



# EPI Newsletter

## Expanded Program on Immunization in the Americas

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IMMUNIZE AND PROTECT YOUR CHILD

August 1982

### Polio Surveillance

#### Dominican Republic

The Dominican Ministry of Health has reported 150 cases of poliomyelitis for the period 1 January-15 August 1982. The date of onset of the last reported case was 23 July.

Vaccination histories were obtained for 129 cases. They showed that 37 percent of the persons affected had received no poliomyelitis vaccine, 30 percent had received only one dose, 14 percent had received two doses, and 5 percent had received three doses. In 14 percent of the cases the vaccination history was unknown.

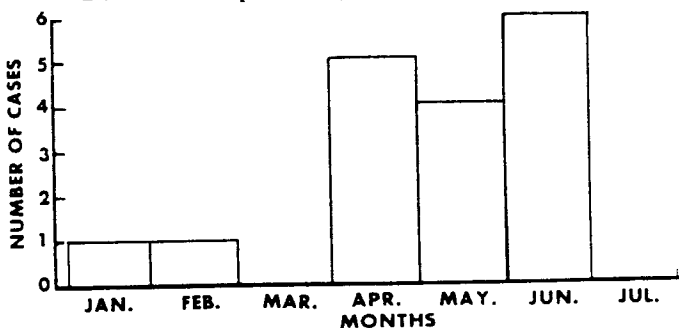
Poliovirus type 1 has been isolated in several of the cases.

The available age-distribution data reveal that 92 percent of the cases occurred in children under 3 years of age, with 43 percent of all cases recorded in children under 1 year of age. The majority of cases (75 percent) occurred in rural areas, while 25 percent were reported in urban areas.

A closer look at this year's polio outbreak was afforded by the Secretariat of Public Health and Welfare (SESPAS) in its report on the 18 poliomyelitis cases admitted to Arturo Grullon Hospital in Santiago as of 18 June. Investigation revealed that the cases came from five different health districts whose 1981 population totaled approximately 1,406,500, or about 25 percent of the country's total population.

Figure 1 shows the number of suspected paralytic poliomyelitis cases reported by month. The first case was reported in January 1982 with the last suspected case occurring on 11 June. As of 18 August no additional cases had been reported.

FIGURE 1. Number of suspected poliomyelitis cases admitted to Arturo Grullon Hospital, by month of onset.\* Santiago, Dominican Republic, 1 January-18 August 1982.



\*Information not available for one case.

ring on 11 June. As of 18 August no additional cases had been reported.

Table 1 shows the age distribution and Table 2 the vaccination history of the 18 cases. Approximately two-thirds of the cases came from urban areas and two-thirds occurred in males. It is important to note that 94 percent of all cases occurred in children who had not received the three doses of polio vaccine, and that 78 percent (14 cases) occurred in children under 2 years of age.

TABLE 1. Age distribution of poliomyelitis cases admitted to Arturo Grullon Hospital. Santiago, Dominican Republic, 1 January-18 June 1982.

Age	Number of cases	Percent
Less than 1 year	7	39%
1 year	7	39%
2 years	4	22%
Total	18	100%

TABLE 2. Vaccination histories of poliomyelitis cases admitted to Arturo Grullon Hospital, Santiago, Dominican Republic, 1 January-18 June 1982.

Number of doses received	Number of children	Percent
None	8	44%
One dose	6	33%
Two doses	3	17%
Three doses	1	6%
Total	18	100%

Tissue cultures and serological studies performed on lab specimens from nine cases reveal poliovirus type 1 was involved in the outbreak.

SESPAS made the following recommendations:

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- Intensify vaccination activities in those areas most affected.
- Improve supervision at all levels of the cold chain and insist that vaccines be kept at the proper temperatures.
- Request the Office of National Statistics to provide the latest census data to assess coverage.

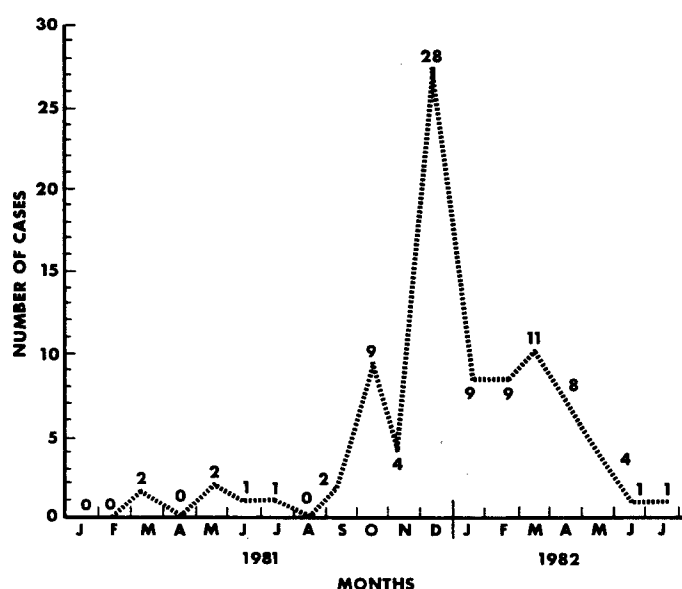
Source: State Secretariat of Public Health and Welfare, Dominican Republic.

## Paraguay

Paraguay's Ministry of Health has reported 43 suspected cases of poliomyelitis for 1982 as of 23 July. For the 19-month period January 1981-July 1982, 92 cases of poliomyelitis were reported.

Figure 2 shows the evolution of the outbreak, which had its peak in November-December 1981.

FIGURE 2. Number of reported cases of paralytic poliomyelitis, by months of onset. Paraguay, January 1981-July 1982.



Of the 61 cases admitted to the Tropical and Infectious Disease Hospital in Health Region V between September 1981 and May 1982, 18 were less than 1 year of age, 39 were 1-6 years of age, two were 7-14 years of age, and two were 15 years or older. There were 10 deaths among the cases admitted to the hospital, five in children under 1 year of age and five in children 1-6 years of age.

The vaccination histories of the 61 cases are shown in Table 3. Seventy percent of these cases never received any doses of poliomyelitis vaccine.

Most of the cases (55) have been reported in Health Region V which encompasses the capital of Asunción.

The control measures instituted include intensification of health-education and vaccination activities.

Source: Ministry of Public Health and Welfare, Paraguay.

TABLE 3. Vaccination history of poliomyelitis cases admitted to the Tropical and Infectious Disease Hospital. Paraguay, September 1981-May 1982.

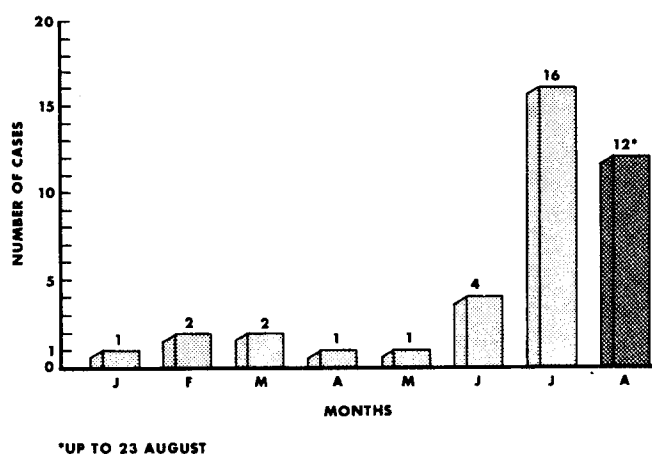
Number of doses received	Number of cases	Percent
None	43	70%
One dose	12	20%
Two doses	4	7%
Three doses	2	3%
Total	61	100%

## Guatemala

Guatemala's Health Ministry has reported an outbreak of 28 paralytic poliomyelitis cases, including two deaths, for the period 1 July-20 August. This brings the total number of cases reported in 1982 to 39.

Figure 3 shows the distribution of 1982 cases by month of onset.

FIGURE 3. Distribution of poliomyelitis cases by month of onset. Guatemala, January-July 1982.



The age distribution of the 28 poliomyelitis cases reported in July-August is shown in Table 4. It can be seen that 69 percent of the cases occurred in children less than 2 years of age.

TABLE 4. Age distribution of reported poliomyelitis cases. Guatemala, 1 July-20 August 1982.

Age	Number of cases	Percent
Less than 1 year	8	29%
1 year	11	39%
2-3 years	9	32%
Total	28	100%

The vaccination histories of the 16 cases reported in July are presented in Table 5. Sixty-three percent of the cases had no history of vaccination with poliomyelitis vaccine.

Thirty-one percent of these cases were reported in the city of Guatemala, and 69 percent from other departments of the country.

**TABLE 5. Vaccination histories of reported poliomyelitis cases. Guatemala, July 1982.**

Number of doses received	Number of cases	Percent
None	10	63 %
One dose	5	31 %
Two doses	—	—
Three doses	1	6 %
Total	16	100 %

The control measures adopted by the Ministry of Health include:

- Coordination between the Institute for Infant Rehabilitation and Polio Clinic in order to identify immediately all cases admitted.
- House-to-house visits in all affected areas to seek out additional cases of poliomyelitis, and identify those children not vaccinated or only partially vaccinated against poliomyelitis.
- Vaccination of all children who have no immunization record or who have not been fully immunized with three doses of TOPV.
- Coordination with the Nutrition Institute of Central America and Panama (INCAP) to obtain laboratory confirmation of the type of poliovirus involved in the outbreak.

Source: Ministry of Public Health and Welfare, Guatemala.

**Editorial note:** For any immunization program to be truly effective in poliomyelitis control, all children must be vaccinated with three doses of poliomyelitis vaccine by the time they reach their first birthday. This is one of the goals of the EPI, which all countries in the Region of the Americas are implementing.

The preceding reports illustrate once more the low levels of immunization coverage thus far achieved in many countries of the Americas. The great majority of cases reported in these three countries had received only one dose of vaccine or none at all (94 percent in Guatemala, 90 percent in Paraguay and 77 percent in the Dominican Republic). This pattern has also been observed in Jamaica's recent polio outbreak (see *EPI Newsletter* Vol. IV, No. 3).

The data presented also underline the need to direct vaccination towards children under 1 or 2 years of age: over half of the cases in these countries have occurred in children under 2 years old, and 30 percent of cases in children under 1.

Unless immunization programs receive greater priority, it is unlikely that the preventable childhood diseases will be brought under control. The 35th World Health Assembly in May 1982 called attention to this fact and recommended a Five-Point Action Program for the 80s to be implemented by Member States to achieve the goals of the EPI by 1990. This program calls on countries to: 1) promote EPI within the context of primary health care; 2) invest adequate human resources in EPI; 3) invest adequate financial resources in EPI; 4) ensure that programs are continuously

evaluated and adapted so as to achieve high immunization coverage and maximum reduction in target-disease deaths and cases, and 5) pursue research efforts as part of program operations (see *EPI Newsletter* Vol. IV, No. 2).

## EPI Evaluation in Peru

From 4 to 22 January Peru's Ministry of Health conducted a multidisciplinary evaluation of its Expanded Program on Immunization in collaboration with the Pan American Health Organization (PAHO).

The evaluation group comprised 14 Health Ministry officials, seven PAHO staff members, and an observer from Brazil.

In the course of the evaluation visits were made to the Health Regions of Arequipa, Cuzco, Loreto, Piura, and Metropolitan Lima. Data were collected at two levels—the administrative and the operational—on two standard forms, and visits were made to a total of nine hospital areas, 21 health centers, and 15 health posts.

After analyzing the data collected, the groups drew up a report on program achievements and problems, as well as recommendations for the future.

The group noted that, although Peru's EPI had been started two years before, the immunization coverages achieved in 1980 were quite low. The national coverage of children under 1 year of age in 1980 was calculated to be about 15 percent for the third dose of DPT and polio vaccine, 21 percent for measles vaccine, and 52 % for BCG. Adequate tetanus toxoid protection had been provided to less than 5 percent of all expectant mothers.

The group also drew up a timetable for implementation of the recommendations this year.

The principal achievements, problems, and recommendations in connection with Peru's EPI are presented below.

### Achievements

**Programming:** An EPI Manual of Operations has been produced which has made it possible to provide programming down to the health-post level.

**Funding:** Extrabudgetary funding has been allocated for the acquisition of biologicals, equipment and supplies through a loan arranged between the Government of Peru and the World Bank.

The Plan of Coordinated Health Actions for 33 hospital areas, covering about 50 percent of the population, gives high priority to immunizations.

**Coordination:** Efforts are being made at the peripheral level to coordinate the institutions in the sector.

**Promotion and community participation:** Preclinical talks are routinely given in most health establishments and mothers' clubs.

**Supervision and evaluation:** Efforts are in progress to increase the frequency of supervision at the peripheral level.

**Cold chain and supplies:** The cold chain has been implemented in most health institutions, thus assuring proper vaccine preservation.

Peru's participation in PAHO's Revolving Fund makes it possible to obtain high quality, potent vaccines, delivered on a timely basis and at low cost.

Personnel are being trained for cold-chain maintenance.

**Training:** All personnel involved in EPI operations at the regional and area levels have been given some type of training based on the EPI Manual of Operations and the self-instructional modules.

Courses, workshops, and seminars have been held at different levels with representatives of the Social Security (IPSS), the Armed Forces' health establishments, and universities. In addition, the EPI training modules have been introduced in the School of Public Health.

Programs on refrigerator maintenance training and instruction have been conducted for personnel in all health regions, in coordination with the National Industrial Training Service (SENATI).

**Information and surveillance system:** A reporting system exists which regularly supplies data on the vaccine doses administered and numbers of cases.

## Problems

**Programming:** Most local-level personnel have no part in programming vaccinations in the health establishment, and therefore feel no commitment to implementing the program.

Population data are estimated, and are not updated by local studies or censuses. The population figures are overestimated and do not correspond to population growth based on preliminary 1981 census data.

**Funding:** The EPI budget is insufficient. It is observed that, in practice, and despite the priorities assigned in the National Plan of Coordinated Health Actions (PNACS), no adequate budgetary provision is made for preventive measures, including the EPI.

Slow administrative procedures make it difficult to use funds on schedule and thus improve program performance.

**Coordination:** Coordination is practically nonexistent among the different directing offices and their staffs at the central and regional levels.

There is at present no clear demarcation of areas of responsibility among operational units, and the structure proposed would in some cases duplicate functions, a situation which should be corrected.

**Vaccination strategies:** The strategies of applying the different vaccines simultaneously and in quarterly rounds in rural areas are not being fully implemented.

In some hospital areas there have been cultural impediments to implementation of the recommended strategies.

The most widely used strategy is response to demand, and community participation is very limited.

The scarcity of funds impedes the use of more active

strategies.

**Promotion and community participation:** The tradition of community participation is being lost due to a lack of communication and educational promotion work.

Health education programs have been deteriorating because of failure to use the most appropriate and effective means, and demand has declined in consequence.

**Supervision and evaluation:** Though there is a timetable for supervision, it cannot be adhered to because of a lack of funding.

In general, guidelines and procedures for supervision and evaluation are not well defined.

**Cold chain and supplies:** Some refrigerators and thermometers have yet to be supplied.

Refrigerator temperatures are not yet checked and recorded daily.

Funds are needed for the purchase of fuel and spare parts (tubes and wicks) for kerosene refrigerators.

Supplies of some vaccines have been lacking at different levels. This situation is caused by various factors, such as:

- Delays in polio vaccine deliveries;
- Delays in dispatching biologicals by the Office of Supply and Auxiliary Services (DASA);
- Lack of petty-cash funds from which to pay freight charges.

In most health regions the local storage centers for biologicals have not yet gone into operation—even though they have been provided with freezers—because their place in the administrative structure has yet to be decided.

There is a shortage of hypodermic syringes and needles at all levels.

There is no system for cold-chain equipment maintenance despite the availability of trained personnel.

**Training:** It is necessary to complete the instruction and training of local-level and recently hired health personnel.

There has been no upgrading of trained personnel. Constant rotation of personnel interferes with program progress.

The EPI Manual of Operations needs to be revised, updated, reprinted and distributed.

There is no Manual of Procedures for refrigerator maintenance.

**Reporting and supervision system:** Data on vaccinations and case notifications are reported on different forms.

Information is received up to three months late.

There is underreporting and underrecording of cases.

Except for poliomyelitis, cases of communicable diseases in vaccinated persons are neither reported nor recorded.

No cumulative record is kept of notified cases or vaccinations administered at the operational level (health centers and health posts).

There is no systematic investigation of notified cases.

## Recommendations

**Programming:** Local-level health personnel should be involved in the program.

Censuses should be conducted in small communities and scattered rural populations, as well as peripheral urban areas.

The data obtained in the 1981 census should be used in EPI programming.

**Funding:** The budgets for 1982 and thereafter should provide all funds requested for the purchase of biologicals and other EPI materials.

The EPI budget should be increased in order to realize the stated priorities of the National Plan of Coordinated Health Actions. This increase is needed to speed up program execution and improve transportation and supervision.

Administrative procedures should be streamlined so that funds may be used on schedule.

**Coordination:** Proposed structures should be studied in order to avoid duplications and define responsibilities so that the coordination mechanisms can function properly.

**Vaccination strategies:** The simultaneous vaccination strategies should be implemented in accordance with EPI norms; a specific time and place should be set aside for vaccinations in health establishments.

Local cultural characteristics should be studied so that in each region the most effective strategy to increase coverage may be used, such as vaccinations performed house-to-house, by population concentration, and by mobile teams.

Community participation should be intensified.

**Promotion and community participation:** The mass information and education media should be promoted and used to increase vaccination coverages.

A situational diagnosis of cultural characteristics should be made so that the educational media used by the health team can be strengthened, especially at the peripheral level.

**Supervision and evaluation:** A study should be made of the possibilities for providing funds for supervision and evaluation activities.

Guidelines and procedural norms for supervision and evaluation need to be formulated.

Supervisory activities should be institutionalized as a permanent function of all components of the health care system.

**Cold chain and supplies:** It is necessary to complete the provision of refrigerators and thermometers to each health establishment.

Daily checking and recording of refrigerator temperatures should be made obligatory.

Adequate quantities of good quality kerosene, as well as tubes and wicks, should be provided.

The supply of vaccines through the Revolving Fund should be assured, and payments made promptly.

Responsibility for the distribution of biologicals should be shifted from the EPI to the Office of Technical Support.

Local centers for storing biologicals should finally be made operational.

A maintenance system should be established which will guarantee cold-chain operations, assuring that trained personnel are employed and provided with the necessary materials.

**Training:** Those health regions which have not yet completed training their personnel should do so.

The skills of trained personnel should be upgraded through workshops and continuing education, and the frequency of rotations should be reduced.

A refrigerator maintenance manual should be prepared.

The EPI Manual of Operations should be revised, updated and reprinted.

**Information and surveillance system:** The monthly vaccination report form (as amended in 1982) should be introduced.

The processing and dispatch of data to all levels needs to be streamlined.

Ways should be found to motivate persons and institutions outside the Health Ministry in order to reduce the underrecording and underreporting of cases.

It is necessary to promote improved recording and specific studies of vaccination histories in cases of the EPI target diseases.

All health establishments should maintain partial and cumulative records of numbers of cases and vaccine doses administered.

Improved reporting should be encouraged by systematic investigation of reported cases.

**Follow-up:** The evaluation team should meet every two months under the direction of the Director General of Health Services to review implementation of the recommendations of this evaluation and report to the Minister of Health on EPI progress.

Another program evaluation should be made in the first half of 1983.

## Quality Control of Biologicals

### Role of WHO/PAHO in the Americas

Standards and testing laboratories are the essence of all activities related to vaccine quality control. Standards are necessary to ensure that similar products have comparable potencies, to establish the relationship between dose and effect, and to eliminate risk from specific hazards. Testing laboratories provide the tools to verify that specific products meet the established requirements.

Vaccine testing has grown increasingly more specialized and requires the application of many different technologies. Perhaps the most important tests are those of **potency** (protective capability) and **safety** (absence of immediate or long-term risks to the vaccinee). Because of the community approach to immunization and the extension of vaccination services to outlying areas, another parameter which has acquired increased importance is **stability**, especially stability to heat.

Any vaccine that is likely to produce undesirable nervous complications should be tested for neurovirulence (NVT) in an Old World monkey such as the *Macaca* or the *Cercopithecus*, using a homologous vaccine for reference pur-

poses. In the case of live polio vaccine, each lot is tested for NVT. In the case of yellow fever and measles vaccines, however, only the primary and/or secondary seed is tested for NVT; the NVT is also performed whenever the seed is replaced by a new one, or if the existing seed has been manipulated genetically to produce a more purified preparation.

Between 1964 and 1980 WHO developed a sizable collection of reference substances that comprises 90 standards, 98 reference preparations, and 150 different reagents for antibiotics, antibodies, antigens, blood products, and endocrinological substances. No fewer than 67 of these international preparations have been established in the last five years and the demand for new reference preparations is increasing. It is interesting to note that more than half of the standards distributed go to developing countries and are used in controlling the quality of imported or locally-produced vaccines. National standards and reference preparations from the United States, Canada and Japan are also being used in Latin America.

In addition to establishing international standards, WHO has published the requirements for the manufacture and control of 31 different vaccines and sera. These requirements were updated in 1980-81 to be consistent with the use of modern technologies, new needs arising from the shortage of monkeys, and the increased emphasis on economical laboratory procedures for testing the viral-infectivity titer as well as the heat stability of vaccines. WHO has either newly approved or recently revised the requirements for the following vaccines: BCG, DPT, hepatitis B (inactivated), influenza (live and inactivated), measles (live), meningococcus polysaccharides, poliomyelitis—attenuated (oral) as well as inactivated (killed)—rabies (human and veterinary) and rubella (live).

WHO standards and reference preparations for vaccines are in the custody of three international laboratories: the Statens Seruminstitut in Copenhagen, the National Institute for Biological Standards and Control in Mill Hill, London, and the Central Veterinary Laboratory in Weybridge, London. They are available as lyophilized preparations for most of the vaccines commonly used in public health immunization programs:

**Bacterial:** BCG

Cholera - Inaba and Ogawa  
Typhoid - phenol killed and acetone killed  
Pertussis - plain

**Toxoids:** Diphtheria toxoid - plain and adsorbed  
Tetanus - plain and adsorbed

**Viral:** Rabies - human diploid tissue culture  
Polio - inactivated (Salk), types 1, 2, 3

So far, no WHO vaccine standards are available for measles, live attenuated polio types 1, 2 and 3, live attenuated influenza or yellow fever vaccines.

The international standard for diphtheria toxoid has been replaced and the second standard is now available from the Statens Seruminstitut in Copenhagen; the standard for pertussis vaccine is being replaced and the new

standard will be established by the National Institute for Biological Standards and Control (NIBSC) in London. The first WHO reference preparations for titration of live polio types 1, 2 and 3 (Sabin type) are also available from NIBSC. References are also available from WHO for testing the neurovirulence of polio types 1 and 3. Work is in progress at NIBSC for the establishment of the first WHO reference preparation for yellow fever 17D vaccine which was produced at Burroughs Wellcome Laboratory. As soon as an international collaborative study confirms its acceptability it will be available to national laboratories; until then, yellow fever vaccine production laboratories in the Americas are advised to use the U.S. reference vaccine or a lot of a vaccine with proven efficacy and safety—provided, of course, that it is also approved by the national control authorities. As the old seed is exhausted, a new WHO primary seed lot for yellow fever vaccine has been prepared at the Robert Koch Institute in West Germany; it should soon be available to manufacturers of yellow fever vaccine.

Another important aspect of the WHO/PAHO program in biological standardization is the development of national capabilities for testing vaccines. Guidelines for preparing reference materials (Annex 4, TRS 626, 1978) and for establishing national control laboratories (Annex 11, TRS 658, 1981) have been distributed to control laboratories. (Copies of the requirements and guidelines are available from WHO/PAHO on request.) Three courses which trained 40 Latin American controllers were held in 1978-79. The national laboratories in Mexico, Cuba, Brazil, Argentina, Costa Rica, Colombia and Honduras have received material and technical assistance to enable them to assay the potency of viral vaccines. A manual on microtitration procedures for the assay of the viral content of live vaccines has been made available in English and Spanish.

In an effort to provide reference services to the national vaccine control laboratories, WHO has designated international laboratories where vaccines can be tested. PAHO has also appointed regional reference laboratories to service national control laboratories in the Region. The Bureau of Biologics of the U.S. Food and Drug Administration provides testing services, training, and reference preparations for yellow fever vaccines (Division of Virology, Dr. Paul Albrecht) as well as for diphtheria, tetanus, and pertussis vaccines (Division of Bacterial Products, Dr. Charles Manclark). The National Virology Institute in Mexico (Dr. Julio de Mucha Macas, Director) provides services for the assay of polio and measles vaccines, and the Pan American Zoonoses Center (CEPANZO) in Buenos Aires provides such services for BCG and rabies vaccines.

While Latin American governments have made an appreciable effort to improve their control activities in recent years, much remains to be done in order to assure and maintain the maximum effectiveness of immunization programs. Governments should give increased support to their control laboratories so that they may become self reliant. Such a goal is technically feasible, given the resources available within the Region, and PAHO is eager to assist

# Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria and whooping cough, from 1 January 1982 to date of last report, and for same epidemiological period in 1981, by country.

Country	Date of last report	Tetanus												Whooping Cough	
		Measles		Poliomyelitis		Non-neonatorum		Neonatorum		Diphtheria					
		1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981		
NORTHERN AMERICA															
Canada	10 Jul.	666	1,787	—	—	4 <sup>a</sup>	1	...	...	3	3	998	1,138		
United States	7 Aug.	1,123	2,471	3	1	44	36	...	...	1	3	693	666		
CARIBBEAN MIDDLE AMERICA															
Antigua and Barbuda	26 Jun.	—	247	—	—	—	—	—	—	—	—	—	—		
Bahamas	7 Aug.	21	31	—	—	2	—	—	2	—	—	5	7		
Barbados	24 Jul.	3	—	—	—	3	6	—	—	1	7	9	3		
Belize	17 Aug.	4	184	...	...	3	2	...	...	4	...	...	55		
Cuba	15 May	19,342	3,059	—	—	9	11	—	—	—	—	382	53		
Dominica	5 Jun.	1	—	—	—	—	—	—	—	—	—	4	1		
Dominican Republic	30 May	...	...	150 <sup>b</sup>	...	...	...	...	...	...	...	...	...		
Grenada	31 Jul.	350	8	—	—	3	1	—	—	—	—	—	—		
Haiti	27 Feb.	122	2,029	1	—	20	117	10	—	8	14	71	400		
Jamaica	29 May	1,246	3,418	54 <sup>c</sup>	—	3 <sup>d</sup>	3	— <sup>d</sup>	3	3	3	80 <sup>d</sup>	7		
Saint Lucia	10 Apr.	59	16	—	—	1	—	...	...	—	—	—	114		
St. Vincent and the Grenadines	3 Jul.	664	1	—	—	— <sup>e</sup>	—	— <sup>e</sup>	—	—	—	—	1		
Trinidad and Tobago	12 Jun.	625	2,646	—	—	8 <sup>f</sup>	5	—	—	2	3	1 <sup>f</sup>	7		
CONTINENTAL MIDDLE AMERICA															
Costa Rica	10 Jul.	66	91	—	—	9	5	—	—	—	—	16	126		
El Salvador	3 Jul.	2,805	5,616	12	39	26	23	48	51	1	1	1,089	1,177		
Guatemala	26 Jun.	2,757	1,689	39 <sup>g</sup>	27	34	42	...	...	9	14	597	664		
Honduras	10 Jul.	1,883	1,798	8	8	16	10	—	1	—	—	920	616		
Mexico	...	...	...	...	...	...	...	...	...	...	...	...	...		
Nicaragua	...	...	...	...	...	...	...	...	...	...	...	...	...		
Panama	29 May	2,719	1,030	—	—	1	10	7	6	—	—	19	60		
TROPICAL SOUTH AMERICA															
Bolivia	30 Jan.	117	353	—	3	13	12	...	...	2	2	171	286		
Brazil	24 Apr.	7,544	17,968	1	34	686	849	...	...	1,137	1,194	14,849	13,608		
Colombia	27 Mar.	2,808	4,042	11	59	137	163	...	...	21	39	1,266	1,417		
Ecuador	3 Apr.	391	1,606	3	7	9	21	10	7	3	4	468	133		
Guyana	3 Apr.	8	19	—	—	...	...	...	...	—	—	...	35		
Paraguay	26 Jun.	140	282	43 <sup>h</sup>	6	31	37	56	45	9	3	212	278		
Peru	17 Jul.	1,302	3,962	99	100	36	189	...	...	5	52	1,005	2,146		
Suriname	28 Mar.	17	596	—	—	...	...	...	...	—	1	1	...		
Venezuela	17 Jul.	7,664	13,177	—	—	...	...	...	...	2	4	1,203	2,045		
TEMPERATE SOUTH AMERICA															
Argentina	28 Feb.	822	2,684	...	...	...	36	...	...	4	10	1,808	4,982		
Chile	( <sup>i</sup> )	...	2,126	...	...	...	13	...	...	...	142	...	1,671		
Paraguay	29 May	58	660	—	—	10	4	1	1	—	—	315	148		

<sup>a</sup>12 June  
<sup>b</sup>15 August  
<sup>c</sup>25 June  
<sup>d</sup>1 May

<sup>e</sup>24 April  
<sup>f</sup>29 May  
<sup>g</sup>20 August  
<sup>h</sup>23 July

<sup>i</sup>Data not available for 1982; data for 1981 through last epidemiological week in August.

— No cases  
... Data not available

governments in achieving it.

**References:** Biological Substances, WHO publication, 1982; WHO Technical Report Series (TRS) 626, 1978; WHO TRS 444, 1970, WHO TRS 658, 1981.

## Measles Complications in Children Under 2 Years of Age

In Bangladesh a retrospective study of the mid-term complications resulting from a measles outbreak in children under 2 years of age was carried out by the International Centre for Diarrhoeal Disease Research (ICDDR). The outbreak occurred in the rural area of Matlab in March-April 1980 and complications were investigated five months later.

At the time of their occurrence, cases were identified by field assistants who had no formal medical training. A sample of the identified cases was verified by the resident doctors of Matlab who showed a 99 percent correlation with the identifications by the field assistants.

Of the 2,219 measles cases in the epidemic, 763 (34.4 percent) occurred in children under 2 years of age. A 10 percent sample of these (75 cases) was chosen for the study. Controls without measles (matched for age and residence) were chosen from available data gathered by the ICDDR's comprehensive Demographic Surveillance System which covers 149 villages with a total population of about 180,000.

The mean duration of the disease was 7.5 days with a standard deviation of 3.9 days. Of the 75 cases, 31 occurred in children under 6 months of age, 19 in children 6-12 months of age, 16 in children 13-18 months of age, and 10 in children 19-24 months of age. The youngest case occurred in a child 67 days old.

Fifty-two of the 75 cases (69 percent) had at least one of the complications classically associated with measles. Children who had a rash lasting less than seven days had more complications than those who had measles for longer.

There were significant associations between the duration of rash and difficulty in respiration, ear discharges, length of diarrhea and conjunctival dryness.

Children under 1 year of age developed significantly more complications than those between 1 and 2 years of age. Complications were highest in the 7-12 month age group. The one death among the 75 cases occurred in a 23-month-old child and was caused by dehydration due to diarrhoea.

There were significant differences between the cases and the controls in the frequency of coughs, difficulty in respiration, conjunctival dryness and the presence of mucoid, bloody or other type of diarrhoea. The conjunctival dryness was directly related to the incidence and duration of diarrhoea.

The complications most often mentioned were as follows: difficulty in respiration (28 percent of cases); ear discharge (16 percent); various types of diarrhoea (92 percent); and conjunctival dryness (21 percent).

In light of these findings, further areas for research were identified, such as an examination of the interaction of nutrition and measles, the effect of measles in terms of weight loss and vitamin A levels, and socio-cultural attitudes towards measles in Bangladesh.

**Source:** *Glimpse* (Newsletter of the International Centre for Diarrhoeal Disease Research, Bangladesh) 3(12):1-3, 1981.

## Chile Aids Revolving Fund Capitalization

The Government of Chile has contributed \$11,253 to the EPI Revolving Fund for vaccine purchases. Previous contributions have been made by the Netherlands, Barbados, Cuba, Mexico, Panama, the Cayman Islands, the East Leo Club of Trinidad and Tobago, and the Bahamas.

Fund capitalization now totals \$2,325,753, or 58 percent of the \$4,000,000 considered necessary for smooth, efficient operations.

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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.

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