soon undertaken. This campaign relied principally on the media and community involvement. Media activities included the following:

- A commercial firm was invited to prepare a multimedia campaign promoting the message that ORT saves lives.
- In July 1983 the President of Haiti initiated the publicity campaign on a nationally televised Oral Rehydration Day.
- Radio messages, color posters, brochures, and leaflets were used to spread the message about ORT.

Regarding community involvement, strong political support at the highest level reinforced a call to all sections of the community to participate in the campaign. Schoolteachers, agricultural extension workers, members of the police and armed forces, and traditional healers were trained in one-day sessions during routine meetings at district headquarters or village gatherings.

Success of the Campaign

Within six months of the start of this campaign, knowledge of ORS had increased from 5% to almost 50% in rural areas, and far above that in urban areas; oral rehydration had become the standard treatment for dehydration in clinics, hospitals, and private practices in Haiti; and health workers at all levels had begun to participate more fully in an improved monitoring and reporting system as the impact of their efforts on mortality became evident. For the first time, a majority of the health establishments sent monthly reports to the district level, to be forwarded on to the national level for review. These quarterly reports documented the sale of packets, the numbers of personnel trained, and the reduction in case fatalities.

Health for All

Having planned, implemented, and monitored this national effort, the Ministry of Health is now extending the strategy employed to other priority primary health care areas. The immunization program is in the process of being expanded, and efforts are being focused on the detection and treatment of tuberculosis. It thus appears that the introduction of oral rehydration therapy, besides providing effective treatment of dehydration due to diarrheal disease, has established a model for attaining universal coverage by primary health care services.

Source: Jon Rohde; Accepting ORT, reports from Haiti, programming on a shoestring; *Diarrhoea Dialogue*, December 1984, pp. 4-5.

THE EXPANDED PROGRAM ON IMMUNIZATION IN THE AMERICAS: A REVIEW

The basis for the PAHO/WHO Expanded Program on Immunization (EPI) is provided by a resolution (WHA27.57) adopted by the World Health Assembly in May 1974. The program's long-term objectives are as follows:

- to reduce morbidity and mortality from diphtheria, whooping cough, tetanus, measles, tuberculosis, and poliomyelitis by providing immunization services directed against those diseases for every child in the world by 1990 (other selected diseases may be included when and where applicable);
- to promote countries' self-reliance in the delivery of immunization services within the context of comprehensive health services; and
- to promote regional self-reliance in matters of vaccine production and quality control.

The EPI, which requires a long-term commitment to continued immunization activities, is an essential element of PAHO/WHO's strategy to achieve health for all by the year 2000. Immunization coverage has been included among the

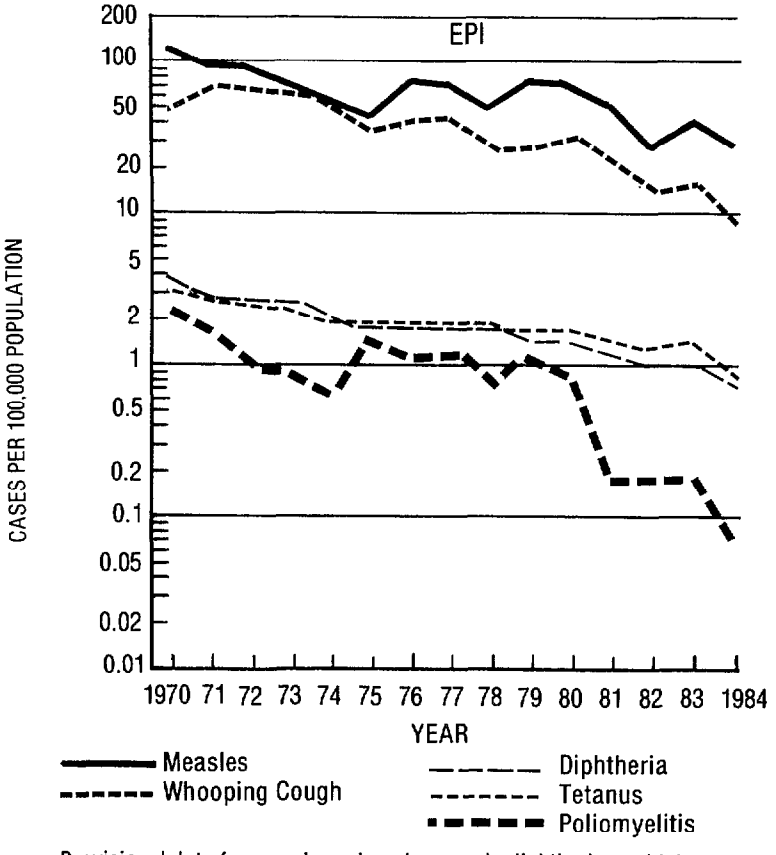
indicators which will be used to monitor the success of that strategy at regional and global levels.

Immunization Coverage

As of April 1985, available country reports showed that immunization coverage in the Americas had improved considerably since the EPI was launched in 1977. In 1978, for example, only a very small proportion of the children under one year of age (less than 10%) outside the United States and Canada lived in countries where 50% immunization coverage with the EPI vaccines had been attained for this age group. By 1984, over 55% of these children were living in countries where at least 50% infant coverage with DPT and measles vaccines had been attained, and over 80% were living in countries where at least 50% infant coverage with polio vaccine had been attained. (The reported incidences of diphtheria, measles, polio, tetanus, and whooping cough from 1970 to 1984 in Latin America and the Caribbean are charted on a logarithmic scale in Figure 1.)

Again with regard to vaccination of infants, Table 1 shows the levels of immunization coverage reported for Latin American countries in

Figure 1. The reported incidence of five vaccine-preventable diseases in the Americas (excluding Bermuda, Canada, and the United States) in 1970-1984.



Provisional data for measles, whooping cough, diphtheria, and tetanus for the year 1984.

Table 1. Latin American coverage: Reported 1983 coverage of children under one year old with three DPT, three polio, measles, and BCG vaccinations, and 1985 vaccination coverage targets established at a meeting of EPI program managers from 20 Latin American countries held at Lima, Peru, in March 1984.

	% coverage with:							
	DPT-3		Polio-3		Measles		BCG	
Country	1983	1985 target	1983	1985 target	1983	1985 target	1983	1985 target
Argentina	65	70	94	90	62	80	64	85
Bolivia	7	60	11[a]	85	14	60	30	70
Brazil	49	80	99[b,c]	95	52	95	56	75
Chile	70	90	63	90	99	95	85	95
Colombia	41	80	42	80	42	80	78	85
Costa Rica	56	85	54	85	73[d]	95	–[e]	95
Cuba	91[f]	95	93[c]	95	71	95	91[f]	98
Dominican Republic	24	70	22	90	23	60	41	60
Ecuador	23[f]	60	27[f]	60	28[f]	60	64[f]	80
El Salvador	45[c,f]	85	41[c,f]	85	47[d]	85	49[f]	85
Guatemala	44[c]	55	44[c]	55	12	40	25	45
Haiti	–	55	–	55	–	55	–	65
Honduras	70	80	68	80	66	85	74	85
Mexico	30	80	85	80	85[d]	80	–	80
Nicaragua	24	70	29[a]	80	23	80	89	90
Panama	61	80	60	80	60	80	81	85
Paraguay	38	80/40[g]	47	80/40[g]	37	80/40[g]	54	80/40[g]
Peru	20[f]	30	19[f]	35	27	43	58[f]	62
Uruguay	70	85	74[c]	90	62	95	95	95
Venezuela	49	65	67	80	42	60	48	80

[a]Does not include national polio campaigns.
[b]Reported number of doses exceeded estimated target population.
[c]Second rather than third dose.
[d]Coverage of children one year of age.
[e]– = information not available.
[f]Projected.
[g]Dual targets: urban/rural.

1983. As may be seen, less than half the countries reported coverage levels of 50% or more with DPT, polio, or measles vaccines in 1983, and less than a quarter reported coverage levels of 70% or more. BCG coverage appeared generally higher, however, with 10 countries reporting coverage levels exceeding 50% and seven reporting levels exceeding 70%.

Table 2 shows comparable figures for 19 Caribbean countries. Since 1980, the 19 countries served by the Caribbean Epidemiology Center (CAREC) have been submitting reports of immunization coverage. All 19 countries routinely administer DPT and polio vaccines, with most countries reporting coverages in the 60-90% range.

BCG and measles immunizations have been introduced more recently in most national programs. By the end of 1984, 11 countries were administering BCG and 17 were giving measles vaccine. Because of their more recent introduction, coverages with these vaccines have tended to be lower.

Immunization coverage generally improved between 1980 and 1984, especially in the 12 smaller countries of the subregion with populations of less than 130,000.[1] Seven of the larger countries (Belize, Bahamas, Barbados, Guyana,

[1]In order of ascending population size: Anguilla, Turks and Caicos Islands, British Virgin Islands, Montserrat, Cayman Islands, St. Christopher/Nevis, Bermuda, Antigua and Barbuda, Dominica, Grenada, St. Vincent and the Grenadines, and Saint Lucia.

Table 2. Caribbean coverage: Reported 1983 coverage of children under one year old with three DPT, three polio, measles, and BCG vaccinations, and 1985 vaccination coverage targets established at a meeting of EPI program managers from 19 Caribbean countries held at Port-of-Spain, Trinidad, in November 1983.

	% coverage with:							
	DPT-3		Polio-3		Measles		BCG	
Country	1983	1985 target	1983	1985 target	1983	1985 target	1983	1985 target
Anguilla	97	95	99	95	70	95	96	95
Antigua and Barbuda	99	90	99	90	48	—[a]	—[b]	—[a]
Bahamas	65	80	65	80	66	80	—[b]	—[a]
Barbados	69	75	62	75	55	65	—[c]	—[a]
Belize	59	60	61	60	43	50	81	75
Bermuda	53	—[a,d]	53	—[a,d]	60[e]	—[a,d]	—[b]	—[a,d]
British Virgin Islands	90	95	75	95	83	95	—[b]	—[a]
Cayman Islands	89	95	90	95	87[e,f]	95[e,f]	69	95[g]
Dominica	93	—[a]	92	—[a]	63	—[a]	99	—[a]
Grenada	68	85	72	85	7	80	—[b]	—[a]
Guyana	56	75	59	75	44[g]	85[g]	73	85
Jamaica	—[h]	65	—[h]	70	—[h]	60	—[h]	70
Montserrat	95	94	95	86	83[e]	51[e]	91	99[i]
Saint Lucia	81	99	80	99	36	—[a]	69	—[a]
St. Kitts/Nevis	90	90	91	90	—[b]	80	—[c]	75[j]
St. Vincent and the Grenadines	80	95	84	90	59	75[j]	—[b]	85
Suriname	85	90	83	90	71[k]	90[i]	—[b]	—[a]
Trinidad and Tobago	60	80	61	80	—[b]	—[a]	—[b]	—[a]
Turks and Caicos Islands	70	—[a,d]	7	—[a,d]	80	—[a,d]	98	—[a,d]

Source: Caribbean Epidemiology Center, 1983.
[a]Immunization coverage target for 1985 not established.
[b]Vaccine not included in national program in 1983.
[c]Five years.
[d]Did not attend Trinidad meeting.
[e]MMR vaccine used.
[f]Fifteen months.
[g]One year.
[h]Information not available.
[i]0-5 years.
[j]Two years.
[k]12-35 months.

Suriname, Trinidad and Tobago, and Jamaica) have also improved their coverages, but none had yet reached levels greater than 80% with any vaccine by 1984.

EPI-Related Activities

EPI Training

In the period since EPI training activities were launched in early 1979 through the end of 1984, it is estimated that at least 15,000 health workers attended EPI workshops. In addition, over 12,000 EPI training modules were distributed in the Region, either directly by the EPI Program or through the PAHO Textbooks Program.

In 1983 and 1984, the Cold Chain Regional Focal Point established by PAHO in collaboration with the University of Valle in Cali, Colombia, held special training workshops on cold chain equipment maintenance and repair in Bolivia, Colombia, and Nicaragua; technicians were also trained in Brazil.

In addition, a number of schools of public health in the Americas have been carrying out EPI training activities and using EPI training materials adapted to national needs.

Vaccine Production

In Northern America, Canada, the United States, and Mexico have the ability to produce all the EPI vaccines, and the first two are self-

sufficient. A fair number of South American countries have limited vaccine production capabilities. In Central America and the Caribbean, however, only Cuba has vaccine production facilities.

Overall, at least 10 Latin American countries[2] are able to produce bacterial vaccines such as DPT, DT, and BCG. The Latin American countries' combined production capacity is about 60 million doses per year, but most of them are not producing up to capacity.

At present, only two Latin American countries (Brazil and Mexico) are producing viral vaccines. Brazil is producing measles vaccine, while Mexico has developed a production capability for both measles and oral polio vaccines. Cuba is developing a measles vaccine production capability with support from PAHO and the United Nations Development Program (UNDP). As in the case of bacterial vaccines, the producing countries' manufacturing capacities tend to be greater than their actual outputs.

Overall, with regard to both bacterial and viral vaccines, most Latin American producers have found it difficult to manufacture sufficient quantities of consistently good-quality vaccines. As a result, the availability of good-quality vaccines at the national level has been limited, and the locally produced vaccines have tended to be more expensive than their imported counterparts.

The major obstacles to vaccine production are related to a lack of financial resources and high-quality personnel, problems with procuring and maintaining the necessary costly equipment, lack of up-to-date management procedures, failure of producers and users at the ministerial level to effectively program production needs, and various problems relating to quality control.

The Cold Chain

Most countries have made notable strides in improving and expanding the cold chain, although cold chain failures have been identified through investigation of vaccine failures. Most programs are actively engaged in acquiring new freezers, refrigerators, cold boxes, and thermometers, as well as in training technicians in the repair and maintenance of cold chain equipment. Several countries have had problems obtaining tools and spare parts in sufficient quantities to keep their equipment running. A few countries are testing solar refrigeration equipment and have programmed activities related to this new technology.

The Regional "focal point" for the EPI cold chain in Cali, Colombia, continues to provide testing services aimed at the identification of suitable equipment for storage and transport of vaccines. This center is also in a position to provide technical cooperation in the following areas: technical advice on the size of solar refrigeration systems and assistance in their installation; provision of ice-pack molds in two different sizes and assistance in production of the ice packs; provision of training and necessary materials for inspection and repair of domestic refrigerators; technical advice on the design and construction of cold rooms used for vaccine storage; and technical advice on the adaptation and/or conversion of equipment for use in the cold chain.

Revolving Fund for Vaccine Procurement

During its six years of operation, PAHO's EPI Revolving Fund has placed vaccine orders worth over US$19 million. The fund, which facilitates the purchase of vaccines and related supplies, has received strong support from the United States in the form of a contribution of US$1,686,000 to aid in its capitalization. This contribution, together with a UNICEF contribution of US$500,000 in 1983, has raised the level of capitalization to US$4,531,112. In the face of the economic crisis confronting many countries of the Region, revolving fund procurements have helped to control vaccine costs during a time of rapid inflation.

At present, all countries in the Region are receiving adequate quantities of vaccines to

[2]Argentina, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico, Peru, Uruguay, and Venezuela.

cover their target populations, with a large majority obtaining vaccines through the revolving fund. The strains of the economic crisis are evident, however, and many countries are beginning to have difficulties in finding enough available local currency to cover orders from the fund.

Dissemination of EPI Information

Another key to EPI program development is dissemination of information. Internationally, the main vehicle for this has been the PAHO *EPI Newsletter,* which is distributed bimonthly to health workers at all levels. This newsletter publishes information on program development in the countries, as well as articles on the epidemiology of the EPI diseases and information about new technologies. In all, more than 10,000 health workers receive this publication, which is distributed in English and Spanish.

PAHO also distributes other materials, such as abstracts of articles related to the EPI diseases and vaccines, educational aids aimed at disease surveillance, and flip-charts to aid training of local health workers in the norms of cold chain logistics and maintenance.

In addition, the Organization published and distributed a comprehensive review of EPI vaccine-related literature under the title *Recent Advances in Immunization: A Bibliographic Review* in 1983 (PAHO Scientific Publication 451, available in English and Spanish). Last year it published a Spanish translation of the American Public Health Association booklet *Immunizations: Issues for Action (Immunizaciones: Información para la acción,* PAHO Scientific Publication 472). And this year it is planning to publish Spanish translations of the proceedings of two international symposiums, one on measles immunization and the other on poliomyelitis control.

Evaluations

Since November 1980, 18 countries have conducted comprehensive EPI evaluations. Six countries have also performed follow-up evaluations to assess implementation of the first evaluation's recommendations. These evaluations have shown that overall declines in disease incidences have resulted from the progress made in each country's immunization program. Though the programs are at different stages of development, it can generally be said that important advances have been made in the areas of vaccine supply, extension of the cold chain, selection of effective vaccination strategies tailored to special needs, training, evaluation, and community participation. Most countries still face significant difficulties in the areas of supervision and information systems—particularly with regard to epidemiologic surveillance.

Control of Poliomyelitis

The improvements in the control of paralytic poliomyelitis in the Americas since the start of the EPI initiative have been remarkable. In the Americas, the proportion of children less than one year of age who have received the recommended three doses of polio vaccine has increased from 34.6% in 1978 to more than 75% in 1984. The number of reported cases of paralytic polio has decrease by 90%—from 4,728 reported cases in 1979 to 526 in 1984 (see Table 3). And the number of countries reporting cases has decreased from 19 in 1975 to 11 in 1984. A major contribution to this increased polio vaccine coverage and decreased paralytic polio morbidity has been made by special immunization programs emphasizing oral polio vaccination in Bolivia, Brazil, Colombia, the Dominican Republic, Mexico, and Nicaragua.

Because all countries in the Americas now have national immunization programs and 26 are considered to have already achieved control of poliomyelitis, it appears that an additional effort in certain priority countries specifically directed at polio can lead to the interruption of indigenous poliovirus transmission in the Western Hemisphere in a short period of time. Therefore, the eradication of indigenous wild poliovirus transmission in the Americas deserves im-

Table 3. Poliomyelitis cases reported in the Americas, by country, during the period 1975-1984.

Subregion and country	No. of cases (annual averages)		No. of cases			
	1975-77	1978-80	1981	1982	1983	1984
Northern America:						
Bermuda	–[a]	–	–	–	–	–
Canada	1	4	–	–	–	1
United States	13	20	7	9	12	8
Caribbean Area:						
Anguilla	–	–	–	–	–	–
Antigua and Barbuda	–	–	–	–	–	–
Bahamas	–	–	–	–	–	–
British Virgin Islands	–	–	–	–	–	–
Cayman Islands	–	–	–	–	–	–
Cuba	–	–	–	–	–	–
Dominica	–	–	–	–	–	–
Dominican Republic	63	107	72	70	7	–
Grenada	–	–	–	–	–	–
Haiti	25	16	35	35	62	63
Jamaica	–	–	–	58	–	–
Montserrat	–	–	–	–	–	–
Saint Lucia	–	–	–	–	–	–
St. Christopher/Nevis	–	–	–	–	–	–
St. Vincent	–	–	–	–	–	–
Trinidad and Tobago	–	–	–	–	–	–
Turks and Caicos Islands	–	–	–	–	–	–
Middle America:						
Belize	–	2	–	–	–	–
Costa Rica	–	–	–	–	–	–
El Salvador	38	23	52	16	88	19
Guatemala	39	116	42	136	208	17
Honduras	78	101	18	8	8	76
Mexico	710	966	186	98	232	137
Nicaragua	26	36	46	–	–	–
Panama	–	–	–	–	–	–
Tropical South America:						
Bolivia	138	121	15	10	7	–
Brazil	2,807	1,854	122	69	45	82
Colombia	525	305	576	187	88	18
Ecuador	45	10	11	11	5	–
French Guiana	–	–	–	–	1	–
Guyana	2	–	–	–	–	–
Paraguay	74	20	60	71	11	3
Peru	136	120	149	150	111	102
Suriname	–	–	–	1	–	–
Venezuela	44	34	68	30	–	–
Temperate South America:						
Argentina	2	22	5	10	26	–
Chile	–	–	–	–	–	–
Uruguay	6	–	–	–	–	–
Total No. of cases	4,772	3,877	1,464	969	911	526
No. of countries reporting cases	19	18	16	17	15	11

[a] – = No cases reported.

mediate hemispheric action. It is unacceptable, given the technology presently available, that any child in this hemisphere should suffer paralytic poliomyelitis.

PAHO has therefore proposed a plan of action with the following objectives:

- to promote overall development of the EPI program in the Americas;
- to eradicate indigenous transmission of wild poliovirus in the Americas by 1990; and
- to improve disease surveillance in the Region and at the country level so as to ensure that all suspected cases of polio are immediately investigated and that control measures are rapidly instituted.

The most critical elements needed for the success of this initiative are political commitment by the national governments involved and support by international agencies. PAHO will coordinate the securing of supplemental financial and technical assistance. It is estimated that an additional US$30 million will be needed over the next five years to fund the necessary personnel, laboratory support, improved surveillance and outbreak control, vaccine quality assurance, and cold chain development.

In this regard, it should be noted that intensified surveillance is critical to the success of this initiative and the EPI in general. All suspected cases of poliomyelitis require immediate and thorough investigation. The chain of transmission must be identified, and field investigations (with laboratory support) must be carried out to determine the extent of the outbreak. Within this context, the laboratory support provided for virus isolation and serologic testing in the Region must be strengthened. It is proposed that PAHO convene a meeting of all national EPI managers every six months to review progress in the polio eradication initiative.

Source: Based upon the EPI progress report presented to the 95th Meeting of the PAHO Executive Committee entitled Expanded Program of Immunization in the Americas, PAHO Document CE95/15, 11 April 1985.

WHO SEEKS COORDINATED WORLD ACTION AGAINST ACUTE RESPIRATORY INFECTIONS

In 1976 WHO began a program to reduce the high levels of morbidity and mortality caused by acute respiratory infections (ARI) in developing countries. Before this there had been little coordinated international action against any of these infections, with the exception of influenza. At that time the complexity of ARI etiologies and clinical symptoms, the widespread incidence of these infections in all communities, and the absence of agreed specific treatment guidelines posed major obstacles to any concerted plan of action.

Initiating Research

The first step was to define the size and nature of the ARI problem and to see how knowledge and practices in developed countries could be adapted to needs in other parts of the world *(1)*. In 1979 the World Health Assembly called upon the WHO Member States to promote ARI control programs and to stimulate research. Early field research focused on ARI among children in developing countries where the highest mortality was occurring. Research methods were standardized using rigorously designed epidemiologic, laboratory, and clinical protocols.

WHO assisted in the development of these protocols by having consultants work with local scientists and by holding a series of meetings in Geneva and the WHO Regional Offices on research design and technical methods. These meetings and the published reports resulting from some of them *(2,3,4)* have stimulated interest in ARI and have improved the quality of studies being undertaken. (WHO has promoted and obtained financial support for many of these studies.) Other meetings have focused more on