EPI Newsletter

Expanded Program on Immunization in the Americas

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Poliomyelitis Eradication: Surveillance Indicators

Of the 2,476 cases of AFP reported in the Region during 1990, 14 had been confirmed as polio by March 9, 1991, 60 as compatible, 2,155 had been discarded and 247 were still pending final classification. The Regional rate of AFP cases was 1.62 per 100,000 children under 15 years of age, with a minimum rate of 0.7 for the Latin Caribbean and a maximum of 2.3 for Central America.

Polio EradicationSurveillance System
Distribution of Cases by Classification
Period: 90/01-90/52 By: Onset Level: Country

COUNTRY	NUMBER OF CASES				
	Reported	Confirmed	Compatible	Probable*	Discarded
Argentina	111	0	0	26	85
Bolivia	61	0	0	3	58
Brazil	901	0	16	105	780
CAREC	9	0	0	7	2
Chile	179	0	0	0	179
Colombia	203	2	8	11	2
Costa Rica	10	0	0	0	10
Cuba	23	0	0	9	14
Dom. Rep.	12	0	0	2	10
Ecuador	61	1	2	17	41
El Salvador	88	0	0	7	81
Guatemala	105	3	0	0	102
Haiti	20	0	0	10	10
Honduras	69	0	0	0	69
Mexico	338	6	8	22	302
Nicaragua	16	0	0	7	9
Panama	8	0	0	2	6
Paraguay	33	0	2	3	28
Peru	101	2	17	0	82
Uruguay	6	0	0	0	6
Venezuela	122	0	7	16	99
TOTAL	2476	14	60	247	2155

*Still under investigation; final diagnosis not yet available.

In terms of surveillance indicators, 76% of all cases were reported within the first 15 days following onset of paralysis, and the variability was from 36% of all cases reported in the English-speaking Caribbean to 89% in the Central American Subregion.

Cases were confirmed in 19 (0.13%) of the 14,372 counties ("municipios") in the Region of the Americas.

The development of the negative reporting system for AFP has improved to the point of including all the Latin American countries of which approximately 70% were reporting regularly in 1990. Efforts are being made at present to develop this system within the countries of the English-speaking Caribbean.

Ten countries (Bolivia, Brazil, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Peru and Venezuela) are carrying out mop-up activities that have covered 947 counties.

Summary of Mop-up Operations
Latin America, 1990 (Provisional data)

COUNTRY	Number of covered counties	Total pop. <5 years to cover	Total house-holds visited	Total pop. <5 vaccinated	%	Total pop. vaccinated
Bolivia	54	71 144	46 539	41 957	58	51 180
Brazil	N.A.	N.A.	N.A.	N.A.		N.A.
Colombia	101	816 123	386 525	243 511	29	243 511
Ecuador	140	639 267	581 091	443 224	69	469 345
El Salvador	193	888 589	355 810	566 070	63	771 347
Guatemala	59	184 863	128 396	107 915	58	107 915
Honduras	290	833 267	134 796	673 984	80	673 984
Mexico	N.A.	N.A.	N.A.	1 246 968		1 246 968
Peru	98	998 942	871 352	689 614	69	1 483 280
Venezuela	12	10 590	12 797	9 531	90	9 531
TOTAL	947	4 442 785	2 517 306	4 022 774	62	5 057 061

N.A.: Data not available

Following the recommendations made at the last TAG meeting, efforts have been made to improve the timeliness of stool sample collections, although it is troubling to observe that during 1990 only 47% of AFP cases reported had samples taken within the first 15 days following onset of paralysis, and that these percentages ranged from 72% of all cases for Central America to 9% for the Latin Caribbean. As far as contact samples were concerned, only 26% of cases reported had stools taken from contacts.

In this issue:

Technical Advisory Group Meets in Guatemala

Introduction

The Ninth Meeting of the PAHO Technical Advisory Group (TAG) on Vaccine-Preventable Diseases took place in Guatemala City, Guatemala, from 12 to 16 March, 1991. Participants were welcomed by Dr. Antonio Casas, PAHO Representative in Guatemala, on behalf of Dr. Carlyle Guerra de Macedo, the PAHO Director. The Meeting was officially opened by the President of Guatemala, Ing. Jorge Serrano Elias, who emphasized that prevention is the most cost effective intervention available to policy makers in the area of health. The TAG members present were Drs. Hilda Alcalá, D.A. Henderson (Chairman) and Joao Baptista Risi, Jr. Unable to attend were Drs. José Manuel Borgoño, Peter Figueroa, and Alan Hinman (Rapporteur). Dr. Frederick Robbins, the Chairman of the Poliomyelitis Eradication International Certification Commission for the Americas established by the PAHO Director in July, 1990, also attended the Meeting. Representatives of the USAID, UNICEF, IDB, and Rotary International, agencies that are collaborating with the countries in this priority program, were also present at the meeting.

The World Health Organization was represented by personnel from its Headquarters in Geneva and from the Regional Offices of the European and Eastern Mediterranean Region. Representatives from Egypt, England and France were also in attendance. Dr. D. A. Henderson chaired the Meeting; Dr. Joao Baptista Risi, Jr. was the Rapporteur *(ad-hoc);* and, Dr. Ciro de Quadros served as Secretary.

Conclusions and Recommendations

Each TAG meeting has documented significant progress over the previous one; this meeting marked yet another new level of achievement. Immunization coverage with the vaccines included in the program reached an all-time high in the Americas: no vaccine shows coverage of less than 70%; levels of coverage of 80% and greater are recorded by several subregions, such as the English-speaking Caribbean and the Southern Cone.

Vaccine-preventable diseases continue to show a declining incidence and poliovirus transmission appears on the verge of being interrupted throughout the Western Hemisphere. Despite examination of thousands of stool specimens, only 14 during the last 12 months have revealed wild poliovirus; the most recent isolate was from a case in January, 1991, in Cartagena, Colombia. Over four years have elapsed since the last isolation of wild poliovirus in the Southern Cone countries; more than eight years since an isolate was found in the English-speaking Caribbean, more than three years since the last isolation of indigenous wild poliovirus in Central America (the last three isolates appear to have originated from a recent introduction from Mexico), two years since the last in Brazil and five months in Mexico. It is notable that the 14 wild poliovirus isolates detected during 1990 represent a decrease of 40% compared with the 24 registered in 1989. The significance of these findings is even more remarkable when one takes into account the enormous improvement in surveillance for acute flaccid paralysis (AFP) during the last year. In all, 2,476 reports were investigated, the largest number investigated to date in a single year. The first and only case so far in 1991 was detected in Cartagena, Colombia, in January 1991.

The TAG recognizes that this tremendous progress can be attributed in substantial measure to the political and social commitment which in turn has generated a high level of priority being given to the immunization programs in all countries of the Americas, in PAHO, and the collaborating national and international organizations. The strategies of national vaccination days and mop-up operations have been highly effective in complementing the vaccination activities of the health facilities. The high level of coordination achieved between all governments and the agencies supporting the immunization efforts in the Western Hemisphere (USAID, UNICEF, ROTARY, IDB, CPHA, and PAHO) was also critical for smooth and creative implementation of the program and for optimal use of available resources.

The TAG notes with satisfaction the considerable improvement in all performance indicators, including an increase in the number of health units included in the weekly surveillance system - now nearly 20,000 - approximately 70% of which report promptly each week; the increase in the proportion of AFP cases being reported within 15 days of onset (nearly 80%); and the increase in the proportion of AFP cases with final diagnoses (now 95%). Additionally, there is a commendable increase in the number of "municipios" which are maintaining immunization coverage rates over 80% -almost 60% of the 7,408 for which information was available.

However, there are still problems of concern. Most critical is the quality of surveillance for wild poliovirus now being accomplished through examination of stool samples from AFP cases and their contacts. Progress in this activity is disappointing. Only 48% of all cases of AFP reported during 1990 had two stool specimens properly and promptly collected and sent to the laboratory. Although this represents considerable progress when compared with a figure of 34% obtained in 1989, the lack of laboratory information on such "compatible" cases undoubtedly results in failure to confirm a number of cases of AFP as being caused by wild poliovirus. In this instance, the possibility of wild poliovirus transmission cannot be ruled out and countries with such cases could not be certified as free of circulation, even in the absence of "confirmed" poliomyelitis cases. Particularly of concern are cases which are "lost to follow up," a number amounting to one third of all AFP cases during 1990.

Confirmation of cases through specimens obtained from contacts is proving to be most important. During 1990, one out of four cases confirmed by wild poliovirus isolation resulted from investigation of contact specimens. When it is seen that only one third of the cases had proper collection

of specimens from contacts, there is cause for concern. It is apparent also that special efforts are needed to ensure that all required information is properly entered into the PAHO information system, PESS, for all cases of AFP. For example, only 44% of the cases were recorded as having a precise final diagnosis, and other variables, such as fever at onset of paralysis, showed data for only 45% of all cases.

The importance of careful monitoring of vaccine potency is well illustrated by the fact that over 30% of the cases which occurred in the Americas over the last two years could be attributed to use of a sub-standard vaccine formulation. Hopefully, the problem is now resolved.

With full appreciation of the exceptional progress made by virtually all countries in the control and elimination of vaccine-preventable diseases, the TAG reaffirms the recommendations of its Eighth Meeting, held in Mexico City, 19-22 March 1990 and makes the following assessment and offers additional recommendations.

Of highest priority is the elimination of what appears to be only a few remaining foci of wild poliovirus infection. The Andean Subregion is of special concern and demands urgent attention. A number of foci are undoubtedly present along both the Atlantic and Pacific coastal areas of Colombia. Neighboring areas of Venezuela and Ecuador are at special risk. Intensive measures are indicated, especially in Colombia where mop-up activities are more limited in intensity and scope than appears to be required. Foci are also present in Northern areas of Peru adjacent to Ecuador and could well be present in other parts of the country. Peru's present problems involving both socio-political disturbances and a cholera epidemic are recognized. Because of these problems, the TAG recommends that all possible assistance be provided to strengthen their surveillance/containment/vaccination program. Overall, a special program (such as the one recently conducted in Central America) encompassing Colombia, Peru, Ecuador, and neighboring areas of Venezuela, now appears to be needed.

The intensive efforts made in Mexico and Central America to eliminate transmission of wild poliovirus appear to be progressing well, but a special alert and special measures will be required for the balance of the year, focusing on periurban areas and migrant groups. All countries should continue to enhance their efforts to document surveillance and program activities of the type which will be needed for certification. From the reports presented, it would appear that programs in Brazil and Panama, in particular, deserve special attention for the improvement of surveillance indicators, especially the prompt collection of adequate specimens for the laboratory.

The data presented on immunization coverage and the striking improvements in surveillance of AFP demonstrate the benefits that could be accrued in other parts of the immunization program, even in other primary health care interventions.

Specific Recommendations:

A. Polio Eradication

1. Vaccines

* Countries must ensure, at all times, that the vaccines being used in the program comply with the minimum potency requirements as recommended by PAHO and WHO: with a balance of 10:1:6 for types 1, 2, and 3, respectively. All countries producing vaccine should have batches of their vaccines tested in the PAHO/WHO reference laboratories.

2. Specimens

* Added efforts should be made in specimen collection. This is critical at this stage in the program. Only if specimens are promptly collected from both cases and contacts will it be possible to determine that transmission of wild poliovirus has been interrupted. Two specimens containing an adequate quantity of stool material are required from each child with AFP and a specimen from at least five contacts less than five years of age. This implies a total of seven stool specimens for each case.

* Because it is impossible to know which children may subsequently be lost to follow-up, it is critical that stool samples and clinical information be collected at the very first encounter. After collecting the specimens, they must be promptly refrigerated and shipped to the laboratory in refrigerated containers to arrive at 4°C or below.

* Epidemiologists and virologists must work closely together to coordinate shipment of specimens and to ensure that all such shipments have ice remaining in the container at time of receipt in the laboratory.

3. Cases of Acute Flaccid Paralysis

* Highest priority should be given to cases of AFP under six years of age who experience fever at onset of paralysis and whose paralysis develops over a period of four days or less. Data show that such illnesses are especially likely to be polio. Special efforts should be made to get samples from the patient ***and from contacts***, and special mop-up vaccination programs (two rounds of house-to-house vaccination at least one month apart in a very extensive geographic area, usually an entire province or state) should be started promptly. A detailed clinical and laboratory justification should be given for any cases of this type which are categorized as "discarded."

* A definite diagnosis of polio can be made (or rejected) by examination of the spinal cord. It is important that a qualified and experienced pathologist examine such specimens, if available, and that a suspension be sent directly to a reference laboratory so that efforts can be made to grow the poliovirus. A death diagnosed as poliomyelitis by pathology may be caused by either wild or vaccine virus and it is important to determine which.

* A clinical review of cases of Guillain-Barré Syndrome shows that it is not possible to differentiate between poliomyelitis and GBS with certainty. Thus, it continues to be essential that GBS cases be considered as

probable polio cases until all laboratory data are available and a 60-day evaluation is conducted.

4. **Reporting of Data**

* Information on all investigated cases must be available at the country level, but such data must also be entered into the regional surveillance system (PESS) to allow proper monitoring of regional progress towards eradication.

5. **High-risk Areas**

* Periurban areas and migrant groups continue to play the most important role in poliovirus transmission and should continue to be targeted for aggressive and extensive house-to-house vaccination.

6. **Environmental Sampling**

* The recommendations of the Consultation on Environmental Sampling and Testing Procedures for wild poliovirus should be promptly implemented, namely:

  a. *Sampling and testing procedures should be standardized.*

  b. *Environmental sampling should begin at sites determined to be at highest risk for wild poliovirus transmission wherever cases have recently been confirmed (e.g. Andean subregion), and during the seasonal peak incidence.*

  c. *These environmental studies should be related to isolation results from fecal specimens obtained from specially designed community surveys performed at the same time and site.*

7. **Research**

* There is a need to determine the rapidity with which poliovirus in stool specimens is destroyed by heat. Some data may be available in the literature from previous studies conducted during the 1953 to 1958 period. Additional studies, using current isolation methodologies, would be useful. A selection of stool specimens should be titered after being held at two or three different temperature levels (e.g. 4°C, 25°C, and 37°C) for periods of up to 10 days.

* The results from measles vaccine trials in six-month-old infants in Haiti and Peru were presented. Edmonston-Zagreb (EZ) vaccine in $10^{4.9}$ or $10^{5.6}$ $TCID_{50}$ induced protective levels (200 in mIU/mL) of neutralizing antibodies in 82% of Haitian infants and 82% of Peruvian infants vaccinated at 6 months of age. These responses were similar to the antibody response following Schwarz strain vaccine at 9 months of age. The response following high titer Biken-Cam vaccine was considered inadequate with only 45% of Peruvian infants responding. The current WHO policy endorses the use of EZ vaccine produced in Yugoslavia at a titer of $10^{4.7}$ $TCID_{50}$ or greater at 6 months of age in areas where measles is an important cause of death in infants under 9 months of age.

WHO convened an expert group to review concerns raised by investigators in Senegal and Guinea Bissau regarding the long term safety of the high titer vaccine. The expert group concluded that the data were inconclusive and the WHO policy for use of these vaccines should continue. Long term follow-up of participants in these field studies was strongly encouraged.

* Single use self-inactivating syringes are now available. A modification of the original Ezeject device will soon be field tested for delivery of tetanus toxoid. Since tetanus toxoid is relatively heat stable, this device could be tested for extending the cold chain using nurse/midwives in areas that are difficult to reach.

* Priority should be given to operational research projects that will result in higher coverage rates. Identification of non-participants in National Vaccination Days and evaluation of reasons for non-compliance should continue. The excellent work on evaluating missed opportunities and correction of inappropriate practices by health care providers should continue.

8. **Certification Planning**

* An *ad hoc* TAG meeting should be convened prior to the next meeting to develop specific plans for obtaining environmental specimens during the coming years. Laboratory staff, epidemiologists and engineers will be required to contribute to the exercise.

9. **Laboratory Support**

* The TAG endorses the recommendations of the Final Report of the Pre-TAG Workshop of the PAHO Polio Laboratory Network (See page 8).

B. Neonatal Tetanus Elimination:

* All countries should establish a tetanus surveillance system to record neonatal and postnatal tetanus cases separately.

* All countries should investigate all neonatal tetanus cases and institute active search for such cases in health facilities, mainly hospitals.

* Vaccinations should be concentrated among women of childbearing age who live in the high-risk areas and every contact with them should be used for vaccination. Prenatal and family planning programs should be used to reach such women.

* Traditional birth attendants should be involved in tetanus toxoid (TT) vaccinations and surveillance activities for neonatal tetanus.

* New simple injection technologies should be applied to TT vaccination that could be easily used by lay personnel and introduced for routine use by national programs.

C. Measles Control:

In spite of increased overall vaccination coverage, measles outbreaks have continued to occur throughout the Region. This is due to the fact that except for Cuba, even those countries with the highest immunization coverage have not achieved levels that would ensure the elimination of transmission.

Efforts carried out in Cuba and the measles elimination initiative in the English-speaking Caribbean will permit the

development of effective strategies aimed at controlling/eliminating the disease.

The low coverage rates that exist among priority groups continue to be the greatest impediments to the control of measles and efforts at increasing coverage among children under two years of age should be undertaken.

D. Hepatitis B Control

Countries that have areas or special populations with a high incidence of Hepatitis B should make efforts to expand the use of Hepatitis B vaccine in such areas or populations, taking into account the present high cost of the vaccine and the priority of this problem compared to other health problems.

E. Elimination of Missed Opportunities for Vaccination:

Since the last TAG Meeting the majority of countries have conducted studies on missed opportunities for vaccination, which have established that false contraindications are the main reasons for missed opportunities.

Based on these observations, the TAG recommends that concrete efforts be implemented to eliminate such missed opportunities. The examples of El Salvador and Bolivia with vaccination at hospital sites should be evaluated and the possibility of replication in other countries should be seriously considered. Additional operational research studies to determine the effectiveness of various strategies to reduce missed opportunities should be conducted.

As polio eradication becomes a reality, national immunization programs should use the experience gained to benefit the overall expansion of the infrastructure for surveillance and control of other preventable diseases. For example, mop-up operations could be used to increase coverage with all vaccines being used by the national program and institutional vaccination should gain particular attention.

Neonatal Tetanus Mortality

An inherent problem of statistics based on reported cases is underreporting. This is an important problem with neonatal tetanus (NNT), whose incidence is higher in remote rural areas where underreporting of deaths is also higher. It also affects the age most susceptible to underreporting, when many patients have not even been named.A survey at the local level could be very useful for producing accurate rates of incidence and mortality and for detecting other factors associated with the disease. The disadvantages of this method are: the results have limited value for other regions which have not been studied; it requires considerable time and resources; has a limited capacity to show clear priorities for intervention; and, in a situation of low incidence it can be very difficult to show an improvement.

The use of obligatory registers for morbidity and mortality notification and the active search in hospitals permits the rapid detection of cases and with few resources although there are important biases such as access to the hospital and the underreporting of deaths. The data can indicate priorities for intervention. Studying these data also helps identify deficiencies in the different epidemiological information systems.

The results of a survey in the state of Jalisco, Mexico in 1988[1] were compared with the results of an active search for cases in the hospital records[2] for the same period.

The survey was undertaken in rural zones in the state of Jalisco in localities with less than 2 499 inhabitants for the purpose of learning the rates of incidence and mortality due to NNT and its underreporting. Based on cases reported in the five previous years, 21 counties were determined to be regions at risk, and out of these, a sample of seven counties was investigated.Through visits and interviews in 14 508 homes (the rate of no response was 7.8%) 2 164 births and 43 deaths were noted, showing a mortality rate of 18.5 per 1 000 live births. Out of the total, 8 (19%) were attributed to NNT, which indicates a rate of 3.7 (IC 95% 2.91, 4.49) per 1 000 live births. For 4 of these deaths there was neither notification nor death certificate, which indicates an underreporting of mortality due to NNT of 50%.In the active search for cases, the archives of almost all the hospitals which could have registered children with NNT were covered, starting with the same 21 counties in Jalisco mentioned above, in the same period. The population of the localities with less than 2 499 inhabitants was calculated based on the results of the 1990 census. The incidence rate of NNT was 1.99 per 1 000 live births and the mortality rate was 1.79 per 1 000 live births.

Taking into account the underreporting of 50% of mortality due to NNT, these results coincide with the results of the survey. Fifty-six percent of the cases of NNT found in all of Jalisco in the last four years originated in localities with more than 2 500 inhabitants, where underreporting of mortality due to NNT is probably less than 50%. For the year 1989 there was a mortality rate due to NNT of 0.034 per 1 000 live births in all of Jalisco. The real mortality should not exceed the rate of 0.068 per 1 000 live births.

1. Tapia-Conyer R. e.a., Factores asociados a la mortalidad por tétanos neonatal en el area rural de Jalisco, México, 1989 Documento no publicado.
2. Hartog R., Cruz M., Nápoles M., Paredes P., Perez A., Tétanos Neonatal en Jalisco, México 1989-90, PAHO 1990, Documento no publicado.

Vaccination Coverage in the Americas, 1989 and 1990

REGION AND COUNTRY	Population under one year of age		% OPV3		% DPT3		% MEASLES		% BCG	
	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990
Andean Region	**2 456 562**	**2 363 278**	**69**	**76**	**60**	**71**	**55**	**67**	**72**	**79**
Bolivia	261 582	221 956	49	50	39	41	47	53	28	48
Colombia	669 809	685 108	90	93	78	87	64	82	94	95
Ecuador	316 622	320 852	64	67	55	68	57	61	91	88
Peru	670 000	600 904	60	73	58	72	52	64	62	83
Venezuela	538 549	534 458	67	72	55	63	50	62	68	63
Brazil*	**4 307 582**	**3 610 961**	**97**	**93**	**54**	**81**	**58**	**78**	**70**	**78**
Central America	**989 404**	**1 016 513**	**71**	**80**	**65**	**74**	**69**	**78**	**59**	**70**
Belize	6 701	7 200	71	80	71	84	68	81	87	80
Costa Rica	82 451	82 500	87	95	87	95	78	90	90	92
El Salvador	182 173	186 267	64	76	64	76	73	75	63	60
Guatemala	339 385	349 847	58	74	50	66	54	68	21	62
Honduras	174 262	180 721	86	87	85	84	94	90	80	71
Nicaragua	143 200	148 085	85	86	66	65	63	82	92	81
Panama	61 232	61 893	72	86	70	86	73	99	87	97
Southern Cone	**1 144 876**	**1 090 660**	**83**	**90**	**82**	**88**	**85**	**92**	**88**	**98**
Argentina	677 398	602 288	86	89	80	85	89	95	92	99
Chile	279 150	293 556	95	99	95	99	91	98	95	97
Paraguay	134 928	138 802	41	76	61	78	53	69	53	90
Uruguay	53 400	56 014	88	88	88	88	82	82	99	99
Latin Caribbean	**606 619**	**616 560**	**71**	**74**	**61**	**67**	**56**	**73**	**57**	**79**
Cuba*	187 529	186 658	95	94	95	92	97	94	97	98
Dominican Republic	217 383	222 265	70	90	43	69	43	96	38	68
Haiti	201 707	207 637	50	40	50	41	31	31	40	72
Mexico*	**2 579 200**	**1 970 515**	**96**	**96**	**65**	**66**	**85**	**78**	**80**	**70**
English Caribbean	**131 672**	**134 637**	**82**	**86**	**82**	**86**	**72**	**75**	**61**	**62**
Anguilla	157	200	99	99	99	99	92	99	99	99
Antigua	1 088	1 114	99	99	99	99	95	89	-	-
Bahamas	5 641	6 013	82	82	86	86	87	87	-	-
Barbados	4 032	4 040	80	90	78	91	85	87	-	-
British Virgin Islands	238	238	97	99	99	99	87	99	99	99
Cayman Islands	378	434	93	99	93	99	89	89	81	81
Dominica	1 715	1 745	94	94	92	94	88	88	99	99
Grenada	2 613	2 650	86	69	87	80	89	85	-	-
Guyana	17 658	18 500	79	79	77	83	69	73	76	85
Jamaica	57 487	59 104	84	87	85	86	71	74	99	98
Montserrat	199	154	93	99	93	99	89	99	60	99
St. Kitts/Nevis	924	980	99	99	99	99	90	99	---	---
St. Lucia	3 530	4 380	93	90	92	89	91	82	99	94
St. Vincent	2 482	2 505	97	92	98	98	99	96	99	99
Suriname	10 000	9 000	71	81	72	83	73	65	-	-
Trinidad/Tobago	23 280	23 280	77	87	77	82	59	70	-	-
Turks/Caicos Islands	250	300	89	98	89	97	76	81	99	99
North America	**3 998 895**	**4 009 883**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
Bermuda	895	883	76	62	74	62	67	63	-	-
Canada	358 000	362 000	---	---	---	---	---	---	---	---
USA	3 640 000	3 647 000	---	---	---	---	---	---	---	---
TOTAL**	**16 214 810**	**14 813 007**	**86**	**87**	**62**	**76**	**66**	**77**	**73**	**78**

\- Vaccine not in use
* OPV Coverage is for two doses
Source: PAHO

--- No data available
** Total coverage does not include North America

Reported Cases of EPI Diseases

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

Subregion and country	Date of last Report	Measles		Poliomyelitis #		Tetanus				Diphtheria		Whooping Cough	
						Non Neonatal		Neonatal					
		1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989
LATIN AMERICA													
Andean Region													
Bolivia	31 Dec.	984	778	0	0	...	...	55	104	4	11	155	705
Colombia	31 Dec.	11 554	12 598	3	5	0	68	162	171	42	24	1 622	2 384
Ecuador	31 Dec.	1 673	3 649	1	2	19	93	88	58	0	3	487	256
Peru	31 Dec.	418	1 145	2	1	141	389	93	183	17	68	776	1 714
Venezuela	31 Dec.	9 442	10 160	0	1	65	13	28	41	0	0	1 215	634
Southern Cone													
Argentina**	31 Dec.	2 022	4 009	0	0	44	55	14	18	31	20	1 974	2 943
Chile	31 Dec.	1 846	13 090	0	0	20	14	0	3	37	44	63	209
Paraguay	31 Dec.	984	220	0	0	87	121	38	37	10	8	78	371
Uruguay	31 Dec.	110	20	0	0	5	0	0	0	0	0	161	40
Brazil	31 Dec..	50 440	22 889	0	2	...	1 553	386	392	733	804	13 973	13 804
Central America													
Belize	31 Dec.	70	11	0	0	0	0	0	0	0	0	0	1
Costa Rica	31 Dec.	81	33	0	0	1	0	0	0	0	0	75	85
El Salvador	31 Dec..	1 112	16 536	0	0	40	24	25	28	0	0	211	46
Guatemala	31 Dec..	8 802	2 413	3	0	22	21	50	113	2	10	138	145
Honduras	31 Dec.	8 360	6 353	0	0	21	7	39	20	0	0	147	78
Nicaragua	31 Dec.	17 529	381	0	0	29	42	15	17	0	0	220	226
Panama	31 Dec.	1 891	301	0	0	...	...	5	7	0	0	22	42
Mexico	31 Dec.	64 571	20 381	6	13	136	128	123	87	0	6	794	1 978
Latin Caribbean													
Cuba	31 Dec.	17	12	0	0	3	0	0	0	0	0	22	70
Haiti	31 Dec.	1 414	580	0	0	...	...	143	153	0	2	913	1 835
Dominican Republic	31 Dec.	3 477	1 505	0	0	49	....	12	13	27	36	227	255
CARIBBEAN													
Antigua & Barbuda	31 Dec.	0	0	0	0	1	0	0	0	0	0	0	0
Bahamas	31 Dec.	65	56	0	0	0	0	0	0	0	0	0	0
Barbados	31 Dec.	51	2	0	0	4	0	0	0	0	0	3	0
Dominica	31 Dec.	13	9	0	0	0	0	0	0	0	0	0	0
Grenada	31 Dec.	5	2	0	0	0	0	0	0	0	0	0	0
Guyana	31 Dec	1	11	0	0	0	0	0	0	0	0	1	0
Jamaica	31 Dec.	3 651	5 788	0	0	...	...	0	0	0	1	3	0
St. Kitts/Nevis	31 Dec.	80	12	0	0	...	...	0	0	0	0	0	0
St. Vincent	31 Dec.	1	1	0	0	3	0	0	0	...	...	0	15
Saint Lucia	31 Dec.	30	10	0	0	0	0	0	0	0	0	7	0
Suriname	31 Dec.	35	0	0	0	...	...	0	0	0	0	0	0
Trinidad & Tobago	31 Dec.	550	2 170	0	0	11	0	0	0	0	0	7	7
NORTH AMERICA													
Canada	31 Dec.	876	11 139	0	0	0	0	...	...	7	3	4 775	1 759
United States**	31 Dec.	26 527	18 193	0	0	60	...	...	...	4	0	4 188	4 030

** Country does not report neonatal tetanus data separately.
# Data for polio includes only confirmed cases through week 52 (ending 29 December, 1990).
... Data not available.

Laboratory Network

The members of the laboratory network met on 10-11 March 1991 to discuss the results of their activities and the problems encountered to date. Despite major contributions to the program, members of the lab network recognize that some aspects of the work need improvement. Of the eight labs in the network, those in Brazil and Mexico failed to report results back to the countries within the accepted 43 days from receipt of the specimens, for more than 60% of the samples. Procedures are being implemented to improve turn-around time for laboratory results.

It was agreed that significant problems continue with the international shipment of specimens. This has impeded the timely reporting and processing of specimens, severely restricted quality control testing, and quite possibly reduced the opportunities for virus isolation. Special shipping arrangements have been pursued to facilitate transport for a few laboratories; however, standardized shipping procedures, using special couriers, must be pursued more actively.

The following recommendations were made:

1. The laboratory should report stool sample results within:

* Four weeks for cases with negative isolations;
* Six weeks for cases which have had virus isolated from stools;
* Intratypic differentiation should be completed within four weeks of receipt of isolates;
* These indicators should be monitored in the same fashion as the epidemiological surveillance indicators.

2. All poliovirus strains isolated from probable cases or their contacts should be characterized immediately by DNA probes. To meet this requirement:

* PCR should be used to confirm the identities of isolates tested by the probes;
* The genomic sequence analysis of all wild poliovirus isolates should be performed in order to identify their probable endemic origins.

3. All wild poliovirus strains should be re-isolated from original specimens.

4. To optimize detection of wild poliovirus, special operational procedures and laboratory techniques should be used:

* Epidemiologists should collect sufficient quantities (at least 10 gms) of stool material; rectal swabs have no place in the collection of stool samples.
* Special isolation techniques (e.g., acid treatment and concentration of samples) should be critically evaluated for their capacity to increase recoveries of wild poliovirus.
* Negative specimens from compatible cases will be examined by at least one additional laboratory. Distribution of such negative specimens to more than one additional laboratory has been difficult because of limited quantities of stool for analysis and increased problems with international specimen transport. In view of these experiences, we suggest reconsideration of the previous recommendation (recommendation 2.1.11, Final Report, Eighth Meeting of the TAG on EPI and Polio Eradication, Mexico, D.F., Mexico 1990) for the participation of two additional laboratories.
* Special attention must be given to appropriate international transport of original clinical specimens which often have low virus titers. Prior notification of shipment to the reference laboratory should be made by the fastest way available in order to prevent delays in the reception of the apecimens.

5. Studies for the direct detection and identification of wild poliovirus in clinical specimens should be continued (e.g., use of elevated incubation temperatures during virus isolation, use of wild-genotype-specific nucleic acid probes, use of PCR).

6. The program should continue to perform quality control measures, including molecular diagnostic techniques, for the isolation and identification of poliovirus in order to maintain a superior level of performance (90% identification rate of unknown test samples).

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