



# EPI Newsletter

## Expanded Program on Immunization in the Americas

Volume XIV Number 3

IMMUNIZE AND PROTECT YOUR CHILDREN

June 1992

### Wild Poliovirus Eradication Peru: The Final Challenge

The Ministry of Health and the Peruvian community have been working energetically to eradicate polio since 1986, when 41 cases were confirmed. Wild type 1 poliovirus was isolated from four people in 1991; three healthy children from Piura and one child with polio sequela from Pichanqui, Junin. In 1990, it had been isolated from three healthy children from the Amazonas Department and one child with sequela from Jaen, Cajamarca. During the first few months of 1992, Peru was faced with the challenge of completing polio eradication for the rest of the Region. With this goal in mind, the government decided to carry out a "Sanitary Mop-up" in 13 Departments with a house-to-house campaign that would also serve to distribute information about cholera prevention. This Sanitary Mop-up is the single largest operation ever conducted in the polio eradication effort; the results are presented in Table 1, below.

Figure 1. Peruvian Departments included in the Sanitary Mop-Up of 1992



Table 1. Sanitary Mop-Up in Peru, 1992

Departments	Under one years of age			One to four years of age			Under five years of age			Total households visited
	Target population	Total Vaccinated	Percent vaccinated	Target population	Total Vaccinated	Percent vaccinated	Target population	Total Vaccinated	Percent vaccinated	
Ancash	29 337	31 662	107.9	112 515	119 335	106.1	141 852	150 997	106.4	196 717
Ayacucho	16 000	19 077	119.2	58 808	57 573	97.9	74 808	76 650	102.5	79 479
Cajamarca	40 864	31 458	77.0	148 025	105 277	71.1	188 889	136 735	72.4	177 173
Callao	12 723	13 661	107.4	48 131	48 909	101.6	60 854	62 570	102.8	0
Huancavelica	12 998	17 291	133.0	46 289	50 082	108.2	59 287	67 373	113.6	79 991
Huanuco	15 432	15 505	100.5	58 315	54 800	94.0	73 747	70 305	95.3	58 427
Ica	14 141	15 778	111.6	55 103	59 681	108.3	69 244	75 459	109.0	96 257
Junin	28 862	23 713	82.2	106 093	85 784	80.9	134 955	109 497	81.1	145 046
La Libertad	33 241	38 241	115.0	132 040	138 933	105.2	165 281	177 174	107.2	208 875
Lamabyeque	26 817	29 359	109.5	103 807	102 837	99.1	130 624	132 196	101.2	135 992
Lima Ciudad	11 846	19 106	161.3	46 187	70 279	152.2	58 033	89 385	154.0	78 897
Lima Norte	45 945	46 405	101.0	179 125	177 977	99.4	225 070	224 382	99.7	259 439
Lima Sur	32 591	31 346	96.2	126 385	132 891	105.1	158 976	164 237	103.3	195 481
Lima Este	14 347	20 326	141.7	55 929	74 772	133.7	70 276	95 098	135.3	107 744
Pasco	9 778	8 202	83.9	36 445	37 190	102.0	46 223	45 392	98.2	40 715
Piura	43 074	52 646	122.2	159 567	172 793	108.3	202 641	225 439	111.3	222 348
Tumbes	3 915	3 752	95.8	15 110	13 773	91.2	19 025	17 525	92.1	20 620
<b>TOTAL</b>	<b>391 911</b>	<b>417 528</b>	<b>106.5</b>	<b>1 487 874</b>	<b>1 502 886</b>	<b>101.0</b>	<b>1 879 785</b>	<b>1 920 414</b>	<b>102.2</b>	<b>2 103 201</b>

Source: Ministry of Health, Peru.

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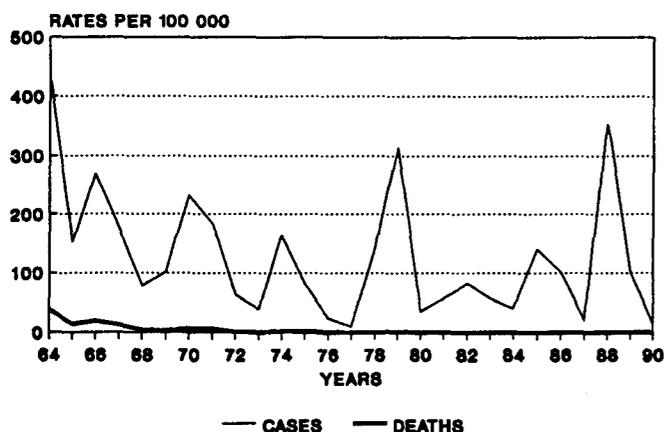
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# The Fight Against Measles Continues: Brazil and Chile Carry Out Mass Vaccination Campaigns

## Chile: 6 to 16 April 1992

The epidemiologists of the Ministry of Health analyzed available data, trends, and statistical sequences of measles epidemics of the last decades. They observed a trend toward two-year epidemics with three-year inter-epidemic intervals (Figure 1). The most recent epidemic of 1988-1989, regrettably caused 82 deaths and a total of 58 057 cases reported throughout the country.

Figure 1. Measles Morbidity and Mortality Chile, 1964 - 1990



Source: Ministry of Health, Chile

Both the trend analysis and the calculations of susceptibles accumulated during the past three years (Table 1), led the epidemiologists to predict that an epidemic would occur between August and September of 1992, which could potentially affect up to 70 000 cases. In order to prevent the epidemic and deaths and severe sequelae among the younger populations affected, which in turn create great consternation among the populace which increases pressure on health establishments, and given the data available on the unique capacity of mass campaigns to interrupt transmission, the Ministry of Health decided to hold a National Campaign for Measles Vaccination. The plan was to hold a ten-day campaign, between April 6 and 16, 1992, targeting 3 869 387 children between nine months and 15 years of age (28.9% of the total population) for vaccination.

Given the magnitude of this historical task, the Ministry personnel decided to enlist the participation of all 26 Health Services as well as the pediatric community to inform the public and social organizations and institutions of the

health threat facing the nation. They also intended to have them collaborate in the vaccination of all children in the targeted age group as the population most susceptible to become ill and die from this highly contagious disease.

Table 1. Population under One Year of Age with and without Measles Vaccine and Accumulated Susceptibles

YEAR	Pop.	Vacc.	Not Vacc.	Coverage	5% not Immun.	Suscep. Pop.
1989	280 813	259 418	21 395	92.4	12 971	34 366
1990	290 389	280 972	9 417	95.8	14 049	23 466
1991	300 827	287 290	13 537	95.5	14 364	27 901
TOTAL	872 029	827 680	44 349	94.9	41 384	85 733

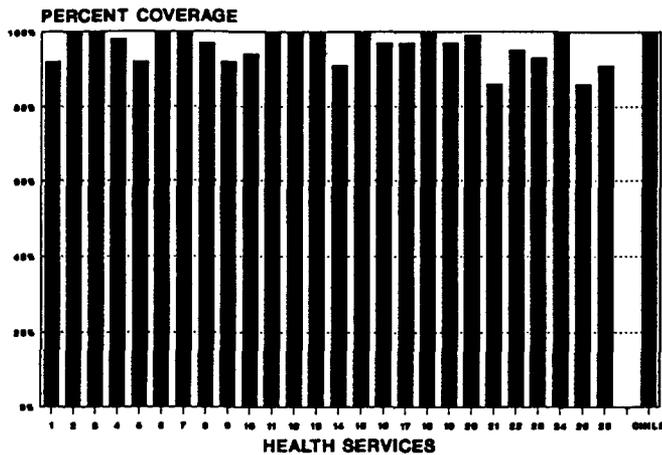
Source: Ministry of Health, Chile.

With this goal in mind, the Ministry, along with the Health Services, implemented all the measures necessary to supply health establishments with the needed cold chain equipment, and the community with free measles vaccine. They also acquired sufficient supplies of syringes and disposable needles to have each child vaccinated and avoid any risk of transmitting other communicable diseases like AIDS or hepatitis.

Following is a summary of the most important coordinated activities sponsored by the Ministry of Health for implementing the national campaign:

1. Creation of a National Commission that would coordinate activities in the areas of training and promotion, adjustment of human and financial resources, supply cold chain equipment, transportation, and the development, analysis and evaluation of information.
2. Through the Department of Epidemiology, the Ministry of Health elaborated a plan of activities designed to coordinate actions with the 26 Health Services, the first of which was a meeting held on January 10, 1992, attended by two representatives of each Health Service. On March 25, regional meetings were held where the representatives informed regional personnel regarding the plan of action for the campaign.
3. A social communication plan was also put into effect, in which prestigious children's television artists made announcements on TV, radio, and newspapers, and brochures, posters, and pamphlets were developed and given wide distribution. After being vaccinated, the children received a sticker with the words: "I am vaccinated, good-bye measles."

**Figure 2. Vaccination Coverage by Health Service  
Measles Campaign, Chile 1992**



Source: Ministry of Health, Chile

4. Extensive social participation in the campaign was enlisted through the recruitment of various public and private organizations, county governments, the police department, the Red Cross, civil defense, firemen, Caritas-Chile, and political parties. Universities, scientific societies, professional associations and private health institutions also participated in the social mobilization efforts.

5. Intersectoral coordination and participation was also accorded high priority, especially among the Ministry of Health and the Ministries of Education, Justice, Defense, Transportation, and Telecommunications.

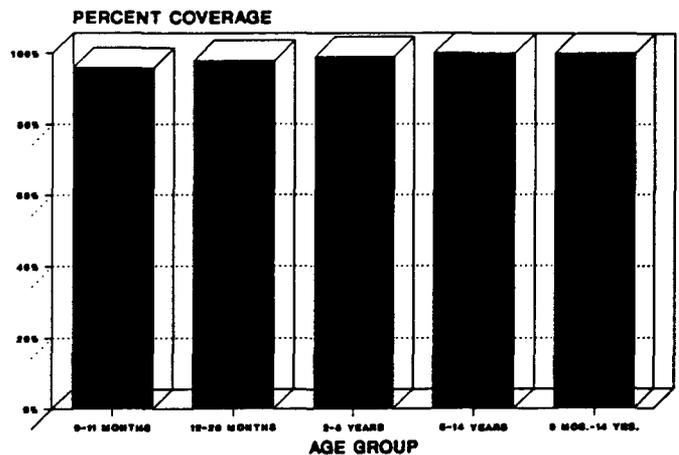
Campaign results are presented in Figures 2 and 3. The total cost is estimated to have mounted to about 1.6 million dollars, and the total vaccination coverage to 99.6% of the target population. Active surveillance of rash and fever illness was implemented immediately following the campaign, with the ongoing collaboration of PAHO.

By achieving the established target and avoiding a national epidemic, the country as a whole has taken the first step towards measles elimination.

### Brazil: 25 April to 22 May, 1992

In mid-1991, the Ministry of Health decided to implement an initiative directed at improving the control of measles in the national territory. Retrospective analyses of data for the last ten years revealed that measles had an average annual incidence of 40 cases per 100 000 inhabitants. But the problem of underreporting was a well-recognized one and it was estimated that this reported incidence constituted between five and ten percent of the real incidence.

**Figure 3. Vaccination Coverage by Age Group  
Measles Campaign, Chile 1992**



Source: Ministry of Health, Chile

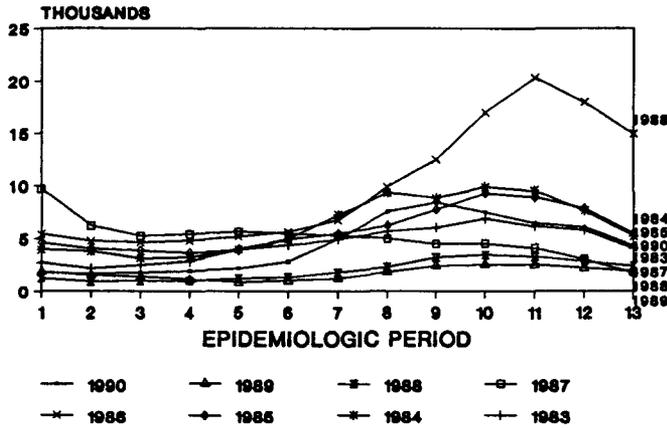
Ministry personnel studied data on measles control programs in the U.S. in the 1980's, the Cuban experience and data on the recent mass vaccination initiative of the English-speaking Caribbean. Data from the campaign carried out in 1987 and 1988 in the states of Sao Paulo, Parana and Bahia were also reviewed. The best documented and most extensive campaign hitherto conducted in Brazil was carried out in Sao Paulo in 1987, where more than eight million children from nine months to 15 years of age were vaccinated. The average number of cases admitted to hospitals in this state had been 3 666 between 1979 and 1986. Following the campaign, this number came down to 247 between 1988 and 1990. An important proportion of the cases reported after the vaccination campaign occurred in laborers immigrating to Sao Paulo from other states, especially from Northeastern Brazil. A consulting group of technicians from the Ministry of Health, CDC, and PAHO, concluded that given the considerable migratory flow to Sao Paulo from other states (approximately 30 000 people arrive daily by bus alone), transmission could not be interrupted in Sao Paulo as long as the other states did not make special efforts to control measles.

On the basis of these data, the Ministry decided to organize a mass measles vaccination campaign that would be carried out during the first semester of 1992. The selection of the first semester was based on the fact that available data indicated that incidence was lower during the first semester in all years analyzed (Figure 4). The objective was to vaccinate all children between nine months and 15 years of age, regardless of measles vaccination history.

A national interdisciplinary coordinating group was organized with personnel from the National Immunization Program, the National Center for Epidemiology, the Program for Vaccine Self-sufficiency, technicians from the

laboratories of the National Health Foundation, and representatives from PAHO and UNICEF. The group was divided into three subgroups, each one charged with specific areas of action, and met as a whole on a weekly basis to evaluate the work and accomplishments of the subgroups. The Minister of Health participated in several of these meetings.

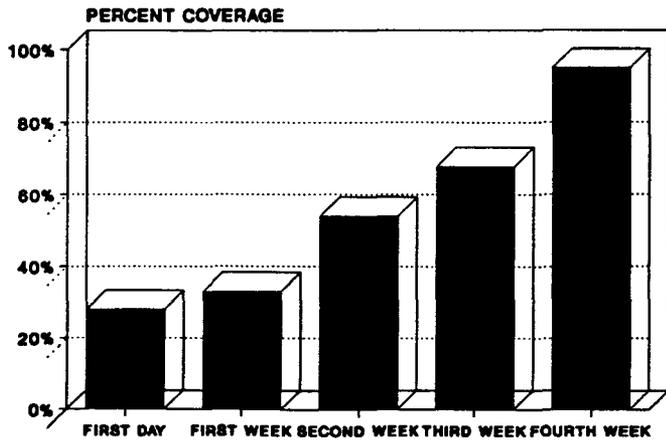
**Figure 4. Reported Cases of Measles, by Four-week Period, Brazil, 1983 - 1990**



Source: Ministry of Health, Brazil

The first group had the principal objective of obtaining the 65 million doses of vaccine that would be required to vaccinate the 50 million children in the target group, along with the 10 000 injectors necessary to administer the vaccine. It is worth noting that securing this amount of vaccine and applicators was not an easy task, and required coordinating several suppliers.

**Figure 5. Vaccination Coverage by Week of Measles Campaign, Brazil 1992**



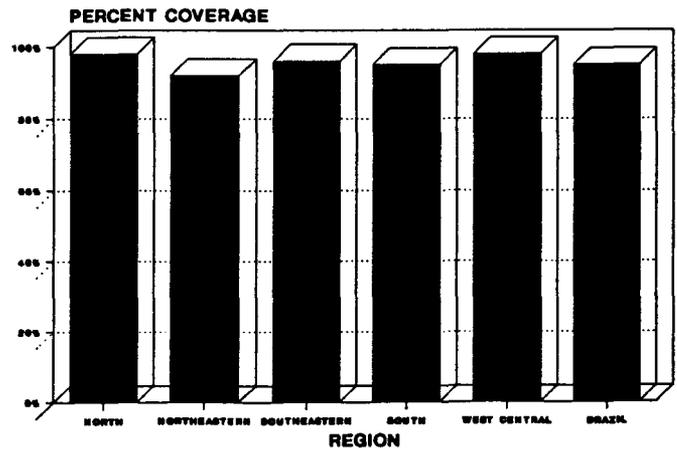
A total of 47 723 333 children were vaccinated in the campaign.  
Source: Ministry of Health, Brazil

The second group was charged with organizing social mobilization and promotion efforts for the campaign. Special efforts were required to develop new initiatives that would target school-aged children and adolescents. By early February, the most popular artists had been recruited to promote the campaign. Other activities were also organized, such as presenting the campaign at the National Congress of Pediatricians and other scientific meetings. National meetings were held for the state coordinators of immunization and epidemiology programs, in which details of the campaign and the Measles Epidemiologic Surveillance Field Guide were presented. State Governors and representatives of other ministries and non-government agencies were also included in the activities.

The third group was responsible for the implementation of the epidemiologic surveillance system that would allow for prompt reporting of suspected measles cases once the campaign was over. In view of the fact that measles cases rarely seek medical help or are admitted to hospitals, the group elaborated a plan to implement epidemiologic surveillance within the 4 500 counties of Brazil. They also developed a plan designed to coordinate the activities of the laboratory network which will process the blood samples of all suspected cases.

The National Health Foundation transferred funds to the state governments, which in turn, transferred them to the counties. The campaign cost an estimated 50 million dollars; that is, one dollar per child vaccinated. This amount includes vaccines, injectors, syringes, operational costs, social mobilization materials, implementation of epidemiologic surveillance, and supplies for the diagnostic laboratories. The President of Brazil addressed the public by national television and radio in order to impress upon them the dangers of the disease, the efficacy of the vaccine, the costs of the campaign, and his personal commitment to achieving measles control.

**Figure 6. Vaccination Coverage by Region Measles Campaign, Brazil 1992**



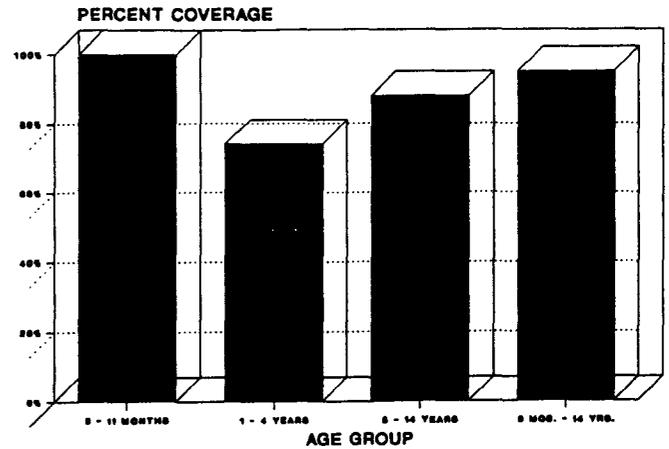
Source: Ministry of Health, Brazil

Over 200 000 vaccination posts were opened throughout the country. In the Northeastern region, where the last cases of polio occurred over three years ago, OPV was also offered to children under five years of age. The basic strategy used was mobile and stationary vaccination posts, but several areas also included schools as a mechanism for reaching children over five years of age.

Mass communication media were used to promote the campaign throughout the four-week period. Artists and technicians informed the public on a daily basis about advances made. Vaccination coverage was also analyzed daily in order to implement immediate corrective measures. Coverages were similar among all age groups, indicating that promotion efforts were successful in reaching small children as well as adolescents.

Since preliminary data revealed the achievement of global coverages of 85% and low coverages in some states, the Minister of Health decided to continue the campaign for another two weeks. All national and state coordinators met in Brasilia on 11 June with the purpose of analyzing results at the state and county level. The campaign was considered a success, with an average national vaccination coverage of 95% (over 47 million children) of the targeted population (Figures 5 to 7). The second stage of epidemiologic surveillance and implementation of control measures at the local level is now ready to begin.

Figure 7. Vaccination Coverage by Age Group Measles Campaign, Brazil 1992



Source: Ministry of Health, Brazil.

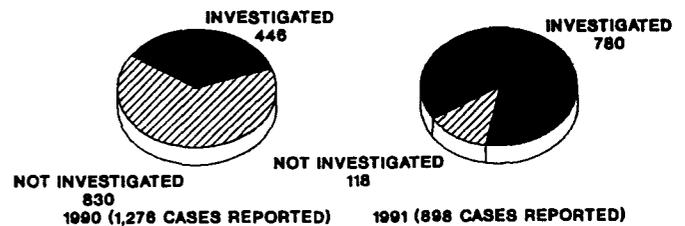
Sources:  
 Chile: Dr. Jorge Toro, Dra. María Teresa Valenzuela y Enf. Irma Canepa, Dpto. Epidemiología del Ministerio de Salud.  
 Brazil: EPI Program, Ministry of Health.

## Neonatal Tetanus Elimination in the Americas: Progress in Surveillance

Neonatal tetanus is a highly underreported disease and thus has been dubbed the "silent epidemic." It is the killer of an estimated 10 000 newborn children per year in the Americas. The cornerstone of the elimination strategy is the vaccination of all women of childbearing age (between the ages of 14 and 45) in areas at highest risk.

A high risk area, or county ("municipio"), has been defined as one in which morbidity or mortality for neonatal tetanus has been greater than the national average in either of the last five years, or one that has had at least one case of neonatal tetanus in the last three years, or a county that possesses socioeconomic or environmental conditions which favor the existence of unreported cases. The countries have used local/national health system data and active searches to identify their high risk counties. Each year between 1988-1991 has seen improvement of surveillance with additional counties being identified as being at high risk. The number of counties under surveillance has increased from over 259 in 1988 to over 1 358 at present. In these counties, representing 10% of the total counties in the Region, intensive vaccination efforts have begun (Figure 1).

Figure 1. Proportion Neonatal Tetanus Cases Investigated in 1990 and 1991 in Latin America



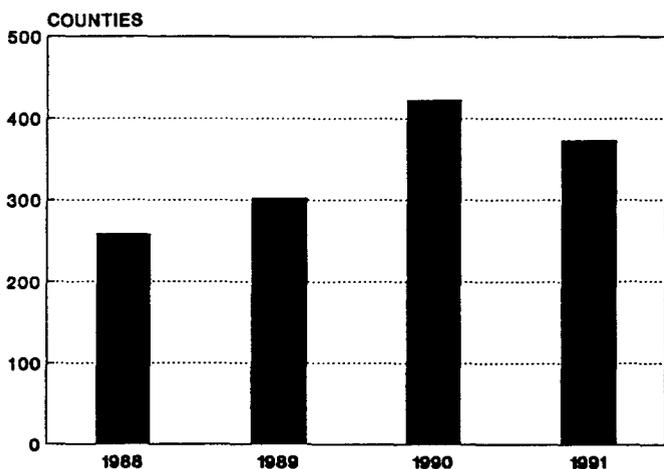
Source: PAHO

As a consequence of improved regional surveillance, the impact of the program is not readily apparent when one looks at aggregate incidence data. This is because the true incidence of neonatal tetanus in the earlier years was much higher. For purposes of evaluation, the high risk counties have been placed in cohorts defined by the year they were identified at risk. Figure 2 displays the approximate number of counties that were newly identified at risk for the period 1988-1991. In Figure 3, the 1988 and 1989 cohort are grouped together and named— 88-89 cohort. The incidence of neonatal tetanus over the last three years is displayed for the Americas, the Andean Region, and Central America. In the 88-89 cohort for the Americas Region, the incidence of neonatal tetanus dropped from 893 to 255, a decrease of over 71%. In the same cohort for the Andean Region and Central America, there is a decreased incidence of 69% and 73% respectively.

Another method of evaluating progress in the program is to look at what percentage of the counties in the 88-89 cohort have gone two years without a reported case of neonatal tetanus. For the purposes of this paper these will be referred to as "cleaned" for the time being. Out of the 561 counties in the Americas 88-89 cohort, 290 (52%) have been "cleaned" (Figure 4.) Similarly in the Andean Region, 146 out of 326 (45%) have been cleaned. And in Central America, 126 out of 189 (67%) have been cleaned. The progress, especially in Central America, has been phenomenal.

There has been a major emphasis on the full investigation of each case of neonatal tetanus. Only in this way can vaccine failures and the reasons for missed opportunities be identified.

**Figure 2. Number of Counties at Risk for Neonatal Tetanus, by Cohort, Latin America (1988-1991)**



Source: PAHO

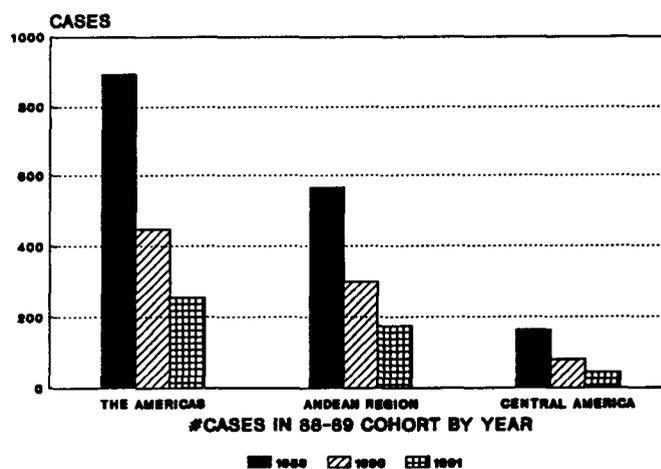
In 1990, 35% of the total reported cases of neonatal tetanus were investigated. In 1991, 87% of the reported cases were investigated, a remarkable improvement.

As the Tetanus Elimination program reaches its midway point, the rapid identification of "silent areas" for neonatal tetanus is of utmost importance. Among the indicators that

are being developed for this activity are vaccine coverage, rate of trained birth attendance, prenatal care, neonatal mortality curves, etc. Rapid assessment techniques using these indicators have shown promise.

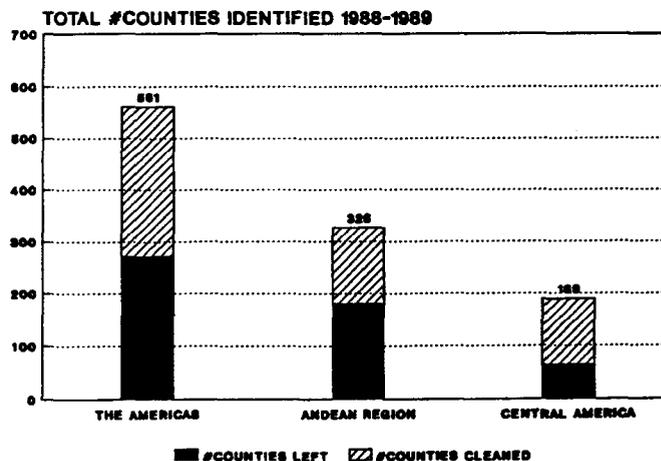
During its last meeting, the Technical Advisory Group on Vaccine-Preventable Diseases (TAG) (see *EPI Newsletter*, Vol. XIV, No. 2, April 1992), commended the countries of the Americas for their progress in the campaign to eliminate neonatal tetanus. It re-emphasized the prioritization of vaccination efforts in women of childbearing age in high risk areas and made the following recommendations: the separate reporting of neonatal tetanus and post-neonatal tetanus; the full investigation of each case of neonatal tetanus; the involvement of traditional birth attendants in surveillance and control efforts; the reporting of tetanus toxoid coverage in women of childbearing age; and the improvement of neonatal records in health services located in high risk areas.

**Figure 3. Impact of Neonatal Tetanus Elimination Activities: Incidence Trend of 88-89 High-Risk Cohort of Counties, by Region**



Source: PAHO

**Figure 4. Impact of Neonatal Tetanus Elimination Activities: Present Status of 1988-1989 High-Risk Cohort of Counties, by Region**



Source: PAHO

# Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1991 to date of last report, and the same epidemiological period in 1990, by country.

Subregion and country	Date of last Report	Measles		Poliomyelitis #		Tetanus				Diphtheria		Whooping Cough	
		1991	1990	1991	1990	Non Neonatal		Neonatal		1991	1990	1991	1990
						1991	1990	1991	1990				
<b>LATIN AMERICA</b>													
<b>Andean Region</b>													
Bolivia	28 Dec.	2 012	751	0	0	...	38	48	42	2	4	56	155
Colombia	28 Dec.	7 401	17 520	8	4	62	129	141	166	6	16	685	1 872
Ecuador	28 Dec.	2 024	1 673	0	1	50	45	80	88	3	3	520	487
Peru	28 Dec.	1 401	1 437	1	3	87	136	89	125	3	44	187	1 134
Venezuela	28 Dec.	13 845	9 981	0	0	64	99	36	28	0	0	777	1 389
<b>Southern Cone</b>													
Argentina	28 Dec.	17 806	255	0	0	25	46	12	14	2	4	1 132	1 974
Chile	28 Dec.	2 080	1 846	0	0	12	22	2	0	21	37	58	63
Paraguay	28 Dec.	471	1 035	0	0	48	89	33	39	4	10	112	80
Uruguay	28 Dec.	1 055	110	0	0	3	3	0	0	0	0	41	161
Brazil	28 Dec.	32 335	61 435	0	0	1 141	1 248	223	250	558	840	5 858	14 057
<b>Central America</b>													
Belize	28 Dec.	7	70	0	0	0	0	0	0	0	0	4	3
Costa Rica	28 Dec.	6 340	75	0	0	1	3	0	0	0	0	19	75
El Salvador	28 Dec.	751	1 124	0	0	42	31	20	25	0	0	92	212
Guatemala	28 Dec.	206	8 819	0	3	15	35	15	50	0	12	138	138
Honduras	28 Dec.	95	8 360	0	0	...	39	18	39	0	0	89	147
Nicaragua	28 Dec.	2 867	18 225	0	0	20	31	11	15	0	0	96	242
Panama	28 Dec.	2 455	1 891	0	0	1	2	6	5	0	0	103	22
Mexico	28 Dec.	2 997	68 782	0	7	184	219	152	145	1	0	127	1 078
<b>Latin Caribbean</b>													
Cuba	28 Dec.	19	17	0	0	1	4	0	0	0	0	0	23
Haiti	...	...	1 414	0	0	...	...	...	143	...	0	...	913
Dominican Republic	28 Dec.	7 512	3 477	0	0	54	56	4	12	11	27	10	227
<b>CARIBBEAN</b>													
Antigua & Barbuda	28 Dec.	0	0	0	0	0	0	0	0	0	0	0	0
Bahamas	28 Dec.	0	65	0	0	1	0	0	0	0	0	0	0
Barbados	28 Dec.	0	51	0	0	4	2	0	0	0	0	0	3
Dominica	28 Dec.	6	13	0	0	1	0	0	0	0	0	0	0
Grenada	28 Dec.	2	5	0	0	1	0	0	0	0	0	0	0
Guyana	28 Dec.	12	1	0	0	0	0	0	0	0	0	0	1
Jamaica	28 Dec.	278	3 651	0	0	5	4	0	0	1	0	20	3
St. Kitts/Nevis	28 Dec.	5	80	0	0	0	0	0	0	0	0	0	0
St. Vincent	28 Dec.	2	1	0	0	1	0	0	0	0	0	0	0
Saint Lucia	28 Dec.	8	30	0	0	0	0	0	0	0	0	0	7
Suriname	28 Dec.	10	35	0	0	0	0	0	0	0	0	0	0
Trinidad & Tobago	28 Dec.	118	550	0	0	7	6	0	0	1	0	0	0
<b>NORTH AMERICA</b>													
Canada	28 Dec.	5 817	726	0	0	3	2	0	0	2	8	1 808	6 266
United States	28 Dec.	9 461	27 672	0	0	48	60	0	0	2	4	2 522	4 188

... Data not available.

# Laboratory Network Meeting Report

Representatives of the laboratory network met on 14-15 March 1992, to discuss the results obtained in support of polio eradication activities and the remaining problems that require resolution.

During this meeting each laboratory presented its report. Of the 2 475 cases of acute flaccid paralysis reported in 1991, a total of 6 719 stools were processed, 4 282 from cases and 2 437 from contacts. Of the 345 polioviruses isolated, 15 were wild type 1, 329 were vaccine-related, and one isolate is pending characterization. Because cases of acute flaccid paralysis usually have more than one stool collected, the 15 wild type 1 poliovirus isolates correspond to the nine confirmed polio cases in 1991 which occurred in Peru and Colombia. Wild poliovirus was isolated from a contact of one case whose own specimens were negative for polioviruses.

In November 1991, a workshop was conducted at CDC on the molecular methods for the characterization of polioviruses for the virologists working in the regional laboratory network for polio eradication. Nucleic acid probe hybridization and polymerase chain reaction (PCR) were the topics presented during the workshop. The full transfer of these technologies, including equipment and supplies, is currently in progress. By the second semester of this year, with PAHO support, all laboratories in the network expect to be working with the new molecular technologies.

In 1991, considerable work was done toward detecting wild polioviruses in the environment. PCR analysis of sewage specimens of this study proved successful. The ad-hoc committee of the ICCPE, has recommended that the study be repeated in Cartagena, as well as at three other

sites in the Americas thought to be at risk for wild poliovirus transmission.

Despite major advances and contributions to the program, representatives of the laboratory network recognize that some aspects of work should be improved. Therefore, they agreed to:

1. Improve communication between the epidemiologists and the laboratories;
2. Reduce turn-around time for reporting results, including molecular characterization of polioviruses;
3. Improve coordination of the information provided by laboratories and epidemiologists to PAHO. In this way, the PAHO Polio Bulletin will reflect the current status of virologic surveillance;
4. Establish criteria for continued storage of specimens;
5. Refine, in collaboration with the epidemiologist, the criteria for testing contact specimens;
6. Evaluate more efficient methods for analyzing large numbers of specimens. The evaluation will include pooling of samples and comparison of traditional and molecular methods;
7. Organize an additional laboratory network meeting in six months to discuss results and establish criteria for processing survey sampling;
8. Prepare to support activities associated with certification, including systematic community surveys and environmental surveillance;
9. Enhance the capabilities of the laboratories to perform better integrated analyses of their data.

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