

EPI Newsletter

Expanded Program on Immunization in the Americas

Volume VII, Number 2

IMMUNIZE AND PROTECT YOUR CHILD

April 1985

El Salvador accelerates EPI

Approximately 270,000 Salvadoran children were vaccinated on March 3, 1985, during the second of three National Vaccination Days, a coordinated effort of the El Salvador Public Health Ministry, with the support of the Pan American Health Organization (PAHO), the United Nations Children's Fund (UNICEF), and other bilateral agencies. The children were immunized against polio, measles, diphtheria, tetanus and whooping cough.

The goal of National Vaccination Days is to vaccinate at least 80% of the country's children under three years of age. The turnout on the first day, held in February, was 217,230 which represented around 70% of the children registered for vaccination prior to that day. Intensive publicity raised the turnout to 88% of the target population on the second day, and the publicity campaign is being maintained to promote the third vaccination day, scheduled for April 21.

This massive effort reflects the interest and concern of the Salvadoran Government, particularly the Ministry of Health, and demonstrates its commitment to improve the health of Salvadoran citizens. The success of National Vaccination Days has required the cooperation of international and national organizations including all political groups. Government forces and leftist guerrillas suspended hostilities during the vaccination days to allow health teams and the International Red Cross Society to enter areas of conflict. Not a single disruptive incident occurred at any of the vaccination posts, according to national press accounts.

The Catholic Church was instrumental in bringing about a suspension of hostilities during the two vaccination days. It also played a very important role in informing the people about the event by discussing the need for vaccination during Sunday church services.

In 2,132 vaccination posts, more than 6,000 individuals, health personnel as well as volunteers, who had all undergone a brief training period, quickly and efficiently attended the long lines of people. They administered the vaccines to children in the target age group and made available doses of tetanus toxoid to all women of child-



The massive efforts of the El Salvador Ministry of Health, in collaboration with other agencies and volunteers, led to the vaccination of thousands of children against polio, measles, diphtheria, tetanus and whooping cough during the National Vaccination Days. (Photo: Fernando Laender /PAHO)

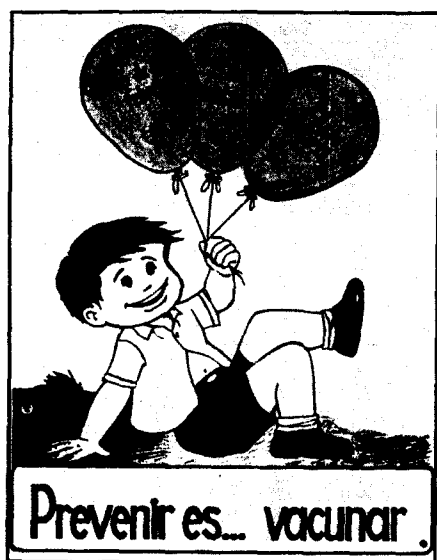
bearing age in an attempt to reduce the incidence of neonatal tetanus.

The need for accelerated measures to deal with the health problems of Central American children was recognized at the Meeting of the Ministers of Health and Directors of Social Security of the countries of Contadora and

Contents

National Vaccination Days in El Salvador	1
Rotary International promotes immunization activities	2
Refrigerator repair & maintenance course, Brazil	3
First EPI evaluation in Venezuela	4
Reported cases table	5

Posters such as this one were used to publicize the dates of El Salvador's National Vaccination Days



Central America, held in Medellín, Colombia in July 1984. In October of the same year, National Vaccination Days were decided upon as part of a Plan for Action that was drawn up at a meeting of the El Salvador Ministry of Public Health and Social Assistance, PAHO and UNICEF.

The health of Central American and Panamanian children is one of the most serious problems in this subregion. Not only is the problem tragic because of the magnitude—nearly 100,000 children die annually before completing their fifth birthday—but well known intervention measures could substantially reduce the number of deaths.

Long range goals of the El Salvador National Vaccination Days are to reduce morbidity and mortality in the infant population and motivate the public to use routine immunization services. Although the importance of setting long range goals cannot be disputed, it was acknowledged at the Medellín meeting that the seriousness of the problem warranted aggressive public health measures that would produce results by the end of this decade. In accordance with the resolution that immediate action be taken, the short term goal of the El Salvador National Vaccination Days is to vaccinate 80% of the children under three

against the illnesses that are the main causes of child morbidity and mortality in that country.

Several factors were taken into account to insure the program's success. The event was planned as a national activity to reach children in all segments of society and was heavily publicized in the radio, television and press for weeks prior to the event. A followup strategy, called "channeling," was considered from the beginning and indeed the campaign was based on it. This refers to a process of channeling people from their homes to the health centers through the active participation of health workers and community leaders who, once every three months, visit each house in a given area, record the vaccination status of pregnant women and each child under 3, and schedule appointments for those who require vaccinations. Followup visits are made to those who fail to keep their appointments (see EPI Newsletter Vol. 5, No. 1 for a more detailed discussion of this strategy). This strategy should allow the immunization coverages to continue growing after the three National Vaccination Days in 1985.

UNICEF, PAHO, USAID, Rotary International, and the Government of Spain, among others, provided material and technical support for the vaccination effort by supplying vaccines, syringes, administrative and technical personnel training, maintenance crews for the cold chain, printed materials, and technical support for the mass communication required in this event.

Rural vaccination posts were located in small villages, tents, and refugee camps and urban vaccination posts were set up in health centers as well as schools, public buildings, parks or recreation centers, depending on how many children were to be vaccinated in the area. Posts were set up so that parents and children would not have to walk more than 2 to 4 kilometers. The number of vaccination posts in either rural or urban areas was determined by each regional committee, depending on the population to be vaccinated.

The national vaccination coverage will undoubtedly be raised significantly as a result of this effort and it is hoped that the channeling strategy, combined with future national vaccination days, will ensure that coverage remains high.

Rotary International promotes immunization activities

With the provision of more than a million dollars in grant funds since 1979, The Rotary Foundation, an international non-profit corporation, has supported a number of Latin American Ministries of Health with their Expanded Programs on Immunization (EPI), in coordination with the Pan American Health Organization and other agencies.

In 1982, the Board of Directors of Rotary International (an association of Rotary clubs worldwide) set a goal to collaborate in the immunization of all the world's child-

ren against polio by 2005, the 100th anniversary of Rotary, and since then work towards this goal has been carried out in 19 Latin American, African, Asian and Western Pacific countries. Rotary International has, to date, awarded a total of \$7.6 million dollars in grants.

Providing expert advice for polio immunization is but one element of Rotary's Polio 2005 campaign. The organization has pledged to raise U.S. \$120 million to fund experts, vaccine and equipment. It will also provide volunteers to help conquer polio by its centennial.

Polio immunization has been a major focus of the Rotary Foundation's international work since 1980, but in some cases it also collaborates in simultaneous vaccination with the other EPI antigens. Funds have also been allotted for cold chain equipment, delivery expenses, and EPI disease informational posters and folders.

Through The Rotary Foundation, Rotary International has supported polio immunization in cooperation with international, national, and local health authorities since 1980 and has initiated or approved projects to protect 46.5 million children. In response to these efforts, the World Health Organization has made Rotary International a nongovernmental affiliate.

The Rotary Foundation of Rotary International sponsors four programs that promote world understanding and peace, and it is mainly under one of these programs, The Health, Hunger and Humanity Program (3-H), that Rotary carries out its immunization and related activities. The 3-H Program serves to improve health, alleviate hunger and enhance human cultural and social development of all peoples as a means of advancing international understanding and goodwill. This program arranges for the donation and shipment of vaccines to where they are most needed, and provides funds for approved immunization projects sponsored by local Rotary clubs and groups.

Rotary International has supported the following countries in carrying out EPI work, in coordination with the Pan American Health Organization:

Country	Rotary grant (U.S. dollars)
Belize	\$51,200
Bolivia	\$104,000
Costa Rica	\$50,000
Guatemala	\$374,000
Haiti	\$196,000
Honduras	\$207,000
St. Lucia	\$66,000
El Salvador	\$247,000
Panama	\$537,000



A grant of U.S.\$196,000 from Rotary International permitted the vaccination of thousands of Haitian children against polio.

(Photo: Courtesy of Rotary International)

Unlike the majority of Rotary funds, which are destined for purchasing vaccines and cold chain equipment, the grant to Panama was designed to support a national public information effort in support of that country's EPI program. Public information is an important component of immunization work, and one of the benefits of the EPI is that their activities encourage parents to become familiar with their community health clinic. Once the parents visit the clinics used for immunization, they are more likely to approach it for other health needs.

As a result of Rotary's close collaboration with the Ministries of Health and PAHO/WHO, millions of infants will be protected against polio. Interested persons may obtain further information by writing to The Rotary Foundation, 3-H, 1600 Ridge Ave., Evanston, Illinois, 60201.

Brazil holds first refrigerator repair and maintenance course

The Expanded Program on Immunization in Brazil held its first refrigerator repair and maintenance course in November, 1984 to ensure the smooth functioning of its cold chain. The course, an effort of the Brazilian Ministry of Health, had support of the Pan American Health Organization, and was taught by instructors and assistants from both organizations.

The objectives of the course can be summarized as follows:

- Provide students with a solid grounding in refrigerator construction and operation
- Recognize and diagnose problems in refrigeration equipment
- Carry out activities of preventive maintenance on refrigerators used in the conservation of vaccines (domestic refrigerators, freezers and cold rooms)
- Effect repairs on refrigerators or freezers
- Complete the necessary operations for transporting and preserving vaccines
- Identify and use tools and materials for repairing cold-chain equipment
- Become acquainted with the mechanical-electrical system of the cold-chain equipment
- Evaluate the maintenance work performed by other technicians.

Thirty-six persons participated in the two week course, held in the city of Goiania, Goias state. Previous experience in refrigerator maintenance among group members ranged from a few participants who were slightly skilled to individuals with no experience at all. For evaluation purposes, pre- and post-tests were given to measure impact of the course. Results indicated that students benefitted

tremendously from the training; some of the students who had minimal experience received the highest scores on the post-test. Out of a possible score of 27, average scores were 1.5 on the pre-test and 22 on the post-test. In addition to the pre- and post evaluation, students were tested at the end of each week to determine their understanding of the material.

Each day was divided into a didactic session in the morning and a lab section in the afternoon. Refrigeration theory included basic instruction in the properties of different refrigerants, the cycle of refrigeration, the functioning of mechanical parts, the control systems and basic concepts related to refrigeration.

The objective of the classroom session was to prepare the students for the lab section so that they had a working knowledge of refrigerator construction and operation. In the lab section, students acquired hands-on experience and learned how to use different tools needed to repair refrigerators.

In an evaluation of the course at the end of the two weeks, the instructors expressed concern that there was not enough lab time to give the proper individual attention to each student. They noted that students showed greater confidence when responding to questions that related to the lab section of the course, where they worked with the instructor on a one-to-one basis.

Editorial note: This was a condensed version of the regular PAHO refrigerator maintenance course which is usually given in three weeks. Instructors recommended that future courses be presented in the original three-week format.

It was also noted that there is a need for the Ministries to support the trained technicians in the areas of logistics, transportation, management, and storage after they have completed the course.

Source: Ministry of Health, Brazil. Trip report Roberto Delgado, PAHO consultant

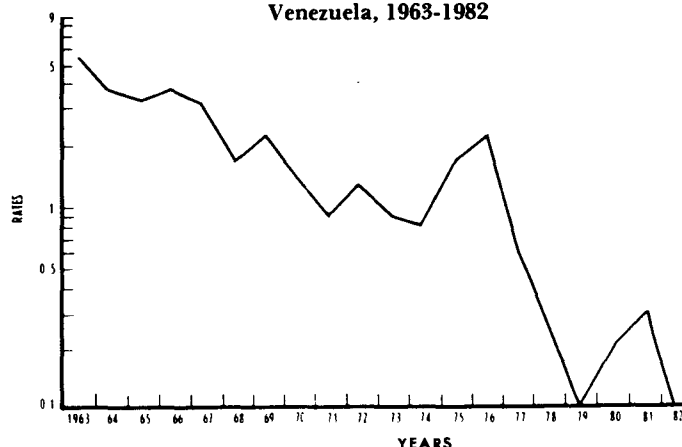
Venezuela conducts first EPI evaluation

The Ministry of Health in Venezuela, with the cooperation of the Pan American Health Organization, conducted the first evaluation of the Expanded Program on Immunization in Venezuela in October, 1984. The evaluation team was composed of health workers from the Divisions of Communicable Diseases, Maternal and Child Health, the Department of Tuberculosis, Promotion of Social Welfare for Health, Office of Nursing, and the School of Public Health (Central University of Venezuela). The team visited the states of Sucre, Merida, Falcon, Carabobo and the Federal District of Caracas. Evaluation of the immunization program is a tool that has been used by countries in the region since 1981 to determine if programs are meeting their objectives and to adjust their work plans accordingly.

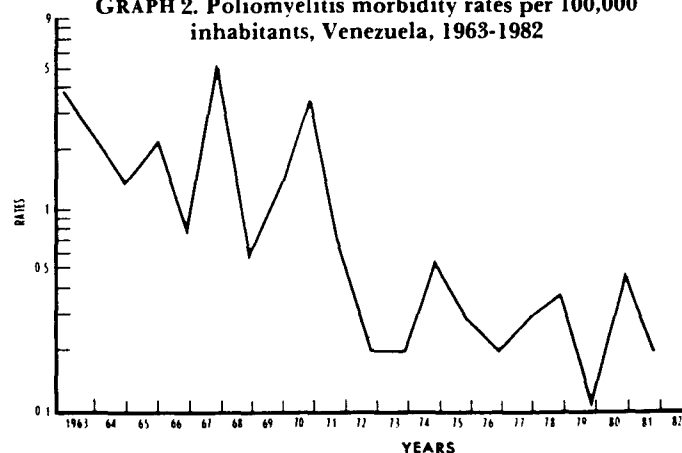
Standard methodology for these reviews was developed by PAHO/EPI and includes the following: A study of current EPI operations (information system, programming and organization, vaccination tactics and strategies, resources, supplies, logistics and cold chain, training, supervision, epidemiological surveillance, community participation and health education) at all levels of the health system in the country (national, regional, local), identification of the accomplishments and limitations of the EPI, design of recommendations for surmounting the problems, and preparation of a work plan with a timetable for implementing the recommendations.

In Venezuela, immunization programs are one of the five top priorities of the Ministry of Health and as such, the organizational infrastructure for the EPI is well developed. The status of Venezuela's EPI and a discussion of the major findings of the evaluation are summarized.

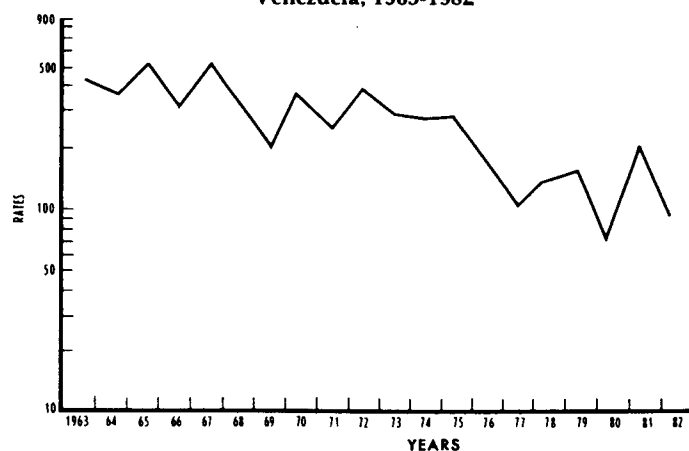
GRAPH 1. Diphtheria morbidity rates per 100,000 inhabitants, Venezuela, 1963-1982



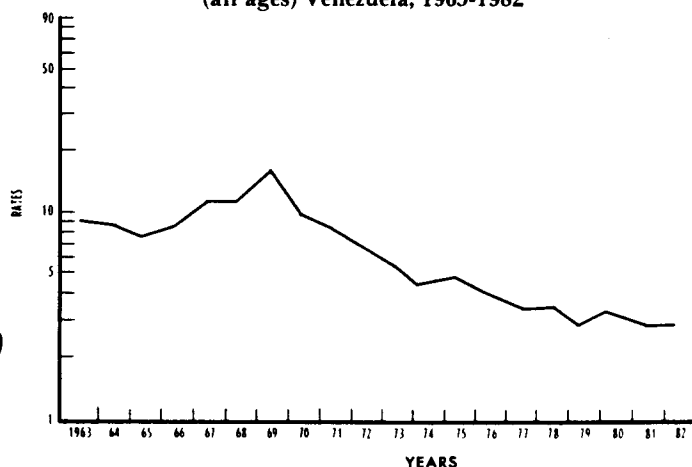
GRAPH 2. Poliomyelitis morbidity rates per 100,000 inhabitants, Venezuela, 1963-1982



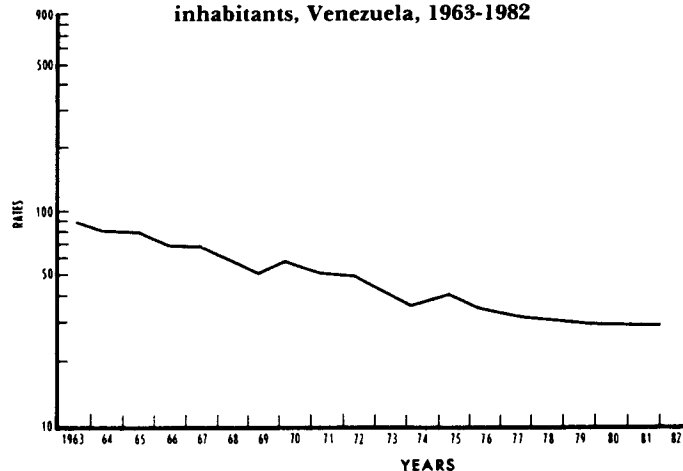
GRAPH 3. Measles morbidity rates per 100,000 inhabitants, Venezuela, 1963-1982



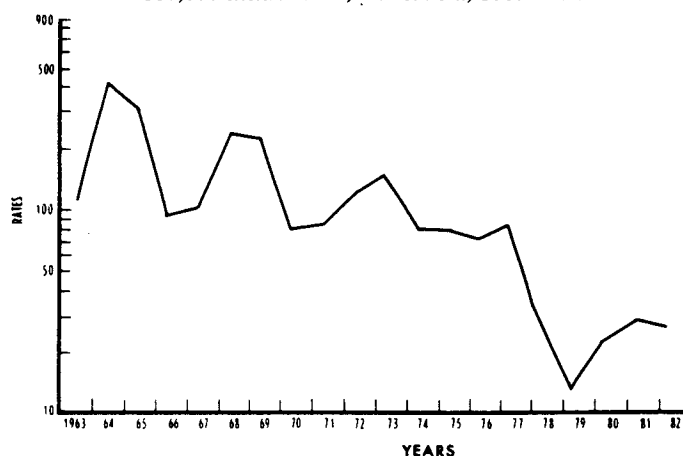
GRAPH 4. Tetanus morbidity rates per 100,000 inhabitants (all ages) Venezuela, 1963-1982



GRAPH 5. Tuberculosis (all forms) morbidity rates per 100,000 inhabitants, Venezuela, 1963-1982



GRAPH 6. Whooping cough (Pertussis) morbidity rates per 100,000 inhabitants, Venezuela, 1963-1982



Morbidity, mortality vaccination coverage

The Venezuelan immunization program has successfully reduced all EPI diseases except tetanus and tuberculosis. Graphs 1 and 2 show the reduction in morbidity for diphtheria and poliomyelitis.

By 1982 mortality from measles had been reduced to 1.0 per 100,000 population. The morbidity rate, however, still remains high as shown in Graph 3. Graph 4 demonstrates that a noticeable decline in tetanus morbidity has been achieved.

Similarly, the control of tuberculosis morbidity shows a steady decline over the years (Graph 5). Since 1977 the mortality rate due to whooping cough has dropped well below 1.0 per 100,000 population. Graph 6 shows the downward trend in morbidity for whooping cough.

Vaccination coverage for children under one year of age is presented in Figure 1 for the years 1979-1983. Vaccination coverage with tetanus for 1979-1983 is shown in Table 1. It should be noted that the vaccination schedule for tetanus toxoid vaccine calls for 3 doses to be administered to pregnant women in rural areas only.

FIGURE 1. Immunization coverage in children under one year of age, Venezuela, 1979-1983

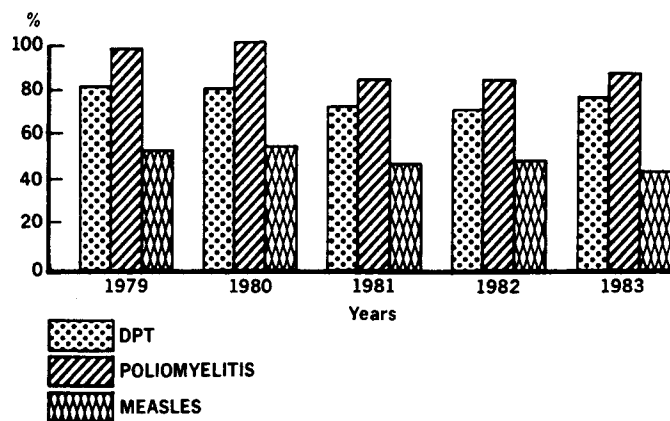


TABLE 1. Tetanus toxoid specified by dose, pregnant women in rural Venezuela, 1979-1983

Years	First dose	Second dose	Third dose	Booster dose
1979	92.449	62.483	42.487	42.090
1980	90.402	60.912	41.077	43.403
1981	95.152	60.784	39.997	43.775
1982	109.741	77.380	54.216	51.901
1983	101.319	68.354	45.121	51.064

Summary of findings

Information system

In general, the information system is providing the necessary data which permits the program managers and supervisors to assess the program and take the necessary actions.

Among the specific achievements in Venezuela, a local census is taken every year of the population in the area served by each type I rural Ambulatory Health Post (a rural dispensary offering simplified medical care). The importance of this practice cannot be overemphasized because this forms the data base for programming immunization activities.

About half of the health facilities evaluated use maps showing the specific health posts within the area. Most establishments register the immunizations on personal vaccination cards, and this data is consolidated onto monthly vaccination forms. Eighty percent of the establishments reviewed report weekly, by telegram, cases of and deaths from notifiable diseases. In each facility at the local level staff members compile and compute the vaccination data.

Although vaccination data is collected at the local level, the use of different forms for recording routine and campaign immunizations hamper the accuracy of the reporting. Also, vaccination data is not uniformly consolidated at the regional level. The evaluation team recommended standardizing collection and consolidation methods so that all vaccinated children are reflected in data analysis. Efforts must also be made to collect immunization data from organizations other than the Ministry of Health.

A routine flow of information and feedback among levels is necessary and it was recommended that consolidated reports regularly be sent back to the local level.

Epidemiological surveillance

Data is collected at each level of the health structure on morbidity and mortality from all EPI diseases. The Ministry of Health requires that weekly and monthly reports be prepared and at most establishments surveyed, these reports were dispatched regularly. The weekly report (a telegram) and the monthly report (a special form) are sent to subregional and central levels where the data are consolidated and analyzed. A weekly epidemiological bulletin is prepared at the central level and distributed to all establishments.

Cases of polio and tuberculosis are investigated and the investigation of measles cases has been initiated in one region. Special surveillance of tuberculosis meningitis in children was recently started at the national level.

The epidemiological surveillance team regularly completes routine activities, but the degree of efficiency is not uniform due to the lack of an updated reference manual for carrying out disease surveillance. Publication of the

weekly epidemiological bulletin at the central level is frequently delayed because the reports from the subregional level are late in arriving, and, regrettably, lack of funds impede the timely publication of the bulletin.

It was recommended that measures be taken to include morbidity and mortality data from entities other than the Ministry of Health.

Programming, organization, tactics and strategies

Immunization is a high-priority activity in the national health plan and two or more immunization strategies, (i.e. routine vaccination activities and campaigns) are used at all levels, with the health teams holding clear views on the advantages and disadvantages of each. For example, interviews with health staff indicated that because vaccination campaigns may induce a passive attitude in the community, the normal development of routine vaccination services has diminished. Conscientious efforts to improve accuracy in delivering vaccines to the target population have been made by personnel at some of the health posts. They determine immunization target populations from a local population census, and administer vaccines in accordance with the requirements of the immunization scheme.

It was proposed that all health establishments adopt the practice of working from monthly or trimester work plans for routine immunization. Although some health posts do establish well-defined goals locally, the practice is not uniform throughout the country. It was suggested that local conditions (epidemiological, climatic, social, etc.) be taken into account at the central level when programming the immunization strategies. At present there is no monitoring system for finding and checking children who are incompletely vaccinated or not vaccinated at all.

Resources and supplies

In general, supplies (vaccines, syringes, blank forms, etc.) are delivered on schedule to the regional level. Half of the establishments surveyed have vaccine carriers and refrigerators, but at some of the establishments there is a shortage of freezers and/or refrigerators.

During 1984 Venezuela suffered vaccine shortages of DPT and BCG. The number of BCG vaccine doses used is shown in Table 2. The actual calculation of coverage with

TABLE 2. B.C.G. specified by target group
Venezuela, 1980-1983

Years	Under one month	1 to 11 months
1980	254.513	95.864
1981	294.879	85.237
1982	301.302	80.994
1983	325.610	978.818

Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria and whooping cough,
from 1 January 1984 to date of last report, and for same epidemiological period in 1983, by country

Subregion and Country	Date of last report	Measles		Poliomyelitis		Tetanus				Diphtheria		Whooping Cough	
						Non-neonatorum		Neonatorum					
		1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983
NORTHERN AMERICA													
Canada	29 Dec.	4,125	934	1	—	2	6	...	...	4	12	1,311	2,231
United States	29 Dec.	2,534	1,497	4	8	64	74	...	...	21	5	2,450	2,460
CARIBBEAN													
Antigua and Barbuda	29 Dec.	1	10	...	—	—	1	—	—	—	—	—	—
Bahamas	29 Dec.	36	2,868	—	—	1	—	—	—	—	—	1	8
Barbados	01 Dec.	4	5	—	—	4	6	—	—	—	—	—	—
Cuba	03 Nov.	3,113	2,822	—	—	11	20	—	—	—	—	76	263
Dominica	29 Dec.	188	1	—	—	—	1	—	1	—	2	1	11
Dominican Republic	16 Jun.	2,115	1,440	—	7	42	49	1	11	51	41	88	151
Grenada	29 Dec.	11	268	—	—	—	—	—	—	—	—	—	—
Haiti	08 Sep.	1,508	...	36	62 ^a	145	162 ^a	78	30 ^a	18	23 ^a	610	392 ^a
Jamaica	29 Dec.	237	...	—	...	4	...	2	...	7	...	27	...
Saint Lucia	29 Dec.	13	70 ^b	—	...	3	1 ^b	...	...	—	...	—	—
St. Christopher-Nevis	29 Dec.	2	556	—	—	1	—	—	—	—	—	—	—
St. Vincent and the Grenadines	22 Dec.	15	63	...	...	...	...	...	...	—	...	...	...
Trinidad and Tobago	01 Dec.	3,500	2,152	—	—	15	15	—	—	—	—	21	—
CONTINENTAL MIDDLE AMERICA													
Belize	29 Dec.	4	11	...	—	—	1	...	...	...	...	3	1
Costa Rica	29 Dec.	11	39	—	—	7	5	—	2	—	—	162	74
El Salvador	08 Sep.	3,248	1,665	15	58	48	33	33	28	12	11	325	344
Guatemala	31 Mar.	868	867	5	31	28	30	...	...	2	6	450	297
Honduras	29 Dec.	5,028	1,181	57	9	26	24	20	—	—	—	630	544
Mexico	*	...	...	...	...	...	...	...	...	...	...	...	...
Nicaragua	06 Oct.	121	...	—	...	...	...	...	...	—	...	54	...
Panama	03 Nov.	338	3,747	—	...	5	5	5	15	—	—	144	66
TROPICAL SOUTH AMERICA													
Bolivia	21 Apr.	805	...	—	7 ^{c*}	13	...	...	...	19 ^c	46	438	...
Brazil	29 Dec.	78,481	58,255	72	45	2,165	3,136	591	655	3,081	3,369	19,273	26,297
Colombia	*	...	...	...	...	...	...	...	...	...	...	...	...
Ecuador	29 Dec.	6,980	2,490	—	5	97	32	79	67	77	23	417	803
Guyana	08 Sep.	187	—	—	—	7	—	...	...	—	—	—	—
Paraguay	01 Dec.	804	1,054	1	11	86	68	82	123	10	3	656	244
Peru	22 Sep.	2,406	...	63	...	189	...	4	...	42	...	2,236	...
Suriname	03 Nov.	36	17 ^d	—	—	6	...	—	...	—	1	—	—
Venezuela	29 Dec.	10,198	9,296	—	—	...	...	...	...	3	...	1,494	2,752
TEMPERATE SOUTH AMERICA													
Argentina	29 Dec.	31,751	4,106	—	25	171	152	...	...	13	35	16,288	6,115
Chile	29 Dec.	4,781	6,750	—	—	21	32	...	...	153	78	1,984	149
Uruguay	29 Dec.	237	11	—	—	9	4	—	...	—	...	88	214

^a26 Nov.

^d31 Dec.

— No cases

^b26 Nov.

... Data not available

^c21 Aug., ^{c*}3 Apr., 1985

* No 1984 reports received, therefore 1983 data not shown.

BCG vaccine for children under 1 year of age is not known because the age groups used by the Department of Tuberculosis and Pulmonary Infection is different from the age group classification used by the immunization program. Nevertheless available data shows that in 1983 BCG vaccine coverage among live births was approximately 87%. It was recommended that BCG vaccine be provided through the delivery system of Central Stores and that its quality be determined.

The EPI evaluation team suggested that an inventory of materials and equipment be made as soon as possible at all levels of care and that the establishments be supplied with everything required at their respective levels which the inventory shows to be lacking.

Logistics and cold chain

A properly functioning cold chain is crucial to the success of any immunization program and in Venezuela it was found that vaccines (with the exception of BCG) were delivered on schedule and in good condition. The cold rooms at the central level are appropriate and adequate for the storage of vaccines and most of the establishments visited in this evaluation have physical premises suited for immunization work, with direct access to the cold chain.

In the establishments where personnel have not received the proper training, the cold chain is not maintained as it should be and activities such as recording temperatures, organizing vaccines and placing water bottles in refrigerators are neglected. The EPI evaluation team recommended that automatic temperature recording devices be installed at Central Stores and that the basic cold-chain training be extended to all health workers, including the Central Store personnel. The evaluation team proposed that manuals and rules on cold-chain operation, including preventive

maintenance, be issued to personnel at all levels. To resolve the problems that result from the frequent power cuts that have been reported in four of the five states surveyed, it was recommended that the personnel develop the alternative procedures required to maintain the cold chain.

In addition to the general recommendation that supplies be inventoried, the evaluation team encouraged setting up a system for the ongoing registration of vaccines by batch number, expiration date and existing stocks for regional, district and local health establishments.

Training and supervision

In the five states surveyed all personnel have received basic immunization and cold chain training and the multidisciplinary health team in charge of the EPI is now performing basic tasks. The evaluation team encouraged a continuing training on the Expanded Program on Immunization with emphasis on programming, evaluation, epidemiological surveillance and the cold chain.

Supervisory visits are conducted by subregional personnel and records are kept at the district and local levels. Although personnel are aware of the importance of them, supervisory visits have unfortunately been limited because of economic constraints.

The Ministry of Health in Venezuela is aware of the problems that exist in the EPI program and is making a thorough study of the evaluation in order to strengthen certain areas of the program. The vaccination coverages in Venezuela have improved; however, in recent years they have shown no significant increase and it is this situation that the recommendations ultimately seek to rectify.

Source: EPI evaluation, Ministry of Health and Social Assistance, October 1984, Caracas, Venezuela.

The *EPI Newsletter* is published bimonthly, in English and Spanish, by the Expanded Program on Immunization (EPI) of the Pan American Health Organization (PAHO), Regional Office for the Americas of the World Health Organization (WHO). Its purpose is to facilitate the exchange of ideas and information concerning immunization programs in the Region in order to promote greater knowledge of the problems faced and their possible solutions.

References to commercial products and the publication of signed articles in this newsletter do not constitute endorsement by PAHO/WHO, nor do they necessarily represent the policy of the Organization.

Editor: Ciro de Quadros
Assistant Editors: Peter Carrasco
Kathryn Fitch

Contributors to this issue:
Maureen Anderson, PAHO
Jacqueline Barth, PAHO

ISSN 0251-4710



Expanded Program on Immunization
Maternal and Child Health Program
Pan American Health Organization
525 Twenty-third Street, N.W.
Washington, D.C. 20037
U.S.A.