



MESSAGE FROM DR HIROSHI NAKAJIMA  
DIRECTOR-GENERAL OF WHO  
ON THE OCCASION OF WORLD HEALTH DAY 1995

The world now stands on the brink of global eradication of poliomyelitis.

It is difficult for the parents of today's children to understand the fear that epidemics of poliomyelitis used to engender only 40 years ago. Any event likely to attract large groups of people was shunned and often cancelled. Schools closed, swimming pools were shut and people lived in fear.

Then, first Jonas Salk in 1955, followed by Albert Sabin in 1961, produced and demonstrated the effectiveness of their vaccines against polio.

Almost immediately, throughout the industrialized world, the threat of polio-induced lifelong disability almost disappeared. Since that time, and, especially since WHO and UNICEF's Expanded Programme on Immunization brought potent, well stored, safely administered polio vaccines to over 80% of the world's children, polio has been in retreat. In 1988, the World Health Assembly targeted global polio eradication for the year 2000, a fitting gift from health workers of this century to the children of the next.

On 29 September 1994, an International Commission headed by Dr Frederick Robbins was able to declare that the disease had been eradicated throughout the Western hemisphere, just ten years after the Directing Council of the Pan American Health Organization committed its Member States to the eradication target. All regions of the world are now making steady progress towards that goal.

Almost unimaginable advances have already been made. In China, over 80 million children were immunized in two days. The whole area of the Western Pacific is about to become the second polio-free region in the world. On World Health Day - 7 April 1995 - it is anticipated that 15 neighbouring countries in Europe and the Eastern Mediterranean will provide polio vaccine to their children simultaneously.

The key to success is the application of certain simple and highly effective strategies. For example, national immunization days, during which vaccine is given within a day or two to all children under five, supplement routine immunizations; systems of surveillance, which include testing faecal samples for the poliovirus, identify and investigate all cases of acute flaccid paralysis in children. As fewer and fewer cases occur, immunization of all those with whom the patient might have been in contact - neighbours, colleagues, schoolmates - finally reduces transmission to zero, thus leading to eradication.

Less dramatic but highly important is the close partnership established between the many partners working towards this common goal. While almost 80% of resources needed for success will come from the endemic countries themselves, many agencies and institutions besides WHO, notably Rotary International, UNICEF, and the International Development Banks, as well as the Governments of Canada, Japan and the United States of America, are cooperating to ensure that critical needs for advocacy, support and vaccine are being met.

Before we can sit back and enjoy the benefits of polio eradication, however, the job has to be completed. There is a need for national immunization days to be organized, sustainable supplies of good quality vaccine to be stocked and delivered, for personnel to be trained, and for epidemiological surveillance to be established.

But the task is not confined exclusively to public health services. Only by joining forces with governmental and nongovernmental organizations, United Nations agencies, and the public at large can the target be met on time. Everyone involved in the polio eradication initiative should be proud of the fact that his or her local efforts are making possible the realization of the global goal. TARGET 2000 can only be achieved by ensuring that village after village, district after district, country after country is polio-free.

The eradication of polio is within our grasp. We owe it to future generations not to let it slip away.



MESSAGE FROM DR UTON MUCHTAR RAFEI  
REGIONAL DIRECTOR  
WHO SOUTH-EAST ASIA REGION  
ON THE OCCASION OF WORLD HEALTH DAY 1995

This year's World Health Day marks the beginning of the countdown to the global eradication of poliomyelitis. By the year 2000, it is expected that this dreaded disease, which has disabled tens of thousands of children, and has been the cause of so much unnecessary pain, suffering and anguish, will cease to exist. It is hoped that not too long from now, there will be no need for calipers and crutches, so commonly used by polio-afflicted children in South-East Asia.

The fight against polio has long been waged by WHO in collaboration with other United Nations agencies, government and non-governmental organizations as well as social service agencies. These joint endeavours have ensured not only sustainability but also the availability and distribution of potent vaccines. Through multisectoral efforts various advocacy measures have been successfully used resulting in over 80% of children being immunized against polio.

In 1993, WHO estimated that 105,000 children were afflicted with polio across the world, and 490 000 cases of paralytic polio were prevented the same year through immunization. This is a vast improvement indeed, considering that in 1974, less than 5% of the world's children were immunized.

Polio eradication for the South-East Asia Region is particularly significant, since it accounts for over half of the world's total number of reported cases. However, it is also worthy to note that commendable achievements towards polio eradication have been recorded. While in 1981 there were over 35 000 reported cases of paralytic poliomyelitis in the Region, this figure dropped to less than 5 000 in 1994. What is now needed is a firm commitment at the highest level to ensure that the target of polio eradication by the year 2000 is successfully met.

Strategies that have proven worldwide require that polio endemic countries conduct national immunization days to eradicate the virus that causes paralysis in children. I am confident that this year's World Health Day will provide the necessary momentum to achieve our goal and thereby banish from the world this malady that has afflicted our children for so long.



# WORLD HEALTH DAY

7 April 1995

WHD 95.1

## Towards TARGET 2000 – A Polio Eradication Progress Report

*In 1988 the World Health Assembly established the year 2000 as the target for the global eradication of polio. As the initiative passes the half-way stage, Dr Nicholas Ward, Acting Director of WHO's Expanded Programme on Immunization (EPI) and Dr Harry Hull, a Medical Officer responsible for polio eradication in the EPI, look back at the progress that has been achieved so far and at what remains to be accomplished over the next five years. While success may seem inevitable, it is far from assured.*

The WHO-recommended strategies for polio eradication are simple in concept. First, support routine immunization systems to immunize as many infants as possible with 3-4 doses of oral polio vaccine (OPV). High routine coverage reduces the incidence of polio to low levels and forms the base for the polio eradication initiative. As shown in Fig. 1, coverage with three doses of OPV (OPV3) rose rapidly during the 1980s. WHO estimates that 80% of infants born in 1993 had been immunized with 3 doses of OPV in their first year of life.

The second polio eradication strategy is to conduct National Immunization Days (NIDs). These national campaigns administer 2 doses of OPV to all children under five, including those who have previously received the basic course of immunization. The objective of the campaigns is to stop the spread of wild poliovirus by both boosting the immunity of children who have already been vaccinated and immunizing children not reached by routine services. As the virus cannot live for long periods outside the human body, NIDs effectively remove the wild polio virus from countries where polio is endemic. Figure 2 is a map showing the countries which had conducted NIDs by the end of 1994.

The third polio eradication strategy is to establish extremely sensitive surveillance systems, capable of detecting the last case of poliomyelitis in a country. Because other paralytic conditions can mimic polio, stool specimens are collected from all children with Acute-Onset Flaccid Paralysis (AFP). These stool specimens are then tested in certified laboratories to determine if the paralysis is caused by wild poliovirus. Figure 3 is a map showing countries which have initiated AFP surveillance systems up to the end of 1994.

The final strategy for polio eradication is to use surveillance data collected to plan and conduct localized immunization campaigns, targeting high-risk districts where the last few cases of polio occur. In these «mopping-up» campaigns, OPV is taken from door-to-door, administering 2 doses to all children under five. These campaigns will eliminate the few, final reservoirs of infection which have not been reached either by routine immunization services or national immunization days.

### INCIDENCE OF POLIOMYELITIS

As these strategies have been successfully implemented by an increasing number of countries, the number of polio cases is declining rapidly and the wild polio virus is being confined to a geographically restricted area of the world. As shown in Fig. 4, the number of reported polio cases for 1994 is not yet available,



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but the number of polio cases reported in 1993 by the 213 countries and areas was only 9164. This is a 74% decline from the 35,225 cases reported to WHO in 1988. Because surveillance systems are not yet able to detect every case of polio in every country, WHO estimates that about 115,000 children contracted paralytic poliomyelitis in 1993. The decline in reported polio cases is accompanied by a sharp increase in the number of countries reporting 0 cases of polio and a decrease in the number of countries reporting significant amounts of polio, as shown in Fig. 5. In 1993, 145 of 213 countries and areas reported 0 cases of polio, compared to 101 of 196 in 1988.

The geographic restriction of wild polio viruses that has occurred as a result of the initiative is evident when the maps in Figures 6 and 7 are compared. Six «emerging polio-free zones» have been identified where wild polio virus has either disappeared or is at such a low level that eradication could be rapidly achieved. These 6 zones are: The Americas, Western and Central Europe, North Africa, the Middle East, Southern and East Africa, and the Western Pacific. West and Central Africa and South Asia are the principle reservoirs of wild polio virus. Nearly two-thirds of polio cases in the world in 1993 were reported from Bangladesh, India and Pakistan and 10% are reported from West and Central Africa.

## REGIONAL PROGRESS

In the African Region, with assistance from Rotary International and the US Centers for Disease Control, EPI surveillance systems are being improved with an emphasis on AFP surveillance in the emerging polio-free zones. An NID is being planned in Nigeria.

In the American Region, it is more than 3 years since the last case of polio occurred in the Western Hemisphere. The last poliomyelitis case in the Region was a 3-year-old boy from Peru who was paralysed in August 1991. The Region has been certified free of wild virus, but children are still being immunized against polio and, to reduce the risk of virus spread from possible importations, this will continue until the entire world is certified polio-free.

In the Eastern Mediterranean Region, Iran and Pakistan conducted their first NIDs in 1994. Simultaneous NIDs are also scheduled in 1995 by 7 nations on the Arabian Peninsula and by the member states of the Maghreb Union. In Egypt, as a result of NIDs and mopping-up campaigns, polio has changed from a highly endemic disease to one with focal transmission.

In the European Region, 9 of the 15 Newly Independent States which emerged from the former USSR remain endemic for polio. A coordinated plan is being developed to ensure adequate supplies of OPV for both routine immunization and NIDs. Organizing NIDs and improving AFP surveillance in Turkey is a regional priority.

In the South-East Asia Region, NIDs have been conducted in Thailand and are being planned in Bangladesh and Indonesia. Limited NIDs have been conducted in India to supplement the high achievements reported for routine immunization.

In the Western Pacific Region, significant progress has been made towards achieving the regional target for polio eradication by the end of 1995. National Immunization Days are being conducted in all 5 polio-endemic countries. Following epidemics of approximately 5000 cases in 1989 and 1990, wild polio virus is now circulating at extremely low levels in China, with laboratory confirmed cases being recorded in only 7 of 30 provinces in 1993. Intensive surveillance is continuing in the Philippines, although no laboratory confirmed cases have been recorded for more than a year.

## CONSTRAINTS TO PROGRESS

Although much has been accomplished and there are many reasons to be confident that **TARGET 2000 - A World Without Polio** will be achieved, global success is far from assured. What are the major obstacles to be overcome if we are to reach the goal? First among these is insufficient political commitment. The World Health Assembly established the polio eradication target in 1988 and reaffirmed that commitment in 1993. UNICEF and more than 130 world leaders adopted the polio eradication goal at the World Summit for Children in 1990. Yet support sufficient to achieve the goal is only beginning to materialize.

Rotary International, in particular, is to be commended for its advocacy efforts on behalf of polio eradication. However, if global eradication is to be achieved, all polio-endemic countries will need to make the commitment to polio eradication at the highest levels. As the benefits of polio eradication will accrue to all countries, additional financing for the initiative should be provided by both industrialized countries and the international donor agencies. Additional political commitment and expanded external funding will be particularly important as each year passes, for as the target approaches, wild polio virus will persist only in the most difficult countries and the most difficult regions within those countries.

Financing the initiative remains problematic. The most recent estimate of the total external cost of polio eradication is more than US\$800 million. Two-thirds of the estimated cost is for the purchase of oral polio vaccine. If funds are available, current production capacity is sufficient to manufacture all the vaccines needed. A number of approaches have been taken to make the most effective use of available funds, including lowering the age cut-off for NIDs, thermosensitive vaccine vial indicators to reduce wastage, and alternative methods for vaccine procurement. Despite these savings, additional funds for vaccine purchase are still needed. The balance for funding requirements are for operating costs, technical expertise in epidemiology and laboratory procedures, essential equipment and training.

Global immunization coverage peaked in 1990 when 85% of infants born that year have received 3 or more doses of OPV. Since that time there has been a gradual decline in immunization coverage for all vaccines. However, the fall in coverage is greatest in those countries which are most dependent on external donor support. The combination of falling coverage and low disease incidence results in a rapidly increasing population of children who have not been vaccinated but are also not immune through natural infection. This increases the potential for large outbreaks of polio to occur with the risk of spread to areas which are currently polio-free.

Political upheavals, economic change, social unrest and war are a constant threat to the Polio Eradication Initiative. Vaccine shortages have developed in a number of countries as a result of economic change. War has almost totally destroyed some national health systems, including those in Afghanistan, Angola, and Somalia. Polio will not be eradicated from the world until all countries are free of polio. Vaccination against polio must continue until essential immunization activities have been conducted in all polio-endemic countries and until surveillance is sufficient to document that wild virus transmission has stopped. Only then can the full benefits of polio eradication be achieved.

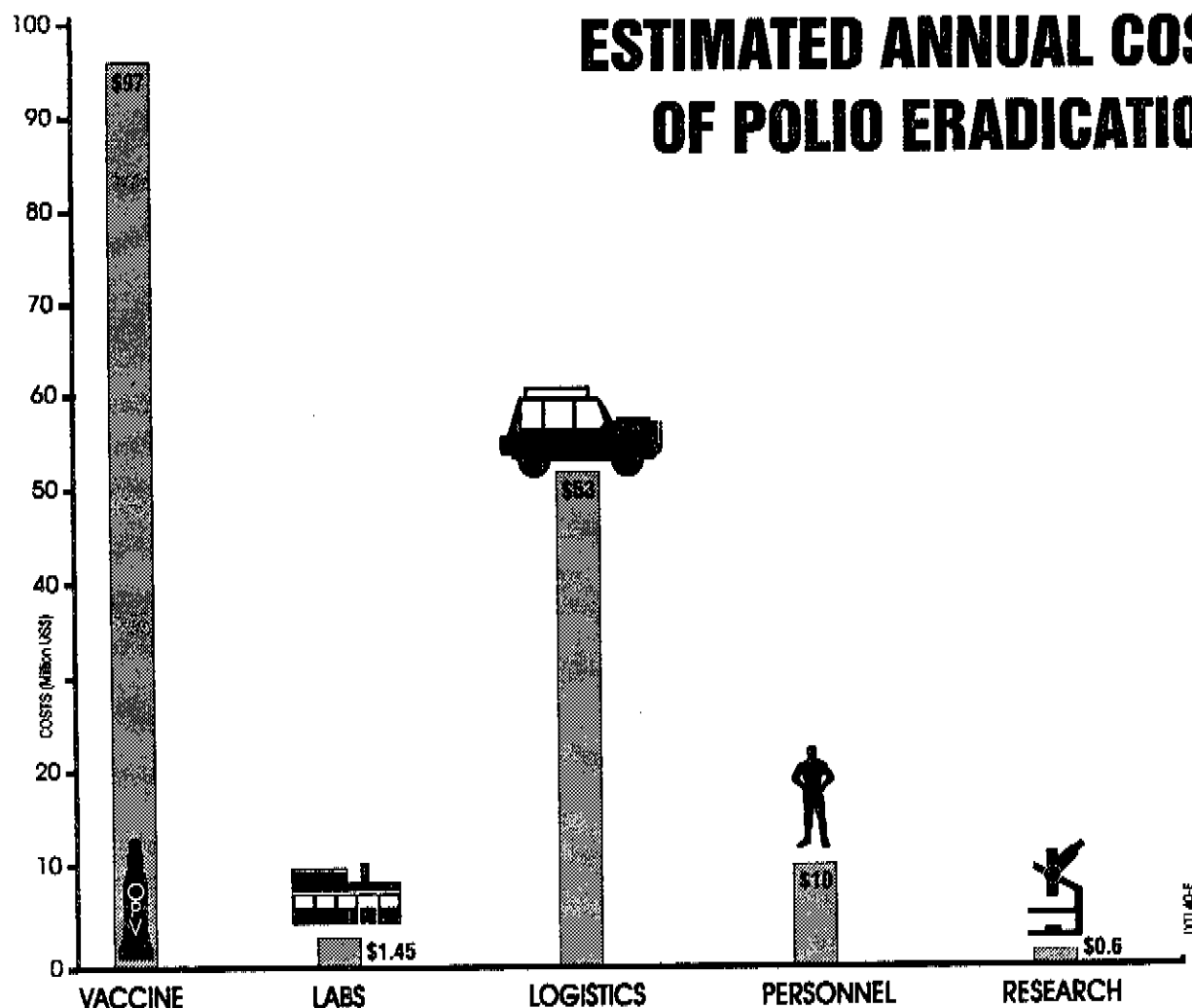
## **CONCLUSION**

At the half-way point along the path to global polio eradication, the strategies have been clearly defined and proved to be effective. Global immunization coverage remains high, and an increasing number of countries are conducting national immunization days and improving their ability to find and confirm polio cases.

Although success may seem inevitable, it is far from assured. Polio is widespread on the Indian subcontinent, which accounts for 2 out of every 3 reported cases of polio in the world. Declining routine immunization coverage increases the potential for epidemics, even in low-incidence countries. The threat of imported cases looms over countries which are currently polio-free.

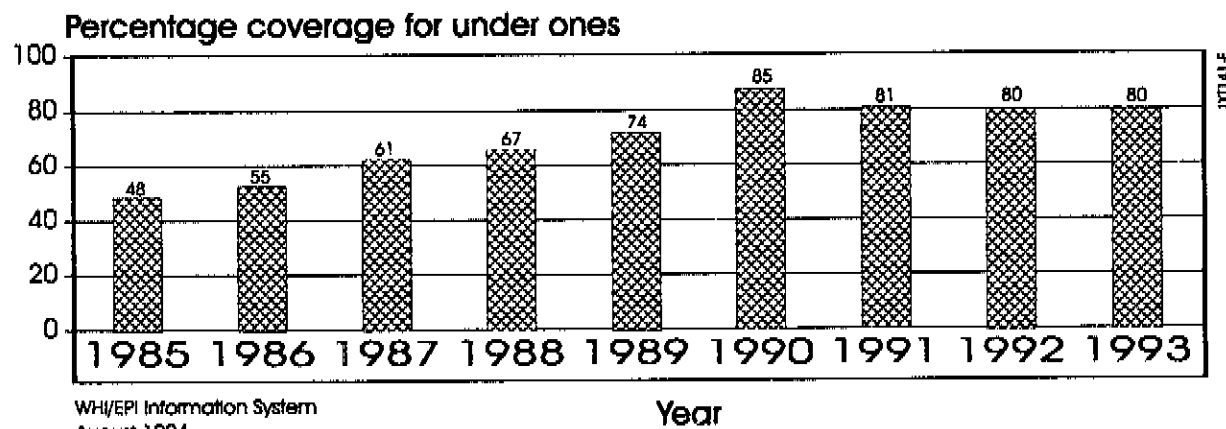
If the world unites to provide the additional financial resources, personnel and vaccine needed for the even more difficult second half of the Initiative, these obstacles can and will be overcome. We can then look forward to the day when parents need no longer fear that their child will be crippled by poliomyelitis.

# ESTIMATED ANNUAL COST OF POLIO ERADICATION



**Fig. 1**

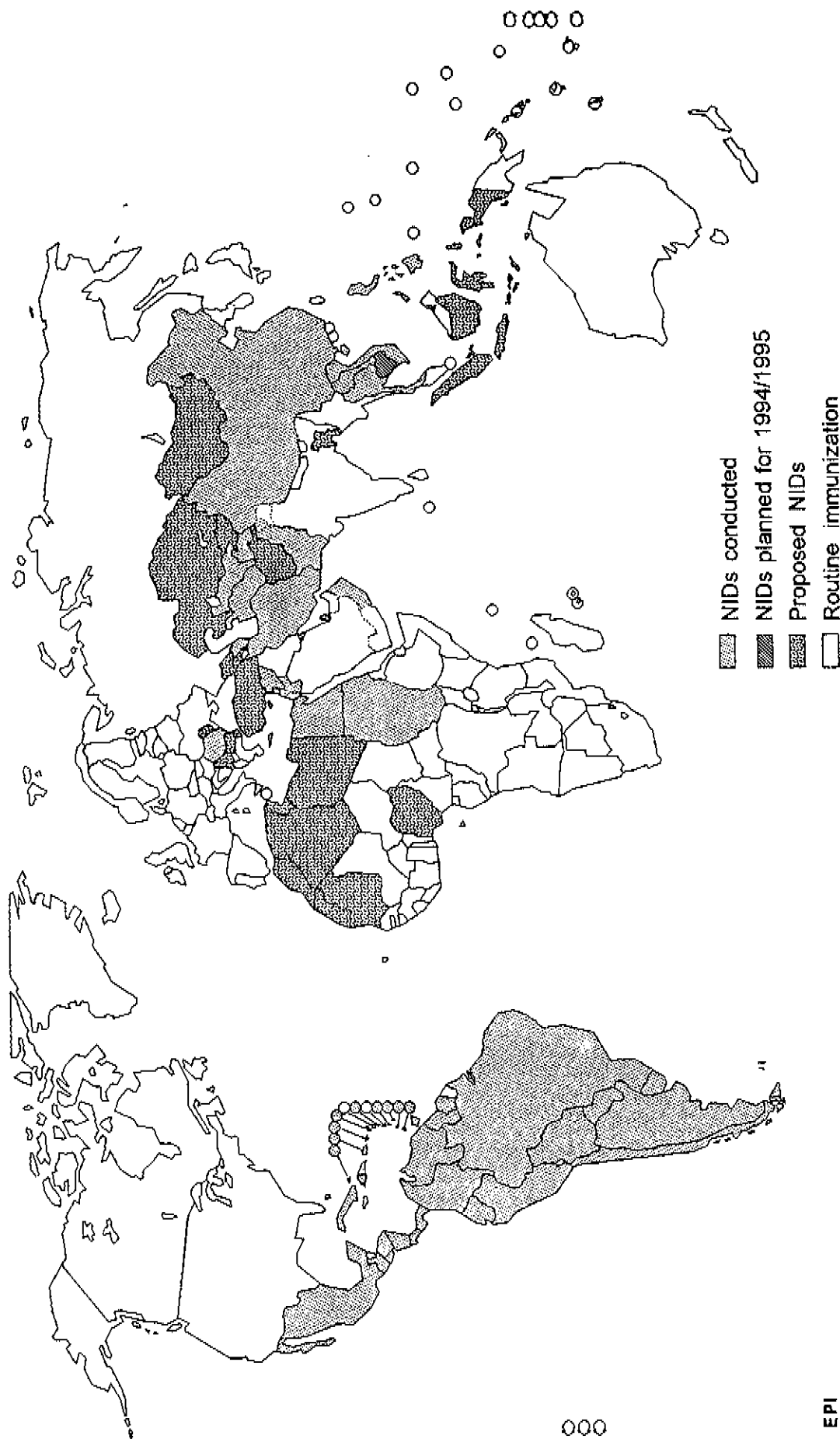
## GLOBAL IMMUNIZATION COVERAGE OF OPV3 FOR CHILDREN UNDER ONE YEAR OF AGE



**Fig. 2**

# Countries conducting supplementary immunization

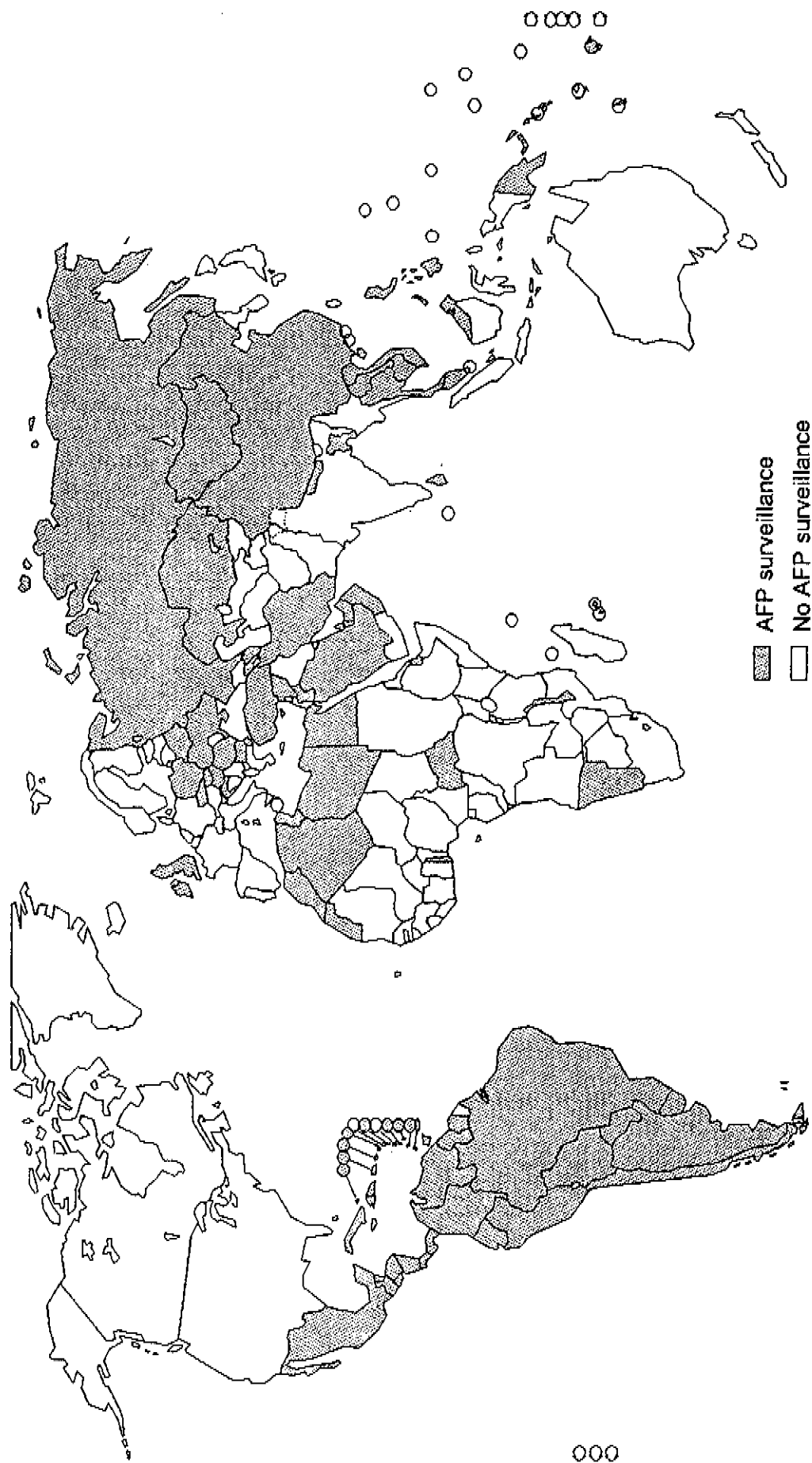
Status as of September 1994



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# Countries conducting surveillance for acute flaccid paralysis

Status as of September 1994

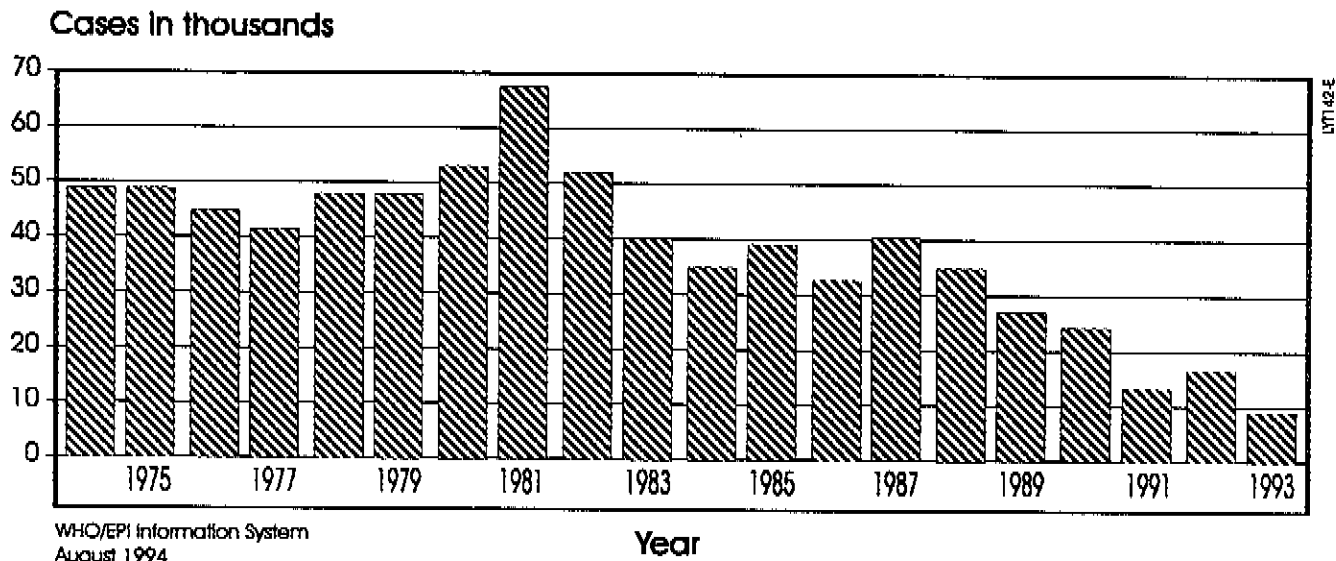


## EPI Information System

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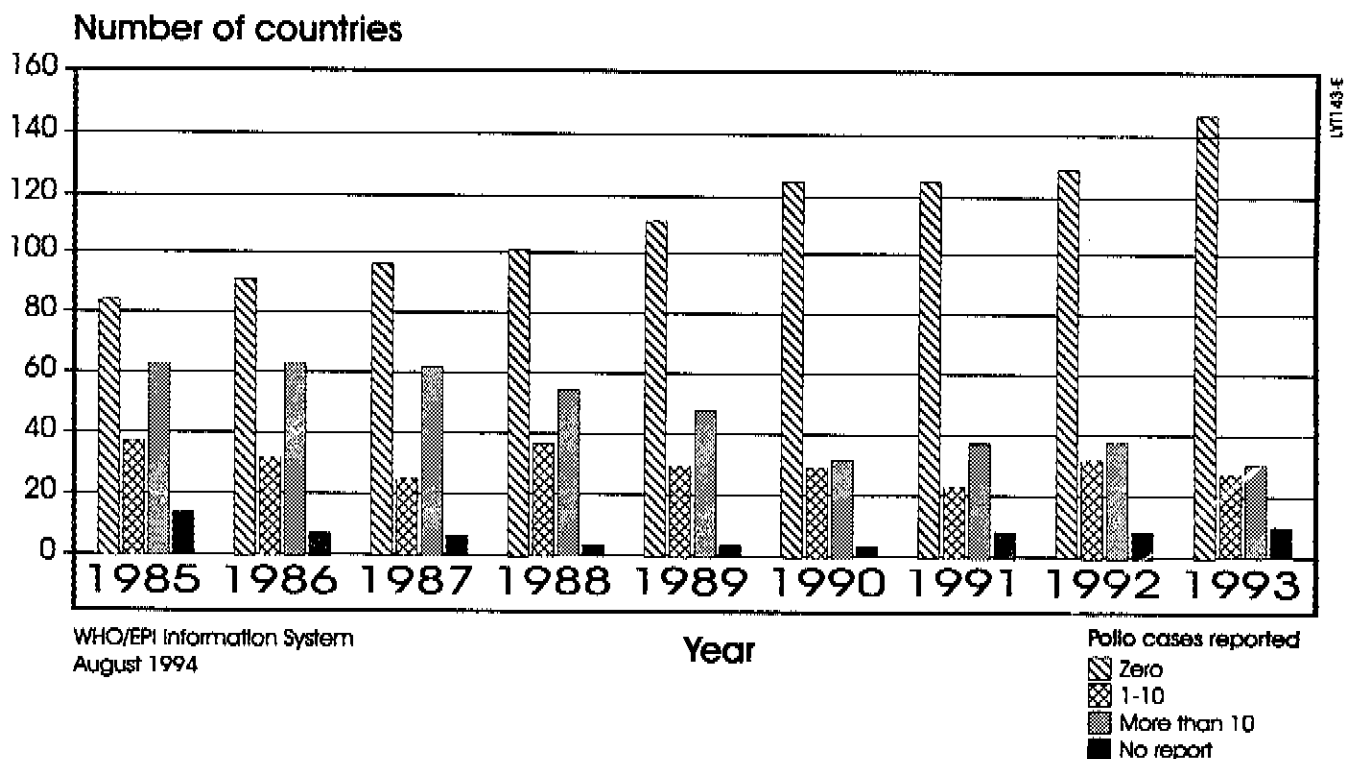
**Fig.4**

# GLOBAL ANNUAL REPORTED POLIO CASES 1974 - 1993



**Fig.5**

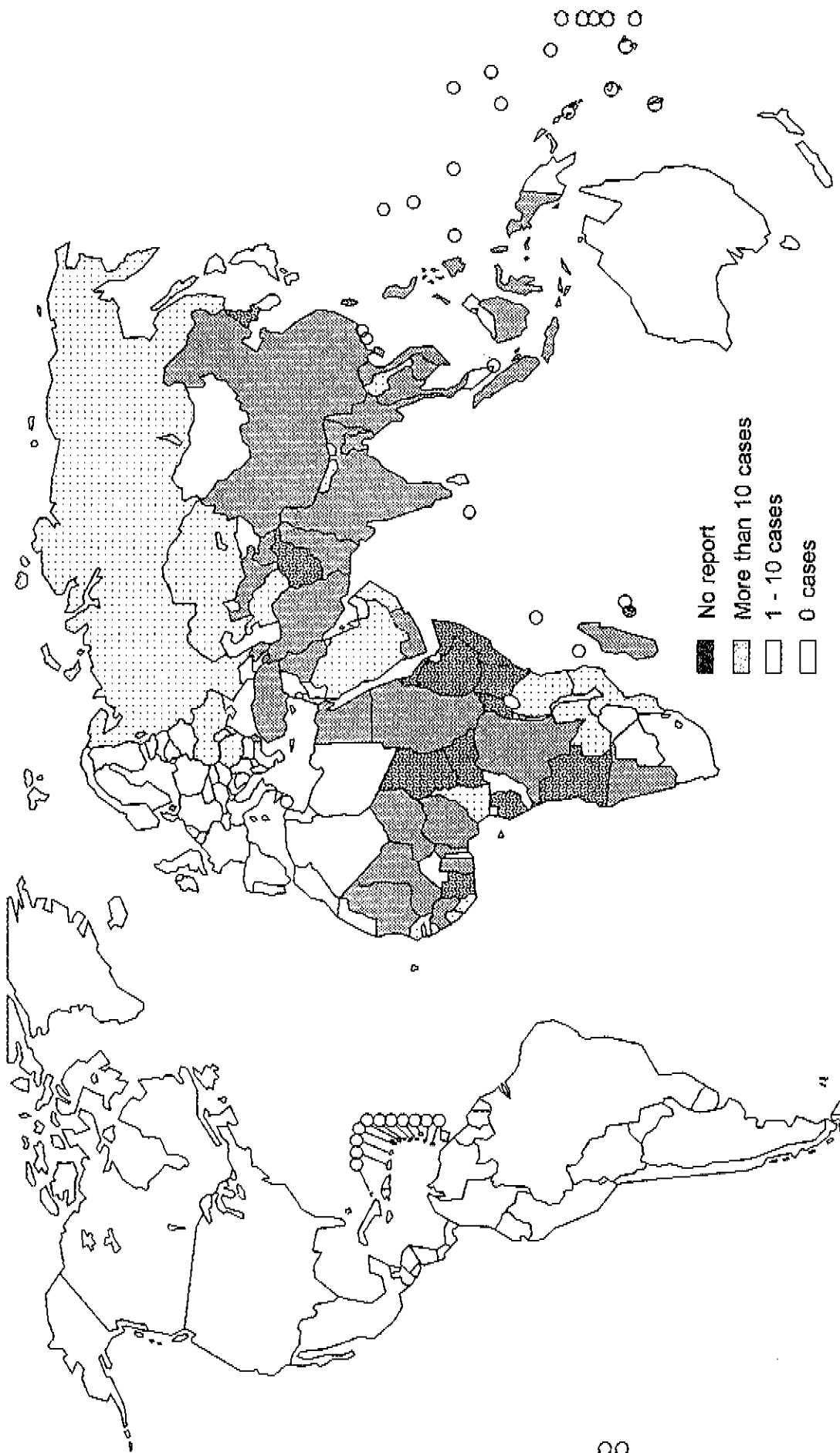
# NUMBER OF COUNTRIES REPORTING ZERO POLIO CASES BY YEAR





# Global incidence of indigenous poliomyelitis 1993

Data available as of August 1994



EPI  
Information System

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# WORLD HEALTH DAY

7 April 1995

WHD 95.2

## POLIO ERADICATION IN THE AMERICAS: A TEMPLATE FOR THE WORLD

*Many people were sceptical when in 1985 the Pan American Health Organization (PAHO) first committed itself to eradicating polio from the Western Hemisphere by the year 1990. Yet only a year after that deadline had passed, the last case of polio was reported in Peru. On 29 September 1994 it was announced that the countries of the Western Hemisphere had been certified polio-free. Dr Ciro A. de Quadros, Senior WHO Regional Adviser for the Americas, who spearheaded the initiative, describes how the goal was reached.*

### The challenge

In May 1985 the Director of the Pan American Health Organization (PAHO), Dr Carlyle Guerra de Macedo, proposed that poliomyelitis be eradicated from the Western Hemisphere by 1990 (1). At the time the Expanded Programme on Immunization (EPI) in the Americas had already achieved a certain level of success, with coverage increases to the order of 60% for some of the vaccines included in the programme, such as DPT (Diphtheria/Pertussis/Tetanus), BCG (Tuberculosis) and Measles, and over 75% for poliomyelitis vaccine (1).

The PAHO Director's proposal met with a sceptical response from many people but was duly endorsed by the PAHO Directing Council in September 1985 (2) and launched with objectives which included the eradication of polio, the development of surveillance systems and the improvement of the overall immunization programme.

### The strategy

The strategy was based on maintaining high immunization levels with Oral Poliomyelitis Vaccine (OPV) in the target population of children under five and establishing a surveillance system for detection of cases of Acute Flaccid Paralysis (AFP) for subsequent investigation to determine whether they were due to wild poliovirus (3).

Maintenance of high immunization levels was achieved by organizing national immunization days (NIDs), usually held twice a year, one to two months apart, in which all children under five received a dose of OPV, regardless of previous immunization status. This strategy had already proved successful in several countries, starting with Cuba in 1962. Subsequently, house to house OPV campaigns, dubbed «mop-up» operations, were implemented in districts which were still at high risk of wild poliovirus circulation (4).

Over 20,000 health units were mobilized to form a surveillance network for the weekly reporting of cases of AFP and a cadre of health workers was trained on the epidemiological investigation of these cases.



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Two stool samples had to be collected and correctly transported to one of a network of laboratories equipped with trained personnel and modern technologies for testing those samples to determine whether they harboured wild poliovirus (5).

## The results

In 1985, nearly 1000 cases of poliomyelitis were reported in the Americas, compared with over 10,000 cases estimated to be occurring annually in the seventies. By the end of 1990, only 18 cases were reported, with transmission on the verge of being interrupted. Interruption was finally achieved in 1991, when only 9 cases were identified: 8 in Colombia, with last onset in April; and in Peru, the one believed to be the last case in the Americas, a two-year-old boy named Jose Fermin, with date of onset 23 August (6).

## The obstacles

Among the major obstacles at the outset of the programme was the lack of political will and resources available. There was a need to challenge the social norm that accepted as inevitable children being maimed every year by a virus that could be eradicated. The intensive social mobilization which the initiative entailed made communities and political leaders aware of the need to reach the goal (7).

In some countries vaccination campaigns were threatened by ongoing civil wars. However, Days of Tranquillity for immunization were observed every year, once again highlighting the social commitment generated by the goal. In Peru, for example, during the control of the last focus of infection, around 2 million households were visited and nearly 2 million children were vaccinated during the course of one week, without any disruption.

The less than optimal efficacy and heat stability of OPV was overcome, both by strict cold chain control and by the rapid distribution and use of the vaccine during NIDs and mop-up operations (8).

Recent field research indicates that efforts to eradicate poliomyelitis from the Americas have had a major impact on the strengthening of health services overall (7).

Finally, the initiative has demonstrated the impact of properly utilized vaccines and the benefits that can accrue from the advent of improved and new vaccines which, thanks to recent technological advances, will be placed at the disposal of health policy-makers in years to come.

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# WORLD HEALTH DAY

7 April 1995

WHD 95.3

## CHINA ESTABLISHES WORLD RECORD FOR POLIO IMMUNIZATION

*The worlds largest ever mass immunization event took place in China in January 1994 — when a record 83 million children under four were vaccinated against polio over two days. The event followed an initial round of vaccinations a month earlier in which 82 million children were immunized. The mass immunizations, known as National Immunization Days' were the first in a series of four rounds scheduled over a 14-month period. The aim was to hasten the final stages of the war against polio in China. Dr Yang Baoping, Head of the EPI Division in the Ministry of Public Health in China and Dr Mac W. Otten (Jr), WHO Medical Officer in China describe the dramatic progress made so far.*

Since polio vaccination was first initiated in China two decades ago, the number of polio victims has plummeted from about 20,000 a year to a total of 653 in 1993. In 1990 China accounted for almost 25 per cent of the reported polio cases worldwide. Two years later that figure had been slashed to less than 8 per cent.

In August 1988, a few months after the World Health Assembly established the year 2000 as the deadline for the global eradication of polio, the member states of WHO's Western Pacific Region announced their resolve to free the region of the disease by 1995. In response, China developed its own national plan of action and launched a range of activities.

The sheer size and population density of China posed major logistical challenges. The country has a population of 1.17 billion people — over a quarter of them under 15. It has a total landmass of 9.6 million square kilometres, of which two-thirds are mountainous areas, highlands or plateaus.

The country is administratively divided into 23 provinces, 5 autonomous regions and 3 municipalities. These are further subdivided into a total of 334 prefectures, 2800 rural counties and urban districts, 58,000 townships and finally — the smallest units — 776,000 villages. At the provincial level the population can range from 2 million in the most sparsely populated province to over 100 million in the most densely populated.

Limited vaccination for poliomyelitis in China began in 1964. Since then, the number of poliomyelitis cases has declined from approximately 20,000 a year in the 1960s, to 12,000 in the 1970s, and to between 5,000 and 10,000 in the early 1980s. The Expanded Programme on Immunization (EPI) began in 1982. A cold chain system was established and vaccination sessions were scheduled every one or two months in most counties, townships and villages. As a result of efforts to reach a universal childhood immunization goal of 85 per cent coverage in all provinces, reported cases of poliomyelitis dropped to 969 in 1987 and 667 in 1988.

However, despite an acceleration of the immunization effort in order to reach the target of 85 per cent coverage in all counties by 1990, a countrywide outbreak of poliomyelitis occurred during 1989 and 1990 in which 10,000 children were paralysed. An analysis of these cases suggested that the starting date for



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the first dose of oral polio vaccine (OPV) had been delayed; 29 per cent of the cases involved children of one year of age and 92 per cent had not been fully vaccinated.

Supplemental immunizations were started in the winter of 1990-1991. During the first three years of supplemental immunizations (1990-1992), provincial health departments made their own decisions about the target age group, the number of counties involved, the number of rounds and the timing. For the first two years there were insufficient supplies of OPV to complete two rounds of supplemental immunizations in every county for all children under the age of four. The total number of supplemental doses administered was equivalent to approximately one-third of a round nationwide in 1990-1991, one round in 1991-1992, and approximately one-and-three-quarters of a round in 1992-1993.

After a demonstration of high-level commitment at a national meeting of senior officials from provincial governments and from international organizations in September 1993, the State Council determined that all children under the age of four should be given one more additional dose of OPV on December 5 and January 5 respectively, each year over the period December 1993 to January 1995, and that NIDs should be a key strategy for polio eradication.

Because of China's large population (approximately 21 per cent of the world total), and the global proportion of polio cases occurring there, the conducting of NIDs is crucial for the success of polio eradication both in China and the rest of the world. In 1990, out of the 21,627 polio cases reported throughout the world, 5065 cases (23.4 per cent) occurred in China. By 1992, the number of cases reported in China had dropped to 1191 (7.7 per cent) out of 15,445 cases worldwide.

Both absolute and relative decreases in polio cases in China have been credited to the initiation of immunization days by an increasing number of provinces. According to statistics, the number of provinces conducting two rounds of immunization days had increased from six during the winter of 1990 to 25 during the winter of 1992. As a result, the number of doses of OPV administered increased from 71 million during the winter of 1990 to 186 million during the winter of 1992. In 1993, 653 polio cases were confirmed through the reporting system for acute flaccid paralysis — a 53 per cent reduction on the previous year. Meanwhile the characteristic seasonal increase in polio cases failed to materialize during 1993.

The first round of NIDs was completed on schedule by 5 December 1993. President Jiang Zemin joined in the NID activities in Beijing, administering OPV to children. Many of the children vaccinated in this first round had never been vaccinated against polio before. They included 31 per cent of the children under one year, 6 per cent of the one-year-olds, 4 per cent of the two-year-olds, and 3 per cent of the three-year-olds.

The massive immunization effort involved social mobilization through a mass media campaign and education activities which made use of radio, TV, newspapers and other media to get the message across. The effectiveness of this campaign can be measured by the number of children immunized: 82 million in the first round and a breathtaking 83 million in the second.

In the Western Pacific Region as a whole, the number of reported polio cases fell dramatically from 11,145 in 1981 to 1,919 by 1992 and to a record low of 1,214 in 1993 — despite a substantial increase in surveillance activity. Highly successful National Immunization Days have been carried out in four of the five countries in the region which are still reporting polio cases. The fifth country, Cambodia is due to conduct an NID in early 1995.

WHO's Regional Director for the Western Pacific Region, Dr Sang Tae Han, remains optimistic that polio can be eradicated from the region on target by the end of 1995. «Each year the level of commitment from national governments has been increasing, as shown by the increased input from national health budgets and by the successful implementation of national immunization days,» he said. «The international community as a whole, including nongovernmental and bilateral organizations, is convinced of the success of the poliomyelitis eradication initiative and is providing increasing levels of support, both technical and financial, to attain the goal of eradication.»



# WORLD HEALTH DAY

7 April 1995

WHD 95.4

## DAYS OF TRANQUILLITY

*One of the most enduring visions of the First World War is the moment when soldiers from the opposing front lines temporarily laid down their weapons and celebrated Christmas by playing football together. It represented then, as it has in the minds of men ever since, a triumph of humanity and hope over suffering and brutality. Dr Nicholas Ward, Acting Director of WHO's Expanded Programme on Immunization, explains how the wartime event has provided a model for combatants throughout the world to call a temporary truce so that children caught on both sides of a conflict can be immunized. Without these so-called Days of Tranquillity WHO's polio eradication initiative could founder.*

When a global disease eradication target, such as for polio, is declared by the nations of the world, there can be no exceptions. Every country, every province, every village, every person must be made free of the virus causing the disease.

A major stumbling block to this is widespread civil war, internal conflict and violent dissent, which in many countries have led to breakdown in the provision of social and medical services.

The trouble is that patterns of conflict have changed. In the past, wars were almost exclusively fought between armies, and most of the casualties were soldiers. Today, conflicts increasingly target civilian populations, and the fighting often takes place right on their doorsteps.

As a result, people's priorities inevitably focus on short-term needs such as food, water, security and the treatment of injuries. Unless major epidemics break out, the provision of preventive health services has far less priority. Routine immunization and regular health checks for children are no longer considered important. All too often the provision of immunization stops altogether and, inevitably, there is a rise in the number of children unprotected against the vaccine-preventable diseases such as polio, measles and hepatitis. When these diseases are reintroduced, epidemics will occur.

The organisms that cause epidemics have no respect for borders and pass freely from one country to the next. A country where those organisms still circulate poses a continuing threat to its neighbours and, thanks to high-speed international travel, a threat to the rest of the world as well.

WHO's eradication strategy for polio is based on the establishment and extension of low incidence or polio-free zones, extending from individual provinces or countries to wider continental areas – a strategy that has already proved successful in the Americas, Western Europe, the Arabian Peninsula, the Mahgreb Union and in Southern and Eastern Africa. Civil war and other disturbances threaten to impede that progress.

### Recognition of the effect of conflict on health



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It is increasingly recognized that children caught up in wars have special needs, and that meeting these needs is a priority. Heads of State of many of the world's nations, meeting at the 1990 World Summit for Children, published a declaration which stated «We will work carefully to protect children from the scourge of war. The essential needs of children and families must be protected even in times of war and in violence-ridden areas.» The leaders proposed «periods of tranquillity..... for the benefit of children». Their declaration also specified that «Resolution of a conflict need not be a prerequisite for measures explicitly to protect children and their families, to ensure their continuing access to food, medical care and basic services, to deal with the trauma resulting from violence.»

Dr Nakajima, Director-General of the World Health Organization, has repeatedly pointed out that the major advances achieved in Primary Health Care, such as in immunization, can be rapidly lost in situations of conflict, where staff are scattered, facilities looted or destroyed, essential supply systems interrupted and the provision of care services disrupted. He also observed that the control of the major communicable diseases, such as polio, depends on effective control measures in all areas as well as across borders. Achievement of the global targets for the eradication, elimination and reduction of disease, such as those for polio, measles and neonatal tetanus, are dependant on the commitment of all countries, and on their capacity to provide vaccines to all children.

James Grant, Executive Director of UNICEF, has called for a new ethic, which accords «first call» to children – placing them at the top of any agenda, in good times and bad. He urged a heightened concern for children in economic crises, natural disasters or under austerity programmes, leading, in a continuum, towards greater protection and care for children caught up in armed conflicts.

### **Immunization through «Days of Tranquillity»**

By the year 2000, the world is targeted to be free of polio. However, it is already apparent that some conflicts will not be resolved within that period. In many countries, civil wars, community disturbances and broken or ineffective supply systems have already lasted up to a decade or longer. In these countries a more active approach is clearly required to overcome these constraints.

Several countries have succeeded in bringing conflicts to a temporary halt while humanitarian activities, normally only possible in times of peace, were re-established for a brief period. On these days, described as «Days of Tranquillity», «Days of Peace» or a «Ceasefire for Children», fighting was stopped while children were immunized.

In 1984, Colombia's President Betancourt negotiated a ceasefire in seven rebel-held areas of the country to allow a National Immunization Day to be conducted. The point of dispute then shifted to which side could achieve the higher immunization coverage.

In 1985, in El Salvador, a ceasefire was negotiated on three separate days so that immunizations could be carried out. These «Days of Peace» continued for seven years, in the course of which polio was eradicated from the country. The success involved not only the government, the armed forces and the Frente Farabundo Martí, but also, among others, the churches, the Pan American Health Organization, UNICEF, Rotary International and USAID. In the 1990 campaign, 245,000 children and women were immunized.

In 1990, all conflicting factions in the Lebanon observed a ceasefire on 5th April, to allow staff in 600 health points and 95 mobile teams to carry out a three-day immunization campaign. A UNICEF poster at the time declared that on that day «the only shots in Lebanon were those giving vaccination to children».

In the Philippines, in 1992, President Ramos announced a «ceasefire for children». Preparation for these days involved massive prior publicity as well as detailed planning to ensure the availability of vaccines to every area and to all communities. The immunization days were strongly supported by many nongovernmental organizations, such as Rotary International, as well as schools, churches and private businesses. Rebel groups laid down their arms and brought their children for immunization. Over 9 million doses of polio vaccine and over 6 million doses of vitamin A were distributed. As a result, within a short period of time the Philippines reported zero cases of polio.

In Sudan, in 1990 and again in the face of major polio and measles epidemics in 1993, immunization and other health care for children was provided to both sides in the civil war. In this case UNICEF created «corridors of tranquillity» in areas in the south of the country where conflict had persisted for many years.

### **Key factors for successful «Days of Tranquillity»**

One of the key factors for success in organizing «Days of Tranquillity» is strong commitment from those responsible for health within a country – on both sides of the political divide – to allow the needs of children to override political differences. Means of communication between opposing factions need to be established, with access to all combatants. Religious groups, women's federations and trade unions often have the potential to develop the level of trust needed to build confidence. Once contact is made and goodwill established, the free and effective provision of services, including vaccine supplies, can be guaranteed. Experience in a range of countries involved in widely differing disputes has shown that the welfare of children and the conquest of disease can transcend apparently intractable conflict.

Implementing mass campaigns through «Days of Tranquillity» demands detailed and competent planning, possibly even more than under normal circumstances. Effective use of the media is needed to inform the public on both sides of the conflict that immunization is not only essential but that the processes involved are safe and reliable. Any breach of trust could be catastrophic. So far this has not been a problem.

Global eradication of polio requires a capacity to immunize all children, safely and with potent vaccine. While ideally this should involve both routine immunizations and mass campaigns, in some countries it will be necessary to seize whatever opportunity exists to provide vaccines rapidly and completely.

Several crucial questions remain as the target for global eradication of polio draws nearer. Is there enough time to reach all children in areas of conflict? Is there sufficient goodwill in all areas of conflict to call a temporary truce? Are combatants prepared to put children first? Do organizations have the skills and the commitment needed to reach across boundaries and overcome the ideological differences behind the conflicts?

There are two reasons for hope. Firstly, the strategies to eradicate polio have been shown to be highly effective, when implemented thoroughly. Results can be achieved within a short period and do not necessarily depend on a long period of routine immunization.

Secondly, experience has shown that conflicts can be halted long enough for immunizations to be carried out and for polio to be consequently eradicated.

As a part of their policy to create and extend polio-free zones around the world, WHO and UNICEF are developing the skills required to tackle the problems of areas of conflict, ensuring that individual disputes are not allowed to prevent the eradication of polio by the end of this century.



# WORLD HEALTH DAY

7 April 1995

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## THE ROTARY FACTOR

*Through its PolioPlus Programme, Rotary International has shown how volunteers can play a key role in public health campaigns. Mim Neal, Rotary International's Media Relations Manager, explains how Rotarians from all over the world are helping to eradicate polio.*

In May 1985 the Pan American Health Organization (PAHO) announced its resolve to eradicate polio from the Americas. Six years later the last case of polio was confirmed in Peru. Nine years later, on 29 September 1994, an international commission led by Nobel Laureate Dr Frederick Robbins officially announced that the Western Hemisphere had been certified polio-free.

Tens of thousands of people have invested, and are continuing to invest, enormous amounts of creativity, courage, and energy to ensure that polio is eradicated throughout the world. An impressive number of organizations and governments have provided the funds to make it happen. There are three groups of key players in this story: international public health experts, many of whom are veterans of the smallpox eradication campaign; public health workers, mostly working at the national level, all too often under-appreciated and on low salaries; and volunteers, who by definition are not paid at all.

PAHO's Dr Ciro de Quadros, who provided the technical leadership to the army of public health experts, international and national, developed the new strategies which worked so dramatically in Latin America and are now being used in the global polio eradication campaign.

They include:

- A Technical Advisory Group (TAG) of experts which sets technical policies for the guidance of governments.
- Inter-Agency Coordinating Committees (ICCs) - for the region and in each country - which coordinate the resources available.
- A laboratory system to provide the information needed to track the poliovirus and thereby ensure efficient programme operation.
- Strategies such as mass immunization campaigns (including National Immunization Days) and «mop-up» immunization (intensive efforts in areas of suspected cases), complementing existing routine immunization systems.

These innovations represent the medical/technical side of the story. But the key aspect of this story is human/sociological. It is the volunteer - in the form of the world's first service club association, Rotary International.

Well before the May 1985 PAHO meeting, Rotary began to support polio immunization. Its first project began in the Philippines in 1980. Latin American efforts were launched in 1981, with projects in Haiti and Bolivia. By 1985, Rotary had committed itself to «help eliminate polio» globally. It had launched or approved projects in 19 countries, nine of which were in the Americas. Oral vaccine developer Dr Albert Sabin helped announce what was to become Rotary's PolioPlus Programme in February that year.



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By then, Rotary had approved more than US\$1.9 million for immunization efforts in Belize, Bolivia, Costa Rica, El Salvador, Guatemala, Haiti, Honduras, Panama and St Lucia.

That's why the 1984-1985 President of Rotary International, Dr Carlos Canscco, of Mexico, was among the participants at the May 1985 PAHO ceremony and why Rotary representatives became members of every international and local Inter-Agency Coordinating Committee.

But no one participating in the PAHO ceremonies had any idea what a group of non-technical, non-medical volunteers might contribute to eradication efforts. Especially Rotary. There had been Rotary clubs in Latin America since 1918. Their members were business and professional leaders and they conducted short-term projects which benefitted local communities as well as initiating activities, such as service to the disabled, which were maintained by other organizations. They were not involved in any long-term projects. What did they know about public health? Public health campaigns were traditionally conducted by a closed fraternity of specially trained personnel. What could Rotary add?

Dr Canscco remembers the tentative welcome Rotary received when it announced its PolioPlus Programme after being granted consultative status with the World Health Organization (WHO).

«They granted us a two-year period as a member of the WHO, with full rights, of course, but we were, I would say, on probation. To prove that we could really help, we needed some examples. So we decided to go to Paraguay, a small country - not more than 600,000 children - and established national immunization days. The result was tremendous. In one year, polio dropped from as many as 100 cases to practically nil. And we continued in that country for five years and now it's free of polio.

But they were not convinced, so I proposed to go to Mexico, with more than 15 million children under five years. As President of Rotary International, I went to see the President and he supported the idea of immunization days. It took us about a year to prepare the national days of immunization in Mexico, but at the end of January 1986, the last Saturday, 13 million children were immunized in one day. More than half a million volunteers participated in this endeavour and it was the beginning of a long story that ended with Mexico's last case of polio in October 1990.

Really, the PolioPlus Programme was conceived as an education programme. Immunization was one way to get to the homes of the poor people who did not accept the invitation of the government to bring their children to the vaccination post. That was the main element of this programme - to contribute to the education of the people through posters, radio announcements, little toys, gimmicks, whatever. And they accepted, reluctantly at first, to bring the children to the vaccination post. But after they realized that they could sleep without the fear that next day they would have a paralysed child in the house, they started coming, and they have kept coming for eight years.»

Rotary's great strengths are that it is community-based, its membership comprises private sector leaders, and it has the potential to be internationally coordinated. Once the service club association committed itself to child immunization, coordination became possible.

Between July 1986 and June 1987, Rotary began to transform its dream into an operational programme. As its two-year fund-raising campaign surged towards a goal of US\$120 million for PolioPlus, Rotary created and trained a Task Force. The five members, from Brazil, the Dominican Republic, the Philippines, Turkey, and the U.S., worked with professional staff to create club and national immunization manuals which they used on visits with Rotarians around the world. Rotary began acting on the hypothesis that community volunteers, properly trained, supported, and utilized could measurably increase immunization coverage and strengthen national Expanded Programmes on Immunization (EPI).

Peru's Rotarians essentially proved that hypothesis. During three national immunization days in 1986, more than 2 000 of the country's 2 300 Rotarians served as home visitors, vaccinators, drivers, meal preparers, data analysts, or publicists. And they generated an estimated US\$440,000 in funds or in kind donations.

The significance of the first globally coordinated private sector support for an international health programme was not lost on the experts. Aware of the progress in Latin America and Rotary's commitment, the World Health Assembly, on 12 May 1988, adopted a resolution to eradicate polio throughout the world by the year 2000. And the World Health Organization's then Director-General Dr Halfdan Mahler sent a special video message to the Rotary International convention in Philadelphia where the organization celebrated raising some US\$240 million for PolioPlus. «As business and professional leaders you have helped to change attitudes towards immunization. And you have given Ministries of Health needed advice or stimulation in making their programmes more effective.»

Between 1988 and 1990, Rotary committed PolioPlus funds to the national immunization programmes in 27 countries in South and Central America and the Caribbean. Grants required the participation of Rotarians. In each country Rotarians brought different approaches and levels of support.

Over the last 10 years, Latin American Rotarians have printed at least a million posters, pamphlets, street banners, calendars, stickers, caps, and even tote bags promoting immunization. They have also provided basic supplies, like ice, thermos flasks, cold boxes, and lunches for health workers. And they have brought substantial management and negotiating skills to national programmes.

- In 1987, La Paz Rotarians persuaded private clinics to conduct immunization in coordination with Bolivia's Ministry of Health.
- Following a disappointing turnout for Guatemala's 1988 NIDs, Rotarians withheld their request for an additional PolioPlus grant until the Ministry of Health completed the immunization plans and budgets for each department. Subsequently, each club «adopted» departments, providing both support and monitoring.
- Honduran Rotarians adopted a similar strategy to convince their ministry to make back payments to PAHO.
- In Colombia, Rotarians worked with UNICEF and PAHO in a 1989 «Awareness Campaign for Mayors and Municipal Officials in Support of Vaccination Strategies». After assembling 10 000 information kits, Rotary clubs presented and explained them to urban leaders.
- During a February 1990 containment immunization in Ecuador, a Rotary club persuaded local health workers to forego a threatened strike. A Rotarian appointed by Ecuador's Ministry of Health to head its Promotion Committee secured the collaboration of broadcast associations and implemented nine days of intensive promotion for April NIDs.

Rotarians also created and shared innovative strategies involving volunteers from one country in order to help their peers in other nations to design immunization support. As early as 1985, Paraguayan Rotarians helped organize intensive house-to-house immunization efforts, which they then taught to Rotarians in Brazil. In September-October 1989, 20 Buenos Aires Rotary clubs assisted health workers in rapidly immunizing children in 200 low-income, high-risk barrios. The Rotarian who coordinated this «urban containment» strategy shared the idea at regional meetings in Honduras and Uruguay.

Because of its nongovernmental status, Rotary proved useful in cross-border immunization efforts in Colombia - Venezuela and Ecuador - Peru, and in delivering vaccine during conflicts in El Salvador, Nicaragua and Peru.

The early fear - that Rotary wouldn't have staying power - has long since dissipated. Rotarians remain active supporters of immunization in 29 countries, for which some US\$40 million in PolioPlus grants have been approved. Seven Rotarians - in Brazil, Colombia, Guatemala, Haiti, Mexico, Peru, and Venezuela - have led their nation's programmes for more than eight years.

As immunization levels rise and polio cases disappear, Rotarians are shifting their activities to surveillance, again utilizing private sector innovation. Ecuador clubs are offering US\$1000 rewards, through a manufacturers national advertizing campaign, for notifying authorities of a confirmed case of polio. Meanwhile in Brazil, Rotarians are using surveys to enlist more than 12,000 paediatricians and neurologists in reporting cases of acute flaccid paralysis. Elsewhere, Bolivian Rotarians, together with UNICEF, have launched media campaigns to encourage the reporting of possible polio cases.

As the limited grant funds diminish, Rotarians continue to support immunization and public education and are investigating other private sector resources to help sustain the achievement until polio is eradicated globally. «I think the greatest contribution of Rotary is our presence, the presence of Rotarians in these countries, their personal presence at the immunization days», said Dr Canseco. «Now I think is the most important and difficult part of this programme. To keep the levels of immunization higher than 80% and to report every case of acute flaccid paralysis.»

According to PAHO's Dr de Quadros, «never before has there been such a strong partnership between the public and private sectors, and between multilateral and nongovernmental organizations.»

For the first time in the history of public health, there is an educated, motivated private sector cadre of collaborators working effectively with the international health community. This bodes well for all the world's children.



# WORLD HEALTH DAY

7 April 1995

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## THE ECONOMICS OF GLOBAL POLIO ERADICATION

*The global eradication of polio is not only technically feasible by the year 2000, it also makes economic sense, according to a study carried out for the World Health Organization by the Atlanta-based Centers for Disease Control and Prevention. The global cost-benefit analysis reveals that, by the year 2005, the cumulative benefits of eradicating polio will exceed the costs by approximately US\$125 million. Dr Deborah A. McFarland, Associate Professor at Emory University School of Public Health and Health Economist at the Centers for Disease Control in Atlanta, USA, explains how the cost-benefit analysis was carried out.*

The analysis compared the financial commitment needed from donors to support global polio eradication by the year 2000 plus a period of monitoring to the year 2005, with the benefits derived from not having to treat the polio cases which would occur in the absence of the eradication effort. The methodological approach parallels one used by Dr Philip Musgrove in a study of the economic justification of polio eradication in the Americas<sup>1</sup>.

With the WHO commitment to support global polio eradication firmly in place, a cost-benefit analysis can serve as both an advocacy tool for donors and a motivational tool for EPI programmes in individual countries. The decision to eradicate polio raises legitimate economic issues for both donors and ongoing immunization programmes which can be addressed in a cost-benefit analysis. However, this kind of analysis requires making explicit assumptions about financial requirements from external sources, the timing and extent of eradication strategies, and the contribution of the existing EPI programme to the control of polio.

The estimated total financial commitment needed from donors for the next six years (1994-2000) in order to eradicate polio is US\$807.2 million. Approximately 70% (US\$482.57 million) is for the purchase of polio vaccine for use in national immunization days (NIDs), mop-up campaigns and routine immunization programmes in those countries unable to provide all the necessary vaccine. Since vaccine accounts for such a high proportion of total costs, the analysis assessed vaccine costs for each country based on country-specific strategies summarized by region. These figures are currently under review by each WHO Regional Office to ensure the validity of the assumptions made in the costing model. The overall cost of vaccines for the polio eradication effort would obviously decrease if the price of polio vaccine was lowered. The cost of a single dose of polio vaccine is currently US\$0.09, although in China, locally produced vaccine is already available at US\$0.02 per dose. Operating costs, the second largest component of the total cost, US\$263.5 million, include funds for salaries, daily allowances, transportation, training and other supplies. These funds are in addition to those already being spent by countries for routine EPI programmes.

Although the finances needed from donors to eradicate polio by the year 2000 may appear high in light of the multiple claims on donor resources, it is worth noting that the annual cost of the polio

<sup>1</sup>Musgrove P. Is polio eradication in the Americas economically justified? Health Economics: Latin American Perspectives, PAHO Scientific Publication No 517, 1989, 107-122.



vaccination programme in the United States alone is approximately US\$272 million. These costs are essential because the US must protect its citizens from imported polioviruses from those countries where polio has not yet been eliminated. Once polio is globally eradicated, this expenditure will no longer be necessary. It is surely in the best interests of donor countries to support the global eradication initiative if only from a purely nationalistic point of view.

The benefits can be measured in several ways: a decrease in the worldwide burden of disease; a reduction in pain and suffering on the part of those afflicted with polio; potential increases in productivity; and savings in long-term health care for victims of polio. In 1990, polio accounted for 4.81 million so-called disability-adjusted life years (DALY's), a measure of the burden of disease, out of a total of 1362.1 million DALY's. While polio constitutes a relatively small percentage of the global burden of disease, it is one of only two diseases, the other being dracunculiasis, which can be eradicated before the end of this century. Other diseases, such as measles, could follow. As the World Development Report 1993, *Investing in Health*, states, «The gains in such cases (diseases which can be eradicated permanently) include not only the DALY's saved at the margin from the last people immunized but all the health years that would otherwise be lost to the disease in the future».<sup>2</sup> In a cost-benefit analysis the benefits are usually measured in monetary terms. Although the reduction in pain and suffering and increased productivity may indeed be considerable if polio is eradicated, both are difficult to measure accurately. However, the economic case for global polio eradication can be made on the basis of savings in health care costs alone.

The WHO/CDC analysis shows that the current net value of savings in health care costs attributable to the global eradication of polio varies significantly across WHO Regions, mainly due to the costs involved in treating polio cases. Where polio is expensive to treat, the savings from even a relatively small number of polio cases is considerable. Where polio is relatively inexpensive to treat, health care savings take longer to accumulate. Thus the net benefits of global polio eradication are first seen in industrialized countries with high expenditures for treatment and/or in those regions of the world where there are a large number of polio cases. Applied on a regional basis, cost-benefit analysis gives a mixed answer to the question of whether the global eradication of polio is economically justified. However, on a worldwide basis, the answer is a resounding yes. The eradication of polio is indeed economically justified.

The World Health Organization and its Member States maintain that polio eradication is technically possible. The cost-benefit analysis reveals that it makes economic sense. The remaining question is how can it be financed. The financial cost to donors of global eradication is US\$807 million over a six-year period. This seems a small price to pay for the global eradication of a second disease. The eradication of smallpox in 1977 cost approximately US\$313 million over 10 years – an investment which has been paid back many times over since then in savings on vaccines and medical care and the suspension of international surveillance activities. When there is donor will to accomplish a goal, the smallpox story shows that it can be done. When added to the continuing contributions which even countries of very limited economic means are making to their immunization programmes, the donor contribution to global polio eradication will pay for itself within 10 years. The effort is not only morally and ethically justified by a reduction in human suffering, it is also a sound investment.

<sup>2</sup>World Bank. World Development Report 1993. New York: Oxford University Press, 1993.



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## THE ROLE OF VIROLOGICAL SURVEILLANCE IN POLIO ERADICATION

*Thanks to the development of highly sophisticated viral detective work scientists today can not only differentiate between wild poliovirus and vaccine poliovirus but are also able to determine the genetic make-up of a poliovirus and pinpoint its exact geographic origin. Dr Olen Kew and Dr Mark Pallansch of the US Centers for Disease Control and Dr Walter Dowdle of the Task Force for Child Survival and Development explain these new laboratory techniques and their crucial role in the global eradication of poliomyelitis.*

Major technological breakthroughs over the past few years have radically transformed efforts to eradicate polio. The explosion in knowledge about the genetic make-up of living things has enabled scientists to analyse polioviruses in minute detail, draw up family trees of viruses and even pinpoint their precise geographic origin.

In the past, it was possible to distinguish between the three types of poliovirus. But not much more. And it took time. Today scientists can differentiate between wild (naturally occurring) viruses and vaccine-related viruses. They can magnify a poliovirus to a million times its normal size to analyse minute differences (mutations) in the genetic make-up of the virus, which varies slightly from one outbreak to another.

But this technical wizardry is far from being a laboratory toy. Its implications for the global eradication of polio are far-reaching. Detailed information on the patterns of poliovirus circulation is of vital importance in drawing up the most efficient, cost-effective strategies for the global eradication of poliovirus. Virological surveillance can help define geographical zones of virus circulation, which often extend across the boundaries of nations and WHO Regions. Identification of these zones provides a clear rationale for interregional cooperation to synchronize national immunization days. In addition, studies of the genetic make-up of polioviruses can help pinpoint regional and local reservoirs of endemic polioviruses where there is a need for intensified door-to-door immunizations (known as mop-up operations).

This crucial viral detective work is carried out by the staff of almost 60 national laboratories, 15 regional reference laboratories and five specialized reference laboratories of WHO's Global Laboratory Network. Their work is carried out in close collaboration with those involved in field-based surveillance for cases of acute flaccid paralysis.

Virological surveillance is aimed at finding out:

- the principal reservoirs (local, regional, global) sustaining wild poliovirus circulation;
- the links between outbreaks of infection;
- the major transmission routes;
- where and when the chains of transmission are weakened;
- when eradication has been achieved;

Laboratory analysis begins when a virus grows in cell culture. Antibodies specific to individual viruses are used to inhibit growth of viruses in cell culture, allowing virologists to single out poliovirus from other viruses. The next step is to distinguish between vaccine-related polioviruses and wild polioviruses. One way of doing this is to use antibody preparations specific to either vaccine or wild strains of the virus to detect differences in their surface properties.



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Another method involves the use of a special "probe" to identify a poliovirus. The probe identifies a virus by binding to its genetic material whenever the sequence of genetic building blocks (RNA) is exactly matched. The technique is similar to closing a zip fastener, the teeth of which will only close if the sequence is identical on each side. This method can also be used to distinguish between different kinds of wild polioviruses by determining the exact sequence of bases in the genetic make-up of the virus. Through this kind of analysis, wild polioviruses can be grouped into genetic families (genotypes) which cluster geographically.

The genetic make-up of a poliovirus can reveal its origin. In most cases the virus belongs to the same genetic family (genotype) as other polioviruses specific to that locality or region. However, studies have also documented long-range importations of wild polioviruses. For example, when the last polio case in the Americas occurred in Peru in 1991, the virus was found to belong to a genetic family that originated in the Middle East (Fig. 1). Closer analysis showed that the genetic make-up of polioviruses from the Middle East in 1980 matched those of polioviruses obtained the same year in Venezuela. The newly introduced poliovirus spread in successive outbreaks from Venezuela and Colombia to Ecuador and Peru until it was finally eradicated from the Americas. Polioviruses from the same genetic family are still circulating in parts of the Middle East and Central Asia.

A 1978 outbreak of polio in The Netherlands among a religious community who refused immunization was traced back to Turkey with the help of detailed genetic studies of the poliovirus. Pathways of transmission from Turkey to the Netherlands and from there to Canada and the United States were worked out from studies of minute changes in the genetic make-up of the polioviruses responsible for outbreaks in all four countries. When an outbreak occurred among the same religious community in The Netherlands in 1992, similar genetic studies revealed that this time the virus had originated in India.

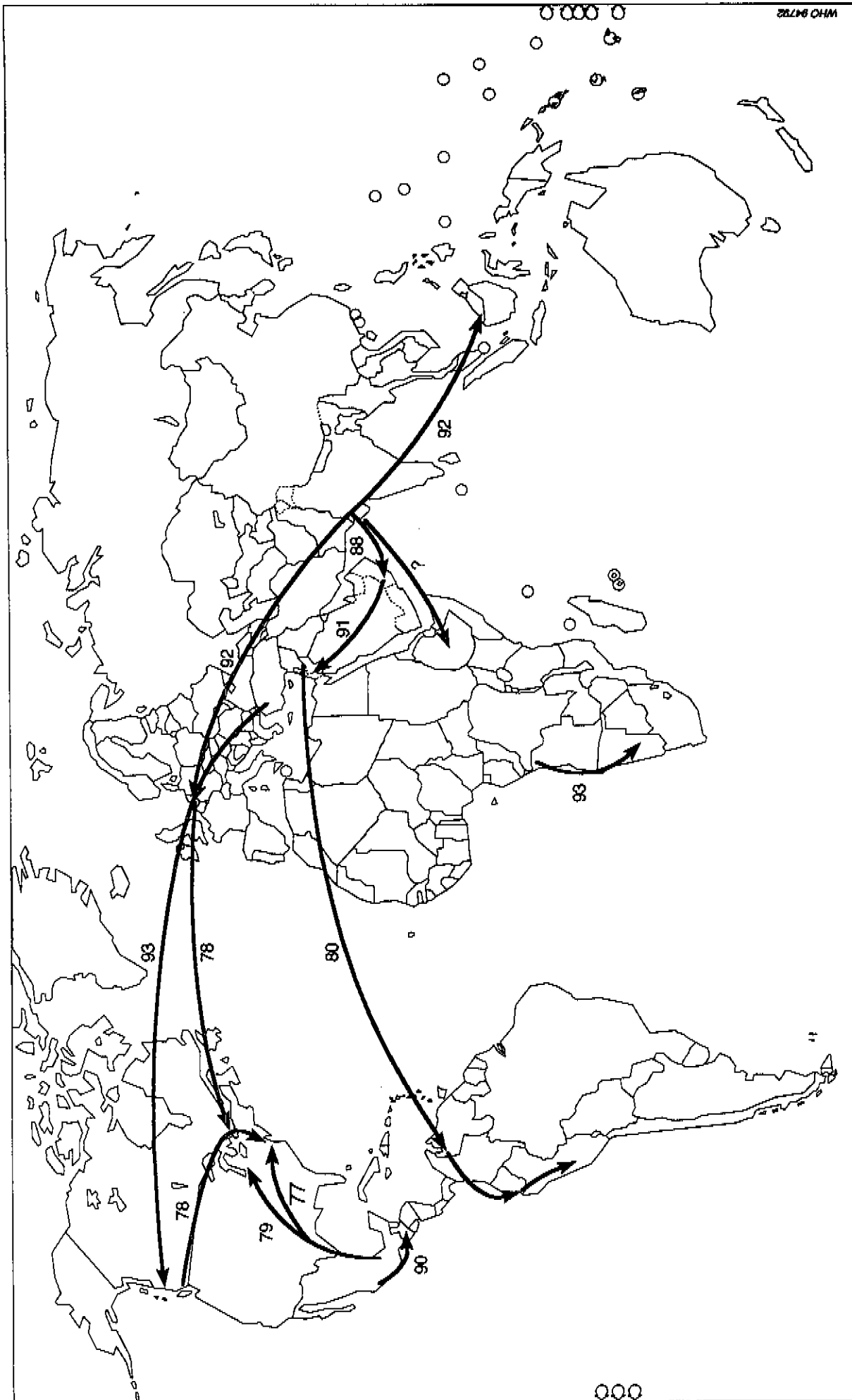
Other molecular methods used to detect wild polioviruses include one involving the million-fold amplification of the genetic make-up of specific wild polioviruses. Through this technique wild polioviruses can be selectively detected, even where they are only present in minute proportions. This approach was used by the Pan American Health Organization (PAHO) in 1991 in a high-risk population in Cartagena, Colombia. Few cases of polio were being reported and it was important to find out whether any wild poliovirus was still in circulation. Tests involved faecal samples from healthy children as well as analysis of sewage water and revealed that wild polioviruses were still in circulation. The wild virus was identified in samples from over 8% of the children and over 20% of the sewage water. As a result, children in high-risk areas in Cartagena and along the entire Pacific coast of the Americas were immunized in intensive mop-up campaigns, eradicating the last vestiges of polio from Colombia.

Virological surveillance has also revealed zones in which continued endemic circulation of closely related polioviruses spans several adjacent countries. For example, cases in the southern Mekong delta region of Vietnam are epidemiologically and virologically linked to cases in Cambodia and Thailand. However, poliovirus isolates from the Red River delta of northern Vietnam are only distantly related to the viruses from the south. Such analyses have helped to better define the range of circulation of certain poliovirus genotypes and are crucial in determining immunization strategies. For example, isolated attempts to eradicate the poliovirus found to be occurring in southern Vietnam or Thailand are unlikely to succeed until immunization is re-established in Cambodia, where health services have been devastated by decades of war.

The scientific techniques now available will become increasingly important as fewer and fewer polio cases are reported and the virus is on the verge of being eradicated. One of the major problems in detecting outbreaks of polio is the fact that in the majority of cases, polio transmission is silent. Only about one in every 200 infections results in polio paralysis and by then transmission of the virus may already be widespread. Environmental sampling like that carried out in Cartagena may show that the virus is still circulating silently, even though no cases are being detected. In the final stages, intensive virological surveillance will provide the evidence that the goal of global polio eradication has been achieved.

*Figure 1. Examples of long-range importations of wild polioviruses detected through genetic studies of the virus. Many other transmission pathways, both within countries and across WHO Regions, have been found through surveillance. The years of importation are estimated from the dates of appearance of cases associated with the imported polioviruses. The dates of introduction of south Asian genotypes into East Africa are uncertain; the surveillance data suggest that multiple importations have occurred. The importation pathways shown here were discovered through the collaboration of epidemiologists studying cases of acute flaccid paralysis (AFP) throughout the world and virologists working in the WHO Global Laboratory Network.*

Figure 1.  
IMPORTATIONS OF WILD POLIOVIRUS



The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate boundaries where there may not yet be full agreement. - Les désignations utilisées sur cette carte et la présentation des données qui y figurent n'impliquent, de la part de l'Organisation mondiale de la santé, aucune prise de position quant au statut juridique de tel ou tel pays, territoire, ville ou zone, ou de ses autorités, ni quant au tracé de ses frontières. Les lignes en pointillés représentent les frontières sur lesquelles un accord complet peut encore ne pas exister.



# WORLD HEALTH DAY

7 April 1995

WHD 95.8

## CHALLENGES TO THE ELIMINATION OF POLIO: THE THREAT OF IMPORTATION

*Although the countries of the Western Hemisphere have been certified polio-free, they will need to be on continued alert against the importation of poliovirus from countries where polio is still endemic. Without continued vigilance, the disease could become resurgent, maintains Dr Adwoa Bentsi-Enchill, Field Epidemiologist at the Laboratory Centre for Disease Control in Ontario, Canada.*

In spite of heightened surveillance for cases of acute flaccid paralysis, no case of poliomyelitis has been detected in the Americas since August 1991, when the last case occurred in Junin, Peru. Certification of the eradication of polio in the Western Hemisphere was formally announced on 29 September 1994.

However, the countries of the Americas, as well as other industrialized countries that have succeeded in eliminating indigenous polio, must be alert to the continuing threat of importation of wild poliovirus from polio-endemic regions. If not recognized promptly and controlled, importation of wild poliovirus could lead to widespread transmission and the subsequent re-establishment of indigenous disease.

The threat of importation is very real. In Canada where the last case of paralytic poliomyelitis due to indigenous wild virus was in 1977, subsequent outbreaks of the disease have highlighted the need for constant vigilance to prevent the importation of wild virus from polio-endemic countries.

Poliomyelitis has been under control in Canada since the early 1970s through extensive immunization, as well as improvements in sanitation and surveillance efforts. Of 15,499 cases of paralytic polio reported in Canada from 1949 through 1993, approximately 70% occurred in the pre-vaccine period of 1949 to 1954. Since 1965, 54 cases of paralytic polio have been reported in Canada. Thirty-five of these (65%) were attributed to wild poliovirus infections, all but one prior to 1980. Of the wild virus cases, 14 were caused by imported virus while 21 were assumed to be endemic (prior to 1975, cases due to the wild virus were not differentiated as indigenous or imported).

The last confirmed case of paralytic poliomyelitis in Canada due to indigenous wild virus was in 1977. However, the last case of wild paralytic poliomyelitis in Canada occurred in 1988 as a result of virus importation. This isolated case of imported polio occurred in a fully immunized nine-month old male child, born in Canada but with close household contact with visitors from polio-endemic countries (Iran, India and Egypt).<sup>1</sup> A diagnosis of wild poliovirus type 1 infection was confirmed by positive stool culture and the virus characterized as resembling poliovirus strains from the Indian subcontinent.

Two other instances of wild poliovirus importation serve as more powerful illustrations of the continuing risk to polio-free countries because of the number of persons infected. Both of these instances involved well-defined communities which, for religious reasons, do not accept immunization and followed outbreaks of poliomyelitis in The Netherlands among similarly non-immunized religious communities.

The first instance of poliovirus importation followed an outbreak of poliovirus type 1 infection in The Netherlands in 1978 and resulted in 11 paralytic cases in three provinces of Canada (Alberta, British Columbia and Ontario) during 1978 and 1979.<sup>2,3</sup> All the paralytic cases involved people who had refused immunization for religious reasons. As is typical of polio, the full extent of infection is not known. In Alberta, only one paralytic case occurred, but an additional 36 confirmed and 10 presumptive infections were reported. Epidemiological investigations proved close contact between members of the religious communities in both countries. Further, the type 1 virus isolated from both clinical and non-clinical cases in the two



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countries were shown to be similar in genetic composition. Fortunately, the potential for spread of the imported virus to the general population in the affected Canadian provinces was averted by the high levels of immunity induced by routine immunization, and the prompt outbreak control measures taken.

From September 1992 to February 1993, another polio outbreak occurred in The Netherlands among the same non-immunized religious communities affected by the outbreak 14 years earlier. During this outbreak, federal and provincial disease control specialists in Canada took swift action to initiate active surveillance for poliovirus in the religious communities affected by the 1978 outbreak. Surveillance included both community (blood and stool) sampling and environmental (sewage) sampling. The alertness of public health officials to the potential risk and the promptness of investigations paid off as wild virus importation was detected in southern Alberta.<sup>4</sup> In that province, 22 of 65 stool samples obtained resulted in isolation of wild poliovirus type 3. Using generic and specific primer sets for genomic analysis, the type 3 virus isolated was shown to be closely related to the virus strain identified in The Netherlands outbreak.<sup>5</sup> In addition, contact between members of the two communities was documented.

No clinical cases were detected in Canada despite heightened surveillance. Moreover, subsequent resampling in Alberta did not reveal the virus, thereby suggesting limited circulation of the virus in that community. Investigations in the other provinces with similarly non-immunized religious communities resulted in zero detection of wild poliovirus. The timely detection of the imported wild virus despite the absence of clinical cases attests to the quality of polio surveillance in Canada.

As other regions of the world forge ahead towards elimination of indigenous poliomyelitis, it is well worth remembering that a polio-free status does not mean a risk-free status. The risk of poliovirus importation is underscored by a number of factors.

Firstly, there is a tendency among health care workers to overlook a disease which is rare or one which may be regarded as clinically insignificant when compared with other more prevalent health problems. This often results in decreased vigilance which may lead to an inability to recognize the occasional rare occurrence of the disease.

A second problem is the possible existence of pockets of low immunization coverage in industrialized countries, despite the notably high levels of overall immunization coverage that have been documented. Such communities with low coverage (for religious or other reasons) should be sought out for active surveillance when necessary as they constitute a particularly high-risk group for infection.

Thirdly, changes in the epidemiological pattern of poliomyelitis as a country progresses from endemicity to elimination have to be taken into account. This may mean identification of different groups at risk for infection and may have an impact on surveillance programmes. Unlike most endemic countries, the majority (65%) of polio cases in Canada in the last three decades involved people above the age of 15 years. In the recent importation of poliovirus, the ages of infected persons ranged from 8 months to 40 years (mean of 15 years, median of 10 years).

Finally, the achievement of the ultimate goal of global eradication is dependent on the efforts of all Member States of the World Health Organization. The long-term benefits of the polio eradication campaign cannot be fully realized until the time when polio vaccine is no longer necessary. Good communication between countries and prompt exchange of information about the occurrence of polio are crucial for the maintenance of polio-free zones.

Until poliomyelitis is wiped off the face of the earth, polio-free countries will have to maintain strict surveillance for possible wild virus importation. Detection of such importation followed by prompt outbreak control measures should avert extensive outbreaks of infection. To further control the transmission of imported virus in the general population, it is also essential that high levels of immunization are maintained to minimize the number of susceptible persons. Strengthened efforts are needed to keep health care workers informed about the continuing risk of importation, as well as the proper case investigation and outbreak control measures including the appropriate notification of public health authorities.

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# WORLD HEALTH DAY

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## REHABILITATION OF CHILDREN WITH POLIO

*In the past, children crippled by polio were often confined to their homes. Unless they could manage to walk to the nearest school, they missed out on education altogether. Even today they are often made fun of by their peers and excluded from normal play activities. Dr Jacob John, Professor of Microbiology at Vellore Christian Medical College in India, explains how they can be helped through both physical and psycho-social rehabilitation in childhood and through vocational guidance once they become adults.*

Mahatma Gandhi once spent three days blindfolded trying to prepare himself for a visit to a home for the blind. Few of us are endowed with such seriousness of purpose or sincerity. Most of us - even those actively involved in the prevention of poliomyelitis or in the rehabilitation of children affected - cannot fully understand how a child feels when he/she realizes that paralysis is going to be life-long.

Fortunately polio prevention through immunization has been a tremendous success. The incidence of polio has fallen by over 90 per cent globally over the past 20 years, as a result of the Expanded Programme on Immunization. Yet in Asia, Africa, and to a lesser extent, in Europe, children continue to contract polio and develop paralysis.

### The magnitude of the problem

During the 1970s and 1980s in several polio-endemic regions, between 6 and 8 out of every thousand school children were affected by polio. Most of them had paralysis of a leg and would come to school limping. Some would use a stick to help them walk; others would use crutches. In some villages children never went to school because they could not manage to walk that far. Others, paralysed in both lower limbs, were mainly confined to the house and never went to school either.

In a few towns, so-called Polio Homes can still be found, where children with severe disabilities are housed and go to school. A visit to one of these homes can be emotionally disturbing. The smiling faces of children who can only crawl is a graphic reminder of what polio is: a disease that can rob children of a normal childhood.

Although 6-8 children per thousand were affected in primary schools, the rate in high schools was only 1 or 2 per thousand, while in colleges it was no more than 1 or 2 per 6000 overall. There are several reasons for these disparities in distribution. In the first place, mortality rates among polio-affected children are several times higher than in non-affected children. As children grow older, the proportion of polio-affected among them inevitably declines. Sometimes they die as a result of accidents, sometimes through neglect. When a polio-affected child falls sick, the parents tend to pay less attention than to a normal sibling.

Secondly, for reasons not fully understood, polio has always tended to affect a disproportionately higher number of children from poorer families. One reason is that once immunization became available, the children of well-to-do families were vaccinated more regularly than those of poorer families. As a result, over the past two decades the disparity in the occurrence of polio has widened between richer and poorer families.

Meanwhile the children from poorer families - the group most affected by polio - are less likely to attend high school or college. Polio-affected children tend to leave school and break off their education at an earlier



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age than physically normal children. Many break off their schooling at the primary stage, while others leave in the middle school. Polio-affected children are also less likely to go on to high school or college.

## **What is rehabilitation?**

A child paralysed by polio is in need of some kind of rehabilitation. This may involve psychosocial rehabilitation as well as different forms of physical rehabilitation.

Physical rehabilitation is intended to improve the functional ability of the affected limb. A child who walks with the support of a stick or crutch should be helped to walk without support, wherever possible. A child who cannot walk due to weakness in both legs should be enabled, if possible, to walk with support. Those who can only crawl should at least be given wheelchairs so they can become mobile.

There are three elements involved in physical rehabilitation. The first involves exercises to prevent contractures and deformities and to improve the residual muscle power of affected muscles. These exercises should begin once the progress and pain of paralysis are over, and following a period of 2 weeks rest, that is, one month after the onset of paralysis. If the mother or another responsible member of the family is taught to help the child with exercises, both passive and active, these could be continued at home.

The second element involves mechanical instruments or appliances to stabilize weak joints (ankles, knees, hips). Calipers are commonly prescribed and then made and fitted in the clinic setting. Back home in the village children often discard them because they are cumbersome to use and sometimes too heavy for the child to wear. User-friendly calipers have been designed made from lighter materials but most centres continue to turn out old-fashioned, heavy calipers.

As children grow, calipers have to be altered and refitted from time to time. Crutches also have to be periodically checked for correct length and changed where necessary. Calipers and wheelchairs are often out of place in a village setting unless some commonsense modifications are made to the house. Ramps are needed and toilet facilities should also be modified for use by a handicapped child. Rehabilitation centres often fail to pay enough attention to these kind of details.

The final element is surgery. Carefully selected children can benefit remarkably from surgery, which can involve tendon lengthening to overcome contractures or tendon transfers to improve the functional ability or stability of a joint. More recently, surgical procedures to lengthen limb bones are being tried, using the bone fixator and slow traction method of Ilizarov. Although surgical procedures are expensive and beyond the reach of many families of children with polio, sometimes governmental or voluntary agencies organize free surgical corrections.

In addition to physical rehabilitation, there is often a need for psychosocial rehabilitation - equally important but all too often neglected. Children physically disabled through polio have normal intellectual functions. They also have emotional needs: in particular, they may need help in coming to terms with their condition and in adopting a positive outlook. All too often other children make fun of their physical handicap, ignore them or exclude them from play groups. As a result, children with polio may become withdrawn and emotionally isolated. They may need rehabilitation through play therapy in addition to regular schooling.

As children grow older, they should be guided towards suitable occupations or vocations. Although governmental schemes sometimes exist which can help them, often there is no one to liaise between the young person with polio and the appropriate agency. This is one area where voluntary agencies have a key role to play. Fortunately most polio victims have their upper limbs spared and they can be taught a range of skills such as operating telephone systems, feeding data into computers, computer programming, assembling instruments and artwork. Without some kind of employment-based intervention, the rehabilitation of a polio-affected person is incomplete.

## **What we can do to help**

So what can organizations and individuals do to help in the rehabilitation of people with polio? A first step is to identify every person with polio in our own geographic locality. The nearest hospital can then be approached to help assess their individual needs, in particular the need for physical rehabilitation. Together with the hospital staff, we can also assess the psychosocial needs of each person. In many cases, hospitals may have trained social workers. Otherwise, governmental social welfare offices can be approached. In some cases we may have to travel to the nearest city to obtain professional advice on psychosocial rehabilitation. Matching up available resources with those in need is the greatest service we can render to people living with polio.



# WORLD HEALTH DAY

7 April 1995

## IN POINT OF FACT

### THE DISEASE

#### What is polio?

Polio (short for Poliomyelitis) is an infectious disease caused by any one of three related viruses. The virus multiplies in the intestine and can then spread elsewhere in the body, causing an illness with mild flu-like symptoms. In about 1 out of every 200 cases, poliovirus passes to the spinal cord where it can destroy the nerve cells which activate the muscles. This damage is irreversible. The nerve cells cannot be replaced, the muscles affected no longer function and the outcome is lifelong paralysis.

#### Is polio ever fatal?

Yes. Sometimes the nerve cells in the brain are affected by the poliovirus. This can lead to respiratory failure and death.

#### Who are the main victims?

The disease mainly affects children under three but older children can catch it too. Adult cases are rare but do occur.

#### How is the virus transmitted?

The virus is transmitted primarily through faecal contamination, especially in areas where sanitation is poor.

The spread is from child to child and there are no long-term carriers of poliovirus. Animals are not carriers either but the virus can survive in sewage for up to three months.

#### Is there a cure?

Sadly no. Although most children infected with poliovirus experience no more than mild flu-like symptoms and make a full recovery, polio paralysis is irreversible.

#### Can you get polio more than once?

Yes. Infection with poliovirus only guarantees immunity against the specific poliovirus responsible. There is no cross immunity between the three viruses. Only vaccination can provide immunity against all three types of virus.

### THE VACCINE

#### Why are there two different kinds of vaccine?

The first vaccine was developed by Dr Jonas Salk in 1955. It consists of an inactivated polio vaccine (IPV) which is administered through injection. It is produced from inactivated (killed) poliovirus.



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The second is a live oral polio vaccine (OPV) developed by Dr Albert Sabin and introduced in 1961. The virus in OPV has been modified so that it no longer causes paralysis but it does stimulate immunity. This vaccine is administered directly into the mouth.

Both vaccines provide effective immunity against all three types of poliovirus.

### **Which polio vaccine is recommended by WHO?**

WHO recommends the use of oral polio vaccine (OPV) for its global initiative to eradicate polio. There are three reasons for this:

- OPV is more effective in stopping the spread of wild polioviruses (unlike IPV, it stimulates immunity in the intestines – one of the key sites where the virus multiplies – and reduces the risk of spread to other children)
- it is easier to administer (IPV requires sterile injection equipment and skilled medical personnel)
- the vaccine costs less (a fifth of the cost of an equivalent dose of IPV)

### **How safe is OPV ? Are there any side-effects?**

OPV is highly safe and effective. However, in very rare instances (about two cases out of every 5 million doses of the vaccine) it can cause vaccine-related cases of polio – either in the vaccinated child or in a close contact.

### **Who needs to be vaccinated against polio?**

All children should be routinely immunized against polio during their first year of life.

### **How many doses of OPV are needed to produce lifelong immunity?**

The number of doses required to produce lasting immunity varies by geographical area. In the temperate countries, three doses will produce almost complete protection, while in the tropics – particularly in those countries with poor sanitation – four or more doses are needed.

WHO recommends *four* basic doses to be administered:

- at birth
- 6 weeks
- 10 weeks
- 14 weeks

### **What is a National Immunization Day (NID)?**

NIDs are mass immunization days intended to supplement routine immunization by providing blanket coverage for young children – irrespective of whether or not they have been vaccinated before. The aim is to interrupt the circulation of wild polioviruses. In countries where polio is endemic, NIDs are a key weapon in eradicating polio.

- The world's largest ever NID was in China in January 1994 when a record 83 million children were vaccinated against polio over two days.

### **How much vaccine is needed to eradicate polio?**

It is estimated that as many as 10,000 million doses of OPV will be needed to ensure the global eradication of polio.

### **Is it true that a lot of vaccine is wasted?**

Until recently, yes. Because OPV was one of the most heat-sensitive vaccines, vaccine vials that had been opened had to be discarded at the end of the immunization session – whether they had been used or not. Vaccines produced now are more stable and can be used on successive days.

### **What is WHO doing to prevent vaccine wastage?**

First, WHO and UNICEF established a «cold chain» – an uninterrupted sequence of cooling systems involving different kinds of refrigerators and ending with an ice box carried by the community health worker.

In addition, temperature-sensitive vial indicators are being introduced. These indicate which doses of unopened vaccine have a continued shelf-life and allow vaccine to be kept for longer periods of time.

In the meantime, research is being carried out into ways of developing less heat-sensitive OPV. Use of an even more thermostable vaccine would reduce vaccine wastage caused by mishandling and also reduce the need for ice and vaccine carriers. The problem is that this may push up the cost of the vaccine at a time when donor funding is already insufficient to cover the overall cost of vaccine needed - even at current prices.

## **ERADICATING POLIO**

### **What does global eradication of polio mean?**

Total eradication of wild (i.e. naturally occurring) polioviruses from every country throughout the world.

### **How is that different from eliminating the disease?**

Eliminating the disease means getting rid of the clinical disease. The eradication of polio means going a step further and getting rid of the virus that causes it.

Over recent years a growing number of countries have succeeded in controlling the disease through intensive immunization and surveillance measures. However, until the poliovirus has been finally eradicated in *every* country, polio-free countries remain at risk from importation of the virus from countries where the disease is still endemic. For this reason they still need to ensure that all children are vaccinated.

Outbreaks of polio will continue to occur until transmission of the virus has been completely interrupted. Only then can vaccination be stopped.

### **How do we know that a country is free of polio?**

Standard surveillance procedures have been established by WHO to ensure the reporting and follow-up of all suspected polio cases. Any case of acute flaccid paralysis should be reported and followed up to determine whether polio is the cause. Clinical diagnosis should be backed up by laboratory tests to analyse faeces for the presence of excreted poliovirus. For this reason WHO is helping to develop a global network of laboratories to ensure that each country has ready access to laboratory facilities.

- On 29 September 1994 it was announced that the countries of the Western Hemisphere had been certified polio-free. The last reported case in the region occurred in Peru in August 1991.

### **Has poliovirus ever been imported into a polio-free country?**

Yes. One well-documented instance was in 1992 when poliovirus was imported into Canada from the Netherlands, where an outbreak had occurred among a small religious group which refuses vaccination. In the Netherlands, there were 71 cases of polio - all but one from the religious community. The virus later spread to a related religious group in Canada but no cases of paralysis occurred.

### **What lessons were learnt from the eradication of smallpox?**

The strategy for the eradication of polio is founded on the pioneering methods used to eradicate smallpox and some of the key public health professionals involved have spearheaded both initiatives.

Eradication measures include:

- routine immunization of all young children
- stepping up surveillance so that outbreaks of the disease can be rapidly detected
- supplemental immunization targeted to polio-endemic countries in order to interrupt transmission of the virus.

### **Where are the worst polio blackspots?**

Polio is still a major problem on the Indian Subcontinent which accounts for 3 out of every 4 polio cases reported throughout the world. The disease is also endemic in most of West and Central Africa.

## **Can polio be eradicated on target by the year 2000?**

Yes, it can.

### **What are the main hurdles still to be overcome?**

- *First*, ensuring top-level political commitment in those countries where polio is still endemic. Commitment from a Head of State can often mobilize extra funds for cash strapped Ministries of Health.
- *Secondly*, mobilizing urgently needed additional resources from industrialized polio-free countries in the form of key health professionals and resources for vaccine purchase.
- *Thirdly*, ensuring that the appropriate WHO recommended strategies are being followed. If few cases of polio are being detected, it makes it harder to accept that nationwide mass campaigns will still be needed. But they will.
- *Finally*, ensuring that the polio eradication initiative is not abandoned in those countries at war or undergoing major political, economic or social upheavals. In some countries civil war has paralysed governments, forced the withdrawal of international agency workers and blocked the delivery of vaccines. In countries such as El Salvador and Sudan, so-called Days of Tranquillity have been organized to allow children on both sides to be vaccinated.

## **THE COST OF ERADICATING POLIO**

### **How much money is being spent on efforts to eradicate polio?**

WHO estimates that the global initiative may cost as much as US\$1000 million over a period of 10 years. To put that figure in perspective, the United States of America currently spends more than 10% of that (over US\$105 million) on polio vaccine in a single year.

More than 70% of the estimated cost of eradication is earmarked for the purchase of vaccine. The rest of the money is for personnel, training, extending the cold chain, communications, research, and development of the laboratory network.

### **How is the polio eradication initiative funded?**

Polio eradication is being achieved through a partnership which includes the countries themselves, Rotary International, WHO, UNICEF and bilateral donors including Japan, the United States of America, Canada and Australia. In addition, a number of other countries – notably Denmark, Sweden, the Netherlands and the United Kingdom – strongly support all immunization activities.

- Polio-endemic countries themselves meet 80% of the cost of polio eradication activities such as staff, allowances and transport.

### **Is it cost effective for polio-free countries to continue to immunize every child?**

Without a doubt.

- A global cost-benefit study carried out for WHO by the Centers for Disease Control (CDC) in Atlanta, USA, estimates that if polio is eradicated on target by the year 2000, the cumulative benefits will exceed the costs by approximately US\$125 million by the year 2005.
- The 1991-92 outbreak of polio in the Netherlands, involving only 71 cases, cost more than US\$10 million – without taking into account the longer-term costs of hospital care and rehabilitation for the survivors.
- Since the world's last case of smallpox in 1977, the United States of America – the largest contributor to the global campaign to eradicate smallpox – has saved its total contribution once every 26 days.

### **Is funding a problem?**

Yes. There is an urgent need for increased donor funding.

- The CDC study estimated that US\$807 million will be needed in donor funding over the final six years of the eradication initiative in the run-up to the year 2000.