

GLOBAL ERADICATION OF POLIO AND MEASLES

HEARING
BEFORE A
SUBCOMMITTEE OF THE
COMMITTEE ON APPROPRIATIONS
UNITED STATES SENATE
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GLOBAL ERADICATION OF POLIO AND MEASLES

FRIDAY, SEPTEMBER 23, 1998

U.S. SENATE,
SUBCOMMITTEE ON LABOR, HEALTH AND HUMAN
SERVICES, AND EDUCATION, AND RELATED AGENCIES,
COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:34 a.m., in room SD-124, Dirksen Senate Office Building, Hon. Dale Bumpers, presiding.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

PUBLIC HEALTH SERVICE

OFFICE OF THE SURGEON GENERAL

**STATEMENT OF DAVID SATCHER, M.D., Ph.D., ASSISTANT SECRETARY
FOR HEALTH AND SURGEON GENERAL**

OPENING REMARKS OF SENATOR BUMPERS

Senator BUMPERS. The committee will come to order.

First let me thank Chairman Specter for calling today's hearing to discuss the eradication of polio and measles throughout the world. I know he shares my commitment to improve preventive health care for children and to make investments necessary to ensure that all children have ready access to vaccines that protect them from illness and death. Over the past several years, the chairman's mark has included significant funding increases for the Centers for Disease Control to carry out its program to eradicate polio and measles. Under his leadership and that of Senator Harkin, the entire subcommittee has supported these efforts in a bipartisan way and today we look forward to hearing some very good news regarding how our investment in polio eradication is about to pay off.

ELIMINATING POLIO THROUGHOUT THE WORLD

There are fewer than 800 days left before we reach the goal of eliminating polio throughout the world by the end of the year 2000. That victory will mark the second time in history we have been able to eradicate an infectious disease. The first was the eradication of smallpox, a disease that claimed millions of lives through the centuries. As recently as the 1950's, smallpox was killing over 2 million people each year, despite the fact that an effective vaccine

for the disease had been in use since 1796. Smallpox eradication began in 1967. The campaign required 11 years to complete and cost nearly \$300 million—\$200 million from countries with endemic smallpox and an additional \$100 million from international donors. The United States was the largest international contributor with a total investment of \$32 million, and that investment has repaid itself many times over. Beyond the humanitarian benefits of eliminating this vicious killer, we have enjoyed tremendous economic benefits. The United States alone has recouped the equivalent of its entire investment every 26 days since the disease was eradicated.

The polio effort began in 1988 when the World Health Assembly endorsed the program and set the year 2000 as the target date for global eradication. Thus far, the campaign has been a very dramatic success story. Today, four out of every five of the world's children receive polio vaccine. Over the past 10 years, polio cases have been reduced by over 90 percent, and today more than 150 nations report no polio. All countries in the western hemisphere have been polio-free since 1991 and all countries in Europe and the western Pacific region, including China, Vietnam, and Cambodia, have been polio-free for 1 or more years.

In my view, the program's achievements are the result of a model public/private partnership. Rotary International began working on immunization programs in the early 1980's, and when the World Health Assembly endorsed the polio eradication program in 1988, Rotary became the primary private sector partner in the campaign. We estimate that Rotary will have contributed \$450 million by the end of the year 2000, the largest private contribution to a public health initiative in history.

In a combined effort with the health ministries in each country, Rotary, UNICEF, World Health Organization, and CDC have mobilized thousands of volunteers to recruit, educate, transport, and vaccinate children in a mass campaign strategy. The scope of the program is enormous. In 1997 alone, more than 450 million children in 80 countries were vaccinated against polio through the use of mass campaigns. And the partners have enjoyed unparalleled success in densely populated areas where the risk of disease has been high. During India's first campaign in 1996, more than 87 million children were vaccinated by 100,000 volunteers over one 3-day period.

The last frontier for the program is Africa, where the polio campaign faces formidable challenges. Efforts there have been hindered by poverty, civil conflicts, and logistical problems in vaccine delivery. Even with these barriers, the program has enjoyed significant success in many areas of the continent. National immunization days have been conducted in over 35 African countries and put a real dent in the number of polio cases.

Experts in the field, including one Betty Bumpers who participated in a mass campaign in West Africa earlier this year, have all returned with the same message: We can win the war against polio and Africa will put us over the top for the year 2000, but only if we intensify our efforts in Africa over the next 2 years. This means more funding from all the donors and more logistical support for programs that are conducted in countries racked by civil conflict and supply shortages.

As was the case with smallpox, the rewards will far exceed the costs. The United States alone will reap annual savings of over \$230 million, and worldwide savings will exceed \$1.5 billion every year. More importantly, we will have conquered a disease responsible for crippling millions of children in our history.

Finally, we have set the stage for our next campaign: the eradication of measles worldwide. Regional efforts to eliminate measles have already begun, and an international effort is on the horizon. Historically, measles has killed more children than any other infectious disease. Even today it is responsible for 1 out of every 10 deaths in children under age 5. I can remember when Dr. Satcher was in my office 3 or 4 years ago and gave me that statistic. I was absolutely staggered. Think of it: 1 out of every 10 deaths in children under age 5 caused by a preventable disease.

INTERNATIONAL STRATEGY

Many leaders in the public health field believe that we should begin planning an international strategy over the next 2 years so that resources can be easily shifted from the polio effort to a measles campaign once polio is eradicated.

We are privileged to have a very distinguished panel this morning to educate us on the polio and measles efforts. Dr. David Satcher has been a leader in the polio effort during his tenure as Director of CDC and more recently as Surgeon General. Dr. E.M. Samba, whom I want to personally thank for his courtesy and hospitality to Betty, is with us this morning. He is head of the World Health Organization in Africa and I am confident will be responsible for winning the final battle of the campaign when polio is eradicated there over the next 2 years. Mr. Herb Pigman heads the Rotary International polio program, and even though he is the only nonphysician on the panel, has probably visited and participated in more polio campaigns across the world than any doctor or nurse in the entire public health care system. Dr. Bill Foege, former Director of the CDC and longtime advisor to the Congress and leader in the international health community, brings us the wisdom of his experience with smallpox, polio, and measles eradication.

Gentlemen, I welcome all of you and thank you very much for taking your time to travel here, prepare your testimony, and enlighten the rest of us.

For lack of a better system, let me just suggest that we start on the right with Dr. Foege.

SUMMARY STATEMENT OF DR. DAVID SATCHER

Dr. FOEGE. Thank you, Senator Bumpers.

Senator BUMPERS. Wait just a moment.

[Pause.]

Senator BUMPERS. I am sorry. Staff always prevails. [Laughter.]

Dr. Satcher, you are uno numero. [Laughter.]

Dr. SATCHER. Well, thank you very much. I certainly understand the logic of starting from your right. [Laughter.]

I am delighted to be a part of this very outstanding panel. I am David Satcher, Assistant Secretary for Health and Surgeon General of the United States.

Senator Bumpers, I just want to say, before I officially begin my testimony, how much it means to me to be here today and to be a part of this panel. I want to thank you for your tireless and effective efforts in support of the health of the citizens of this country and throughout the world. Your wisdom and foresight have helped reach unprecedented achievements, especially in the area of immunization, and we are grateful. As Director of the CDC, I came to respect your integrity, appreciate your commitment, and admire your insights into issues surrounding immunizations.

This will probably be my last opportunity to testify before you in Congress, and I will miss you greatly but I will always appreciate the outstanding work that you have done as a Member of the Congress of the United States. Thank you.

Senator BUMPERS. Thank you, Dr. Satcher.

Dr. SATCHER. I will be brief because this is an outstanding panel, and I would just like to support some major points that you have made: No. 1, about the rationale for polio eradication; two, the status of our efforts to eradicate this disease; and three, to talk about the issue of measles eradication and where we are with that consideration and developments related to that.

Often when we talk about the rationale for eradicating polio, we speak of it from the standpoint of the financial gains. And they are significant in terms of being able to save on the costs of immunizations in this country and throughout the world. That is an important consideration, the fact that this was, in fact, a cost effective effort. But I believe it is fair to say that the opportunity which we have to prevent pain and suffering and unnecessary deaths in this country and throughout the world should be our overriding consideration.

We are a Nation that invests over \$1 trillion a year in our health care system, and we are predicting that by the year 2007, we will be spending over \$2 trillion. We spend only about 1 percent of that amount on population based prevention. Because of that, I think it is critical to point out that there is no better investment that we could make than to prevent this disease throughout the world and the necessity for immunizing against it.

So, I think the rationale is really clear. We have the technical ability to eradicate this disease. We have demonstrated that. We eliminated this disease in the Western Hemisphere. We have not had a case since 1991. As we speak, our colleagues from the Pan American Health Organization are meeting down the street. They played a great role in eliminating this disease from the Western Hemisphere and demonstrating, in fact, that it can be eradicated from the world.

In terms of the status of polio eradication, I would just like to point to some very important charts, and that was the first one. [Laughter.]

DECREASE IN CASES OF POLIOMYELITIS

The number of reported poliomyelitis cases by year worldwide. Beginning in 1988 when the World Health Organization declared its commitment to eradicate this disease, there has been an 85- to 90-percent decrease in the reported cases of poliomyelitis by year. As you know, we do not report every case. We know that there are

many cases of polio that are not reported, but using an epidemiological model, we can estimate the number of cases from the number of cases that are reported.

So, this is a dramatic story of success in the efforts to eradicate polio in the world, and it reflects a great reduction in pain and suffering and deaths. Hundreds of thousands of children who would have died from polio have been saved because of this effort. I think that is the major message here.

You are very familiar with these charts, as are members of the panel. In 1988, this disease was very common throughout the world. The reports were very common. If you look at the color of the charts, the red areas and the green areas especially, the increase in the number of countries reporting no cases of polio, when you compare 1988 with 1997, and the fact that today we are struggling primarily in Africa, and primarily sub-Saharan Africa, and Southeast Asia and making significant progress.

I think if you look at India and what has happened in India over the last few years, it is the most dramatic example of what we can achieve. There has been in India more than a 90-percent reduction in cases of reported polio since 1988. We have really targeted in the last few years India. I was there in 1996, December 7, when we immunized 120 million children against polio.

But I also gained on that occasion a new kind of respect for Rotary International. I was aware of all of their financial investment, but on that particular day, 57,000 Rotarians were in the streets throughout India getting children out to be immunized. The commitment of this organization throughout the world and the way it has coordinated its efforts has really been something to behold. It is a unique kind of public health partnership that we enjoy, and I commend Rotary International for their commitment and effective operations.

It is going to be difficult to go the rest of the way. I was a long distance runner in college. I really was not that good, so you did not hear about me. [Laughter.]

But I learned something, and that is, I learned that it does not matter how great your stride or how well you run the first one-half or the first two-thirds or three-fourths of the race. If you do not finish, you are a failure.

And I believe we have come to the point now where the issue is, are we committed to finishing this race to eradicate polio? We know we can do it. We have demonstrated that we can do it, but I think we run the risk, if we are not careful, of slowing down and not finishing the race by the year 2000. So, I think it is really critical that we make the commitments, financial and otherwise, to finish this task.

STRUGGLES FACED IN SOUTHEAST ASIA

This chart demonstrates some of the struggles that we face in Southeast Asia and in Africa especially. Even though this is from Afghanistan, the fact of the matter is that some of the things we take for granted in terms of communication and transportation systems or the ability to preserve and move the vaccine from place to place, all those issues become very difficult, especially when you put on top of that often wars and conflicts of various kinds that

make it very difficult for people to come together and implement national immunization days.

Those are some of the things we are facing now in terms of the logistics and the operations. We can overcome those barriers. We have demonstrated that and I think we will, working together, overcome them and complete the task of eradicating polio. The benefits are tremendous and certainly Dr. Foege who played such a critical role in the eradication of smallpox probably appreciates that better than anyone in terms of working very hard to accomplish the eradication of disease and then seeing the benefits of it play out over the years.

As a leader in public health and all of the challenges that we are facing, I appreciate the fact that the effort to eradicate polio has really helped us to develop an infrastructure, a global infrastructure that we would not otherwise have in place. The importance of epidemiological and laboratory surveillance in terms of monitoring the progress of eradicating the disease and all of those systems that we have put in place in order to carry out this effort will benefit us tremendously, not only as we approach other diseases such as measles, but the whole challenge of global emerging infectious diseases.

I am meeting with our partners in eight nations throughout the world now in terms of trying to make sure that we have in place systems to deal with new and emerging infectious diseases. We are learning a lot from our experience in the eradication of polio. We have laboratories in place. We have trained people in place. We have systems in place that we would not have if it were not for this effort. So, the benefits are just tremendous.

EFFECTIVE VACCINE AGAINST MEASLES

Well, I will just say a few words about measles because I am sure that is going to be discussed by my colleagues. As you pointed out, measles is still a very important disease, still responsible for the deaths of almost 1 million children a year in the world and almost 37 million cases of measles in the world.

We have a very effective vaccine. We know that we can eliminate this disease because in this country, for example, we have seen dramatic declines in measles over the last several years. In the past 5 years, we have averaged only about 400 cases, and last year we had, I think, a total of 138 cases in this country. It looks like we are going to have fewer than that this year, my colleagues from CDC tell me.

So, I think it is very clear that we can eliminate this disease, we can eradicate it, and I think on the horizon is the prospect of moving forward after we finish polio. If we do not finish the job with polio, I think the hope of being successful with measles and other diseases is not very great. So, we have got to finish polio, but I think after we have finished it, it looks like the prospects of eradicating measles are very real and that we should pursue that. We are already working very hard.

Again, PAHO has been very successful in dealing with measles. To a great extent the reason we have had so few cases in this country is there have been so few cases in the Western Hemisphere. Now, last year we did have an outbreak in Brazil, and that dem-

onstrated the importance of being diligent in terms of pursuing these diseases. But I think it is very clear that as we complete the task of polio, we can look to eradicating other diseases in the world and controlling emerging infectious diseases.

PREPARED STATEMENT

So, I am very pleased to be a part of this panel and very pleased to join you in reviewing our commitment to the eradication of polio and look forward to, even in your retirement from the Congress, working with you and Mrs. Bumpers as we continue to work toward a world that is free of polio and safe from other infectious diseases. Thank you.

Senator BUMPERS. Dr. Satcher, thank you very much for that wonderful, articulate, and enlightening statement.

[The statement follows:]

PREPARED STATEMENT OF DR. DAVID SATCHER

Good morning, Mr. Chairman and members of the Subcommittee, I want to thank you for your invitation to testify at this important hearing on the eradication of polio and control or elimination of measles. I am Dr. David Satcher, Assistant Secretary for Health, Department of Health and Human Services (HHS) and Surgeon General of the United States.

Mr. Chairman, like myself, some people in this room may remember the fearful time in the 1940's and 1950's when thousands of Americans were paralyzed by polio every year. Today, the Department is assisting the World Health Organization (WHO) in the worldwide effort to eradicate poliomyelitis by the year 2000. Ultimately, global polio eradication is the most cost-effective and permanent way to protect the United States from imported polio cases. No single country can be safe from polio until all countries are free of polio.

Within HHS, the Centers for Disease Control and Prevention (CDC) has lead responsibility for global polio eradication and measles elimination programs. I would like to briefly address the following: The rationale for global polio and measles initiatives, progress toward global polio eradication, partnerships, and challenges, and the status of efforts to develop and implement a global measles elimination plan.

RATIONALE FOR GLOBAL POLIO ERADICATION AND MEASLES ELIMINATION INITIATIVES

Diseases do not recognize national boundaries; therefore, international disease eradication and elimination activities are essential in protecting Americans from the threat of imported disease. Eradication is the permanent reduction to zero of the worldwide incidence of infection caused by a specific agent. Eradication creates an environment where intervention measures are no longer needed. Elimination is the reduction to zero of the incidence of infection in a defined geographic area.

Although the United States has been free from indigenous polio since the early 1970's, polio cases resulting from imported polio virus occurred during the late 1970's, and such events remain a threat in the 1990's, although, thankfully, a diminishing one. Virtually all measles cases in the United States are now directly or indirectly imported from other countries. By contrast, no American has suffered from smallpox since global eradication was reached in 1977.

Successful eradication programs save significant amounts of money. The global eradication of smallpox in 1977, with support from the Department and the U.S. Agency for International Development (USAID), proved to be a remarkably good economic investment for public health. A total of \$32 million was spent by the United States over a 10-year period in the global campaign to eradicate smallpox. The entire \$32 million has been recouped every 2½ months since 1971 when routine smallpox vaccination was discontinued in the United States by saving the costs of smallpox vaccine preparation and administration, medical care, quarantine and other direct and indirect costs. According to an April 1998 General Accounting Office (GAO) report, "Infectious Diseases: Soundness of World Health Organization Estimates for Eradication or Elimination," the cumulative savings from smallpox eradication for the United States is \$17 billion. The report also estimates the real rate of return on the smallpox investment for the United States to be 46 percent per year since smallpox was eradicated.

Achievement of global polio eradication will offer benefits similar to those realized by smallpox eradication. More than \$230 million will be saved annually in the United States alone when polio eradication is achieved and polio vaccination is stopped. Globally, more than \$1.5 billion will be saved annually.

Disease eradication also dramatically reduces the global burden of disability and death resulting from disease. Smallpox eradication eliminated the suffering of an estimated 10- to 15-million people a year and saved the lives of 1.5 million people per year. The polio eradication initiative is eliminating the burden, disability and death related to polio. Since 1988, several million children worldwide who would have been paralyzed were not because of the dramatic reductions in polio virus transmission. More than 100,000 children who would have died from polio, were saved.

Successful disease eradication initiatives also benefit the broader spectrum of public health.

Disease surveillance systems established for eradication initiatives can be used for other important public health efforts. For example, polio surveillance systems in Latin America were helpful in determining the scope of cholera outbreaks in the early 1990's.

Eradication initiatives provide models for appropriate and feasible laboratory networks. For example, the global polio laboratory network (87 virology labs) developed for polio eradication is a model for global infectious disease laboratory surveillance.

Capacity-building required for successful eradication initiatives leads to improvements in public health planning, logistics, training, and communications. For example, the global polio eradication initiative has helped the expansion of computer capacity and development of health information systems in developing countries.

Quite importantly, the success of polio eradication activities is increasing the enthusiasm for immunization and other public health programs by local and political officials.

GLOBAL POLIO ERADICATION

Basic strategies for polio eradication

WHO has defined four basic strategies for polio eradication. They are:

(1) Achievement and maintenance of high routine immunization coverage levels among children with at least three doses of polio vaccine. When a high percentage of children are vaccinated, disease incidence is reduced and eradication becomes feasible.

(2) Development of sensitive systems of epidemiologic and laboratory surveillance for suspected cases of poliomyelitis. Eradicating polio requires a system to detect, investigate and report every possible case of polio. Disease surveillance is a critical component of any disease eradication program. Two stool specimens are collected from every suspected polio case for testing in a virology laboratory for the presence of polio virus.

(3) Implementation of National Immunization Days (NIDs)—mass immunization campaigns that aim to vaccinate every child in a country (generally children less than 5 years of age) in as short a time as possible, usually within one to a few days, to rapidly stop the spread of polio virus. Because not all children are reached by the routine immunization system and not all children are fully protected by the doses they have received, NIDs target all children less than 5 years of age, regardless of their prior immunization status. This strategy provides the additional advantage of boosting the intestinal immunity among previously protected children, providing a further barrier to the circulation of polio viruses in the community. Two doses of polio vaccine are administered to all children with an interval of 4- to 6-weeks between doses. Because the oral polio vaccine does not require a needle and syringe to administer, volunteers with minimal training can serve as vaccinators during NID's, thus vastly increasing the number of vaccinators well beyond the existing staff of the country's ministry of health and facilitating completion of NIDs within a short period of time.

(4) Implementation of "Mopping-Up" Immunization Campaigns. These are localized campaigns conducted in the final stages of polio eradication in a country, which are targeted to high-risk areas where polio virus circulation still persists. In order to reach every child, polio vaccine is carried from house to house rather than having children come to a central immunization station. As with the NID's, two doses of polio vaccine are administered to all children less than five years of age, regardless of prior vaccination history, with an interval of 4- to 6-weeks between doses.

Progress toward achievement of global polio eradication

Extraordinary progress continues toward achieving the goal of global polio eradication by the year 2000. Reported cases have declined by more than 85 percent since

the initiative was launched in 1988. (Attachment I) A significant portion of the world has become polio-free since 1988. (Attachments II and III) All countries of the Americas have been polio-free since 1991, and virtually all countries in Europe and the Western Pacific Region (including China) have been polio-free for 1 or more years.

In addition to this progress, notable reductions in polio cases have occurred in other countries. For example, laboratory-confirmed polio in the European Region declined to less than 10 cases in 1997 following three years of synchronized NIDs in 10 polio-endemic countries in the Region. Also, India has experienced the most dramatic declines in reported polio cases. In 1988, India documented a total of 24,257 cases. The number of cases fell dramatically to a total of about 2,300 cases in 1997, a decrease of more than 90 percent. In Indonesia, three years have passed since the last laboratory-confirmed cases of polio. Furthermore, the number of polio cases in Viet Nam has declined from 557 cases in 1992 to zero cases in the last 12 months.

The polio eradication initiative has provided a tremendous example of global cooperation and action. More than 450 million children in 80 countries worldwide were vaccinated against polio in National Immunization Days (NIDs) in 1997, which is approximately two-thirds of the world's children less than 5 years of age. NIDs in India in January 1998 involved deployment of 2 million volunteers to vaccinate over 130 million children in a single day. The polio-endemic countries of South Asia, including India, Bangladesh, Myanmar, Nepal and Indonesia, have conducted NID's for 2 or more years. In December 1997 and again in January 1998, six countries (Bangladesh, Bhutan, India, Myanmar, Nepal, and Thailand), in an unprecedented display of international coordination for health, conducted simultaneous NID's in which 165 million children were vaccinated in each round. India's new National Polio Surveillance Project works with a national laboratory network and has greatly improved India's surveillance during the past 12 months. More than 100 persons have been hired whose main job is to find polio virus wherever it may be to guide further eradication efforts. Current efforts to eradicate polio involve continuing polio NIDs, improving polio surveillance, and strengthening routine immunization programs.

The fight against polio is taking place in some of the most difficult locations, including those in the countries of Sudan, and Somalia. Despite the challenges of war, famine, extremes of weather, and a lack of roads or other infrastructure, polio immunization days were implemented in Southern Sudan from February through April of this year. New strategies to deliver the vaccine were developed including a unique process that uses vaccine temperature monitors to ensure the potency of polio vaccine in the absence of refrigerators. Small aircraft were rented to bring personnel, educational materials, and polio vaccine to the most remote areas.

Only last month, polio immunization days were conducted in Southern Somalia. Somalia health workers and volunteers, under the leadership of experts from WHO, United Nations Children's Fund (UNICEF), and CDC, successfully vaccinated more than 1 million children, many of whom had not received any health services for more than 8 years.

Partnerships to eradicate polio by the year 2000

Collaboration among Rotary International, WHO, UNICEF, USAID, the Task Force for Child Survival and Development, CDC, and the governments of Australia, Denmark, Japan, the United Kingdom, and other countries has been unique among public health initiatives for the unprecedented level of cooperation, the magnitude of private-sector contributions and the amount of funds raised. It is estimated that Rotary International will have contributed hundreds of millions of dollars by the end of the polio eradication initiative. Rotary International's contribution is the largest private contribution to a public health initiative in history.

A further example of the outstanding partnerships that are operating in this highly successful initiative is the joint effort required for NIDs in Afghanistan. Vaccine was transported by donkeys that carry loads of polio vaccine, packed to keep it cold, along mountainous terrain to remote vaccination stations. Under the direction of WHO, the vaccine was provided with CDC and Rotary International funds, procured and shipped to Afghanistan by UNICEF, prepared for distribution within the country using an action plan developed by WHO, UNICEF, and Afghanistan national staff of the Ministry of Health, and transported to its final destination within Afghanistan by Afghans using whatever local transportation was available. (Attachment IV)

Challenges for the final days of polio eradication

Although polio eradication remains feasible by the year 2000, "business as usual" will not get the job done. While all of the partner organizations involved in the ef-

fort are impressed with the tremendous progress which has been made, the program is at a critical stage with just over two years remaining before the end of the target year 2000 and much work remains to be done. It is critical to achieve eradication as close as possible to the target date, because: (1) the longer that it takes to complete the global effort, the longer that NIDs and other resource-intensive polio eradication activities will continue to be required in those countries which are already polio-free; (2) there is potential for fatigue in eradication efforts in those areas that have already been successful, thereby jeopardizing the entire eradication initiative. The partner organizations participating in the eradication initiative are convinced that the established strategies, when fully implemented, will achieve eradication.

While the vast majority of the costs of polio eradication is borne by the polio-endemic countries themselves, enhanced leadership and continued support from the major partner organizations and governments of the industrialized countries will be crucial at this critical phase for successful completion of the eradication program on schedule. About \$170 million has been committed by partners in 1998.

During the next 2 years, the global polio eradication activities will intensify to reach the needed peak of effort. However, global shortfalls will increase in the years 1999 and 2000 without greater commitment of resources on the part of the partner organizations and governments. WHO estimates that the 1999 global shortfall is \$131 million, and the year 2000 global shortfall is \$116 million. These global shortfalls are due both to the lack of financial commitment by partners beyond a 1-year period, and a real shortfall of expected funds. Similar to the smallpox eradication campaign, the provision of adequate resources is important for finalizing efforts. Since the final stages of eradication efforts are often the most difficult and resource intensive, the year 2000 goals can only be met if adequate and timely partner commitments of the needed resources are made.

Despite the extraordinary progress towards polio eradication, progress in Africa has not kept pace with progress in other regions. Rapid and complete implementation of the recommended polio eradication strategies is urgently needed. Completion of special initiatives in war-torn areas such as the Democratic Republic of Congo, Liberia, and Sierra Leone is essential to bringing the polio eradication program to a successful and timely conclusion. Additional funding from donor organizations and governments will also be required to support polio eradication activities in Africa.

Recent events that have threatened eradication of polio by the year 2000 include the tragic loss of life caused by the bombing of the U.S. Embassy in Nairobi, Kenya. NIDs in Kenya were postponed by one week nationwide and for one month in Nairobi. In subsequent developments, the CDC epidemiologist in Pakistan had to be evacuated last month. Necessary travel restrictions on U.S. Government employees traveling to some African countries will increase the difficulty of placing staff in long- and short-term positions there. Also, the eruption of civil war again in Democratic Republic of Congo suspended NIDs scheduled for August and September. It is important to remember, however, that smallpox eradication was achieved in Africa in 1977 despite similar impediments.

The legacy of polio eradication will not only be the prevention of millions of cases of paralysis, permanent disability, and deaths, but also a victory for global public health, with the demonstration that diverse groups throughout the world can work together toward a common goal. The successful conclusion of this initiative will have substantial implications for other public health initiatives, the strengthening of national health services and the credibility of national and international organizations. Stopping polio vaccination alone will save approximately \$1.5 billion annually on a global basis in perpetuity. The polio eradication program will leave stronger immunization programs worldwide, improved capacity for disease surveillance, a functioning global laboratory network, and the momentum to tackle other major public health problems, including measles.

GLOBAL MEASLES CONTROL AND ELIMINATION

Progress toward measles elimination

Despite the availability of a highly effective vaccine, measles causes one million deaths annually and accounts for more child deaths than any other vaccine-preventable disease. (Attachment V) One out of every 10 deaths in children less than 5 years old is caused by measles, a preventable disease. Virtually all cases of measles in children in the United States are now the direct or indirect result of measles imported from Europe, Asia, or Africa.

Global measles eradication would result in significant economic benefits for the United States. CDC estimates that more than \$50 million annually in measles vaccine costs alone would be saved in the United States following a successful measles elimination initiative and termination of measles immunization. Additional savings

would accrue from the prevention of hospitalizations and medical costs if future measles epidemics in the United States were eliminated. For example, hospitalization and other medical costs exceeded \$100 million during the measles resurgence in the United States during the period 1989–91.

Although there is not yet consensus for a global measles eradication initiative, the Department fully supports regional measles elimination goals and accelerated measles control as a step toward a global initiative. If regional measles elimination goals continue to be successful, we hope that a global measles initiative will be launched as the polio eradication program comes to a successful conclusion.

A tremendous amount of progress toward establishing a global measles initiative has already occurred. In 1994, the Pan American Sanitary Conference endorsed the goal of measles elimination in the Western Hemisphere by the year 2000. Implementation of an immunization strategy combining high routine coverage with at least one dose of measles vaccine and periodic mass campaigns vaccinating all children in target age groups regardless of prior receipt of measles vaccine, has led to a greater than 90-percent reduction of measles cases in the Western hemisphere from 1990 to 1997. (Attachment VI) For more than a year, measles transmission has been interrupted in Mexico, the Caribbean, all countries of Central America, and some in South America, including Colombia, Chile, and Peru. The importation of measles into the United States from countries in Latin America has virtually disappeared.

In addition to the ongoing measles initiative in the Americas, other WHO regions are taking action. The Eastern Mediterranean Region of the WHO has established a regional measles elimination initiative. Countries in this region that have already conducted mass vaccination campaigns designed to interrupt measles transmission include: Oman, Kuwait, Jordan and Bahrain. Saudi Arabia, Syria, Tunisia, Qatar and the United Arab Emirates are planning similar activities in 1998–1999. In addition, the European Region of WHO is considering adopting a regional measles elimination initiative. England and Wales conducted a highly successful mass vaccination of school-aged children in 1994 which has resulted in elimination of indigenous measles. Romania experienced the largest measles outbreak in Europe in 1997 and is planning a mass vaccination campaign among school-aged children, starting in October 1998. Other countries that have established national measles elimination initiatives include Australia, New Zealand, South Africa and several other southern African countries.

Partnerships

The partnerships that will be required to accelerate measles control and achieve the eventual goal of measles eradication are being developed using the polio eradication model. Strong relationships are being developed among CDC, WHO, UNICEF, USAID, the International Federation of the Red Cross and Red Crescent Societies, and the American Red Cross.

Challenges

Many experts have concluded that global measles eradication is biologically feasible. However, the eradication of measles will be a more difficult challenge than either polio or smallpox eradication. The highly infectious nature of the measles virus and the complex logistical and operational requirements of conducting mass immunization campaigns using an injectable vaccine (rather than an orally administered vaccine as with polio), and ensuring safety of injections in developing countries, make this a unique challenge. Another major challenge will be harnessing the political will globally to move forward. This is particularly relevant for many developed countries in Western Europe and Asia that have not accepted measles as a serious health burden and thus have not made prevention of measles a high priority.

Refinement of the technical strategies (e.g., vaccination, surveillance) for measles eradication may also be needed. Although we have achieved a tremendous amount of success with measles prevention and control, outbreaks still occur. In 1997, a measles outbreak in Brazil affected more than 20,000 individuals, primarily young adults. Investigations are ongoing to determine the reasons for the outbreak and what additional prevention strategies may be required for adults.

Despite the importance of measles as a public health problem in the United States and worldwide, it is critical that the global public health community focus on finishing polio eradication before embarking on a more difficult and expensive measles eradication initiative. As we continue our efforts to eradicate polio by the year 2000, we are carefully considering how we can best achieve global measles eradication. The major challenges to measles eradication include: (1) developing the political and financial commitment within countries and regions, and at the global level to strive for measles eradication; (2) developing the technology and logistics to safely deliver

measles vaccine in mass vaccination campaigns; (3) building consensus in the clinical and public health communities that the time is right for a measles eradication initiative; and (4) finalizing a timetable for measles eradication that is synchronized with polio eradication activities.

CONCLUSION

The public health, financial and humanitarian benefits of eradication programs offer a compelling rationale for continued U.S. Government support of such initiatives. The smallpox eradication program and the ongoing polio eradication initiative best document that these potential benefits can be realized. However, for polio eradication it should again be stated that "business as usual" will not get the job done. Efforts must be extended to ensure success. While recognizing that appropriate caution is needed, the United States must also be willing to be ambitious and farsighted, even when some questions remain unanswered. Simply stated, the eradication of polio would be a remarkable gift to the children of the 21st Century.

NONDEPARTMENTAL WITNESSES

STATEMENT OF EBRAHIM M. SAMBA, M.D., REGIONAL DIRECTOR, REGIONAL OFFICE FOR AFRICA, WORLD HEALTH ORGANIZATION

Senator BUMPERS. Dr. Samba, let me just say we are most honored to have you here. As I said, Betty talked more about you when she got home than she did about what she was doing over there. [Laughter.]

She was immunizing children, but she did not know what she was doing. She was scared she was going to overdose some of them, and the doctors assured that was not possible.

In any event, thank you very much for being with us. Please proceed.

Dr. SAMBA. Thank you very much, Senator Bumpers.

For me this is an inspiration, again coming this morning. My colleagues behind me said, have you been here before? I said, yes, I have been here many times when I was director of the River Blindness Control Program. We used to come here to solicit your support, which we got. You were lead supporters and I am very pleased to tell you, sir, that we have won that battle. Nobody—nobody—risks being blind of that disease in west Africa today, thanks to you, thanks to your continued support.

Senator BUMPERS. Dr. Samba, if I may interrupt you, this would be a very good time—and I know Dr. Foege will wholeheartedly agree. Jimmy Carter, the President of the United States, as you remember, from 1976 through 1980, deserves an awful lot of credit for the success of that program. I appreciate very much your mentioning it. Most people do not understand what river blindness is.

Dr. SAMBA. That is right. Indeed, when I took over the regional office of the World Health Organization in 1995, we were looking for another challenge. Too many challenges in Africa, but a challenge that we can win. And we looked at the example of the United States and the Western Hemisphere, and we said the World Health Organization has declared that polio should and could be eradicated, but Africa was way behind.

We took up the challenge. We appealed to our partners, Rotary, the United States, including CDC-Atlanta, and I went around to some donors. And it is amazing how many of them said, is the United States involved? And we said, yes. So, they joined in. The United Kingdom, Germany, and many others.

WORLD HEALTH ORGANIZATION

And today, since we started in January 1995, of the 46 African countries in the World Health Organization that did not have any polio eradication campaign, today 36 have had a national immunization day, even Angola where there has been civil war raging for years. We managed to convince the belligerents to lay down their arms and participate in the national immunization days against

polio, and we succeeded in vaccinating over 90 percent of the targeted children.

As you have heard, sir, as Dr. Satcher has heard, we can win but until we cross the finishing line—and in Africa the finishing line is very tough indeed. No roads, no boats. Sometimes we have to wear life jackets and wade our way through hazardous rivers, avoiding crocodiles to cross over to vaccinate all the children. But we know this is worth it because, as Dr. Satcher said, we have been able to put down in place mechanisms that can lead us to fight other battles in Africa. And there are so many.

Recently Dr. Satcher, when he was Director of CDC, came to my office in Brazzaville and we crossed over the Congo River to Kinshasa to celebrate our defeat of ebola. I came here to this house to thank the United States Government and to inform my friends in the United States what we have done in protecting them from ebola because ebola killed 70 percent of Africans. I said, no disease will wipe out all Africans. Because we have lived with them, some of us have immunity, but here in the United States, you eat sterile food, your water is clean and potable, even your source in preparing them are sterilized. Any disease that can wipe out 70 percent of Africans will probably wipe out 100 percent of Americans. And from the area where ebola was in Kitwe to Kinshasa, a few hundred miles, and there are daily flights from Kinshasa to Paris, to Zurich, and between Zurich and the United States in a matter of hours.

WINNING THE BATTLE AGAINST POLIO

So, together we are convinced that we can win the battle against polio, and unless the last bastion of polio in Africa is eliminated, the whole world is at risk. So, we are here in this partnership, a noble partnership, led by the United States of America. This is why I am here today. I arrived a few days ago. I will be leaving tomorrow.

We come to follow, to salute you. Mrs. Bumpers was in Africa a few months ago in my office, and she inspired us. I said to her, we are going to return the compliment. We are going to visit you and thank you and thank your husband, and through Mr. and Mrs. Bumpers, thank the population of the United States for helping us together eradicate polio, which is doable. We can win. We are convinced, but it is going to be very difficult. It is going to cost a bit more.

After polio, already in southern Africa in some parts of Africa where polio has not been reported for the past 5 years, measles has come to replace polio in our eradication campaign. Similar principles, very slight modifications, dedicated, committed collaborators, sufficient resources, good will, and your support. We will win. We can win. We are going to win.

PREPARED STATEMENT

The objective of my mission here today therefore is to thank you for the support you have always given Africa, for the support you continue to give. Senator Bumpers, Dr. Satcher said you are going to be missed. All the world will miss you. We hope and pray, when

you retire from the Senate, you will be invigorated and you will have so much reserve energy, we invite you to Africa to collaborate with us to continue our battle against disease, suffering for the whole of humanity.

Thank you, sir, for this privilege.
[The statement follows:]

PREPARED STATEMENT OF DR. EBRAHIM M. SAMBA

POLIO ERADICATION AND MEASLES CONTROL/ELIMINATION INITIATIVES IN THE WHO
AFRICAN REGION

Mr. Chairman and distinguished Senators, the World Health Organization [WHO] and its Regional Office for Africa appreciate the opportunity to brief the Subcommittee on the initiatives to eradicate polio and to control measles in the African Region. This statement describes the progress and challenges to date, particularly in the areas of polio vaccination, surveillance for acute flaccid paralysis (AFP), and mobilization of funding, resources, and partnerships to support the Polio Eradication Initiative in the African Region.

POLIO ERADICATION

Situation analysis

Throughout the 1980's, 4,000 to 5,000 clinical cases of poliomyelitis were reported annually in the WHO African Region.¹ Experience in the field showed that this figure reflected severe under-reporting, representing perhaps only 10 percent of all cases that occurred in reality. The annual number of reported cases fell to 1,500 to 2,000 during the first half of the 1990's, presumably as a result of the increasing impact of routine vaccination activities. This number represented almost one-half of all polio cases reported in the world. In 1997, only 883 clinical cases of polio were reported through the routine reporting systems in Member States in the African Region.

For programmatic purposes, the WHO African Region was divided into four epidemiological blocks—Central, Eastern, Southern and Western—to ensure that eradication activities could be tailored to the specific needs of groups of countries. In addition, a separate, fifth epidemiological block was formed by four large countries, each of which has suffered difficult circumstances in recent years: Angola, DR Congo, Ethiopia and Nigeria. These four countries represent major reservoirs of wild polioviruses in the African Region and are believed to spread polio to neighbouring countries.

In order to achieve polio eradication, countries in the African Region have adopted and continue to implement four major strategies recommended by WHO: (1) achieving and sustaining high routine vaccination coverage with oral polio vaccine (OPV); (2) implementing mass vaccination campaigns, known as National Immunization Days (NIDs); (3) establishing effective surveillance of suspected polio cases (that is, surveillance of all cases of acute flaccid (floppy) paralysis (AFP)); and (4) carrying out mop-up activities as indicated by surveillance data.

Tremendous progress has been made to date in the Eastern and Southern African epidemiological blocks. Supplemental vaccination through National Immunization Days (NIDs) conducted in all countries of these two blocks appear to have had a significant impact on the circulation of "wild" polioviruses. NIDs aim to cover a high proportion of the under-5 child population of a given area with two doses of oral polio vaccine about a month apart. Despite increasingly sensitive surveillance based upon the clinical, epidemiological and virological investigation of AFP cases, wild polioviruses (that is, those which are not associated with the vaccine) have not been isolated in continental Southern Africa since 1995. A similar picture has emerged in Eastern Africa since 1997.

Wild polioviruses continue to circulate in Central and Western Africa and the four large countries. The fact that polioviruses were detected after one or even two series

¹ The WHO African Region consists of forty-six WHO Member States: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Cote d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, South Africa, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, and Zimbabwe.

of NIDs in some of these countries indicates that polio-free status will be more difficult to achieve in those areas.

Routine vaccination

Routine vaccination coverage with three doses of oral polio vaccine (OPV3) among infants under 1 year of age reached 54 percent in the WHO African Region in 1997. This represented no increase as compared with the previous year. Coverage rates varied considerably by epidemiological block in 1997: 39 percent for Central Africa, 59 percent for Eastern Africa, 74 percent for Southern Africa, 57 percent for Western Africa, and 45 percent for the four large countries in difficult circumstances. Factors which limit the achievement of high routine vaccination coverage in certain countries include poor access to health services, high drop-out rates, occasional shortages of vaccine and deficiencies in the refrigerated transport or cold chain system including fuel and power shortages and lack of transport.

Although supplemental vaccination through NIDs is critical for the eradication of poliomyelitis, doses supplied through NIDs do not replace routine vaccination of infants with OPV. Therefore, the importance of educating and mobilizing communities to bring their infants to health facilities, outreach clinics and mobile units for routine vaccination has been strongly emphasized.

It is widely recognized that routine vaccination benefits substantially from the implementation of NIDs. NIDs have increased political commitment and support for the whole Expanded Program on Immunization (EPI) from country-based and external partners. Additional resources become available which benefit EPI in general and may be used for strengthening planning and managerial capacities of health staff, and provision of additional equipment such as refrigerators and cold boxes. NIDs provide excellent opportunities for advocacy, social mobilization and increasing community awareness about target diseases and the benefits of immunization. Furthermore, it has been observed in many countries, for example Angola, that the success of NIDs increases the morale of health workers, especially where routine vaccination coverage was poor.

National immunization days

The first series of National Immunization Days (NIDs), the biggest ever conducted in Africa, was implemented in 31 countries of the African Region in 1996 early 1997. Over 74 million children below five years of age were targeted. More than 55 million (74 percent) children received OPV in the first round and about 60 million (80 percent) in the second round of NIDs. The majority of countries achieved remarkable results in vaccinating their target population with OPV: 26 countries (84 percent of the 31 countries that participated) had 80 percent or greater coverage in at least one round and 20 (65 percent) achieved 80 percent or greater coverage in both rounds.

The second series of NIDs involved 36 countries between March 1997 and March 1998. These were the first NIDs for seven countries: Burundi, Guinea, Guinea-Bissau, Madagascar, Mali, Niger and Senegal. Two supplemental OPV doses were received by 85 million children under age five. Immunization coverage was reported at 80 percent or greater for both NID rounds except in the Central African Republic (77 percent and 82 percent), Equatorial Guinea (76 percent and 99 percent), Kenya (79 percent and 82 percent), Lesotho (67 percent and 65 percent), Mozambique (65 percent and 75 percent), Nigeria (72 percent and 95 percent), Rwanda (73 percent and 75 percent) and South Africa (81 percent and 76 percent). It is hoped that the three countries which have yet to conduct nation-wide NIDs—DR Congo, Liberia and Sierra Leone—will do so in 1998. Those countries in West Africa where wild polioviruses have reappeared since the first series of NIDs will require four rounds of OPV (2 rounds of NIDs, 2 rounds of house-to-house "mopping-up") if the goal is to be achieved by the year 2000.

NIDs reached over 80 percent of children under five years of age in a number of countries where less than 50 percent of infants had previously received routine OPV3, such as Angola, Burkina Faso, Cameroon, Central African Republic, Chad, Mauritania and Niger.

Particularly noteworthy is the success achieved in Angola. This country immunized 71 percent and 80 percent of its target population in the first and second rounds in 1996 and 83 percent and 90 percent in 1997, respectively. This is especially remarkable since routine coverage in Angola was below 40 percent. NIDs resulted in increased collaboration between all national and international partners. Initiated by the Government, this important initiative has also involved UNITA, WHO, Rotary, UNICEF, UN Peacekeeping Forces and the private sector. It was the first time that the Government and UNITA worked together to improve health of

their young compatriots. The challenge now is to extend EPI in general and NIDs in particular into those districts which remain inaccessible due to security problems.

Furthermore, a number of countries have utilized the opportunity to include with OPV during NIDs the administration of other vaccines or health interventions, for example, measles vaccine and vitamin A supplementation. Although the inclusion of an injectable vaccine like measles vaccine adds technical and logistical complexity to the operation, the additional cost of including measles vaccine is less than that of a separate measles vaccination campaign.

Although this support from external and country-based international agencies and NGOs was important, the remarkable success of NIDs was mainly achieved due to high-level political commitment, technical competence and experience of national health authorities and health staff, through the effective planning and coordination of activities. The implementation of NIDs demonstrated the tremendous potential of the health sector and communities to undertake joint activities, and effective coordination between governments, external and country-based partners. NIDs resulted in remarkable strengthening of inter-sectoral and inter-agency coordination and co-operation, and boosted the revitalization or formation of national EPI inter-agency coordination committees.

Disease surveillance

The major task of countries implementing polio eradication activities is to prove that the circulation of wild polioviruses, whose presence in stool specimens of patients with AFP is considered definitive proof of confirmed polio, has been interrupted. This only can be done if all AFP cases are promptly detected, reported and investigated, and if adequate stool specimens are properly collected and shipped to a laboratory where they can be reliably cultured for poliovirus.

The WHO African Regional Polio Laboratory Network currently comprises three regional reference laboratories in Central African Republic, Ghana, and South Africa and ten national and inter-country laboratories. A further two national laboratories (Ethiopia and Maidugari/Nigeria) are in the process of being certified. National laboratories process stool specimens and identify serotypes from AFP cases, and regional reference laboratories confirm the identity of polioviruses isolated by national laboratories and determine whether the viruses are wild or vaccine-derived.

In 1997, all but twelve countries of the African Region (Angola, Burundi, Congo Gabon, Equatorial Guinea, Eritrea, Liberia, Mali, Mauritania, Mozambique, Rwanda and Sierra Leone) submitted specimens to the regional polio network laboratories. All stool specimens collected from AFP cases in Eastern and Southern African countries in 1997 were laboratory negative for wild poliovirus.

In 1997 and 1998, wild polioviruses were, however, isolated from specimens collected in DR Congo and a number of countries mainly situated in Central and Western Africa, including countries which had conducted NIDs (Angola, Benin, Burkina Faso, Central African Republic, Chad, Cote d'Ivoire, Ghana, Nigeria and Senegal). Partial genomic sequencing shows that many wild poliovirus isolates from countries surrounding the DR Congo originate in the DR Congo.

The performance of AFP surveillance in many countries of the African Region, although it has markedly improved, still remains inadequate for the purposes of official certification of polio-free status. National surveillance systems need to be further strengthened to increase their reliability and effectiveness. One critical task is to sensitize medical professionals to the polio eradication initiative and its proven strategies, in order to help them understand the need to report and investigate AFP cases whose final diagnosis may eventually be other than poliomyelitis.

The establishment of a system for AFP surveillance in Africa has laid the foundation for the development of integrated infectious disease surveillance throughout the continent. The provision of resources including staff, transport and communications tools will facilitate the inclusion of surveillance of other priority or epidemic diseases such as measles, cholera, dysentery, meningitis and haemorrhagic fevers.

Funding

During 1996 and 1997, over US\$65 million were provided by Rotary International, USAID, the U.S. Centers for Disease Control and Prevention (CDC), the Government of Japan, vaccine manufacturers and other partners for implementation of the two series of NIDs and disease surveillance in the African Region. The United States of America is playing a significant role in supporting the Polio Eradication Initiative in the African Region. In 1996–97, the U.S. Government not only disbursed US\$34.5 million—that is, over half of all external funds for NIDs and surveillance of EPI target diseases—through USAID and CDC but also provided consultants to assist countries in planning and implementation of these activities. This important external financial support acted as a catalyst for national political and

financial commitments, and stimulated preparations for NIDs, local fund raising, and resource mobilization in the majority of countries.

The cost of NIDs was estimated from a study conducted in Southern Africa at approximately US\$0.50 to 0.60 per child vaccinated with two OPV rounds. However, the actual NIDs cost may be slightly higher, since infrastructure, staff, funds and in-kind contributions were provided by national governments, country-based international agencies, nongovernmental organizations (NGOs) and other partners, including the private sector and local communities.

Funding requirements for polio eradication activities in the WHO African Region during 1999–2001 are summarized in Annex 1.

Political commitment, advocacy and social mobilization

In July 1996, African Heads of State and Government at the Thirty-Second Ordinary Session of the OAU Summit in Yaounde, adopted a Declaration on Polio Eradication in Africa. This declaration urges all Member States to take immediate and concrete steps to urgently address the problem of poliomyelitis and give their full political support to polio eradication as a matter of top priority. The African leaders confirmed their strong determination to make Africa free of polio and committed themselves to fully support the implementation of the polio eradication strategies recommended by the World Health Organization. The Declaration states that adequate human, financial and material resources, both local and external, be mobilized to support polio eradication activities in Africa.

The Yaounde Declaration on Polio Eradication in Africa was instrumental in obtaining the highest-level political commitment and support for the Polio Eradication Initiatives in the African Region.

A "Committee for a Polio-Free Africa", chaired by President Nelson Mandela and with high-level representation from around the continent, was created to strengthen political advocacy and social mobilization for polio eradication, and met for the first time in South Africa in August 1996.

A region-wide "Kick Polio out of Africa" campaign was launched in August 1996 in South Africa by President Mandela with participation of the Members of the "Committee for a Polio-Free Africa" (the First Ladies of Congo, Ghana and Nigeria, General Toumané Touré, former President of Mali, and senior officials representing Rotary International, WHO, OAU, UNICEF and USAID) at the first meeting of the Committee.

NIDs were especially successful in countries where this political commitment was attained. The role of Heads of State and Government and First Ladies was critical in ensuring that NIDs receive necessary attention and support, not only from external international and donor agencies and organizations but, most importantly, from various governmental sectors, as well as country-based agencies, non-governmental organizations (NGOs), the private sector and communities themselves. In many countries, Heads of State and Government demonstrated their support for NIDs by addressing the nation through the mass media and by participation in launching ceremonies. In a number of countries First Ladies served as patrons for the NIDs and other polio eradication activities.

The three First Lady Members of the "Committee for a Polio-Free Africa" have remained very active in advocacy and social mobilization activities in preparation for NIDs in their respective countries. The First Lady of Mozambique was also particularly active in the promotion of NIDs in that country in 1998.

The success of NIDs continues to be made possible by the very effective social mobilization campaigns carried out by each country, with support from the highest-levels political leaders and other opinion makers within countries, and advocacy from WHO and other partners. To consolidate and share this experience widely, an advisory group on social mobilization was established in the WHO African Region with the membership of all major partners. The campaign's soccer-linked theme in conjunction with its slogan and logo have now become widely accepted and powerful tools for advocacy. The advisory group has planned and implemented various regional activities such as the activities during the Cup of African Nations contest in 1998.

The challenge is to maintain the interest and commitment for polio eradication and to extend it to all EPI activities to ensure that all partners play their part and contribute effectively to achieving this important goal.

Partnership

A strong and effective partnership has been created to support the Polio Eradication Initiative in the African Region with the leadership of the WHO Regional Office. The major partners are the African Governments, World Health Organization, Rotary International, UNICEF, USAID, Centers for Disease Control and Prevention

in Atlanta (USA), Government of Japan, DFID (UK) and CIDA (Canada). The partners participate in annual technical conferences of the African Regional Task Force on Immunization, which are usually held in conjunction with donor meetings of the Regional EPI Inter-Agency Coordination Committee.

Vaccine manufacturers also donated U.S. \$600,000 worth of OPV for polio eradication activities in Africa in 1997.

The Governments of Denmark, Finland, France, Germany and Ireland, Rotary Clubs, the National Peace Corps Association (USA), national Red Cross organizations, Swiss Development Corporation and private companies, such as SmithKline Beecham, Rhône Poulenc, Barclays Bank, Johnson & Johnson, Coca Cola and others, were involved in supporting polio eradication activities in individual countries.

MEASLES CONTROL/ELIMINATION

Since the introduction of measles vaccine in Africa, there has been an estimated 56 percent reduction in measles cases and an estimated 77 percent reduction in measles deaths. However, the measles burden in Africa remains the highest of any of the six WHO Regions, with an estimated 9.2 million cases and 435,000 deaths in 1995. Studies have shown that measles case fatality rates of 6 percent and higher continue to occur.

Most of the deaths attributable to measles in Africa occur as a result of various complications. It is estimated that approximately 5 percent to 30 percent of measles cases will have severe measles disease and complications. The most common complication is bronchopneumonia, followed by dehydration from diarrhea and vomiting. Some of the measles cases also become malnourished. As much as half of all childhood corneal blindness may result from measles complications in vitamin A deficient children. Other complications include skin sepsis, purulent conjunctivitis, blindness and otitis media which lead to deafness in a small percent of children.

Routine vaccination coverage with one dose of measles vaccine among infants under one year of age remains persistently the lowest of all the vaccines in the EPI. In 1997, 16 out of 46 countries in the WHO Africa Region, representing 21 percent of the regional population, failed to reach 50 percent routine vaccination coverage.

In accordance with national variations in routine vaccination coverage, measles epidemiology and operational and financial feasibility, WHO has developed and, in some countries, begun to implement three sets of strategies designed specifically for three sets of countries, with the following primary objectives: to reduce measles mortality to accelerate measles control; or to eliminate measles transmission.

To achieve these objectives, a careful mix of activities will be implemented (see Table 1), including strengthening routine vaccination services, supplemental measles vaccination, social mobilization, surveillance and evaluation. The additional funds required to carry out supplemental vaccination are presented in Annex 2.

TABLE 1.—PROPOSED MEASLES CONTROL/ELIMINATION STRATEGIES IN THE WHO AFRICAN REGION

| Epidemiological characteristics | Geographic areas | Proposed strategies |
|---|--|---|
| Low routine coverage (<50 percent), presumed high number of deaths (Case Fatality Rate >4 percent). | West Africa and Central Africa, Angola, DR Congo, Ethiopia, Nigeria. | Reduction of measles deaths: Achieve higher routine coverage with measles vaccine; Reduce measles deaths through measles campaigns in urban, densely populated rural areas and other high-risk areas (target age group: children below 5 years of age); Conduct periodic measles campaigns in high risk areas with 2–3 year intervals; Collect aggregated surveillance data. |
| Medium routine coverage (50–75 percent), presumed low-medium number of deaths (Case Fatality Rate 0.5–4 percent). | East Africa, Algeria, Madagascar, Mauritania, Mozambique. | Accelerated measles control: Achieve higher routine coverage with measles vaccine; Further reduce measles cases and deaths through campaigns in high-risk areas (target age group: children below 5 yrs of age); Conduct periodic measles campaigns in high risk areas (frequency of campaigns and target age group to be determined by surveillance data); Establish sentinel collection of case-based data. |
| High routine coverage (>75 percent), presumed low number of deaths (Case Fatality Rate <0.5 percent). | Southern Africa | Measles elimination: Increase and sustain routine coverage with measles vaccine to above 90 percent; Conduct “catch-up” measles campaigns among children below 15 years of age; Conduct periodic “follow-up” campaigns; and Case-based surveillance including laboratory investigation of cases. |

CONCLUSIONS

Less than 1,000 days remain to achieve the goal of polio eradication by the end of the year 2000, as established by the Member States of the World Health Organization in 1988, and endorsed by the World Summit for Children in 1990.

In view of current trends, it appears that the polio eradication goal is achievable in Africa. Marked progress is reported from Eastern Africa, and there is justifiable confidence that Southern Africa is close to being confirmed as polio-free. However, despite the remarkable progress achieved, there is an urgent need to improve surveillance in order to document the progress achieved to date. To accomplish the goal by the target date, implementation of polio eradication strategies must be accelerated, in particular, by establishing effective disease surveillance systems. Financial and political support from all partners for polio eradication in the African Region is particularly important right now, in light of the success to date and the remaining challenges to reaching the regional and global goals of polio eradication.

The eradication of poliomyelitis will not only prevent our children from becoming crippled for life and reduce human suffering caused by this terrible disease in Africa. It will also save an estimated US \$1.5 billion per year worldwide, currently spent on immunization, surveillance and rehabilitation of patients. After eradication, these resources could be reprogrammed to address other emerging health problems in Africa.

Measles remains significant among the major causes of childhood morbidity and mortality in Africa. The lessons learned from the Polio Eradication Initiative in the African Region will serve as critical experience for the next vaccine-preventable disease control step. Measles control and elimination in the African Region will require further coordination of efforts and resources from all partners.

ANNEX 1.—FUNDS NEEDED FOR POLIO ERADICATION ACTIVITIES IN THE AFRICAN REGION

[U.S. dollars]

| Budget line | 1999 | 2000 | 2001 |
|---|-------------|------------|------------|
| OPV for NID's | 20,817,000 | 17,107,000 | 6,946,000 |
| NID's operational costs | 40,878,000 | 36,165,000 | 13,764,000 |
| Mopping-up activities | 19,875,000 | 19,875,000 | 19,875,000 |
| Disease surveillance | 8,395,000 | 8,582,000 | 8,960,000 |
| Laboratory activities | 810,000 | 664,000 | 739,000 |
| Certification activities | 102,000 | 140,000 | 175,000 |
| Personnel (including duty travel and support) | 9,067,000 | 8,880,000 | 9,324,000 |
| Regional office/inter-country activities | 650,000 | 683,000 | 716,000 |
| Subtotal | 100,594,000 | 92,096,000 | 60,499,000 |
| PSC | 6,608,000 | 6,010,000 | 3,166,000 |
| Total | 107,202,000 | 98,106,000 | 63,665,000 |
| Grand total: U.S. dollars | 268,973,000 | | |

ANNEX 2.—FUNDS NEEDED FOR MEASLES CONTROL/ELIMINATION ACTIVITIES IN THE AFRICAN REGION ¹

[U.S. dollars]

| Budget line | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|--|-----------|-----------|------------|------------|------------|------------|
| Costs of vaccine and injection equipment for supplemental immunization | 1,674,993 | 6,209,330 | 5,511,090 | 8,763,394 | 8,063,125 | 30,221,932 |
| Operational costs of supplemental immunization | 1,486,680 | 5,511,240 | 4,891,500 | 7,778,160 | 7,156,620 | 26,824,200 |
| Costs of injection safety and evaluation/surveillance | 495,560 | 1,837,080 | 1,630,500 | 2,592,720 | 2,385,540 | 8,941,400 |
| Subtotal: Supplemental immunization | 3,657,233 | 13,557,65 | 12,033,090 | 19,134,274 | 17,605,285 | 65,987,532 |

ANNEX 2.—FUNDS NEEDED FOR MEASLES CONTROL/ELIMINATION ACTIVITIES IN THE AFRICAN
REGION ¹—Continued
[U.S. dollars]

| Budget line | 1999 | 2000 | 2001 | 2002 | 2003 | Total |
|-------------|-----------|------------|------------|------------|------------|------------|
| PSC | 475,440 | 1,762,495 | 1,564,302 | 2,487,456 | 2,288,687 | 8,578,380 |
| Total | 4,132,673 | 15,320,145 | 13,597,392 | 21,621,730 | 19,893,972 | 74,565,912 |

¹ Supplemental immunization.

HUMAN AND NATURAL RESOURCES TO SUSTAIN EVERYBODY

Senator BUMPERS. Thank you very much, Dr. Samba, and thank you very much for your kind words. It was a very powerful, wonderful statement. I regret that 99 other Senators could not have heard your testimony this morning. [Laughter.]

You know, there is not anything wrong with this country. Indeed, there is not anything wrong with the world. We have the assets and we have the human and natural resources to sustain everybody in relative prosperity, but we simply miscue our priorities and squander so much on misspent priorities. And you have set that out with a great deal of specificity and very graphically.

Again, I thank you very much for being with us.

Dr. SATCHER. Senator Bumpers.

Senator BUMPERS. Yes.

Dr. SATCHER. Please allow me to apologize for having to leave. As I said, the Pan American Health Organization is meeting, and I have just been paged and told that we are getting ready for a very important vote.

Senator BUMPERS. That is quite all right.

Dr. SATCHER. I am part of the U.S. delegation.

I am delighted to have been able to be here and to testify in front of you once again about this very important issue and to join my outstanding colleagues here. I am sure they can answer any questions that you have. Thank you.

Senator BUMPERS. Well, most of them were directed to you, so we will see. [Laughter.]

STATEMENT OF HERBERT A. PIGMAN, CHAIRMAN, POLIO ERADICATION ADVOCACY TASK FORCE, THE ROTARY FOUNDATION, ROTARY INTERNATIONAL

Senator BUMPERS. Mr. Pigman, once again welcome. Thank you in advance for the magnificent job Rotary International has done in bringing us really to this happy state. Please proceed.

Mr. PIGMAN. Thank you, Senator Bumpers. Rotary International would like to thank your subcommittee for conducting this hearing. It comes at a critical time in the fight against polio. The virus may indeed be on the threshold of extinction, but that final threshold is a formidable one, and without the needed resources directed on a timely basis, we could fail to reach the target in the year 2000.

I would like the privilege of joining my colleagues here in commending you, Senator Bumpers. Throughout your distinguished career, you have carried the torch for immunization both here and abroad, and speaking on behalf of the 450,000 members of Rotary in this country, we could wish for no greater advocate of the rights of the children for a healthy start in life. We thank you.

Polio eradication is one of the great public health stories, and since that resolution by WHO 10 years ago, a global partnership has developed and it includes the private sector. The private sector has joined with health ministries and their workers in polio endemic countries, and as you have seen, the reported incidence of this disease has declined by 90 percent and now 160 nations are polio-free. Some 4 million cases of polio have been prevented in this period, and victory holds the promise of \$1.5 billion in savings and \$230 million in this country alone.

Support for polio eradication by the private sector is unprecedented, and I think it is instructive to question why this has developed and furthermore what lessons are there for the future of such collaboration.

The polio initiative presents an attractive case to the private sector. It is a time-limited goal. It is an achievable goal. We have an effective vaccine. We have a proven strategy, the promise of future savings and future benefits in the fight against other infectious diseases. Health workers in countries all over the world soon awakened to the potential of their new ally, the private sector, and they identified roles which play to the strengths and the interests of the private sector. All these I believe are positive factors in the decisions by the private sector to get on board on polio eradication, and it has been a fruitful marriage.

ORAL POLIO VACCINE

Three pharmaceutical firms have donated 100 million doses of oral polio vaccine. Another has contributed \$1 million to support polio virology labs in Africa. Corporations are lending advertising know-how to convey the message of immunization. In support of national immunization days, they have deployed private helicopters, jets, vehicles. They have printed posters, provided faxes and fuel, megaphones, and meals, all with the aim that the war on polio in their particular country shall not fail for the want of a horseshoe nail.

Rotary, as a service club organization, has helped to tap this private sector potential because we ourselves are the private sector. We comprise business and professional leaders in 159 countries and our 1.2 million members try to lead by example. Since the PolioPlus Program began in 1985, Rotary has committed \$313 million for vaccine, social mobilization, and laboratory support in 119 nations. We support a core of experts, some of whom are here today, who are leading the polio fight at WHO headquarters in Geneva and in regional offices. Very recently \$5 million has been contributed by cooperating clubs to fund polio laboratories in a dozen countries. We will invest, as you have said, Senator Bumpers, at least \$425 million in polio by the year 2005 when we celebrate Rotary's 100th anniversary in a polio-free world.

This financial support was welcome. It is needed, but of even greater value are the millions of hours invested by Rotarians and friends and others in volunteer service. They constitute an army of workers on the front lines, and in stretching out a hand of help to health workers, they help them stretch their nation's health dollars. Some 150,000 Rotarians and their friends have turned out for each of India's national immunization days, and in many countries,

members of Rotary chair the national and regional interagency coordinating committees which help health ministries to plan and execute strategies.

Rotary also is advocating the benefits of polio eradication to the leaders of donor governments, some 30 other governments. This effort has helped to produce more than \$500 million in polio specific grants in the last 5 years, and I am very proud to say as a citizen of this country that the United States has contributed 40 percent of this total, or \$201 million, toward polio eradication overseas.

We wish to commend your subcommittee for the recommended increase of \$20 million for polio needs in Africa. These funds are vitally needed not only for fiscal year 1999, but also for the year 2000.

The task of delivering oral polio vaccine to children faces enormous problems in many parts of Africa, as Dr. Samba has testified. Civil conflict, poor roads, uncertain communication, unpaid health workers, shortages of transportation and refrigeration, and a weak but rapidly improving surveillance system.

The good news is that national immunization days against polio in Africa have achieved remarkable results despite these obstacles. The health workers of these countries need these additional resources. Furthermore, they merit the encouragement which such special help will bring them. New funds will buy needed vaccine, fuel, training, extend surveillance capacity. But, moreover, they will trigger new private support. Rotary has committed \$92 million to the program needs of 47 African nations, and that continent continues to have our highest priority.

In closing, Senator Bumpers, I would like to emphasize that private sector collaboration in the war on polio, for which I have provided a few examples, has implications which transcend the victory over a single infectious disease. The private sector has responded to an appeal by leaders of the public health community. They have asked for help in winning a war that can be won, a war that can eliminate forever a terrible disease.

PREPARED STATEMENT

Now we are allied in a mutual testing ground. The goal is in sight, and all partners, governments of polio endemic nations, donor governments, and the private sector, must stay the course and keep the resources flowing. Victory over polio will prove to have many lasting benefits, but I believe one of the most important benefits may well be that the value of childhood immunization will engrave itself on the corporate social conscience and nurture the realization that in the long run healthy kids are the future of a healthy global economy.

Thank you for this opportunity to testify, Senator.

Senator BUMPERS. Thank you very much, Mr. Pigman.

[The statement follows:]

PREPARED STATEMENT OF HERBERT A. PIGMAN

Mr. Chairman, members of the subcommittee, Rotary International thanks you for the opportunity to participate in this hearing as a representative of the non-governmental, private sector community, a sector which has emerged as a key partner in the global effort to raise immunization levels among the children of this world.

We particularly wish to commend Senator Bumpers for his leadership in immunization, both here in the United States and in the international arena. Early in his distinguished career he recognized the value of investing in immunization. He has worked assiduously toward this end, with the great support and participation of Mrs. Bumpers. Newborns around the world could wish for no greater advocates of their right to a healthy start in life.

I will address in particular one theme of this hearing: the importance of public and private sector collaborative efforts in achieving the world-wide eradication of polio, and its implications for measles eradication and other public health goals. The global program to eradicate poliomyelitis provides an outstanding example of how a public/private partnership can be forged and sustained, producing dramatic results.

The international team which is attacking this dreaded, crippling disease includes among its public sector the World Health Organization, UNICEF, the U.S. Centers for Disease Control and Prevention, the U.S. Agency for International Development and counterpart agencies in other donor nations, and the health ministries and workers in the countries where the battle against polio continues. Chief among the private sector is Rotary International, the service club organization of over 1.2 million business and professional leaders in 29,000 communities in 159 countries.

Over the past 13 years, this global team—unprecedented in the history of public health—has applied innovative strategies to reduce the reported cases of polio by 90 percent. The polio virus is on the threshold of extinction, and we are surrounding it in its final stronghold: sub-Saharan Africa. If adequate financial resources continue to flow to this program, there is great optimism that we will see the last case of polio by the end of the target year 2000. This virus, which once crippled or killed some 600,000 people annually, mostly children, will join the smallpox virus as the second to be eradicated from the planet. In addition to immeasurable human benefits, the world will save at least \$1.5 billion every year in the cost of vaccine and its administration, when polio immunization is no longer needed. There will be lasting benefits in the form of a stronger infrastructure for the delivery of vaccines against other infectious diseases.

The strategy, the successes, and the challenges remaining to the global polio eradication campaign have all been reviewed by my distinguished colleagues who are testifying today. I would like to take this opportunity to point out that Rotary holds these men in great esteem, for their vision of a world without polio. Dr. Satcher, Dr. Foege and Dr. Samba are all recipients of Rotary's Polio Eradication Champion award, for their leadership in the international partnership which is making the "Target 2000" dream a reality.

On behalf of Rotary International and the 400,000 American Rotarians, I would also like to express our deep gratitude to this Subcommittee for its staunch support of the CDC's international polio eradication efforts over the past several years. In particular, I would like to thank the Subcommittee for the recommended increase of \$20 million for fiscal year 1999. The CDC has accomplished so much with the funds you have allocated them to date. This additional appropriation will help make it possible to eliminate polio in Africa by the end of the year 2000. As may be seen in the appendix to this document, the United States' generosity has fueled the rapid progress. US appropriations in the last three fiscal years total \$201 million, or 40 percent of the major polio-specific grants of all donor nations. These monies have been deployed most effectively by the CDC and USAID, which are spearheading America's fight against polio. Few investments are as risk-free or can guarantee such an immense return. Rotary greatly appreciates your personal leadership and continued support of the CDC's program and "Target 2000."

THE POLIO ERADICATION STRATEGY WORKS

Polio, like smallpox before it, can be eradicated because humans are the only host for the virus. At the 1988 World Health Assembly, the nations of the world resolved to see the last case of polio by the end of the year 2000, with certification of eradication by the year 2005. This is possible because we have a proven strategy. In 1994, the entire Western Hemisphere was certified free of polio. Every country which can effectively implement WHO's polio eradication strategy can expect to be polio-free within three to four years. We must make certain that every country is able to do this, because if we fail in any one country, we fail world-wide.

Although polio-free since 1979, the United States currently spends at least \$230 million annually to protect its newborns against the threat of importation of the polio virus. This threat is real. In 1996, for example, a polio outbreak in Albania, caused by an imported virus, killed and crippled dozens of people and spread to neighboring Greece and Yugoslavia. Once polio is eradicated and immunization

against it can be ceased, America will save this amount every year. Eradicating the disease in the 50 countries where it remains clearly benefits the American people.

ROTARY'S ROLE IN THE GLOBAL PARTNERSHIP

Thanks in large measure to United States support, the international effort to eradicate polio has made tremendous progress during the past year: 160 countries now polio-free; polio apparently gone from the Western Pacific, and virtually eliminated in Europe; solid improvements in polio surveillance and the global laboratory network; National Immunization Days (NIDs) conducted or scheduled in all polio-endemic African nations. Rotary is proud to have played a role in these many successes. Rotary's contribution to the international effort is fourfold: funding, volunteerism, laboratory and surveillance support, and advocacy for polio eradication.

Funding.—When the PolioPlus Program began in 1985, Rotary initially intended to raise \$120 million to provide oral polio vaccine (OPV) for all the newborns in the developing world for a period of five years. Rotarians responded with \$247 million, more than double the original fund-raising goal. Since then, Rotary has committed additional resources, and by the year 2005, when we expect to celebrate the certification of polio's eradication, Rotary International will have expended over \$425 million on the effort—the largest private contribution to a public health initiative ever. Of this, \$313 million has already been allocated for polio vaccine, operational costs, laboratory surveillance, cold chain, training and social mobilization in 119 countries, including \$92 million to date for 47 African nations. Over the past year, realizing the increased role which external donors need to play in order to ensure that polio eradication is not jeopardized due to lack of resources, The Rotary Foundation has allocated an additional \$40 million to its PolioPlus Fund. But Rotary's contribution goes beyond the financial.

Volunteerism.—Around the world, Rotarians and their friends and families have contributed millions of hours to polio immunization and eradication efforts in their nations and communities. Rotarians are active at all levels of the campaign—international, regional, national and local. They work together with their national ministries of health, UNICEF and WHO, and with health providers at the grass-roots level. They help to plan and implement the National Immunization Days, to publicize the campaigns, to transport vaccine, to staff immunization posts, and to help track children who may have missed the immunization. In Angola, for instance, Rotarians helped negotiate a cease-fire in order to immunize children, and led a campaign to solicit corporate jets, helicopters and vehicles to move vaccine through Angola's land-mine infested countryside. The Government has been so impressed by Rotary's ability to negotiate with the factions and build consensus that the President of Angola has approached Angolan Rotarians to solicit Rotary's assistance in convening a national peace conference. In India, 70,000 Rotarians and the 100,000 additional volunteers they were able to mobilize were critical to the success of the NIDs, during which 130 million children were immunized on one day—the largest single public health event in history.

Laboratory and surveillance support.—Rotary is committed to strengthening the network of international, regional and national laboratories which is necessary to investigate suspected polio cases. We have made grants to fund laboratory equipment, personnel, and training of virologists, and through our PolioPlus Partners program have enabled Rotarians in polio-free countries to make direct, specific contributions to the global eradication of polio, by adopting laboratory and social mobilization projects in polio-endemic countries. Rotary districts in America, Canada and Japan have funded polio laboratories in Côte d'Ivoire, Kenya, Madagascar, Nigeria, Senegal, Zambia, and 6 other African nations, in some cases providing all the equipment and materials necessary to get the lab functioning. In addition, Rotarians in polio-endemic countries are involved in surveillance for suspected polio cases at the local level, actively looking for any child with the tell-tale signs of paralysis and fever and informing the appropriate health authorities. In the 1980's, Rotarians worked with the Brazilian Pediatrics Association to educate 12,000 Brazilian pediatricians about the need to report suspected polio cases. During the last stages of the eradication campaign in the Americas, Rotarians in several countries even offered substantial rewards to citizens reporting confirmed polio cases.

Advocacy.—For the past 3 years, The Rotary Foundation's Polio Eradication Advocacy Task Force has coordinated Rotarian efforts to inform both governments and the private sector about the benefits to all nations of global polio eradication, and the urgent need for all to increase their commitment to the Target 2000 goal. Advocacy also means building the political will to eradicate polio in those countries of the world in which it still exists. Many of you may be familiar with our efforts here in the USA—we have testified before your Subcommittee and others, and held

events to celebrate progress in the polio eradication campaign and United States leadership of the international partnership. But you may not be aware that Rotarians are engaged in similar activities in over 25 other nations around the world. Australia, Belgium, Canada, Denmark, Germany, Japan and the United Kingdom are among those countries which have followed the United States' lead in increasing their commitment to Target 2000. In these and other countries, Rotarians have been taking the message to parliamentarians, foreign aid agencies, and heads of state. Over the past three years, Rotarians have played a role, sometimes greater, sometimes lesser, in decisions by their governments to commit some \$500 million in new funds for international polio eradication. We hope to maintain this momentum until polio is eradicated, and also step up efforts to solicit the support of international corporations and other private sector sources.

The examples I have cited above are just a few of the reasons why United Nations Secretary General Kofi Annan has called Rotary's PolioPlus Program "A shining example of the achievements made possible by cooperation between the United Nations and non-governmental organizations."

PRIVATE SECTOR SUPPORT FOR POLIO ERADICATION

The Polio Eradication Initiative has been strongly supported by the private sector, most notably at local levels. Corporate involvement has often resulted from efforts by Rotarians to engage private sector partners for the highly visible and popular National Immunization Days. A few examples are provided below:

Financial contributions.—Lederle Laboratories donated US\$1 million over a 3-year period to support the development of the Polio Laboratory Network in Africa. During the polio eradication initiative in Latin America, a fast-food chain donated a fixed amount of the proceeds from each item sold in their restaurants in several countries.

Vaccine.—The largest corporate contribution for polio eradication to date has been the donation by Chiron, Pasteur-Merieux, and SmithKline Beecham of 100 million doses of oral polio vaccine to WHO, over a 3-year period. These three companies the principal suppliers of OPV to UNICEF. The vaccine is valued at US\$8 million and is targeted to African countries, where the need is greatest. Connaught Laboratories also donated 1 million doses of OPV through Rotary in 1996.

Advertising and social mobilization.—Within the private sector, particularly corporations, there are considerable resources and expertise for "communications." A number of corporations and media organizations have supported polio eradication by providing advertising to inform and motivate parents regarding NIDs. Local and national firms have paid for print and electronic media announcements on NIDs. They have also paid for more traditional forms of advertising and social mobilization, including posters, banners and mobile megaphone announcements. One striking example of this approach was the free television advertising provided by a major household products company in Turkey. During the weeks leading up to the NIDs, the last 10 seconds of each of their television commercials was an NID announcement. This advertising was provided without cost to the Ministry of Health.

Transportation.—Transportation of vaccine, vaccinators and laboratory specimens is another area where local private sector support has been substantial. Soft drink companies have transported vaccine from central storage facilities to villages where it was used in NIDs. In some cases this was accomplished during regular deliveries and with minimal cost to the company. Local companies and individuals have also contributed the use of vehicles for the short period of time needed to transport vaccinators and vaccine to the immunization clinics. In one country an oil company donated gasoline for vehicles for an NID. Finally, in the Philippines, an express-delivery company donated the service of delivering laboratory specimens from provincial health centers to the central laboratory in Manila.

Facilitating NID's immunization clinics.—Corporate sponsors have assisted with NIDs immunization clinics in many countries. For example, several major food companies in the Philippines offered their restaurants as immunization posts during NIDs, while companies in Egypt donated food for the immunization teams. Companies have also donated balloons, candy and other small items to be given to children as a reward for being immunized. T-shirts, aprons, pins, baseball caps and other items bearing NIDs logos have been donated by corporate sponsors to increase the visibility of the NIDs and serve as a reward for health workers.

Other approaches to the private sector.—In addition to the successful examples of private/public sector collaboration for polio eradication outlined above, Rotary and WHO have made approaches to a number of other corporations at both the national and international levels. These include approaches to a major soft drink manufacturer, a large mining concern, an oil company, an automobile manufacturer and a

computer manufacturer, asking them to consider donations of money and/or materials.

AFRICA: THE KEY TO GLOBAL SUCCESS

The task of delivering oral polio vaccine to children faces enormous problems on the African continent. These include civil conflict, poor roads, uncertain communication, shortages of transportation, unreliable refrigeration facilities, lack of sufficiently trained personnel to plan and manage National Immunization Days, and a weak system of surveillance.

Despite these obstacles, however, the countries of Africa have made remarkable strides in polio immunization. These countries need and merit special assistance in their fight against polio. Thus Rotary International strongly endorses the recommendation of this Subcommittee in providing an additional \$20 million for Africa's needs in fiscal year 1999, supplementing the planned deployment of \$47.2 million by the CDC. Furthermore, Rotary International hopes that such an amount can be included in the President's budget for fiscal year 2000.

The additional \$20 million would go to three areas of need: \$6 million for oral polio vaccine for NIDs, \$5 million for NID operational support in difficult countries, and \$9 million for developing the surveillance systems which are critical to the eradication strategy. These areas of expenditure all provide additional opportunities for private sector support on national and local levels. Increased funding for the polio campaign is critical for eradication of the virus by the year 2000.

THE LEGACY OF POLIO ERADICATION

The global Polio Eradication Initiative learned much from the successful campaign to eradicate smallpox, and in turn the polio eradication effort is teaching the public health experts important lessons which will help other disease control and elimination programs. Firstly, increased political and financial support for childhood immunization has many documented long-term benefits. Polio eradication is helping countries to develop public health and disease surveillance systems useful in the control of other vaccine-preventable infectious diseases. Already, much of Latin America is free of measles, due in part to improvements in the public health infrastructure implemented during the war on polio. As a result of this success, measles has been targeted for elimination in the Americas by the year 2000, and it is anticipated that measles can be eradicated world-wide. The disease surveillance system—the network of laboratories, computers and trained personnel built up during the Polio Eradication Initiative—is now being used to track measles, Chagas, neonatal tetanus, and other viral diseases.

The campaign to eliminate polio from communities has led to increased public awareness of the benefits of immunization, creating a "culture of immunization" and resulting in increased usage of primary health care and higher immunization rates for other vaccines. It has identified and eliminated barriers to immunization. It has improved public health communications and taught nations important lessons about vaccine storage and distribution, and the logistics of organizing nation-wide health programs. Lastly, the unprecedented cooperation between the public and private sectors serves as a model for other public health initiatives. In this regard, Rotary applauds two service club organizations: Kiwanis International for its work with UNICEF to eliminate Iodine Deficiency Disorders (IDD) worldwide, and Lions Clubs International which is working with WHO's Blindness Prevention Programme to eliminate onchocerciasis (river blindness) and other causes of blindness.

Humankind is on the threshold of victory against polio, and we must not miss this window of opportunity. Poliomyelitis will be the second major disease in history to be eradicated, but not the last. The world celebrated the eradication of smallpox in 1979, and no child anywhere in the world will ever suffer from smallpox again. The annual global savings of nearly \$1 billion per year in smallpox immunization and control costs far exceed the approximately \$300 million that was spent over ten years to eradicate the disease. The United States was a major force behind the successful eradication of the smallpox virus, and has recouped its entire investment in smallpox eradication every 2½ months since 1971. Even greater benefits will result from the eradication of polio, and after that, measles and other infectious diseases which kill and maim millions of children every year.

Polio eradication is an excellent example of truly cost-effective foreign assistance. It is estimated that the world will "break even" on its investment in polio eradication—saving the more than \$1.5 billion now spent annually on routine polio vaccination—only 2 years after the virus has been vanquished and immunization against it can be ceased. The financial and humanitarian benefits of polio eradi-

cation, which will accrue forever, will be a gift to the children of the twenty-first century.

Thank you for this opportunity to testify.

MAJOR POLIO-SPECIFIC GRANTS ¹

[In U.S. dollars]

| | Fiscal year— | | | Total |
|--|--------------|-------------|--------------------------|-------------|
| | 1996 | 1997 | 1998 ² | |
| Australia | 210,000 | 948,000 | ..... | 1,158,000 |
| Belgium | 5,100,000 | ..... | ..... | 5,100,000 |
| Canada | 1,400,000 | ..... | 40,740,000 | 42,140,000 |
| Denmark | 40,000,000 | 6,000,000 | ..... | 46,000,000 |
| European Union | 704,000 | 400,000 | ..... | 1,104,000 |
| Finland | 330,000 | ..... | ..... | 330,000 |
| Germany ..... | ..... | 451,000 | 24,000,000 | 24,451,000 |
| Italy | 750,000 | ..... | ..... | 750,000 |
| Japan | 22,430,000 | 25,720,000 | 10,228,000 | 58,378,000 |
| Korea ..... | ..... | ..... | 900,000 | 900,000 |
| Netherlands ..... | ..... | 248,000 | ..... | 248,000 |
| Norway | 2,120,000 | 700,000 | ..... | 2,820,000 |
| Sweden | 481,000 | 400,000 | ..... | 881,000 |
| Switzerland | 177,000 | 1,300,000 | ..... | 1,477,000 |
| United Kingdom | 78,600,000 | 1,550,000 | 31,160,000 | 111,310,000 |
| USA | 47,200,000 | 72,200,000 | 81,200,000 | 200,600,000 |
| Vaccine manufacturers ³ | 9,000,000 | ..... | ..... | 9,000,000 |
| Total | 208,502,000 | 109,917,000 | ² 188,228,000 | 506,647,000 |

¹ Grants in excess of US\$100,000 intended primarily for polio eradication activities. These may be direct bilateral grants to polio-endemic nations, or multi-lateral grants through international organizations such as WHO or UNICEF. Some are for multiple years.

² As of August 1998.

³ Donation from three European and one American vaccine manufacturer: 100 million doses of Oral Polio Vaccine plus US\$1 million.

Note: In addition to these polio-specific grants, many countries are supporting the WHO Expanded Programme on Immunization, which combats several infectious diseases, among them polio.

BIOGRAPHICAL SKETCH OF HERBERT A. PIGMAN

GENERAL SECRETARY OF ROTARY INTERNATIONAL, 1979-86 AND 1993-95

Herb Pigman served as General Secretary of Rotary International and of The Rotary Foundation of Rotary International from 1979 to 1986 and again from 1993 to 1995. As Rotary International's managing officer, he supervised the Rotary International staff located at Rotary's World Headquarters in Evanston, IL, USA, and service centers in eight other countries.

He began his 35-year career with Rotary International in 1956 as an editor of The Rotarian magazine. As Under Secretary from 1964 to 1975 he was responsible for Rotary's program development, publications, and international meetings. From 1976 to 1978 he was executive assistant to the president. In 1979 he was elected General Secretary, serving until his retirement in 1986 after 30 years' service.

In 1986-89, he directed the Rotary International Immunization Task Force for the PolioPlus Program. The Task Force helped to launch Rotary's child immunization operations in 90 countries of Asia, the Pacific, Latin America, and Africa. He was Rotary's liaison with UNICEF, the World Health Organization, and with national health ministers. More than 1 billion children in developing countries have been immunized against polio with Rotary's help, an effort recognized by the World Health Organization in the awarding of its Gold Medal.

He currently serves as chairman of the Polio Eradication Advocacy Task Force, which encourages governments to commit financial resources needed to eradicate polio by the year 2000. He is also a member of The Rotary Foundation Permanent Fund Leadership Team.

He is a graduate and former trustee of Franklin College of Indiana, from which he holds a degree in journalism and an honorary doctorate in the humanities. He is a member of the Indiana Academy. He and his wife, Betty, who have five children, live in rural Warren County, IN, where he pursues farming and newspaper publishing. Herb is a past president of the Rotary Club of Evanston, Illinois. He is a member and past president of the Rotary Club of Boswell, IN, USA.

ROTARY—A SERVICE ORGANIZATION

Senator BUMPERS. It was only a few years ago I discovered Rotary's role in this whole thing. One day I was going home for the weekend, and Betty said, what is your schedule? And among other things, there was a Rotary Club speech on the agenda, and she said, do not forget to thank them. I said, thank them for what? [Laughter.]

And that is when I first discovered Rotary as a service organization in the very highest meaning of the word. Your work on polio is probably not well known in the country, but it is no less meaningful because of that. I want to again express my personal gratitude to all Rotarians, all 450,000 of them, for their commitment to this, and I hope they will stay committed as we move from polio to measles.

STATEMENT OF DR. BILL FOEGE, FORMER DIRECTOR, CENTERS FOR DISEASE CONTROL

Senator BUMPERS. Dr. Foegen, a close friend of mine and Betty, for many, many years. Dr. Foegen, we are most honored that you could be with us this morning and please proceed.

Dr. FOEGE. Thank you, Senator Bumpers.

Unlike a marathon, we will not know the day we cross the line with polio. We will only know afterwards. For example, it was October 1977, a family entered a hospital in Somalia with two small children. They both had smallpox. They asked directions to the infectious disease ward, and a cook at the hospital said, instead of giving directions, I will take you there. In the few minutes that it took him to take that family to the infectious disease ward, he got smallpox from one of those children. We did not know that day that that was the last time smallpox would be transmitted from one person to the next. He recovered. No one got smallpox from him. That broke the chain. It went right back to the very first human case. So, we did not know that day. We will not know until some time later the day we have crossed the line on polio.

Senator BUMPERS. Where was that, Dr. Foegen?

Dr. FOEGE. In Somalia.

So, it was not only the first disease eradicated that day, but it is the first time a body of medical knowledge actually benefits everyone in the world and everyone who will ever be born in the future. There are lots of lessons from smallpox. I want to mention four of them.

One is the value of tenacity. You mentioned that the first smallpox vaccination was in 1796, and you can understand why people 150 or 160 years later would come to the conclusion smallpox could not be terminated. Yet, a new look was taken, a global approach was taken. People shared the value of smallpox eradication, and hard work led to, 11 years later, smallpox eradication. So, it is worth always taking new looks.

No. 2, the value of partnership and the possibility of partnerships even during the cold war. We forget it was the Soviets who first suggested smallpox eradication, and we found, during the cold war because we had a health objective, we learned how to work together and it had value beyond smallpox.

No. 3, the most refreshing lesson, I believe, was the discovery that some things have to be done only once in the entire history of the world. Smallpox vaccine had to be developed only once. The eradication of the disease does not have to be repeated. It is almost an afterthought to find out it was such a good financial investment.

And No. 4, the value of U.S. leadership. USAID provided the early smallpox eradication resources, and CDC actually provided 300 people to WHO over those 11 years. We get a return on that investment in this country by having global and domestic health people who really have a totally different view.

One strange outcome was the feeling by many people that such a success could not be repeated, that this was unique. So, while some things need be done only once, some lessons apparently have to be relearned.

Some people in this room will recall that April day in 1955 when a press conference at the University of Michigan announced that the Salk vaccine actually protected children against polio. It is almost impossible to recreate the feeling of that day, but the next day around the United States, simultaneously and spontaneously, there were signs in store windows that said, thank you, Dr. Salk.

Well, as you know, we struggled with the best mechanisms, but we finally got it right, and 25 years after the vaccine was introduced, we had the last outbreak in this country. But we did not automatically go the next step and commit to global eradication. It took a catalyst, and as we have heard repeatedly this morning, that catalyst was Rotary International. It was not just the resources that we have heard about of millions of hours of work or millions of dollars. It was their role as a collective conscience. Gandhi once said that his interpretation of the Golden Rule is that he should not be able to enjoy something denied to others, and Rotary reminded us that we cannot enjoy having our children and grandchildren free of polio unless we give all parents that same joy.

I will never forget the day when Dr. Maseto, director of the Pan American Health Organization, called a group of people together to look at the science behind polio, and at the end of the day, the scientific evidence was so compelling that he went out on a limb by himself, the first person in WHO to say we will eradicate polio. And he announced that it would be eliminated from the Americas, and as we have heard, by 1991 it was.

LESSONS FROM POLIO

So, what are some of the lessons from polio?

No. 1, the scientific case is clear. The objective is realistic, as we have heard, but we still have not fully grasped the size of the effort which will be required in Africa. In smallpox eradication, our first success was in west and central Africa. It was a CDC/USAID effort and we demonstrated what could be done with people who were realistic but very motivated. The same can be done for polio in Africa,

but it will require more support I believe than people have thought heretofore.

The key lesson is that we do not save money by just getting by. You asked where the last case of smallpox was. It was in Somalia. The smallpox eradication program put great effort into Ethiopia, but not quite enough. Elimination from Ethiopia took one month longer than it should have, and in that last month smallpox was transmitted to Somalia and it took us 2 years of hard effort to get it out of Somalia. That is my fear with polio. If it takes 1 month, 6 months, 1 year too long than we will have reimportations into Brazil or India or Burma.

We are at a crucial phase where a labor intensive effort is required in Africa. The structure, as we have heard today, has rapidly been put into place in that continent, and the next step, and the last major step, should be to flood them with help before anything can go wrong. If that is to be done, it will be done because the United States decides to do it, giving even more support to CDC to, in turn, give to UNICEF and WHO and others. We can assure this country that that is a direct investment in American children for all time.

A few closing words on measles. It is because of you and your wife that we even raise the idea of measles eradication. Your efforts on immunization in Arkansas were shared with President and Mrs. Carter at a dinner at the White House in 1977. The next day I had a phone call from Joe Califano and he said, we are going to have an immunization initiative in this country.

Within a year, the results were so good we started asking the question could we actually interrupt measles transmission in the United States, and I can tell you many public health people told me do not take that objective. You will only ruin the credibility of CDC.

SPREADING OF MEASLES

We did take that as an objective and we had weekly reviews. One problem after another was uncovered. Military recruits going to basic training would spread measles around the country as they went home on furlough. That was solved by immunizing all military recruits, whatever their past history was. Then day care centers, colleges, one problem after another, until we got down to the last barrier, and that turned out to be importation of measles from other countries. We were having on average two importations a week at that time. As Dr. Satcher mentioned, PAHO has now done such a good job, that we have very few importations from this hemisphere, but we can clearly say we have interrupted transmission of measles in this country and all of our cases are due to importation.

So, we have discovered that we are interrelated. It takes more than a village to raise a child. It takes the entire world, and if we are to protect American children, it will be by getting rid of measles in the rest of the world.

What are the lessons we have learned from this? Scientifically measles eradication can be done, and we have shown that by getting rid of it in this country.

It will require tremendous effort. We should continue to build the infrastructure for measles immunization, and we should improve the tools. We should develop vaccines that are heat resistant so we do not need the cold chain. We should develop stealth vaccines that actually get by the maternal antibody so you can give measles immunization in the first 9 months of life. And we should make measles vaccine a tugboat to pull the entire immunization program to greatness. We should some day make global measles eradication a legacy of the Arkansas immunization program. Our best argument for measles eradication will be made by finishing polio with all the speed we can generate.

Permit me to end on a personal note. I no longer work for the Government. I am nearing the end of my professional career and, therefore, I feel free to say what I want. [Laughter.]

Senator BUMPERS. Sort of like not running again. [Laughter.]

Dr. FOEGE. At a time of great criticism of Government, Government employees, and politicians, I can identify few instances of social justice by groups other than Government. No church group, no service club, no organization represents all of us except Government. Our immunization successes in this country have resulted from Government at its best by a desire to protect every child individually and society collectively. It is the result of politics at its best. And likewise, the U.S. support of smallpox eradication, polio eradication, child health, child immunization for the rest of the world, it is enlightened self-interest, yes, but it also expresses our understanding as Americans of a responsibility to the world and to the future. As with the Marshall plan and the Point Four Program, it is the U.S. Government at its best.

PREPARED STATEMENT

For years of giving us Government at its best and on behalf of tens of millions and hundreds of millions of people who are never invited to a hearing like this, I thank both you and Mrs. Bumpers. Thank you.

[The statement follows:]

PREPARED STATEMENT OF WILLIAM FOEGE M.D., M.P.H

INTRODUCTION

It is not possible to grasp the pace of health improvements in our lifetime. When my parents were born, 15 percent of children in this country died before their first birthday. Now the figure is less than 1 percent. Given his life expectancy at birth, my father was destined to die in 1953. 20th Century medicine and science have given him both quantity and quality of life, and at age 93 he enjoys a full life.

Likewise, global health gains stagger our imagination. The World Bank has reported that health has improved more in the past 40 years than in the previous 4,000. Global life expectancy has approached 65 and infant mortality rates for the world have been cut in half in the past 35 years. But the gains cannot be mentioned without also noting the increasing gaps between the haves and the have-nots, the rich and the poor. Disease eradication efforts help to close that gap, providing the same benefits for everyone.

SMALLPOX

On an October day in 1977, a family arrived at a hospital in Somalia with two small children. They both had smallpox. Asking for directions to the infectious disease ward, they were escorted by a hospital employee. In that brief period, the employee contracted smallpox. But, no one acquired smallpox from him, thus breaking

the chain of smallpox transmission that went back to the very first human case hundreds of years before. Not only was that the first disease eliminated from the world, it was also the first time that a body of medical knowledge benefited everyone living and everyone who would be born in the future. It was truly social justice in the medical field.

Many lessons come from the smallpox eradication experience. I will mention only four.

1. The value of tenacity.—Senator Bumpers mentioned that the first smallpox vaccination was given in 1796. It is understandable that after 150 or 160 years people would conclude the disease could not be eliminated. But after a new analysis, global agreement was reached, a shared goal was defined and the hard work of 11 years led to eradication.

2. The value of partnerships.—It was possible, even in the Cold War, to develop effective partnerships with the Soviet Union. [Indeed, we forget that it was the Soviets who originally suggested smallpox eradication as a global goal.] The program gave us practice in working together and this led to benefits beyond smallpox eradication.

3. But the most refreshing lesson for me was the demonstration that some things need to be done only once in the history of the world. Smallpox vaccine did not need to be developed a second time. The eradication of smallpox did not have to be repeated. It is almost an afterthought to find what a good financial investment it was.

4. The value of U.S. leadership. USAID provided the early resources and the Centers for Disease Control and Prevention provided over 300 people to the World Health Organization for the eradication effort. The U.S. got a return on that investment with global and domestic health workers that had a different perspective and great skills.

One disconcerting outcome was the feeling by many that such a success could not be repeated, that it was unique.

POLIO

So, while some things need be done only once, some lessons apparently have to be relearned.

Some here will remember that April day in 1955, when a press conference at the University of Michigan caused absolute euphoria with the announcement that the vaccine developed by Jonas Salk protected children from polio. There was a spontaneous reaction with signs appearing in store windows the next morning saying, "Thank you, Dr. Salk!"

We struggled in this country for the best mechanisms, but we finally got it right. Our last outbreak occurred 25 years after the vaccine was introduced.

But we did not automatically go the next step and commit to global eradication. It took a catalyst and that catalyst was Rotary International. It was not just their resources of millions of hours in the field and millions of dollars that was important. It was also their role as a collective conscience.

Gandhi once said that his interpretation of the Golden Rule is that he shouldn't be able to enjoy something denied to others. Rotary reminded us that we cannot enjoy having our children and grandchildren free of polio unless we give all parents that joy.

I will never forget the day when Dr. Macedo, director of the Pan American Health Organization, called together a group to review the science of polio control. On hearing the scientific evidence, he immediately went out on a limb, ahead of his colleagues, to announce that polio would be eliminated from the Americas. And it was done by 1991.

What then are the lessons we take to from our polio eradication to this date?

1. The scientific case is clear as larger and larger geographic areas are freed of the disease.

2. The objective is still realistic.

3. But, we still haven't grasped the size of the effort required in Africa. In smallpox eradication, our first success was in West and Central Africa. It was a CDC/USAID effort that demonstrated what could be done with realistic and well-motivated people. The same can be done for polio in Africa, but it will require more support for the next two years than we have given, or even imagined to date.

4. The key lesson is that we don't save money by just getting by. In smallpox eradication we put great effort into the program in Ethiopia but not quite enough. Elimination of smallpox took one month too long. In the last month of smallpox in Ethiopia, the disease was transmitted to Somalia, and it took an additional 2 years to rid Somalia of the disease.

That is my fear with polio. If it takes one month, 6 months, 1 year too long we may get re-importation into Brazil, India, or Burma.

We are now in a crucial phase, where a labor-intensive effort is required in Africa. The structure has rapidly been put into place and the next step (and the last major step), should be to flood them with help before anything can go wrong.

If this is to be done, it will require the support of the United States giving even more support to CDC to, in turn, provide assistance to WHO, UNICEF and others.

We can assure Congress that it is a direct investment in American children for all time.

MEASLES

A few closing words on measles. It is because of you, Senator Bumpers, and your wife, that we even raise the idea of measles eradication.

Your efforts on immunization in Arkansas were shared with President and Mrs. Carter at a dinner in the White House in 1977. The next day I received a call from the Secretary of HHS, Joseph Califano, to inform me that we were going to have an immunization initiative.

Within a year the results were so good that we began asking ourselves if measles transmission could be interrupted in this country. Many public health people advised against it saying it was not possible and would serve only to impair the credibility of CDC. But we chose that objective and began to have weekly reviews of progress. We found one problem after another, from military recruits spreading the disease, to problems in day care centers, colleges, sports events, etc. But we solved each problem as it arose until the ultimate barrier presented itself—importations from other countries.

We were experiencing two importations of measles in the average week. Once again we were faced with the fact that everything in the world is interrelated. If we want to protect American children from measles we have to protect all children in the world from measles.

It doesn't just take a village to raise a child, it now takes the entire world to raise a child. PAHO launched a very effective program and importations from this hemisphere have been dramatically reduced.

We have now interrupted measles transmission in this country. All cases now are due to importations.

What are the lessons?

1. We have demonstrated the science. Measles eradication is possible.
2. It will require tremendous effort.
3. We should continue to build the infrastructure for measles immunization. All children in the world need to be immunized.
4. But we should also improve the tools. We should strive for vaccines that are heat stable in order to minimize the costly and difficult cold chain. We should seek "stealth" vaccines that evade maternal antibody, allowing immunization in the first 9 months of life.
5. We should make measles vaccine a tugboat to pull the entire immunization program to even greater heights. All of the new vaccine possibilities require an ever stronger immunization structure.
6. We should make global measles eradication the legacy of the Arkansas immunization program.
7. Our best argument for measles eradication will be made by eradicating polio with all of the speed we can generate.

Finally, permit me to end on a personal note. I no longer work for the government; I'm near the end of my professional career; therefore, I am free to say what I want.

At a time of great criticism of government, government employees and politicians, I can identify few instances of social justice by groups other than government. No church group, no service club, no other organization represents all of us. Only government does that.

Our immunization successes in this country have resulted from government at its best by a desire to protect every child individually and society collectively. It is the product of politics at its best.

Likewise, the U.S. support of smallpox eradication, polio eradication, child health, and child immunization for the rest of the world, while we know it is enlightened self interest, it also expresses our understanding, as Americans, of a responsibility to the world and to the future.

As with the Marshall Plan, and the Point Four Program, it is the U.S. Government at its very best.

For the years of giving us government at its best, and on behalf of ten's and hundred's of millions who are never invited to a Senate hearing, I thank you and Mrs. Bumpers.

Thank you.

WHEN TO STOP MANUFACTURING POLIO VACCINE

Senator BUMPERS. Dr. Foegen, that statement can only be described as beautiful, powerful, clear, representing the highest and best values of citizens of this country. I cannot tell you how impressed I am with it and how, once again, I wish not just my colleagues in the Senate but every citizen in America could hear that.

This is such an unbelievable success story, and at the same time we have to recognize that the success just simply points out how far we have to go and you have done that in your statement.

Let me ask you three or four questions, Dr. Foegen. No. 1, how soon after the last case of polio can we safely quit manufacturing polio vaccine?

SMALLPOX VACCINE AND STOCKPILING

Dr. FOEGE. It is a difficult question to answer because as with smallpox, we are now reasking the question 20 years later. Should we be making smallpox vaccine and stockpiling it in case something goes wrong?

With polio eradication, it will take us some time, some years actually, of close surveillance and monitoring every suspected case, every case of flaccid paralysis, to make sure that there is no virus actually circulating in the population. Then we have to make the decision do we stockpile vaccine even if we do not use it. But we are talking about a period of years, not a period of decades.

Senator BUMPERS. How long has it been since the last case of smallpox was reported?

Dr. FOEGE. It has been over 20 years since the last case.

Senator BUMPERS. When did we discontinue manufacturing smallpox vaccine? I assume we have discontinued it.

Dr. FOEGE. We have. We actually stopped giving smallpox vaccine in this country before it was eradicated from the world. That is how confident we were that eradication was going to take place and that we could respond to an emergency.

Polio is more of a stealth virus that it can get into the population without us knowing. So, we cannot do that with polio. We have to continue right up until the last case and then longer.

But we did stop making smallpox vaccine. We could do it again without any problems if we had to.

Senator BUMPERS. Oh, you could.

Dr. FOEGE. We could make it again. We do not have to have smallpox virus to make the vaccine because the vaccine is actually made from a vaccinia virus or a cowpox virus.

Senator BUMPERS. At the time we chose vaccine for international, worldwide eradication, was that the only vaccine we had that was practical for such a big undertaking or did we do it for another reason?

TWO POLIO VACCINES

Dr. FOEGE. We, of course, had two polio vaccines and still do: the inactivated polio vaccine that Jonas Salk developed which is injected, and the oral vaccine that Dr. Sabin developed which is taken by mouth. The decision was made to use the oral vaccine because it was easier to use and because it provides an immunity in the intestine of the person that is not always achieved with the inactivated vaccine. So, it was considered to be the better vaccine to use on a global basis.

In this country we now talk about using the inactivated vaccine at the end of the campaign, but these decisions have not been totally made as yet.

Senator BUMPERS. Is it feasible or desirable to do more than one global eradication at the same time?

Dr. FOEGE. We, of course, are doing two global eradication programs right now, one for guinea worm and one for polio, and we are talking at the same time about doing one for measles.

I think what happened after smallpox is we lost a certain momentum because people were so convinced this was unique, they did not automatically ask, OK, how do we use what we have done to continue on something else?

ERADICATION PROGRAMS

I think it is probably useful to think in terms of always doing one or two actual eradication programs and one or two programs where you are building up to it. I would hope that measles eradication will be so feasible that it will be almost seamless to go from polio eradication to measles. So, yes, we can do two at the same time.

Senator BUMPERS. Where is guinea worm indigenous to, what part of the planet?

Dr. FOEGE. Guinea worm used to be in areas south of the Sahara in Africa and in Pakistan and in India. It has been reduced by over 95 percent in just the last 8 or 9 years. Now we are finding the problems that we fear with polio; that is, in Sudan we are having difficulties with guinea worm because of the political problems. You do not know what will happen with social and political problems. It is another reason to do this as fast as we can.

Senator BUMPERS. Is the kind of civil conflict in some African nations—maybe, Dr. Samba, I should address this question to you. We have quite a few civil disturbances in Africa, in various parts of Africa. What, if any, impact—I know it is going to have some, but how difficult is it going to be to continue with this schedule we are on to try to eliminate polio, say, by the year 2000? I know, first of all, it increases our cost because transportation is often interrupted and so on, but just comment generally on that subject, if you would.

CIVIL STRIFE

Dr. SAMBA. It is feasible because the civil strife does not continue indefinitely. Like in Sierra Leone now we are starting the polio eradication, in Liberia, in Niger. Even in Congo, we got the stocks ready and within a week of starting, the civil strife erupted, so we had to suspend. When the electricity was stopped, we bought port-

able generators to preserve the vaccines and so on. And in December we will restart again. In Angola, it was during the civil strife that we managed to have over 90 percent vaccinations. We have been able to convince the warring partners that health is in the interest of all concerned, and even during civil strife, we have been able to carry on. It is very difficult but it can be done.

HIV AND AIDS

Senator BUMPERS. Let me ask you a second question. Some critics say that HIV and AIDS are much more critical to these nations and this money could be better spent on trying to control and even to treat HIV and AIDS. What is your thought on that?

Dr. SAMBA. My impression, for what it is worth, I said earlier, as a result of partnership, governments inside Africa, governments outside Africa, the United States taking the lead, civil society—in the case of river blindness, Merck, Sharp, & Dome, a private enterprise—we have been able to win. With polio we are on the way of winning. Smallpox we have won.

We are convinced that with the partnership, the dedication, the commitment, increasing resources and knowledge, that with AIDS we will win. We are already starting on an initiative in Africa to complement the United States system on AIDS. For the moment it is a big problem. It is increasing, but AIDS is relatively new. We knew about it in the 1980's. It is much more recent than polio and smallpox and river blindness.

Senator BUMPERS. Are other nations in Africa trying to assist with what a lot of people in this country consider rather epidemic proportions of HIV and AIDS? Is the United States involved in it, and if so, to what extent? Let me rephrase the other question. Are other, for example, European nations, Japan, wealthier nations, involved in trying to help with HIV/AIDS problems in Africa?

Dr. SAMBA. Yes; indeed. The United States is involved. Japan is involved. Britain, all western countries, all Asia, in fact, are involved because the whole world is realizing more than ever that with any epidemic anywhere in the world with the type of mobility of human beings, no other country is safe. So, it is in the interest of all concerned that the last bastion of these diseases are attacked. They are all involved, sir.

Senator BUMPERS. It is what we call enlightened self-interest on an international basis.

Dr. SAMBA. Exactly.

Senator BUMPERS. Mr. Pigman, do you think we would be able to count on the Rotary Club, once we eradicate polio, to continue with their assistance, say, in measles?

POLIO ERADICATION

Mr. PIGMAN. That question is often asked, Senator Bumpers, and I would respond by saying that when we named our program back in 1985, we could have named it "polio eradication" or we could have named it "kick polio off the planet," but we named it PolioPlus, the "plus" implying that our focus on polio is aimed at raising the immunization levels against all infectious diseases.

Now, we have an army currently deployed against polio. Polio eradication is going to be their focus until the job is done, but I would hope that we would not have disarmament.

Senator BUMPERS. Well, I hope not too. I hope to be a private citizen then, but I will do my best to weigh in with such Rotarians as I have any influence with to make sure that they continue their efforts.

Mr. PIGMAN. Thank you.

ROTARIANS

Senator BUMPERS. I find, incidentally, that Rotarians take great personal satisfaction in what they have been able to accomplish, and they are very proud of themselves. As I say, a lot of service organizations are not service organizations at all, but the Rotarians have shown that they really are truly a service organization.

Mr. PIGMAN. Well, Senator, in defense of sister organizations, we are very happy to see that such large service organizations such as Kiwanis has tackled iodine disease deficiency and Lions, vitamin A deficiency, et cetera. So, let us hope that the partnership will only grow in the future.

Senator BUMPERS. Dr. Foegen, will there be any significant change, up or down, in the cost of eliminating measles compared to the cost of eliminating polio?

ERADICATE MEASLES

Dr. FOEGE. Measles is going to be a tougher disease to eliminate, and my belief is that it will probably be somewhat greater cost than polio. It is a very difficult disease to contain. It spreads rapidly and it is going to take a massive effort to eradicate measles, but it is doable.

Senator BUMPERS. You do not think there is any question but that measles ought to be the next effort I take it.

Dr. FOEGE. That is right. The figures that you gave, the single most lethal agent in the world just a few years ago. It is such a problem in Africa that I think we should do this, and I think that we are getting experience now in how to improve our infrastructure. So, there is no question in my mind that we should do this, but that polio should be eradicated as a step toward measles.

Senator BUMPERS. I have a couple of technical questions that I probably will submit in writing to you, Dr. Foegen, just for my own enlightenment and the members of the subcommittee, about the possible shortfall of funds to make sure we finish this.

CONCLUSION OF HEARING

Well, let me just again thank you all very much for what I know is a great effort to get here to be here for this. I have been here 24 years, and I can tell you—and this is not to flatter you—this has been one of the most enlightening, gratifying hearings I have ever attended in my life. All of you spoke so extremely well. Whether they read it or not, it will be shared with all the members of the full committee, not just the subcommittee. So, we will submit two or three questions in writing, but again thank you all very much for coming.

The subcommittee will stand in recess subject to the call of the Chair.

[Whereupon, at 11:39 a.m., Wednesday, September 23, the hearing was concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]

