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EXPANDED PROGRAM ON IMMUNIZATION IN THE AMERICAS

Progress Report by the Director

This progress report is presented to the Executive Committee for review in response to Resolution CD26.R21 of the XXVI Meeting of the Directing Council (1979). The Report describes the progress achieved in this program as well as the generally low degree of program impact, calling attention to the fact that if progress is not accelerated the goal of providing immunization services to all children by 1990 will not be achieved.

EXPANDED PROGRAM ON IMMUNIZATION IN THE AMERICAS

Progress Report by the Director1. Background and Policy Basis

1.1 The Expanded Program on Immunization (EPI) has its basis in Resolution WHA27.57, adopted by the World Health Assembly in May 1974. General program policies, including the EPI goal of providing immunization services for all children of the world by 1990, were approved in Resolution WHA30.53, adopted in May 1977. These goals and policies were endorsed by Resolution CD25.R27 of the PAHO Directing Council in September 1977. EPI's importance as an essential component of maternal and child health and primary health care was emphasized in Resolution WHA31.53, adopted in May 1978, and in the Declaration of Alma Ata in September 1978.

In September 1978, Resolution CSP20.R16 of the XX Pan American Sanitary Conference established an EPI Revolving Fund for the purchase of vaccines, and in September 1979, Resolution CD26.R21 of the XXVI PAHO Directing Council requested the Director to reallocate funds and other resources from related programs to strengthen the EPI program and to establish a regional cold chain development focal point.

In May 1982 the World Health Assembly, by Resolution WHA35.31, urged Member States to take action on a five-point action program geared at strengthening the progress of EPI towards reaching its goals by 1990.

The long term objectives of the EPI are to:

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

The EPI requires a long-term commitment to continued immunization activities and is an essential element within PAHO/WHO's strategy to achieve health for all by the year 2000. Immunization coverage has been included among the suggested indicators to monitor the success of that strategy at regional and global levels.

2. Summary of Progress to Date

All countries in the Region of the Americas are committed to the implementation of this program. The five major areas of PAHO's technical cooperation are related to training, purchase of vaccines and related supplies through the operation of a Revolving Fund, development and implementation of the cold chain, development of immunization information systems and dissemination of information, and comprehensive program evaluation. Promotion of operational research is also envisaged, particularly in the areas of morbidity and mortality of the target diseases and in the cost-effectiveness of the different strategies for program delivery.

2.1 Training and Research

One of the main components of the EPI is the training of health workers at all levels on the various aspects of program planning, implementation and evaluation. The basic materials are the five EPI workshop modules, which cover the epidemiology of the target diseases, vaccines, the cold chain, local programming, and evaluation. From the time EPI training activities were launched in early 1979 to the end of 1982, nearly 10,000 health workers were exposed to these workshops (Table 1). Over 9,000 EPI modules have been distributed in the Region, either directly by the EPI Program or through the PAHO Textbooks Program.

TABLE 1. Number of national and local EPI workshops held and number of participants. Region of the Americas, 1979-1982.

Subregion	National courses	Number of participants	Local courses	Number of participants
Caribbean	20	404	8	186
Middle America	8	309	27	888
Tropical South America	10	542	104	5,477
Temperate South America	2	104	74	2,001
Total	40	1,359	213	8,552

Additionally, in 1982 the Cold Chain Regional Focal Point established by PAHO in collaboration with CIMDER (Centro de Investigaciones Multidisciplinarias en Desarrollo) and the Universidad del Valle in Cali, Colombia, started special training workshops for cold chain repair and maintenance. The first such course, held in Buenaventura, Colombia, was

attended by cold chain technicians from Colombia, Honduras, and Paraguay who were trained in the basic concepts of problem diagnosis and repair of faulty refrigerators. With the previous two cold chain maintenance courses held in Peru in 1981, the number of technicians trained in the Region is over 25.

As the EPI enters a phase of full implementation in all countries of the Region, the challenge is to shift the focus of program development and stimulation from PAHO staff at regional and country levels to national staff operating within the context of national institutions. With this shift, program development and enrichment through training, evaluation and operational research can occur continuously as staff within these institutions are charged with solving the myriad technical and managerial problems which are impeding the accomplishment of program goals. As an institution successfully develops these support capacities at national level, it can play an increasingly active role in providing similar support at the international level, participating in the long-term goal of stimulating the development of similar institutions in other countries (technical cooperation among developing countries--TCDC).

To accomplish the above, PAHO has made agreements with the Government of Colombia, to establish the Cold Chain Regional Focal Point, and with the Government of Brazil, to support a training and research institution in conjunction with the National School of Public Health (ENSP) in Rio de Janeiro and the Public Health Services Foundation (FSESP). The National School of Public Health in Rio de Janeiro is preparing several training materials in conjunction with the Ministry of Health, particularly for use at the local level, with emphasis on surveillance of the target diseases, and is also involved directly in the training of health workers at the state level.

A cooperative study to help determine the best age for measles immunization in Latin America was conducted in collaboration with the Ministries of Health of Brazil, Chile, Costa Rica and Ecuador. Results of this study have been widely disseminated through the PAHO Bulletin.

Operational research has also been initiated with particular regard to the morbidity and mortality associated with measles and neonatal tetanus, and the cost-effectiveness of different strategies for vaccine delivery services. Results of these studies will be available early in 1983.

In the field of cold chain research and development, the Regional Focal Point in Cali, Colombia, has embarked on a global testing program to identify the proper equipment for use within the cold chain. Several cold boxes from within the Region have been tested and the tests results reported to the countries. Refrigerators manufactured in the United States, Europe, Africa and Asia are also undergoing tests at this facility. Studies are also being conducted on time-temperature indicators to monitor the handling of vaccines during transportation and storage.

Another technology which began to be field tested in late 1982 is a potency indicator for measles vaccine which will indicate to health workers the potency of this vaccine during its cold chain life. Results of this study will be completed in two years.

2.2 Revolving Fund

In 1982 the Expanded Program on Immunization (EPI) Revolving Fund faced a new set of problems due to the economic crises faced by the countries in the Region and the global recession. Because of heavy currency devaluations experienced by many countries, the Revolving Fund could not accept local currencies for payment of vaccine orders from several countries. Therefore the EPI Revolving Fund had to request payment in U.S. dollars from those countries with devalued currencies. The global recession made it more difficult for those countries because they also faced a shortage of hard currencies with which to purchase vaccines.

The shortage of hard currencies and the devaluations of local currencies placed an added burden on the Revolving Fund in meeting its obligation of accepting local currencies for payment of vaccines and related supplies. This problem may escalate in 1983 and will place an added burden at country level, with the possibility of interruptions in vaccine supplies.

Despite the aforementioned financial problems faced by the Revolving Fund and its members, the Fund's procurements have helped to control vaccine costs during a time of rapid inflation. At a time when pharmaceutical prices have risen by 41.4 per cent, only polio and measles vaccine prices have increased (by 33-35 per cent), while prices for all other EPI vaccines registered declines. The EPI Revolving Fund benefits manufacturers by facilitating their production planning and assuring them a reliable cash flow.

Table 2 summarizes the price changes for the EPI vaccines between 1979-1983 and 1982-1983. The figures show that, even though the overall prices of measles (1-dose) and polio (10- and 20-dose) vaccines have increased from 1979 levels, they have declined since 1982. In general, the Fund has been able to provide good quality vaccines at low prices.

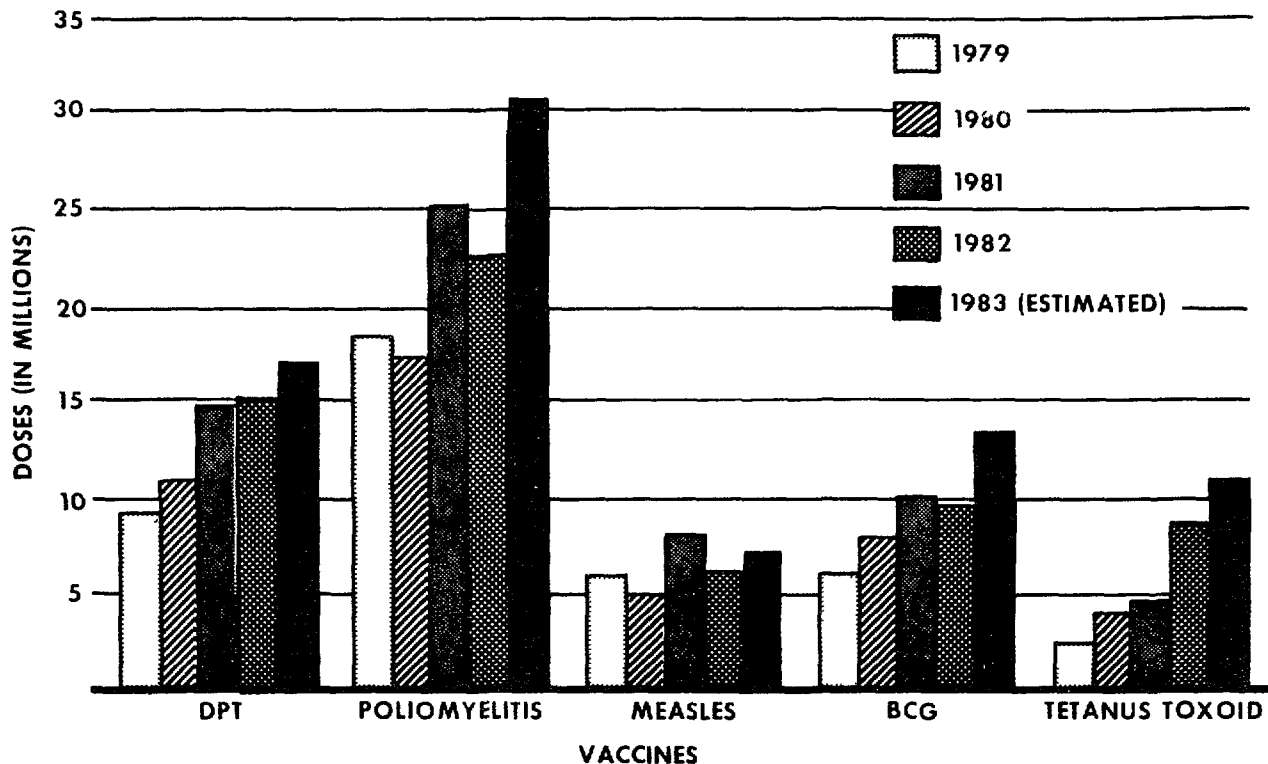
TABLE 2. EPI vaccine prices (FOB), 1979-1983

Vaccine	Vial size (doses)	Jan/79	July/80	July-	Jan.-	Jan.-	Price Change		
		Jun/80	June/81	Dec/81	Dec/82	Dec/83	1979-83	1982-83	
Polio	10	.022	.025	.035/.036*		.0297	.028	+27%	- 6%
	20	.019	.021	.029/.026*		.0253	.0205	+ 8%	-10%
	50	No contract in effect 1979-81				.0199	.0195	--	- 2%
Measles	1	.33	.28	.302		.385	.365	+11%	- 5%
	10	.14	.099	.106		.1278	.071	-49%	-45%
DPT	10	.038	.041	.041		.0337	.0220	-40%	-30%
	20	.037	.034	.034		.0256	.0177	-52%	-30%
TT	10	.026	.026	.026		.0223	.015	-42%	-33%
	20	.021	.023	.025		.0173	.011	-48%	-36%
BCG	10	No contract in effect 1979-81				.0996	.0933	--	- 6%
	20	.055	.059	.054		.0486	.0551	+ 2%	+13%
	50	.029	.031	.027		.0249	.0274	- 6%	+10%
DT (Adult)	10	(No contract in effect 1979-82)					.025	--	--
	20	(No contract in effect 1979-82)					.0155	--	--
DT (Ped.)	10	(No contract in effect 1979-82)					.0191	--	--
	20	(No contract in effect 1979-82)					.0155	--	--

*During this period two manufacturers supplied polio vaccine.

Figure 1 shows the number of doses of each of the five vaccines procured through the Revolving Fund for the period 1979-1982 and the estimated 1983 requirements. As can be seen, there has been a substantial increase in the amount of vaccines purchased over the four years.

FIGURE 1. Revolving Fund vaccine procurements, in doses.
1979-1983



The present membership of the Fund includes the countries and territories shown in Table 3, which account for approximately 45 per cent of the population of Latin America and the Caribbean.

TABLE 3. EPI Revolving Fund Members

Anguilla	Costa Rica	Nicaragua
Antigua	Dominica	Panama
Argentina	Dominican Republic	Paraguay
Bahamas	Ecuador	Peru
Barbados	El Salvador	St. Kitts
Belize	Grenada	Saint Lucia
Bolivia	Guatemala	St. Vincent and the Grenadines
British Virgin Is.	Guyana	Suriname
Cayman Islands	Honduras	Trinidad and Tobago
Chile	Jamaica	Turks and Caicos
Colombia	Montserrat	Uruguay

By the end of 1982 the quality of the vaccines used in over 95 per cent of the countries and territories in the Americas was known to conform to WHO requirements.

During its first four years of operation, the EPI Revolving Fund placed vaccine orders worth over US\$18 million (Table 4).

TABLE 4. Dollar value of vaccines purchased through the EPI Revolving Fund, 1979-1983

Year	Value (US\$)
1979	2,259,064
1980	3,250,178
1981	4,303,246
1982	4,209,548
1983 (estimated)	3,979,342
Total	18,001,378

While the EPI Revolving Fund has been able to meet many of the demands placed upon it for vaccines and supplies, the resources of the Fund reached their limit during 1982. In the course of that year a number of orders for vaccines had to be held up until funds became available; in some cases countries were requested to make advance payment in US dollars due to inadequate capitalization.

There is a demonstrated need for continued expansion of the EPI program, which has proven to be effective in preventing numerous cases of debilitating diseases. However, in order to meet this demand the resources of the EPI Revolving Fund will have to be augmented to the authorized level of capitalization--US\$4.0 million.

The fund is presently capitalized at \$2.314 million, resulting in an under-capitalization of \$1.686 million. This under-capitalization has resulted in considerable problems for its operation, some of which are listed below.

- a) Limitations in operations, since it is not possible for countries to purchase adequate supplies of cold chain equipment, syringes and needles through the Fund;
- b) Delays in placing vaccine orders on a quarterly basis with consequent disruption of program plans and immunization delivery at country level; and

- c) Frequent need for countries with larger orders to make advance deposits in US dollars, which disturbs the smooth flow of vaccine due to the difficulty for those countries to assure the availability of hard currency, disrupts the immunization program, and may result in deterioration of health status in the countries.

In view of the increasingly scarce resources available to the health sector in developing Latin American countries as they face severe economic setbacks and a rising burden of debt and oil costs, it becomes clear that cost-effective solutions for disease prevention such as the EPI Revolving Fund should assume the highest priority.

2.3 Program Evaluation

As most countries are gearing their activities toward the increase of immunization coverage, particularly to the high-risk groups of children under one year of age and pregnant women, program evaluation assumes increasing importance so that national authorities can identify problems that are hampering program implementation, analyze possible alternatives for solving them, and adjust their programming accordingly.

PAHO has developed and tested a comprehensive multidisciplinary evaluation methodology for this purpose, which was first applied in Colombia and Bolivia in late 1980.

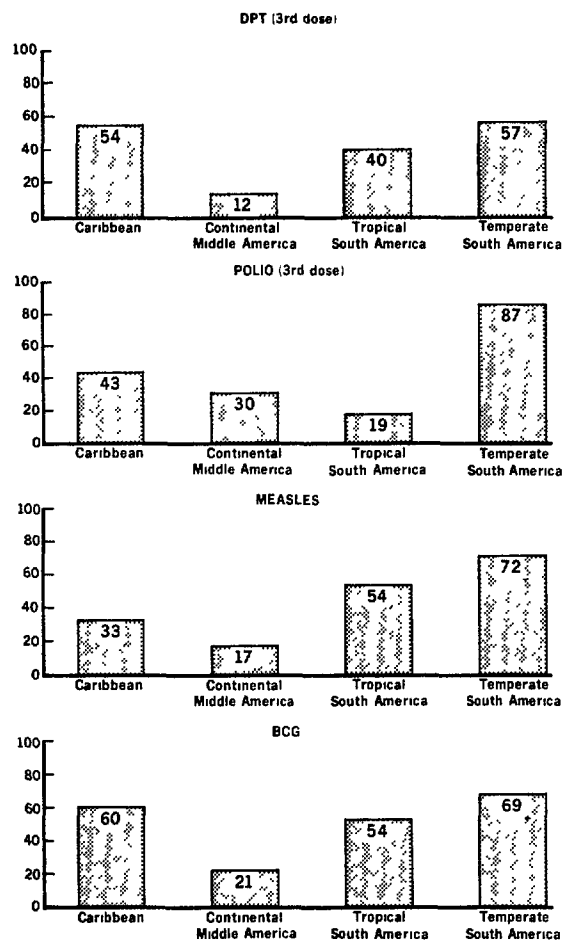
The evaluation methodology calls for the participation of a multidisciplinary team from the Health Ministry which works jointly for two weeks. In the first week all the available data related to program implementation are analyzed and field visits are paid to a selected sample of the countries' health facilities for additional data gathering and interviews with health workers and community members. The second week is spent at the central level of the Health Ministry for interviews and analyses of activities implemented by all Ministry units which have a bearing on immunization delivery. By the end of the second week, a comprehensive report is prepared, detailing the major problems identified and the solutions proposed in the form of recommendations. These are organized under the following topics: programming, strategies and tactics, supervision, vaccine supply and cold chain logistics, community promotion and participation, coordination, training, information systems, epidemiological surveillance and financing. A detailed plan of work is then prepared, which identifies all the recommended activities and the unit within the Ministry of Health responsible for carrying them out.

From 1980 until the end of 1982 evaluations were carried out in Argentina, Bolivia, Colombia, Cuba, Dominican Republic, Ecuador, Honduras, Peru, and Uruguay. Colombia and Ecuador have already performed

follow-up evaluations, including analysis of the degree of implementation of previous recommendations and work plans. These evaluations show that most countries have made substantial progress, particularly in the areas of staff training, vaccine supply, the cold chain, program planning, and administration.

In most countries, however, the levels of immunization in children under 1 year of age have either remained the same or experienced very slight change. Figure 2 shows the average vaccination coverage for each subregion in 1981. These graphs are based on the latest data reported to PAHO, though it should be noted that complete reports have not been received from all countries. Table 5 shows vaccination coverages in each country, from which the subregional coverages were calculated.

FIGURE 2. Average percentage of vaccination coverage in children under 1 year of age, by subregion. Region of the Americas, 1981.



*Includes only those countries which have submitted reports and which follow a 3-dose schedule for DPT and polio vaccines

TABLE 5

Vaccination Coverage in Children under 1 Year and Pregnant Women, by Vaccine Type and Dose, Including Dropout Rates. Region of the Americas, 1981.

Sub-Region and Country	Pop under 1 year	Coverage (%) in children under 1 year of age							Coverage (%) in pregnant women			
		DPT 1st dose	DPT 3rd dose	Dropout 1st/3rd dose	POLIO 1st dose	POLIO 3rd dose	Dropout 1st/3rd dose	MEASLES	BCG	TT 1st dose	TT 2nd dose	Dropout 1st/2nd dose
NORTHERN AMERICA												
Canada												
U.S.A.	3,165,121											
CARIBBEAN^a												
Antigua and Barbuda	1,500		79.0				47.0					
Bahamas	5,506		55.0				53.0					
Barbados	4,200		58.9				55.0					
Belize	5,301		50.0				51.0	28.7	54.3			
Cuba	1,140,025		99.9					56.3	98.7			
Dominica	1,722		93.0				93.0					
Dominican Republic ^b	191,337	59.1	26.9	54.5	84.1	42.4	49.6	17.4	33.8	36.2	25.5	29.6
Grenada	2,510		43.0				41.0					
Haiti	221,001											
Jamaica	57,461		39.4				37.0					
Saint Lucia	4,000		63.6				65.3					
St. Vincent and the Grenadines	3,000		32.0				33.0					
Trinidad and Tobago	26,300		51.9				45.5					
CONTINENTAL MIDDLE AMERICA												
Costa Rica	70,960	96.3	84.4	12.4	97.6	86.5	11.4	52.0	82.3			
El Salvador	198,168	54.2	52.2 ^c		50.4	47.1 ^c		57.8	54.6			
Guatemala	288,133	65.7			66.3				30.3			
Honduras ^b	160,479	64.0	36.0	43.8	64.0	37.0	42.2	35.0	42.0	17.5	10.9	37.8
Mexico	2,955,938	13.0	9.6	26.2	44.2	31.4	29.0	11.6	12.9			
Nicaragua	150,938	47.4	17.7	62.7	64.1	18.3	71.5	15.2	50.3			
Panama	54,846	79.5	48.5	39.0	82.4	49.7	39.7	52.2	76.2			
TROPICAL SOUTH AMERICA												
Bolivia	227,325	34.7	9.7	72.1	36.4	10.4	71.5	14.3				
Brazil	3,717,032		53.3		100.0 ^d	100.0 ^{c,d}	...	72.0				
Colombia ^b	778,000	57.1	20.0	65.0	62.4	22.2	65.0	25.5	56.7	10.2	5.9	43.0
Ecuador ^b	298,574	45.1	18.0	60.1	43.7	18.6	57.4	21.9	57.3	11.7	3.7	68.4
Guyana	24,000		45.0			40.0						
Paraguay	110,475		27.5			26.1		25.1	25.1	10.2	5.9	42.2
Peru	677,339	43.6	16.9	61.3	42.3	16.5	61.0	23.3	55.8	7.1	3.5	50.8
Suriname	10,000		35.1			32.5	...					
Venezuela	522,863											
TEMPERATE SOUTH AMERICA												
Argentina	724,000	70.7	44.5	37.1		89.0		65.1	58.5			
Chile	257,568	99.2	90.6	8.7	96.9	89.8 ^c	7.4	88.7	98.1			
Uruguay ^b	53,923	88.0	55.0	37.5	84.0	58.0	31.0	90.0	74.0	30.0	18.0	40.0

(a) Data for English-speaking Caribbean countries from CAREC SAC, 83/2, Director's Report for 1982

Data not available

(b) Data from 1982 EPI evaluations

(c) Second dose only

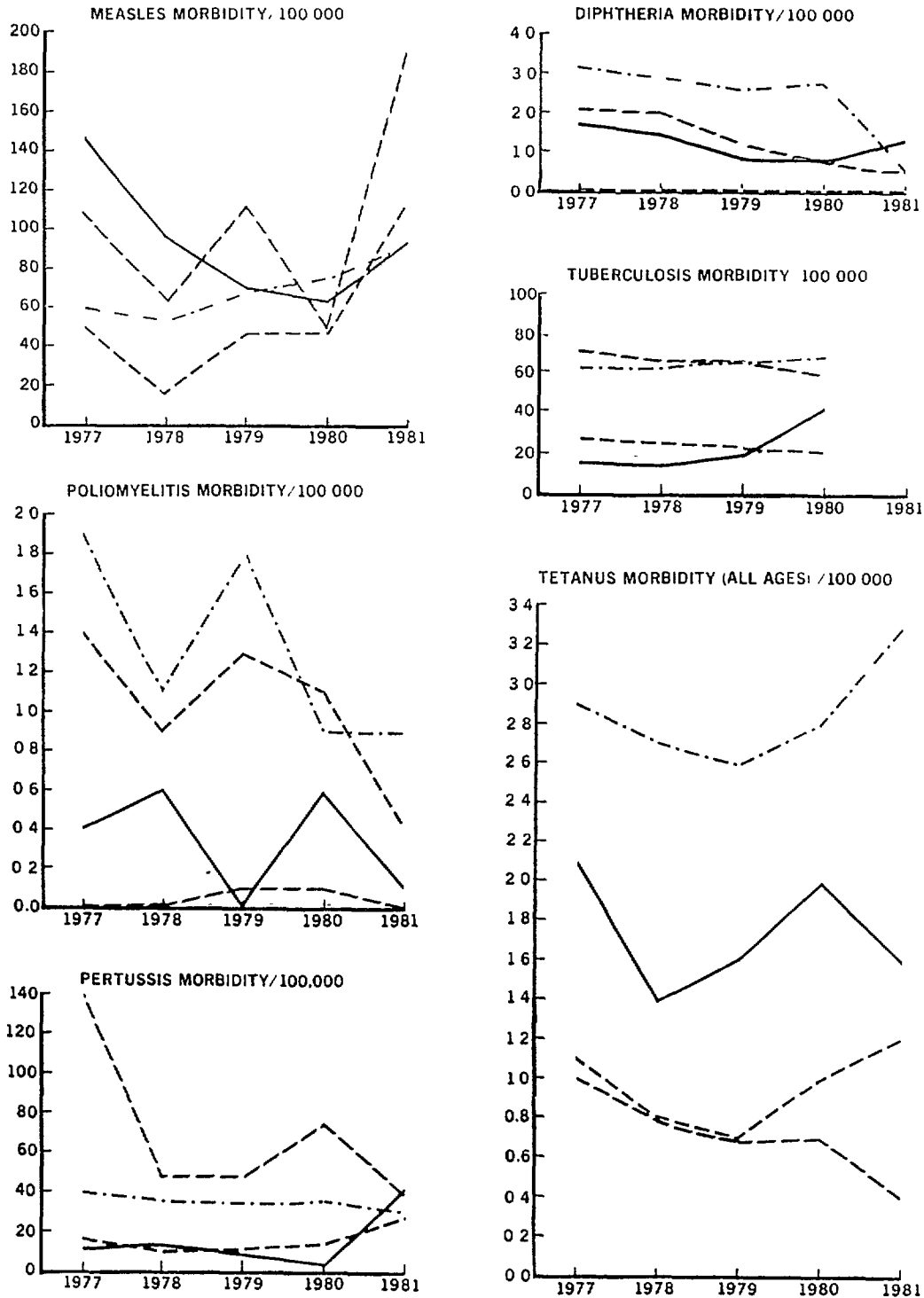
(d) National immunization days

An important factor affecting coverage in this age group is the very high dropout rates from the first to the third doses of multiple-dose vaccines such as DPT and poliomyelitis. Available data from some subregions indicates that dropout rates are over 50 per cent, probably resulting from a lack of follow-up systems and community participation in immunization activities. Table 5 shows the dropout rates for those countries which have reported both first- and third-dose coverage.

Of great concern is the coverage with tetanus toxoid vaccine in pregnant women, to protect the newborn against neonatal tetanus. This data is not available for most countries in the Region, and most of those for which data have been collected report levels below 10 per cent.

Morbidity rates for the EPI target diseases in the various subregions do not show any dramatic decline in the last five years, remaining practically at the same levels, and reflect the low levels of immunization coverage. Considering the early stage of development of most countries' surveillance systems, these rates may be even higher than the ones shown in Figure 3.

FIGURE 3. Morbidity rates/100,000 population for the EPI target diseases. Region of the Americas, 1977-1981.



2.4 Dissemination of Information

Information dissemination is another key to program development at all levels. The main vehicle for this purpose is the EPI Newsletter, which is distributed bi-monthly to health workers at all levels of the health system. This newsletter publishes information on program development in the various countries of the Region, as well as epidemiologic information and notes on the target diseases. It also includes information on new technologies available for program implementation. Over 6,000 health workers receive this publication, which is distributed in English and Spanish.

In addition, PAHO periodically 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. A comprehensive review on "Questions Regarding the EPI Antigens" entered its publication phase in late 1982 and will be available for distribution in mid-1983.

2.5 Resources

PAHO/WHO regular budget support for EPI, excluding salaries, will total approximately \$160,800 for the period 1984-1985. Most of these funds will be directed to program development, particularly in the areas of training, evaluation, improvement of information systems and surveillance, operational research and dissemination of information. Until now, most of these activities have been supported by funds from the WHO Voluntary Fund for Health Promotion; however this makes advanced planning of these activities difficult. The subject of adequate financial and human resources for EPI was addressed by the Thirty-fifth World Health Assembly through the adoption of Resolution WHA35.31 in May 1982 and a Five-Point Action Program for the 1980s.

3. Five-Point Action Program for the 1980s

The EPI progress and evaluation report presented by the WHO Director-General to the Thirty-fifth World Health Assembly in May 1982 states that program success will require that a number of challenges be met in the immediate future. They can be described under five headings: the primary health care approach; human resources and training; program evaluation and adaptation; and research and development. Subsequently, the World Health Assembly, through Resolution WHA35.31, urged Member States to take action on the following five-point program:

- 1) Promote EPI within the context of primary health care:
 - develop mechanisms to enable the community to participate as an active partner in program planning, implementation and evaluation, providing the technical and logistical resources to support these functions; and
 - deliver immunization services with other health services, particularly those directed towards mothers and children, so that they are mutually supportive.
- ii) Invest adequate human resources in EPI: Lack of human resources in general and lack of management skills in particular represent the program's most severe constraints. Capable senior and middle-level managers must be designated and given authority and responsibility to carry out their tasks. They require training, not only to be effective with respect to EPI, but also to contribute to the understanding and strengthening of the primary health care approach. Reasons for low motivation and performance in the areas of field supervision and management need to be identified in order that appropriate measures can be taken to encourage managers to visit, train, motivate and monitor the performance of those for whom they are responsible.
- iii) Invest adequate financial resources in EPI: For the program to expand to reach its targets, current levels of investment in EPI, estimated now at US\$72 million per year, must be doubled by 1983 and doubled again by 1990, when a total of some US\$300 million (at 1980 value) will be required annually. Over two thirds of these amounts must come from within the developing countries themselves, the remaining one third from the international community.
- iv) Ensure that programs are continuously evaluated and adapted so as to achieve high immunization coverage and maximum reduction in target-disease deaths and cases: Such adaptation depends on the development of adequate information and evaluation systems. By the end of 1985, at the latest, each country should be able to:
 - estimate reliably immunization coverage of children by the age of 12 months with vaccines included in the national program;
 - obtain timely and representative reports on the incidence of EPI target diseases included within the national program; and

- obtain information on the quality of vaccine so that it is known that the vaccines employed for EPI meet WHO requirements and are potent at the time of use.

In addition, countries should promote the use of periodic program reviews by multidisciplinary teams comprised of national and outside staff to ensure that operational problems are identified and that a wide range of experience is reflected in the recommendations which are made.

- v) Pursue research efforts as part of program operations: The objectives should be to improve the effectiveness of immunization services while reducing their costs and to ensure the adequate supply and quality of vaccines. Specific concerns include the development of approaches for delivering services which engage the full support of the community, the improvement of methods and materials relating to sterilization and the cold chain, the acquisition of additional knowledge concerning the epidemiology of the target diseases, further development of appropriate management information systems, and further improvement in the production and quality control of vaccines which are safe, effective and stable.

This five-point action program had previously been discussed in 1981 by the EPI Global Advisory Group, which has met annually since 1978 to evaluate program progress.

The Global Advisory Group concluded that much progress had been achieved, but it also recalled that because immunization services in the developing world are still not generally available, 10 children die and another 10 become disabled with each passing minute. It warned that the current rate of program progress was not sufficient to achieve the EPI goal of reaching all children by 1990, representing not only a setback for the EPI, but also a threat to WHO's aspirations to achieve health for all by the year 2000. Reaffirmation of national commitments and intensification of program activities are needed, and the five-point action program should be a guide for national and international efforts for the remainder of the decade.