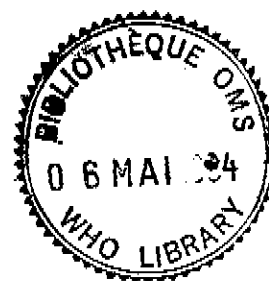


World Health Organization



***Progress Towards the
Global Eradication
of Poliomyelitis***

**Status Report
March, 1994**



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The Poliomyelitis Eradication Initiative

The initiative to eradicate poliomyelitis from the world by the year 2000 was launched by the resolution of the World Health Assembly in May, 1988. The resolution specified that eradication was to be achieved in a manner that strengthened the Expanded Programme on Immunization (EPI) and promoted primary health care (PHC). Following apparent success in the Region of the Americas, a revised Global Plan of Action was endorsed by the World Health Assembly in 1993. The plan defined the three basic strategies recommended by WHO to eradicate wild polioviruses: maintaining high coverage with oral polio vaccines, improving surveillance systems to detect and investigate all possible polio cases and conducting supplementary immunization to control disease in high-risk populations. Integration of polio eradication within EPI ensures that improved surveillance and disease control capabilities resulting from the initiative will be used to eliminate neonatal tetanus as a public health problem and, eventually, to eradicate measles.

The World Health Organization (WHO) is just one member of a coalition seeking to achieve poliomyelitis eradication. The principal members of the coalition are the Ministries of Health in the polio-endemic countries of the world. These countries are providing the staff and finance to conduct the work of eradication. These countries are supported, in addition to WHO, by many other donor governments, nongovernmental organizations and UN agencies, notably the PolioPlus programme of Rotary International and UNICEF. The purpose of this report is to inform current and future supporters of the initiative on the progress and achievements in the six years since the World Health Assembly resolution and to summarize the remaining constraints. I hope to share the enthusiasm felt for the progress achieved and the optimism that exists at WHO that the goal will be attained by the target date.



Dr J.W. Lee
Director
Global Programme for Vaccines

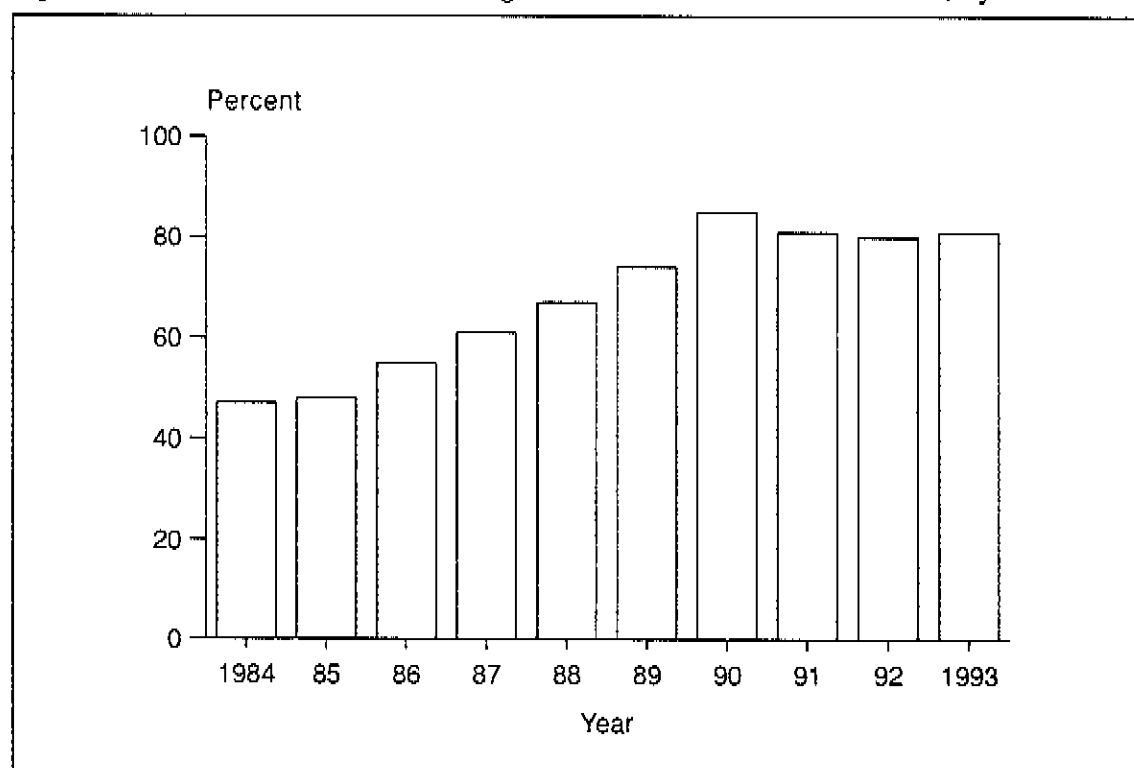
1. Immunization Coverage

When the Expanded Programme on Immunization (EPI) was established in 1974, it was estimated that less than 5% of infants were being fully immunized. In the subsequent 20 years, immunization programmes have matured in most countries of the world. More than 90% of infants now receive at least one immunization during their first year of life and three-quarters are fully immunized within the first year of life against diphtheria, measles, pertussis, poliomyelitis, tetanus and tuberculosis. Immunization coverage for all vaccines peaked in 1990, following the extraordinary international effort to achieve the 1990 target for Universal Childhood Immunization. As shown in Figure 1, coverage with 3 doses of oral, live poliovirus vaccine (OPV) reached 85% in that year. For several reasons,

including decreasing support for immunization both by donors and countries, coverage gradually declined. Estimated immunization coverage for 3 doses of OPV fell to 81% in 1993. Immunization coverage has fallen most severely in those countries which are most dependent on donor support to achieve their immunization goals.

Although declining immunization coverage is a cause for general PHC concern, the trend has specific implications for the polio eradication initiative. Falling coverage results in a rapidly enlarging pool of unprotected children and increases the potential for polio epidemics in the near future.

Figure 1: Global Immunization Coverage of OPV3 in the First Year of Life, by Year



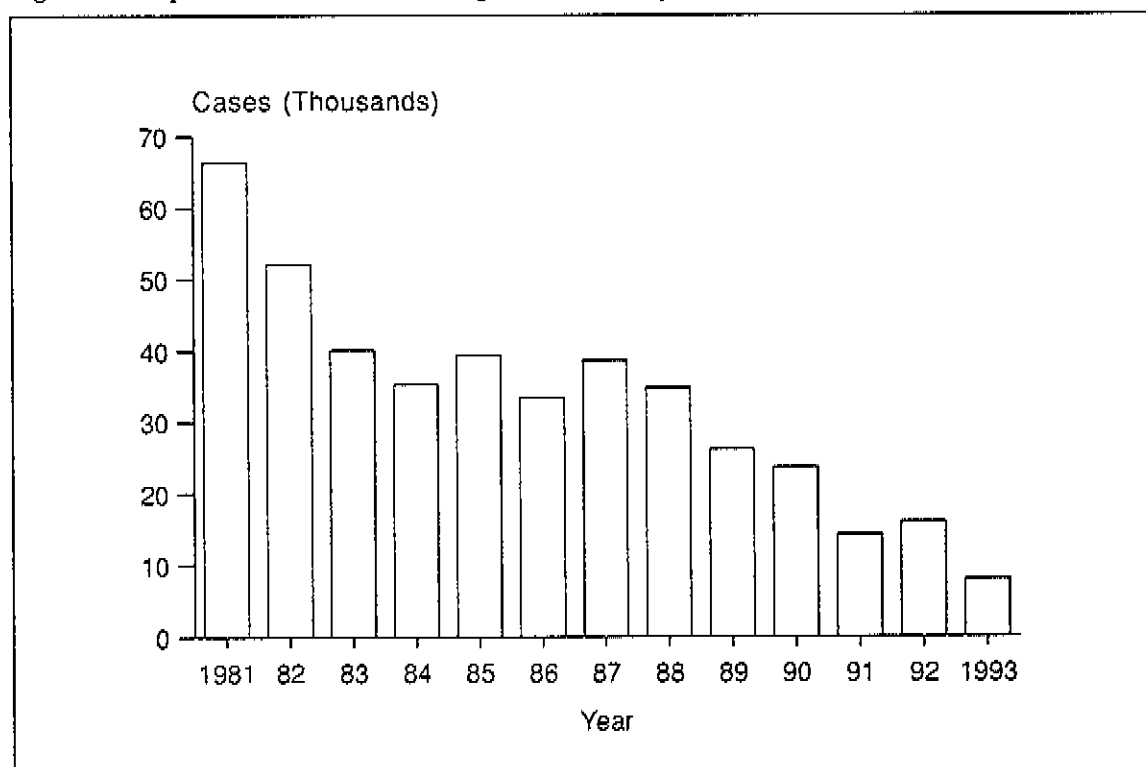
2. Incidence of Poliomyelitis

As a consequence of both high immunization coverage and specific polio eradication activities (see below), the global incidence of polio has fallen dramatically since the initiation of the poliomyelitis eradication initiative in 1988 (Figure 2). As of 16 March 1994, a total of 7 898 cases of poliomyelitis have been reported for 1993. This represents a 78% decrease from the 34 762 cases reported in 1988, and a 50% decrease from the 15 911 cases reported in 1992.

which have reported 0 polio cases for 3 consecutive years may be a more realistic estimate of which countries are truly free of polio. Figure 4 shows the number of countries reporting 0 cases of poliomyelitis for 3 years. A linear increase is, again, evident. The number of countries having reported 0 cases of endemic polio for at least 3 years was 106 in 1993.

A comparison of maps of polio incidence in 1988 and 1993 (Figures 5 & 6) demonstrates a reduction in reported polio cases for much

Figure 2: Reported Incidence of Indigenous Poliomyelitis, 1981-1993



Circulation of wild polio viruses is being restricted to fewer countries each year. As shown in Figure 3, the number of countries reporting 0 cases of polio has been steadily increasing each year, reaching 141 in 1993. This was an increase of 36 from 1988 and an increase of 12 from 1992. Because surveillance systems are imperfect, countries reporting 0 polio cases for one year may not be polio free. The number of countries

of the world. Six zones are apparent where polio is either absent or occurs at very low levels. These emerging polio free zones are: the Americas, Western and Central Europe, North Africa, Southern and Eastern Africa, the Arabian Peninsula and the Western Pacific. WHO's strategy designates countries bordering these zones as high priority for implementation of the recommended polio eradication strategies.

Figure 3: Number of Countries Reporting Zero Indigenous Poliomyelitis, by Year

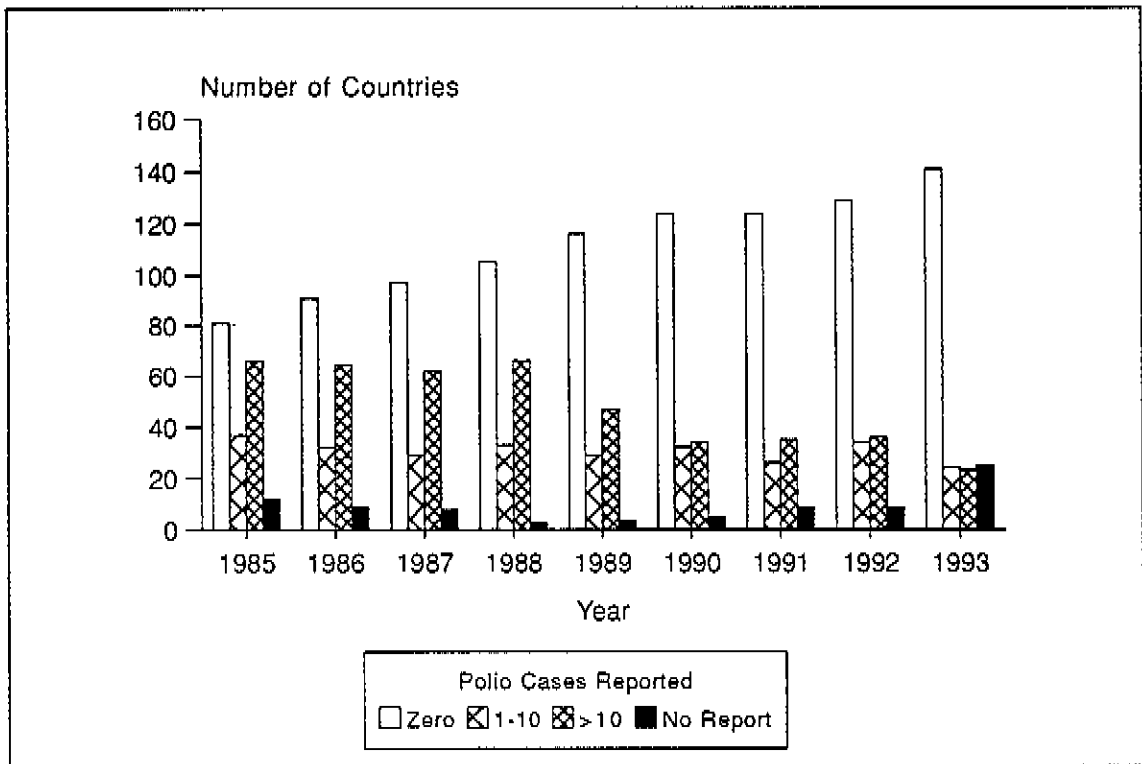


Figure 4: Number of Countries Reporting Zero Incidence of Poliomyelitis for Three Years

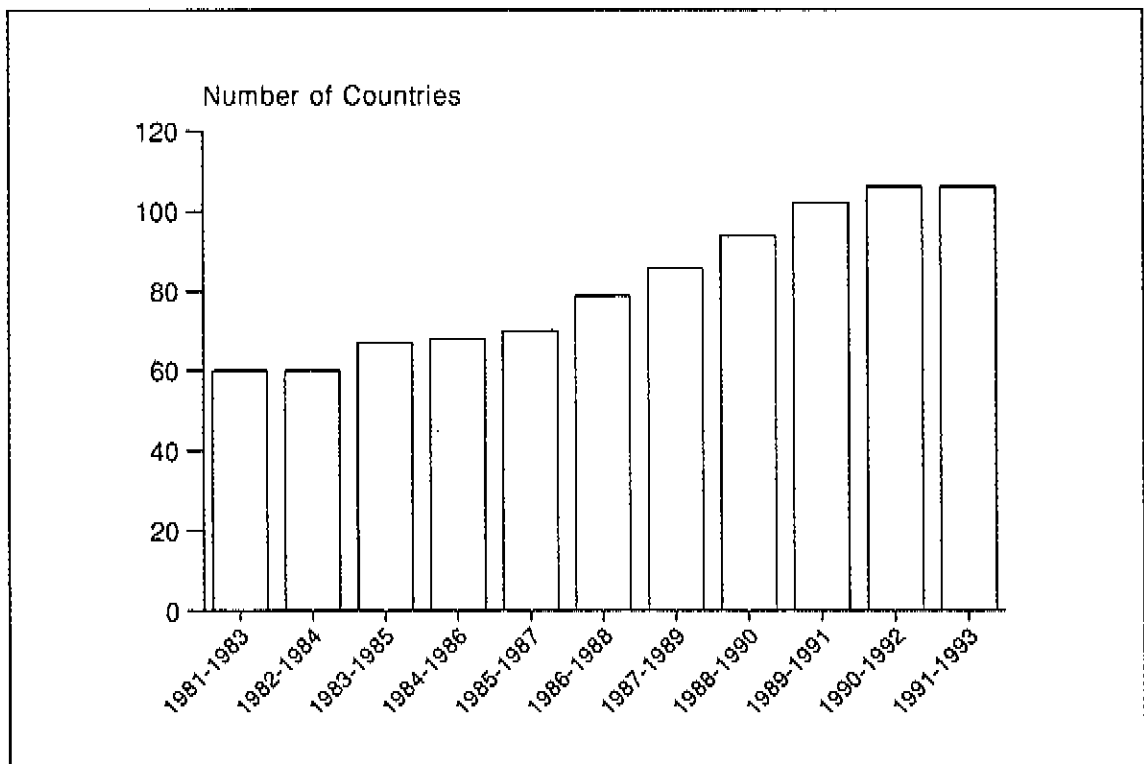


Figure 5: Reported Incidence of Indigenous Poliomyelitis, 1988

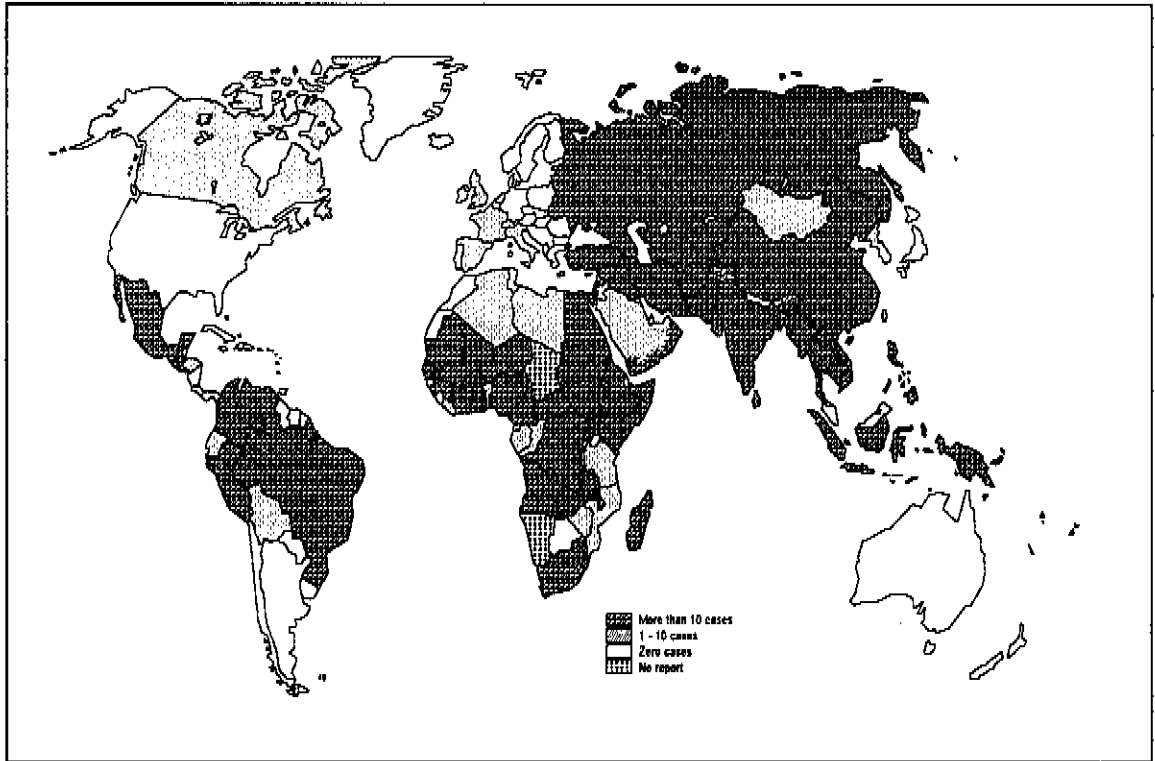
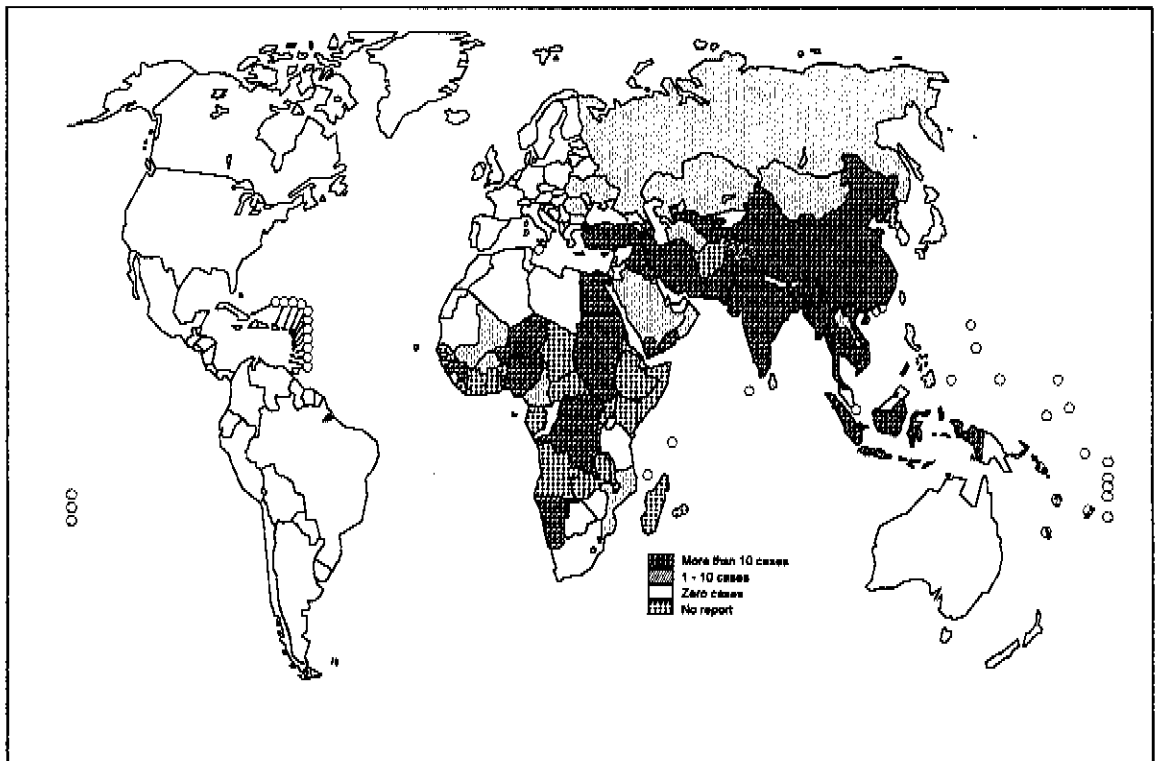


Figure 6: Reported Incidence of Indigenous Poliomyelitis, 1993



3. Estimated Incidence of Poliomyelitis

The process of developing a highly efficient surveillance system capable of detecting all cases of poliomyelitis is one of the critical steps leading to eradication. Currently, the efficiency of surveillance is highest in countries with low levels of poliomyelitis and is low in countries with high levels of

disease. Thus, most cases of paralytic poliomyelitis are still not being reported. WHO's current estimate is that 110,000 cases of poliomyelitis actually occurred in 1993. Reporting efficiency is, therefore, less than 10%.

4. Incidence in Specific Regions

African Region

Due to the interruption of work in Brazzaville in 1993, data from the Region are highly incomplete. A total of 167 cases have been reported from 25 of the 47 countries in the Region. This is a 93% reduction from the 2 306 cases reported in 1992. However, a recent review of surveillance in Kenya indicated that most of the 835 reported cases in 1992 (36% of the Regional total) were, in fact, clerical errors.

American Region

The American Region has reported 0 cases of paralytic poliomyelitis since September 1991. Wild poliovirus type 3, imported from the Netherlands, was detected in Canada in a religious community which refuses immunization. There were no paralytic cases and the virus apparently failed to spread to other susceptible communities in the United States and Canada.

Eastern Mediterranean Region

The Eastern Mediterranean Region reported 2 360 cases of paralytic poliomyelitis in 1993, a 24% increase from the 1901 cases reported in 1992. Seventy-six percent of the cases were reported by Pakistan which experienced large outbreaks in all 4 major provinces. Pakistan reported 1 803 cases in 1993, a 72% increase over the 1 046 cases reported in 1992. Sudan reported 243 poliomyelitis cases in 1993, 10% of the Regional total. This type 1 outbreak occurred largely as a result of falling immunization coverage. Egypt reported 126 cases of polio, 5% of the Regional total and a 78% reduction from the 584 cases recorded in 1992. (See section 5).

European Region

Europe reported 187 cases of poliomyelitis in 1993. 161 cases (86%) were reported from 9 of the Newly Independent States of the former Soviet Union. Azerbaijan and Uzbekistan reported outbreaks of 64 and 68 cases respectively. Both of these outbreaks resulted from vaccine shortages which developed following independence. Inadequate vaccine supply for the Newly Independent States represents a continuing threat to the Region.

South-East Asia Region

The number of polio cases reported from the South-East Asia Region declined by 54% in 1993. The Region reported 4 423 cases in 1993 compared with 9 611 cases in 1992. This decline occurred primarily as a result of a 59% decrease of cases in India, which reported 4 077 cases in 1993 compared with 9 203 cases in 1992. (See section 5). Poliomyelitis cases remain at static levels in other countries of the Region, with the exception of Indonesia which saw an 87% reduction in reported cases from 119 to 16.

Western Pacific Region

The Western Pacific Region recorded a 60% decline in reported cases of poliomyelitis. 1 912 cases were recorded in 1992 and 761 in 1993. Only 6 countries in the Region have reported cases in the past 3 years. Three countries, Cambodia, China and Viet Nam reported 99% of the cases in 1993. (See section 5).

5. Priority Countries

The 1993 Plan of Action defined polio eradication in a number of areas and countries, mostly those adjacent to polio-free areas or having a very large population, as being the highest global priority.

China

In both 1989 and 1990, epidemics of approximately 5 000 cases of paralytic poliomyelitis were recorded in China. During the period 1991-1993, provincial health authorities administered 1-2 supplementary doses of OPV per year to children less than 4 years of age. The number of provinces administering 2 doses increased from 6 out of 30 in the period 1991-1992 to 25 out of 30 in 1992-1993. As a consequence of these supplementary immunization campaigns, the number of polio cases reported in China fell to 344 in 1993. The expected summer peak in polio cases did not appear in 1993 (Figure 7). Although cases were reported from throughout the country, 31% of cases were from one province, Guandong. An additional 35% of cases occurred in 5 contiguous southern provinces which surround Guandong. The first coordinated National Immunization Day (NID)

administered OPV to an estimated 100 million children less than 4 years old in December 1993 and January 1994. Because a high proportion of polio cases had received 0 doses of OPV, previously unimmunized children were a high priority during the campaign. National immunization days are also planned for 1994-1995 and 1995-1996. Prompt case investigation with laboratory confirmation and mopping-up will be key activities in 1994.

Egypt

National immunization days were first conducted in Egypt in 1990 and 1991. These campaigns administered a single dose of OPV to children less than 5 years of age. In 1993, 2 doses of OPV were administered to all children less than 5 years old. Mopping-up immunization was initiated in 1991 with 2 doses of OPV administered to all children less than 3 years of age living in high-risk districts. High-risk districts were defined as those with polio cases in the last 5 years and/or low immunization coverage. Between 1991 and 1992, 6 million doses of OPV were administered during more than 100 district-wide mopping-up operations. By 1993, polio appears to have shifted from

Figure 7: Reported Incidence of Poliomyelitis, China, 1982-1993

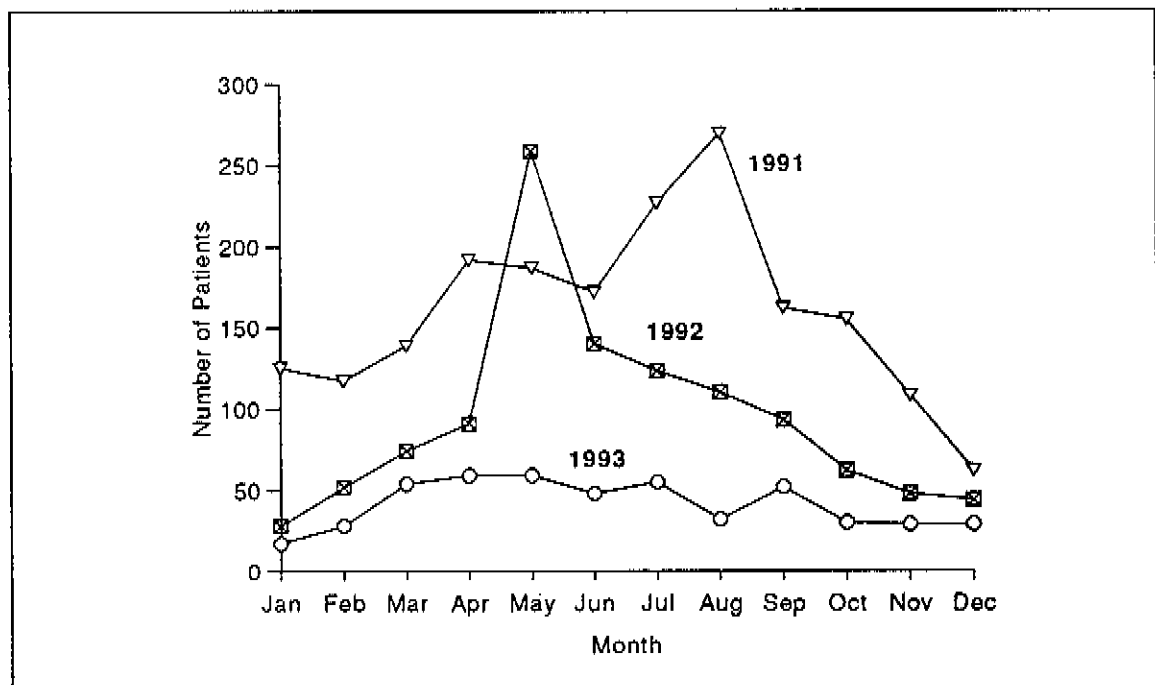
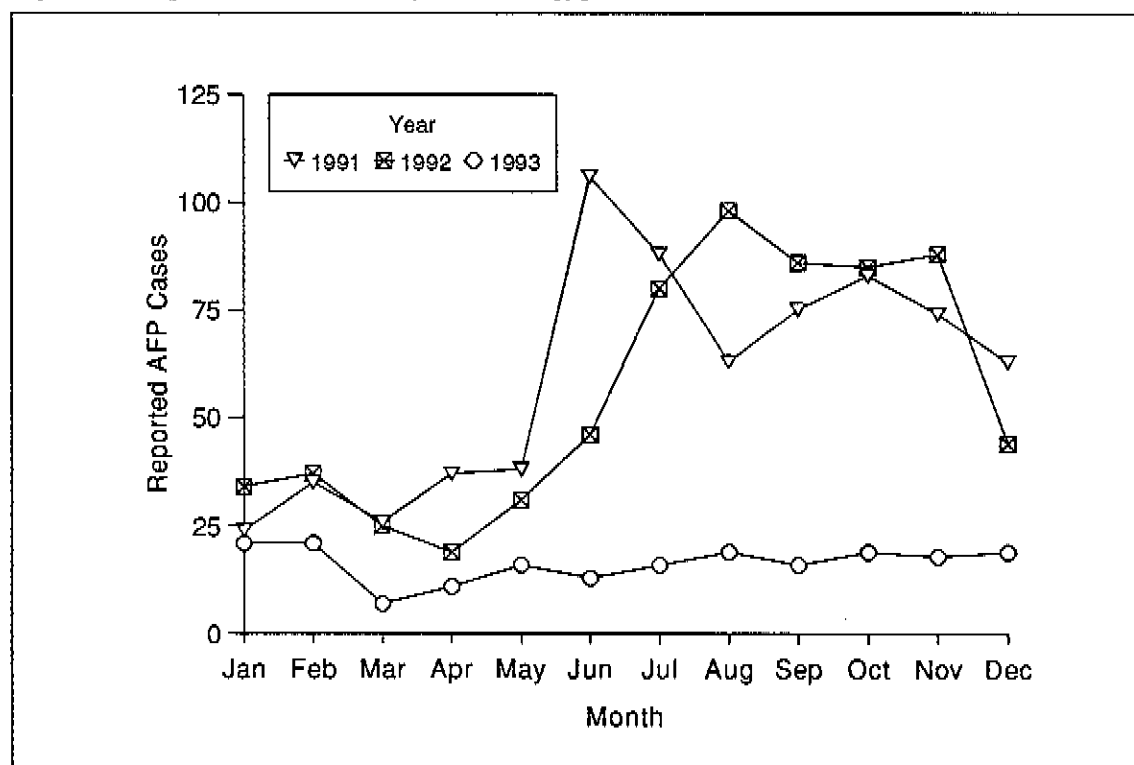


Figure 8: Reported AFP Cases by Month, Egypt, 1991-1993



being a wide-spread endemic disease to one with a limited, focal distribution. Comparisons of the seasonal variation of acute flaccid paralysis (AFP) cases between the years 1991-1993 indicates that the expected increase in AFP in late summer failed to materialize in 1993 (Figure 8).

India

Prior to 1986, less than 50% of infants received 3 doses of OPV in India. Since 1990, OPV3 coverage has been over 90%.

Reported cases of poliomyelitis in India, fell from 23 800 in 1988 to 4 077 in 1993. The Government of India plans call for polio eradication to be phased. A target has been set to have 11 states, with a combined population of 250 million, free of polio by the end of 1994. These non-contiguous states, which have high immunization coverage and more advanced surveillance systems, reported approximately 25% of polio cases in India.

6. Significant Events of 1993

Sudan Epidemic

In response to the 1990 target for Universal Childhood Immunization, Sudan used a mobile team approach to raise national coverage for DTP3/OPV3 from 28% in 1987 to 62% in 1990. This resource-intensive approach was not sustained and coverage fell to 53% in 1992. An outbreak of 243 cases of type 1 poliomyelitis occurred in 1993. An outbreak investigation found that 82% of cases were less than 5 years of age and only 39% had received 3 or more doses of OPV. Localized immunization campaigns

failed to control the outbreak. A national mass vaccination campaign was conducted in January 1994.

Namibia Epidemic

During the period 1989-1992, Namibia reported 0 cases of paralytic poliomyelitis. Beginning in June 1993, an outbreak of 53 cases of type 1 poliomyelitis occurred with the highest attack rates occurring in Windhoek and the south of the country. Seventy-nine percent of cases were less than 5 years of age and only 38% had received 3

or more doses of OPV. The outbreak ended in December, 1993 following a mass immunization campaign which reached 92% of all children less than 5 years. A retrospective review of hospital records identified 10 suspected polio cases during the years 1989-1993 which had not been reported.

National Immunization Days in the Philippines

Despite immunization coverage with 3 doses of OPV of 92% in 1992, cases of poliomyelitis continued to be reported in the Philippines. During 1992, 47 cases of AFP were reported, of which 8 were confirmed as poliomyelitis. Three of the 8 were laboratory confirmed; all 3 were apparently infected in Metropolitan Manila. During April and May 1993, 2 doses of OPV were administered to all children from 0-59 months of age during NIDs. Approximately 9.2 million children received OPV during the campaigns. Estimated coverage levels of 89.6% and 90.9% were achieved in the first and second rounds, respectively.

National Immunization Days in Viet Nam

Supplementary immunization began in Viet Nam in 1991 with 375 000 children less than 3 years of age receiving OPV in Hanoi and Ho Chi Minh City. Due to a shortage of vaccine, subnational immunization days were conducted in 1992 in eight provinces for children less than 3 years old. In November and December 1993, NIDs were conducted in all provinces targeting children less than 5 years of age. A total of 9.3 million children received 2 doses of OPV. OPV coverage was estimated to be between 80-85% of the under 5's. Viet Nam reported 275 confirmed polio cases in 1993.

Azerbaijan Outbreak

Poliomyelitis is endemic in Azerbaijan; at least 10 cases have been reported each year for the past 10 years. Immunization coverage was reported to be high with 93% of infants vaccinated in 1991. A shortage of vaccines developed in Azerbaijan following independence, with reported coverage falling

to 70% in 1992. During a 7-month period beginning in March 1993, no OPV was available in the country. A total of 64 type 1 polio cases were reported in 1993. Most cases were less than 3 years of age. Only 19% of cases were documented to have received at least 3 doses of OPV. Mass campaigns administering OPV and other EPI antigens to all children from 3-35 months were started in the last days of November. Immunization campaigns administering OPV to all children less than 3 years of age are planned for 1994.

Netherlands Outbreak, Importation of Poliovirus into Canada

A type 3, poliomyelitis outbreak occurred in the Netherlands beginning in late 1992. A total of 71 cases occurred, almost exclusively among members of a religious denomination which refuses immunization. Only one case occurred outside this group. Although large numbers of the general population were immunized with either OPV or IPV, most members of this group continued to refuse immunization. The outbreak apparently ended in February 1993, possibly when the pool of susceptible persons was exhausted. While there was no documented spread in Europe outside this group, the virus was isolated in early 1993 from members of a related religious group in Canada. There were no paralytic cases. Spread of the virus to other, related communities in Canada and the United States did not occur.

Surveillance Assessments

Beginning in November 1992, WHO's African and Eastern Mediterranean Regions began a series of surveillance assessments. By the end of 1993, a total of 18 countries had been visited. The countries selected were primarily in North Africa, on the Arabian Peninsula, and in Southern and East Africa which had been reporting low levels of poliomyelitis. Surveillance systems were reviewed to determine the sensitivity of the system for detecting cases of poliomyelitis and the capacity of the system to confirm the diagnosis. The team was to recommend means for implementing or improving AFP surveillance. In the process, the assessment team often was able to estimate the

incidence of polio in these countries. These assessments have demonstrated that few, if any, cases of poliomyelitis were occurring in these countries. In general, AFP surveillance had not been implemented and existing surveillance systems were not sufficiently sensitive to detect low level transmission. Although polio eradication could be quickly

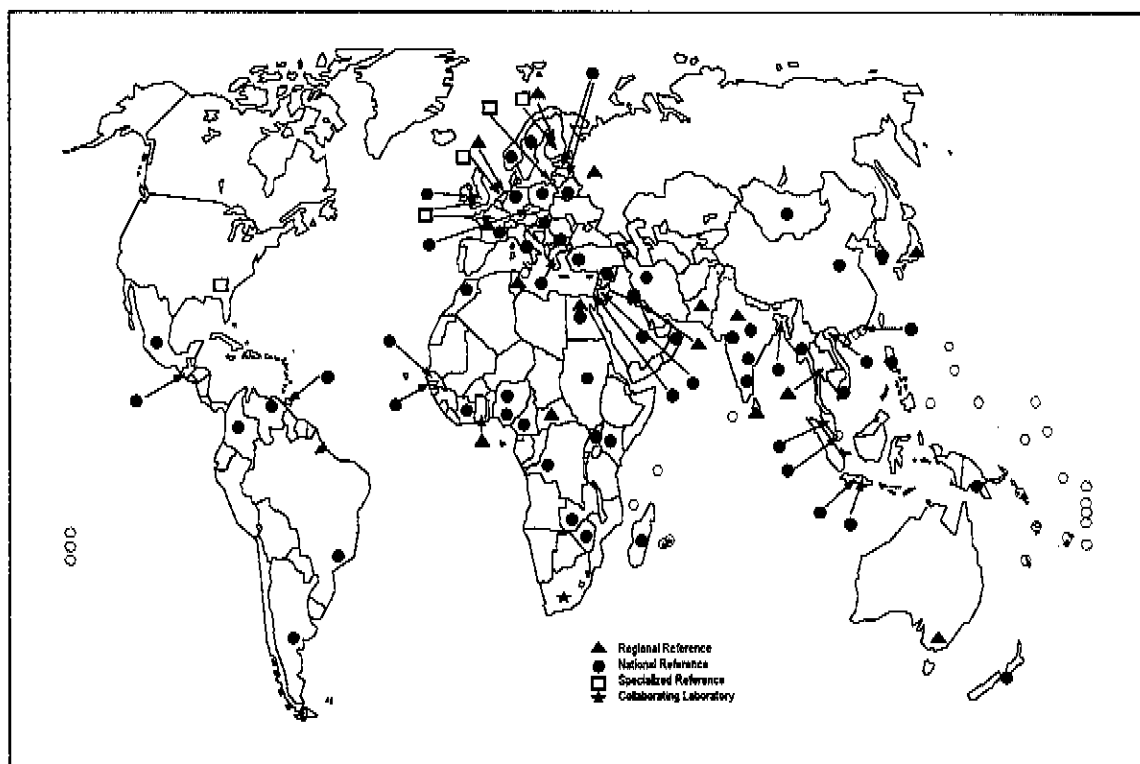
achieved in each of these countries, full implementation of AFP surveillance was recognized as the key element for documenting the occurrence of the few polio cases that might remain, targeting supplementary immunization and providing the evidence needed for certification.

7. Laboratory Network

Laboratory networks are fully functional in the American and Western Pacific Regions. Laboratory networks are in differing stages of development in other Regions. The global network now consists of 5 specialized laboratories, 15 regional reference laboratories and 48 national laboratories (Figure 9). Staff from the regional reference laboratories have been trained in intratypic differentiation. Most national laboratories have been certified following staff training,

provision of reagents and proficiency testing. Additional equipment and training is still needed for some national laboratories. However, laboratory networks cannot be fully functional until countries develop their surveillance systems and begin case investigation with collection of stool specimens. Regional laboratory advisers are being recruited for the African and Western Pacific Regions.

Figure 9: Global Laboratory Network



8. Indicators of Progress

In view of the demonstrated effectiveness of WHO's recommended strategies, the absolute number of reported cases is no longer the most important indicator of progress for the polio eradication initiative. The key indicators have become the geographic distribution of the disease and the numbers and geographic location of countries conducting the recommended strategies. The two principle strategies to be monitored are AFP surveillance and

supplementary immunization campaigns. The number of countries conducting AFP surveillance has been increasing steadily, and now stands at 60. Figure 10 is a map showing the countries conducting AFP surveillance. Figure 11 is a map of the countries which have conducted at least one round of national immunization days by the end of 1993 as well as countries planning to conduct their first NID in 1994.

Figure 10: Countries Conducting Surveillance for Acute Flaccid Paralysis (AFP)

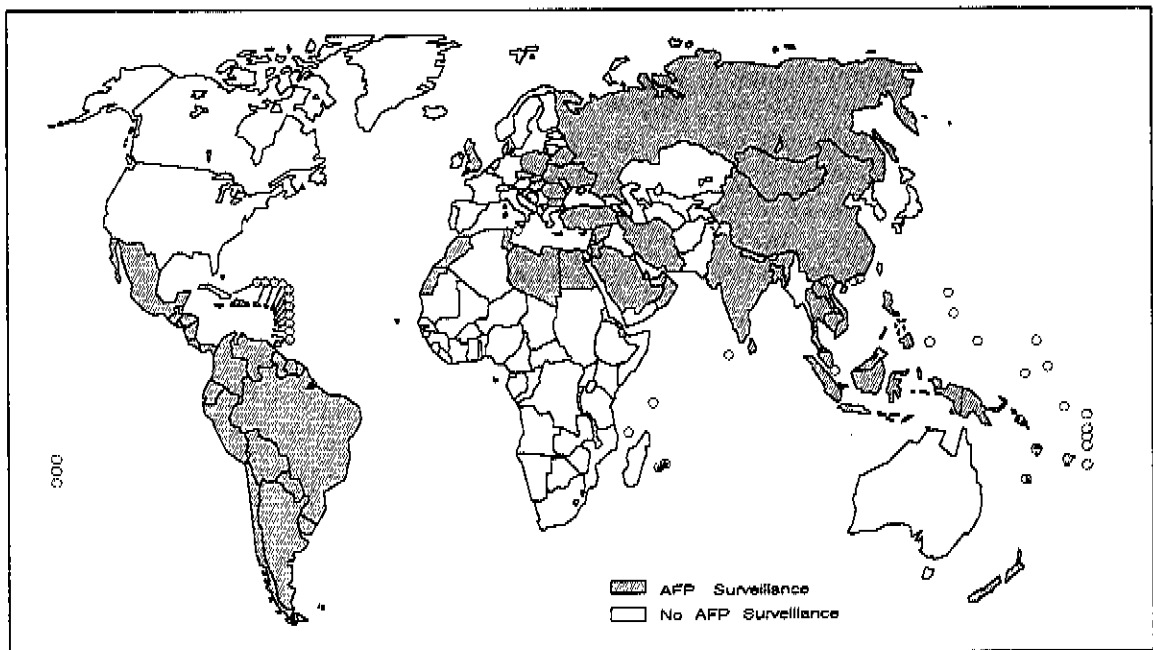
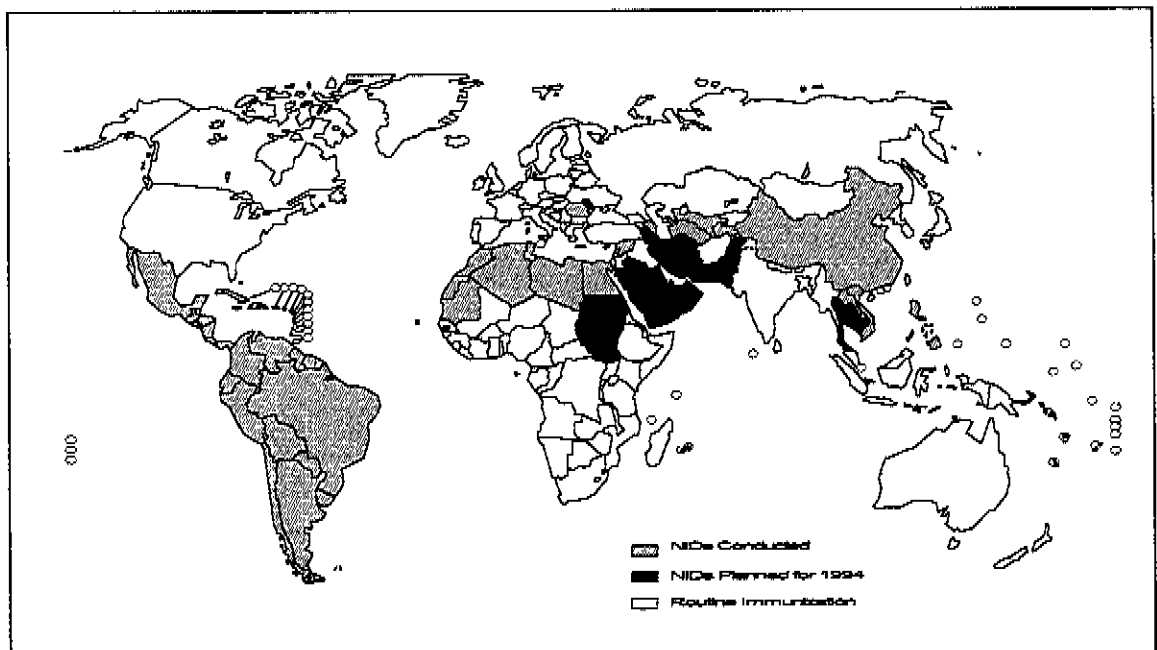


Figure 11: Countries Conducting Supplementary Immunization



9. Improved Vaccines

Research to develop more thermostable OPV continues. While the goal of stability for 7 days at 45° has not been met, stability for 7 days at 37° has nearly been achieved.

Highly thermostable OPV will probably increase the cost of the vaccine. A compromise between cost and thermostability is being explored before the final vaccine formulation is recommended.

9. Developments Anticipated in 1994

In the African Region, a new Regional Plan of Action will be adopted. This plan of action calls for countries in the Region to be divided into epidemiologic blocks. Polio eradication, neonatal tetanus elimination and measles control will be implemented in each of the blocks. In support of this plan, Rotary International and the Centers for Disease Control and Prevention will be providing grants to WHO totalling \$3 million to develop surveillance.

A major milestone for the Initiative will be achieved on August 26, 1994, when 3 years will have elapsed since the last case of indigenous wild poliomyelitis occurred in the Western Hemisphere. The Pan American Health Organization is finalizing plans for certifying polio eradication in countries of the Region.

In the Eastern Mediterranean Region, Iran and Pakistan will be conducting national immunization days for the first time in April and May, 1994. Simultaneous national immunization days will be conducted on the Arabian Peninsula in late 1994 by the 6 members of the Gulf Cooperation Council

and Yemen. Another coordinated sub-regional immunization day will be conducted by the countries of the Maghreb Union, which includes Morocco, Tunisia, and Libya as well as Algeria and Mauritania from the African Region.

In the European Region, plans are being developed to ensure vaccine supply to the Newly Independent States of the former Soviet Union. Organizing supplementary immunization activities and improving surveillance in Turkey has been identified as a priority for the Region.

In the South-East Asia Region, Bangladesh and Indonesia will be organizing NIDs to begin in 1995. Surveillance reviews will be conducted in 3 countries in 1994. India is actively seeking a supply of vaccine sufficient to conduct immunization days.

In the Western Pacific Region, Cambodia will be conducting its first national immunization days during 1994. Laos and Viet Nam will be conducting their second NIDs in late 1994. Improving AFP surveillance is a Regional priority.

11. Constraints to Progress

The strategies employed in the Poliomyelitis Eradication Initiative have been proven in the American Region and, increasingly, in other Regions. While further refinements of those strategies may accelerate the timetable, the technical feasibility using currently available tools and strategies cannot be doubted. Progress could be limited by 3 factors:

Lack of Political Will

Poliomyelitis eradication cannot be achieved without the determined effort of the polio-endemic countries. Progress has been rapid in countries where both the Head of State and the Ministry of Health are fully committed to the polio eradication goal. The national resources required to achieve eradication often are beyond the means of the Ministry of Health. Commitment by the

Head of State can often mobilize additional, needed resources from other Ministries, the armed forces and government service corporations.

While polio eradication will be of considerable benefit to the polio-endemic countries, substantial benefits will accrue to polio-free, industrialized countries. More than \$100 million is spent in the United States each year for the purchase of polio vaccines. The cost of controlling the Netherlands outbreak exceeded \$10 million. The cost of hospital care and rehabilitation raises that cost even further. Because polio eradication will exceed resources available in some polio-endemic countries, resources, especially expert personnel and vaccine, must be mobilized from industrialized, polio-free countries for global eradication to be achieved. Rotary International's support for polio eradication has demonstrated the value of mobilizing the private sector, both at the country level and internationally.

Vaccine Supply

The 1993 Global Plan of Action called for 10 000 000 000 doses of OPV for both routine and supplementary immunization for the period 1992 to 2000. The capacity to manufacture this quantity of vaccine currently exists, but the funds to purchase the entire quantity have not yet been identified. Several approaches are being used to maximize use of currently available funds. Alternative approaches for vaccine purchase are being employed to reduce the cost of vaccine procured. These include purchase from local manufacturers for in-country use and production sharing. Lower age cut-offs for supplementary immunization activities are being used in large countries to reduce the amount of vaccine required. The impending eradication of poliomyelitis in China has been achieved by vaccinating children less than 4 years old, instead of the more usual target of children less than 5

years old. Thermosensitive vaccine vial indicators are being introduced to decrease vaccine wastage in routine immunization clinics, which may exceed 50%. Each of these approaches has reduced the total cost of vaccine needed for the Initiative. Despite these savings, additional funds for vaccine purchase still need to be raised, from both governments and the private sector.

Political Unrest

Political upheavals, economic change, social unrest and war are a constant threat to the Polio Eradication Initiative. Health infrastructure has been destroyed in Afghanistan, Angola, Ethiopia, Liberia, Mozambique and Somalia. Evolving economic systems have reduced resources available for vaccine purchase in many of the Newly Independent States. Civil disturbances in some African countries have paralyzed governments and forced the withdrawal of international staff. Warfare in Afghanistan, Angola, Bosnia and Georgia prevents delivery of vaccines to much of the population. Global polio eradication requires that all countries be free from wild polioviruses. Until appropriate immunization activities are conducted in all polio-endemic countries and surveillance is sufficient to ensure that virus circulation has stopped, vaccination against polio must continue. Although peace may be needed to achieve eradication, polio eradication and childhood immunization has been a force for achieving peace. Days of tranquility to allow vaccination of children on both sides of the battle front were a prelude to peace in El Salvador. Government health workers were able to immunize children in rebel territory during national immunization days in the Philippines. Negotiations are taking place in Sudan for a day of tranquility for immunization. A global commitment to polio eradication may, therefore, bring about a better future for all children through means broader than those initially envisioned.

12. Conclusion

Now that the basis for the poliomyelitis eradication has been established, 1993 and, subsequently 1994, will be years of acceleration for the global initiative. Poliovirus is disappearing from several highly endemic countries. National immunization days are being conducted in an increasing number of the remaining polio-endemic countries. AFP surveillance with laboratory confirmation is being implemented in an expanding group of countries with low levels of disease. This, in turn, allows mopping-up campaigns to eliminate the remaining reservoirs of infection. The same surveillance system will eventually provide the data needed to certify

eradication. While success may seem almost inevitable, it is far from assured. Polio is widespread on the Indian Subcontinent, which contributes 3 of every 4 polio cases reported in the world. Declining OPV3 immunization coverage presages epidemics even in low incidence countries. The threat of importation looms over countries that are currently polio free. If additional resources, personnel and vaccine are provided in the coming years, these obstacles will be overcome. We can then look forward to the day when parents need no longer fear that their child will be crippled by poliomyelitis.