

# EPI Newsletter

## Expanded Program on Immunization in the Americas

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IMMUNIZE AND PROTECT YOUR CHILDREN

April 1996

### Spain Supports Measles Elimination

The Government of Spain has recently joined other members of the international community in supporting the implementation of the Plan of Action for the Elimination of Measles in the Americas by the year 2000. The Plan of Action was unanimously approved by the Ministers of Health during the XXXVIII Meeting of the Directing Council of the Pan American Health Organization held in September 1995, in Washington D.C. It will have a duration of five years (1995-2000) and will cost approximately US\$ 53 million, which includes the provision of an estimated US\$ 7 million from PAHO/WHO regular budgets and voluntary funds. National contributions in the order of US\$ 650 million are expected.

These monies will not only support the elimination of measles, but will allow countries to sustain high levels of childhood immunization coverage and control other vaccine-preventable diseases, including the maintenance of a polio free status in the Region.

The measles elimination initiative calls for the achievement and maintenance of 95% measles vaccine coverage in all municipalities or districts in every country of the Region of the Americas, with complementary periodic vaccination campaigns aimed at preventing the accumulation of susceptibles among pre-school children. To accomplish this, emphasis is placed on training personnel for effective program operations; rigorous fever and rash surveillance for

the detection of suspected measles cases; and intensive social mobilization to enhance the community's role in the prevention of the disease.

Spain's grant in the amount of US\$ 685,649 will be disbursed over a one-year period, focusing on strengthening national capabilities in the areas of measles surveillance, laboratory diagnosis, as well as training and supervision.



Spain's grant will help consolidate measles surveillance in the Americas. Source: D. Downie, PAHO/WHO.

Due to the low number of measles cases being reported in the Region, a sensitive and aggressive epidemiological surveillance system for suspected cases of measles will be critical to the successful completion of the measles elimination strategy. This component is of utmost importance for the detection of remaining chains of transmission which could trigger an outbreak and for dealing with imported cases. With the financial support of Spain, countries plan to enhance their national surveillance systems by identifying and incorporating new reporting sources, such as non-gov-

ernmental organizations, private physicians and community groups.

A key aspect of surveillance is the laboratory confirmation of suspected measles cases. A Regional Network of Reference Laboratories has been developed with PAHO's support to facilitate and promote technical cooperation among national institutions. The Network, comprised of

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eleven laboratories from the Americas, including Canada and the United States, has been assigned to monitor the progress made towards measles elimination (see *EPI Newsletter* of August, 1995.)

Spain's grant will be channelled to streamline the logistical aspects of national laboratories to guarantee the continued supply of standardized reagents for measles serological studies. Other activities include the production of a reference manual with laboratory definitions and procedures, and the development of a simplified kit for field diagnosis.

The grant will also complement national resources for the mobilization of health staff to conduct measles case detections and investigations, and to implement effective control measures. Another barrier that hinders the rapid deployment of health staff is the lack of funds to support per diems and transportation. Therefore, resources will be provided, particularly in those areas considered to be at high-risk.

Priority is also being given to training at the national and local levels to regularly update health staff on recent developments in the field of measles epidemiological surveillance. Traditionally, training has served as a useful mechanism to disseminate lessons-learned from the field. For greater impact among beneficiaries, training sessions will be held primarily at the local level, and include the participation of private and public institutions. The program also seeks to enhance, through continued education and supervision, the national technical capabilities that will ensure the uniformity and quality of tests used, and the reliability of the results.

International expertise, as well as national professionals will be made available to help strengthen epidemiological surveillance. Through their collaboration, national immunization programs will be better prepared to make quick adjustments and to focus control activities on eliminating pockets of transmission.

## Decrease of Measles Cases in Mexico

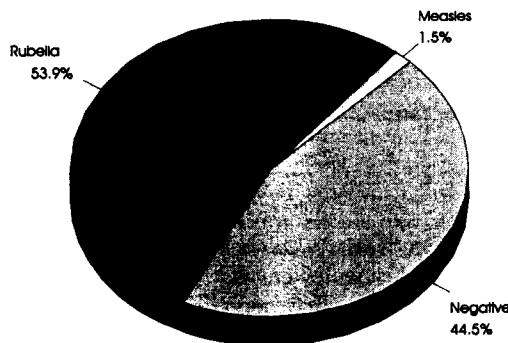
*Recognizing the critical nature of evaluation for monitoring, detecting and resolving problems, PAHO in collaboration with Member Countries is carrying out "rapid surveillance evaluations" to identify obstacles which are impeding progress in the implementation of the measles elimination strategy. These evaluations seek to determine the capacity of the measles surveillance system to detect the circulation of the virus in any municipality*

An evaluation of Mexico's measles surveillance system was conducted with the participation of PAHO's Special Program for Vaccines and Immunization (SVI) to validate the decline in reported measles cases and to identify areas for improvement.

clinical case definition for a probable case and had a serum sample submitted to the national reference laboratory for diagnostic testing. Of these, 894 (including 13 with post-vaccination rashes) were discarded. Among the 905 sera, 488 (54%) were found to be positive for rubella IgM antibodies (see Figure 1).

In 1995, a total of 174 confirmed measles cases were reported. In comparison, over 68,000 confirmed cases were reported in 1990 (see Figure 2). Of the total confirmed cases reported in 1995, 14 (8%) were laboratory confirmed (IgM positive by Capture EIA) and 160 (92%) were confirmed only on clinical grounds (without laboratory investigation). Confirmed measles cases were reported by 21 of 32 Mexican states. Six states reported 9 clusters of 3 or more confirmed cases occurring in the same municipality, with a range of 3-20 cases. One-hundred and seven (62%) of the confirmed cases were reported from urban areas. Ninety-nine (57%) cases occurred among females. Of the 168 cases for whom age was known, 21 (13%) were under the age of one year, 26 (16%) were aged 1-4 years, and 107 (64%) were between the ages of 5-15 years. Fourteen cases (8%) occurred among persons over the age of 15 years. Of the 167 cases for whom vaccination status is known, 140 (84%) had previously been vaccinated against measles. The vaccination status of laboratory confirmed cases was similar; 12 (86%) of the 14 had previously been vaccinated against measles. The number of doses received is known for only 116 cases; 75 (65%) had received 1 dose of measles-containing vaccine, 35 (30%) had received two doses, and 6 (5%) had received three doses of measles-containing vaccine. Five (3%) cases required hospitalization. No measles deaths were reported.

**Figure 1**  
**Results of laboratory investigation of suspected measles cases Mexico, 1995 (n=905)**



Source: Ministry of Health, Mexico

At the time of the evaluation, 1,206 suspected measles cases had been reported to the Mexican Ministry of Health in 1995. This represents a rate of 1.3 suspected cases reported per 100,000 total population, with a range per state from 0 suspected cases reported by the state of Campeche up to 3.7/100,000 suspected cases reported by the state of Chihuahua. Nine hundred and five suspected cases met the measles

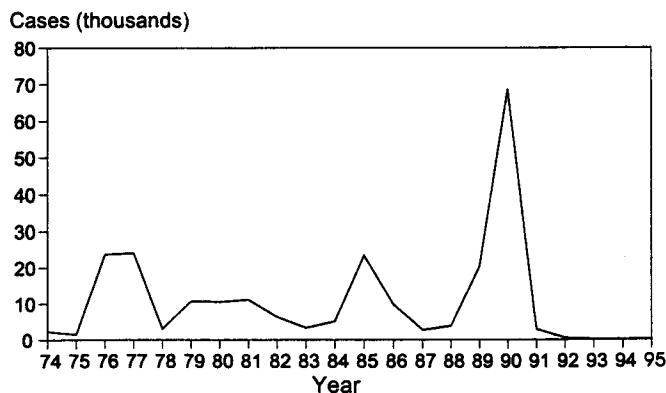
The goals of the surveillance evaluation were to:

- describe the procedures for detection, notification, investigation and classification of suspected measles cases;

- make recommendations to improve the effectiveness of surveillance, including the development of indicators to be used for ongoing assessment of the surveillance system;
- develop a standard methodology for assessing measles surveillance in other countries.

During November 27 to December 15, 1995 evaluation teams carried out site visits in 21 states, including 58 health centers or hospitals, 29 sanitary jurisdictions, and 16 state laboratories. At each site, in-depth interviews were conducted with personnel responsible for surveillance. The interviews consisted of open-ended questions about the system of case classification, reporting procedures, actions taken in response to cases detected, the process of confirming a case of measles in the laboratory, material resources, training and personnel structure of the surveillance system, and the use of indicators to determine the quality of the system. In addition to the interviews, daily patient discharge logs were reviewed to actively search for cases of fever and rash illnesses. The methodology introduced by PAHO/SVI in this evaluation is now being adapted for use in other countries of the Region.

**Figure 2**  
Reported measles cases  
Mexico, 1974-1995



Source: PAHO

## Results

The interviews revealed that personnel had good knowledge of case definitions and procedures and reviews of thousands of daily patient records yielded only one case compatible with the diagnosis of measles. However, the evaluation found that the process for identifying and reporting cases of suspected measles was time-consuming and complicated: different case investigation forms were needed for reporting to epidemiologists and to the laboratory, and the forms were lengthy and required excessive clinical information, which was often not completed. Typically, patients needed to be seen on multiple occasions in order to determine if they satisfied the clinical case definition of a suspected measles case and to obtain a specimen for laboratory testing.

Identification of a suspected case of measles prompts an intensive surveillance effort in the community aimed at identifying contacts and susceptible persons before the case is confirmed by the laboratory. Particularly at the local level, no system for tracking suspected cases or cases that

had been investigated and discarded was in use, and no standardized databases were maintained at the different levels of the system. Although the Ministry of Health's manual for measles surveillance is widely available, the need for ongoing training and feedback exists, especially at the local level. Lack of communication between the Ministry of Health's surveillance system and those of other health care providers, such as the Mexican Institute of Social Security, is also a hindrance. Finally, there is no ongoing evaluation of the surveillance system. Indicators to monitor its functioning are not being used consistently by state and local epidemiologists. These are minor problems, however, and only a few changes are needed to streamline the process and allow low-performing areas to be targeted for improvement.

There was a large number of suspected measles cases investigated. However, after reviewing hospital and clinic registers, the evaluation teams found only one case that fit the suspected measles case definition, which had not been reported to the surveillance system. This provides strong evidence that the Mexican surveillance system is capable of detecting measles cases and that transmission is at very low levels or may have been interrupted in the country. Despite thorough contact investigations, the inability of the surveillance system to identify chains of transmission for many of the cases raises the issue of whether these isolated cases of measles were false positives or linked to undetected importations.

## Recommendations

The following specific recommendations were made to the Ministry of Health:

- simplify the definition of a suspected case to a rash of any duration, and collect a single serum sample at the first contact with the patient;
- shorten the suspected case investigation form and combine it with the form accompanying the specimen to the laboratory, in order to minimize paperwork;
- reduce the number of clinically confirmed cases;
- maintain a log of suspected cases at the jurisdictional level, in order to ensure adequate follow-up;
- develop a common database of cases to be used at the jurisdictional level and above, as well as by laboratories to improve the tracking of cases and specimens;
- strengthen training, supervision and evaluation of surveillance personnel;
- integrate other institutions into the Ministry of Health's surveillance system by standardizing surveillance training between the various institutions and by sharing a common database of cases;
- develop indicators for the quality of the surveillance system.

Adoption of these recommendations, particularly with regard to streamlining the case investigation forms and standardizing the databases will facilitate the ongoing measurements of the quality of surveillance, and further the cause of measles elimination in Mexico.

# High-Risk Areas for Neonatal Tetanus

The following letter was published in *Lancet*, Vol. 346, page 1628, December 16, 1995.

SIR - Immunization of pregnant women and women of childbearing age with tetanus toxoid (TT) is the main control measure for neonatal tetanus (NNT), and the global plan for elimination of NNT emphasizes the need to focus such immunization activities on high-risk areas.<sup>1</sup>

Household-based surveys of maternal and child health, and NNT, were undertaken in 1993 and 1994 in 282 counties in eight Provinces of the People's Republic of China. Surveys of 31 counties in Gansu Province along with reported NNT deaths from each county for 1991, 1992 and 1993 were made available by Gansu Province Health authorities. TT coverage in women of childbearing age was below 4% in 28 of the counties, and about 24% in three counties that had undertaken immunization campaigns. Given high case-fatality ratios, NNT cases and deaths should be similar. Reports were available in all 3 years for 22 counties, but were missing in 1 of the 3 reporting years for eight counties, and one county had reported only once.

13 counties in Gansu Province had NNT rates of 4 or more/1000 live births but only three had reported NNT deaths and live births in 1993 consistent with such NNT rates, assuming case-fatality ratios of 50% or more. Under-reporting of NNT cases and deaths from routine reporting systems is widely recognized. Two operational criteria to identify high-risk areas using reported cases have been proposed by the Pan American Health Organization: (1) reports of one or more cases of NNT in each of the past 3 years; and (2) reports of one or more cases from an area not previously identified as high-risk. The data from Gansu Province provided an opportunity to test such an assessment, with NNT defined by deaths rather [than] by cases. [Criterion] 1, (above) had a low sensitivity, 54% (7/13), but a high specificity, 83% (15/18), in identifying first priority counties within Gansu Province. [Criterion] 2 (above) is equivalent to reports of any cases at any time during the 3-year period since all counties were deemed at unknown risk before 1991. 12 truly highest risk counties were positive by this criterion, giving a high sensitivity, 92% (12/13), but lower specificity, 28% (5/18). With adequate resources, such outcomes should be acceptable in selecting counties that will be given special priority for campaigns with TT. However, the efficiency of selection is low, since most (13 of the 25) counties selected for campaigns are not first priority. A report of no cases in any of the 3 years proved meaningful, since it correctly identified 14 of the 18 lower risk counties, while incorrectly identifying four of 13 first priority counties. A combination of reports of any case at anytime and the absence of no reports during the 3 reporting years can be used to select high-priority counties; this criterion has a sensitivity of 69% (9/13), specificity 78% (14/18), and improves the efficiency of selection with nine of 13 (69%) selected counties [determined as] being high priority. This approach may be attractive when resources

are insufficient, since it targets only 13 rather than 25 counties for campaigns, but still encompasses nine of 12 first priority counties identified by (2) above.

John V. Bennett, Jan Seward, Suomi Sakai, Wang Long-de

The Task Force for Child Survival and Development, The Carter Center, Atlanta, GA 30307, USA; UNICEF, Beijing, China; and Gansu Province Bureau of Health, Lanzhou, China.

<sup>1</sup> An integrated approach to high coverage control of measles, elimination of neonatal tetanus, eradication of poliomyelitis. Expanded Program on Immunization, World Health Organization, Geneva, 1993 (WHO/EPI/GEN/93.21).

**Editorial Note:** This letter provides evidence that the approaches proposed by PAHO and modifications thereof may indeed be useful in the task of identifying areas of highest risk for NNT. They are simple to apply, use data likely to be accessible, and should be further evaluated in situations where deficiencies in routinely reported data do not permit or warrant more quantitative approaches. In this way, countries in the Region of Americas have been successful in controlling the disease as shown in the table below.

**Number of districts with less than 1 case of neonatal tetanus per 1000 live births by country in 15 Latin American countries, 1994**

Country	Total Districts	Number of districts with NNT rate < 1/1000 LB	
		Number	%
Argentina	490	487	99.4
Bolivia	83	82	98.8
Brazil	4,267	4,207	98.6
Colombia	1,023	986	96.4
Dom. Republic	129	126	97.7
Ecuador	177	155	88.6
El Salvador	243	239	98.4
Guatemala	331	323	97.6
Honduras	291	287	98.6
Mexico	2,404	2,377	98.9
Nicaragua	147	147	100.0
Panama	66	64	96.9
Paraguay	214	210	98.1
Peru	1,773	1,711	96.5
Venezuela	750	736	98.1
<b>TOTAL</b>	<b>12,388</b>	<b>12,137</b>	<b>98.0</b>

Source: EPI/PAHO

# Measles Case Classifications

The following adjustments have been incorporated into the measles case classifications:

## I. Suspected case

All cases for which a health worker suspects measles.

(Patient with:

- fever **and**
- generalized maculopapular rash **and**
- cough or coryza or conjunctivitis)

## II. Confirmed measles case

A suspected case which is:

1. Laboratory confirmed
  - positive for measles antibodies (by the IgM Capture test) **or**
  - epidemiological linkage to another laboratory confirmed case (by the IgM Capture test)
2. Clinically confirmed
  - all suspected cases without an adequate blood sample or without an epidemiological linkage to another laboratory confirmed case (by the IgM Capture test.)

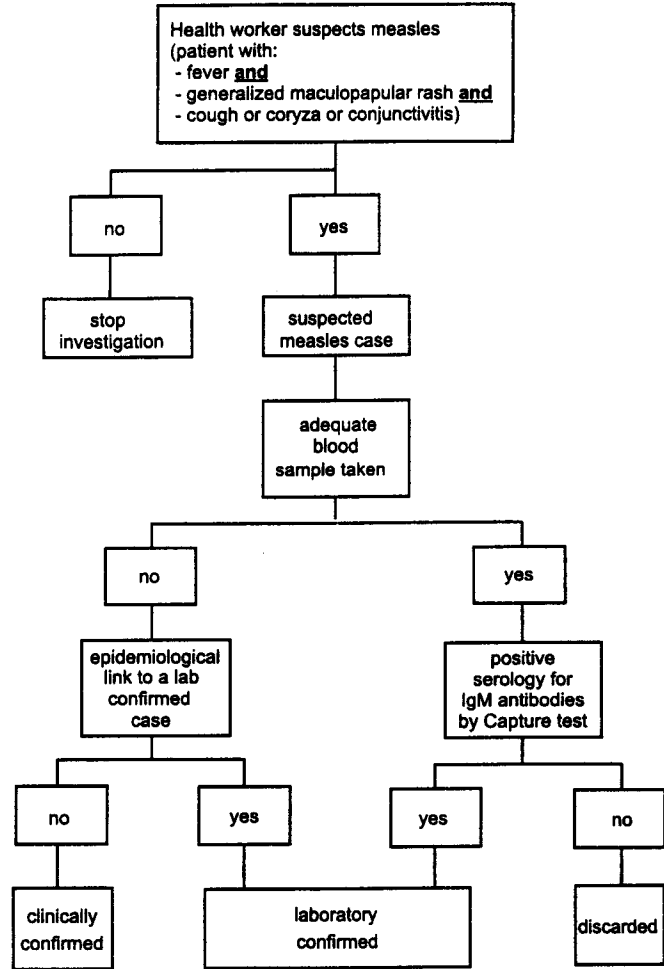
All **Clinically Confirmed** cases are considered failures of the epidemiological surveillance system.

An adequate sample is one taken within the initial 45 days following rash onset, and which meets requirements of proper handling, conservation and transportation.

## III. Discarded case (not measles)

A suspected case in whom an adequate sample was collected, which tested negative for the presence of anti-measles IgM, through either an indirect IgM test or IgM Capture test.

Flow Chart for Measles Case Classifications



# Polio Surveillance

AFP Surveillance Indicators

Country	80% weekly reporting units	80% of cases investigated in 48 hours	80% of cases with 1 adequate stool sample taken	AFP Rate $\geq 1:100,000$ for children < 15 years
Colombia				
Cuba				
Ecuador				
Honduras				
Nicaragua				
Venezuela				
Brazil				
Chile				
Paraguay				
Peru				
Bolivia				
El Salvador				
Mexico				
Dominican Republic		-	-	
Guatemala				
Panama		-	-	
Costa Rica	N.R.	-	-	
Uruguay	N.R.	-	-	
Argentina	N.R.	N.R.	N.R.	N.R.
Haiti	N.R.	N.R.	N.R.	N.R.

Meet criteria   
  N.R. No report received   
  - Zero cases

\* Data as of 16 March 1996  
Source: EPI/PAHO (PESS)

Data on polio surveillance received as of 16 March 1996, show a significant decrease in the compliance with the AFP surveillance indicators in some countries of the Region. These data are provisional, but represent a serious situation that could impede countries in detecting the possible circulation of wild poliovirus. As previously mentioned, until the world is polio free, the commitment to comply with the AFP surveillance indicators needs to continue.

The maintenance of oral polio vaccine (OPV) coverage rates of at least 80% and of a sensitive surveillance system are of paramount importance. In 1995, the average coverage rate with three doses of OPV was 82.9% in the Region of the Americas. While this complies with the goal of at least 80% coverage, areas of low coverage with rates as low as 64% still exist in the Americas.

# Cost-Benefits of Disease Eradication

- Three million lives of children less than 5 years of age are saved annually by vaccination. Cost-benefit analyses have consistently indicated that immunization programs are the most cost-effective public health strategy for preventing infant and childhood morbidity and mortality. This assertion was most recently confirmed in the *World Development Report - 1993*, published annually by the World Bank.
- Recent outbreaks of diphtheria in Canada and Ecuador demonstrate the constant threat posed by the possible re-emergence of vaccine-preventable diseases once immunization levels drop.
- It is estimated that for every US dollar invested in vaccination, approximately US\$ 7 to US\$ 20 are saved as a result of the prevention of disability, death and medical costs otherwise associated with childhood diseases.
- The polio eradication initiative of the Americas provided a critical entry point for mothers and children to other health services at the primary health care level. These preventive measures have reduced the need for expensive curative and rehabilitative care.
- Cooperation from bilateral and multilateral agencies has stimulated the commitment of financial and human resources at the highest levels in the governments of the Region. During their 5th Meeting held in Paraguay, September 1995, the First Ladies of the Western Hemisphere endorsed the measles elimination initiative adopted by the Ministers of Health of the Americas at the September 1994, Pan American Sanitary Conference. All First Ladies pledged to work with the Ministers of Health of the Region, the Pan American Health Organization (PAHO), and other international organizations to achieve the target of measles elimination by the year 2000.
- One of the major achievements of the polio eradication initiative was its impact on the level of commitment shown by national governments in the Region of the Americas. For example, overall contributions by national governments for immunization programs in 9 countries in the Americas have increased from 66.3 % in 1990 to 92.5% in 1995.
- An important point to remember with polio and measles is that as long as any of these diseases is prevalent in other areas of the world, the potential for reintroduction exists, even after eradication has been successfully accomplished in one region.

## Smallpox

Smallpox was the first infectious disease to be eradicated by means of vaccination. *The Pediatric Infectious Disease Journal*, April 1995 issue, states that since the last case of smallpox was detected in 1977, more than US\$ 2 billion have been saved in the United States alone by

stopping smallpox vaccination. On a global level, these savings amount to over US\$ 20 billion. More importantly, thousands of deaths and millions of cases of this disfiguring disease are avoided each year.

## Poliomyelitis

Achievement of the global eradication of polio will offer similar benefits. In the United States alone more than US\$ 230 million will be saved annually in polio vaccine and administration costs when the global eradication of polio is achieved and polio vaccinations can be stopped. PAHO launched the polio eradication initiative in 1985 and eradication was achieved in 1994. Following PAHO's successful results, WHO decided to embark on a global eradication effort making substantial use of PAHO's strategies. Global eradication is expected to be accomplished by the year 2000. Since its eradication in the Region, the only wild poliovirus imported into the Western Hemisphere came from the Netherlands, and occurred in Canada in 1993.

## Measles

According to the *Journal of Infectious Diseases*, November 1994 issue, when measles eradication is accomplished, worldwide savings of hundreds of millions of dollars annually will be possible in both the developed and developing countries. The United States spends an average of US\$ 65 per child (combining private and public sectors) to buy and administer two doses of measles, mumps, and rubella vaccine. In 1 year, measles vaccination in the United States alone costs US\$ 260 million. In a decade, JID reports that conservatively assuming that prices did not rise with inflation and that unit costs fell as volumes rose, cumulative costs would reach US\$ 2.6 billion.

The July 1985 issue of the *American Journal of Public Health* cited that the United States would save US\$ 669,311,673 million in disease burden by immunizing against measles, with an estimated program cost of US\$ 55,989,233 million (a cost-benefit ratio of 11.9:1).

The successful polio eradication initiative has led the countries of the Americas to strengthen their activities aimed at the control of measles. As a result of these initiatives and given the dramatic impact of PAHO's measles strategies on the incidence of the disease, the countries of the Americas have called for the elimination of measles by the year 2000.

Experience gained thus far indicates that the PAHO measles elimination strategy is proving to be effective in combating the disease. Throughout 1995, approximately 5,623 confirmed cases were reported from the countries of the Americas, compared to 23,583 in 1994. This represents a considerable reduction in the number of cases since measles surveillance began. The provisional annual measles incidence rate was 0.48 cases per 100,000 population; this represents a 99% reduction from the incidence rate reported in 1980.

# Reported Cases of Selected Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1996 to date of last report, and the same epidemiological period in 1995, by country.

Country /Territory	Date of last report	Measles			Confirmed 1995	Polio		Tetanus				Diphtheria		Whooping Cough	
		Labo-ratory	Clini-cally	Total 1996		1996	1995	Non Neonatal		Neonatal		1996	1995	1996	1995
					1996			1995	1996	1995					
Anguilla	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Antigua & Barbuda	16 Mar	0	0	0	0	0	0	...	0	...	0	...	0	...	0
Argentina	16 Mar	0	0	0	21	0	0	7	13	0	2	29	2	0	555
Bahamas	16 Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbados	16 Mar	0	0	0	0	0	0	...	0	...	0	...	0	...	0
Belize	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Bermuda	16 Mar	0	0	0	0	0	0	...	0	...	0	...	0	...	0
Bolivia	16 Mar	0	0	0	0	0	0	...	...	0	2	1	1	1	12
Brazil	16 Mar	0	9	9	31	0	0	13	121	5	13	0	27	79	491
British Virgin Islands	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Canada	16 Mar	46	...	46	36	0	0	...	...	...	...	...	...	...	1,658
Cayman Islands	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Chile	16 Mar	0	0	0	0	0	0	4	4	0	0	0	0	245	56
Colombia	16 Mar	0	4	4	36	0	0	...	...	10	9	...	...	...	...
Costa Rica	16 Mar	0	0	0	9	0	0	...	...	...	...	...	...	...	...
Cuba	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Dominica	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Dominican Republic	16 Mar	0	0	0	0	0	0	...	...	0	0	1	0	0	0
Ecuador	16 Mar	0	14	14	462	0	0	...	...	8	13	1	56	15	73
El Salvador	2 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
French Guiana	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Grenada	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Guadeloupe	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Guatemala	16 Mar	...	...	...	11	0	0	...	...	...	...	...	...	...	...
Guyana	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Haiti	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Honduras	16 Mar	0	0	0	0	0	0	...	...	...	...	0	0	0	0
Jamaica	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Martinique	...	...	...	...	...	0	0	...	0	...	0	...	0	...	0
Mexico	16 Mar	0	0	0	5	0	0	14	0	10	0	...	0	0	0
Montserrat	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Netherlands Antilles	...	...	...	...	...	0	0	...	...	...	...	...	...	...	...
Nicaragua	16 Mar	0	0	0	2	0	0	0	0	0	1	5	0	0	0
Panama	16 Mar	0	0	0	1	0	0	...	0	...	0	...	0	0	3
Paraguay	16 Mar	0	4	4	1	0	0	...	...	...	...	...	...	...	...
Peru	10 Feb	0	0	0	73	0	0	...	...	...	...	...	...	...	...
Puerto Rico	16 Mar	0	...	0	0	0	0	...	...	...	...	...	...	...	...
Saint Lucia	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
St. Kitts/Nevis	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
St. Vincent	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Suriname	16 Mar	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinidad & Tobago	16 Mar	0	0	0	0	0	0	...	0	...	0	...	0	...	0
Turks & Caicos	16 Mar	0	0	0	0	0	0	...	...	...	...	...	...	...	...
United States	16 Mar	18	...	18	43	0	0	...	4	...	...	...	0	...	625
Uruguay	2 Mar	0	0	0	...	0	0	...	...	...	...	...	...	...	...
Venezuela	2 Mar	0	2	2	31	0	0	...	...	1	2	0	0	81	51
<b>TOTAL</b>		<b>64</b>	<b>33</b>	<b>97</b>	<b>762</b>	<b>0</b>	<b>0</b>	<b>38</b>	<b>142</b>	<b>35</b>	<b>44</b>	<b>37</b>	<b>85</b>	<b>421</b>	<b>3,524</b>

... Data not available.

# Twenty-Fifth Anniversary of Smallpox Eradication in the Americas

On April 19, 1971 the Americas became the first Region of the world to achieve the goal of smallpox eradication. The last case of naturally occurring smallpox was detected in Rio de Janeiro, Brazil.

In 1959, smallpox transmission had been interrupted in all but 5 countries of South America, of which 3 - Brazil, Colombia and Ecuador - were recording large numbers of cases every year. By 1966, when PAHO/WHO intensified its eradication efforts and set a deadline of 10 years to achieve final eradication, Brazil was the only smallpox endemic country in the Americas. All known cases were of the mild variola minor type. During the last quarter of 1969, 7.3 million persons were vaccinated. The momentum achieved during that year continued into 1970: programs were begun in all the states, the government allocated additional funds, and by the end of the year more than 30 million vaccinations had been performed. In 1971, new cases were reported which prompted intensive search and containment measures throughout the country. Three more cases occurred among hospitalized patients in Rio de Janeiro; the third became the last case in the Americas.

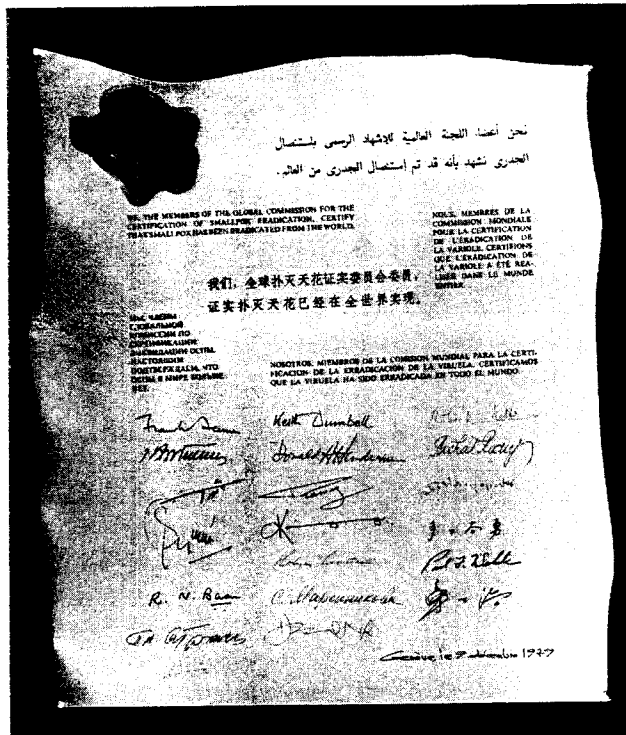
The first experiments with the surveillance and containment strategies that became the key to smallpox eradication were simultaneously developed in Brazil, India and Nigeria. Smallpox eradication became the seed for the successful

implementation of the Expanded Program on Immunization, and many of its lessons were applied during the eradication of polio from the Western Hemisphere, and more recently in the efforts to eliminate measles from the Americas by the year 2000.

In retrospect, this extraordinary achievement was attainable when countries throughout the world collaborated in pursuit of a common aim, making use of the structures of an international organization and acting under its auspices. This made it possible for the necessary resources to be mobilized and applied to better effect, for improved methods of management and epidemiology to be introduced and widely applied, for vital modifications in strategy to be communicated quickly, and for new and often very simple techniques suited to a

country's capacities and characteristics to be introduced promptly.

Source: *Smallpox and its Eradication*, World Health Organization, 1988.



The official document certifying the global eradication of smallpox. Source: WHO

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Editor: **Ciro de Quadros**  
Assistant Editor: **Monica Brana**

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Special Program for Vaccines and Immunization  
Pan American Health Organization  
525 Twenty-third Street, N.W.  
Washington, D.C. 20037  
U.S.A.