EPI Newsletter

Expanded Program on Immunization in the Americas

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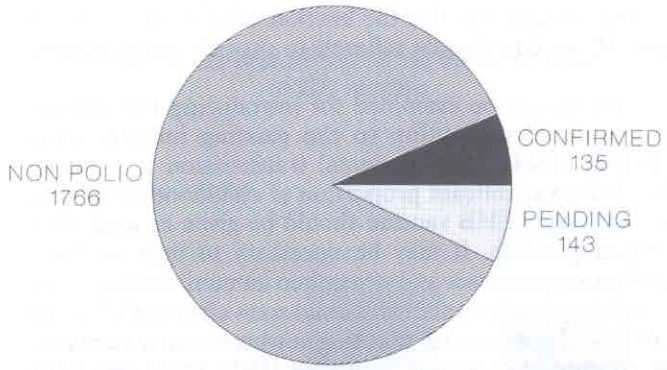
Poliomyelitis in the Americas, 1989

In 1989, 2 044 cases of flaccid paralysis were reported in the Region of the Americas. By the end of February, 1990, 135 polio cases had been confirmed, 1 766 had been discarded as "non polio", and 143 cases were still under investigation -- probable (Figure 1). The data presented below are preliminary, since almost 7% of the total cases reported are still pending final classification.

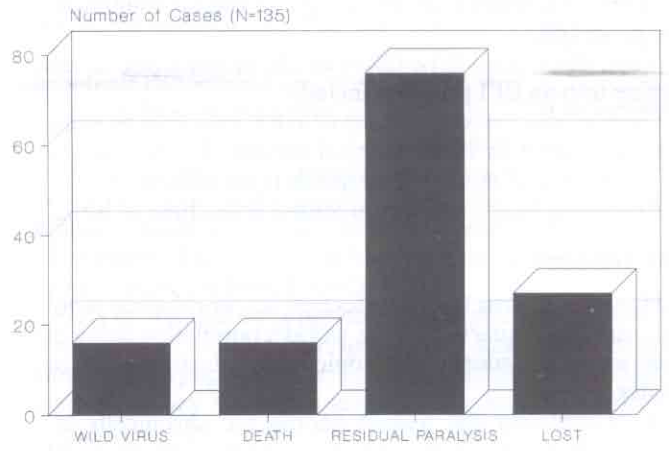
Figure 1. Classification of Cases of Flaccid Paralysis Reported in the Americas, 1989*



* Preliminary data
Source: PAHO

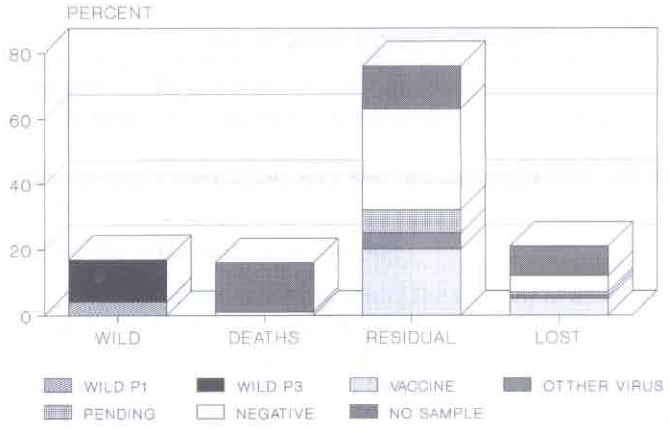
Of the 135 confirmed cases, 12% (16) were confirmed through isolation of wild virus, 12% (16) due to death, 56% (76) due to the presence of residual paralysis compatible with polio 60 days after onset of paralysis, and 20% (27) because they were lost to follow-up (Figure 2). Figure 3 presents the results of the analysis of the stool samples taken from the confirmed cases, by category of confirmation.

Figure 2. Confirmed Polio Cases, by Confirmation Criteria, Americas, 1989*



* Preliminary data.

Figure 3. Results of Stool Sample Analyses of Confirmed Polio Cases, by Confirmation Criteria, Americas, 1989



* Preliminary data.

In this issue:

Hepatitis B Vaccine -- Attacking a Pandemic

Highlights

More than two billion individuals have been infected with hepatitis B virus (HBV) globally, of whom some 280 million are chronic carriers. Three quarters of the world's population live in areas where there are significant levels of infection.

Hepatitis B infection can be prevented by immunization with hepatitis B (HB) vaccine. In countries or areas where HBV is a significant public health problem, include three doses of HB vaccine in the EPI schedule.

Although the price of HB vaccine is higher than other EPI antigens, it is falling rapidly and is now at a point where a number of countries are including it in routine immunization programs.

Steps which need to be taken for the introduction of HB vaccine into an EPI program include:

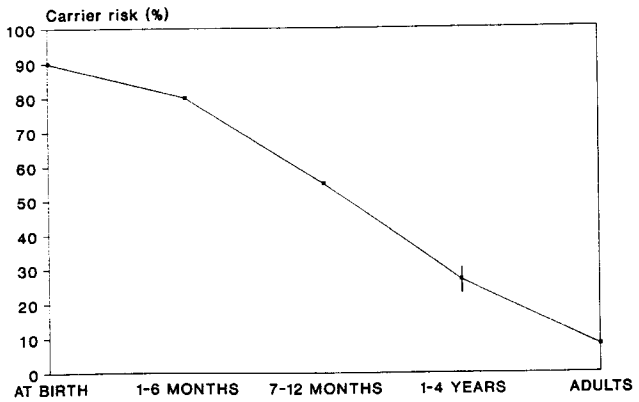
- Determining the importance of HBV infection by using existing data or by serological surveys. Determine the importance of mother to newborn transmission.
- Improving health services provided at the time of birth.

The Disease

Hepatitis B virus (HBV) infection is a world-wide problem, with three quarters of the world's population living in areas where prevalence of chronic HBV infection is 2% or greater.

Approximately 280 million people are chronically infected with HBV. These people constitute a reservoir of virus placing future generations at risk of infection. HBV is harbored in the liver of chronic carriers who are themselves at risk of becoming one of the one to two million individuals who die each year as a direct result of HBV-induced cirrhosis or liver cancer.

Figure 1. Carrier Risk, by Age



- 25% of chronic carriers die of primary liver cancer or cirrhosis as adults.
- HBV causes as much as 80% of the world's primary liver cancer.
- Primary liver cancer is one of the three leading causes of cancer deaths in East and South-East Asia, the Pacific Basin and Africa.

Chronic HBV Infection

Five to ten percent of adults with acute HBV infection remain chronically infected with the virus. The remainder eliminate the virus from their body and have no long term effects. Those most at risk from HBV are the very young. Younger individuals are more likely to become chronic carriers and to develop fatal complications as an adult (Figure 1). Seventy to ninety percent of infants infected at birth become chronic carriers of HBV.

Transmission

In areas of high endemicity, most HBV infections occur during childhood. They may occur around the time of birth from an infected mother to her infant (perinatal transmission), or from one infected child to another (child to child transmission). There is considerable variation between areas, countries and continents as to the age at which most transmission takes place. It is therefore important to know the local situation so that the immunization program which uses HB vaccine can be tailored to provide the maximum impact.

Ways should be examined for introducing HB vaccine with minimal disruption to the existing immunization schedule (Table 1). If perinatal transmission is found to contribute a significant proportion of childhood infections, the first dose of HB vaccine should be given as soon after birth as possible. It may be necessary to improve birth notification processes and strengthen immunization services so that they reach mother and child soon after birth. Health staff should be trained in reaching newborns and administering appropriate antigens including HBV, OPV and BCG vaccines.

Table 1. Examples ofVaccination Schedules which use HBV

Age	Example1*	Example2*
At birth	BCG/OPV/HBV1	BCG/OPV
6 weeks	DPT1/OPV1/HBV2	DPT1/OPV1/HBV1
10 weeks	DPT2/OPV2	DPT2/OPV2/HBV2
14 weeks	DPT3/OPV3	DPT3/OPV3
6 a 12 months	Measles/HBV3	Measles/HBV3

* Other alternatives are possible but only two examples are shown

Prevention

The Vaccine

This is the most effective tool in preventing transmission of HBV infection. Vaccines are composed of the surface antigen of the hepatitis B virus (HBsAg) 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 30 million doses have been given over a number of years. Use of this vaccine was initially compromised by a fear that it could transmit human immunodeficiency virus (HIV). This fear proved unfounded: the vaccine production methods ensure that HIV particles cannot survive.

Recombinant DNA vaccine is also safe and effective. It appears to be equal to the plasma-derived vaccine in every way.

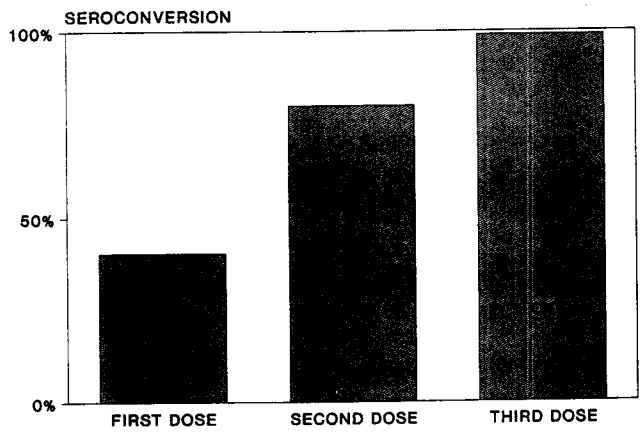
Stability

HB vaccine must not be frozen as this will destroy its potency. Storage should be between +0 and +8C, the same as for DPT vaccine. Tests so far suggest the vaccine may be very stable and able to withstand storage at +37 to +45C for 30 days without damage.

Administration

The full dose as recommended by the manufacturers for infants should be given intramuscularly. The recommended dose may vary from one manufacturer to another. Three doses produce excellent seroconversion rates (Figure 2). They should be scheduled to coincide with the administration of other vaccines to avoid the need for an extra contact.

Figure 2. Seroconversion rates for three doses of HB vaccine



Four weeks is the minimum interval between doses; a longer interval is preferred between the second and third doses.

Compatibility with other vaccines. HB vaccine can be given simultaneously with measles, DPT, OPV and BCG vaccines.

Adverse reactions. These are uncommon and mild.

Hepatitis B Immune Globulin (HBIG). Additional protection may be provided against perinatal transmission if HBIG is given at birth. However, this policy is not a realistic option for most countries.

Introducing the Vaccine

Define the Problem

The global epidemiology of HBV is well known for most areas of the world. In certain cases, programs may need to demonstrate the extent of the problem in a given area or country through data on the age-specific prevalence of infection. Data may already be available from a previous study or from blood bank specimens.

If such data are not available or are felt to be derived from a biased sample, a special survey may have to be undertaken. The proportion of pregnant mothers who are carriers and who are highly infectious (positive for the HBV antigen) should be ascertained. This may need to be done for different social or geographical groups who may differ markedly in their risk levels.

From the same data source it may be possible to ascertain if a significant proportion of transmission is perinatal, indicating the need for immunization as soon after birth as possible. If most transmission occurs some time after birth, it may be possible to delay the first dose of the vaccine until a few weeks of age. Protocols for determining this epidemiology are available from PAHO/WHO.

HB immunization programs should aim primarily at the prevention of chronic carriage of HBV and should be considered in all population groups with chronic carrier rates of over 2%. They become a major public health priority for populations with carrier rates over 8-10%.

Count the Cost

At present, the best price for complete immunization with three doses of HB vaccine is about US$2.80. Over the next few years, the cost is expected to fall further. Large orders could also reduce the price. Even so, HB vaccine is an expensive addition to the EPI. However, if the vaccine is carefully integrated with the existing program, there should be few additional costs above that of vaccine procurement.

Whether the vaccine is funded directly by a Ministry of Health or by a donor organization, it is important to budget for all costs associated with the vaccine's introduction and continued delivery.

Plan the Introduction of Vaccine

The cost of the vaccine will limit the number of developing countries which can consider introducing it as a routine component of national immunization programs. It is suggested that such introduction be done in a phased manner, beginning in well defined areas in which operational problems can be recognized and solved before moving to a national program. Phased introduction and selective immunization may be useful in introducing HB vaccine into programs, but only universal immunization of newborns is likely to control the disease in the long term.

Source: WHO/EPI Update, November, 1989.

Viral Hepatitis B Vaccine Standards and Stability

When hepatitis B vaccine is routinely used for infant immunization, PAHO/WHO recommends that it be handled exactly like DPT vaccine:

- the vaccine must never be frozen;
- the vaccine should be shipped from the laboratory to the consignee according to the established PAHO/WHO standards for the shipment of DPT vaccine;
- the storage temperature range should not exceed the limits +0 to +8C;
- opened vials should be discarded at the end of each day. Twenty dose vials may lead to considerable wastage under these conditions. One, five or ten dose vials are to be recommended depending on average numbers of immunizations per immunization session;
- the vaccine should not be taken out of the cold chain. Data concerning stability at higher temperatures is available, but they are neither complete for all manufacturers nor were they obtained on commercial vaccine from an independent laboratory.

The following investigations are in progress and the results will be shared as they become available:

- all manufacturers are being asked to submit heat stability data;
- preparations are being made to determine the freezing point of all commercial Hepatitis B vaccine from the major international suppliers. The freezing study will identify the scientific freezing point and it will identify the lowest temperature at which the vaccine remains in a stable liquid supercooled state even when shaken by the movement of a compression type refrigerator. After exposure to this state the vaccine is believed to remain effective;
- storage volume standards for 10 dose Hepatitis B vaccine are the same as for DPT, up to 3.0 cm^3/dose. Standards for 5 dose and 1 dose vaccine vials are in the process of being determined.

Editorial Note: The EPI Global Advisory Group, during its October, 1989 meeting made the following recommendation regarding hepatitis B immunization:

"The scientific basis for the integration of hepatitis B vaccine within the EPI has been clearly established. There are no significant technical impediments to its use. Nonetheless, many countries are unable to use the vaccine while its price remains high. WHO is therefore urged to find ways to reduce the purchase prices of hepatitis B vaccine to levels permitting its widespread use in developing countries.

High risk sub-groups exist in many countries with low overall carrier rates. To date, it has proved difficult to achieve high coverage in such groups through policies of selective immunization. Re-evaluation of these selective immunization policies is encouraged with specific consideration being given to introducing routine hepatitis B immunization of infants even in countries in which the problem is largely confined within sub-groups."

* (WHO/EPI document CCIS/81.4; available from the PAHO/EPI program upon request)

Sixth International Symposium on Pertussis

The sixth international symposium on pertussis will be held in Bethesda, Maryland, U.S.A., September 26-28, 1990. It is being sponsored by the Center for Biologics Evaluation and Research of the Food and Drug Administration of the United States government.

For more information contact: Dr. Charles R. Manclark, Center for Biologics Evaluation and Research, 8800 Rockville Pike, Bethesda, Maryland 20892, U.S.A.

First Andean Vaccination Day

The XIV Meeting of Health Ministers of the Andean Area, considering the importance of maintaining efforts made by the countries in the expanded program on immunization, and particularly the eradication of the wild poliovirus, resolved to declare April 29, 1990, as the "Andean Vaccination Day".

The Resolution also recommends that the governments try to make their vaccination campaign and mobilizations coincide with this day.

EPI in Bahamas: Role of Private Practitioners

The Expanded Program on Immunization of the Bahamas offers immunization against diphtheria, pertussis, tetanus, polio, mumps, measles and rubella according to the following National Schedule:

- DPT and Polio at 3, 5, and 7 months of age;
- MMR at 12 months of age;
- DPT booster at 18 months; and,
- DPT and polio boosters at 5 years of age.

Efforts to increase immunization coverage are directed towards increasing public awareness, improving facilities and conducting extensive follow-up and recall of defaulters. Nevertheless, coverages for 1988 were only 82% for DPT, 80% for polio, and 76% for MMR. It was felt that many of the immunizations administered outside the national EPI programme, by private practitioners, were not being reported to Community Health Services (CHS). In order to investigate this, an EPI audit of private practice offices was written into the Program plan for 1989. The audit was conducted between April and August of 1989, with the purpose of reviewing reporting and recording as well as the condition of the cold chain.

Twenty four private doctors thought to be involved with infant immunizations were visited, of which only three were not administering EPI vaccines. Almost all were recording the immunizations on the card, but only eight (32%) were reporting them to CHS. None had figures on the target populations and none had a system for recall of defaulters. It was estimated that if reporting of these figures could be ensured, the coverage rate could be raised by approximately 11.5%.

Only nine practitioners reported that the vaccines arrived at the correct temperatures and 12 were definitely not satisfied with the state in which the vaccines were delivered. Eighteen refrigerators were examined, and none received an excellent score, one received very good, two good, nine fair, and six unsatisfactory.

This study shows how a review of the private sector can help to determine reasons why coverages are not being improved, despite strong efforts on the part of the public sector. In summary, while recording of immunizations by private practitioners in New Providence is nearly perfect, only 32% are reporting to CHS. Improvements in reporting by private practitioners alone could bring immunization levels up to very satisfactory levels. Maintenance of the cold chain within the private sector was found to have serious problems and both vaccine delivery and storage need to be improved.

Study conducted by Dr. Adrianne Garner and Mrs. Fredrica Sands.

Neonatal Tetanus in Venezuela, 1986 - 1989

A recent investigation of Tetanus Neonatorum (TNN) cases was completed in Venezuela for the years 1986 through September 1989. There has been a progressive decrease in the number of cases of TNN in Venezuela since the early 1970's. In 1979 there were 679 reported cases of TNN in the country, representing a rate of 1.73 (cases per 1000 live registered births). By 1980, the rate had decreased to 0.26 (MSAS). This improvement can be explained by the progressive increase of institutional deliveries and the immunization program promoting the application of tetanus toxoid to rural pregnant women. Yet there continue to be cases of TNN in Venezuela at a rate of 0.06 per 1000 live births as of week 38, 1989.

To target control measures it is important to know the geographic distribution of TNN cases. The risk areas were defined in Venezuela according to Municipios. In addition, distribution of cases of TNN according to rural or urban origins is important. It is well known that most cases of TNN occur in rural areas where home deliveries and poor hygienic practices are common. Women do not always receive prenatal care and therefore may not be vaccinated against tetanus toxoid. In reviewing the medical histories, the exact address of the patient was often noted and urban or rural status could then be determined. In this study 37.3% of cases were found to have occured in urban areas (Figure 1). This finding supports a change in the present policy of vaccination in which only rural pregnant women are required to be vaccinated.

It was surprising to find that the medical records rarely mentioned the tetanus toxoid history of the mother. In 82.4% of the case histories, no mention was made of the mother's vaccination history. This information is very important for directing control measures appropriately. The fact that this information is lacking in most of the records also suggests that the health care workers (i.e. physicians) do not recognize the importance of tetanus toxoid vaccination in the prevention of TNN.

In contrast, the records frequently noted whether or not the mother had had prenatal care. However, the number of consultations was almost never mentioned. Again, vital information is missing from the hospital records. Prenatal care was found to be lacking in 68.3% of the cases. Since these

Figure 1. Percent TNN Cases, by Origin Venezuela, 1986-1989

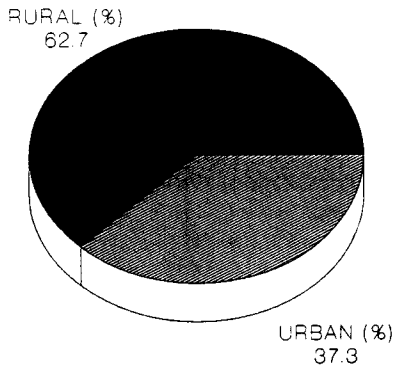
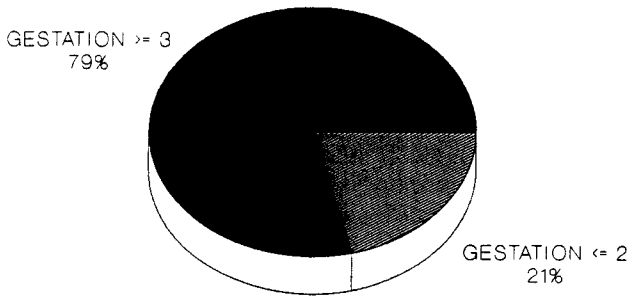


Figure 2. Percent Pregnancies/Gestations of the Mothers of the Cases of TNN, Venezuela, 1986-1989



Source: Hospital medical histories.

women are not receiving prenatal care, it is not wise to rely on prenatal visits at a health care facility to dispense tetanus toxoid vaccine. This strengthens the argument that any woman of childbearing age should receive vaccination during any contact with a health care facility if she is not already immunized.

The records showed that 84.5% of the cases were delivered outside the hospital, most of them at home. The position of the person attending the delivery was often not mentioned. Of the home deliveries, 26.1% were attended by a family member or neighbor, 13% by a midwife with training, 8.7% by a midwife without training, and 52.2% had no information. Again, if these cases were actively investigated this information could be obtained. Decisions could then be made regarding the practicality of having special training courses for midwives.

The vaccine coverage of women can greatly increased if eligible women are vaccinated during any contact with the health care facility. This is to say that even when a woman comes to a clinic for childcare or curative care, the opportunity should be taken to ensure she has received adequate doses of tetanus toxoid.

Analysis of this data can provide some indirect indicators of missed opportunities of vaccination in women of childbearing age. First, the average age of the mother, from 76 records that had this information, was 28 years. Since these women are well into their reproductive age, it seems reasonable to expect that they are fully immunized if they were vaccinated during routine health care. In addition, many of these women have had at least two pregnancies. During the first pregnancy the women should have been fully vaccinated, yet 79% of the mothers of infants infected with tetanus have had more than two pregnancies and the mean gestation is five (Figure 2). In addition, it is likely that the greater number of children a woman has, the greater her chances of visiting health centers, since her children will require health care. The contacts a woman has had with the health care system, whether curative, preventive, or for childcare, represent missed opportunities.

The following recommendations were made to reduce the incidence of TNN:

1. Take every opportunity to vaccinate women of childbearing age, including any contact whatsoever with the health care facility.

2. Report all cases to the sub-regional epidemiologist so that they may be investigated. Better prenatal histories should be obtained by visiting the mother of each case. Forms should be filled out in triplicate, and copies should be kept at the local, sub-regional, and central levels.

3. Use the International Diagnostic Coding (ICD) system in all hospitals.

4. Adequately vaccinate all women of childbearing age, both urban and rural, with tetanus toxoid.

5. Report tetanus toxoid administered at the "municipio" level to all women 15 to 45 years old.

6. Educate leaders in the community to teach the women in their communities to seek vaccination and prenatal care. Also, reinforce proper aseptic technique for all of those who attend deliveries, i.e. midwives, nurses, and physicians.

Source: Ministry of Health, Venezuela

Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1989 to date of last report, and for same epidemiological period in 1988, by country.

Subregion and country	Date of last Report	Measles		Poliomyelitis #		Tetanus				Diphtheria		Whooping Cough	
						Non Neonatal		Neonatal					
		1989	1988	1989	1988	1989	1988	1989	1988	1989	1988	1989	1988
LATIN AMERICA													
Andean Region													
Bolivia	1 Jul.	223	615	2	2	13	19	66	46	5	5	321	193
Colombia	31 Dec.	10 235	15 732	17	41	...	...	108	193	35	23	1 668	1 994
Ecuador	17 Jun.	2 403	2 605	3	9	46	56	28	62	0	5	113	109
Peru	9 Sept.	518	3 180	17	55	70	122	84	112	14	36	435	806
Venezuela	31 Dec.	9 554	12 203	21	20	...	...	44	41	0	2	590	465
Southern Cone													
Argentina(v)	31 Dec.	3 730	4 148	1	4	72	80	10	...	11	8	2 936	3 585
Chile	31 Dec.	11 904	45 079	0	0	14	14	2	5	36	132	206	234
Paraguay	31 Dec.	220	772	0	0	120	62	37	52	8	13	371	886
Uruguay (v)	31 Dec.	18	76	1	0	5	2	0	0	0	0	40	25
Brazil	31 Dec.	18 783	23 742	37	106	1 534	1 842	295	324	836	1 103	10 741	8 342
Central America													
Belize	31 Dec.	11	74	0	0	0	0	0	0	0	0	1	0
Costa Rica	31 Dec.	33	358	0	0	2	5	0	2	0	0	85	95
El Salvador	31 Dec.	15 917	787	3	12	...	50	24	33	0	0	34	46
Guatemala	31 Dec.	2 415	208	3	38	...	67	15	29	...	...	...	725
Honduras	31 Dec.	6 653	1 155	2	6	13	21	16	11	0	0	75	235
Nicaragua	31 Dec.	130	167	0	0	54	67	17	27	0	0	324	63
Panama	31 Dec.	301	364	0	0	7	5	9	6	...	0	37	29
Mexico	31 Dec.	20 076	3 195	26	18	177	303	35	127	6	2	1 468	693
Latin Caribbean													
Cuba	9 Dec.	10	121	0	0	6	5	0	0	0	0	70	32
Dominican Republic	31 Dec.	1 185	692	0	1	42	104	12	33	25	75	299	104
Haiti	*	...	...	2	9	...	...	...	...	...	...	...	...
CARIBBEAN													
Antigua & Barbuda	31 Dec.	0	0	0	0	0	0	0	0	0	0	0	0
Bahamas	16 Dec.	55	22	0	0	0	0	1	1	0	0	0	0
Barbados	23 Dec.	2	0	0	0	0	1	2	0	0	0	0	0
Dominica	17 Jun.	5	...	0	0	0	0	0	0	0	0	0	0
Grenada	19 Aug.	0	...	0	0	1	...	0	...	0	...	0	...
Guyana	30 Sept.	9	861	0	0	0	5	0	0	0	0	0	0
Jamaica	1 Jul.	10	...	0	0	1	...	0	...	1	...	0	...
St. Cristopher/Nevis	29 Jul.	12	...	0	0	...	...	...	...	...	...	...	...
St. Lucia	16 Sep.	8	2	0	0	0	...	0	...	0	...	0	...
St. Vincent & Grenadines	29 Apr.	0	...	0	0	0	...	0	...	0	...	0	...
Suriname	*	...	...	0	0	...	...	...	...	...	...	...	...
Trinidad & Tobago	25 Nov.	2 166	346	0	0	11	2	0	0	0	0	7	11
NORTH AMERICA													
Canada**(v)	29 Jul.	10 383	410	0	3	2	1	...	...	2	11	570	414
United Sates**(v)	25 Nov.	13 811	2 726	0	9	41	...		...	3	...	3 284	2 781

* Country has not reported in 1989.
** Country does not report neonatal tetanus data separately.
# Data for polio includes only confirmed cases through week 52 (ending 30 December, 1989).
(v) All polio cases are vaccine -related.
(i) Polio cases are imported.
... Data not available.

Vaccination Coverage in the Americas, 1989*

Region and Country	Population (under 1 year)	OPV3 %	DPT3 %	Measles %	BCG %
Andean Region	2 703 780	68	59	59	77
Bolivia	271 200	50	40	70	70
Colombia	834 180	92	75	73	90
Ecuador	347 800	58	50	51	83
Peru	681 600	58	57	51	60
Venezuela	569 000	60	49	44	---
Brazil**	3 617 900	96	51	55	66
Central America	1 001 100	71	64	67	75
Costa Rica	82 600	91	88	88	---
El Salvador	183 300	66	58	67	57
Guatemala	343 200	57	51	52	---
Honduras	183 600	83	77	86	75
Nicaragua	146 500	82	64	61	90
Panamá	61 900	71	71	75	90
Southern Cone and Paraguay	1 125 335	78	82	78	89
Argentina	668 000	78	72	76	90
Chile	279 150	94	94	89	98
Paraguay**	121 585	71	67	58	58
Uruguay	56 600	82	82	75	97
Caribbean	175 000	---	---	---	---
Latin Caribbean	385 800	86	70	72	68
Cuba**	183 500	97	96	99	99
Dominican Republic**	202 300	75	46	46	40
Haiti	229 600	---	---	---	---
Mexico	2 579 200	96	65	81	80
TOTAL	11 413 115	86	60	67	75

--- No data available
* Provisional data, only countries reporting to date are listed
** OPV coverage is for two doses
Source: PAHO

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