EPI Newsletter

Expanded Program on Immunization in the Americas

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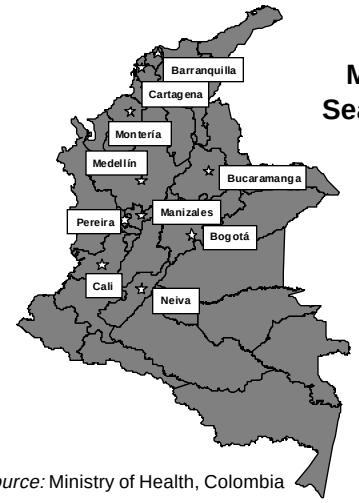
On the Trail for Measles in Colombia

What follows is a summary of an active search for measles cases organized by a working group with staff from Colombia's Ministry of Health and National Institute of Health, and the collaboration of PAHO's Division of Vaccines and Immunization. The search was conducted by approximately 880 health care workers between August and November, 1999 and had the objective of determining if indigenous measles virus was circulating in 10 selected cities of Colombia.

Background

From 1997-1999, Colombia reported 8, 12, and 10 laboratory confirmed measles cases respectively. Each case was sporadic in both time and location. While some departments had two or more cases annually, these did not occur within the same exact location. Case investigations and active search for additional cases carried out for each case in 1998 and 1999 could not detect source of infection and chains of transmission. From 1997-1999, two departments Cuindinamarca (which includes the city of Bogota) and Antoquia had reported several confirmed measles cases each year. This pointed to continued measles virus transmission in these two departments.



Measles Active Search in 10 Cities

Colombia August – December 1999

Source: Ministry of Health, Colombia

In these two departments, coverage rates with measles vaccine in routine programs for children under 24 months of age had been consistently above 79% for the years 1998-1999. Overall national data for Colombia for 1997, 1998, and 1999 showed coverage with measles vaccine of 88%, 87%, and 79% respectively for children under 24 months of age. Colombia carried out a national measles *follow-up* campaign in 1999. In Bogota, data showed that 98% of the children between 1-5 years had received a dose of measles vaccine. In Antoquia, coverage rates reached for the same age group were 74%.

An analysis of the distribution of confirmed measles cases *only* (Figure 1) by month in Antoquia (population of 5.3 million) for 1998 and 1999, showed two possible explanations: 1.) In face of relatively high measles vaccine coverage, measles virus can circulate without producing large outbreaks; and 2) The surveillance system in Antioquia did not have the capability to pick up additional cases that would account for the sporadic measles cases or the possible chains of transmission. A different picture emerged when looking at both laboratory and clinically confirmed cases (Figure 2). It could be concluded that there may have been ongoing measles virus transmission and that the laboratory data did not support the concept of sporadic measles cases.

The working group recommended that an active search be carried out in the 10 largest urban centers in Colombia, to detect measles virus circulation and prevent the occurrence of a large outbreak. These 10 cities come from departments that contain 62% of Colombia's population. These 10 cities, in turn, account for approximately 34.7% of the total population of Colombia. The rationale for selecting only the largest cities for conducting an active search was based on the fact that both, in Medellin (Antioquia) and Bogota cases had occurred mainly in the metro areas. If measles virus was circulating in Colombia, it was concluded that it would likely circulate in urban areas, where the high-density of the population (hence large pools of susceptibles)

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would allow the virus to freely re-seed itself.

Methods

Collection of data

An active search was carried at health centers and other institutions in Colombia:

- **Medical centers:** Medical records of 1,189 health institutions (IPS – private or public health providers) were reviewed. Health records were checked to find diagnosis compatible with measles (rubella, roseola, acute exantema, scarlet fever).
- **Institutions and households:** There were 20,362 visits carried out at universities, schools, households, preschools, hotels, prisons and military barracks. During these visits questions were asked whether people had seen a person that may have had a measles rash within the last 30 days of the date the search was initiated

Figure 1
Distribution of confirmed measles cases with IgM(+) by date of rash onset, Antioquia, 1998-1999

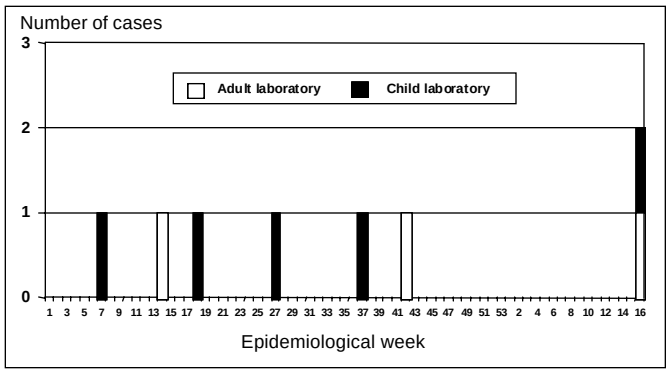
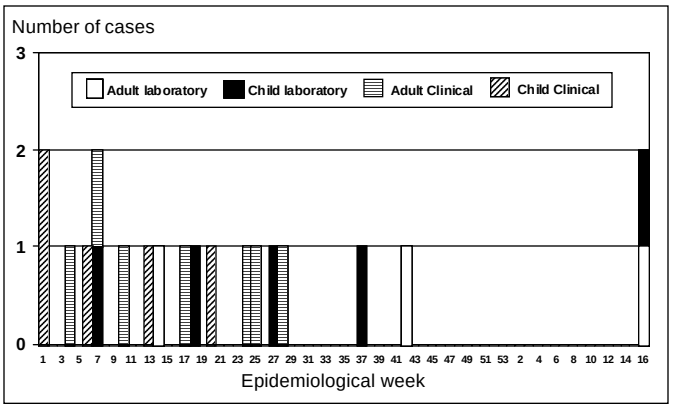


Figure 2
Distribution of confirmed measles cases by laboratory and clinical per date of rash onset Antioquia 1998-1999



The screening definition used for determining if cases should be classified as a measles suspected case, and therefore requiring a complete epidemiological investigation (including collection of blood and/or urine samples) was:

- A person with fever, maculopapular rash with cough and/or coriza and/or conjunctivitis in the last 30 days since the search was initiated **or/**
- The presumptive diagnosis by a health care worker was measles

Results

From 2,396,842 possible leads (health records and leads), 2,496 persons were identified as having a rash (2.4 / per 1000). Upon further investigation, 352 (14%) were classified as suspected measles cases. The distribution of the case classifications is shown in Table 1. During the investigation of all 352 cases, an active search was carried out by health workers in the surrounding communities. No additional suspected measles cases were identified.

Table 1
Distribution of Suspected Measles Cases

Based on serologic sample	No.	Classification				TOTAL		
			No.		No.	Discarded	Under investigation	Clinically Confirmed
With sample	324	Discarded		IgM (-)	322	322		
		Positive (IgM)	2	Discarded*	1	1		
				Under Investigation	1		1	
Without sample	28	Discarded			24	24		
		Under investigation			3		3	
		Clinically confirmed			1			1
TOTAL	**352**				**352**	**347**	**4**	**1**

*Recent vaccination status

Three hundred and twenty four (90%) of the 352 cases classified as suspected measles had an adequate blood specimen taken. Health workers were not able to collect a blood samples in 28 cases. Of these 352 cases, 99 cases (28%) were found in their acute phase. However only 43/99 urine specimens were collected in cases that were found within seven days of rash onset. Only two of the blood samples processed were IgM positive in the laboratory. One case was discarded because the person had received a measles containing vaccine within the last 56 days. The second case with a positive IgM had a severe case of scabies and is still being investigated in the laboratory.

Twenty-eight cases (those without adequate blood sample) remained under investigation at the end of the active search. Upon further review of the 28 cases by the working group, an additional 24 cases were discarded based on information from case investigation forms, clinical history, and discussion with team members in charge of the search in each city. The four remaining cases are still under investigation. In three of them, a rubella diagnosis was made but no blood sample was taken. In these three cases, it was decided that further review of each person's clinical history and an interview with the attending physician would assist in determining final classification. Only one case was classified as clinically compatible in the District of Bogota.

None of the blood specimens collected were positive for Igm rubella, however there were some dengue Igm positive results. None of the urine collected was processed for virus isolation because they came from cases with negative laboratory results.

Discussion

A broad case definition for a measles case was used to increase the sensitivity of the active search and improve the possibility of detecting cases.

The convenience sample method was used in nine of the 10 selected departments for carrying out the active search in

the 10 cities. Only in one city was there the use of a statistical sampling methodology to select the health care providers. In every city, efforts were made to ensure that all segments of the population were covered by including visits to educational institutions or reviews of records of health care providers (IPS) in the target areas. In all cases except in the District of Bogota, all high-risk and geographically under served populations were adequately sampled. In Bogota, visits were not made to health care providers or an active search was not conducted in the community in areas with confirmed measles cases in 1997- 1999. Only in 2/13 of the boroughs that form Bogota were health care providers targeted for review of health records, to identify possible measles cases. However, an effort was made to include either a large university and/or a high school in these areas. Nevertheless, the working group determined that more should be done at the borough level to reach health care providers or undertake community searches, to ensure effective detection of circulating measles virus. In the city of Cali, an active search for measles cases in high-risk community areas was not carried out because of administrative reasons. The health team of Cali said it would undertake this activity in March 2000.

A review of the completion of case investigation forms from the active search revealed that only 46% were totally filled out. This indicates the need to strengthen supervision.

In countries with low numbers of confirmed measles cases and where health workers are not familiar with measles, a more sensitive case definition should be considered (see case definition above), to enhance the possibilities of detecting measles virus. Using the measles case definition of PAHO ("any case in which a health worker suspects measles"), health workers diagnosed measles in 26 instances (these had been reported as suspected by the routine surveillance system). When a more sensitive case definition was used, an additional 154 cases were identified as "clinically compatible" with a measles infection. Thus, of the 180 suspected measles cases identified through health care providers, 86% of them were detected using a more sensitive case definition. If one takes into account all the suspected measles cases identified through different institutional searches, including in the community, only 26 cases out of 352 cases were actually picked up. This should be considered as an indicator of the actual sensitivity of the current reporting system to detecting potentially suspected measles cases in the community.

Conclusion

Following the results of the active search and surveillance data obtain from Colombia's routine system, the working group concluded that between August-December of 1999, there was no evidence of measles virus circulation in the surveyed cities. It was also concluded that the active search exercise had allowed health workers to evaluate the quality of the national surveillance system for measles in Colombia.

Global Alliance for Vaccines and Immunization

The Global Alliance for Vaccines and Immunization (GAVI) was launched on January 31, at the World Economic Forum in Davos, Switzerland. GAVI brings together business leaders, philanthropic foundations, development banks, United Nations agencies and national governments, who will work in partnership to ensure widespread use of vaccines worldwide. An immediate priority for GAVI is to see that all countries of the world achieve at least 80% immunization coverage by 2005. Nearly 30 million of the 130 million children born every year are not receiving vaccinations of any kind. The great majority of these children (25 million) live in countries that have less than 1,000 USD per capita GNP. In launching GAVI partners pledged to address three widening gaps in developing nations:

- Thirty million children born every day in poor nations who are still not receiving the 'basic six' immunizations
- Growing disparity in the number of vaccines available to children in industrialized and developing countries
- Lack of investment in vaccine research and development for diseases that are prevalent in poorer countries.

GAVI's Strategic Objectives

GAVI has established four strategic objectives to fulfill its mission of protecting children of all nations and of all socioeconomic levels against vaccine-preventable diseases:

- Improve access to sustainable immunization services
- Accelerate R&D efforts for vaccines needed primarily in developing nations, such as pneumonia, HIV/AIDS, malaria, tuberculosis and diarrhea
- Expand the use of all existing cost-effective vaccines where they address a public health problem
- Make immunization coverage a centerpiece in international development efforts.

How GAVI Will Accomplish Its Goals

Children's Challenge — a global campaign to help educate and enlist the support of individuals and institutions in the effort to immunize the world's children.

The **Global Fund for Children's Vaccines,** a GAVI financial tool established recently to purchase under-utilized and new vaccines and to provide resources to strengthen immunization infrastructure. It will also support research for developing new vaccines — against diseases such as malaria, AIDS or tuberculosis — needed primarily in the developing world. The Bill and Melinda Gates Foundation pledged US$750 million (US$150 million per year for five years) to establish the Fund.

The Unites States Government also announced a US$50 million investment in the Fund.

Source: GAVI Secretariat. For more information on GAVI, refer to http://www.vaccinealliance.org

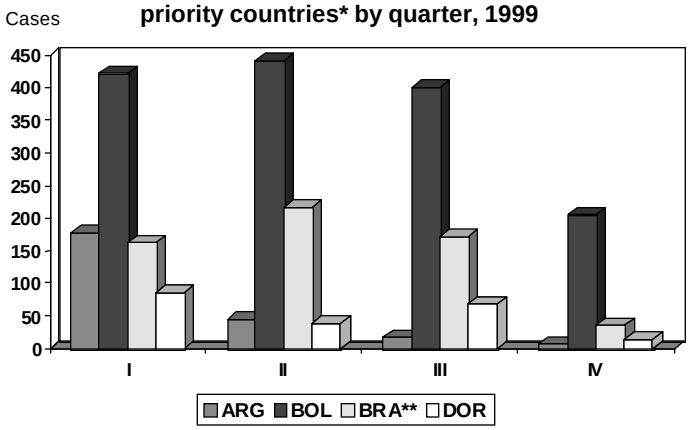
Southern Cone: Progress Towards Measles Eradication

Managers of national immunizations programs and laboratory staff responsible for measles diagnosis in the Southern Cone, Brazil and Bolivia met in January to review the current measles situation and discuss the next steps to meet the deadline of measles eradication by the year 2000. The meeting was sponsored by PAHO and included the participation of Argentina, Chile, Paraguay, Uruguay, Bolivia and Brazil.

Coverage: Provisional data for the countries of the Southern Cone, as well as for Brazil and Bolivia show that those carrying out a measles campaign for children under 5 years of age reported coverage rates between 94% and 100%. Routine vaccination coverage against measles, however, has been under 95%.

Surveillance: During 1999 there were a provisional total of 3,000 confirmed measles cases in the Americas. These cases occurred in 11 countries, of which only four (Bolivia, Brazil, Argentina and the Dominican Republic) have reported indigenous virus transmission. Bolivia reported 1,442 cases (48% of the total in the Region), Brazil 756 (25%), Argentina 247 (8%), and Dominican Republic 206 (7%). All these countries are currently implementing aggressive plans of action that include: implementation of timely *follow-up* measles campaigns, active search of measles cases, and strengthening of surveillance. As a result, the number of cases decreased in the last quarter of the year (see Figure 1). The five countries that kept high measles vaccination coverage (Canada, Chile, the United States, Peru, and Uruguay) were affected by measles importations, which caused limited outbreaks and no endemic circulation afterwards.

Figure 1
Number of confirmed measles cases in priority countries* by quarter, 1999



* Argentina, Bolivia, Brazil and Dominican Republic
** Unknown week of onset for 178 cases

The outbreak in Brazil started in 1996 in Santa Catarina and São Paulo (the latter state did not participate in the last scheduled national measles *follow-up* campaign). The highest incidence of cases was seen in 1997 (53,644 cases), 68 times more than in 1996. In 1998, the total number of confirmed cases went down to 2,930. Of the 756 provisional confirmed cases in 1999, 305 (40%) occurred in the Northeastern region. The state of Pernambuco was the most affected, with 24% of the total cases in the country.

Unlike the 1997 situation in São Paulo, the age group most affected in 1999 was children under 5 years. With the incorporation of 27 additional epidemiologists, hired as part of a special Task Force, and the implementation of an emergency plan, there was a surge in the notification of suspected measles cases to a total of 33,781 cases. Although each state had at least one laboratory for serological diagnosis, only 355 of the 756 confirmed cases were confirmed by laboratory or had an epidemiological link to a suspected case. Overall, measles vaccination coverage in 1999 reached 93%. However, in 59% of the municipalities coverage was under 95%. In order to interrupt measles virus transmission, Brazil has scheduled a *follow-up* campaign for June 17, 2000 and has also intensified surveillance. The campaign will target children under 5, up to age 15 years of age in some states.

In Argentina, the outbreak began at the end of 1997 in Missions. That year, 121 cases were reported in three provinces. The outbreak spread to the entire country in 1998, with a total of 10,229 confirmed cases. In 1998, a national vaccination campaign was conducted targeting children 1 to 6 years of age, but it did not include all the provinces. During 1999, 247 confirmed measles cases were reported from 12 (50%) of the 24 provinces. The last case was reported during epidemiological week 46 in Mendoza. The population most affected were unvaccinated children under 5 years of age.

In Bolivia, it is important to note that in 1995 vaccination coverage was 80%, but increased in 1996 and 1997 to 98%. Nevertheless, due to lack of vaccines, this coverage declined again in 1998 to 85%. The measles outbreak commenced in May 1998 in Tarija, which borders with Argentina, and from there gradually spread to the rest of the country, with a total of 1,004 confirmed measles cases in 1998 and 1,442 cases in 1999. Fifty two percent of the total number of confirmed cases in 1999 corresponded to unvaccinated children under 5 years of age.

In order to control the epidemic in Bolivia, the government implemented a plan of action with the collaboration of PAHO, the World Bank, USAID, UNICEF, and the IDB and an important financial contribution from the government. The plan included the implementation of a national *follow-up* campaign between November and December 1999. Coverage obtained in the campaign was 98%, with 71% of municipalities reporting coverage of 95% or higher. A dramatic reduction was achieved in the number of cases confirmed since the end of the campaign to date. Currently, the country is carrying out mop-up vaccination and active search of cases in municipalities at risk.

As of March 16, 2000, the total number of confirmed measles cases in Bolivia is 35 (31 by laboratory and 4 by

epidemiological link) five are pending and 71 have been discarded. The last confirmed case had onset on February 23. Eighty six percent (30 cases) correspond to persons over 5 years of age and 62% (22 cases) to those over 15 years of age. Starting from epidemiological week six (February 12), the Department of Beni was the only one reporting confirmed cases due to an outbreak in a military barrack. The departments of Santa Cruz and Beni account for 86% of the cases in Bolivia this year. Other states reporting cases are Pando (3), Potosi (1), and La Paz (1). A total of eight of the 314 municipalities in the country have been affected. In each of the eight municipalities, control activities are being carefully implemented, in order to ensure that transmission is stopped.

Highlights of Other Vaccine Preventable Diseases

Rubella

The majority of countries of the Southern Cone are using measles, mumps, rubella (MMR) vaccine as part of their regular vaccination program. Paraguay plans to introduce the vaccine this year. Brazil is integrating its surveillance system for rubella with that of measles. The remaining countries utilize the measles surveillance system to detect rubella virus circulation. Chile carried out a successful national rubella campaign, which targeted women between 10 and 29 years to prevent the occurrence of congenital rubella syndrome (SRC). The campaign achieved vaccination coverage of 98%. (See issue of *EPI Newsletter*, December 1999)

Yellow fever

In 1999 the epidemiological situation of yellow fever (YF) in the Americas presents characteristics similar to those of the previous years. Until December 1999, 204 confirmed cases of the selvatic form and 97 deaths had been reported, the majority occurring in Brazil, Peru, and Bolivia. As of March 17, there were a total of 38 confirmed cases and 15 deaths. Thirty five of the 38 cases were from Brazil, especially from the State of Goias (31 cases). The sociodemographic profile of confirmed cases maintains the classical pattern of the selvatic form: males over 15 years who work in the jungle. The episode in Brazil, where at least 5 ecotourists were infected in an epizootic area and became ill in different cities infested by the urban vector of the disease, shows the high-risk existing today of the re-urbanization of yellow fever.

Epidemiological surveillance is improving and health professionals in high- risk areas have been informed of the risk of the YF. Bolivia, Brazil and Peru have established routine epidemiological investigation for YF whenever a suspected case is identified. Almost all cases reported in 1999 are laboratory confirmed. In the Americas, only Trinidad and Tobago and French Guiana have introduced universal vaccination of children. Brazil initiated the implementation of this strategy in 17 of its 27 states. Peru, Bolivia and Venezuela are also aiming for universal vaccination of children this year. Brazil, Peru, Venezuela, Bolivia, Ecuador and Colombia launched vaccination campaigns for other age groups in areas considered to be at greater risk.

Hepatitis B

Hepatitis B is an acute and chronic disease, with global distribution. It is estimated that there are over 2 billion of past or present infections, and approximately 350 million chronic carriers of the surface antigen. Over a million people die every year because of active chronic hepatitis, cirrhosis, and/or hepatocarcinoma. Only in the Americas, new annual cases have been calculated to be in the range of 140,000 and 400,000.

In the Americas highest endemicity is found among indigenous groups, such as the Jíbaros of the Amazon Basin and the Eskimos of Alaska. Epidemiology of hepatitis B indicates that in areas of low and intermediate prevalence, transmission occurs especially in adults of the following risk groups: health workers and others such as emergency technicians exposed to blood, male homosexuals, drug addicts (due to used syringes), heterosexuals with multiple partners, persons with sexually transmitted diseases, persons undergoing dialysis and hemophilics.

Haemophilus influenzae type b

Efforts are underway to introduce and/or consolidate the introduction of conjugated vaccines against Hib, which are safe and of known effectiveness, in the routine schedule for children under 1 year. In the Southern Cone, Uruguay, Chile, Argentina, and Brazil have already introduced Hib vaccine; Bolivia and Paraguay will join this year.

Progress: Government of Bolivia/ PAHO/World Bank Collaboration

The Pan American Health Organization is working with the World Bank in Bolivia, Peru and the Dominican Republic, and more recently in Paraguay and Haiti in the immunization component of the Bank's health projects. In Bolivia, the PAHO/World Bank collaboration is part of a 10-year project seeking to improve coverage and the quality of service networks, empower communities to improve their health status and strengthen local capabilities to respond to health needs. The implementation of the overall World Bank project is being monitored by the use of eight indicators, three of which are related to immunization.

Progress has been achieved in establishing a specific budget line in the national budget to cover vaccines and syringe costs of national immunization programs and in the introduction of the pentavalent and measles mumps rubella vaccines, as well as yellow fever in endemic areas. Bolivia allocated US$ 2 million towards its immunization program in 1999, up from US$ 53,000 in 1998. Another innovative development of this project is the inclusion of diphtheria, pertussis and tuberculosis (DPT3) vaccine coverage, as an indicator to measure performance and resource allocation within *Performance Agreements*, which are contracts signed between the states and central authorities as part of the processes of decentralization of health services.

Cold Chain: Facts to Remember

Four types of refrigerators are generally used to store and preserve vaccines used in national immunization programs.

Refrigerators by electric compression: Considered one of the most suitable for storing vaccines at health centers that have permanent access to electricity. The cooling unit is charged with gas and functions with an electric motor or a compressor.

Refrigerators by absorption: Refrigerators with absorption systems are appropriate for regions and /or areas that lack electricity, or where there is irregular supply of electricity. To refrigerate, these units require a source of heat, which can be propane and butane gas or liquid combustants, such as kerosene. Cooling is produced by heating a mix of ammonia and water.

Photovoltaic refrigerators - solar energy: These refrigerators are useful to store vaccines in regions that are hard-to-reach, especially in regions or areas either lacking conventional energy resources, or where they are difficult to obtain. Cooling is produced similarly to an electric compression refrigerator. However, energy is provided by batteries, which are charged by solar panels.

Icelined refrigerators: These kinds of refrigerators are used to ensure adequate temperature for vaccines in case of a power failure or irregular electric supply. The icelined refrigerator has tubes filled with water, which are built within the walls of the unit. These tubes allow them to freeze or reach sufficient cold temperature to protect vaccines against excessive heat during power failures for up to 30 hours. Cooling is produced similarly to an electric compression refrigerator.

Proper installation of a vaccine refrigerator

A refrigerator functions effectively if the following requirements are met:

- Must be installed in a cool and breezy place
- Must be placed in the shadow and far from any heat sources.
- The appliance must be separated from the wall by (150 mm.)
- Must be place on a straight surface (especially the absorption systems).

Certification of Global Polio Eradication

The exceptional efforts undertaken by all countries worldwide to eradicate poliomyelitis by the end of the year 2000 are coming to an end, and the thought of a polio-free world will finally become a reality. At that stage, the countries in the Western Hemisphere will join the world in carrying out extensive reviews of surveillance information, which are part of the certification process, to document the absence of circulating wild poliovirus. For the Americas, this process will be an opportunity to show that it continues to maintain a quality surveillance system, capable of detecting any importation in a timely fashion.

At PAHO's annual sub-regional meetings which include the participation of all managers of national immunization programs, discussion is increasingly focusing on the key steps needed to strengthen surveillance of acute flaccid paralysis (AFP) at the country level to meet certification criteria. These steps, outlined below, should be implemented jointly in each country by all health workers and health authorities responsible for surveillance at the central level:

- Notify and immediately investigate any case of acute flaccid paralysis and ensure that an adequate stool sample is taken and that final case classification of cases takes place within 10 weeks following case reporting.
- Comply with the four critical surveillance indicators of acute flaccid paralysis (see Table), placing special attention to the indicator that each country reports at least 1 case of AFP per 100,000 in children under 15 years of age.
- Reactivate the National Committees for the Certification of Polio Eradication, established in the Americas to review and oversee the certification process. Among their first tasks should be an analysis and final decision on each AFP case classified since 1995 as "polio compatible".
- Carry out a comprehensive evaluation of all National Health Institutes, universities, research institutions and private entities which have a laboratory, to document the presence or absence of wild poliovirus. It should be noted that stool samples still stored at laboratories from the time the virus was circulating in the Americas, should be considered as hazardous and a potential source of virus re-introduction in the environment.

AFP Surveillance Indicators, 1999*

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

* Data as of 4 December 1999
Source: HVP/PAHO (PESS)

Reported Cases of Selected Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1999 to date of last report, and the same epidemiological period in 1998, by country.

Country/Territory	Date of last report	Measles				Polio		Tetanus				Diphtheria		Whooping Cough	
		Confirmed 1999			Confir-med*			Non Neonatal		Neonatal					
		Labo-ratory	Clini-cally	Total	1998	1999	1998	1999	1998	1999	1998	1999	1998	1999	1998
Anguilla	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Antigua & Barbuda	1-Jan	0	0	0	0	0	0	3	0	0	0	0	0	0	0
Argentina	1-Jan	247	0	247	10,229	0	0	19	21	2	0	0	2	554	792
Bahamas	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Barbados	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Belize	1-Jan	0	0	0	0	0	0	1	1	0	0	0	0	0	1
Bermuda	1-Jan	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Bolivia	1-Jan	1,295	166	1,461	1,004	0	0	1	6	2	9	2	6	14	43
Brazil	1-Jan	436	353	789	2,930	0	0	633	750	59	72	197	217	1,317	1,704
British Virgin Islands	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada	1-Jan	20	0	20	12	0	0	0	1	...	...	1	0	4,528	5,887
Cayman Islands	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	7	0
Chile	1-Jan	31	0	31	6	0	0	15	15	1	0	0	0	2,916	2,487
Colombia	1-Jan	10	27	37	61	0	0	6	5	14	13	0	2	211	191
Costa Rica	1-Jan	4	20	24	20	0	0	1	0	0	0	0	0	18	1
Cuba	1-Jan	0	0	0	0	0	0	2	2	0	0	0	0	0	0
Dominica	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Dominican Republic	1-Jan	215	5	220	25	0	0	17	13	1	0	45	25	9	20
Ecuador	1-Jan	0	0	0	0	0	0	43	26	14	24	5	21	204	243
El Salvador	1-Jan	0	0	0	0	0	0	7	7	3	0	0	0	3	4
French Guiana	1-Jan	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Grenada	1-Jan	0	0	0	0	0	0	0	1	0	0	0	0	4	0
Guadeloupe	1-Jan	0	0	0	2	0	0	...	...	...	...	...	...	...	...
Guatemala	1-Jan	0	0	0	1	0	0	8	5	2	6	0	0	282	441
Guyana	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Haiti	1-Jan	0	0	0	3	0	0	...	...	11	11	4	0	18	4
Honduras	1-Jan	0	0	0	0	0	0	6	11	0	3	0	0	19	35
Jamaica	1-Jan	0	0	0	1	0	0	6	8	0	1	0	0	12	1
Martinique	1-Jan	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Mexico	1-Jan	0	0	0	0	0	0	105	141	13	25	0	0	51	166
Montserrat	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Netherlands Antilles	1-Jan	0	0	0	0	0	0	...	...	...	...	...	...	...	...
Nicaragua	1-Jan	0	0	0	0	0	0	5	10	0	0	0	0	27	10
Panama	1-Jan	0	0	0	0	0	0	4	0	1	0	0	0	212	216
Paraguay	1-Jan	0	0	0	70	0	0	23	19	9	13	0	0	29	38
Peru	1-Jan	8	4	12	10	0	0	61	81	12	14	8	2	2,387	2,268
Puerto Rico	1-Jan	0	—	0	0	0	0	...	...	...	...	...	...	20	10
St Vincent/Grenadines	1-Jan	0	0	0	0	0	0	0	1	0	0	0	0	0	0
St. Kitts/Nevis	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
St. Lucia	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Suriname	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trinidad & Tobago	1-Jan	0	0	0	0	0	0	7	2	0	0	0	0	0	1
Turks & Caicos	1-Jan	0	0	0	0	0	0	0	0	0	0	0	0	0	0
United States	1-Jan	86	—	86	100	0	0	33	34	...	...	1	1	6,011	7,395
Uruguay	1-Jan	34	0	34	0	0	0	0	2	0	0	0	0	1	0
Venezuela	1-Jan	0	0	0	4	0	0	46	38	4	6	0	0	502	528
TOTAL		**2,386**	**575**	**2,961**	**14,478**	**0**	**0**	**1,053**	**1,201**	**148**	**197**	**263**	**276**	**19,356**	**22,488**

... Data not available.
— Clinically confirmed cases are not reported.
* Laboratory and clinically confirmed cases.

PAHO's Revolving Fund Vaccine Prices for 2000

The PAHO Revolving Fund for Vaccine Procurement continues to play a critical role in the rapid introduction of new vaccines, such as *Haemophilus influenzae* type B, as in the widespread introduction of vaccines already available in the market for the past 15 years, such a measles, mumps, rubella (MMR), hepatitis B and yellow fever. The Fund was established in 1979 for the purchase of vaccines, syringes/needles and cold chain equipment for countries in Latin America and the Caribbean. Through a system of bulk purchasing, the PAHO Fund secures the supply of high quality vaccines for national immunization programs at affordable prices, while it also allows for the orderly planning of national immunization activities. The rationale behind its creation was to provide participating countries with a means of ensuring a smooth and constant flow of vaccines and basic related supplies for the implementation of immunization programs.

Vaccine Prices for 2000

Vaccine	Doses per Vial	Prices per Dose FOB US$
BCG	10	0.093
DPT	10 20	0.073 0.0575
DT (Adult)	10 20	0.042 0.032
DT (Pediatric)	10	0.045
Polio (Glass vial)	10 20	0.080 0.072
Polio (Plastic vial)	10 20 25	0.081 0.072 0.072
TT	10	0.0345
HEP B DNA 20 MCG Recombinant	10 1	0.580 0.900
HEP B Plasma Derivative	10 1	0.230 0.50
HIB – Liquid HIB – Lyophilized	10 1	3.11 3.00
DTP, HEP B/Hib (pentavalent)	1	3.50
Measles (Edmonston)	1 10	0.68 0.102
MMR – URABE (Pasteur) – PRIORIX (SmithKline) – URABE (Pasteur) – PRIORIX (SmithKline)	1 1 10 10	0.92 2.00 0.69 1.30

Source: PAHO

The price of the pentavalent vaccine, a formulation containing the vaccines of DPT, hepatitis B and Hib remained at US$ 3.50 for a single dose vial. This vaccine is currently being used in 14 countries in the Region and has the potential advantage of reducing the amount of injections and syringes required, thus cutting the amount of waste. The Fund is offering countries a selection of prices for MMR vaccines, whose widespread use occurred only as recently as 1998. In 1997, hepatitis B vaccine was limited only to risk groups and risk areas, but now is part of routine immunization programs in most countries in the Americas. The availability of all these vaccines at affordable prices is the direct result of economies of scale derived from bulk purchasing through the PAHO Revolving Fund.

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