

# EPI Newsletter

## Expanded Program on Immunization in the Americas

Volume V, Number 2

IMMUNIZE AND PROTECT YOUR CHILD

April 1983

### Immunization Coverage Surveys

#### Suriname

In March-April 1982 Ministry of Health personnel in the Advanced Nursing Education course conducted an EPI survey of immunization coverage in two districts of Suriname. The survey was carried out as part of the students' course work in epidemiology, using the cluster sampling survey technique. It focused on children under 1 year of age in the districts of Paramaribo and Suriname to determine their histories of immunization against poliomyelitis, diphtheria, whooping cough and tetanus. In all, 195 children were included in the investigation.

The vaccination history was documented either by a vaccination card or by interview with the mother. Sixty percent of the children surveyed had immunization records in the home at the time of the visit in Paramaribo and 48 percent in the district of Suriname. Table 1 shows the number and percentage of children under 1 who had received first, second and third doses of polio and DPT vaccines in each district.

TABLE 1. Number and percentage of children under 1 year of age vaccinated with poliomyelitis and DPT vaccines, by district.\* Suriname, March - April 1982.

District	No. of children surveyed	Poliomyelitis			D P T		
		1st	2nd	3rd	1st	2nd	3rd
Paramaribo	67	46 (69%)	38 (57%)	28 (42%)	45 (67%)	38 (57%)	29 (43%)
Suriname	128	65 (51%)	58 (45%)	49 (38%)	65 (51%)	59 (46%)	49 (38%)
Total	195	111 (57%)	96 (49%)	77 (39%)	110 (57%)	97 (50%)	78 (40%)

\* Documented either by vaccination card or interview with the mother.

The number of fully vaccinated children (those who had received three doses of poliomyelitis vaccine) in each ethnic group is given in Table 2.

TABLE 2. Poliomyelitis vaccination coverage of children under 1 year of age, according to ethnic group. Districts of Paramaribo and Suriname, March - April 1982.

Ethnic group	Number of children	Number fully vaccinated*	%
Javanese (Indonesian)	34	16	47
East Indian	82	33	40
Creole (Negroid)	53	29	55
Amerindian	8	0	0
Bush Negro	14	1	7
Other	4	4	100
Total	195	83	43

\* With three doses of poliomyelitis vaccine.

The survey also attempted to ascertain the principal reasons why children had not been fully immunized (Table 3). Most of the families cited lack of knowledge,

TABLE 3. Reasons for non- or insufficient vaccination of children under 1 year of age. Districts of Paramaribo and Suriname, March - April 1982.

Principal reason cited	Number	%
1) Insufficient knowledge regarding vaccination*	35	30
2) Illness or absence of child	28	24
3) No time, or too far to health clinic	20	17
4) Insufficient motivation of parents	16	14
5) Family resistance (father, mother-in-law)	4	3
6) Mother pregnant or ill	3	3
7) No vaccine	1	1
No reason given	10	9
Total	117	100

\*Including both knowledge of vaccination principles and awareness of where and how children could be vaccinated.

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illness or absence of the child, and time/distance factors as the major obstacles to having their children complete or start their vaccination schedule.

The data contained in Table 3 has been taken into account in reprogramming health education activities. As a result, a list is now published every three months in the two major newspapers showing where and at what time vaccinations are being given. It is expected that the next survey will show considerably better results.

Source: B.O.G. Publication No. 5, Bureau of Public Health, Suriname, 1982.

## São Paulo, Brazil

As part of a specialized epidemiological surveillance course, students at the University of São Paulo School of Public Health carried out a vaccination coverage survey of children 19-31 months of age in the district of Araraguara (São Paulo) in September 1982. The purpose of the exercise was to teach students the survey methodology used to estimate the proportion of the target population protected against the EPI diseases. The survey was also an attempt to evaluate the degree of compliance with the recommended vaccination schedule (shown in Table 1).

TABLE 1. Immunization schedule during the first two years of life. São Paulo, Brazil, 1982.

Age	Vaccine-dose
2 months	DPT-1/Polio-1
3 months	DPT-2
4 months	DPT-3/Polio-2
6 months	Polio-3
7 months	Measles-1*
15 months	Measles-2*
18 months	DPT-4/Polio-4
During first year of life	BCG

\* During 1982 the national immunization program changed the measles immunization schedule to one dose at 9 months of age.

The survey included the following steps:

- Identification of the geographic area to be studied
- Identification of the target age group
- Random selection of 30 clusters
- Selection of seven children between 19 and 31 months of age in each of the 30 clusters chosen.

Home visits were made to record the information contained in the children's vaccination cards.

In the case of poliomyelitis vaccine, the doses administered during the national polio immunization days were taken into consideration when they coincided with one of the doses (either in the primary series or a booster) the child was to have received in accordance with the vaccination schedule.

Only 5.2 percent of the children did not have a vaccination card and were considered "not vaccinated."

Table 2 shows the vaccination coverage for children who completed the basic schedule (three doses of poliomyelitis vaccine, three doses of DPT, one dose of BCG and one dose of measles vaccine), as well as those who had additional doses (a fourth dose of DPT and poliomyelitis vaccines and a second dose of measles vaccine).

TABLE 2. Percentage of vaccination coverage in children 19-31 months of age, according to basic schedule and booster. Araraguara, São Paulo, 1982.

Schedule	Number of children	%
Basic + boosters	83	41.7
Complete basic	97	48.8
Incomplete basic	19	9.5
Sub-total	199	94.8
Not vaccinated	11	5.2
Total	210	100.0

Over 90 percent of the children completed the basic schedule. Observation of the individual cards shows that over 70 percent of the 180 children who completed the basic schedule did so during the first year of life.

The investigators concluded that the methodology used was reliable and that the results confirmed the accuracy of the data provided by the routine information system.

The group made the following recommendations:

- In view of the fact that the immunization coverage was high and that there is an efficient system for home visits, the health services should put special emphasis on followup to ensure children complete the vaccination schedule.

- The present immunization schedule should be re-evaluated in order to implement simultaneous administration of vaccines, thus reducing the number of times children have to attend the health clinics.

Source: da Cunha Correia Lima, C; Alves Pereira, E; de Paula Carvalho, JP; Baptistella, MI; Lopes Rebello da Fonseca Brasil, MT; Nakao Sato, N; Juarez, E., School of Public Health, University of São Paulo, São Paulo, Brazil.

## Cold Chain: Solar Refrigerator Field Tested

The Health Ministries of Colombia and Peru, in collaboration with EPI/PAHO and the U.S. Centers for Disease Control (CDC), have begun field testing a vaccine refrigerator which operates on solar energy.

The field trials are designed to determine whether solar-powered refrigerators can maintain the temperature required for vaccine storage (+4 to +8°C) and produce ice at the rate of 2 kg/24 hours under different environmental conditions. Such refrigerators would be particularly useful in areas which lack a consistent supply of good-quality

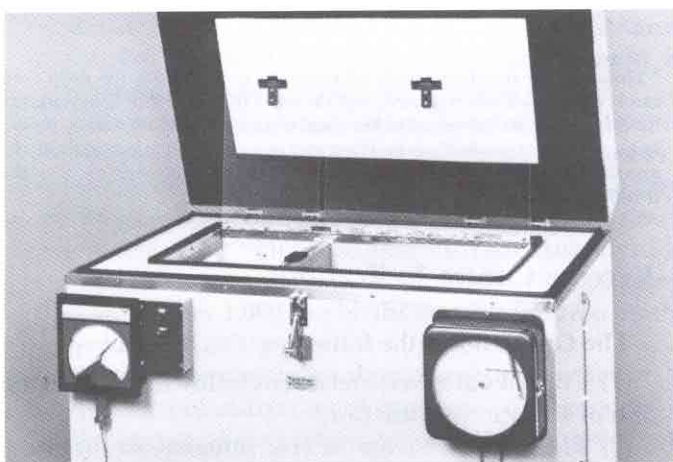


fuel or where the electrical supply is intermittent or non-existent.

The specifications for a solar-powered vaccine refrigerator were developed by CDC in conjunction with the Lewis Research Center of the U.S. National Aeronautical and Space Administration (NASA). Contracts were awarded to several manufacturers to produce refrigerators based on these specifications. To date the following refrigerators have passed the qualification tests:

Model	Manufacturer
SPC-RF-103	Solar Power (U.S.A.)
12-2	Marvel, Inc. (U.S.A.)
RR2	Polar Products (U.S.A.)
RHC-100	Solarex (U.S.A.)

Solar Power's refrigerator (Photo A) is being field tested in Peru and Colombia. It has a gross volume of 69 liters of refrigerator space and 34 liters of freezer space which can produce 2 kg of ice per day. All units are fully equipped with instruments to monitor refrigerator and electrical performance, as can be seen in Photo A.

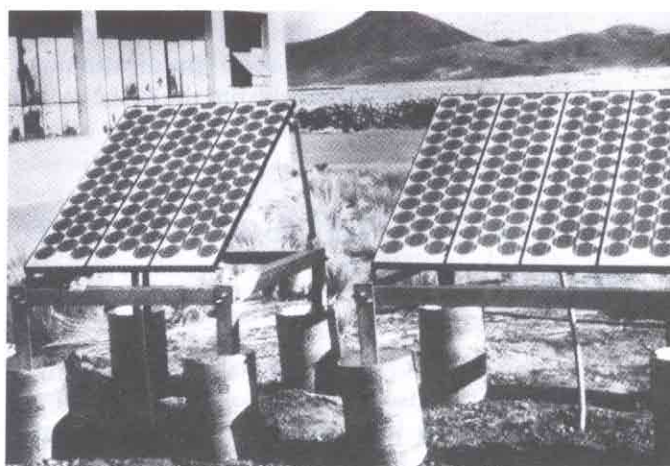


**Photo A:** This vaccine refrigerator, designed to operate on solar energy, is currently being field tested in Colombia and Peru. (Photo: Solar Power Corp.)

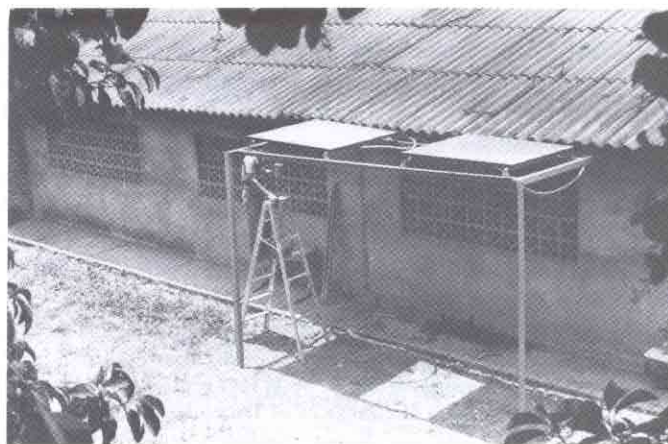
The solar panels can be mounted near the ground as shown in Photo B (Peru) or high above the ground as seen in Photo C (Colombia). The size of the photovoltaic array (that is, the number of solar panels) and the number of batteries to store the converted solar energy are determined by the amount of energy needed to power the equipment, and the amount of sunlight which falls on a particular area (its "insolation characteristics").

Full appraisal of this new technology will require two years of field testing. Colombia and Peru expect to complete their tests sometime in 1985.

To be an economic and practical alternative to refrigerators run on conventional energy sources, solar-powered refrigerators must be designed for high efficiency and reliability. Data are needed on equipment performance under different working conditions in order to design more efficient and economic solar refrigeration systems for any chosen location. Performance data will also be used to further improve the technology.



**Photo B:** Solar panels in Peru are mounted near the ground and angled to capture the maximum amount of sunlight. (Photo: Solar Power Corp.)



**Photo C:** In Colombia, solar panels are installed above the ground behind the health clinic in order to assure that surrounding buildings and trees do not block the sunlight. (Photo: Carlos Dierolf, Universidad del Valle)

**Editorial note:** Many new manufacturers of solar-powered refrigerators have emerged within the last two years and these companies are actively promoting the sale of their equipment to the health sectors of various countries.

PAHO/WHO recommends that any health ministry considering the purchase of a particular system keep the following guidelines in mind:

- The initial purchase should be for a limited quantity of refrigerators (approximately five) to permit field testing for one year under different climatic, geographic and working situations in the country.
- Solar panels should meet the criteria developed by the Jet Propulsion Laboratory (United States) and the Joint Research Center (Italy).
- Consideration should be given only to those refrigerators which have passed laboratory qualification tests.
- Each unit procured should be fully equipped with monitoring devices and spare parts.
- The ministry should arrange to have a trained refrigerator technician available to repair the equipment.

Readers interested in obtaining further information on this subject should request WHO publications EPI/CCIS/82.8 and EPI/CCIS/82.11 from the *EPI Newsletter* editor.

## EPI Global Advisory Group Meeting, 1982

The fifth meeting of the Expanded Program on Immunization Global Advisory Group took place 18-22 October 1982 at the WHO Regional Office for Africa in Brazzaville, Republic of the Congo. The following is a summary of the conclusions and recommendations made by the Group.

### Global

Continued progress has been achieved in the development of the EPI at country, regional and global levels. Information relating to immunization coverage and to the incidence of the target diseases has improved (Table 1, Figure 1), and activities relating to training and evaluation have increased. Little progress has been seen in the assessment of the program at regional level in Europe, however, and this should be remedied without delay.

**TABLE 1. Estimated percentage of children immunized in the first year of life and percentage of pregnant women immunized against tetanus, by WHO region, based on information available as of December 1982.**

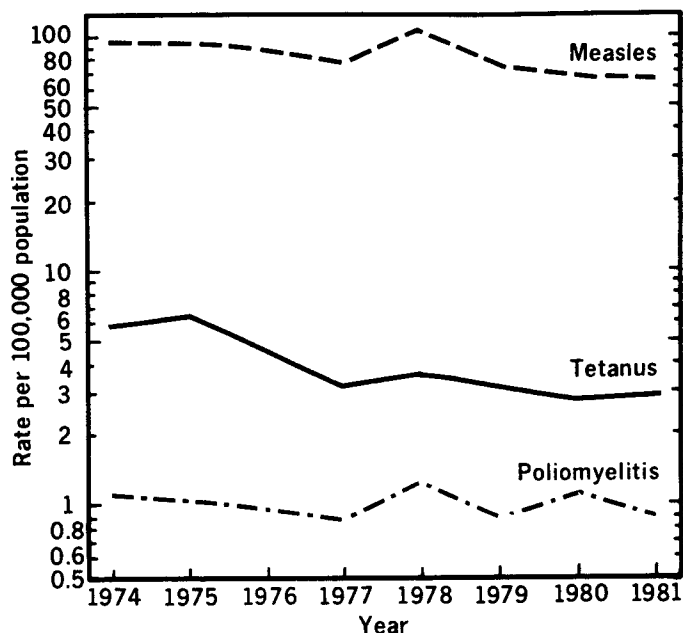
Region	% of population coverage by reports*	% of children immunized by 12 months of age					% of pregnant women immunized
		BCG	DPT-3	Polio-3	Measles	TT-2	
Africa	44	31	19	17	27	18	
Americas	60	54	37	34	37	10	
South-East Asia	98	21	17	5	0.2	16	
Europe	26	64	70	82	63		
Eastern Mediterranean	99	22	24	28	22	4	
Western Pacific	19	74	61	70	15		

\*Where percentage differs for different vaccines, the highest percentage is shown.

Despite the progress noted above, the Group emphasized that only a short time—eight years—remains in which to accomplish the EPI goals, and stressed that action is urgently needed to implement the Five-Point Action Program endorsed by the World Health Assembly in 1982 in resolution WHA35.31 (See *EPI Newsletter* Vol. IV, No. 2).

The Global Advisory Group notes with concern that Point Three of the EPI Action Program, calling for increased financial resources, is not reflected in all Regions in the WHO Regular Budget proposals for 1984-85.

**FIGURE 1. World: Reported incidence rates per 100,000 population for measles, tetanus and poliomyelitis, 1974-1981.\***



\*These are the diseases which are expected to be among the most accurately diagnosed and reported, and the most influenced in the short term by immunization programs. Yet their diagnosis and reporting remain major problems in many countries, and it is premature to conclude that any decline such as that reported through 1981 for measles is real or that it reflects the start of a long-term trend.

### Vaccine Contra-Indications

The Group noted the following:

(1) The risks of adverse reactions following administration of EPI vaccines are low.

(2) The slight increase in risk inherent in the use of vaccines in ill children must be balanced against the dangers involved in leaving such children unimmunized. The practice of immunizing infants presenting with minor illnesses is already accepted in many countries with various levels of socio-economic development.

(3) It is particularly important to consider the immunization of ill or malnourished children under the following circumstances:

- where living conditions favor a high incidence and severity of the target diseases, particularly among children during the first 18 months of life;
- where access to health services is limited;
- where immunization coverage is low;
- where children are most likely to come into contact with the health services only during periods of illness;
- where attendance at health facilities is, in itself, an important factor in the spread of infectious diseases of childhood, particularly measles;
- where a refusal to immunize is likely to result in the child not being brought back for further immunizations.

The Group concluded that health workers should use every opportunity to immunize eligible children. The great majority of children attending health facilities are suffering from minor illnesses, frequently combined with malnutrition, and should be considered eligible for immunization. Individual national advisory groups should decide on the eligibility of children who are more severely ill in the light of the above criteria.

## Neonatal Tetanus

Neonatal tetanus remains a serious and often unrecognized public health problem in developing countries. Globally some one million deaths are thought to occur annually from this disease.

The Group supports all the recommendations of the 1982 Lahore Meeting on the Prevention of Neonatal Tetanus (See *WHO Weekly Epidem Rec* 18:137, 1982), and this calls particular attention to the following:

- "Ministries of Health should now give a high priority to the control of neonatal tetanus. Neonatal tetanus should become a notifiable disease and should be reported separately from non-neonatal tetanus.
- "The control of neonatal tetanus and of other diseases included within the EPI can and should be used as a spearhead in the development of primary health care.
- "Disease-reduction targets should be adopted by each country. Each significant administrative sub-division should aim for a neonatal tetanus mortality rate of less than one per 1,000 live births by 1990 and zero deaths by the year 2000.
- Neonatal tetanus levels should serve as an index of the quality and utilization of maternal health services, of the impact of the immunization program and of progress being made in achieving health for all by the year 2000."

The successful control of neonatal tetanus should include both improved maternity care and maternal immunization with tetanus toxoid. Therefore a close and active cooperation between maternal and child health, EPI and other programs at every level is essential to eliminate this disease.

As part of health for all by the year 2000, all countries are committed to the objective of every woman in childbirth being attended by a trained person. It is recommended that careful baseline and trend assessment with respect to the extent of delivery care be initiated and that activities promoting the provision of this care for all births be implemented urgently.

## Measles

The goal of the EPI is the control of measles along with other target diseases. Those countries, particularly in the European Region, in which adequate economic and oper-

ational resources exist should be encouraged to undertake complete measles control or eventual eradication.

Research into the operational aspects of measles control should be pursued. Such research should include strategies to change the behavioral patterns of the public and of those working in the field of public health in order to increase acceptance of measles immunization. Research to investigate the potential use of aerosol measles vaccine in the future should be encouraged.

## Poliomyelitis

Oral poliomyelitis vaccine remains the vaccine recommended for use in the EPI. WHO should continue its active involvement in research on and evaluation of poliomyelitis vaccines and their impact in controlling the disease under various epidemiological, geographical and sociological conditions.

## Program Reviews

Substantial progress has been achieved in developing and implementing the EPI review methodology. In these reviews, plans, procedures and techniques at all levels of the health services are examined and actual results at community level are measured. The use of multidisciplinary teams composed of national and international staff has lent itself particularly well to strengthening of coordination of various health and related programs within the country. It has also promoted collaboration between staff concerned with immunization and other elements of maternal and child health and primary health care.

The EPI should continue to collaborate with other programs in conducting joint national reviews. Yet, some cautions are appropriate:

- The protocols now available are intended only as checklists, and should be amended as needed to fit the objectives of the particular review in which they are to be used.
- The EPI cluster sampling method to estimate immunization coverage is not necessarily valid for assessing other items now included in community level questionnaires.
- Reviews which are too broad in scope will lose their effectiveness; the information obtained should be limited to that required for decision making.
- Criteria of managerial effectiveness should be further developed for all levels within countries.

Similar program reviews should be promoted for other elements of primary health care. In some cases, this may require further development of indicators, targets, and valid methods to assess program effectiveness and impact at the community level.

Community participation in evaluation should be encouraged. Community members can help to design and carry out evaluations and can help to analyze their results.

## Health Education/Community Participation

A number of examples of successful initiatives resulting in increased community participation in immunization programs exist, but much remains to be done in this field.

Specific areas for action were identified as follows:

- Promote the involvement of communities in the planning, management and assessment of immunization activities, actively soliciting community views and responding appropriately to them.
- Seek effective means to involve women's groups in promoting immunization and other preventive health programs. Appropriate lesson plans, reading and other informational materials should be developed for schools which help pupils become effective promoters of these preventive actions for their younger siblings and for others in the community. Special efforts should be made to educate girls, recognizing the benefits in their future role as mothers and recognizing that many of them currently have fewer educational opportunities than boys. The above efforts will require joint initiatives between ministries of health, education, communication and other ministries concerned with community development. Adequate financial support for such activities should be provided in program budgets.
- Efforts should be made to integrate information/education materials dealing with immunization with those dealing with other important community health issues, particularly the control of diarrhoeal diseases and nutrition.
- An important aspect of community involvement in some areas is financial involvement. By supporting from local resources all or part of the costs of such items as petrol, salaries and buildings, communities may be able to realize the benefits of immunization and other health services which would not be possible if national budgets alone were used. This means of accelerating the extension of health services should be actively investigated. Governments must, however, accept the major responsibility to provide services to those in need.

Source: WHO Wkly Epidem Rec 3:13-18, 1983.

## Poliomyelitis in Guatemala

An analysis of polio cases admitted to the Children's Rehabilitation Institute and Polio Clinic in Guatemala shows that the number of cases tended to increase in two-year cycles up to 1973. A national polio vaccination campaign was undertaken in that year and morbidity decreased considerably, remaining low up to 1979.

In 1980, however, 162 cases of polio were admitted to the Polio Clinic. Then in 1982 a new outbreak occurred, with a total of 136 cases. Eleven (8.1 percent) of the 1982 cases occurred during the first semester, and 125 (91.9 percent) between July and December. One fourth of all cases reported for the year occurred in December (Table 1).

**TABLE 1. Number of poliomyelitis cases admitted to Children's Rehabilitation Clinic and Polio Institute, by month. Guatemala, 1982.**

Month	Number of cases	Percent
January	1	0.7
February	2	1.5
March	2	1.5
April	1	0.7
May	1	0.7
June	4	3.0
July	18	13.2
August	18	13.2
September	18	13.2
October	21	15.5
November	16	11.8
December	34	25.0
Total	136	100.0

By the end of December 1982, 13 of the country's 23 departments had been affected and a total of 41 municipalities had reported cases. Over 70 percent of these cases were reported from the departments of Guatemala and Escuintla.

More than 85 percent of the cases occurred in children under 3 years of age, and cases were particularly concentrated in 1-year olds, who made up 43.2 percent of all cases (Table 2).

**TABLE 2. Number of poliomyelitis cases admitted to Children's Rehabilitation Clinic and Polio Institute, by age. Guatemala, July - December 1982.**

Age group	Number of cases	Percent
Less than 1 year	30	24.0
1 year	54	43.2
2 years	23	18.4
3 years	10	8.0
4 years	6	4.8
5 years and above	2	1.6
Total	125	100.0

Children with histories of no vaccination or incomplete vaccination made up 82.4 percent of cases. In 11.2 percent of cases the child was reported to have received three doses of vaccine (Table 3).

There were five deaths among the 125 cases, giving a case fatality rate of 4 percent.

In accordance with the trend observed between 1975 and 1981, the number of poliomyelitis cases reported for July-

# Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria and whooping cough, from 1 January 1983 to date of last report, and for same epidemiological period in 1982, by country

Sub-Region and Country	Date of last report	Tetanus										Whooping Cough	
		Measles		Poliomyelitis		Non-neonatorum		Neonatorum		Diphtheria			
		1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982
NORTHERN AMERICA													
Canada	19 Mar.	185	317	—	—	—	1	...	...	6	2	483	596
United States	26 Mar.	302	172	1	1	12	9	...	...	—	—	302	226
CARIBBEAN													
Antigua annd Barbuda	26 Mar.	1	—	—	—	—	—	—	—	—	—	—	—
Bahamas	2 Apr.	678	6	—	—	—	2	—	—	—	—	7	2
Barbados	26 Mar.	3	—	—	—	4	2	—	—	—	—	—	2
Belize	12 Apr.	5	1	...	...	—	2	—	—	—	3	1	—
Cuba	22 Jan.	274	3,576	—	—	1	2	—	—	—	—	16	33
Dominica	26 Mar.	—	—	—	—	—	—	—	—	—	—	9	—
Dominican Republic	*	...	...	...	...	...	...	...	...	...	...	...	...
Grenada	26 Mar.	241	89	—	—	—	—	—	—	—	—	—	—
Haiti	*	...	...	...	...	...	...	...	...	...	...	...	...
Jamaica	19 Mar.	384	594	—	—	—	1	—	—	2	3	9	73
Saint Lucia	*	...	...	...	...	...	...	...	...	...	...	...	...
St. Vincent & the Grenadines	29 Jan.	9	17	—	—	...	—	...	—	—	—	...	—
Trinidad and Tobago	19 Feb.	324	56	—	—	...	2	...	...	—	—	...	—
CONTINENTAL MIDDLE AMERICA													
Costa Rica	12 Mar.	8	27	—	—	1	—	—	—	—	—	7	4
El Salvador	12 Feb.	214	1,097	8	5	5	12	2	10	4	1	49	408
Guatemala	12 Feb.	303	381	29	1	6	7	—	—	6	—	117	82
Honduras	12 Mar.	177	663	2	3	1	5	—	—	—	—	125	330
Mexico	*	...	...	...	...	...	...	...	...	...	...	...	...
Nicaragua	*	...	...	...	...	...	...	...	...	...	...	...	...
Panama	26 Feb.	180	1,478	—	—	2	3	4	...	—	—	20	3
TROPICAL SOUTH AMERICA													
Bolivia	*	...	...	...	...	...	...	...	...	...	...	...	...
Brazil	*	...	...	...	...	...	...	...	...	...	...	...	...
Colombia	*	...	...	...	...	...	...	...	...	...	...	...	...
Ecuador	*	...	...	...	...	...	...	...	...	...	...	...	...
Guyana	27 Feb.	4	4	...	...	...	...	...	...	...	...	...	...
Paraguay	12 Feb.	65	43	3	14	8	5	8	7	—	—	20	62
Peru	19 Feb.	25	53	—	4	3	2	—	...	—	—	37	34
Suriname	*	...	...	...	...	...	...	...	...	...	...	...	...
Venezuela	19 Feb.	1,221	2,045	—	—	...	...	...	...	—	—	272	204
TEMPERATE SOUTH AMERICA													
Argentina	26 Feb.	268	987	6	—	25	26	...	...	4	4	548	1,968
Chile	2 Apr.	946	1,477	—	...	8	10	...	...	22	33	54	161
Uruguay	*	...	...	...	...	...	...	...	...	...	...	...	...

\* No 1983 reports yet received, therefore 1982 data not shown.

— No cases

... Data not available



December 1982 exceeded the maximum number of cases which would have been expected for the period.

**TABLE 3. Number of poliomyelitis cases admitted to Children's Rehabilitation Clinic and Polio Institute, by vaccination history. Guatemala, July - December 1982.**

Vaccination history	Number of cases	Percent
None	69	55.2
One dose	27	21.6
Two doses	7	5.6
Three doses	14	11.2
Unknown	8	6.4
Total	125	100.0

1983 began with 29 cases reported in January, slightly fewer than those reported in December 1982. Children under 3 accounted for 89.7 percent of these cases, with almost half the cases occurring in 1-year olds (Table 4).

**TABLE 4. Number of poliomyelitis cases admitted to Children's Rehabilitation Clinic and Polio Institute, by age. Guatemala, January 1983.**

Age group	Number of cases	Percent
Less than 1 year	8	27.6
1 year	14	48.3
2 years	4	13.8
3 years	2	6.9
4 years	1	3.4
Total	29	100.0

Over 65 percent had a history of no vaccination and 24.2 percent had received only one dose of vaccine (Table 5). No deaths were reported in January.

The Nutrition Institute of Central America and Panama (INCAP) has made a preliminary report showing that of 101 specimens processed up to 25 January, four were negative, 66 showed cytopathic effects characteristic of enteroviruses and 9 were identified as polioviruses. Of the latter

group, one was poliovirus type 1, three were type 3 and five have not yet been identified.

**TABLE 5. Number of poliomyelitis cases admitted to Children's Rehabilitation Clinic and Polio Institute, by vaccination history. Guatemala, January 1983.**

Vaccination history	Number of cases	Percent
None	19	65.6
One dose	7	24.2
Two doses	1	3.4
Three doses	1	3.4
Unknown	1	3.4
Total	29	100.0

The following control measures have been adopted:

1) Design of an epidemiological form for case reporting and a form for weekly reporting of surveillance information.

2) Coordination with the Children's Rehabilitation Institute and Polio Clinic to assure immediate reporting of all cases admitted.

3) Notification of all cases to the respective health area to ensure that visits are made to each patient's home, and to houses in the same and adjacent blocks. The purpose of these visits is to look for other cases of paralysis and to vaccinate any children under 3 who have not previously received any polio vaccine or who have not completed the three-dose series.

4) Coordination with INCAP to assure that it receives specimens to carry out virus isolation and antibody titration.

The following recommendations were made:

- Determine actual polio vaccination coverage in children under 3 in affected areas.
- Vaccinate susceptible children under 3 years of age.
- Gradually replace the vaccination campaigns with permanent, routine immunization activities.

Source: Epidemiology Division, Ministry of Health, Guatemala.

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