interventions to communities in addition to OPV. Since the introduction of IPDs, the proportion of children in northern states who had never been immunized was reduced to an average of 20% (from more than 50% at end-2005). The number of new cases dropped after June: fewer than a third of Nigeria's cases in 2006 occurred in the second half of the year.

The IPDs have also proven popular with local communities and political leadership. 'Community Dialogues', organized in key areas before IPDs, give community members the opportunity to ask questions about polio eradication efforts and have given rise to a nascent sense of ownership by civil society.

Egypt and Niger stop indigenous polio: number of remaining endemic countries reduced to lowest ever.

NIGERIA

KEY POINTS 2006

- Presidential mandate for polio eradication
- New strategy of Immunization Plus Days recommended by Nigeria's Expert Review Committee on Polio Eradication
- Increase in number of children reached in northern states
- Decrease in new cases in second half of year

FOCUS FOR 2007

- Build on progress achieved in 2006 through IPDs
- Use risk-classification to target Kano, Katsina and Jigawa states as 'very high risk' for ongoing polio transmission
- Further engage all communities
- Ensure all activities are state-driven

Key to success: reduce the number of 'missed children' to <10% in Kano, Katsina and Jigawa

Nigeria: Risk classification by state

In northern Nigeria, the proportion of never-immunized children in northern states fell from over 50% to an average of 20%.



AFRICAN UNION COMMISSION HELPING TO "KICK POLIO OUT OF AFRICA"

At the end of 2006, indigenous polio in Africa was restricted to Nigeria, as most of the countries re-infected in 2003-05 had successfully stopped polio transmission or were close to doing so. Political leadership from the Chairperson of the African Union Commission, Professor A.O. Konaré and the strong support of the Union's Social Affairs Commissioner was important to this development.

Chairperson Konaré reviewed the progress of polio eradication in Africa on a quarterly basis with the World Health Organization, and actively engaged with the Heads of State of polio-affected countries. He also encouraged donor nations, especially the G8 and the EU member states to continue their financial support to ensure the success of this historic effort on the continent.

The new approach does not come without drawbacks, not the least of which is financing. Operational costs are 60% more than polio-only supplementary immunization activities. This level of cost is difficult to sustain and demands new sources of funding. The IPDs are also operationally complex to manage, straining the health infrastructure in the north of the country. The availability of the additional vaccines, vitamins and medications that are offered is erratic due to weaknesses in operational planning or deficiencies in stock.

The ERC re-convened in December 2006 to analyse local strategies to overcome local challenges. Each geographical area was classified by the level of risk of poliovirus transmission, to enable states to better prioritize their activities. Kano, Katsina and Jigawa states – which accounted for 60% of the country's cases in 2006 – were classified as 'very high risk' due to ongoing coverage gaps of greater than 25% during IPDs. The key to successfully eradicating polio in Nigeria will be to urgently reduce the proportion of missed children in very high risk states to less than 10%.

In November 2006, Cheikh Hassan Cissé, a spiritual leader with followers across western Africa, embarked on a two-week tour of eight high-risk northern Nigerian states. He impressed upon communities there that polio immunization is a religious obligation of parents, in keeping with the teachings of Islam to protect children from disease. This tour took place at the request of the Secretary-General of the Organization of the Islamic Conference.

During this extraordinary mobilization campaign, the Cheikh, who is the Grand Imam of Medina Kaolack in Senegal, travelled most nights and met by day with Governors, Emirs and religious leaders and scholars. He addressed vast gatherings of his followers in all the major cities of the area and visited Quranic schools and mosques to speak with parents and religious leaders, quoting from the Holy Quran and the

Hadith to underscore “the need for protecting children, as they are the future,” as he put it.

In press conferences, the Cheikh encouraged members of the media to communicate his message that Islamic teachings advocate immunization. Coverage of his sermons and speeches was broadcast on and printed in local and international media.

At the end of the tour, President Olusegun Obasanjo invited Cheikh Cissé to the capital to express his gratitude and appreciation for the Cheikh’s efforts.

Cheikh Hassan Cissé, respected spiritual leader, immunizes a child against polio during his visit to Nigeria.



■ INDIA :

OUTBREAK IN NORTHERN INDIA, BUT IMMUNITY GAP LIMITED TO UNDER-TWO YEAR-OLDS

In India, an outbreak originating in the western end of Uttar Pradesh state resulted in the re-infection of polio-free areas of the country and a ten-fold increase in new polio cases in 2006 over the previous year (676 cases, compared to 66 cases in 2005).

The outbreak occurred primarily due to a drop in vaccination campaign quality and children being missed in late 2005 and early 2006. The Government of India reacted with swift improvements in vaccination campaign coverage in the highest-risk areas. This response, coupled with wide-spread use of monovalent oral polio vaccine type 1 (mOPV1), resulted in 60% fewer cases than India’s most recent outbreak in 2002.

Epidemiological research published in November showed that trivalent OPV is less effective at protecting children from polio in northern India than in the rest of the country or other parts of the world, due to the unique demographic, health and sanitation conditions prevalent in Uttar Pradesh and Bihar. The research vindicated the large-scale use of mOPV in these areas and indicated that immunity levels of children there would have to be boosted with more intense vaccination activities before they could reach the levels reached in other parts of India.

INDIA

KEY POINTS 2006

- Uttar Pradesh and Bihar only remaining endemic states
- Outbreak originating in western Uttar Pradesh results in ten-fold increase in cases
- Immunity gap reduced to children under two years old

FOCUS FOR 2007

- Increase frequency of supplementary immunization activities to rapidly close immunity gap
- Focus on youngest children in high-risk districts of western Uttar Pradesh and Bihar
- Maximize each contact through expanded use of monovalent OPV type 1

Key to success: raising and maintaining immunity levels above the levels in polio-free parts of India

In India, field efficacy of monovalent OPV over trivalent OPV confirmed.

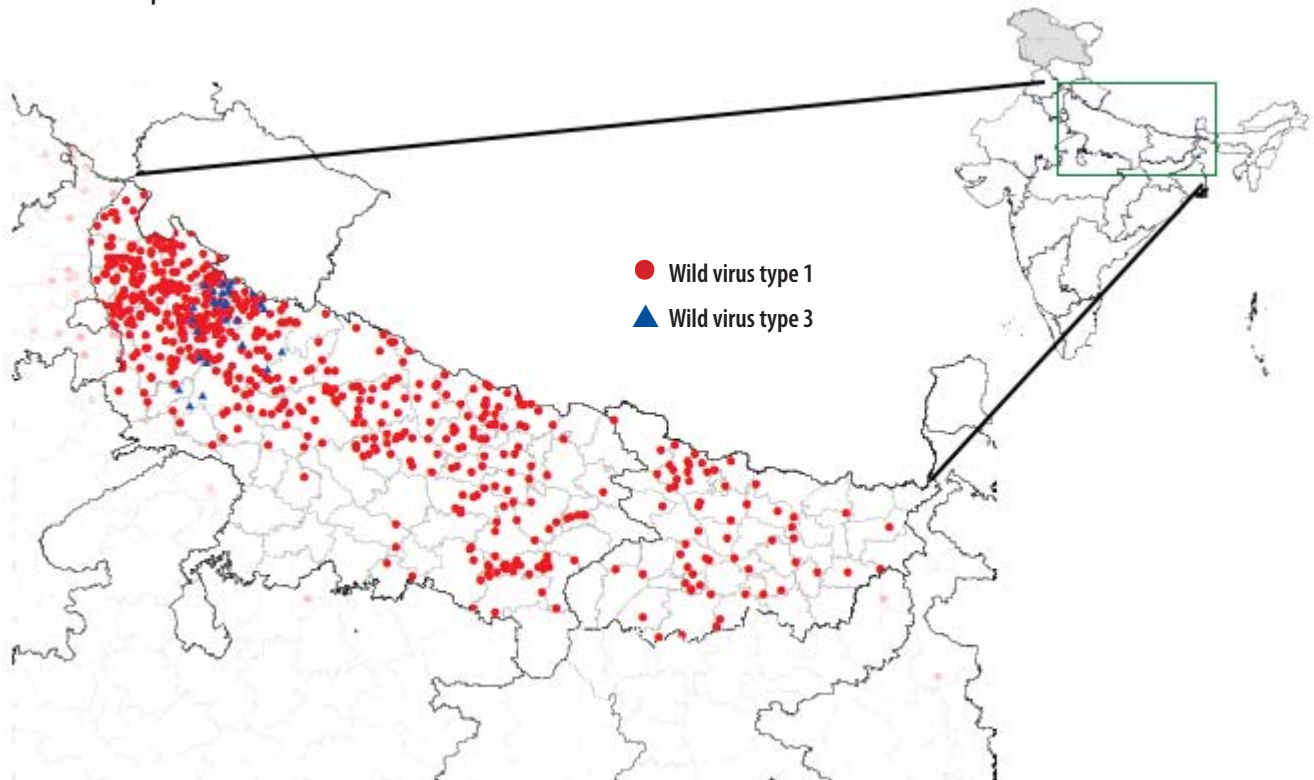
In addition, analysis of the epidemiological and programmatic data from the 2006 outbreak revealed that 73% of children affected were less than two years old, showing that mOPV had effectively immunized older children. The programme could now concentrate on reaching the youngest children more frequently, so that they would have more doses of mOPV before the age of two than previous birth cohorts.

In December 2006, armed with the vaccine efficacy research and this immunological profile, the India Expert Advisory Group on Polio Eradication (IEAG), which provides independent technical counsel to the programme, recommended a tactical refinement to close the immunity gap in the youngest age group.

Launched in early 2007, the approach calls for sharply increasing the number of large-scale supplementary immunization activities (SIAs) in the highest-risk districts of western Uttar Pradesh and Bihar and focusing on children aged less than three years of age. Large-scale SIAs with mOPV1 will be held on average every four weeks, supplemented by the administration of a dose of mOPV1 at birth.

Full implementation of this strategy is expected to close the immunity gap in the youngest children in Uttar Pradesh and Bihar states and to raise immunity levels in these areas to levels above those in the rest of India.

Wild poliovirus in 2006 in Uttar Pradesh and Bihar states of India



More than 200 Rotarians from Canada, Europe and the United States joined thousands of their counterparts in India and in African countries to immunize children against polio during numerous supplementary immunization activities in 2006.

A humanitarian service organization that has made polio eradication its top philanthropic goal, Rotary International is a spearheading partner in the Global Polio Eradication Initiative and is committed to the cause until global certification.

To that end, Rotary members around the world, including those based in the endemic and high-risk countries, donate their time and personal resources to raise funds and volunteer in the field. During mass immunization campaigns, Rotarians regularly administer the drops of oral polio vaccine, staff immunization posts, deliver the vaccine to remote villages and educate families on the importance of protecting every child against polio.

“Until polio is eradicated worldwide, every child remains at risk,” said Anil Garg, US team leader of a group that travelled to his homeland of India. “Preventing paralysis from polio in just one child has major social and economic consequences for the victim, family and entire country.”

Through its PolioPlus program, established in 1985, Rotary was the first to have the vision of a polio-free world, and continues to play a crucial role in global efforts to eradicate polio. More than one million Rotary members have volunteered to protect more than two billion children in 122 countries from polio. Rotary provides urgently needed funds: to date, the organization has contributed more than US\$ 616 million to eradicate polio. In addition, Rotary International has played a major role in decisions by donor governments to contribute more than US\$ 3 billion to the effort.



PHOTO © ANIL GARG

Rotarian Anil Garg of Simi Valley in the USA. Born and raised in Delhi, India, Garg has led numerous polio immunization trips to India and has also provided Tsunami relief.

■ PAKISTAN :

CLOSE BILATERAL COORDINATION NEEDED TO STOP POLIO AS VIRUS LARGELY LIMITED TO BORDER AREAS

Of the remaining areas which have yet to stop polio, the single epidemiological block represented by Pakistan and Afghanistan stands to achieve eradication most rapidly. In 2006, even though the number of polio cases rose to 40 (from 28 in 2005), transmission in Pakistan was limited to a handful of clearly-identified areas, largely along the Afghan border. These include the corridors between southern and eastern Afghanistan and Pakistan’s North West Frontier Province (NWFP) and Balochistan.

The interruption of transmission in 80% of the districts in Pakistan testifies to the strength of the overall strategies of mass vaccination campaigns to reach every child repeatedly to boost immunity. The vast majority of polio cases in 2006 came from previously identified zones of transmission in NWFP, Balochistan and Sindh. In a demonstration of the impact of mOPV1, no type 1 polio cases have been reported from reservoir areas in northern Sindh since 2005 and southern Punjab since July 2006.

PAKISTAN

KEY POINTS 2006

- Most of the country polio-free
- Continued polio transmission in mobile or socially conservative communities and in insecure areas
- Corridor of cross-border transmission with Afghanistan

FOCUS FOR 2007

- Increase cross-border coordination with Afghanistan to close immunity gap
- Strengthen federal and provincial political ownership of polio eradication
- Improve access to tribal agencies

Key to success: fully coordinating activities with Afghanistan to increase access to hard-to-reach populations

In Pakistan and Afghanistan, polio was largely limited to a shared corridor of transmission along the common border.

In some of the high-risk areas, most notably the Federally Administered Tribal Areas in NWFP and some areas of Balochistan, access to communities is compromised by security risks. While efforts to overcome this constraint are ongoing, further mechanisms are needed to improve access in these areas. In 2006, work focused on the identification of, and access to, mobile populations and engagement with the semi-autonomous tribal communities and their leaders.

In a joint technical meeting between Pakistan and Afghanistan, held in Oman in December 2006, advisers recommended closer cooperation between the two countries. The Ministers of Health of both countries met that same month at the Torkham border post and agreed on specific steps, including an increase in the numbers of immunization posts at formal crossings points – to vaccinate children who are travelling – and the establishment of regular inter-ministerial meetings to coordinate planning. After the meeting, each minister crossed the border and administered OPV to children in the neighbouring country.

Successfully eradicating polio in Pakistan depends on implementing a multi-pronged strategy to reach children in mobile groups, to involve conservative and semi-autonomous tribal communities and to synchronize vaccination campaigns carefully with Afghanistan in order to clear the border of poliovirus. A significant affirmation of national and provincial commitment will be vital to the effective implementation of this strategy.

AFGHANISTAN

KEY POINTS 2006

- Most of the country polio-free
- Polio transmission limited to mobile or socially conservative communities and insecure areas
- Corridor of cross-border transmission with Pakistan

FOCUS FOR 2007

- Increase cross-border coordination with Pakistan to close immunity gap
- Sustain political ownership of polio eradication at national and provincial levels
- Exploit any improvement in security conditions by coordinating with relevant actors

Key to success: fully coordinating activities with Pakistan to increase access to hard-to-reach populations

■ AFGHANISTAN:

OUTBREAK IN SOUTHERN REGION CONTAINED DESPITE SECURITY CHALLENGES

Most of Afghanistan is today polio-free, but the country suffered an outbreak in the southern region due to continued cross-infection with Pakistan, with which it forms a single epidemiological block. Cases in Afghanistan increased from 9 in 2005 to 31 in 2006.

The outbreak in the southern region was exacerbated by deteriorating security conditions – making it perilous for health workers to move around and vaccinate children – but contained by intense vaccination activities which exploited every opportunity within the constraints of the conflict. By year-end, the outbreak had been contained within the region and Afghanistan was closer to polio eradication than any of the other three endemic countries.

In tandem with the fluctuating security situation, polio teams worked with various sectors of society at the district, state and national level to negotiate increased access to children. More local community members were recruited as vaccinators and supervisors. Teams took advantage of any opportunity when areas could be accessed to conduct rapid and focused mop-up activities, in addition to the planned large scale vaccination rounds. In August, the President of Afghanistan, Hamid Karzai, established a National Polio Action Group to align and strengthen national and provincial oversight of these activities.

The most significant chain of wild poliovirus in this region straddles the Afghan-Pakistan border and caused an outbreak in 2006 in Afghanistan's southern region. Deteriorating security in the region presented immediate hazards for health workers attempting to vaccinate children in the area, exacerbating the outbreak. To align the response in the provinces concerned, President Hamid Karzai established a National Polio Action Group in August, tasking governors in the southern region to oversee the development and implementation of plans to increase access to all populations.

Polio eradication in the southern region focused on three immediate objectives:

- To ensure the safety of staff working in the field.
- To maintain the highest levels of operational continuity possible, given the deteriorating situation.

- To ensure that polio transmission did not re-infect other areas of Afghanistan.

Polio teams used any window of opportunity to access districts in security-compromised areas, while continuing large-scale campaigns in other regions to maintain high-population immunity levels.

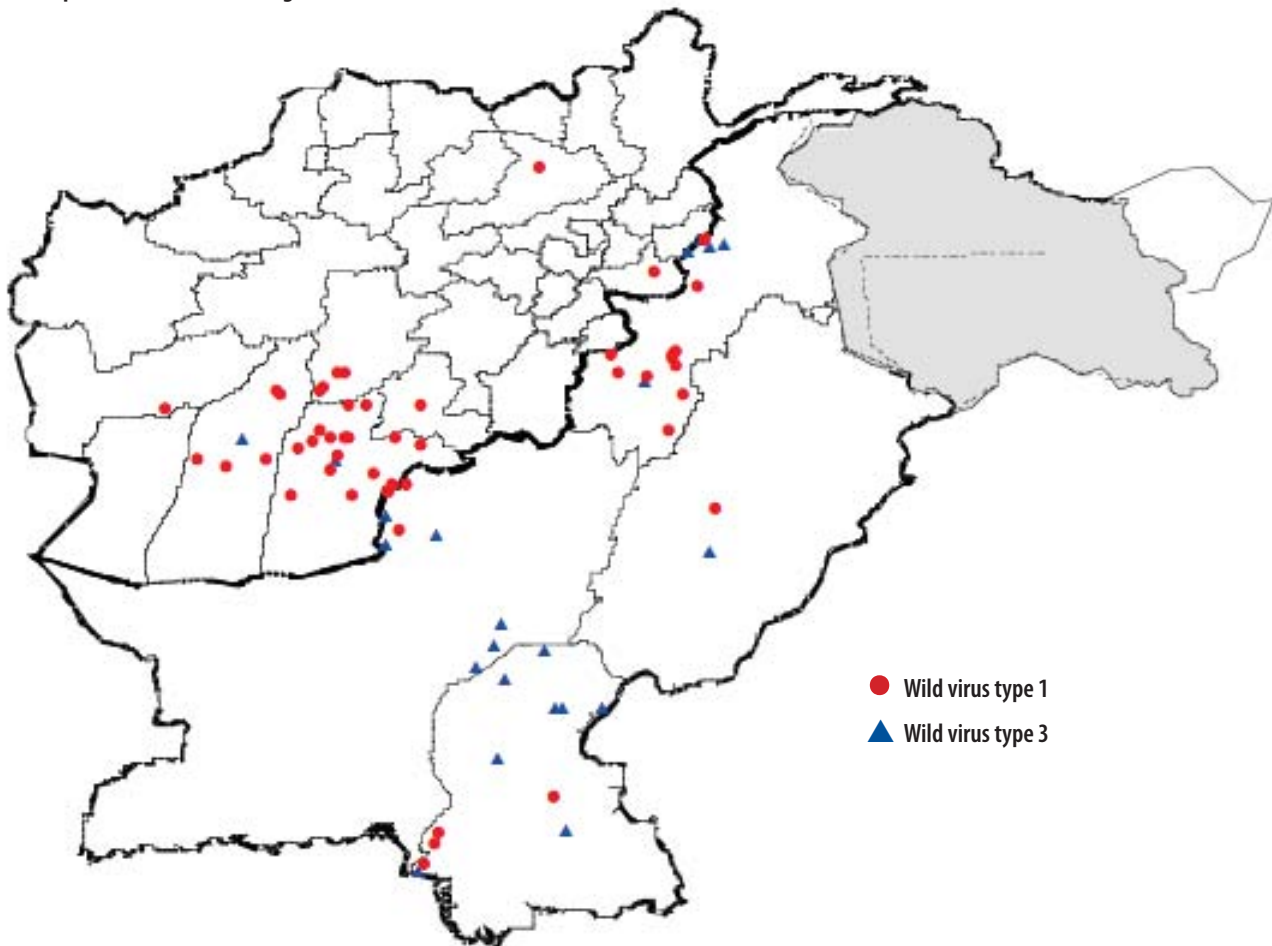
With these efforts, polio eradication remained one of the few public health initiatives to maintain operations in the southern region in 2006, and the outbreak was contained. Other areas of Afghanistan were protected from re-infection, and by the end of the year only three cases had been reported outside the southern region, one of which was on a frequently-travelled area on the border with Pakistan's North West Frontier Province.



President Hamid Karzai vaccinates an Afghan child.

PHOTO © EPI AFGHANISTAN

Wild poliovirus in 2006 in Afghanistan and Pakistan



Indigenous transmission of endemic poliovirus continues in Afghanistan among mobile groups – whether nomadic, displaced or seasonally migratory – and in communities who live in insecure or socially conservative areas. The poliovirus that straddles the Afghanistan-Pakistan border circulates among and with these communities. The movements of the mobile communities were mapped more systematically in 2006 and long-term immunization posts set up at key migrant gathering areas and known border crossings between Afghanistan and Pakistan.

To rapidly close the immunity gap among these “hard-to-reach” populations, in December 2006 independent technical advisers for Pakistan and Afghanistan, meeting in Oman, recommended that both surveillance and SIAs be increasingly coordinated between the two countries. In one of their first actions after this, Ministers of Health of both countries jointly addressed a historical health *jirga* of tribal leaders to request the latter’s support and the participation of their communities in reaching each child with vaccine.

Successfully eradicating polio in Afghanistan now depends on exploiting any positive security developments, on tighter coordination of activities with Pakistan and on continued top-level oversight at the federal and provincial levels to make sure no child is missed.

RE-INFECTED COUNTRIES: NEW RESPONSE GUIDELINES SHORTEN OUTBREAKS

2006 was a testing ground for the effectiveness of new outbreak response guidelines, adopted by the World Health Assembly in May (Resolution WHA59.1). Of the 26 countries re-infected with importations of poliovirus since 2003, only 10 continued to report polio cases in the second half of 2006. An outbreak in June in Namibia, following an importation of Indian virus via Angola, affected mostly adults and caused a number of deaths. Using the outbreak response guidelines and vaccinating the entire population several times, officials limited the outbreak to a record 50 days from first case to last. Indonesia and Yemen, which suffered the largest, single country epidemics in recent years, succeeded in stopping their respective outbreaks in the first two months of 2006. As a result, re-infected countries only accounted for 6% of all polio cases in 2006, down from more than 50% of cases in 2005.

The focus for 2007 will be on rapidly stopping the high-risk outbreaks where polio transmission continues: in central Africa (Angola and the Democratic Republic of the Congo), the Horn of Africa (Ethiopia, Kenya and Somalia) and Bangladesh. Areas contiguous to endemic countries are also at heightened risk until the interruption of transmission in the latter.



PHOTO © WHO ETHIOPIA/DR. TAJUDIN

Polio immunization of a nomadic child in the Somali region of Ethiopia: 2006 witnessed rapid progress in stopping outbreaks in re-infected countries, but active polio transmission continues in Angola, Bangladesh, the Democratic Republic of the Congo, Ethiopia, Kenya and Somalia.

Re-infected countries
accounted for 6% of all polio
cases in 2006, down from
more than 50% in 2005.

The World Health Assembly, where WHO Member States set global health policies, adopted in May 2006 a resolution with clear guidelines for polio-free countries to respond to importations of virus.

Given the ease with which poliovirus travels, the risk of importation is very real as long as the virus circulates anywhere in the world, and the guidelines are designed to minimize both this risk and the consequences of an importation. The main characteristics of the response are:

- It is rapid and creates an emergency plan – a rapid investigation within 72 hours of confirmation of a case to establish an emergency plan of action;
- It is swift and sustained – a minimum of three large-scale rounds of immunization with type-specific vaccine, the first of which starts within four weeks, with at least two campaigns after the last case;
- It is large-scale – targeting at least two million children aged less than five years in the affected and adjacent geographical areas;
- It is high quality – house-to-house campaigns where applicable and independent monitoring to determine whether immunization coverage is at least 95%; with higher-than-standard surveillance for acute flaccid paralysis for the duration of the outbreak and at least 12 months thereafter and high routine immunization coverage.

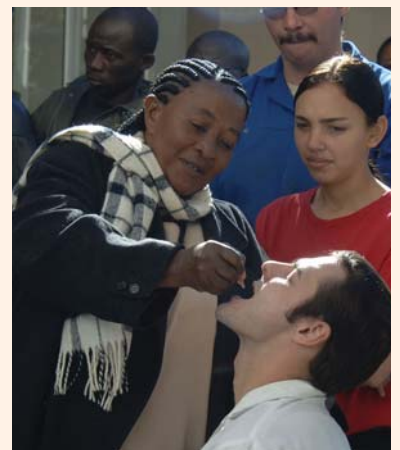


PHOTO © T. FIGUERA/UNICEF

Swift and massive vaccination campaigns such as this one, targeting the entire population, shut down the Namibia outbreak within 50 days.

STRATEGIC OBJECTIVES

3.2 SURVEILLANCE AND CERTIFICATION OF GLOBAL POLIO ERADICATION

Confirming that transmission of wild poliovirus is stopped depends on solid surveillance and is followed by certification for polio-free regions that have maintained the necessary levels of surveillance. Recognizing the delays in detecting transmission of poliovirus in some areas in 2003-04, the surveillance target for acute flaccid paralysis (AFP) detection rates* has been doubled since 2005 in high-risk areas. To this is added the strength of new laboratory procedures that halve the confirmation time for poliovirus.

■ MILESTONES 2006

MILESTONE 1: PERCENTAGE OF NON-CERTIFIED COUNTRIES WITH CERTIFICATION-STANDARD SURVEILLANCE: 100%.

STATUS: PARTIALLY ACHIEVED — 97% of non-certified countries have certification-standard surveillance (the exceptions are Algeria, Bhutan, Djibouti, East Timor, Guinea Bissau and Lebanon).

MILESTONE 2: PERCENTAGE OF AFP SPECIMENS PROCESSED IN A WHO-ACCREDITED LABORATORY 100%.

STATUS: ACHIEVED — All AFP specimens were processed in a WHO-accredited laboratory.

MILESTONE 3: PERCENTAGE OF COUNTRIES COMPLETING PHASE I LABORATORY BIO-CONTAINMENT PHASE: 100%.

STATUS: PARTIALLY ACHIEVED — 75% of polio-free countries have completed Phase I activities, including all countries of the WHO European Region.

MILESTONE 4: PERCENTAGE OF COUNTRIES SUBMITTING 'FINAL' CERTIFICATION DOCUMENTATION: 85%.

STATUS: PARTIALLY ACHIEVED — 80% of eligible countries submitted final documentation for certification.

*Certification-standard surveillance is defined as the ability to detect at least one case of non-polio AFP for every 100,000 children under 15 years of age, to collect two adequate stool specimens from at least 80% of cases of acute flaccid paralysis and to process all specimens at a WHO accredited laboratory.

AFP SURVEILLANCE SENSITIVITY CONTINUES TO CLIMB

The very high sensitivity and reliability of AFP surveillance was sustained and even further improved in 2006. All WHO regions, including those already certified as polio-free (the region of the Americas and the Western Pacific and European Regions), maintained AFP surveillance at or substantially above ‘certification quality’ (see Table 1).

Continued sensitive AFP surveillance in polio-free countries is critical in order to protect countries from importations of poliovirus and to enable swift outbreak response if necessary. The Regional and National Polio Certification Commissions assist countries and regions striving to maintain or achieve polio-free status.

AFP surveillance quality in all three endemic regions, already well above certification standards, further increased in 2006. The total number of non-polio AFP cases reported from the African (AFR), Eastern Mediterranean (EMR) and South-East Asian (SEAR) Regions increased from 52,062 in 2005 to 57,849 in 2006, mainly due to heightened surveillance and resultant increases in AFP reporting in the four large remaining endemic countries in those regions: Afghanistan, India, Nigeria and Pakistan. The sheer increase in AFP cases reported in 2006 in these regions led to overall non-polio AFP rates of 3 or more per 100,000 – as the vast majority of AFP cases turn out to be caused by conditions other than polio after stool analysis. All three regions also recorded increases in the second important surveillance quality indicator, the percentage of AFP cases with collection of adequate stool specimens.

AFP surveillance quality in all three endemic regions, already well above certification standards, further increased in 2006.

Table 1: Quality of AFP reporting by WHO Region in 2005 and 2006¹

WHO Region	Reported AFP cases		Non-polio AFP rate		% AFP with adequate specimens	
	2005	2006	2005	2006	2005	2006
African Region	11 683	12 478	3.3	4.0	86	89
Americas	2 213	2 154	1.3	1.1	80	79
Eastern Mediterranean Region	8 849	8 740	3.7	3.9	88	89
European Region	1 479	1 550	1.1	1	82	82
South-East Asian Region	31 530	36 631	5.4	5.9	82	83
Western Pacific Region	6 680	6 873	1.7	1.7	88	88
Global total	62 434	68 426	3.3	3.6	84	85

¹2006 data as of 17 April, 2007.

A country-by-country analysis of AFP surveillance quality shows improvements in the great majority. The proportion of countries which reached a level of AFP reporting of 2 or more per 100,000 in the two endemic regions with the greatest disease burden increased from 62% to 75% of countries in AFR and from 54% to 63% of countries in SEAR.

A limited number of countries in each endemic region did not reach certification quality AFP surveillance. These include Algeria and Guinea Bissau in AFR, Bhutan and East Timor in SEAR, and Djibouti and Lebanon in EMR. A few other countries and territories in EMR achieved AFP indicators just below the 'certification cut-off' and are considered to have maintained certification-quality AFP surveillance: Morocco, United Arab Emirates, Lebanon, and the West Bank and Gaza Strip.

LAB NETWORK CONFIRMS VIRUS TWICE AS FAST

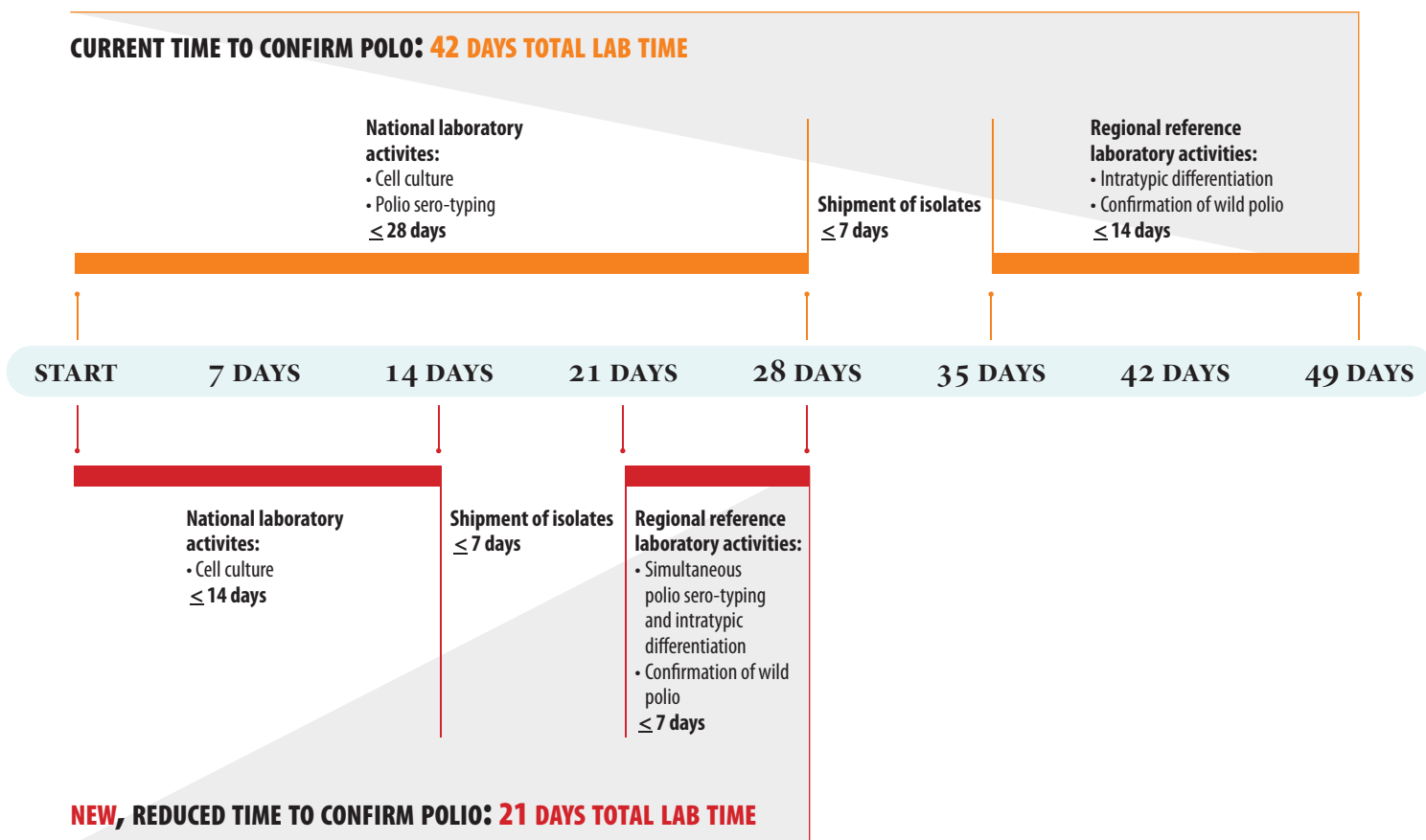
Laboratory results are used to confirm the presence of poliovirus, to plan immunization responses and to monitor progress towards achievement of the eradication goal. Rapid and accurate laboratory results are paramount to these goals. A global network of 145 laboratories continues to support AFP surveillance. The network's quality assurance programme incorporates a WHO-administered accreditation program involving annual (usually on-site) evaluation of facilities and procedures, results of proficiency tests, timeliness and accuracy of results. Ninety seven per cent of laboratories were fully accredited in 2006, and all samples from AFP cases were tested in accredited laboratories with arrangements for parallel testing of samples from poorly performing laboratories where necessary.

The laboratory network's workload in 2006 was approximately 125,000 faecal samples from 63,000 AFP cases and 8,600 non-AFP samples. The workload for investigated AFP cases was 25% higher than that of 2005. Wild polioviruses were isolated from AFP cases in 16 countries in 2006.

Genetic characterization of isolates showed that indigenous viruses were transmitted in four countries (Afghanistan, India, Nigeria and Pakistan). Five countries had continued transmission of imported viruses introduced in 2005 (Angola, Ethiopia, Indonesia, Somalia and Yemen), while other countries had new importations (Bangladesh, Cameroon, Chad, Namibia, Nepal, Niger, Kenya, DR Congo). Viruses in five countries (Angola, Bangladesh, DR Congo, Namibia and Nepal) were genetically linked to India viruses, while all other importations linked directly or indirectly (via transmission in intermediate countries) to Nigeria.

In 2006 the laboratory network evaluated, and subsequently adopted, a new testing strategy that reduces poliovirus confirmation time within laboratories by 50% (from 42 days using the traditional approach, to 21 days) without compromising poliovirus detection sensitivity. The new approach involves use of technologies that are already available within the network but in a different algorithm (i.e. sequence of testing). The strategy was evaluated in reference laboratories in Atlanta in the USA, Islamabad in Pakistan and Mumbai in India. Approximately 5,200 faecal samples, including 900 poliovirus positive samples, were tested during the field evaluation. It is estimated that the new strategy will increase cell culture costs by 25% and intratypic differentiation (ITD) costs by 100%.

The key to achieving faster results will be testing of samples in laboratories with capacity for both virus isolation in cell cultures and intratypic differentiation (of viruses as wild or vaccine like) using polymerase chain reaction (PCR) and Enzyme Linked Immunosorbent Assay (ELISA). The network has established a goal of testing at least 75% of faecal samples from polio endemic regions in laboratories with such capacities by December 2007. This will require upgrading of 11 existing national laboratories to perform ITD tests with implications for investing in capital equipment, reagents and staff training. Staff training has already begun. An ITD training workshop was held in Uganda in November 2006 for participants from eight network laboratories. Additionally staff of four existing ITD laboratories of South East Asia were oriented on the requirements of the new test strategy in April 2006.



In 2006 the laboratory network evaluated, and subsequently adopted, a new testing strategy that reduces poliovirus confirmation time within laboratories by 50%.

The network suffered a serious setback in 2006 when fire destroyed the sequence unit at the global specialized laboratory in Mumbai, India, and caused damage to the cell culture unit and office areas within the facility. The impact included: loss of equipment; closure of the laboratory for cleaning and renovation; re-directing of over 10,000 faecal samples and 6,000 polio isolates to 2 other network laboratories (situated in Lucknow and Chennai, India) for testing; loss of 15 trained staff who obtained jobs elsewhere; suspension of testing of sewage samples collected in Mumbai; suspension of Mycoplasma testing of cell cultures used in 16 laboratories in South-East Asia; and long delays in obtaining sequence data on polioviruses from India. At year-end, sequencing was being performed in Mumbai at a non-network laboratory that generously offered part-time access to its equipment. The Mumbai polio laboratory is expected to become fully functional by mid-2007 following completion of renovation works.



PHOTO © WHO/F. PALADIN

Participants from eight polio network laboratories are trained in Uganda in November 2006, on use of the new protocol which halves the time required to confirm the presence of poliovirus.

NOTABLE PROGRESS ON CONTAINMENT PREPARATIONS FOR POLIOVIRUS

Laboratory containment remains an integral part of polio eradication activities in all six WHO Regions. In 2006, regional and sub-regional meetings on laboratory containment were held to either monitor progress with Phase I implementation or review documentation from countries reporting completion of the work.

Notable progress towards completion of Phase I was reported from China, central America, and eastern and southern Africa. China has successfully completed a thorough survey of all facilities falling under the jurisdiction of the Ministry of Health, with plans to complete the survey of remaining facilities in 2007. Similarly, Mexico reported expanding its initial survey of facilities to include an additional 50,000 laboratories throughout the country. In southern and eastern Africa, all

polio-free countries either submitted a report on the completion of the activities to the Regional Certification Commission at their meeting in 2006 or report that the process is ongoing.

In WHO regions with a large number of countries which previously completed the Phase I activities, work continues to ensure that complete documentation on the process is reviewed by Regional Certification Commissions (RCCs). EMRO conducted such a review for the 16 countries which reported completion of Phase I. Countries were requested to submit standardized information which was first reviewed by WHO and subsequently by independent experts. The results will be made available to the RCC at its meeting in 2007.

The Phase I laboratory containment activities work towards the objective of identifying facilities with poliovirus materials and raising awareness of the need for containment of polioviruses once eradication is achieved. To date, over 75% of all polio-free countries have completed Phase I activities, including all countries of the WHO European Region.

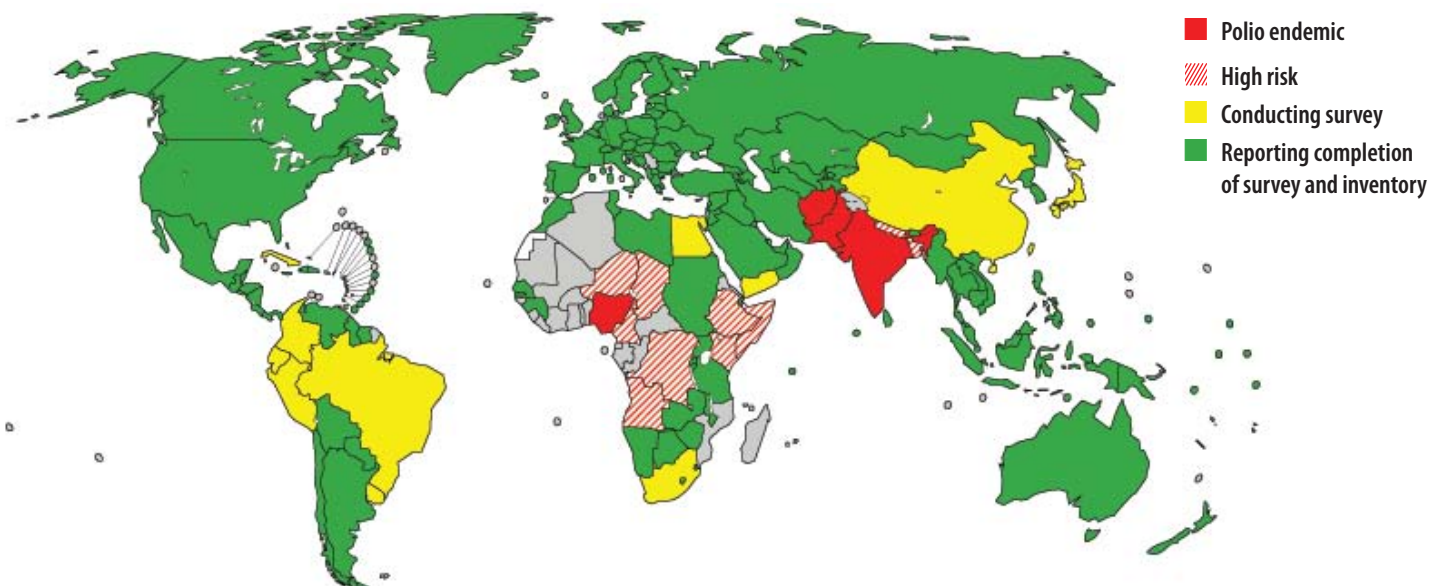
Over 75% of all polio-free countries have completed Phase I containment activities and established inventories of poliovirus stocks.

INCREASE IN NUMBER OF COUNTRIES SUBMITTING FINAL CERTIFICATION DOCUMENTS

National Polio Certification Committees (NCCs) and Regional Certification Commissions (RCCs) in endemic regions continued to scrutinize in detail national documentation to show polio-free status submitted by eligible* countries. The number of eligible countries for which RCCs accepted final certification documentation increased from 10 to 14 in AFR (of 46 Member States), and from 6 to 8 in SEAR (of 11 Member States); it remained steady at 15 of 22 Member States in EMR because several countries, including Sudan, were re-infected after they had already successfully submitted final certification documentation. The percentage of total WHO Member States which successfully submitted final certification documentation increased slightly from 78% in 2005 to 80% in 2006.

*Eligible countries are those where no wild poliovirus has been found for at least three years, in the presence of certification quality surveillance. Countries can file documentation but cannot receive polio-free certification, which can only be conferred on a WHO Region as a whole.

Progress towards Phase I of Global Containment



STRATEGIC OBJECTIVES

3.3 DEVELOPMENT OF PRODUCTS FOR POTENTIAL GLOBAL OPV CESSATION

The current risk posed by wild polioviruses remains far greater than the risk of vaccine-associated paralytic polio (VAPP) or circulating vaccine-derived polioviruses (cVDPVs). However, after interruption of wild poliovirus transmission, Sabin vaccine viruses could continue to cause individual paralysis or outbreaks. Consequently, as recommended by the ACPE, the Global Polio Eradication Initiative undertakes a programme of work for the identification, reduction and management of the potential risks associated with the cessation of OPV, whether the re-emergence of polio due to a cVDPV or re-introduction of either a wild or Sabin poliovirus. Progress on these strategies and related products are detailed in the section below.

■ MILESTONES 2006

MILESTONE 1: CESSATION OF OPV FOR ROUTINE IMMUNIZATION: CONSOLIDATE OPV CESSATION STRATEGY AND NATIONAL IPV DECISIONS.

STATUS: PARTIALLY ACHIEVED — Research is ongoing in a variety of settings to determine the scope and nature of the risks and risk mitigation options associated with OPV cessation and use of inactivated polio vaccine (IPV).

MILESTONE 2: DETECTION AND IMMEDIATE NOTIFICATION OF CIRCULATING POLIOVIRUSES: INCORPORATE POLIO SURVEILLANCE INTO INTERNATIONAL HEALTH REGULATIONS (2005) AND THE GLOBAL OUTBREAK AND ALERT RESPONSE NETWORK.

STATUS: ACHIEVED.

MILESTONE 3: POLIO VACCINE STOCKPILES AND EMERGENCY RESPONSE: LICENSURE OF AT LEAST TWO MOPV SUPPLIERS.

STATUS: ACHIEVED.

MILESTONE 4: LONG-TERM CONTAINMENT OF POLIOVIRUS STOCKS: FULLY ALIGN WITH SECURITY PROCESSES FOR SIMILAR PATHOGENS.

STATUS: ACHIEVED — Bio-risk management standard developed in consultation with those responsible for bio-containment of smallpox and experts in bio-safety and risk management.

IDENTIFICATION OF RISKS ASSOCIATED WITH OPV CESSATION

As the knowledge of VDPVs continues to evolve, a better understanding of the risks they pose to polio eradication has become a priority of the Global Polio Eradication Initiative. In terms of identifying and defining these risks, the focus is currently on: modelling of VDPV risk associated with OPV cessation; further defining VDPV prevalence among immuno-deficient persons (iVDPVs) in middle- and low-income countries; and analysing poliovirus isolates emanating from the global acute flaccid paralysis (AFP) surveillance system and other sources.

■ iVDPV STUDY SERIES

A known potential source of VDPVs are people suffering from primary immune deficiencies (PIDs) who excrete vaccine-derived polioviruses (iVDPV). It has been recognized that the risk of circulating VDPVs (cVDPVs) will eventually be reduced over time once OPV is no longer in use; however the risk of iVDPVs is likely to persist as long as there are persons excreting iVDPVs.

Thirty-two persons shedding iVDPVs have been reported to WHO since 1962. All of the iVDPVs identified to date have been reported from upper- or middle-income countries. Although most of the reported iVDPVs have spontaneously stopped poliovirus excretion or died, at least four have reported excretion for more than five years. Limited data are available on the prevalence and natural history of prolonged or chronic poliovirus excretion among persons with PIDs in middle- and low-income countries, and whether this population may serve as an important reservoir of VDPVs in these countries is unknown. To address the knowledge gaps associated with the incidence and behaviour of iVDPVs, as well as to increase local capacity for the surveillance and monitoring of iVDPVs, the Global Polio Eradication Initiative has begun planning a study series to generate information regarding the prevalence of PIDs with long-term poliovirus excretion in low- and middle-income countries currently using OPV.

■ LABORATORY ANALYSIS OF VDPVs

During 2006, the laboratory network detected VDPVs in a number of locations, including:

- Locations with evidence of person-to-person spread: Nigeria (type 2 VDPVs from 16 AFP cases in 4 different provinces), China (type 1 VDPV from 1 AFP case and 8 community contacts in Gaunxi), Myanmar (type 1 AFP case and 7 contacts); Cambodia (type 3 VDPV from 1 AFP case following isolation of a genetically related VDPV from an AFP case with onset in late 2005).
- VDPVs from AFP cases with follow up investigations pending: Syria (a single type 2 case)
- VDPVs detected in sewage waters without paralyzed persons found during follow up investigations: Czech Republic (10 type 1 VDPVs); Israel (2 type 2 VDPVs).
- VDPVs (type 2) in an immuno-deficient person from Tunisia, the case having been detected in France.

After interruption of wild poliovirus transmission, Sabin vaccine viruses could continue to cause individual paralysis or outbreaks.

REDUCTION OF RISKS ASSOCIATED WITH OPV CESSATION

Reducing the potential risks of OPV cessation involves the preparation for containment of all polioviruses in a post-eradication world and the demonstration of the scientific and logistic feasibility of producing inactivated vaccine based on Sabin rather than wild poliovirus. Additional projects include the development of products such as rapid diagnostics and antiviral compounds against polioviruses.

■ CONTAINMENT OF POLIOVIRUSES

In 2006, the plan for long-term containment of poliovirus was completed with the development of the draft *WHO Global Action Plan to minimize poliovirus facility associated risk in the post-eradication/post-OPV era (GAP III)*. The development of *GAP III* provides the Global Polio Eradication Initiative with a long-term vision and rational plan to ensure that polioviruses are not reintroduced to human populations once circulation has been interrupted.

A key recommendation of *GAP III* is to reduce to fewer than 20 the number of research or production facilities retaining polioviruses worldwide that serve essential functions and meet defined primary and secondary safeguards against transmission. *GAP III* outlines a two-pronged strategy of risk elimination and risk management implemented in four phases, each linked to achievement of milestones in global polio eradication. The first three phases of the plan focus on eliminating and managing the risk of wild polioviruses in facilities after eradication is achieved.

In countries retaining wild poliovirus materials, primary and secondary safeguards are described based on findings from risk assessment and risk consequence models. Primary safeguards were developed in consultation with the WHO department responsible for bio-containment of smallpox along with experts in biosafety and risk management. The resulting *Biorisk management standard (BSL 3/polio) for essential poliovirus facilities in the post-eradication/post-OPV era* establishes a new international benchmark for managing the risk of an eradicated pathogen. This document outlines goals to be achieved by each facility in 16 broad areas, based on the principles of a quality management system. It places the responsibility of risk management squarely on the facility and its management and requires that appropriate controls and systems for managing the risk be not only developed but also demonstrated during periodic national and international accreditation procedures.

Beyond these primary safeguards, secondary safeguards are necessary in order to minimize the consequences in the unlikely event of a poliovirus release. These include the location of essential poliovirus facilities in areas with high routine national population coverage with IPV (more than 90%) and high quality closed sewage systems with secondary or greater effluent treatment.

GAP III provides the Global Polio Eradication Initiative with a long-term vision and rational plan to ensure that polioviruses are not reintroduced to human populations once circulation has been interrupted.

■ SABIN IPV

A critical element of risk-reduction in the post-eradication era is the effort to replace wild poliovirus in vaccines with Sabin virus, which is less neuro-virulent and therefore safer. A vaccine manufacturer has been contracted to establish the feasibility of inactivated vaccine production from Sabin strains. Once this “proof-of-principle” is established through the production of what is known as a pharmaceutical batch, the Global Polio Eradication Initiative will sponsor the clinical development of Sabin IPV. In addition, work has begun to establish standards for Sabin IPV through the United Kingdom’s National Institute for Biological Standardization and Control. The goal of both these lines of work is a potent vaccine based on the least neuro-virulent strain of virus, reducing the potential risks of manufacturing, handling and taking vaccine.

MANAGEMENT OF RESIDUAL RISKS ASSOCIATED WITH OPV CESSATION

While research and policy activities are focused on identifying and reducing the risks associated with OPV cessation, the residual risk must be managed. The scientific guidance for national immunization policies, the preparation of a vaccine stockpile and the development of monovalent oral polio vaccine type 3 (mOPV3) are all integral to both reduction and management of these risks. Ensuring long-term surveillance of polioviruses must be planned for as well.

■ IPV INTRODUCTION AND FRACTIONAL DOSE STUDIES

Scientific research helps form national policy decisions on maintaining population immunity in a post-eradication world: this is the goal of fractional IPV dose trials in Cuba and Oman and an IPV project in a tropical country.

A series of natural disasters in Indonesia and the importation and a large outbreak of poliomyelitis led to substantial delays in the introduction of IPV in the province of Yogyakarta. This project continues to be a high priority for the Global Polio Eradication Initiative and will answer key scientific questions, including whether IPV-induced immunity will prevent the emergence of VDPVs in a tropical setting, which will potentially influence a future recommendation for an IPV-only schedule for tropical developing countries. While environmental surveillance in the context of this project is ongoing, a policy switch from OPV to IPV is expected in 2007.

Above and beyond the various scientific, programmatic and operational issues affecting IPV use in the developing world, the cost of IPV vaccination is a major decision factor (especially when weighted against limited resources and the opportunity costs). For the past year, AMRO, EMRO and WHO HQ have collaborated in promoting research to evaluate fractional doses of IPV administered intra-dermally by needle-free devices. Such an approach could lead to substantial cost-saving for an IPV schedule.

The implementation of a study series to compare the immunogenicity of fractional doses of IPV administered by needle-free device versus full doses of IPV administered by intramuscular injection began in September 2006, with an initial study set in Cuba, while another set in Oman is expected to begin enrolment in early 2007. The data generated by this study series are intended to facilitate the regulatory approval of fractional doses of IPV.

■ VACCINE STOCKPILE SOPs AND TENDER PROCESS

The Standard Operating Procedures for an mOPV stockpile were drafted and presented to the ACPE in October 2006. This document sets forth the basis for emergency response in the post-eradication world. Furthermore, it outlines the triggering events for such an emergency response as well as a decision-making mechanism in case mOPV has to be released in an emergency situation. This work represents a major step forward for the Global Polio Eradication Initiative in terms of tools and products to manage a post-eradication response to the re-introduction or re-emergence of poliovirus.

In 2006, mOPV1 was licensed by four different producers: GSK (in Indonesia, Belgium and Nigeria), Panacea and Bio Farma (in Indonesia) and Sanofi Pasteur (in Pakistan). GSK also licensed its mOPV3 in Belgium. Several more applications for licensure of mOPV products are pending with national regulatory authorities.

Another significant achievement in the preparedness for emergency response in a post-eradication world was the UNICEF Request for Commercial Indication (RCI). In December 2006, UNICEF issued its RCI to four manufacturers – all of which are WHO pre-qualified for trivalent OPV products – to provide them with basic information on stockpile requirements for suppliers, such as presentation of the vaccine, the number of doses per serotype, storage and security, etc.

The Standard Operating Procedures for the vaccine stockpile set forth the concepts for emergency response in the post-eradication world.

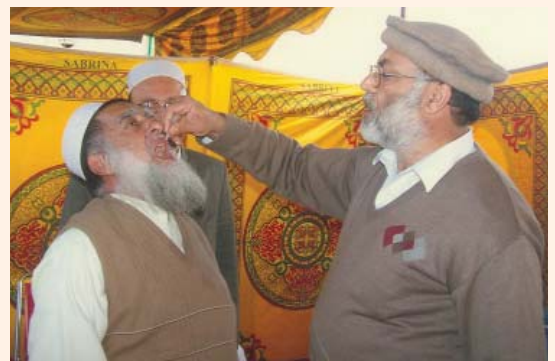
CURBING THE RISK OF INTERNATIONAL SPREAD OF POLIO

The poliovirus has repeatedly shown its ability to travel great distances, causing importations by land, sea or air travel. To minimize the risk and consequences of potential future importations, countries are protecting themselves with immunization measures.

Full vaccination of all travellers from any polio-affected area may be necessary in the near future. The Executive Board of the World Health Organization, convening

in January 2007 in Geneva, Switzerland, called for an appropriate standing recommendation under the International Health Regulations (2005), after their entry into force in June 2007.

Individual countries are already enforcing similar policies at national level. Saudi Arabia, for example, requires all Hajj travellers from Afghanistan, India, Nigeria and Pakistan to be immunized against polio.



Pilgrims from Peshawar, Pakistan, are immunized prior to their departure. Such polio immunization requirements may be instituted by other countries.

PHOTO © WHO PAKISTAN

Plans to finance the necessary preparations for a post-eradication world were aided by the launching of the innovative financial issuer, the International Finance Facility for Immunization. The Executive Committee of the GAVI Fund in September 2006 approved the use of US\$ 191 million from this issue to help build the stockpile of OPV for the post-eradication era.

■ POLIO SURVEILLANCE UNDER THE INTERNATIONAL HEALTH REGULATIONS (2005)

With the global reduction and eventual interruption of wild poliovirus, and in a post-eradication world, long-term surveillance for polioviruses takes on a new role. Circulating wild polioviruses will become one of the four diseases specifically mentioned in and “notifiable” under the International Health Regulations 2005 (IHR 2005), which come into effect in June 2007. The evolving relationship between IHR and vaccine-preventable disease control and polio eradication activities, especially at regional and country level, is expected to increase in importance as the Initiative approaches the global interruption of wild poliovirus circulation.

Event-based reporting for polio cases will need to be fully incorporated into existing mechanisms for dealing with events of international public health importance, such as the IHR. Integration of polio into the IHR will further help to prevent, protect, and control the international spread of the disease in the event of an outbreak. As the IHR comes into force, countries will be assessing their capacity to identify, verify, and control potential polio outbreaks.

Circulating
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International Health
Regulations 2005.

STRATEGIC OBJECTIVES

3.4 MAINSTREAMING OF THE GLOBAL POLIO ERADICATION INITIATIVE

Mainstreaming of the Global Polio Eradication Initiative is one of the key strategic objectives. It includes integration of the long-term functions of polio eradication into national and international mechanisms for managing other pathogens and the transition of the polio infrastructure to other programmes such as immunization and outbreak response.

■ MILESTONES 2006

MILESTONE 1: 75% OF JOINT GAVI/POLIO PRIORITY COUNTRIES IMPLEMENTING INTEGRATED PLANS.

STATUS: **ACHIEVED** — 43/52 (83%) joint GAVI Alliance/Polio priority countries have drafted or finalized comprehensive multi-year plans.

MILESTONE 2: 100% OF COUNTRIES WITH INTEGRATED OR EXPANDED AFP REPORTING, AS APPROPRIATE (ESPECIALLY FOR MEASLES AND NEONATAL TETANUS):

STATUS: **PARTIALLY ACHIEVED.**

- 118/180 (66%) countries with AFP case-based reporting also have measles case-based reporting;
 - 180/193 (93%) countries have AFP case-based reporting systems.
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MILESTONE 3: 75% OF COUNTRIES WILL HAVE GAVI-SUPPORTED ICC AND IF APPROPRIATE, TAG.

STATUS: **ACHIEVED** — 43/52 (83%) of joint GAVI Alliance/Polio priority countries have GAVI Alliance-supported Interagency Coordinating Committees (ICCs) which work on broader issues as demonstrated by their development, approval, dissemination and implementation of comprehensive multi-year plans. Joint GAVI Alliance/Polio priority countries are defined as all GAVI Alliance-eligible countries in polio endemic regions (i.e. AFR, EMR, SEAR).

MILESTONE 4: 75% OF POLIO-FUNDED 'HUMAN RESOURCES' FORMALLY CONTRIBUTING TO MULTI-DISEASE PROGRAMMES.

STATUS: **ACHIEVED** — 100% of polio-funded staff contributes formally to multi-disease programmes.

MILESTONE 5: 100% OF COUNTRIES WITH POLIO OPERATIONS ARE FULLY INTEGRATED WITH THOSE FOR MEASLES.

STATUS: **ACHIEVED** — 85% of the institutions performing polio laboratory surveillance are also involved in national measles laboratory surveillance.

INTEGRATION OF LONG-TERM FUNCTIONS

Once wild poliovirus transmission is interrupted, all other polioviruses must be contained, surveillance for them sustained and a stockpile of vaccine maintained. These long-term functions of polio eradication will be integrated with existing mechanisms to help countries prepare for, monitor and respond to public health emergencies and outbreaks.

The International Health Regulations 2005 (IHR – which come into force in June 2007) call on signatories to develop, strengthen and maintain surveillance and response capacities for public health emergencies which may have an international impact. Polio eradication functions which are being incorporated into existing mechanisms to help countries comply with this instrument of international law include: surveillance – in the form of the AFP surveillance and laboratory network; vaccine stockpile and response functions to help deal with disease outbreaks; and laboratory containment functions such as those necessary for smallpox.

INTEGRATION OF CAPACITY AND EXPERIENCE

The global polio infrastructure encompasses its human resources, standards and operational guidelines governing polio eradication activities and the physical assets of the programme such as cars, computers and laboratory equipment. These have each over the years become an integral component of national and regional health systems. An indicator in WHO's *Medium Term Strategic Plan 2008-2013* is the number of countries in which the polio surveillance infrastructure contributes to national core capacity building for IHR.

Some 3,300 AFP surveillance and response staff operate in 54 countries, along with thousands more polio communication and social mobilization workers. A survey of 1,500 Global Polio Eradication Initiative-funded staff indicated that 85% give an average of half their time to work that is related to immunization, surveillance and outbreak response for other diseases – constituting the single largest source of such technical assistance to low-income countries. Polio staff helped to support measles mortality reduction activities that have averted 2.3 million deaths between 1999 and 2005¹, bringing the world closer to Millennium Development Goal 4; the human and physical infrastructure of polio eradication is fully involved in routine immunization coverage, the introduction of new and under-used vaccines, the distribution of insecticide-treated bed nets against malaria and the response to health emergencies following earthquakes and other disasters. The “Reach Every District” (RED) strategy that aims to improve access to routine immunization is built on the polio model and is operational in 56 countries. The global polio laboratory network serves to identify and track other diseases, including measles and yellow fever.

Highly trained polio surveillance officers are already among first to respond to major humanitarian and health emergencies around the world.

¹ Wolfson LJ, Strebel P, Gacic-Dobo M, Hoekstra E, McFarland JW, Hersh B, for the Measles Initiative. *Has the 2005 measles mortality reduction goal been achieved? A natural history modelling study.* Lancet 2007; 369: 191-200.

Countries with implementation of 'RED' activities in 2002–2006



As AFP surveillance officers are highly trained and on the ground, they are often the first to respond to haemorrhagic fever outbreaks like Marburg and Ebola, avian influenza, cholera and other serious infectious disease outbreaks for which the WHO's Global Outbreak Alert and Response Network (GOARN) was set up. As the Global Polio Eradication Initiative moves towards interruption of wild poliovirus, GOARN is expected to assume a greater role in polio surveillance.

4 FINANCING

The international community has over the past 19 years invested US\$ 5.3 billion in polio eradication, US\$ 695 million of this in 2006, a year in which the international donor community continued to make strong promises of financial support. In a statement to the 59th World Health Assembly in May 2006, EU member states re-affirmed their “full support” for polio eradication. G8 leaders, meeting in July 2006 at the G8 Summit in St Petersburg, pledged to continue support to polio eradication, following their 2005 commitment at Gleneagles to “continue or increase” their contributions to consign polio to the history books.

A broad public-private partnership that includes 44 donors of more than US\$ 1 million and 27 donors of more than US\$ 5 million, the Global Polio Eradication Initiative is, at the end of 2006, in its most precarious financial position ever. Unless additional funds are contributed quickly, the global programme will start to run out of money by mid-2007 and activities will have to be curtailed, putting at risk the 19-year eradication effort. The 2007-2008 global funding gap as of May 2007 stands at US\$ 540 million.

In 2006, governments of polio-affected countries, including Bangladesh, India, Indonesia, Namibia, Nigeria and Pakistan provided domestic funding at unprecedented levels.

The international donor community is urged to translate its public statements of support into funding for countries to finish the job. The humanitarian and economic case for finishing eradication is sound. A new study from Harvard University demonstrates that over a 20 year period, controlling polio at high levels would cost more, in human suffering and dollars, than finishing eradication.

The world has an opportunity to come together to finish polio eradication once and for all and give a perpetual gift to children across the world. The alternative is unacceptable: hundreds of thousands of children would again be paralysed by this disease over the coming years, and billions of dollars would be spent on outbreak response activities, rehabilitation/treatment costs and associated loss of economic productivity. The international community has very few opportunities to do something that is unquestionably good for every child and every country in the world. We owe it to all future generations to succeed.

The Global Polio Eradication Initiative is, at the end of 2006, in its most precarious financial position ever.

■ AUSTRIA

Austria continued its support to polio eradication by committing US\$ 710,000 in 2006 for Ethiopia's polio eradication efforts, bringing its total contributions to US\$ 1.67 million.

■ AUSTRALIA

In 2006 Australia provided US\$ 804,000 – vaccine funding for polio outbreak response in Nepal, as well as global funding – bringing its total contributions to US\$ 16.3 million.

■ BILL AND MELINDA GATES FOUNDATION

The Bill and Melinda Gates Foundation provided US\$ 39.8 million for Nigeria and surrounding countries, with the objective of minimizing spread of poliovirus along the Hajj pilgrimage route. This latest funding brings the Foundation's total commitments to US\$ 149.80 million.

■ CANADA

Taking steps towards fulfilling its G8 promise to “continue or increase” polio funding for 2006–08, Canada in 2006 provided US\$ 39 million in global funding, and earmarked an additional US\$ 4 million for 2006–07 activities in Afghanistan. These latest contributions bring Canada's total commitments to US\$ 181 million.

■ US CENTERS FOR DISEASE CONTROL AND PREVENTION (CDC)

In addition to its role as a core technical spearheading partner, CDC provided funding for OPV, operational costs and programme support to UNICEF and WHO. It also continued to support the Investment Partnership for Polio, which sees CDC providing funding to allow countries to buy down to zero World Bank loans for OPV, in effect turning the loans into grants. US Congress in its fiscal year 2006 allocated US\$ 101.25 million

to CDC for polio eradication. CDC continued to support the international assignment of epidemiologists, virologists and technical officers to assist WHO, UNICEF and polio-endemic countries in implementing polio eradication activities.

■ CENTRAL EMERGENCY RESPONSE FUND (CERF)

The CERF provided US\$ 830,000 to help Somalia and the Democratic Republic of the Congo respond to polio outbreaks.

■ DENMARK

Denmark contributed US\$ 500,000 in 2006 to support Niger's polio eradication programme.

■ EUROPEAN COMMISSION (EC)

The EC in 2006 continued its support of the polio eradication efforts of 14 African countries and provided US\$ 7 million in new funding for Niger. The European Community Humanitarian Office (ECHO) supported the Democratic Republic of the Congo's (DRC's) polio outbreak response with US\$ 480,000.

■ FRANCE

France, which joined the Global Polio Eradication Initiative in 2004, provided US\$ 12.6 million in global funding in 2006, as it paid its final instalment on its three-year, US\$ 36 million pledge. It also provided technical staff to assist Chad and Niger in their polio eradication programmes.

■ GLOBAL ALLIANCE FOR VACCINES AND IMMUNIZATION ALLIANCE (GAVI ALLIANCE) AND THE INTERNATIONAL FINANCE FACILITY FOR IMMUNIZATION (IFFIM)

The Executive Committee of the GAVI Fund at its September 2006 meeting approved US\$ 191.28 million for the creation, procurement and evaluation of

a polio vaccine stockpile as an investment case under the International Finance Facility for Immunisation (IFFIm). This investment will provide the up-front financing needed to establish a mOPV stockpile that GAVI Alliance-eligible countries can access (as needed) in the post-eradication era.

■ GERMANY

Germany committed an additional US\$ 37.2 million in multi-year OPV funding for India's polio eradication effort and signed a new US\$ 1.3 million global agreement for 2007–08. These latest contributions bring Germany's total contributions to US\$ 142 million.

■ ICELAND

Iceland followed its first-ever contribution to global polio eradication activities in 2005 with a second contribution of US\$ 50,000 in 2006.

■ IRELAND

Ireland signed a 2006–08 global pledge of US\$ 10.4 million, double its 2003–05 contribution to polio eradication, and bringing its total polio funding to US\$ 16.6 million.

■ JAPAN

Japan provided US\$ 13.4 million for OPV for SIAs in priority countries. Eighty per cent of this funding was earmarked for Ethiopia, India, Nigeria and Pakistan. Japan's 2006 contributions bring its total polio commitments to US\$ 312 million.

■ LUXEMBOURG

Luxembourg pledged US\$ 2.76 million for 2006–08, bringing its total polio contributions to US\$ 9.08 million. Luxembourg is the highest per capita government donor to the Global Polio Eradication Initiative, having provided US\$ 19.14 for every man, woman and child in Luxembourg.

■ MONACO

Monaco continued its support for polio eradication by providing US\$ 78,000 for polio eradication activities in Niger.

■ NETHERLANDS

The Netherlands Ministry of Health committed US\$ 210,000 to support polio work at the Dutch National Institute of Public Health.

■ NEW ZEALAND

New Zealand contributed US\$ 300,000 for global polio eradication efforts through their partnership with local Rotary clubs in the country.

■ NORWAY

Norway signed a two-year pledge to provide US\$ 15.2 million in global funding for 2006–07, bringing its total polio contribution to US\$ 50 million.

■ SULTANATE OF OMAN

The Sultanate of Oman continued its support for global polio eradication efforts by contributing US\$ 100,000 in 2006, bringing its total contribution to US\$ 200,000.

■ ROTARY INTERNATIONAL

Rotary International, a spearheading partner of the Global Polio Eradication Initiative, is the largest private sector donor to the Global Polio Eradication Initiative, and the second-largest contributor, after the Government of the United States. In 2006, Rotary International contributed US\$ 22.6 million to support polio eradication efforts in priority countries, bringing its total contributions to more than US\$ 616 million.

■ RUSSIAN FEDERATION

The Russian Federation, during its Presidency of the G8 in 2006, kept polio eradication on the G8 agenda during the Summit at St Petersburg and pledged US\$ 10 million in global funding for 2006–08, a 25% increase over its 2003–05 funding.

■ SPAIN

In 2006, Spain, through its Agencia Española de Cooperación Internacional, continued its strong support by providing US\$ 1.25 million for global polio eradication activities, including funding to maintain and improve certification standard surveillance in Angola, Cape Verde, Guinea Bissau, and Namibia.

TRIBUTE TO KOFI ANNAN

The former United Nations Secretary-General Kofi Annan played a critical leadership role in the strong progress made in global polio eradication efforts over the past 10 years. When he assumed his office in 1997, polio was endemic in most of Africa, South-East Asia and the Eastern Mediterranean; even Europe had not been certified polio-free. By the end of his tenure in 2006, only four countries in the world reported indigenous wild poliovirus transmission, and only one of these – Nigeria – is in Africa.

The former Secretary-General personally raised the polio eradication in bilateral meetings with Heads of State of key polio-affected and donor countries and regularly included the subject in his speeches at major events. In 2006, Mr. Annan took some extraordinary actions to engage leaders of polio-endemic countries, writing to the Heads of State to express his concern and that of the international community at the increase in the number of reported polio cases. His message of alarm caught the attention of the Heads of State and helped mobilize efforts to improve the quality of polio immunization activities.

Noting that the program faced a critical funding gap for implementing activities in 2006, the Secretary-General also took the initiative to write to the Kings and Heads of Government of the Gulf Cooperation Council member states requesting that they partner in this global effort and provide financial resources. Contributions and pledges are now being received in response to his request. Mr. Annan also contacted the leaders of a number of G8 countries, urging them to fulfil their funding commitments for polio eradication.



PHOTO © UN PHOTO/P. FILGUEIRAS

■ **UNITED NATIONS CHILDREN'S FUND (UNICEF)**

In 2006, spearheading partner UNICEF provided funding for polio eradication activities through several channels:

Regular Resources: UNICEF allocated regular resources of US\$ 12 million for polio activities in Afghanistan, Pakistan, India, Nigeria, Angola, Namibia and Sudan.

National Committees: UNICEF National Committees in Switzerland, Iceland, Australia, Canada and the United Kingdom together contributed US\$ 954,000 for polio eradication activities in priority countries.

UNICEF Country Offices: UNICEF offices in Angola, Bangladesh, DR Congo, India and Namibia locally reprogrammed US\$ 1.7 million in funding for polio eradication activities.

■ **UNITED KINGDOM'S DEPARTMENT FOR INTERNATIONAL DEVELOPMENT (DFID)**

DFID's US\$ 53.65 million in global and country-specific funding in 2006 brought its total polio contributions to more than US\$ 600 million. DFID

complemented its flexible global funding with support for Pakistan, India, Somalia, Indonesia and Myanmar, as it continued to take action on the pledge of G8 leaders at the 2005 G8 Summit at Gleneagles to "continue or increase" funding for 2006–08.

■ **UNITED NATIONS FOUNDATION (UNF)**

In 2006, the UNF provided US\$ 3.34 million for surveillance in WHO's AFR and EMR regions, for OPV for Myanmar and operations costs for Nigeria, while also continuing its support to the Global Polio Eradication Initiative's resource mobilization efforts.

■ **USAID**

US Congress in its fiscal year 2006 allocated US\$ 32 million through USAID to support global polio eradication efforts. In addition, USAID's Office of US Foreign Disaster Assistance (OFDA) provided US\$ 200,000 for polio eradication activities in south/central Somalia. USAID's total contributions to polio eradication are more than US\$ 322 million.

■ **WORLD BANK**

The World Bank provided a US\$ 6 million grant to Afghanistan for the purchase of OPV in 2006–07. Nigeria and Pakistan continued to benefit from the World Bank Investment Partnership for Polio, which sees the Bill and Melinda Gates Foundation, Rotary International, CDC and UNF providing funding to allow countries to buy down to zero World Bank loans for OPV, in effect turning the loans into grants. This innovative financing mechanism has since 2003 facilitated the purchase of US\$ 165.5 million of OPV in Nigeria and Pakistan.

GLOSSARY OF TERMS

ACPE	Advisory Committee on Poliomyelitis Eradication
AFP	Acute flaccid paralysis
AFRO	WHO Regional Office for Africa
AMRO	WHO Regional Office for the Americas
CDC	US Centers for Disease Control and Prevention
cVDPV	Circulating vaccine-derived poliovirus
DFID	UK Department for International Development
EC	European Commission
EMRO	WHO Regional Office for the Eastern Mediterranean
EURO	WHO Regional Office for Europe
EPI	Expanded Programme on Immunization
GAP III	WHO Global Action Plan to minimize poliovirus facility associated risk in the post-eradication/post-OPV era
GAVI Alliance	Global Alliance for Vaccines and Immunization
GCC	Global Commission for the Certification of the Eradication of Poliomyelitis
ICC	Interagency Coordinating Committee
IFFIm	International Financing Facility for Immunization
IPV	Inactivated polio vaccine
ITN	Insecticide-treated net
mOPV	Monovalent oral polio vaccine
NCC	National Certification Committee
NID	National Immunization Days
OIC	Organization of the Islamic Conference
OPV	Oral polio vaccine
RCC	Regional Certification Commission
RED	Reaching Every District
SEARO	WHO Regional Office for South-East Asia
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
WHA	World Health Assembly
WHO	World Health Organization
WPRO	WHO Regional Office for the Western Pacific

Success will ensure
a gift in perpetuity
to children of future
generations.

Success is the
only option.



PHOTO © UNICEF/RAVI KUMAR GUPTA

A child is immunized in Bihar, India.

ANNUAL REPORT 2006

POLIO

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