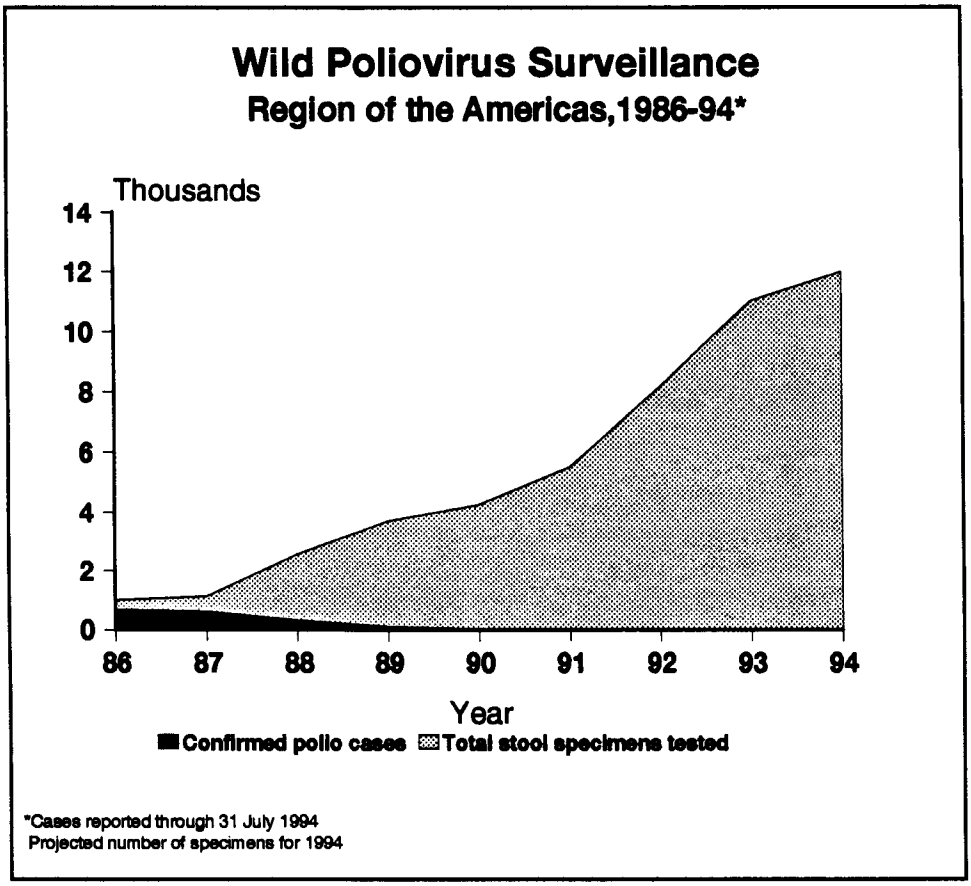
FINAL REPORT

ELEVENTH PAHO TECHNICAL ADVISORY GROUP (TAG) MEETING ON VACCINE PREVENTABLE DISEASES AND THE THIRD MEETING OF THE INTERNATIONAL COMMISSION FOR THE CERTIFICATION OF POLIOMYELITIS ERADICATION (ICCPE)



Washington D.C.
22 - 25 August, 1994

Expanded Program of Immunization
Special Program on Maternal and Child Health and Population
Pan American Health Organization

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Eleventh Technical Advisory Group (TAG)
Meeting on Vaccine-Preventable Diseases
The Third Meeting of the International Commission
for the Certification of Poliomyelitis Eradication in the Americas
(ICCPE)

Final Report

I. INTRODUCTION

The Eleventh meeting of the PAHO Technical Advisory Group (TAG) on Vaccine-Preventable Diseases took place in Washington DC, USA, from 22 to 25 August 1994. Participants were welcomed by Dr. Carlyle Guerra de Macedo, the PAHO Director. TAG members present were Drs. D.A. Henderson (Chairman of TAG), Alan Hinman (Rapporteur), Hilda Alcala, Joao Batista Risi, Peter Figueroa, and Jose Manuel Borgoño. Dr. Ciro de Quadros served as Secretary. Representatives of USAID, UNICEF, CPHA, Rotary International, and the Task Force for Child Survival, agencies that are collaborating with countries in this program, were also present at the meeting. The World Health Organization was represented by Dr. J.W. Lee, Director of the Global Program for Vaccines (GPV) and by staff from HQ and from the European WHO office in Copenhagen.

At the same time, the Third meeting of the members of the International Commission for the Certification of Poliomyelitis Eradication (ICCPE) took place and the following members were present: Drs. Isao Arita, Dorothy Horstmann, Jan Kostrzewski, Maureen Law, Elsa Moreno, Fernando Olinto, V. Ramalingaswami, Olikoye Ransome-Kuti, Frederick Robbins (Chairman of ICCPE), Guillermo Soberon and Kenneth Standard. Also present were the presidents of the 22 National Polio Eradication Certification Commission in the countries of the Americas as well as the President for the English-speaking Caribbean Commission.

From August 22-23 the ICCPE received the Reports of the National Certification Commissions. From August 24 -25 the TAG convened its meeting and reviewed the progress made to date by countries in their immunization programs and the ICCPE deliberated on the data presented by the National Commissions.

II. RECOMMENDATIONS

POLIOMYELITIS

The TAG notes with great pleasure the third anniversary of a polio-free hemisphere and looks forward to the conclusions of the International Commission for the Certification of Poliomyelitis Eradication. However, it is clear that program efforts will have to be continued in the Americas until the rest of the world has similarly interrupted transmission. Taking into account the achievements in this hemisphere, some refinements in strategy seem appropriate.

1. Immunization levels of at least 80% must be maintained and these levels must be maintained in every district. Special efforts will be needed in high risk areas such as those which had to have "mop-up" operations and those with vulnerable populations (e.g., religious groups which refuse vaccination).

2. Excellent surveillance with weekly negative reporting must be maintained and all of the existing surveillance sites should continue to be included in the system.

3. Immediate investigation of acute flaccid paralysis (AFP) in children <15 years of age must continue and every effort must be made to obtain 2 adequate specimens from every case. Stool specimens from contacts no longer need to be collected as a routine; however, they should be taken when the situation warrants, such as when adequate specimens cannot be obtained from the case or if there is increased suspicion of poliomyelitis. This change in investigation practice should enable investigators to get adequate specimens from every AFP case and also should help alleviate the burden on the laboratories, thus enabling them to maintain the highest quality performance.

4. PAHO should evaluate the pros and cons of lowering the upper age limit of the target population for AFP surveillance.

5. The reward offered for reporting a case which is subsequently confirmed to be due to indigenous wild poliovirus should be raised to $1,000 throughout the Region and the availability of the reward should be widely publicized.

6. Studies should be undertaken to document the historical patterns of international transmission of wild poliovirus in the Americas.

MEASLES

Nearly every country in the Region has now set an elimination target for measles. The individual country efforts could be enhanced by undertaking a regional elimination initiative. Such an initiative could help answer questions regarding surveillance of rash and fever, laboratory diagnosis, and most effective vaccination strategy(ies) to interrupt transmission. Continued efforts should be made to achieve and maintain the highest possible levels of vaccination coverage.

1. Highest priority should be placed on developing practical technique(s) for rapid diagnosis of measles in the field.

2. More information is needed on the epidemiological patterns of measles in the different countries of the Region.

3. Improved, standardized case definitions should be developed.

4. An impressive amount of laboratory effort is being undertaken to confirm the diagnosis of measles. Greater standardization of laboratory procedures and definitions is needed.

5. The effectiveness of outbreak control measures should be documented.

6. Continuing evaluation of the most appropriate vaccination strategy(ies) is needed.

DIPHTHERIA

The outbreaks of diphtheria in the Newly Independent States and Ecuador are a reminder of the continued epidemic potential of diphtheria and the necessity to maintain high immunization levels with vaccine of known high quality. Every country should assure that the DTP/Td it uses is tested and approved by an independent control authority and conforms to WHO specifications. It is critical to carry out studies to understand patterns of transmission of diphtheria in the countries of the Region. It would be useful to explore the possibility of establishing an emergency reserve supply of Td.

PERTUSSIS

Continued investigations are needed to improve understanding of the epidemiology of pertussis in the countries of the Region. PAHO should consider the implications of the acellular pertussis vaccines likely to be licensed in the near future in terms of their impact on local production of DTP and their cost and effectiveness.

HEPATITIS B

The previous TAG recommendation of vaccination of infants in high risk areas should continue. Consideration of extension beyond these areas should include analysis of the costs and the benefits of such extension.

HAEMOPHILUS INFLUENZAE TYPE B (HIB)

Given the existence of a highly effective vaccine to prevent meningitis and other systemic infections caused by Hib in infants, studies should be undertaken to define the epidemiology of these conditions in the countries of the Region.

RUBELLA

PAHO should prepare a discussion paper on rubella in the Region and possible strategies to reduce the occurrence of congenital rubella syndrome.

MENINGITIS DUE TO GROUP B MENINGOCOCCUS

Critical review of recent studies indicates that available vaccines are ineffective in children <4 years of age, the age group at highest risk for this disease. Because of some methodological deficiencies in the existing studies, additional studies are needed.

SIREVA

The TAG enthusiastically endorses the development of a network of vaccine quality control laboratories and the program for certification of vaccine production laboratories.

III. SUMMARY OF PROGRESS

Three years have passed since the last case of poliomyelitis, due to the wild poliovirus occurred on August 23rd 1991 in Peru. This historical medical triumph also marked an even higher level of achievement since the last TAG (March 1992). Immunization levels have continued to climb; vaccine coverage is now greater than 77% for all vaccines (**Table 1**); surveillance indicators improved in most countries; and the incidence of all the vaccine-preventable diseases particularly measles continues to decline (**Table 2**).

A. POLIOMYELITIS ERADICATION:

Three years without Poliomyelitis in the Americas

The Presidents of the National Commissions for the Certification of Poliomyelitis Eradication presented the summary of their reports to the ICCPE. All National Commissions concluded that the transmission of the wild poliovirus has been interrupted in their respective countries.

Table 1.
Vaccination Coverage in the Region of the Americas
in Children Under One Year of Age
1992-1993

SUBREGION/ COUNTRY	CHILDREN <1 YEAR OF AGE 1992	1993	DPT 1992	1993	OPV 1992	1993	MEASLES 1992	1993	BCG 1992	1993
ANDEAN REGION	2,418,394	2,412,244	76.68	79.51	81.04	82.46	72.72	79.17	88.71	91.08
BOLIVIA	190,334	198,840	77.33	81.39	83.55	82.90	79.78	80.79	80.58	83.99
COLOMBIA	807,928	814,931	75.71	83.04	81.52	85.36	72.28	93.65	86.06	93.82
ECUADOR	266,437	293,788	86.68	76.37	86.44	79.03	69.24	72.94	99.31	99.33
PERU	610,250	617,058	82.94	84.25	84.23	86.39	83.25	75.09	85.22	86.95
VENEZUELA	543,445	487,627	65.97	68.72	73.21	74.55	60.79	63.21	84.92	82.41
BRAZIL	3,764,634	3,582,240	70.97	68.55	95.99	92.39	90.62	77.76	89.58	89.89
CENTRAL AMERICA	1,032,674	1,026,490	73.52	81.20	77.30	84.36	69.00	80.30	72.48	82.45
BELIZE	6,500	7,500	89.00	88.00	89.00	89.00	83.00	83.00	97.00	94.00
COSTA RICA	81,110	81,110	90.52	86.00	90.56	86.72	84.22	81.56	93.73	96.62
EL SALVADOR	191,159	171,629	60.63	79.28	61.66	79.23	55.37	86.46	62.24	79.14
GUATEMALA	355,704	364,581	65.57	75.75	69.82	77.00	59.32	68.40	57.14	69.17
HONDURAS	184,564	185,130	92.75	94.01	94.33	95.00	88.73	94.00	91.49	92.25
NICARAGUA	151,593	154,379	73.96	77.89	86.32	93.84	73.03	83.45	81.03	94.39
PANAMA	62,044	62,161	76.72	81.45	77.03	82.79	76.53	82.43	84.16	90.72
ENGLISH CARIBBEAN	131,313	135,730	84.81	89.18	81.17	89.79	71.91	84.10	81.89	98.56
ANGUILLA	164	159	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
ANTIGUA	1153	1,284	99.99	99.99	99.99	99.99	99.99	99.99	...	...
BAHAMAS	6266	6,571	89.48	91.37	89.42	91.39	90.73	87.99	...	...
BARBADOS	4,192	4,097	90.63	85.89	89.05	88.41	90.17	92.04	...	...
CAYMAN ISLANDS	562	595	96.98	98.32	96.98	98.32	98.93	89.58	80.07	99.33
DOMINICA	1,652	1,652	98.97	98.97	98.97	98.97	98.97	98.97	98.97	99.09
GRENADA	2,429	2,372	90.45	88.58	89.91	90.81	72.66	99.99	...	...
GUYANA	18,137	21,344	79.00	92.90	87.00	92.19	73.00	90.43	88.00	94.28
JAMAICA	59,879	58,627	84.00	90.95	74.00	93.29	63.00	80.00	85.00	99.99
MONTSERRAT	203	186	99.99	99.99	99.99	99.99	99.99	99.99	99.99	99.99
ST. KITTS & NEVIS	898	864	99.99	99.99	99.99	99.99	99.22	99.88	...	...
ST. LUCIA	3,669	3,690	94.93	96.91	95.26	96.88	72.36	94.23	98.69	94.93
ST. VINCENT	2,108	2,640	99.99	99.77	99.99	99.99	99.99	98.98	99.99	99.99
SURINAME	9,000	9,000	73.60	76.18	71.46	75.77	61.17	60.51	...	...
TRINIDAD & TOBAGO	20,351	22,014	87.00	80.78	87.00	78.34	83.00	87.00	...	...
TURKS & CAICOS	300	314	76.00	99.99	77.00	99.99	59.00	97.13	99.99	96.18
BRITISH VIR. IS.	350	321	99.99	98.44	99.99	99.07	83.14	99.99	84.00	99.99
LATIN CARIBBEAN	615,333	618,751	53.05	58.68	56.11	66.41	64.22	77.21	60.42	73.61
CUBA	157,043	151,508	94.43	99.99	99.70	97.19	99.99	96.38	97.95	97.21
DOMINICAN REPUB.	231,586	236,232	48.01	57.10	52.51	82.27	73.72	99.99	47.10	83.51
HAITI	226,704	231,011	29.54	30.00	29.58	30.00	24.06	24.00	48.03	48.00
MEXICO	2,122,711	2,110,364	91.00	91.00	91.70	91.70	91.30	91.30	94.60	94.60
NORTH AMERICA	4,469,960	4,487,954	75.94	65.00	76.98	65.00	71.04	73.96	...	...
BERMUDA	960	954	75.94	65.00	76.98	65.00	71.04	73.96	...	...
CANADA	390,800	394,000	...	...	...	...	...	...	...	...
USA	4,078,200	4,093,000	...	...	...	...	...	...	...	...
SOUTHERN CONE	1,204,251	1,209,150	86.04	83.13	88.67	83.39	91.21	93.81	99.99	96.04
ARGENTINA	716,773	716,773	80.77	79.28	84.85	79.50	90.80	94.90	99.99	95.80
CHILE	287,931	292,496	98.50	93.73	98.50	93.73	95.11	92.53	99.36	96.67
PARAGUAY	144,345	144,679	85.49	78.92	87.14	79.99	86.01	96.25	99.08	94.86
URUGUAY	55,202	55,202	90.90	88.00	90.91	88.00	89.85	80.00	98.93	99.00
TOTAL	10,809,318	10,953,008	76.99	77.66	87.14	86.89	83.34	82.67	89.09	90.19

... NO DATA AVAILABLE
SOURCE: EPI/PAHO

Table 2.
Incidence of Selected Diseases, Region of the Americas, 1992-1993

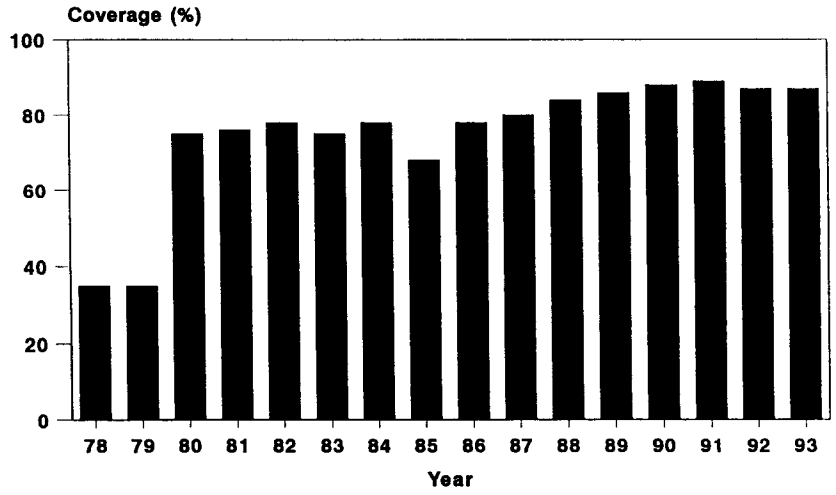
REGION & COUNTRY	CONFIRMED MEASLES		NEONATAL TETANUS		DIPHTHERIA		PERTUSSIS	
	1992	1993	1992	1993	1992	1993	1992	1993
ANDEAN REGION	50,570	37,222	368	307	113	72	2,347	3,134
BOLIVIA	4,037	3,391	44	21	20	4	284	245
COLOMBIA	7,976	9,105	86	70	76	45	872	1,271
ECUADOR	4,356	3,627	71	81	10	13	320	147
PERU	22,252	855	140	120	6	10	364	1,013
VENEZUELA	11,949	20,244	27	15	1	0	507	458
BRAZIL	7,934	5,830	229	218	276	256	5,155	4,750
CENTRAL AMERICA	6,213	1,076	69	51	3	0	1,002	456
BELIZE	11	0	0	0	0	0	0	0
COSTA RICA	2,361	579	0	0	0	0	29	29
EL SALVADOR	509	38	25	18	0	0	33	24
GUATEMALA	97	17	22	19	3	0	156	123
HONDURAS	58	13	10	6	0	0	425	15
NICARAGUA	2,332	339	9	6	0	0	333	47
PANAMA	845	90	3	2	0	0	26	218
ENGLISH CARIBBEAN & SURINAME	0	0	0	0	0	0	9	8
ANGUILLA	0	0	0	0	0	0	0	0
ANTIGUA & BARBUDA	0	0	0	0	0	0	0	0
BAHAMAS	0	0	0	0	0	0	5	0
BARBADOS	0	0	0	0	0	0	0	1
CAYMAN ISLANDS	0	0	0	0	0	0	0	0
DOMINICA	0	0	0	0	0	0	0	0
GRENADA	0	0	0	0	0	0	0	0
GUYANA	0	0	0	0	0	0	0	0
JAMAICA	0	0	0	0	0	0	0	0
MONTSERRAT	0	0	0	0	0	0	0	0
SAINT KITTS & NEVIS	0	0	0	0	0	0	0	0
SAINT LUCIA	0	0	0	0	0	0	0	0
SAINT VINCENT & AND THE GRENADINES	0	0	0	0	0	0	0	0
SURINAME	0	0	0	0	0	0	0	0
TRINIDAD & TOBAGO	0	0	0	0	0	0	4	7
TURKS & CAICOS	0	0	0	0	0	0	0	0
BRITISH VIRGIN ISLANDS	0	0	0	0	0	0	0	0
LATIN AMERICAN	7,662	4,639	2	0	31	6	72	16
CUBA	12	2	0	0	0	0	1	11
DOMINICAN REPUBLIC	7,650	4,637	2	0	31	6	71	5
HAITI	...	...	...	...	...	...	...	...
MEXICO	533	169	137	97	0	0	136	148
NORTH AMERICA	5,132	468	0	0	5	4	7,550	13,112
BERMUDA	0	0	0	0	0	0	0	0
CANADA	2,901	187	0	0	2	4	3,615	6,777
USA	2,231	281	0	0	3	0	3,935	6,335
SOUTHERN CONE	21,999	7,131	34	39	22	17	2,846	1,387
ARGENTINA	20,551	5,048	13	5	4	1	2,166	506
CHILE	397	1	3	1	12	10	264	592
PARAGUAY	864	2,066	18	33	6	6	372	272
URUGUAY	187	16	0	0	0	0	44	17
Total	100,043	56,535	839	712	450	355	19,117	23,011

... NO DATA AVAILABLE
SOURCE: COUNTRY REPORTS SENT TO P.A.H.O.

When the American Region began its initiative for eradication of poliomyelitis in 1985, the OPV(3) coverage in children under one year of age was less than 70%. After 3 years (1988), the coverage reached 80% and remains at this level today. (Figure 1)

Figure 1.

OPV3 coverage in the Americas, 1978-93

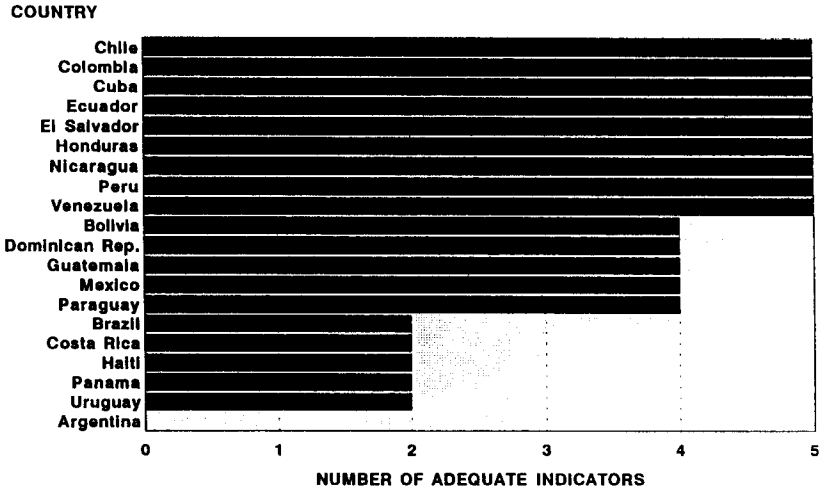


Source: EPI/PAHO (PAISIS)

Data as of 19 August, 1994 shows that nine countries have satisfied 5 surveillance indicators, and 5 countries have satisfied 4 indicators. (Figure 2)

Figure 2.

SURVEILLANCE INDICATORS MEETING CERTIFICATION CRITERIA BY COUNTRY, LATIN AMERICA, 1994*

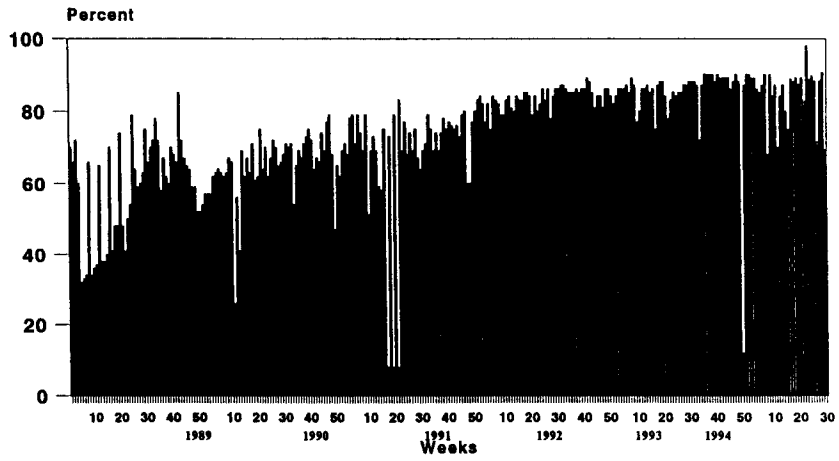


* Data as of 19 August
SOURCE: PESS/EPI

There are over 20,000 reporting units in the Region. Since 1992, over 80% have reported weekly the presence or absence of AFP cases. (Figure 3)

Figure 3.

Percent health units reporting weekly
Latin America, 1989-94*

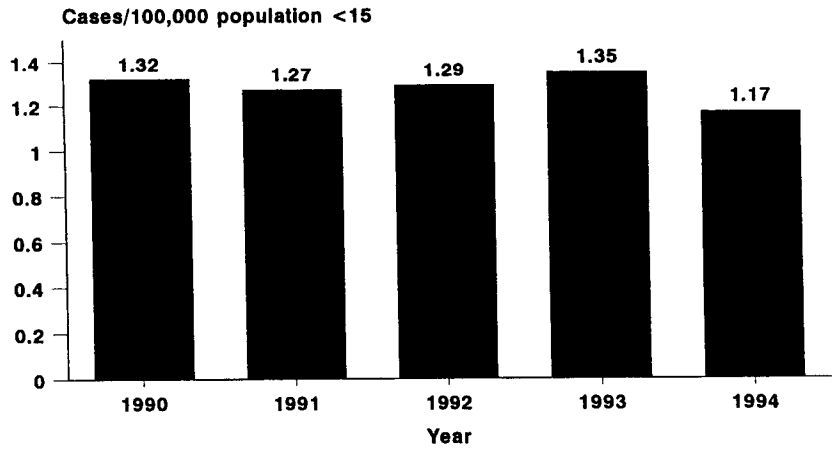


* Data as of 19 August
Source: EPI/PAHO(PESS)

The regional AFP reporting rate has satisfied the expected annual rate of 1 AFP case per 100,000 children under 15 years of age since 1990. (Figure 4)

Figure 4.

Annual AFP reporting rate
Latin America, 1990-94*

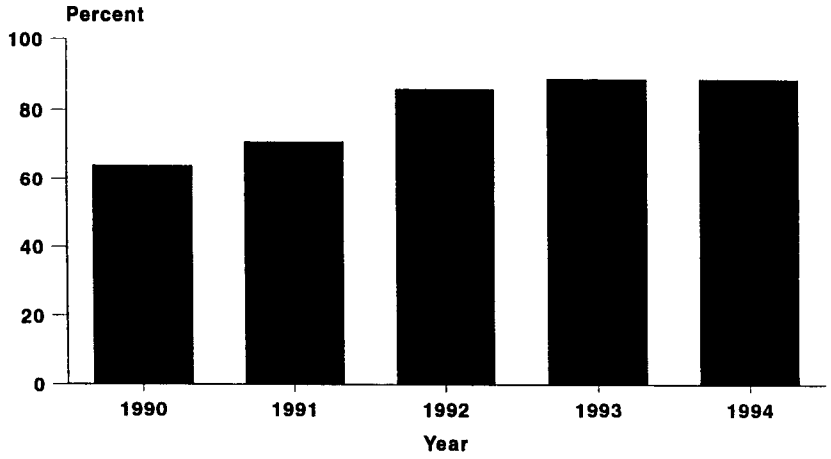


* Data as of 19 August
Source: EPI/PAHO (PESS)

Since 1992 over 80% of reported AFP cases have been investigated within 48 hours of report. (Figure 5)

Figure 5.

AFP cases investigated within 48 hours of report
Latin America, 1990-94*

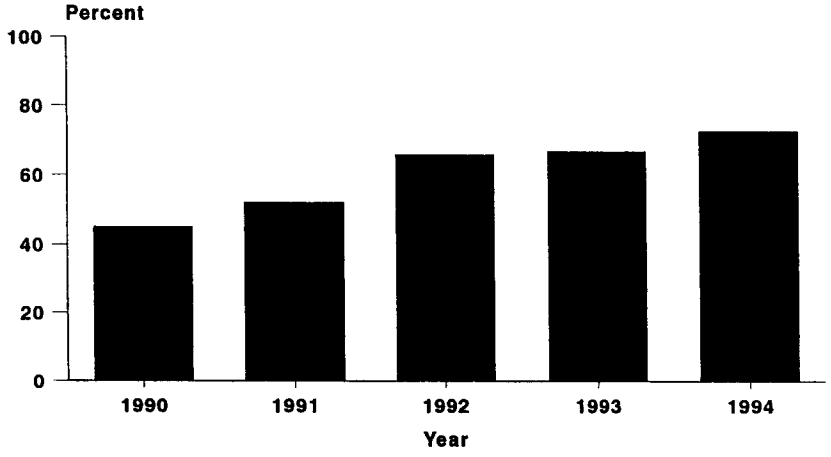


* Data as of 19 August
Source: EPI/PAHO (PESS)

The percentage of AFP cases with 2 adequate stools collected has progressively increased since 1990. In 1994, the rate reached 73%. (Figure 6)

Figure 6.

AFP cases with 2 adequate stool specimens
Latin America, 1990-94*

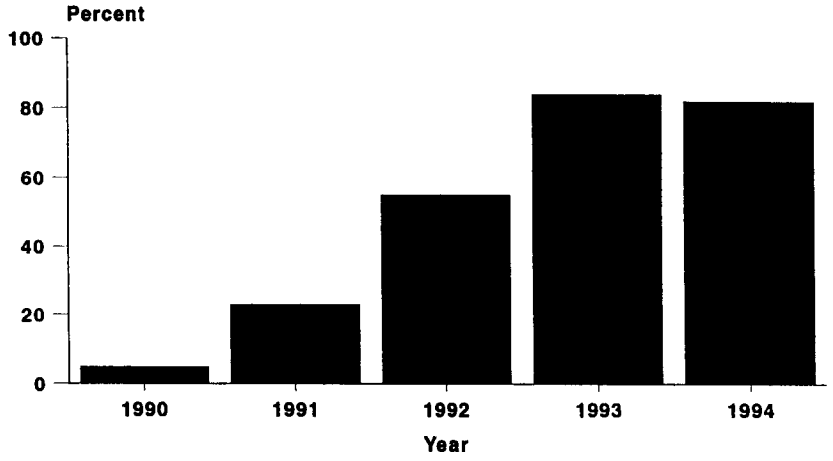


* Data as of 19 August
Source: EPI/PAHO (PESS)

The percentage of AFP cases with at least 5 contact stools collected has surpassed 80% since 1993. (Figure 7)

Figure 7.

AFP cases with 5 contact stool specimens
Latin America, 1990-94*

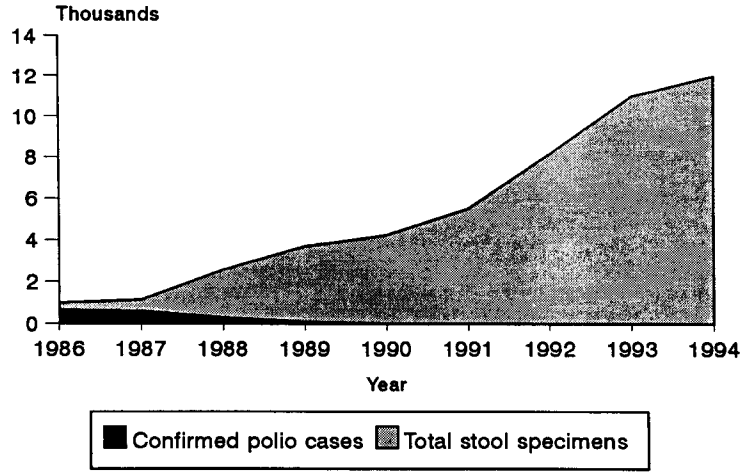


* Data as of 19 August
Source: EPI/PAHO (PESS)

Since the last case of confirmed poliomyelitis was reported in August 1991, over 6,000 AFP cases have been reported and thoroughly investigated; none has been confirmed as paralytic poliomyelitis due to wild poliovirus. (Table 3) Furthermore, over 25,000 stool specimens obtained from these AFP cases and their contacts have been tested; no wild poliovirus was found. (Figure 8 and Table 4).

Figure 8.

Wild Poliovirus Surveillance
Region of the Americas, 1986-94*



*Cases reported through 31 July 1994
Projected number of specimens for 1994

Table 3.. Classification of reported AFP cases by year of onset, American Region, 1985-94+.

YEAR	NUMBER OF PROBABLE CASES	NUMBER OF DISCARDED CASES	NUMBER OF COMPATIBLE CASES	NUMBER OF VACCINE RELATED POLIO CASES	NUMBER OF CONFIRMED POLIO CASES	TOTAL AFP CASES REPORTED
1985	0	0	0	0	800	800
1986	0	409	0	0	1,050	1,459
1987	0	594	0	10	614	1,218
1988	0	1,634	0	9	315	1,958
1989	0	1,975	3	19	115	2,112
1990	0	2,050	62	13	18	2,143
1991	0	2,030	23	11	9	2,073
1992	0	2,089	27	9	0	2,125
1993	0	2,171	28	4	0	2,203
1994	379	790	6	2	0	1,177
TOTAL	379	13,742	149	77	2,921	17,268

+ = Cases reported through 19 August 1994

Table 4. Laboratory Results for stool specimens from AFP cases and contacts, American Region, 1986-94+.

Year	# AFP Cases	# Patients with > 2 Stools	%	Total # of patient stools tested	# Wild Polio Virus Found	# Vaccine Polio Virus Found	# Non Polio Virus Found	# No Virus Found	# Cases with ≥ 5 Stools from Contacts	%	Total # of contact stools tested	# Wild Polio Virus Found	# Vaccine Polio Virus Found	# Non Polio Virus	# No Virus Found
1986	1459	187	12.8%	953	4	61	27	621	3	0.2%	39	0	0	0	27
1987	1218	214	17.6%	968	71	62	114	705	12	1.0%	174	6	17	12	136
1988	1958	429	21.9%	1941	64	131	218	1496	66	3.4%	614	5	12	0	548
1989	2112	759	35.9%	2902	33	236	358	2259	50	2.4%	738	2	46	42	629
1990	2143	964	45.0%	3344	20	170	520	2609	97	4.5%	841	8	33	225	556
1991	2073	1078	52.0%	3359	15	157	571	2609	468	22.6%	2054	1	94	638	1277
1992	2125	1411	66.4%	3989	0	166	952	2865	1167	54.9%	4088	0	286	1231	2441
1993	2203	1468	66.6%	4039	0	158	800	3069	1836	83.3%	9611	0	442	3225	5706
1994	1177	855	72.6%	1631	0	32	291	1270	965	82.0%	3288	0	80	876	2207
Total	16468	7365	44.7%	23126	207	1173	3851	17503	4664	28.3%	21447	22	1010	6249	13527

+ = Cases reported through 19 AUGUST 1994

Based on the aforementioned information, the International Commission for the Certification of Polio Eradication will review within the next few weeks the National Commission Reports and determine whether the Region can be certified as being polio-free.

Progress towards Global Polio Eradication

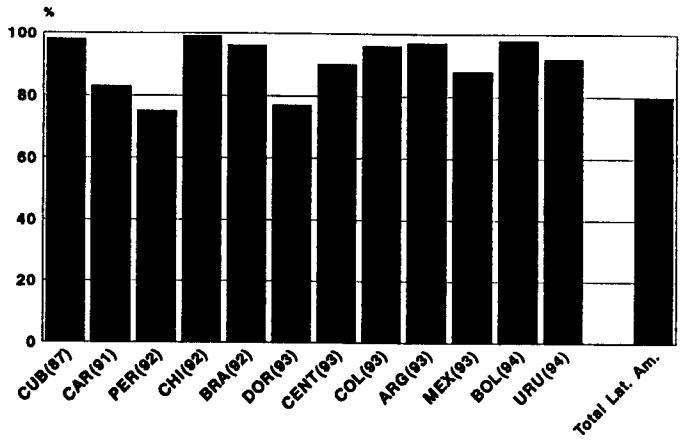
Despite the fact that global immunization coverage with 3 doses of OPV has fallen below 85% in 1990, the reported polio cases fell to less than 10,000 for the first time in 1993. WHO's estimate is that 115,000 cases of paralytic polio occurred in 1993. In addition to the decline in the number of polio cases, the number of countries reporting zero cases of polio has increased. Five polio free zones are recognized: Western and Central Europe, North Africa, Southern and Eastern Africa, the Middle East, and the Western Pacific. The number of countries conducting national immunization days and implementing AFP surveillance is increasing rapidly. Polio is rapidly disappearing from China and Egypt, two major reservoirs of wild polio viruses. Two thirds of reported polio cases in the world come from Bangladesh, India, and Pakistan. Controlling polio on the Indian subcontinent is a priority for the global eradication initiative. The major obstacles to global eradication are the needs to improve political support and overcome insufficient financial commitment, primarily for vaccine purchase. If these obstacles can be overcome, the Year 2000 target for global eradication of wild polio virus will be achieved.

B. MEASLES ELIMINATION

All countries except Venezuela and Haiti have already launched their National Campaigns against Measles and vaccinated nearly 80% of their target groups (children <15 years old). (Figure 9)

Figure 9.

PERCENT OF 1-14 YEARS OLD CHILDREN VACCINATED BY COUNTRIES AND FOR LATIN AMERICA AND THE CARIBBEAN MEASLES ELIMINATION AND CONTROL EFFORTS, 1987 - 1994



Source: PAHO/WHO

In most of these countries the surveillance systems for fever and rash illnesses with laboratory diagnosis capabilities are in place and reporting weekly cases (Table 5).

Table 5. Rash and Fever Surveillance, Latin America and the English-speaking Caribbean for 1994 from countries notifying Compatible Measles cases

Country	Report Week	Notified	Confirmed	Compatible	Discarded	Pending
Argentina	31	316	44	145	72	55
Brazil	30	771	39	100	255	377
CAREC*	31	194	0	3	132	59
Costa Rica	29	171	0	21	62	88
El Salvador	29	7913	0	3	7798	112
Guatemala	29	227	204	3	19	1
Honduras	29	15	1	2	9	3
Nicaragua	29	638	1	112	394	131
Panama	29	21	2	0	17	2
Chile	31	107	0	5	75	27
Colombia	29	538	68	18	117	335
Mexico	30	794	111	8	412	263
Paraguay	30	76	56	17	0	3
Total		**12,502**	**526**	**437**	**9,362**	**1,456**

Information Received by PAHO

* CAREC represents all the English-speaking Caribbean and Suriname

Interrupting measles transmission apparently has been achieved and sustained in Cuba (6 years), the English-speaking Caribbean (3 years), and Chile (2 years). Chile represents the first non-island setting were transmission has been interrupted for more than one year. In Central America the number of cases has been drastically reduced and virus circulation appears to have been interrupted in some countries. In other countries such as Argentina, Brazil, Colombia, Dominican Republic, Guatemala, Mexico, and Peru, measles transmission has been reduced to a few foci where cases and limited outbreaks continue to occur.

Measles elimination efforts in the U.S. date back to 1966, three years after the introduction of measles vaccine. Though elimination has not yet been achieved, by 1993 measles case reports were at an historical low of 312 (1.4/1 million) and school entry laws had ensured measles vaccine coverage in school aged children over 95%. In 1993 a measles elimination goal was declared for 1996 as part of the President's Childhood Immunization Initiative.

A national consensus conference held in December 1992 has set the goal of elimination of indigenous measles in Canada by the year 2005. The lowest incidence ever reported was in 1993 with only 187 cases, (6.5 cases/1 million). This represents well over 95% reduction from the prevaccine era;

however, despite a vaccine coverage at 2 years in excess of 97%, epidemics continue to occur as a result of a combination of factors, among which primary vaccine failures account for the majority. Furthermore, in 1994, Canada experienced increased measles activity with sporadic cases and small outbreaks mostly involving vaccinated individuals and occurring in communities with documented measles immunization coverage up to 99.7%. Most cases are linked to importation from outside the country or from one province to another.

Measles immunization in England and Wales has attained levels of coverage of 93% in children by the time they reach two years of age. A national measles immunization campaign will be carried out in November 1994 to immunize all 5 to 16 year old children in school. This campaign, in addition to preventing a measles epidemic, will be an important stepping stone on the path to measles elimination.

The major bottle neck in the smooth implementation of rash and fever surveillance has been the lack of an operative measles case definition. To help in this matter, PAHO, the Venezuelan Ministry of Health, and the Centers for Disease Control (CDC) in the U.S. began a study to evaluate the clinical case definition of measles in December 1993, continuing through 1994. Preliminary data indicates that physician diagnosis had a sensitivity of 77% and a specificity of 84%. These estimates did not vary by the child's age. A clinical case definition of fever, rash, and cough was 90% sensitive and 33% specific. If coryza or conjunctivitis are added, the sensitivity increased to 100% but specificity decreased to 10%. If instead of including coryza or conjunctivitis, diarrhea or vomiting, and cough are used, the sensitivity was 62% and the specificity increased to 83%. Future analyses will evaluate the duration of the rash, progression of the rash, and other characteristics on sensitivity. In addition, the presence of significant numbers of confirmed rubella and dengue cases may help identify characteristics that improve the specificity of measles clinical diagnosis.

To assist field workers in confirming if wild measles virus is circulating in a community, CDC and PAHO are working to develop a more operational confirmatory laboratory diagnostic test. New laboratory-based diagnositc assays including the IgM capture EIA which employs recombinant expressed measles nucleoprotein (N) antigen and the polymerase chain reaction (PCR) detection of measles-specific RNA have been developed. The PCR assay uses primers within highly conserved regions of the measles N gene. Measles ribonucleic acid was identified in clinical specimens from infected individuals including nasopharyngeal aspirated, monocytes, lymphocytes, brain, lung, bronchial washes, and most recent urine. Interestingly, urine specimens collected fourteen days post-immunization were positive by the PCR reaction.

Additionally, new field assays including immunodot and a single reagent agglutination assay are being developed. The latter assay takes advantage of an antibody that was found to react with the surfaces of human red blood cells (RBCs), but does not agglutinate the RBCs. Regions of the measles nucleoprotein gene have been genetically fused to the end of this antibody molecule without destroying the antibody reactivity. When expressed the fragments of fused N protein remain reactive with monoclonal and polyvalent antisera, and well. The ability of human IgM made in response to an acute measles infection to effectively cross-link the measles epitopes thus causing an agglutination reaction is currently under investigation. Such reagents hold great promise as rapid, specific and sensitive field test for not only measles, but dengue and rubella as well.

Availability of such a test would be the major breakthrough for the measles elimination efforts.

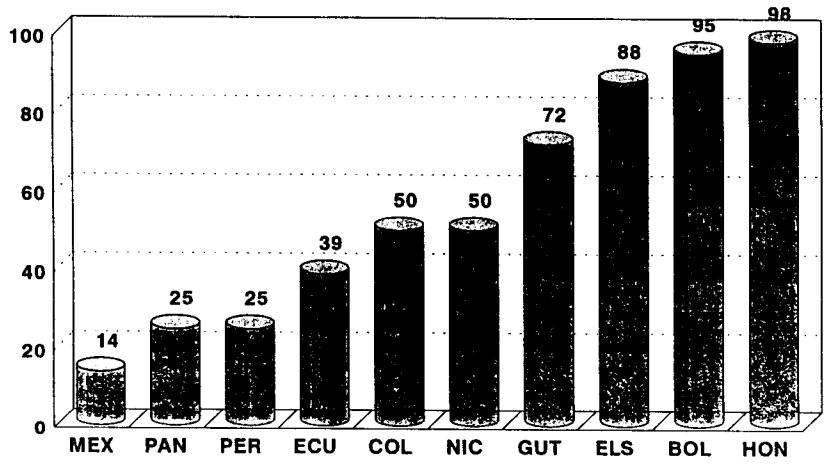
C. NEONATAL TETANUS

With the exception of Chile, Costa Rica, Cuba and Uruguay, neonatal tetanus is endemic throughout Latin America. For Haiti, due to a lack of information, data are not presented.

The objective of the Neonatal Tetanus Elimination Program is to accelerate control by targeting the immunization of all the women of child-bearing age (WCBA) living in defined high risk districts. Out of 12,500 districts in the countries endemic for NNT, 16% (2002) have been designated as high risk areas.

In those high-risk districts live 27 million women of child-bearing age, representing over 30% of all the WCBA living in the affected 15 Latin American countries. In 10 countries, located in the Andean, Central and North American Subregions, 41% (approximately 6,600,000 WCBA) of the targeted population have received 2 doses of tetanus toxoid (TT) (Figure 10). The proportion of WCBA vaccinated by country fluctuated from 14 to 98%. In the other 5 countries with endemic NNT, the same strategy has been applied, but properly recorded data are not available.

FIGURE 10. CUMULATIVE TT2 COVERAGE IN WOMEN OF CHILD-BEARING AGE IN HIGH RISK DISTRICTS IN 10 COUNTRIES 1988 - 1993



SOURCE: EPI/PAHO

High risk areas for neonatal tetanus have been defined by the following criteria:

1. Areas with an incidence of neonatal tetanus greater than the national average in any of the three previous years;
2. Areas with recurrent annual cases of neonatal tetanus;
3. Areas with one or more neonatal tetanus cases in the current year;
4. Areas which are potentially at risk: social indicators.

Over the last 4 years there has been an increase in the percentage of reported cases of neonatal tetanus which are fully investigated. In 1990, 1991, 1992, and 1993 there were 43%, 59%, 86% and 89% of cases investigated respectively; however, the quality of data recording still needs improvement especially regarding the mother's prenatal care and her vaccine status. Despite improvements in surveillance systems, the annual number of reported cases has decreased, as shown in Table 6 and Figure 11.

Table 6
Number of Reported Neonatal Tetanus cases by Country, 1985-1994

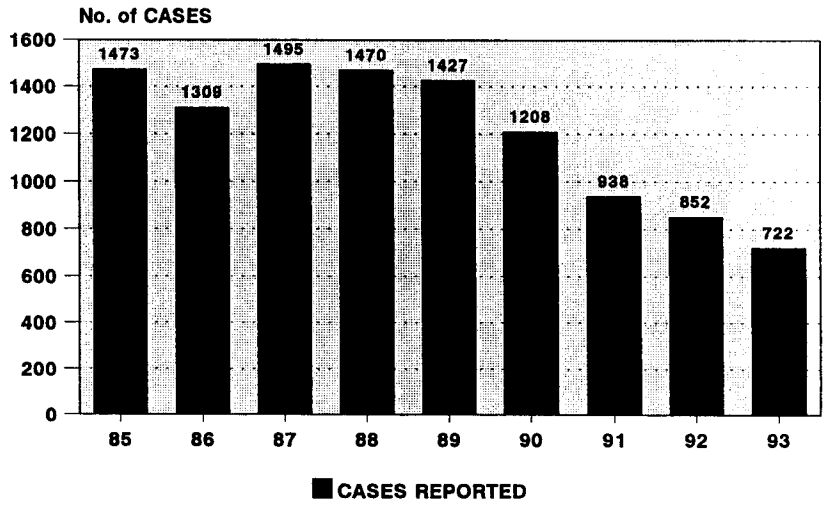
COUNTRY	CASES REPORTED PER YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994*
ARG	119	18	17	21	18	8	18	13	6	9
BOL	9	69	86	118	102	46	45	44	21	12
BRA	684	497	464	403	392	298	272	229	218	61
COL	252	211	203	178	161	165	142	100	71	25
DOR	12	8	7	33	13	12	4	2	0	0
ECU	91	74	80	126	58	88	80	71	81	31
ELS	52	39	26	33	28	25	18	25	18	4
GUT	17	8	143	110	103	60	15	22	19	8
HAI	57	57	75	63	153	143	...	...	...	...
HON	20	24	21	4	20	39	18	10	6	3
MEX	...	57	84	108	87	145	152	137	97	46
NIC	30	28	32	26	17	15	11	9	7	2
PAN	12	12	7	7	9	5	6	3	2	2
PAR	76	59	59	54	37	38	33	18	29	7
PER	72	89	138	143	183	93	89	140	120	88
VEN	70	59	53	43	46	28	35	29	27	6
TOTAL	1,473	1,309	1,495	1,470	1,427	1,208	938	852	722	304

* For 1994 data as of week no. 33
... Data not available

Three major problems remain: 1) The epidemiological investigation has to be improved: mother's vaccine status and prenatal care visit information have to be obtained; 2) Identification of new migrants

settlements should be part of epidemiological surveillance and such areas should be considered as potentially at risk; 3) Data on vaccination of WCBA living in HRA have to be recorded properly.

FIGURE 11. NEONATAL TETANUS TRENDS AMERICAS, 1985 - 1993

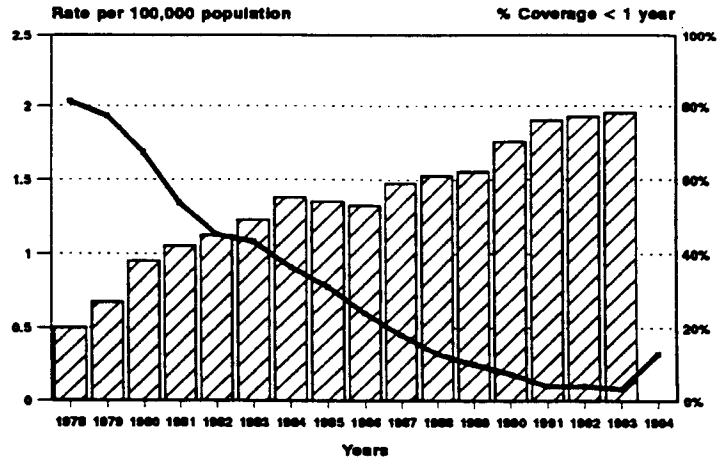


SOURCE: EPI/PAHO

D. DIPHTHERIA

In 1993, diphtheria 355 cases were reported in the Region, a 96% reduction compared with 1977 when 7,900 cases were reported. This is mainly attributable to the increase in vaccination coverage for the third dose of DTP which increased from 20% to 78% for children less than one year of age between the years 1978 and 1993 in Latin America and the English speaking Caribbean. (Figure 12)

Figure 12. DIPHTHERIA INCIDENCE RATE & DPT3 COVERAGE LATIN AMERICA, 1978 - 1994*



* Data for 1994 based on projection for data available up to week 31
Source: EPI/PAHO

In 1993, an epidemic of diphtheria occurred in Ecuador. Between week 29 of 1993 and week 32 of 1994, 210 cases were reported (13 in 1993 and 197 in 1994) in Pichincha province, which includes Quito. The epidemic spread to the rest of the country. Vaccination in adults started in April, as 74% of cases were found in persons over 15 years of age, compared to only 13% in the previous 10 years. A similar age distribution of cases was observed in recent epidemics of diphtheria in the Russian Federation and Ukraine. With more than 40% of the municipalities in Latin America with DTP coverage below 80%, the current priority is **to increase vaccination coverage** in each new born cohort and reduce drop out rates.

Strengthening of surveillance for diphtheria with access to laboratory confirmation must be in place to identify any change in the case incidence and in the age group affected.

The medical community should be informed and sensitized about the importance of this disease, its clinical characteristics, and adequate case management. Reporting should be encouraged and laboratory confirmation of cases should be required.

In case of an epidemic, mass vaccination of the affected age group and other high risk groups should be carried out either with DPT, TD or Td for containment. Routine quality control measures for DTP and DT vaccine should be assured outside the production laboratory to guarantee the good quality of the vaccine.

The administration of a booster dose of DTP vaccine at school entry and then a booster of Td every 10 years may be recommended in certain situations. However, it may not be advisable in many countries as persons receiving the booster dose will most likely be the ones already properly vaccinated, and as usual, unvaccinated persons will be missed again.

To help reach some of the susceptibles, Td vaccine could be used instead of TT when vaccination of high risk areas for neonatal tetanus are organized. This approach has already been implemented in Bolivia and represents a relatively affordable US$ 0.024 cost increase per vaccine dose.

E. PERTUSSIS

In Latin America and the English-speaking Caribbean countries, 11,567 cases were notified in 1992 compared to 9,888 cases in 1993. Several countries are improving pertussis surveillance which will include standard case definitions for suspected and confirmed cases. Coverage rates for DPT3 in Latin America and CAREC member countries have been similar for 1992 and 1993 (77.0% and 77.7% respectively).

In 1993, in the USA a total of 6,586 pertussis cases were reported to CDC. This represents the highest annual total reported since 1967. The precise reason for this resurgence is unclear. All age groups have been affected. From 1980-1991, the increase in reported age-specific incidence was greatest among persons >10 years of age; in 1993 increases in age-specific incidence were greatest among <1 and 1-4 year-olds. Improved surveillance or the introduction of a clinical case definition for reporting pertussis cases in 1988 alone are unlikely to have resulted in the increase in the number of reported cases. The

similar complication rates among cases <5 years of age in 1993 to previous years indicates that the peak in 1993 was not due to reporting of milder non-culture confirmed cases. The proportion of cases 1-4 years of age who had received >3 doses of pertussis vaccine was relatively constant until 1991 (30-40%) and then increased to >60% in 1993. This observation is consistent with the higher immunization coverage achieved in 1993, but also could be due to reduced vaccine efficacy in recently vaccinated cohorts. Despite the peak in reported pertussis incidence in 1993, pertussis vaccine remains effective and current disease levels are <5% of those reported in the prevaccine era.

Despite high pertussis coverage (93% with 3 doses and 82% with 4 doses or more at 2 years) and despite a reduction in over 93% of cases from the prevaccine era in the 80's, during the recent years large pertussis outbreaks have occurred in Canada, in particular, in 1993 (nearly 7,000 cases, 23/100.000). Attack rates were highest in children less than 1 year (2/1000). Studies have revealed a significant problem in case ascertainment. Reasons for the recent epidemics include incomplete vaccine coverage, presence of an adult reservoir as immunity may be short lived, low vaccine efficacy, and breaks in the cold chain with freezing of the vaccine. The last two points need to be investigated. A national consensus conference on pertussis was held in May 1993 to develop national goals and targets for the control of pertussis. Recommendations to achieve the goals and targets included: improving pertussis immunization rates through education, reducing missed opportunities, evaluation of vaccine programs with emphasis on surveillance of vaccine associated adverse events, maintaining of the cold chain, and improved surveillance to monitor the effectiveness of immunization programs.

F. HEPATITIS B

HBV infection is a serious public health problem in the Americas. Patterns of HBV infection in this Region vary from low to very high endemicity levels. Low prevalence of HBV surface antigen (HBsAg) carrier state (0.1 to 1.0%) is found in temperate areas of North and South America, in parts of Middle America and the Caribbean, and in Mexico. Moderate levels of HBsAg (1.4 to 28%) are found in parts of tropical Middle and South America. Very high prevalence of HBsAg (5 to 15%) occurs in the western parts of the Amazon Basin, in some Caribbean Islands (Hispaniola, and St. Kitts and Nevis), and in some areas of Brazil, Colombia, Peru and Venezuela. There are about 6.3 million chronic HBsAG carriers in the Americas, of which 5.5 million live in Latin America and the Caribbean.

Fulminant hepatitis associated with delta infection has been documented in the Western Amazon and in certain areas of Colombia (e.g. Santa Maria, Urabá and Catatumbo areas), Venezuela (among the Yucpa-Bari Indians) and Peru (e.g. Abanacay, Quillabamba). Although scarce information is available on the impact due to the chronic consequences of HBV infection in Latin America and the Caribbean, it is likely proportional to the level of disease endemicity and, in high endemicity areas, comparable to those in Africa and parts of Asia.

Vaccination is the most effective tool in preventing transmission of HBV. Vaccines are composed of the surface antigen of the hepatitis B virus (HBVsAg) and are produced by two different methods (plasma-derived or recombinant DNA). When administered properly, hepatitis B vaccine induces protection in about 95% of recipients. The plasma-derived vaccine is made from the blood of chronically infected individuals which has been treated to destroy any live virus. It has been shown to be safe and effective. Over 40 million doses have been given over a number of years. Recombinant

DNA vaccine is also safe and effective. It appears to be equal to the plasma-derived vaccine in every way. Two countries (Cuba and the Unites States) manufactured this type of vaccine in our Region.

Three doses of vaccine are considered a full course. In areas such as Latin America and the Caribbean where perinatal transmission of HBV is uncommon, the first dose may be given at six weeks (or later) with the first dose of DPT. The second and third doses should be timed to coincide with visits required for other childhood immunizations. Several vaccine manufacturers are attempting to develop a quadrivalent DTP-HBV vaccine. It is believed that such a vaccine will be available for use in about 2-3 years. The availability of this vaccine will contribute significantly to the progress of the universal programs of HBV immunization of infants.

In general HBV immunization in Latin America has been directed towards areas of high HBV endemicity, particularly in those where outbreaks of fulminant hepatitis associated with delta infection have been recognized. Currently immunization demonstration programs are underway in several Latin American countries. One of the main objectives of these programs is to integrate HBV vaccine into EPI schedule and it is expected that in the future these programs will be extended to all infants from these countries. Vaccination of older children and health workers has also been implemented in certain areas. So far Cuba, Colombia, the United States and Brazil (in the Amazon Region) are the only countries in the Americas that are implementing universal infant immunization. Immunization of children is also being conducted selectively in other countries such as Venezuela, Costa Rica, Dominican Republic, Peru and Honduras.

G. HAEMOPHILUS INFLUENZAE B (Hib):

Haemophilus influenza b (Hib) causes invasive disease in children; the peak age of infection is between five and 11 months, the disease declines progressively thereafter, becoming rare after the fourth birthday. Approximately two thirds of cases are meningitis. About one in every 575 children under 5 years of age suffered from invasive Hib infection in the United Kingdom before routine Hib immunization was begun. Hib vaccine was introduced into the routine immunization program at two, three, and four months of age in October 1992 in the UK. The UK launch of Hib vaccine included a catch-up program, whereby all children under 4 years of age were immunized in an orderly fashion. The impact on disease incidence has been dramatic. Coverage for the very first cohorts to go through the program has been in excess of 90%, and invasive Hib disease has virtually disappeared from the childhood population within one year of the vaccine's introduction. The decision to introduce Hib vaccine should take account the disease epidemiology and the availability of resources. If Hib coverage can be matched to that of DTP then there are good prospects for Hib elimination.

H. RUBELLA

Fetal rubella infection in the first trimester of pregnancy can have devastating consequences of deafness, blindness, brain damage, congenital heart disease and growth failure - congenital rubella syndrome (CRS). Through the application of the correct strategy, CRS can be prevented. Risks of CRS can be increased by the application of an inappropriate strategy.

Three approaches to rubella immunization are recognized: notably the protection of adult women by immunizing school girls, the mass immunization of both sexes through MMR immunization at the age when measles vaccine is routinely given, or a combination of both approaches. The second strategy, aimed at interrupting transmission, requires very high coverage. Without this, there is a real risk that virus circulation will be reduced, and as a consequence, the age specific infection rate will shift progressively to older groups, increasing the risk of infections of pregnant women. Although this is the most expensive approach, the combined strategy is safe and produces the greatest impact the most quickly.

New surveillance systems are needed, including monitoring of rubella infections in pregnant women, cases of CRS, rubella susceptibility and parity, as well as rubella immunization coverage. Countries should not embark on rubella immunization strategies without careful consideration of the necessary surveillance, and of the prospect of increasing the risk of CRS, rather than reducing it.

I. MENINGOCOCCAL MENINGITIS

Countries such as Cuba, Brazil, Colombia, Chile, Argentina and Uruguay have recently experienced increases in serogroup B meningococcal meningitis, especially in children under five years of age. The Cuban meningococcal B vaccine has been field tested for efficacy in several places in Brazil and Colombia. Papers reporting the results of efficacy studies in Brazil in three states (Rio de Janeiro, Santa Catarina and Sao Paulo) were reviewed by the Center for Immunization Research of the Johns Hopkins University School of Hygiene and Public Health at PAHO's request. The Sao Paulo study suggests that the efficacy of the vaccine is age specific and children under two years are not protected. Although the use of surveillance data to measure impact of vaccination is problematic, no decrease in the rates of meningococcal infection were observed, despite a massive vaccination campaign in Sao Paulo. This review argues against a strong protective effect of the vaccine. The Santa Catarina and Rio de Janeiro studies were difficult to interpret because of an inadequate description of the methods used. The review concluded that protocols for the evaluation of immunization with more than two doses of the Cuban Meningococcal B vaccine among children under four years old may be warranted, especially if such studies utilize randomized controlled trials.

J. CVI AND SIREVA

The Regional System for Vaccines (SIREVA) is a multi-institutional and international program initiative. Its structure responds to the need to establish and strengthen scientific and technical cooperation for the development, production, improvement, quality control, and evaluation of vaccines, within the institutional framework of the Pan American/World Health Organization.

SIREVA involves a global approach to vaccine development including the systematic execution of all the required phases in this process: epidemiological research and surveillance, basic research, technological development, pilot-scale production, quality control, and clinical and field trials. With regard to production activity, the strategy is supported by the certification program for production laboratories, which will provide technical advisory services on how to implement procedures and meet

other technical requirements in order to guarantee the quality of vaccines produced. The activities outlined will be carried out through collaborative projects, joint action networks or consortiums of scientific and technological institutions formed through agreements, alliances and other arrangements. Simultaneously, SIREVA will promote joint efforts in vaccine development by strengthening scientific and technical infrastructure with the goal of maximizing the existing structures in the Region.

Several SIREVA ongoing activities include: the annual workshop on Good Manufacturing Procedures; technical cooperation among Brazil, Chile, and Mexico in the development of an improved *S. typhi* vaccine; the development of an improved *N. meningitidis* vaccine, with emphasis in the sero-group B, by three institutions in Brazil; the implementation of activities of the Regional Network of Quality Control Laboratories, with eight National Control Laboratories as participants; the epidemiological study on the distribution of *S. pneumoniae* in seven countries of the Region; and, the cholera vaccine efficacy trial in Arequipa, Peru.