EPI Newsletter

Expanded Program on Immunization in the Americas

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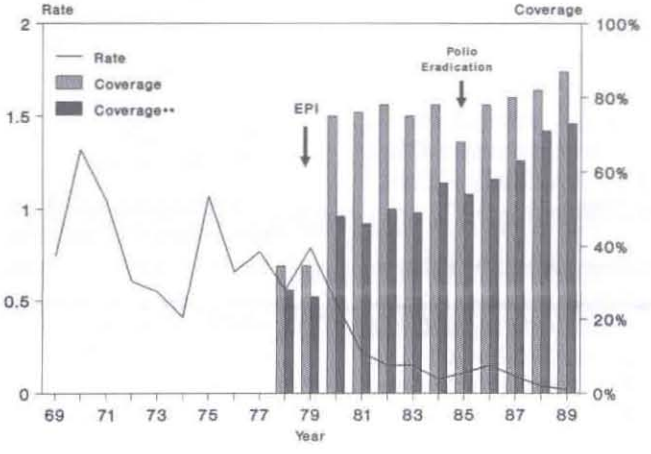
Update: Progress Toward Eradicating Poliomyelitis from the Americas

In May 1985, the Pan American Health Organization (PAHO) established a plan for eradicating the indigenous transmission of wild poliovirus from the Region of the Americas by the end of 1990 (1). In response to this initiative, PAHO's Expanded Program on Immunization (EPI) implemented a program strategy that included 1) achievement and maintenance of high poliomyelitis immunization levels through accelerated immunization efforts, including national immunization days held twice a year at least four weeks apart; 2) surveillance to detect all new cases of acute flaccid paralysis (AFP); and 3) a rapid, vigorous response, including containment measures, to all new cases of paralysis (2). This report updates efforts through 1989 toward the polio eradication initiative and provides preliminary laboratory surveillance data for 1990.

Through 1989, rates of reported paralytic poliomyelitis continued to decline substantially, coincident with a doubling in oral poliovirus vaccine (OPV) coverage in young children (Figure 1). In 1988, regional estimates of OPV coverage with three doses of vaccine in children by 1 year of age were >70%; in 1989, this estimate reached an all-time high of 73%. Although polio vaccination levels should be

Figure1. Rate of reported paralytic poliomyelitis and oral polio vaccine coverage in children under one year of age - the Americas, 1969-1989



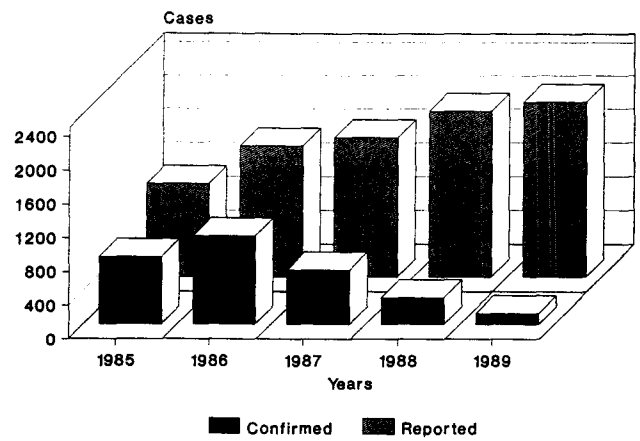
* Excludes Brazil, Cuba, Mexico, and Paraguay, which regularly hold two national vaccination campaigns a year, and therefore only apply two doses per year.

In this issue:

interpreted with caution because of changes over time in the methodology for assessing coverage (3), results such as these are encouraging for the rest of the world.

The intensification of surveillance activities in 1986 resulted in a nearly twofold increase in the number of AFP cases that were investigated and reported, from 1 100 in 1985 to 2 094 in 1989 (Figure 2). Despite yearly increases since 1986 in reported AFP cases, however, the number of AFP cases confirmed* as poliomyelitis decreased to 130 in 1989, representing an 86% decline from the 930 cases confirmed in 1986 and a 62% decline from the 340 cases confirmed in 1988. These polio cases were located in 99 (0.7%) of the 14 372 counties in Latin America.

Figure 2. Reported and confirmed polio cases by year - the Americas, 1985-1989



For 1989, of the 2 094 reported AFP cases in the Region of the Americas, 1 964 were determined not to be polio. For 703 of these cases determined not to be polio, a final diagnosis was submitted to the regional PAHO office and was available for this analysis. The most common known alternative diagnosis was Guillain-Barré Syndrome (43%), followed by trauma (3%), transverse myelitis (2%), neoplasms (2%), and other diagnoses (50%).

Of the 130 confirmed cases, 24 were caused by culture-confirmed wild poliovirus, and eight were vaccine-related. Of the remaining 98 patients who either died (18 patients), had residual paralysis (61), or were lost to follow-up (19), 36 (37%) had no stool sample taken for virus isolation, and 15 (15%) with negative stools had their stool specimens obtained more than 2 weeks after paralysis onset. (Because the likelihood of virus isolation diminshes with increasing duration between paralysis onset and collection of stool sample, patients for whom stool samples were not taken and patients for whom isolates were negative and stool samples were taken >2 weeks after paralysis onset both should be monitored.)

**Before 1990, a case of AFP was "confirmed" as poliomyelitis if there was: 1) laboratory confirmation (wild-type poliovirus isolated from the stool), 2) epidemiologic linkage to another case of AFP or confirmed case, 3) residual paralysis 60 days after onset, 4) death, or 5) lack of follow-up of a case. Cases of AFP were "discarded" if they did not meet these criteria. In July 1989, routine serologic testing was discontinued in favor of efforts to obtain laboratory confirmation by isolating wild poliovirus from stool.*

When the characteristics of cases caused by wild poliovirus were compared with cases in the other categories, patients with wild poliovirus were more likely than patients who died to be <5 years of age (82% vs. 27%; $p<0.01$).

Of the 24 wild poliovirus cases confirmed in 1989, 16 were type 3 and eight were type 1. These cases were limited to six countries in three geographic regions in the Americas: northwestern Mexico, northern Andean Subregion, and northeastern Brazil. During 1989, 13 wild type 3 cases occurred in Mexico. In the northern Andean Subregion, type 1 wild polioviruses were isolated in Colombia (two cases), Ecuador (two cases), Peru (one case), and Venezuela (one case); type 3 wild polioviruses were isolated in Colombia (three cases). In northeastern Brazil, type 1 wild polioviruses were isolated from two patients.

As of the first 32 weeks of 1990, wild polioviruses had been isolated from three patients with AFP, including type 3 virus from a patient from northwestern Mexico with paralysis onset on February 19, 1990, and type 1 virus from two patients in the northern Andean Subregion (one in Ecuador and one in Peru) with respective dates of paralysis onset of March 26 and April 25, 1990.

As efforts to eradicate polio from the Western Hemishpere proceed, the surveillance of paralytic poliomyelitis has shifted to focus on the surveillance of wild poliovirus. Accordingly, EPI has been using surveillance indicators, such as those assessing the quality of stool collection, to maximize detection of wild poliovirus in persons with suspected polio. Of cases that were confirmed as paralytic poliomyelitis (because of either loss to follow-up, presence of residual paralysis, or death), half were inadequately investigated because stool samples were not obtained or were negative but obtained >2 weeks after paralysis onset. The difference in age distribution between persons with culture-confirmed wild poliovirus and fatal cases provides additional indirect evidence that polio may be overdiagnosed among patients from whom wild poliovirus is not isolated.

During the initial stages of the PAHO eradication effort, surveillance of paralytic poliomyelitis was designed to be highly sensitive; consequently, many reported AFP cases ultimately were determined not to be caused by wild poliovirus. This aggressive approach to case detection by a sensitive surveillance system, combined with immediate action to control outbreaks, has contributed to the containment of wild poliovirus within the two remaining areas of risk: northwestern Mexico and the northern Andean Subregion.

A large number of probable cases are ultimately classified as "confirmed" because adequate diagnostic specimens were not collected or tested or because the patients were lost to follow-up or died (98 [75%] of the 130 confirmed cases in 1989). Consequently, at PAHO's most recent Technical Advisory Group (TAG) Meeting on the EPI and Polio Eradication, held in March 1990 in Mexico City, TAG members recommended the following changes in classification of AFP in the Region of the Americas (4);

*1. **Confirmed poliomyelitis.*** Acute paralytic illness associated with the isolation of wild poliovirus, irrespective of residual paralysis.

2. Vaccine-associated poliomyelitis. Acute paralytic illness in which vaccine-like poliovirus is isolated and is believed to be the cause of the disease. Vaccine-associated cases should be reported separately. They are considered as a category separate from confirmed polio with wild poliovirus isolates.

3. Polio compatible. Acute paralytic illness with compatible residual paralysis at 60 days or death or loss to follow-up in which at least two adequate stool specimens were not obtained within 2 weeks after onset of paralysis and examined in three different laboratories. These cases can neither be confirmed nor discarded. This should be a very small proportion of the cases.

4. Not poliomyelitis. Acute paralytic illness in which at least two adequate stool specimens were obtained within 2 weeks after onset of symptoms and were negative for poliovirus. Aliquots of the original samples should be held at the laboratory for possible future use. To ensure the accuracy of this categorization, any patient who dies, is lost to follow-up, or has residual paralysis at 60 days, should have aliquots of the original specimens examined in two other laboratories in the PAHO network, using all appropriate techniques. If the specimens were adequate and all were negative, these cases should be considered "not polio" and "discarded." This classification represents a major change from the previous system.

Use of the new classification of AFP has been implemented for all patients with dates of paralysis onset since January 1, 1990.

In July 1990, the International Certification Commission of Poliomyelitis Eradication in the Americas[1] (5), convened by PAHO, met for the first time to develop the methodology to certify countries that are polio-free. Although the criteria are not finalized, many of the same procedures that PAHO uses to evaluate polio eradication efforts will also be used by the Commission. The burden of diagnosis and, ultimately, the proof that eradication of transmission of wild poliovirus has been achieved rests with the laboratories. Accordingly, countries need to continue to investigate properly all cases of AFP, and stool specimens obtained from persons with suspected polio must be submitted to the laboratory in adequate condition. The current level of effort must be sustained if polio is to be eradicated from the Americas by the end of 1990 and from the world by the year 2000 (6).

1 The Commission members are: Waldyr Arcoverde, M.D., National Health Foundation, Ministry of Health, Brazil; Isao Arita, M.D., Kumamoto National Hospital, Japan; Rodrigo Guerrero, M.D., Carbajal Foundation, Colombia; Dorothy Horstmann, M.D., Yale University School of Medicine, United States; Jan Kostrzewski, M.D., Polish Academy of Science, Poland; Maureen Law, M.D., International Development Research Center, Canada; Elsa Moreno, M.D., University of Tucumán, Argentina; V. Ramalangaswami, M.D., Nehru University, India; Olikoye Ransome-Kuti, M.D., Ministry of Health, Nigeria; Frederick Robbins, M.D., (Commission Chairman) Case Western Reserve University School of Medicine, United States; Guillermo Soberón, Mexican Foundation for Health, Mexico; and Kenneth Standard, M.D., Caribbean Public Health Association, West Indies.

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4.Pan American Health Organization. Final Report of the Technical Advisory Group. Presented at the VII Meeting of the Technical Advisory Group on EPI and Polio Eradication in the Americas. Mexico City, March 1990
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Editorial Note: This article, as reported by the Expanded Program on Immunization of the PAHO, was published in the Morbidity and Mortality Weekly Report of the Centers for Disease Control, Vol. 39, No. 33, August 24, 1990.

Neonatal Tetanus Control Defining High Risk Areas: The Experience in the Americas

1. Introduction

In May, 1989 the World Health Assembly of the World Health Organization adopted a resolution calling for the elimination of neonatal tetanus (NNT) from the world by the year 1995. The Directing Council of the Pan American Health Organization endorsed this goal at its Meeting in September, 1989.

NNT control can be achieved faster if efforts and resources are concentrated in risk areas of higher incidence. Considering the closeness of the target date, the use of methods to define high risk areas as fast as possible becomes fundamental. What is herewith described is the approach taken by the Pan American Health Organization to achieve this goal by the use of the data provided by the national morbidity/mortality information systems in use in the various member countries.

The identification of these high risk areas will permit policy makers and program managers to start immediate control measures by utilizing strategies suitable to their own health systems, and within the general guidelines outlined by the World Health Organization and the Pan American Health Organization, which recommends that all women of childbearing age be immune against tetanus.

2. Methodology

Definitions - *NNT case*: a disease or death that occurs between the third or thirtieth day of life of a child who initially cried at birth and was normally breast-fed and who

was incapable of sucking after the second day of life. This clinical picture is followed by generalized spasmodic contracture, rigidity and trismus.

High-risk area : geographic unit(s) of a country that reported a higher morbidity of NNT cases than the national average in any of the previous three to five years. This can be measured in total numbers or by rate per 1 000 live births per year and/or by the systematic occurrence of cases in the period of time under review (regardless of the number of cases).

Sources of data - The identification of high-risk areas for NNT was conducted on the basis of morbidity, mortality, demographic, clinical and epidemiological data available through the health information systems at the national, regional and local levels. Additional sources such as periodical medical publications and reports of special studies conducted in some countries included in this review were also used.

The data available on the cases studied covered the last three to five years, although some of the publications reviewed also covered previous periods of time.

Data analyzed included:

a.Case identification, place of origin, age and sex;

b.Date of birth, onset of trismus, hospitalization and release from hospital (depending on the clinical evolution of the disease);

c.Information on the mother: age, vaccination history, prenatal care, number of births;

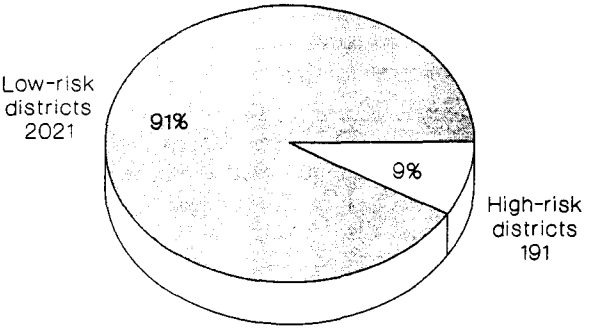
d.Data related to the birth: place of birth and level of training of birth assistant.

Data collection and analysis - The national epidemiological services identified high-risk areas at: regions, states, provinces, counties, districts or other geographical units. In some selected areas, clinical and epidemiological data were collected from hospital records as well. This helped evaluate diagnostic capability as well as the efficiency of the national information system for identifying all cases of the disease. The diagnostic quality was evaluated according to the fitness of the patient to the case definition as described in the clinical record.

3. Results

Of the 2 212 geographic units existing in the 11 countries in which these studies were conducted, it was found that only 191 or 9% were at high-risk for NNT control(Figure 1), contributing 79% of the total cases occurring in these countries (Figure 2). The women of childbearing age living in these areas represent only 21% of the total number of women of childbearing age living in the countries being studied (Figure 3). For example, in the Andean Region (Bolivia, Colombia, Ecuador, Peru and Venezuela), of the 178 districts with higher incidence, only 28 or 16% had incidences higher than 5 NNT cases per 1 000 live births (Figure 4). The population of women of childbearing age residing in these 28 districts represents only 9% of the population living in the high risk areas (Figure 5).

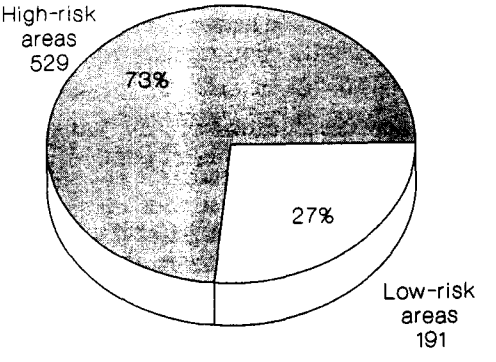
Figure 1: Proportion of Areas at High-Risk for Neonatal Tetanus, Americas, Circa 1988



Total districts: 2 212

Source: PAHO

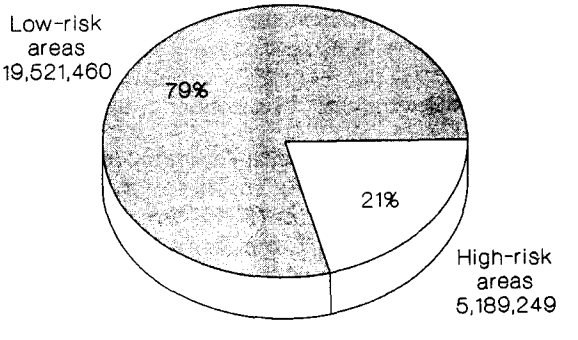
Figure 2: Proportion of Neonatal Tetanus cases in High-Risk Areas, Americas, Circa 1988



Total cases: 671

Source: PAHO

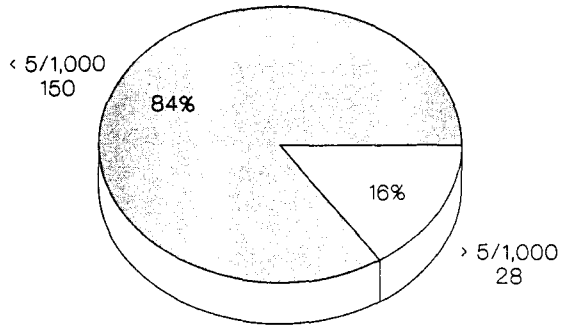
Figure 3: Proportion of Women of Childbearing Age in High-Risk Areas, Americas, Circa 1988



Total population women of childbearing age: 24,710,712 (11 countries)

Source: PAHO

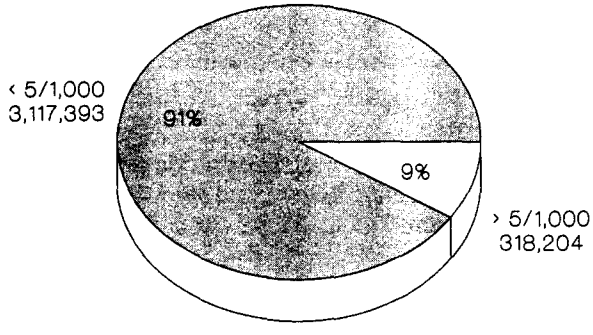
Figure 4: Proportion of Districts with Incidence >5 NNT Cases/1 000 Live Births, Americas, Circa 1988



Total districts at high-risk: 178
(Andean countries)

Source: PAHO

Figure 5: Population of Childbearing Women by Level of Incidence Of NNT, Americas, Circa 1988

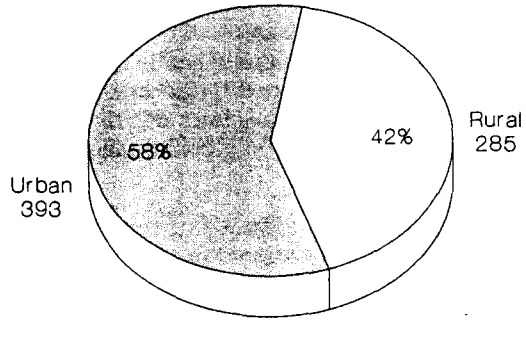


Total women childbearing age: 3,535,597
(Andean countries)

Source: PAHO

The distribution of cases by urban or rural location showed that 58% of the cases occurred in urban areas, where the population has access to both prevention services as well as to prenatal and delivery care (Figure 6).

Figure 6: Distribution of Neonatal Tetanus Cases by Urban or Rural Status, Americas, Circa 1988

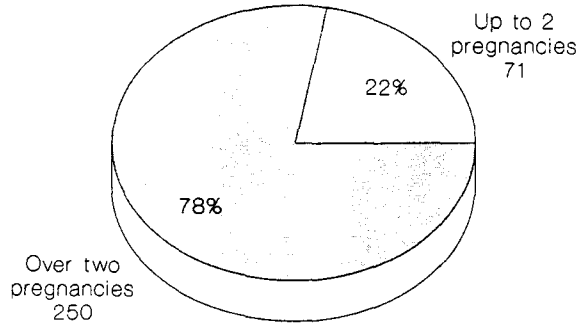


Total cases: 678
(11 countries)

Source: PAHO

The data also showed that 78% of the cases registered occurred in children born from women which had already had at least two pregnancies and therefore had the previous opportunity to have been vaccinated. This may represent missed opportunities for vaccination (Figure 7).

Figure 7: Proportion of Neonatal Tetanus Cases by Number of Pregnancies, Americas, Circa 1988



Total cases: 321
(11 countries)

Source: PAHO

4. Conclusions

4.1. The utilization of data on neo-natal tetanus available routinely through the national morbidity/mortality information systems in the eleven Latin American countries studied in the Americas, provided enough information for the identification of the high risk areas for initiating control of this disease. In many instances these high risk areas were identified at the sub-district level.

4.2. This methodology should be utilized by any country which already has a national morbidity/mortality information system (regardless of its stage of development), as a first step toward the identification of those geographical areas that should be targeted for control measures.

4.3. Once this first step is finalized, control measures should be implemented. The target population should be all women of childbearing age that reside in those areas. This target population should be reached by utilization of all vaccination strategies available, such as during pre-natal visits or any other visit of such women to health facilities, house-to-house vaccination, during attendance at market places and in conjunction with childhood immunization during national vaccination days.

4.4. Simultaneously with the control measures, it is critical that an epidemiological surveillance system be established or improved. For those areas initially classified at low risk for NNT, this system will confirm this status or provide additional information on the disease and for those areas initially targeted, the system will allow the measurement of the impact of the control measures.

First Meeting of the International Certification Commission of Poliomyelitis Eradication in the Americas

Commission members with Technical Advisory Group members and the PAHO Director.

The International Certification Commission, having reviewed the status of poliomyelitis eradication from the Americas, expressed appreciation for the exceptional achievements made to date. They also recognized that much remains to be done in the complex task ahead, and that sufficient data must be assembled to confirm this accomplishment.

The Commission set forth the following provisional criteria that should be met in order for a country to become eligible for certification. At the same time, they recognized that these criteria may change based on further experience:

1. Absence of virologically confirmed indigenous poliomyelitis cases in the Americas for a period of at least three years under circumstances of adequate surveillance.

2. Absence of detectable wild polioviruses from communities as determined by suitable environmental sampling methods and/or stool samples from selected high risk populations.

3. On-site evaluation of national/regional programs by a committee appointed jointly by PAHO and respective member countries, composed of knowledgeable local persons and outside experts. Only after the national/regional committee considers that the criteria have been met will the information be submitted to the International Commission for certification.

4. Appropriate measures are in place to deal with importations.

The Commission expressed the view that it should be the responsibility of the PAHO/EPI Technical Advisory Group to spell out in appropriate detail necessary standards and bench marks to meet the criteria set forth above (see Working Guidelines, below), and emphasized the need for full commitment and active participation by all countries in the Region.

In view of the fact that proof of eradication will depend upon the demonstration by laboratory methods that wild virus is absent from the environment and available methods are not yet entirely adequate, it is considered critical that continuation and expansion of research in this area be given highest priority.

The Commission encouraged the eradication program to exploit its activity so as to promote immunization generally, strengthen and expand surveillance programs, develop an infrastructure supportive of overall public health activities including primary care and to enhance public awareness of the benefits of prevention and health promotion.

It also recommended that extensive information campaigns be organized to: a) promote the certification work being undertaken by the countries' health services, and b) provide evidence of feasibility of polio eradication. Such information should encourage greater efforts in the other continents towards the target of global eradication by the year 2000.

Lastly, the Commission affirmed its readiness to assist the Organization and the national programs as needed in every appropriate manner.

Working Guidelines for Certification of Eradication

Surveillance of flaccid paralysis:

1. Weekly negative reporting of acute flaccid paralysis

Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1990 to date of last report, and for same epidemiological period in 1989, by country.

Subregion and country	Date of last Report	Measles		Poliomyelitis #		Tetanus				Diphtheria		Whooping Cough	
						Non Neonatal		Neonatal					
		1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989
LATIN AMERICA													
Andean Region													
Bolivia	6 May	39	128	0	0	...	...	4	51	24	4	82	228
Colombia	22 Apr.	1 831	4 528	0	4	0	68	54	63	7	15	339	454
Ecuador	1 Apr.	523	3 649	1	0	19	93	17	58	1	3	145	256
Peru	30 Jun.	...	...	1	1	...	...	...	...	...	...	...	...
Venezuela	3 Jun.	3 672	5 314	0	1	34	13	12	29	0	0	475	173
Southern Cone													
Argentina**	13 Jan.	63	174	0	0	4	...	...	...	1	0	...	...
Chile	18 Aug.	691	8 823	0	0	13	8	0	2	25	22	48	169
Paraguay	27 May	239	67	0	0	115	17	37	10	7	1	197	49
Uruguay	1 Sept.	4	...	0	0	...	0	0	0	0	...	70	...
Brazil	30 Jun.	...	...	0	2	...	...	...	...	...	...	...	...
Central America													
Belize	30 Jun.	19	11	0	0	0	0	0	0	0	0	2	1
Costa Rica	2 Jun.	6	10	0	0	1	0	0	0	0	0	41	15
El Salvador	3 Jun.	443	12 703	0	0	17	21	4	15	0	0	54	17
Guatemala	2 Jun.	7 257	50	0	0	22	21	1	7	1	0	27	51
Honduras	31 Mar.	4 865	64	0	0	11	7	5	4	0	0	22	19
Nicaragua	26 May	2 436	45	0	0	17	21	6	7	0	0	95	26
Panama	31 Jul.	89	...	0	0	0	0	0	0	0	0	15	...
Mexico	1 Sept.	58 159	8 166	2	8	136	128	28	53	0	6	569	1 286
Latin Caribbean													
Cuba	17 Feb.	0	0	0	0	0	0	0	0	0	...	7	...
Haiti	30 Jun.	...	...	0	0	...	...	...	...	...	...	...	...
Dominican Republic	30 Jun.	...	...	0	0	...	...	...	...	...	...	...	...
CARIBBEAN													
Antigua & Barbuda	7 Apr.	0	0	0	0	0	0	0	0	0	0	0	0
Bahamas	3 Mar.	8	4	0	0	0	0	0	0	0	0	0	0
Barbados	28 Apr.	0	0	0	0	0	0	0	0	1	0	0	0
Dominica	7 Apr.	3	4	0	0	0	0	0	0	0	0	0	0
Grenada	28 Apr.	0	1	0	0	0	0	0	0	0	0	0	0
Guyana	24 Mar	8	3	0	0	0	0	0	0	0	0	0	0
Jamaica	24 Mar.	2 304	3	0	0	...	...	...	...	...	...	...	...
St. Kitts/Nevis	30 Jun.	...	...	0	0	...	...	...	...	...	...	...	...
St. Vicent	24 Mar.	0	0	0	0	3	0	0	0	...	...	...	...
Saint Lucia	27 Jan.	0	1	0	0	0	0	0	0	0	0	0	0
Suriname	30 Jun.	...	...	0	0	...	...	...	...	...	...	...	...
Trinidad & Tobago	14 Apr.	317	689	0	0	3	0	0	0	0	0	0	1
NORTH AMERICA													
Canada	31 May	105	275	0	0	0	0	0	0	5	0	3 074	286
United States**	18 Aug.	16 822	11 019	0	0	35	...	0	...	2	...	2 055	2 005

** Country does not report neonatal tetanus data separately.
# Data for polio includes only confirmed cases through week 35 (ending 1 September, 1990).
... Data not available.

should be implemented at all sentinel health units and at least 90% should report weekly.

2. All cases of acute flaccid paralysis should be investigated by an epidemiologist within 48 hours of reporting.

3. From the moment the stool sample is taken until the arrival at the laboratory, storage temperature should be monitored and recorded to be less than 10 degrees C., or the presence of ice each time the transport container is opened is documented. There should be no history to suggest improper handling of samples during transport.

4. Every country should report a minimum rate of acute flaccid paralysis in children less than 15 years age of 1.0 per 100 000 population. Eighty percent of these cases should have two stool samples taken within two weeks after onset of paralysis.

Surveillance of wild poliovirus:

1. Absence of wild virus isolated from cases or contacts of acute flaccid paralysis for at least three years.

2. Absence of wild poliovirus from high risk groups and the environment as documented by special surveys.

3. Only those results obtained from the laboratories in the PAHO Network of Laboratories in the Americas will be considered valid. Other laboratories may be added to the Network in the future.

4. All cases of acute flaccid paralysis which died, had residual paralysis, or were lost to follow-up that have had two stool specimens taken within two weeks after the onset of paralysis and were reported negative should be retested in two other PAHO Network Laboratories.

Certification Process:

The International Commission will be responsible for final certification. The certification procedure would be held in two phases and could be implemented by groups of countries. In the first phase, groups of countries would be certified by special commissions under the guidance of the International Commission, including appropriate site visits by members of the International Commission. They would be responsible for preparing all the documentation that would be necessary for review for final certification.

Phase two would consist of a final review of all data by the International Commission that would result in eventual certification.

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

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