

# EPI Newsletter

## Expanded Program on Immunization in the Americas

Volume III, Number 1

IMMUNIZE AND PROTECT YOUR CHILD

February 1981

### Training Activities

#### Local-level EPI Courses

The training component of the Expanded Program on Immunization was initiated in 1978 with the First Regional Course for EPI Managers, held in Costa Rica in July of that year. A Second Regional Course was subsequently held in Peru in early 1979. Both of these one-week courses were directed towards top-level public health officials involved with immunization activities at the national level.

The second phase of training activities was introduced in 1979 and focused on training middle-level supervisory personnel who are involved in the day-to-day management of immunization activities. One of the principal objectives of the national courses is to create "multipliers," that is, health workers who will replicate the course at the local level, often after having adapted the text to the needs and conditions of the local health system.

Most of the countries in the Region have already held national EPI courses, and many of them are now carrying out the third phase of training activities by holding local-level courses. The experiences of three countries involved in this process--Peru, Guatemala, and the British Virgin Islands--are described in the articles which follow.

#### \* Peru

In January 1979 Peru was host to the Second Regional Course for Managers of the Expanded Program on Immunization which was attended by 45 participants from 12 Latin American countries. Subsequently, a national EPI course was held in Peru in March of that year. The national course made possible the preparation of an EPI Manual of Operations to be used by field workers in planning their vaccination activities at the local level.

Once the Manual had been approved by the Ministry of Health, the question was how to disseminate the information to more than 1,500 health establishments in the country. Sets of questions and answers were prepared with the object of highlighting the most important points in each chapter of the Manual. This

system was field tested, and texts more responsive to local conditions were developed.

The local-level course lasts two and a half days. It is conducted in groups of no more than ten persons, coordinated by a local monitor who has previously been trained by central-level personnel. A pre-test is administered before the course in order to determine the level of knowledge in the group. At the end of the training, the same test is given again in order to gauge the amount of new knowledge acquired during the exercise.

Also of vital importance to the workshop are the cold chain demonstrations, in which prototypes of cold chain equipment in use are presented, and instruction is given as to their proper handling in order to ensure that they maintain appropriate temperatures for vaccine preservation. These demonstrations proved to be very valuable for both the participants and the program.

Another practical exercise--"Techniques of Vaccine Application"--has been introduced as part of the Module on Vaccines, since it was felt that there was a need for this type of instruction.

Training activities are continuing, and firm dates have been scheduled for a workshop at Chimbote, which embraces the hospital areas of Santa, and other workshops at Chiclayo, covering the ORDELAM Administrative District (Health Region).

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In 1979 and 1980 a total of ten local training workshops were held, attended by a total of 691 participants.

Training activities for the rest of the country in 1980 were held at San Martín and Amazonas, at Cajamarca, Huánuco and Cerro de Pasco, at Cuzco, Apurímac and Madre de Dios, at Huaraz and Marañón, and at Ica, Ayacucho and Huánuco.

Source: Dr. Carlos Queirolo, EPI Manager, Ministry of Health, Peru, and Mr. Alberto Uribe, EPI Technical Officer, PAHO, in unpublished EPI report, May 1980.

## \* Guatemala

In November 1979 Guatemala held a national EPI workshop which was attended by 67 professionals in charge of immunization operations in the country. A principal purpose of the workshop was to turn out "multipliers" who would replicate the course in their own work areas.

In February 1980, an EPI workshop for the teaching staffs of schools for nursing auxiliaries was held in Guatemala City; the workshop was attended by 31 nurses from the following institutions:

School of Nursing Auxiliaries of the Capital . . .	5
School of Auxiliaries of Mazatenango . . . . .	4
School of Jutiapa . . . . .	4
School of Quetzaltenango . . . . .	2
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This course was intended to create additional multipliers at the teaching level, which is being done by holding local workshops such as the one taking place at the Quiriguá Training Center.

The first local workshop for the health team of the Sacatepéquez region (department) was held in March 1980; this was the first of six such workshops scheduled in 1980. It was attended by 66 persons employed in the three districts constituting the Sacatepéquez health region, as follows:

Physicians . . . . .	18
Nurses . . . . .	3
Inspectors . . . . .	5
Rural Health Technicians (RHT) . . . . .	9
Nursing Auxiliaries . . . . .	31

Six working groups were formed, each under a coordinator, and all under the direction of a general coordinator. The course included a cold chain demonstration.

Different material was prepared for groups 1 and 2 (physicians, nurses and inspectors) and for groups 3 to 6 (auxiliaries and rural technicians). All the material involved the analysis of five modules: EPI diseases, vaccines, the cold chain, programming, and evaluation. However, the material for physicians and nurses con-

tained more technical information, while that for the auxiliaries and RHT's focused entirely on the operational aspects.

The first assignment of the participants was to complete a pre-test, in which the average score of correct answers was 43 percent; the same test was administered on completion of the workshop, and the average score was 82 percent.

The comments and views of the participants on the methods employed were very favorable; the excellent results of the course are clearly shown by the difference between the pre- and post-test scores.

EPI operations are being launched in Guatemala in the Department of Sacatepéquez, and will later be extended to the Departments of Jalapa, Chiquimula and Suchitepéquez, once the health teams for these regions have been trained.

Source: Dr. Otto Zeissig, EPI Manager, Guatemala, and Dr. Italo Barragán, PAHO Epidemiologist, Area III, in unpublished EPI report, March 1980.

## \* British Virgin Islands

One of the activities of the Immunization Program Managers who participated in the Subregional EPI Workshop for Caribbean countries, held in Trinidad in June 1980, was to develop specific program plans for improving immunization services at the national level. (See EPI Newsletter Vol. II, No. 4, August 1980.)

The participant from the British Virgin Islands identified as a priority the training of district nursing personnel, which led to the organization of an EPI Workshop in Tortola, B.V.I., from 1-5 December 1980. Ten persons representing different categories of health and nursing personnel participated in the week-long workshop. They formed one work group and each participant was given the five modules of self-instructional material for the course. Following individual work on the questions contained in the text, there was a group discussion on the information presented, answers to the questions in the material presented, and a general sharing of ideas and experiences in relation to the immunization program of the country.

After completing the five modules, guidelines were given to participants for developing plans of action within their district or sphere of work, to ensure maximum immunization coverage in 1981. Each plan is based on problem identification, definition of specific and measurable objectives to solve the problem, activities programmed to accomplish the objectives, and the resources required within a specific time frame.

On completion of the course, participants were given the same written test they had taken before the course, in order to evaluate what learning had taken place. These tests showed that the average number of correct or partially correct answers rose from 36% on the pretest to 96% on the post-test, providing an objective measurement of the high level of knowledge obtained during the course regarding the EPI program.

Source: Ms. Gloria Noel, PAHO Nursing Adviser, in unpublished EPI report, December 1980.

## National Cold Chain Course: Argentina

The first National Cold Chain Course was conducted in Argentina from 24 to 26 September 1980 at the Carlos G. Malbrán National Institute of Microbiology of the National Secretariat for Public Health, in the city of Buenos Aires. It was attended by 43 participants from provinces, the armed and security forces, binational offices of major enterprises, private agencies, staff members of the Institute, and officials of SENASA (Animal Health, Foot-and-Mouth Disease Control).

The principal purposes of this course were as follows:

- To improve cold chain management;
- to identify cold chain problems;
- to improve and update the cold chain reporting system.

The teaching materials for this course were based on the documents obtained through the First International Cold Chain Seminar-Workshop promoted by PAHO/WHO and held at Quito, Ecuador, in May 1978; PAHO/WHO reports; and developments, studies and experiments carried out at the Institute during the last three years in connection with the national cold chain project and its implementation. The material included slides, transparencies for overhead projector, posters, large murals, maps, and materials suitable for maintaining cold life. There was also a film on the cold chain in Ghana.

Exercises in the design and testing of cold boxes were conducted, as was a simulated cold chain operation in which all the students participated.

Source: Dr. Enrique Ferrand, Director of the Carlos G. Malbrán National Institute of Microbiology, in unpublished EPI report, October 1980.

### Editorial Note

Argentina is to be commended for a well organized national cold chain course with its emphasis on the identification of specific problems in the cold chain. It is expected that similar courses will be held for personnel at different levels of cold chain management. Countries which are preparing this type of national cold chain course should keep the following points in mind:

- The importance of multiplying the course to reach all personnel involved in immunizations should be emphasized.
- The methodology of the course should be made explicit, as should the procedures for handling the vaccines.
- The course should stress the importance of improving the management and supervision of the cold chain.
- Participants should be asked to bring to the course data regarding equipment needs and, of even greater importance, information on cold chain logistics, such as the number of vaccine shipments being made per quarter and the quality of vaccine in each shipment. The availability of this type of information will allow personnel to

evaluate cold chain operations and, in particular, the cost/effectiveness of the national cold chain system.

- Plans should be developed for the routine maintenance and repair of cold chain equipment.

## Epidemiology

### Control of Poliomyelitis in Brazil

Oral vaccination against poliomyelitis was started in Brazil in 1961. The coverage and continuity needed for effective control of the disease were lacking, however, and it remained a major public health problem in the country.

In 1975 epidemiological surveillance operations were stepped up and systematic procedures were established for the investigation of cases and outbreaks, including laboratory confirmation of diagnoses. These measures provided a good understanding of the epidemiological behavior of the disease in Brazil, which is essential for the planning of an effective control program.<sup>1</sup>

The persistence of outbreaks of considerable magnitude in different parts of the country, despite the steadily expanding coverage of oral vaccination from year to year,<sup>2</sup> prompted the Ministry of Health in 1980 to adopt a special vaccination strategy designed to rapidly reduce the incidence of the disease.

The "Polio Control Operation" (Ação de Controle de Poliomielite),<sup>3</sup> relying on the technical simplicity of oral vaccination, which allows the large-scale participation of people who are not in health occupations, established "national vaccination days" for the purpose of administering two doses a year to all persons under 5 years of age, regardless of whether they had previously been vaccinated.

Accordingly, machinery was set up at the national and state levels by the Ministry of Health and the State Secretariats for Health, respectively, for coordination among the institutions most directly involved in the execution of the program.

Vaccination operations were carried out simultaneously throughout the country on 14 July and 16 August 1980 and required the establishment of about 92,000 vaccination posts, most of them improvised in schools. About 300,000 persons were mobilized to implement the program, and an extensive publicity campaign was waged through the mass media. In the two stages of the operation, 65 million doses of oral polio vaccine were distributed.

<sup>1</sup>Boletim Epidemiológico (Brazil) Vol. IX, No. 21, 1977.

<sup>2</sup>Boletim Epidemiológico (Brazil) Vol. XII, No. 9, 1980.

<sup>3</sup>National Immunization Program, Polio Control Operation, Ministry of Health and Social Welfare, February 1980.

The results are shown in Table 1. About 21.8 million doses were administered in the first stage and 23.0 million in the second, of which 18.1 and 19.0 million, respectively, reached the target population (those under 5 years of age). Those instances where targets appear to have been exceeded may be due to record-keeping errors, incorrect information on the age of the persons vaccinated, or discrepancies in estimates of the 1980 population, which were based on 1970 census data.

**Table 1**

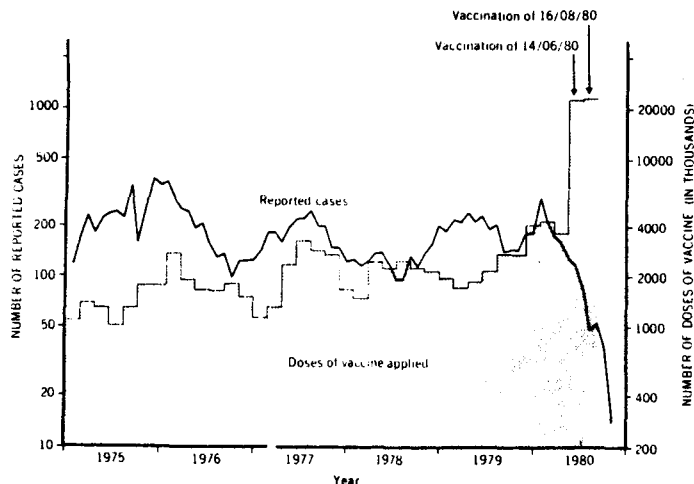
Results of Vaccination against Poliomyelitis on Two "National Days" in Major Regions  
Brazil, 1980

Region	Target Population Under 5 Years	13 June 1980		16 August 1980	
		Vaccinated Population under 5 Years	Total Doses Administered	Vaccinated Population Under 5 Years	Total Doses Administered
North	947,662	1,027,294	1,213,911	1,088,220	1,268,012
Northeast	6,080,310	6,178,040	7,052,204	6,614,088	7,623,290
Southeast	6,650,410	6,885,179	8,977,709	7,157,490	9,400,095
South	3,378,980	2,792,888	3,076,648	2,814,050	3,111,745
West-Central	1,493,030	1,239,577	1,438,576	1,324,250	1,550,604
<b>Total</b>	<b>18,550,392</b>	<b>18,122,978</b>	<b>21,759,048</b>	<b>18,998,098</b>	<b>22,953,745</b>

The impact of the two vaccination operations on the occurrence of cases of poliomyelitis in the country is illustrated in Graph 1 and Table 2.

Up to the 24th week of 1980, when the first stage of the vaccination operation was carried out, the number of cases reported for four-week periods ranged between 95 and 385, with an average of 186 cases. After that week, the incidence curve drops steeply to 14 cases in the last reporting period, which is 1/13 of the previous average.

**Graph 1. Poliomyelitis cases reported by four-week periods and doses of vaccine applied, Brazil, 1975-1980**



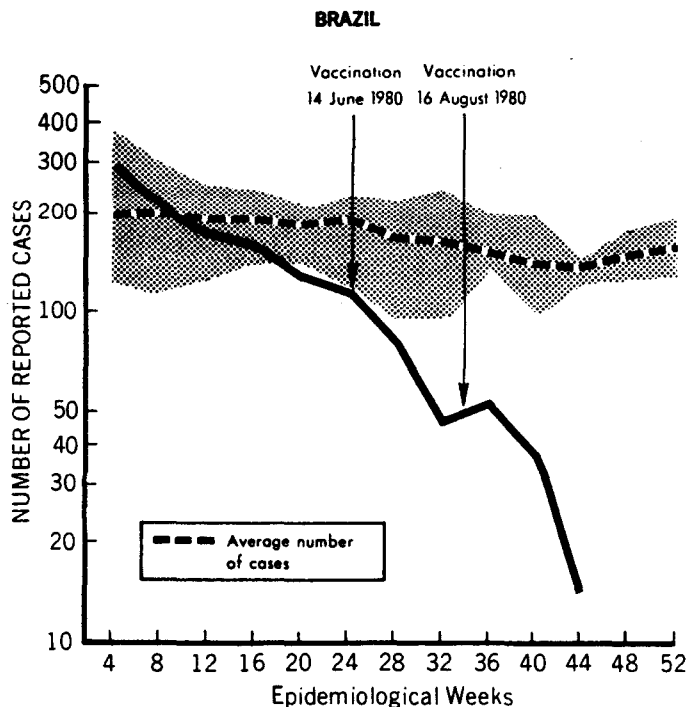
**Table 2**

Cases of Poliomyelitis Reported in Four-Week Periods  
Brazil, 1975-1980

Epidemiologic Weeks	1975	1976	1977	1978	1979	1980
1 - 4	118	367	142	127	188	294
5 - 8	174	294	183	115	221	214
9 - 12	232	250	183	126	215	171
13 - 16	182	242	162	139	242	159
17 - 20	223	194	197	140	216	129
21 - 24	236	208	223	120	233	116
25 - 28	241	156	225	97	192	82
29 - 32	225	128	248	95	205	47
33 - 36	346	137	202	134	140	53
37 - 40	160	98	201	114	147	38
41 - 44	248	123	150	139	144	14
45 - 48	385	125	150	160	181	-
49 - 52	352	126	123	201	183	-
<b>Total</b>	<b>3,122</b>	<b>2,448</b>	<b>2,389</b>	<b>1,707</b>	<b>2,507</b>	<b>1,307</b>

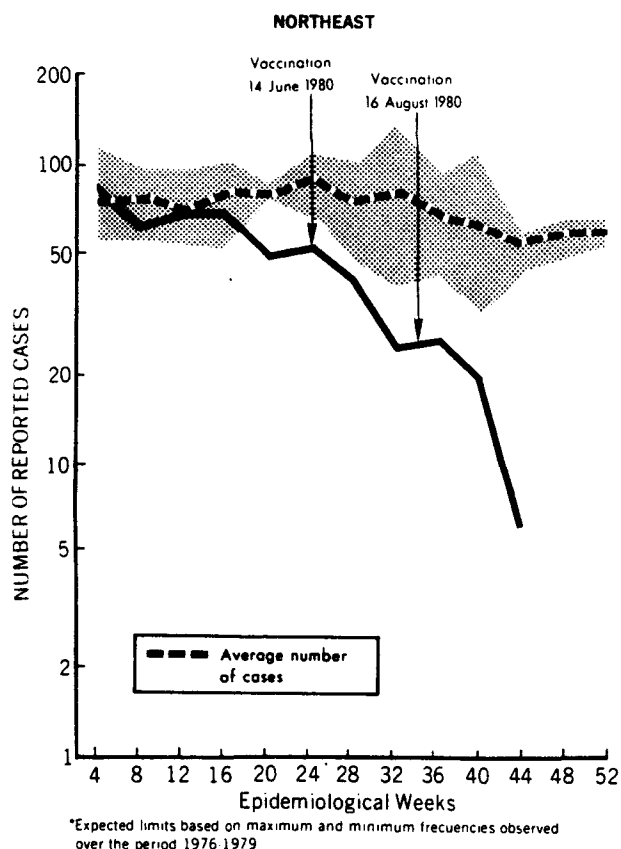
Graphs Nos. 2, 3, 4 and 5 (for Brazil as a whole, the Northeast, the Southeast, and the combined South, North and West-Central regions) compare the number of cases notified in 1980 with the maximum and minimum four-week frequencies observed over the four-year period 1976-1979. The South, North and West-Central regions were combined because of their lower incidence of cases.

**Graph 2. Cases of poliomyelitis reported by four-week periods in 1980, compared with expected maximum and minimum limits\***

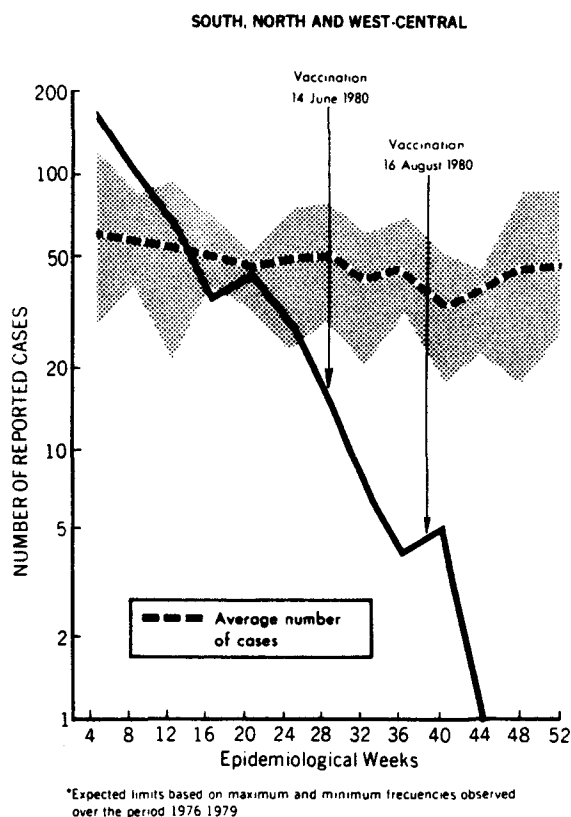


\*Expected limits based on maximum and minimum frequencies observed over the period 1976-1979.

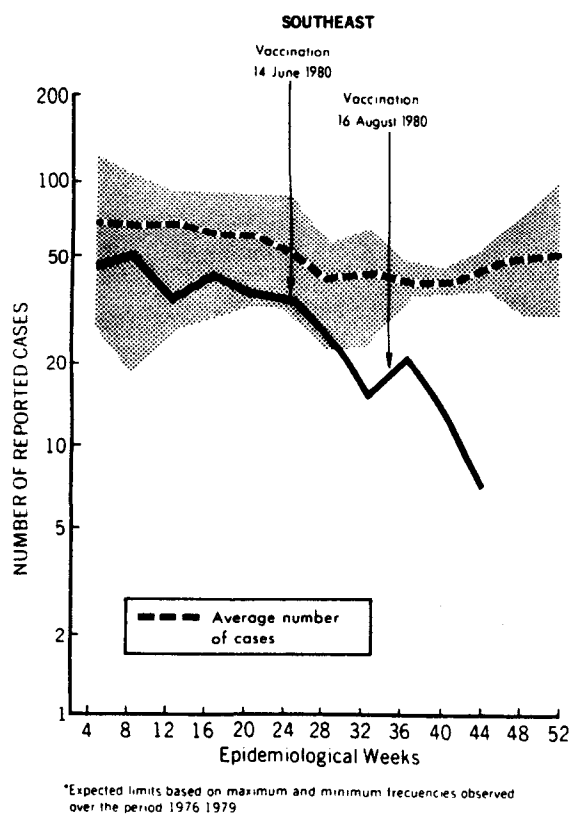
Graph 3. Cases of poliomyelitis reported by four-week periods in 1980, compared with expected maximum and minimum limits\*



Graph 5. Cases of poliomyelitis reported by four-week periods in 1980, compared with expected maximum and minimum limits\*



Graph 4. Cases of poliomyelitis reported by four-week periods in 1980, compared with expected maximum and minimum limits\*



It is found that in all regions the incidence of cases notified in 1980 was much lower than the lowest level of previous years, in clear correlation with the two stages of the vaccination operations.

These results attest to the immediate effect of well organized vaccination programs in areas where the incidence of poliomyelitis is high. In order to ensure the control of the disease, it is essential to maintain the levels of coverage attained, while also intensifying epidemiologic surveillance activities.

Source: Boletim Epidemiológico (Brazil), Vol. XII, Nos. 16 and 17, 1980.

### Measles: Costa Rica, 1979

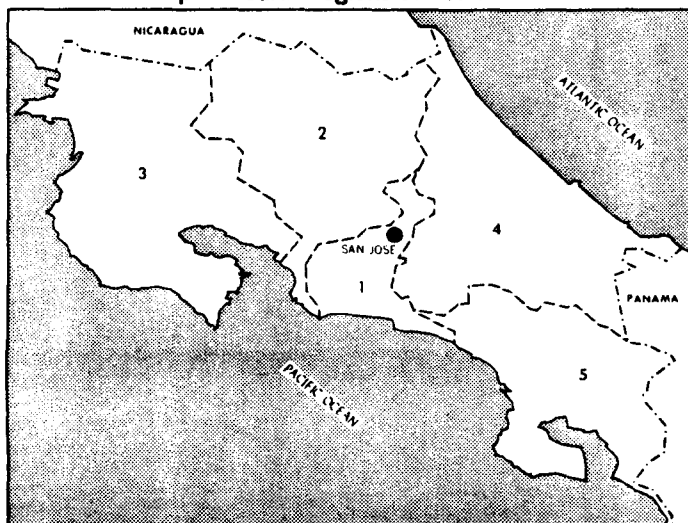
In 1979, 6,601 cases of measles, including 31 deaths, were reported in Costa Rica; this is equivalent to a morbidity rate of 3.1 per 1,000 and a case fatality rate of 0.46%.

In the years 1976, 1977, and 1978, the total numbers of cases reported were 1,664, 1,972, and 347, respectively.

All five health regions of the country reported cases in 1979. Region 1, which includes the capital city, had the largest number of cases (3,263) and the highest morbidity rate (4.3 per 1,000).

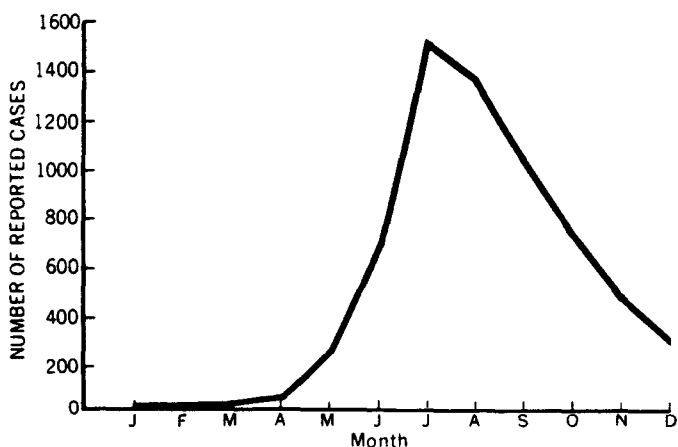
The outbreak began in the central part of the country (Region 1), which is more urban, and spread toward the Pacific area (see Map 1). A focus was discovered in the northern part of the country in August 1979, and at the end of the year the number of cases reported in the southern area increased.

Map 1. Health Regions of Costa Rica



Graph 1 shows the distribution of cases by month.

Graph 1. Measles cases notified by month Costa Rica, 1979



The majority of cases reported in April occurred among schoolchildren. Epidemiological investigation showed that many of these children had not been vaccinated and that they had been in contact with Nicaraguan children who had measles. This situation changed rapidly and soon children under one year of age constituted the most affected group. Up to then, measles vaccine had been administered at one year of age. Starting in May, vaccination was begun at six months of age.

Table 1 presents the total number of measles cases reported in Costa Rica in 1979, together with the percentage distribution and rate for each age group.

Of the 1,413 cases in infants less than one year old, 312 occurred in the age group from 0 to 5 months old (equivalent to a rate of 9.2 per thousand inhabitants) and 1,101 in the group from 6 to 11 months old (a rate of 31.5 per thousand).

Table 1

Reported Cases of Measles, by Age Group  
Costa Rica, 1979

Age Group	Number of Cases Reported	Percentage	Rate per 1,000 Population
Less than 1 year	1,413	21.4	20.5
1 year	1,217	18.4	19.0
2 years	573	8.7	9.7
3 years	387	5.9	7.0
4 years	296	4.5	5.6
5-9 years	1,088	16.5	3.3
10-14 years	733	11.1	2.3
15 years or more	894	13.5	0.8
Total	6,601	100.0	3.1

Of the 31 reported deaths, 13 occurred without medical attention, six of them (three infants of 3 months, a child of 11 years, and two adults) in an American Indian population in southern Costa Rica. Table 2 shows case fatality rates in the different age groups.

Table 2

Case Fatality Rates for Measles by Age Group  
Costa Rica, 1979

Age Group	Number of Deaths	Case Fatality Rate
0-5 months	6	1.92%
6-11 months	5	0.45%
Less than 1 year	11	0.77%
1 year	14	1.15%
2 years	1	0.17%
3-9 years	-	-
10-14 years	1	0.13%
15 years or more	4	0.44%
Total	31	

On the basis of the case studies, it was concluded that 75% of the children who contracted the disease had not been vaccinated, while 25% of them had, most of them at one year of age.

During 1978 and 1979, surveys were done to determine the levels of coverage achieved in Costa Rica. The surveys were done in Regions 1 and 2 in 1978, and in Region 1 in 1979 (during the first months of the year). The results indicated that 73% of the one-year olds had been vaccinated against measles and rubella in 1978, and 68% in 1979.

Costa Rica reported a total of 1,000 cases of measles in 1980, which is almost a seven-fold decrease from the same period in 1979, when 6,833 cases were reported.

Source: Ministry of Health, Department of Epidemiological Surveillance, Costa Rica, 1980.

# Reported Cases of EPI Diseases in the Americas

NUMBER OF REPORTED CASES OF MEASLES, POLIOMYELITIS, TETANUS, DIPHTHERIA AND WHOOPING COUGH  
FROM 1 JANUARY THROUGH THE LAST PERIOD REPORTED IN 1980  
AND FOR THE COMPARABLE PERIOD IN 1979, BY COUNTRY

COUNTRY	ENDING DATE OF PERIOD	MEASLES		POLIOMYELITIS		TETANUS		DIPHTHERIA		WHOOPING COUGH	
		1980	1979	1980	1979	1980	1979	1980	1979	1980	1979
ARGENTINA	19 APR. 80	1,096	1,287	23	1	64	75	31	43	7,466	5,325
BAHAMAS	03 JAN. 81	484	1,659	-	-	3	2	-	-	15	-
BARBADOS	03 JAN. 81	27	16	-	-	13	7	11	13	-	2
BOLIVIA	01 NOV. 80	2,534	3,693	45	377	151	96	29	30	1,684	1,280
BRAZIL	18 OCT. 80	75,424	50 210	1,313	1,990	2,423	2,360	3,932	3,975	35,024	24,815
CANADA	27 DEC. 80	13,347	22 621	-	3	2	...	63	84	2,812	2,171
CHILE	15 NOV. 80	3,048	30 570	-	-	22	...	218	338	1,936	346
COLOMBIA	30 NOV. 80	7,821	17 013	112	461	524	...	253	163	6,911	10,324
COSTA RICA	27 DEC. 80	1,000	6,883	-	-	9	23	-	-	960	311
CUBA	20 DEC. 80	3,703	7,446	-	1	25	28	-	-	126	143
DOMINICA	03 JAN. 81	-	178	-	-	2	2	-	-	1	1
DOMINICAN REP.	29 MAR. 80	3,132	1,411	a) 93	9	31	33	82	50	88	27
ECUADOR	29 NOV. 80	2,279	4,031	9	5	96	83	15	22	779	1,882
EL SALVADOR	03 JAN. 81	2,244	10,359	55	3	98	114	2	-	1,003	812
GRENADA	03 JAN. 81	53	3	-	-	3	2	1	-	6	6
GUATEMALA	27 DEC. 80	2,613	3,351	66	24	59	67	7	4	1,543	1,452
GUYANA	22 NOV. 80	466	668	...	-	b) 13	25	1	5	...	...
HAITI	02 JAN. 81	348	259	c) 4	-	276	72	35	7	516	216
HONDURAS	03 JAN. 81	4,188	4,895	3	226	d) 31	47	2	2	2,503	2,451
JAMAICA	27 DEC. 80	27	82	-	-	10	12	11	9	13	37
MEXICO	06 DEC. 80	28,438	24,220	596	684	539	545	11	10	4,904	4,400
NICARAGUA	31 DEC. 80	3,775	1,270	20	101	88	1	5	11	2,469	267
PANAMA	03 JAN. 81	2,000	4,350	-	-	30	39	-	-	648	726
PARAGUAY	27 DEC. 80	1,256	1,606	7	17	192	185	14	7	912	1,015
PERU	13 DEC. 80	8,721	4,149	175	55	276	174	194	147	4,747	8,325
SAINT LUCIA	27 DEC. 80	35	9	-	-	1	8	-	1	19	1
SURINAME	03 JAN. 81	254	...	e) -	1	e) -	-	-	1	-	-
TRINIDAD & TOBAGO	03 JAN. 81	394	394	f) -	-	f) 30	32	f) -	1	f) 10	47
U.S.A.	03 JAN. 81	13,430	13,600	g) 9	h) 26	74	76	5	59	1,651	1,570
URUGUAY	31 DEC. 80	154	1,300	-	-	22	17	-	-	162	230
VENEZUELA	03 JAN. 81	8,695	20,791	2	12	...	...	12	3	2,834	1,751

a) Source: Secretariat of Public Health  
and Welfare, 30 September 1980.  
b) 30 September 1980  
c) 13 December 1980  
d) 31 December 1980

e) 1 November 1980  
f) 27 December 1980  
g) 7 paralytic cases  
h) 22 paralytic cases

- No cases

... Data not available

## Newsbriefs

### Argentina: Compulsory Presentation of Measles Vaccination Certificate for Admission to Primary and Pre-primary School

By Resolution No. 3845/80 of the Ministries of Social Welfare and of Culture and Education, presentation of the measles vaccination certificate has been made compulsory for admission to primary and pre-primary school.

Exempt from this obligation are children who have had measles, for whom a medical certificate to that effect must be presented.

The measles vaccination will be performed in accordance with current health standards by the competent health authority (whether national, provincial or municipal), which will issue the appropriate certificate.

Whenever the epidemiological situation makes it advisable to do so, the health authority may order the vaccination of susceptible children who entered school before the resolution went into effect, or revaccination if the circumstances warrant. This vaccination or revaccination may also be performed on school premises in a coordinated operation of the health and education areas.

The provisions of this resolution also apply in the primary and pre-primary schools functioning under the Ministry of Culture and Education. The provinces, the national territory of Tierra del Fuego, Antarctica and the South Atlantic Islands, and Buenos Aires municipality may join the system under agreements to be signed through the Ministries of Social Welfare and of Culture and Education for purposes of implementing the resolution in public and private schools in their jurisdictions.

The preamble to the resolution states that measles is a major health problem in the country because of its extensive contribution to infant morbidity and mortality, that vaccination programs and campaigns have not yet attained the expected epidemiological results for total control of the disease, and that the magnitude of the harm to children warrants extraordinary measures to consolidate the benefits obtained.

"Ensuring that the child is immune on admission to school," it states, "guarantees that the spread of the disease in schools will be avoided, and therewith the repercussions that would ensue for the family and the community at risk." The preamble adds that "it is the duty of the health and education authorities to provide the means for protecting the population from preventable diseases."

The resolution complements the health measures taken by the State Secretariat for Public Health which, in intensified measles vaccination campaigns since 1976, have been able to reduce the incidence of the disease to the lowest levels known in the country in the last decade.

Source: Boletín del Día No. 1985, Ministry of Social Welfare, Republic of Argentina, 26 January 1981.

### Improved Stability of EPI Vaccines: Correction

We would like to call our readers' attention to the fact that some data were inadvertently misquoted in the article "Improved Stability of EPI Vaccines" in the last issue of the EPI Newsletter (Vol. II, No. 6, December 1980).

With regard to vaccine storage temperatures and stability, it should be noted that freeze-dried BCG and freeze-dried measles vaccines do not "remain potent for at least four months at +20°C to +25°C," as stated in paragraph three of the above-mentioned article. Rather, the stability of BCG vaccines varies, and UNICEF-supplied vaccines will lose 10% and 20% of their viability after storage at +20°C to +25°C for two and four weeks, respectively. With regard to freeze-dried measles vaccine, many vaccines are stable for 7 to 30 days at +20°C to +25°C storage, while only improved vaccines retain satisfactory potency after storage from one to four months.

Readers are referred to WHO Wkly Epidm Rec. 55(33): 252-254 (15 August 1980) for the complete text of the article on which the abstract was based.

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