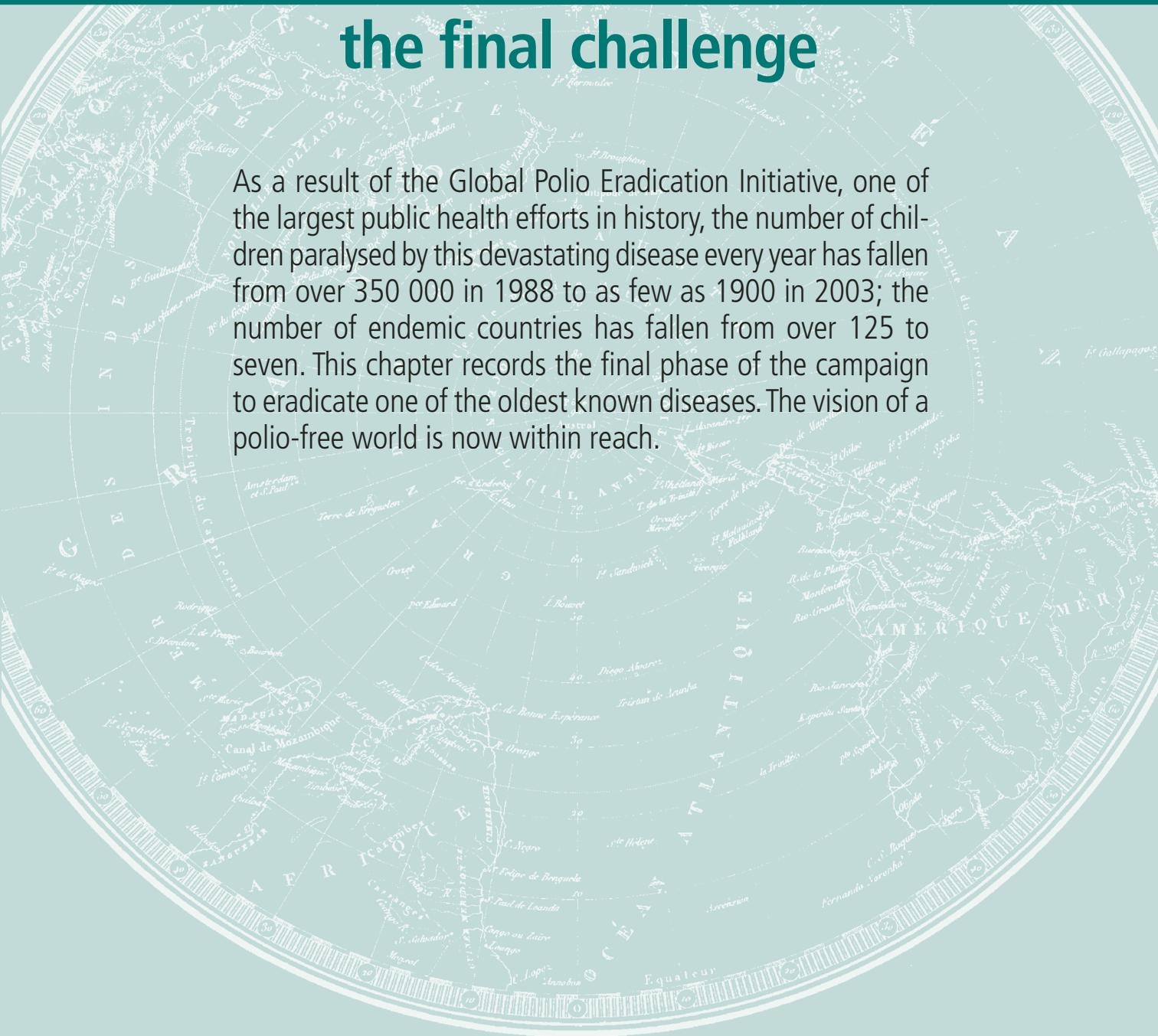


Polio Eradication: the final challenge

As a result of the Global Polio Eradication Initiative, one of the largest public health efforts in history, the number of children paralysed by this devastating disease every year has fallen from over 350 000 in 1988 to as few as 1900 in 2003; the number of endemic countries has fallen from over 125 to seven. This chapter records the final phase of the campaign to eradicate one of the oldest known diseases. The vision of a polio-free world is now within reach.



4

Polio Eradication: the final challenge

In 1962, just 12 months after Albert Sabin's widely hailed oral polio vaccine (OPV) was licensed in most industrialized countries, Cuba began using the vaccine in a series of nationwide polio campaigns. Shortly thereafter, indigenous wild poliovirus transmission had been interrupted. In other words, no Cuban child would ever again suffer this devastating disease as the result of a Cuban poliovirus. Seldom, if ever, had a new health technology been fully exploited so successfully and so early in its lifespan, to the benefit of so many people. Few countries were to experience such early successes, however, as polio continued to paralyze permanently half a million people every year – even by the 1990s between 10 and 20 million people who had survived the acute illness were living with its debilitating and often painful consequences. For Sabin, however, Cuba's experience with mass campaigns had reaffirmed his conviction that polioviruses could be eradicated so completely that future generations would know polio paralysis only through history books. Sabin's way of shaping that future without polio was to donate his vaccine to the World Health Organization so that it might be made available to all peoples, everywhere.

Forty years later, the world is on the verge of realizing Sabin's global vision of a future without polio. Through an extraordinary 15-year international effort, indigenous polioviruses have now been eliminated from all but seven countries, down from over 125 when the initiative began (1) (see Figure 4.1). This progress is the result of a unique partnership forged between governments, international agencies, humanitarian organizations and the private sector to take up three key challenges to reaching all children, everywhere: effective engagement of political leaders, adequate financing, and sufficient human resources. Through this partnership, over 10 million volunteers immunized 575 million children against polio in 93 of the lowest-income countries in the world in the year 2001 alone. This experience, and the prospects for the completion of polio eradication, provide insights for scaling up access to other health interventions, a process that will be essential to achieving ambitious national and international health targets such as those adopted in the Millennium Development Goals (2).

A new kind of partnership

As international interest in a global effort to eradicate polio began to build up 20 years ago, there was limited experience with large-scale international health initiatives and with partnerships. In the mid-1980s, however, as an increasing number of countries in South America – most notably, Brazil – successfully applied the Cuban model of mass campaigns and heightened surveillance to control polio, a new kind of partnership began to emerge with this common purpose.

By 1988, the year in which the World Health Assembly voted to launch a global initiative to eradicate polio (3), four agencies had begun to form the core of the “polio partnership”: the World Health Organization, Rotary International, the United Nations Children’s Fund (UNICEF) and the United States Centers for Disease Control and Prevention (CDC). Over the following 15 years, the polio partnership has grown to become an extensive network of national governments, international agencies, private corporations, foundations, bilateral donors, humanitarian organizations, nongovernmental organizations and development banks. The work of the partnership continues to be governed by a common, multiyear strategic plan and overseen by international technical committees at the country, regional and global levels. The close relationship between national health authorities and this international partnership was critical to the extremely rapid scaling-up of eradication activities in the mid-1990s, as the initiative began building on the early momentum in the Americas and the Western Pacific Region and extended its activities to all countries of all regions. By the end of the decade, over 500 million children were regularly being reached with OPV through the efforts of 10 million volunteers in every low-income and middle-income country in the world.

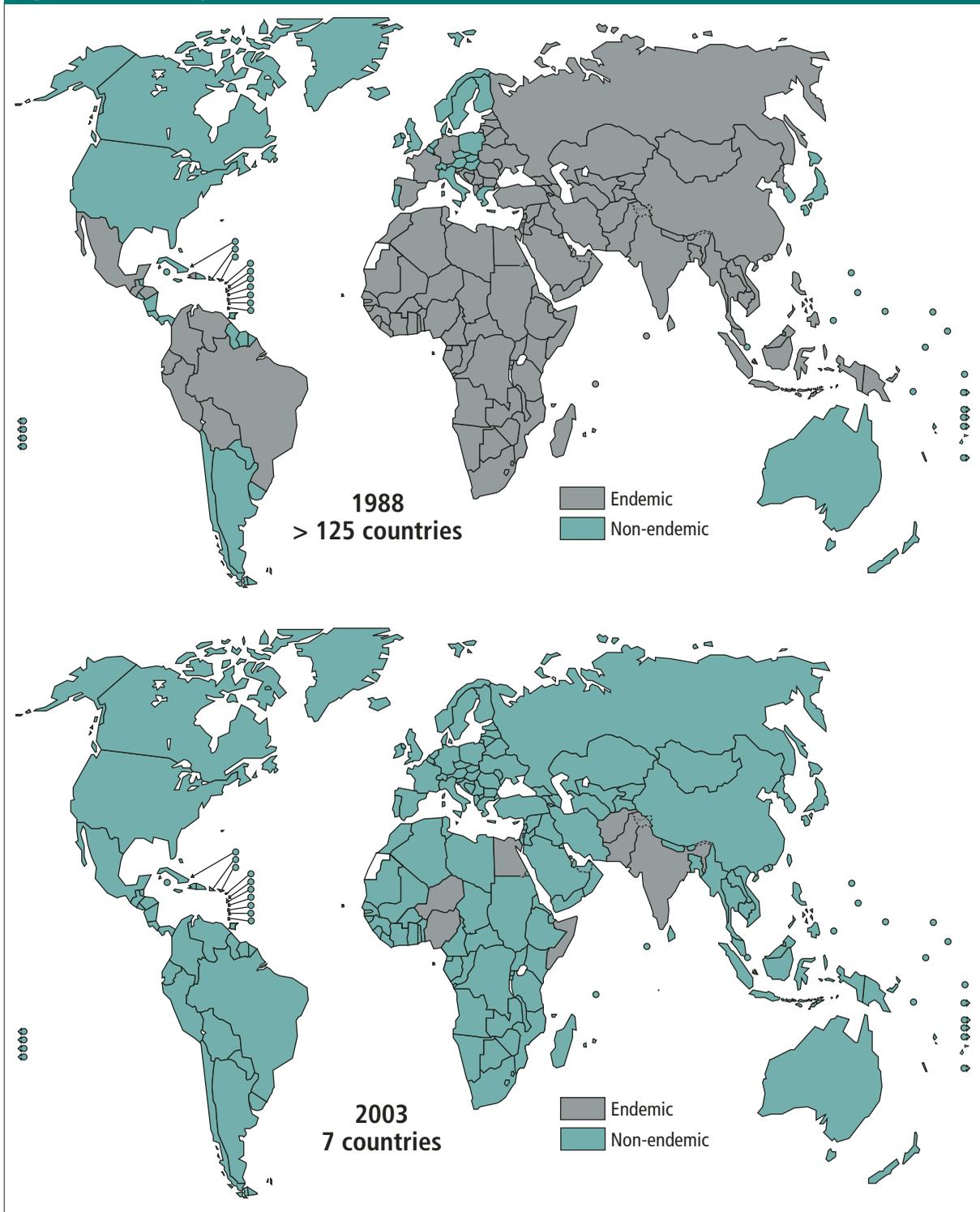
From the outset, this partnership sought to bring a new efficiency to international support for national health efforts. It relied heavily on strategies and management processes that had been established by the Pan American Health Organization (PAHO) in its work to achieve regional elimination of polio. This goal was realized in 1991, when a young Peruvian boy named Luis Fermin Tenorio became the last child ever to be paralysed by a wild poliovirus in the Region of the Americas. The global partnership adopted PAHO’s proven four-pronged strategy: high coverage with routine OPV immunization, national polio immunization days, surveillance and laboratory investigation of acute flaccid paralysis (AFP) cases, and massive house-to-house “mop-up” campaigns (4). PAHO’s Interagency Coordinating Committee (ICC) mechanism brought together partner inputs at the country level to ensure sufficient resources, while promoting transparent budgeting and efficiencies. The ICCs, convened regularly by national ministries of health, ensured that national authorities were always at the centre of key decisions on strategy implementation. The global partnership also emphasizes engagement at the highest political levels in both donor and endemic countries.

Effectively engaging political leaders

The most visible element of the polio eradication initiative has been the National Immunization Days (NIDs), as they require the immunization of every child under 5 years of age (nearly 20% of a country’s population) over a period of 1–3 days, several times a year for a number of years in a row. In many countries, the scale and logistic complexity of these activities were even greater than those of campaigns undertaken during the height of the smallpox eradication effort. Consequently, the commitment of political leaders has been central to their success. This support has been generated by actively and continuously advocating for such leaders to play a role in three key areas: oversight, access to non-health resources, and accountability.

The oversight of polio activities by political leaders has often begun with their personal participation in highly visible events such as the launching of NIDs and, ideally, has continued with their monitoring of progress. Following the example of South America, most countries have had their NIDs launched by the head of state or other prominent political figure. For example, in China, President Jiang Zemin immunized the first child in the national polio campaign in 1993. In the same year, King Sihanouk played a similar role in Cambodia. In 1996, President Nelson Mandela of South Africa launched the “Kick Polio Out of Africa” campaign at the Organization of African Unity (OAU) meeting in Yaoundé, Cameroon, and committed the OAU to regularly monitoring progress (5). Among donor countries, polio has

Figure 4.1 Endemic polio in 1988 and mid-2003



received similar support – most noticeably when the G8 Heads of Government discussed their role in closing the funding gap for eradication activities during their meetings of 2002 and 2003 (6).

This high-level visibility has been critical to achieving the second, and perhaps most important goal of political advocacy: access to government and nongovernmental resources which lie outside the health sector. Because of the huge numbers of people and vehicles that are required to implement NIDs, such activities are beyond the logistic and communication capacity of the health sector in many countries. Consequently, countries have drawn heavily on ministries of information, transport, defence and others to help solve the challenge of rapidly reaching all children, in all corners of a country. Countries have also engaged the private sector, often on an extraordinary scale. In the Philippines, for example, more than 140 private companies have regularly donated personnel, vehicles, facilities and financial support. The effective mobilization of such support has been possible only when the highest political leadership, at both national and subnational levels, endorsed the initiative publicly and took the necessary steps to put these resources at the disposal of health authorities. Thus, the delivery of this health service became a government and societal responsibility, with the responsibility of the health sector moving from implementation to management and monitoring.

This personal engagement of political leaders in the oversight and implementation of activities leads naturally to the third goal of political advocacy: heightened accountability, both

Box 4.1 Progress towards polio eradication in the Eastern Mediterranean

All countries of the Eastern Mediterranean Region are rapidly progressing towards the eradication of poliomyelitis. The number of cases has decreased relatively regularly, as shown by the well-developed and efficient surveillance system. By the end of 2002, poliovirus transmission had been interrupted in 18 countries of the region for more than three years; in addition, Sudan has not reported a single polio case since April 2001. During 2002, 110 confirmed cases of polio were reported from only four countries (Pakistan: 90; Afghanistan: 10; Egypt: 7; and Somalia: 3). During the first eight months of 2003, 61 cases were reported (Pakistan: 57; Afghanistan: 2; and Egypt: 1); a further case, in Lebanon, proved to be imported and genetically linked to the virus strains from India.

Intensified national immunization days (NIDs) are continuing in 2003, with technical support from WHO, both in endemic countries (Afghanistan, Egypt, Pakistan and Somalia) and in Sudan which was recently declared polio-free. All these countries conduct more than two NIDs and one or more rounds of sub-national immunization days (SNIDs) in high-risk districts each year, reaching all children through house-to-house immunization. Acute flaccid paralysis (AFP) surveillance continued to improve throughout the region. The non-polio AFP rate has further increased in 2003 to reach 2.39 per 100 000 children under 15 years of age, while stool specimen collection has reached 90%.

As the polio eradication initiative moves into its final phase, technical advisory groups for the priority countries regularly review the epidemiological situation and national plans and provide technical advice. In addition, a regional technical advisory group was established to provide leadership for eradication activities in the remaining polio-endemic countries and to advise Member States on other technical issues. Increasing attention is being given to the laboratory containment of wild

poliovirus, the certification of polio eradication and the development of post-certification immunization policy.

National containment coordinators have been nominated in 19 of the 23 countries of the region, 16 of which have also established national containment committees. By the end of 2002, 18 countries had prepared a national containment plan; three of the remaining five countries still have ongoing virus transmission. The first containment phase has been successfully completed in seven countries and is currently being implemented in another 11.

All countries of the region except Somalia have established National Certification Committees (NCCs) with appropriate membership. Eighteen countries with no viral circulation have submitted reports and national documentation to the Regional Certification Committee (RCC), which has already reviewed 15 of these reports and provided appropriate feedback. The RCC is also reviewing annual updates provided by countries whose initial reports were satisfactory. These annual updates will be submitted annually until regional certification is achieved.

Despite the significant achievements in remaining endemic areas, the eradication programme still faces a number of challenges and constraints that must be overcome to reach the final goal. The main focus now is Pakistan, where several outbreaks occurred during 2002–2003. It seems that the youngest children in tribal and conservative populations are likely to be missed if the vaccination team does not include a woman. In order to overcome these difficulties, the emphasis is on enlisting federal, provincial and local political leaders and expanding the SNIDs to target all transmission zones. New international staff are being mobilized in districts with no previously assigned consultants, to help provide the needed technical support to ensure high-quality performance in surveillance in all areas.

within and outside the health sector. Only the highest-level political leadership has the necessary authority to ensure this accountability, particularly in the non-health ministries whose personnel and resources are so important in ensuring that all children are reached with OPV.

Such high-level engagement of political leaders has brought additional, often extraordinary, benefits. Recognizing that poliovirus knew no borders, in April 1995 leaders of 18 countries of Asia, Europe and the Eastern Mediterranean began coordinating the OPV immunization of 56 million children. Similar activities followed in Africa, where the conflict-affected countries of Angola, the Democratic Republic of the Congo, Gabon, and the Republic of the Congo synchronized three rounds of NIDs from July 2001, reaching 15 million children. Throughout the past 15 years, in countries such as Afghanistan, Angola, Sierra Leone and Sri Lanka, warring parties have laid down their weapons to participate in “days of tranquility” so that their children might be immunized against polio (7). Progress towards eradication in countries of the Eastern Mediterranean and South-East Asia Regions is detailed in Boxes 4.1 and 4.2.

Finding the funds

Sabin’s vision of a world without polio required reaching all children with multiple doses of OPV, which in turn required substantial financial resources and in-kind contributions from national and international sources. To mobilize and manage resources on this scale, the polio partnership established a mix of strategies and mechanisms. The success of this approach is reflected in the mobilization of more than US\$ 5 billion in funding and in-kind contributions for polio eradication activities, over a 20-year period (8). While the majority of these funds went to time-limited eradication activities, a substantial proportion was directed to the strengthening of routine immunization and surveillance services.

In any given country, the proportion of costs covered by national and international sources has correlated most closely with income level and health system capacity. China, for example, has estimated that over 95% of its costs were borne by the country itself. Even in the poorest countries with virtually non-existent formal health services, such as Somalia, the community absorbs 25–50% of the real costs of implementing polio NIDs through in-kind contributions. Because of the diversity of the communities, governments and partners that have

Box 4.2 Responding to the challenge of polio eradication in South-East Asia

In 2002, the global goal of polio eradication was jeopardized as India suffered the largest outbreak in recent history: 1600 cases were reported that year, a fivefold increase over 2001. As the epidemic spread into Indian states which had finally become polio-free in recent years, the number of infected districts more than doubled from 63 in 2001 to 159. Because of India’s long borders with Bangladesh and Nepal, the epidemic also threatened these polio-free countries. By the end of 2002, the South-East Asia Region accounted for 84% of the global polio burden. Since then, however, a massive national and international response has again brought polio to the brink of elimination in the most populous WHO region.

By the end of 2000, 9 of the 10 WHO Member States in the South-East Asia Region and 35 of India’s 37 states had interrupted wild poliovirus transmission as part of the global eradication effort. In addition to Bangladesh and Nepal, Myanmar has been polio-free since 2000; Bhutan, the Democratic People’s Republic of Korea, Indonesia, Maldives, Sri Lanka and Thailand all stopped indigenous transmission prior to 1999.

This progress is the result of a regionally coordinated, data-driven programme that began in the early 1990s and through which National Immunization Days have reached over 200 million children, often synchronized across Member States and supported by regional bodies such as the South Asian Association for Regional Cooperation. Strong polio surveillance and a regional network of 17 high-quality laboratories have guided the effort and confirmed these achievements.

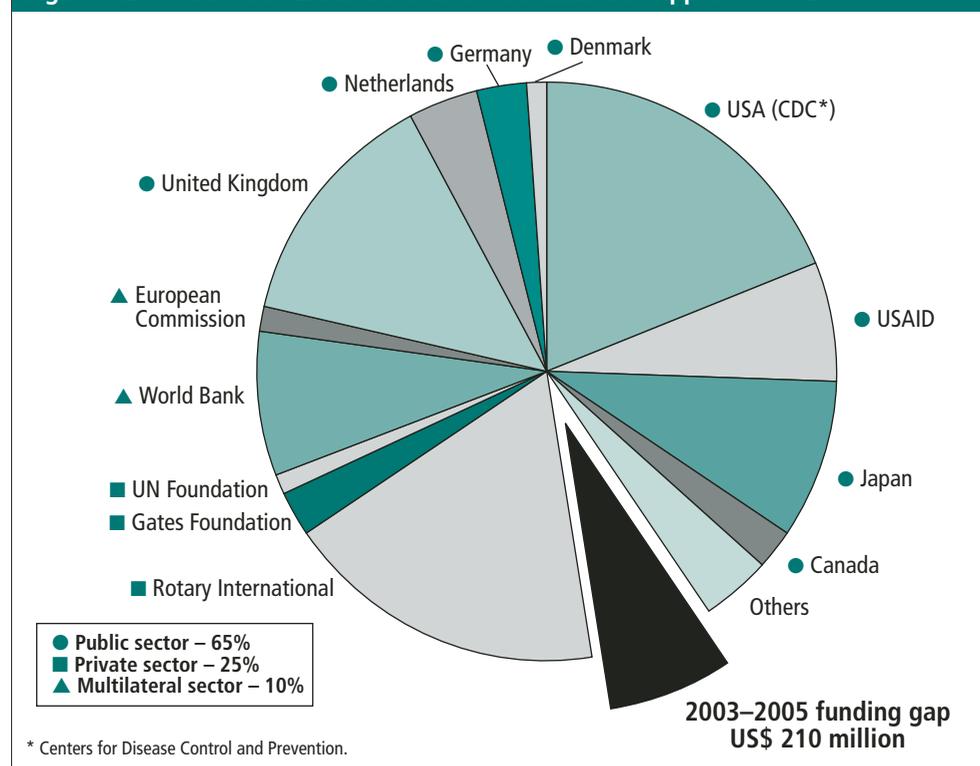
Investigations into the 2002 epidemic demonstrated that a combination of low routine immunization coverage and an insufficient scale, number and quality of polio campaigns had led to a rapid accumulation of susceptible children, especially in the state of Uttar Pradesh. In response, political oversight of the programme was markedly increased, the number of polio campaigns was raised to six per year, and additional efforts were made to reach children in minority populations. Consequently, by the end of September 2003, polio was at its lowest level in history (132 cases) and there was again the real possibility of forever eliminating this devastating disease from South-East Asia by 2005.

contributed to the implementation of polio activities, it is impossible to quantify accurately the value of all financial and in-kind expenditures. Of the over US\$ 5 billion that will have been spent on the initiative, however, a conservative estimate based on the time of volunteers and health workers during NIDs – the most labour-intensive of the strategies – suggests that polio-endemic countries will have contributed at least US\$ 2.35 billion in volunteer time alone between 1988 and 2005 (8). Additional public and private sector resources from the national, state, province, district and local community levels paid for petrol, social mobilization, training and other costs.

External sources will have provided at least US\$ 3 billion to help endemic countries cover polio eradication costs. Of the more than 100 external donors to date, 26 will have contributed more than US\$ 1 million over the lifespan of the initiative and 12 at least US\$ 25 million (see Figure 4.2). A particular strength of the polio initiative has been its strong partnership with a number of non-traditional donors of development aid, most notably Rotary International (see Box 4.3). The country-level budgeting and resource management processes, combined with centralized tracking of resource requirements and funding flows, have allowed the programme to accommodate the needs of donors and recipient countries while improving the efficient use of available financing. Despite their limited infrastructure, many low-income and lower-middle-income countries have clearly demonstrated a tremendous absorptive capacity for health resources, which can rapidly achieve real health outcomes.

Although the coordinated international advocacy and resource management of this initiative have been very successful, the most striking aspect of the financing for polio eradication has been the substantial contribution of endemic countries and communities themselves to ensuring that their children share fully in the global vision of a world without polio.

Figure 4.2 Global Polio Eradication Initiative: financial support 1988–2005



Finding the people

While strong political engagement and substantial financial and in-kind resources are essential to the success of the polio initiative, they are not sufficient. These two elements have had to be complemented with sufficient people to implement the eradication strategies in every corner of the world. Although high-income and higher-middle-income countries could usually rely on strong health services to implement the eradication strategies, a massive gap in the critical area of human resources for health, particularly in low-income and lower-middle-income countries with the greatest polio burden, threatened the success of the entire global effort.

The number, mix and distribution of people required to eliminate polio from countries differed, depending on the strategy. The most labour-intensive strategies were the massive, time-limited, supplementary immunization activities such as NIDs and “mop-up” campaigns. The most skill-intensive strategy was that involving continuous disease surveillance and laboratory activities. In general, the very different human resource requirements of the two types of strategy were met through different approaches.

The number of people required to implement NIDs is tremendous. As noted above, an estimated 10 million volunteers and health workers immunized 575 million children during such polio eradication activities in 2001. Two key aspects of NIDs were critical to resolving the gap between existing, trained vaccinators in a country and the number needed for NIDs. First, because NIDs only require administering 2 OPV drops to a child and then recording the number immunized, with 1–2 hours of training community volunteers could safely deliver the service. Second, the time-limited nature of NIDs meant that volunteers were willing to participate and that other government ministries, nongovernmental organizations and private sector partners could bear the opportunity costs incurred by having their staff participate. Consequently, the major challenge for national and subnational health authorities and the polio partnership became the mobilization, training, equipping and management of these human resources. Given the scale of this mass mobilization, a substantial effort was made to include other interventions in NIDs where feasible and safe: it has been estimated that the inclusion of vitamin A supplementation in polio NIDs averted 1.25 million childhood deaths (9).

The high-quality surveillance required for guiding supplementary immunization activities and monitoring their impact called for a different human resources response. Far fewer people were required than for NIDs, but with a much higher level of skills to identify, notify,

Box 4.3 A public–private partnership for polio eradication

Rotary International is one of the four spearheading partners of the Global Polio Eradication Initiative, having endorsed the concept of a global effort even before the World Health Assembly resolution of 1988. In 1985, Rotary pledged its commitment to the international health goal of a “polio-free world” by the time of its centenary in 2005.

In endemic areas, Rotarians – from more than 160 countries – have volunteered their time to help ministries of health with every aspect of the programme, including polio vaccine delivery, health worker transport, provision of critical equipment, and community mobilization. In polio-free countries, Rotarians have continuously raised the profile and importance of polio eradication through advocacy and public information campaigns.

Rotary International has provided financial support to polio eradication on an unprecedented scale. By 2005, Rotary’s direct financing will have reached over US\$ 500 million since 1988, 20% of the total external financing for the entire initiative. In addition, Rotary has been at the centre of the multi-agency advocacy effort that has mobilized US\$ 2.4 million in further external funding from donor governments, foundations, development banks and the private sector.

Rotary International has campaigned with key political leaders of both endemic and polio-free countries to ensure their active participation in the programme. This regular, high-level advocacy by a private sector partner has kept polio eradication high on the global agenda, despite many competing priorities

investigate and respond to cases of AFP (4). Furthermore, they had to be available on an ongoing basis. Consequently, the polio partnership focused on working with national authorities to expand and strengthen the existing national surveillance infrastructure wherever possible. Where this infrastructure was functionally non-existent, partners worked with national authorities to establish AFP surveillance. In any particular country, the strategy pursued to close this human resources gap depended on the broader national strategy for strengthening health services. In some countries, surveillance personnel received government salaries with operating costs, including vehicles and equipment, covered by international sources. In other countries, national salaries were supplemented by partners as part of a government strategy to retain highly qualified staff. In still others, WHO and governments established and operated a joint surveillance programme. In addition, WHO hired and deployed nearly 1500 national and international staff to provide technical assistance and even conduct surveillance activities in those areas with the weakest capacity.

Through this mix of strategies and approaches to the gap in human resources for health, it has been possible to reach almost every child in the world with OPV and other interventions (such as Vitamin A supplementation), irrespective of socioeconomic status, religion, minority status, geography or even war. In addition, a truly global surveillance and laboratory capacity now exists to identify and respond rapidly to polio, as well as to many other diseases of public health importance such as measles, neonatal tetanus, meningitis, cholera and yellow fever, depending on the country (10). In the Western Pacific Region, this capacity contributed to the international response to the SARS outbreaks of 2002–2003.

Prospects for a polio-free future

As the result of an aggressive, deliberate and internationally coordinated effort, polio has changed from being a devastating disease with a global distribution to one that is now geographically restricted to seven countries. To capitalize on this progress, substantial effort is now required to interrupt the final chains of polio transmission, certify that achievement, and minimize the risk of polio being reintroduced in the future. The polio partnership's Polio Eradication Strategic Plan 2004–2008 summarizes these challenges in its major objectives.

First, the final chains of poliovirus transmission must be interrupted in the remaining seven countries. Particular effort will be required in India, Nigeria and Pakistan, which now account for 99% of the world's polio burden and remain a source of importation to polio-free areas. Within these countries, five of the 76 states or provinces are the key to global eradication; with sustained high-level political engagement, oversight and accountability in each one, high-quality NIDs could rapidly reach all children and halt polio transmission within 12 months.

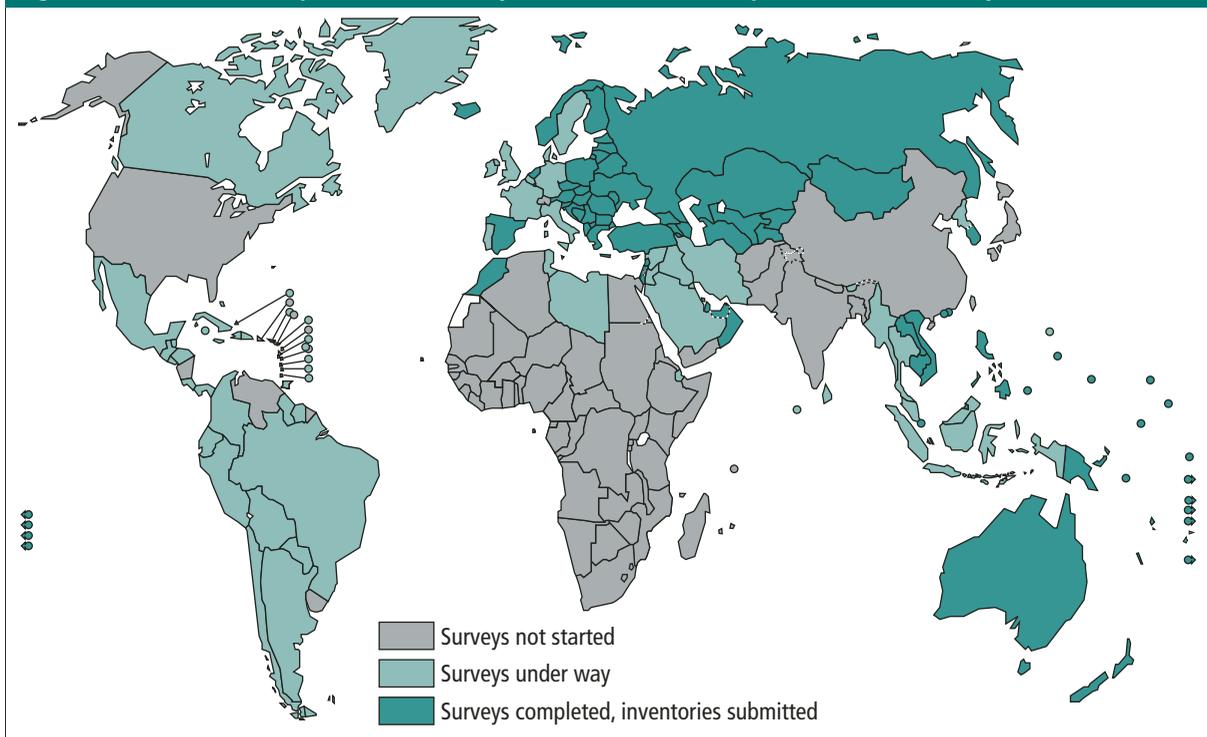
Second, the global interruption of wild poliovirus transmission must be verified by the Global Commission for the Certification of Poliomyelitis Eradication. Certification requires that all countries provide documentation demonstrating the absence of wild poliovirus circulation for at least three years, in the presence of high-quality surveillance, as well as the "containment" of all stocks of wild poliovirus. Containment requires that within one year of the interruption of wild poliovirus transmission globally, countries will have identified all stocks of wild poliovirus and ensured their storage and handling under appropriate biosafety conditions (see Figure 4.3).

Third, appropriate policies will need to be developed, and internationally agreed, for the post-certification era. These policies must be designed to both minimize the risk of reintroduction of wild poliovirus and ensure the global capacity to manage such an event should it occur. Consequently, policies will be needed in four areas: polio detection and notification, long-term biocontainment of *all* poliovirus strains (that is, wild and vaccine strains), polio vaccine stockpiles, and routine immunization (11). The development of these policies will be even more complex than it was for smallpox, for a number of reasons. For example, the very low risk of vaccine-derived polioviruses regaining the capacity to cause outbreaks is now well documented. Furthermore, the risks of international terrorism have substantially affected the willingness of some policy-makers to plan for the discontinuation of routine polio immunization in the near future, regardless of the economic benefits. Because of the complexity of these issues, ongoing research in this area will be complemented by broad consultation with governments and stakeholders through the World Health Assembly and other forums from 2004 onwards (11).

Scaling up the delivery of health services

The greatest success of the polio eradication initiative to date has been its capacity to reach virtually every population in the world with a basic health service, regardless of geography, religion, conflict or even the strength of the health system. This experience in scaling up to implement fully the eradication strategies is now one of the most valuable assets of the programme. Perhaps the most frequent, if unfair, criticism of the highly regarded smallpox eradication effort was that it left little infrastructure behind to tackle other diseases. Indeed, the ultimate legacy of the polio eradication initiative will depend largely on the extent to which the experience and lessons learnt are used in scaling up the delivery of other health services.

Figure 4.3 Global action plan for laboratory containment of wild polioviruses, February 2003



Although political engagement, partnership management and financing were essential components of the scale-up, these approaches alone were not sufficient in areas with particularly weak health systems. In such areas it was only possible to achieve scale-up after other fundamental gaps in the health system had been tackled. At the central level, joint national and international technical advisory bodies, established at either the regional or national level, helped strengthen and support policy-making functions. Substantial international technical assistance then helped build national capacity to translate these policies into local guidelines and procedures, while assisting national bureaucracies to “jump start” their implementation. At the sub-national level, national staff were trained or hired to perform these functions. In general, a very pragmatic approach was taken to ensure appropriate remuneration for the work that was conducted. Great emphasis was placed on establishing national capacity to monitor and evaluate strategy implementation effectively at each level, using standard and robust performance indicators for every aspect of the programme, from the collection of stool specimens from suspect cases to the cost per child immunized.

At the level of service delivery, the major challenges related to creating and then meeting demand for immunization with OPV. Demand creation was usually a major issue only in urban areas; in rural settings, the simple availability of the service was often sufficient to create the necessary demand, and this is likely to be the case for other pressing needs such as HIV treatment. Consequently, social mobilization was the principal service delivery challenge in the urban setting while logistics were far more important in rural areas. Mobilizing communities in urban areas required a heavy reliance on radio and television, with carefully tested messages delivered by appropriate spokespeople. In the rural setting, the systematic identification and engagement of traditional and community leaders was the essential foundation for the person-to-person communications that were needed. The logistic demands of actually delivering OPV in urban areas could frequently be met through the formal health services, supplemented by paramedical personnel or students. In the rural setting, gaps in the formal health service required community volunteers for every element of the programme from the collection of vaccine from depots through to immunization, tallying and reporting.

While the importance of all of these elements is widely and well recognized, the strength of the eradication initiative has been in its ability to deal sufficiently with these matters at the international, national and peripheral levels at the same time. This was only possible, however, by deploying substantial numbers of technical and support staff in areas where the formal health systems were weakest; the number of these staff reached nearly 3000 by the year 2001, with 80% in just 15 countries.

Many of the newer international disease control initiatives, such as those targeting other vaccine-preventable diseases, AIDS, tuberculosis and malaria, must deliver more complex interventions than OPV. Nonetheless, the lessons learnt through polio eradication in filling gaps in the health system are also applicable to scaling up the delivery of such services. For example, the success of these newer initiatives will also require the active participation of communities on a massive scale to close the gap caused by insufficient numbers or distribution of trained health workers. Optimizing the engagement of volunteers – whether to deliver bednets, conduct HIV education, or distribute drugs and ensure their consumption – will also require supply lines that can provide every community with the necessary tools on a predictable, if intermittent, basis.

Optimizing the potential benefits of the polio eradication infrastructure, experience and lessons will require strengthening linkages with newer programmes to scale up access to these important health interventions. WHO is firmly committed to strengthening these links for

the benefit of all peoples everywhere and being as bold with the new interventions as Cuba was in rapidly scaling up the use of OPV.

Progress in eradicating this debilitating disease clearly demonstrates that national governments, backed by strong international partnerships, can generate and manage the political leadership, financing, and human resources needed to reach all populations with health interventions. The ultimate success of the polio eradication effort, however, is still not guaranteed; it now rests with the leaders of a very small number of endemic areas, who must ensure that all of their children are immunized, and the leaders of wealthy countries, who must act on their verbal pledges to close the chronic financing gap for these activities. In meeting these challenges, the world will create a global public good for health whose benefits will accrue to all children, potentially for ever.

This chapter has chronicled the long and difficult war against one of the world's oldest diseases. Chapter 5 is the story of the brief but deadly encounter with one of the world's newest threats, SARS – how a vital victory was achieved, and the lessons it offers for the future.

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