



*executive committee of  
the directing council*

PAN AMERICAN  
HEALTH  
ORGANIZATION

*working party of  
the regional committee*

WORLD  
HEALTH  
ORGANIZATION



103rd Meeting  
Washington, D.C.  
June-July 1989

---

Provisional Agenda Item 4.6

CE103/3 (Eng.)  
Corrigendum  
1 June 1989  
ENGLISH/SPANISH

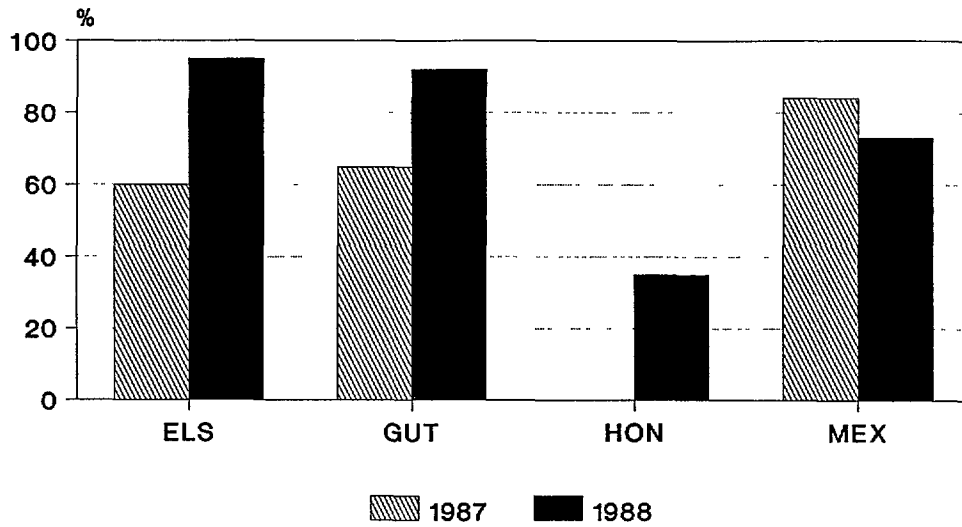
PLAN OF ACTION FOR THE ERADICATION OF INDIGENOUS TRANSMISSION OF WILD  
POLIO VIRUS FROM THE AMERICAS BY 1990

Corrigendum

Please add the attached Figure 17 to Document CE103/3.

Figure 17

**% OF PROBABLE CASES NOTIFIED WITH  
CONTROL MEASURES ORGANIZED  
CENTRAL AMERICA Y MEXICO, 1987-88\***



• INFECTED COUNTRIES ONLY  
Source: PAHO

*executive committee of  
the directing council*



PAN AMERICAN  
HEALTH  
ORGANIZATION

*working party of  
the regional committee*

WORLD  
HEALTH  
ORGANIZATION



103rd Meeting  
Washington D.C.  
June-July 1989

Provisional Agenda Item 4.6

CE103/3 (Eng.)  
28 April 1989  
ORIGINAL: ENGLISH

PLAN OF ACTION FOR THE ERADICATION OF INDIGENOUS TRANSMISSION OF WILD  
POLIO VIRUS FROM THE AMERICAS BY 1990

The Program moved into high gear during 1988. National Plans of Action have been consolidated and moved into their third annual cycle, while the administrative and managerial aspects of their implementation have been perfected. Information systems, including the hemispheric poliomyelitis surveillance was advanced into a computerized system that was installed in every country by the end of 1988. Coverage with the EPI vaccines reached the highest levels ever and the incidence of polio was at all time low, with less than 2% of all the districts or municipalities in Latin America and the Caribbean still affected by the disease.

By the end of the year, countries were actively preparing special "mop-up" operations, aimed at increasing immunization coverage in those districts or municipalities reporting low coverage or polio cases. This operation, which was started in the first quarter of 1989 and is now under way in all endemic countries, was made possible through additional financial support from Rotary International, which approved a special grant of US\$1.2 million to PAHO, in December, 1988. This is in addition to the support already provided by PAHO, the USAID and the IDB, bringing the total EPI funds channeled through PAHO to US\$34 million.

The monitoring of coverage and disease incidence by district or county level made it possible to identify the high risk areas that should be the target of special actions.

The laboratories that are supporting the program were established and are functional, but some operational problems still need much attention.

A special initiative to eliminate measles from the English-speaking Caribbean was launched in September 1988. The areas at risk for neonatal tetanus were identified in nine countries of the Region, and preparatory steps were taken to implement the appropriate control measures.

Inter-agency coordination was good during the year. There was review of issues on a country-by-country basis as well as discussions by agency heads (PAHO/UNICEF) to prepare joint initiatives at the political level.

The Technical Advisory Group (TAG) met twice during the year, in January 1988 in Lima, Peru and in November 1988 in Buenos Aires, Argentina. In those meetings, attended by participants of all Latin American countries and donor agencies, progress towards the goals of EPI were assessed, in particular the issues related to the polio initiative, measles and neonatal tetanus control.

Much still remains to be done if the goals of the program are to be achieved by 1990 and if these initiatives are to be sustained into the nineties. Nearly 4 million children that are born every year in the Americas do not have access to immunization services, and additional efforts will need to be made in order that the last few cases of polio are wiped out. Political commitment will be the critical element in the years to come.

The Executive Committee is requested to review the current status of the Expanded Program on Immunization in the Americas, with particular attention to the progress being made in carrying out the plan to eradicate the indigenous transmission of wild poliovirus from the Americas by the end of next year. In this light, comments are requested especially on the recommendations made by the Technical Advisory Group which are presented in Section 2 of the document.

CONTENTS

	<u>Page</u>
1. Situation Analysis . . . . .	1
1.1 Immunization Coverage . . . . .	1
1.2 The Cold Chain. . . . .	1
1.3 Disease Incidence . . . . .	2
1.4 Strategies and "Mop-Up" Operations. . . . .	3
2. Major Conclusions and Recommendations of the VI EPI Technical Advisory Group (TAG) Meeting. . . . .	5

PLAN OF ACTION FOR THE ERADICATION OF INDIGENOUS TRANSMISSION OF  
WILD POLIO VIRUS FROM THE AMERICAS BY 1990

1. SITUATION ANALYSIS

1.1 Immunization Coverage

Immunization coverage for children under one year of age reached an all time high during 1988, of around 60% for any of the vaccines (Table 1 and Figure 1). Most importantly, for the first time most of the subregions of the Americas reached a more uniform coverage level, as can be seen in Figure 2. Another excellent indicator of progress is the analysis of coverage by municipality, which is now being done in the majority of countries. When this indicator is analyzed, as illustrated by the four countries shown in Figure 3, it can be observed that the number of municipalities with low coverage (50% or less) is diminishing, while the number of municipalities reporting higher coverage (80% or more) is increasing. This indicates that action is being taken at the local level to correct specific problems: this simple analysis points to the necessity for reorganization of health delivery with emphasis on the local health systems.

However, there are still nearly 4 million children born every year in the Americas who do not get the full benefits of immunization. Major problems which still hamper the improvements in coverage levels are related to three issues:

- a) The national vaccination days are not being planned to focus the effort towards those areas identified as the ones with the lowest vaccination coverage. This is due to the fact that there are no evaluations taking place between the vaccination days that could direct subsequent planning.
- b) Missed vaccination opportunities in health facilities, where children eligible to receive vaccination do not receive it, mainly due to false perception of contraindications, or in some instances lack of vaccine and/or syringes and needles.
- c) High drop-out rates for those vaccines that require a multidose schedule. These problems will require specific measures during 1989 if the EPI goal of universal childhood immunization is to be met by 1990.

1.2 The Cold Chain

The present status of the cold chain in the Americas indicates that vaccines being used in the countries are, in general, kept in

satisfactory conditions and are effective in immunizing the target populations. Over last ten years, only one major outbreak of one of the EPI diseases was traced to a general cold chain break down. Still, permanent attention and maintenance is required if this situation is to be maintained.

As the EPI enters its second decade in the countries of the Americas, the cold chain tends to age and it has become necessary to conduct in depth reviews of its present status and additional needs for equipment. Therefore, several countries requested that PAHO assist them in these reviews. A methodology was developed for this purpose with the subsequent preparation of national cold chain plans. These plans also identify the recurrent costs associated with the maintenance of the cold chain, such as fuel and spare parts, as well as those related to transportation of vaccines, training and supervision. Such surveys and planning were completed in Bolivia and Peru during 1988, and so far in 1989, in Guatemala and Ecuador.

The focal point for the cold chain, at the Universidad del Valle in Cali, Colombia, continues to run the cold chain testing program for the Region. Refrigerators from Brazil, Colombia and Venezuela were tested this year, but unfortunately they failed to meet PAHO/WHO cold chain specifications. PAHO will continue to work with those manufacturers in order to help improve the performance of the refrigerators they produce.

Several solar energy refrigerators were installed in some countries of the Region, particularly in Chile and Haiti, allowing for the availability of vaccines in remote areas that otherwise would not be able to store vaccines due to lack of other energy sources.

### 1.3 Disease Incidence

a) The incidence of poliomyelitis reached an unprecedented low level during 1988: less than 400 cases were confirmed during the year, compared with 647 in 1987 and 947 in 1986 (Figure 4). This decrease is even more significant when one considers that surveillance for this disease has never been better throughout the Region. These cases were found in less than 2% of the municipalities existing in the Region (Table 2). It is clear now that the disease has been confined to very few geographic areas. Analysis of the dates of onset of the confirmed polio cases over the last three years shows that, for the first time, in 1988 there was a marked decline in the number of the cases being reported weekly and that there was no seasonal increase during the periods between weeks 19 and 39 as in previous years (Figure 5). There is a decline in case rates for all subregions, although this decline is not uniform in all of them, being most marked in the Southern Cone, the Latin Caribbean, Northern America and Brazil. The Andean and Central America subregions are the ones that experienced the least decline (Figures 6 and 7). Distribution of cases by country during the years of 1987 and 1988 is shown in Figure 8 and there is little difference in the number of cases reported by the various countries in both years. However, as shown in Figure 9, the highest rates for the disease during 1988 were presented by Guatemala, Peru, Venezuela, and Colombia.

The laboratory data confirmed that isolates from only 26 out of over 1,500 stool specimens collected from probable cases yielded wild virus, indicating that circulation may be coming to a halt.

b) The true incidence of measles and whooping cough remained difficult to measure, since surveillance for these two diseases is still not properly developed. Outbreaks of measles occurred in some countries in Latin America, particularly in Chile, where over 45,000 cases were reported in 1989, compared with less than 3,000 cases reported in 1987.

Measles in the English-speaking Caribbean reached an historical low, with three countries reporting zero cases for over five years; there has been a steady decline in the total number of reported cases over the last seven years (Figure 10). These data motivated the ministers of health of that Subregion to set the target of measles elimination by 1995. Cuba has apparently stopped transmission of the disease, since it has not reported any measles cases in the last 20 weeks. This has been achieved by an intensive vaccination campaign coupled with aggressive surveillance and containment.

c) A review of the high risk areas for neonatal tetanus was completed in nine countries (Bolivia, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Nicaragua, Paraguay and Peru), which showed a prevalence of over 10 cases per thousand live births.

Special measures should be taken in those areas, with mass vaccination of women of child-bearing age. In spite of the fact that surveillance for these diseases and for whooping cough is not yet well developed, the general tendency is for decline over the last few years (See Figures 11 to 14).

#### 1.4 Strategies and "Mop-Up" Operations

As the polio eradication effort enters its final stages and the number of polio cases further decreases, it becomes of paramount importance that all countries adhere to the most effective strategies that aim at increasing the coverage to levels that will bring the Region closer to the attainment of universal childhood immunization and the final interruption of transmission of the wild poliovirus by December 1990.

As discussed by the Technical Advisory Group at its last meeting in November 1988 in Buenos Aires, Argentina, the strategies to be implemented over the next few months will have to aim at maintaining high levels of coverage in every country and at intensification of surveillance mechanisms that will ensure that every single suspected or probable case is promptly investigated and that the possibility of involvement of the wild poliovirus is completely ruled out.

The strategies which should be implemented include:

a) National Vaccination Days

National Vaccination Days (NVD's), with utilization of all EPI antigens, including the tetanus toxoid for women of childbearing age, should be continued in all polio endemic countries to ensure the maintenance of high EPI coverage. Those countries that are not endemic for polio should continue their efforts to maintain their level of EPI coverage, including tetanus toxoid in those areas identified as at risk for neonatal tetanus.

During the organization of these national vaccination days, special attention should be paid to those municipalities in which coverage is below the national average and additional human and logistical resources should be allocated. Furthermore, in the periods between the annual NVDs, special programs should be organized in those municipalities that remain with low coverage. In both instances, participation of local community leaders will be essential for success. Finally, the decentralization of financial resources for direct administration by health officials at the lowest level of the health system will be essential if the targets are to be met.

b) "Mop-Up" Operations

An additional, essential element of the strategy, will be the organization of special house-to-house vaccination campaigns with OPV in those municipalities that are still endemic for polio, defined as any municipality that has reported any confirmed polio case over any of the past three years. This house-to-house vaccination with OPV, dubbed the "mop-up" operation, is aimed at the final interruption of polio transmission in the endemic countries, and will have to be completed before September 1989. Any new municipality that reports a probable case of polio during the present period has to be included as a target for the "mop-up" operations.

The "mop-up" operation received further support from Rotary International, which approved a grant to PAHO of approximately US\$1.2 million. These resources are being utilized to finance additional supervisory personnel at country level and supporting activities related to the house-to-house vaccination, in particular transportation, per diems and some promotional activities.

c) Strengthening Surveillance

Surveillance activities will have to be intensified, in particular the organization of the network of reporting sites within each country. The surveillance indicators for case investigation will have to be established. In particular, stool specimens will have to be collected from each case of flaccid paralysis that occurs in every country.



Without this single and most important element, the eradication of the disease cannot be certified. Therefore, cases will have to be detected early in their symptomatology, so that the chances of recovering the virus are increased. To reach this goal, the reporting network has to be fully operational before the end of 1989 in every country. Therefore, it is imperative that every country identify those health institutions that are most likely to see cases of flaccid paralysis (even those countries that are primarily non-endemic for polio) in order that negative weekly reporting is instituted and regularly maintained. Available information, shown in Table 3, indicates that much remains to be done in this area by all countries, since to date there are few institutions regularly reporting. As the reporting network is expanded, the search for flaccid paralysis can be intensified and the subsequent investigation, including collection of specimens, can be carried out to determine the presence or absence of wild polioviruses. This final decision on the presence or absence of wild poliovirus will have to be certified by one of the PAHO Reference Diagnostic Laboratories which are now operational in the Region. The solution of the operational problems which are still present in the network of laboratories must be given top priority at this juncture. Additional virology consultants are being made available to reinforce the network and help eliminate the remaining bottlenecks.

To achieve the first element of this strategy--maintenance of high immunization coverage--political commitment and proper allocation of resources will be one of the key elements. For the second component of the strategy, the strengthening of surveillance, much remains to be done in the technical area of the program, since the surveillance indicators still need further refinements. For example, intervals between onset of the disease and notification, investigation and specimen collection will have to be improved if the wild virus is to be detected properly. As can be observed in Figures 15, 16 and 17, there are improvements in general and in some countries in particular, but much effort will be needed in some other countries, particularly with respect to early collection of specimens and institution of control measures. The deterioration of these indicators, such as illustrated by the example from Honduras, cannot be accepted if the target of eradication is to be reached by the end of 1990.

2. Major Recommendations of the VI EPI Technical Advisory Group (TAG) Meeting (November 1-4, 1988, Buenos Aires, Argentina)

2.1 The polio eradication effort has contributed to strengthening the overall status of the EPI in the Americas and it has led the World Health Assembly to adopt a goal of global eradication by the year 2000. Although the goal for the Americas is in sight and there is great cause for optimism, much remains to be done in the 25 months remaining before the end of 1990, the target date for interrupting poliovirus transmission. To achieve the target, it is essential that a sense of urgency be established at all levels--regional, national, provincial, and local. Because this is a regional undertaking and because the remaining persisting foci of infection in the Hemisphere pose a threat to the rest of the Region, it is essential that countries move forward together. This will require acceleration of efforts in many countries.

2.2 The major technical issues facing the eradication of poliomyelitis have been addressed and the primary need at present is to implement the solutions uniformly within each country and improve the approaches that have been developed: active surveillance, ongoing immunization services, continued use of multi-antigen national vaccination days, and aggressive response to the occurrence of cases.

2.3 Through the extraordinary efforts of international agencies, both governmental and nongovernmental, substantial external resources (both financial and personnel) are being made available throughout the Region. Particular acknowledgment should be made of the cooperation of UNICEF, Rotary International, the US Agency for International Development, the Inter-American Development Bank, the Canadian Public Health Association (with support from the Canadian International Development Agency), and PAHO/WHO. The remaining task is to identify the internal resources essential for completion of the task and to make needed resources available at the local level.

2.4 No effort should be spared to identify the remaining foci of infection with special intensified immunization activities (such as house-to-house immunization campaigns) to eliminate the virus from these areas.

2.5 Coverage levels in some countries are not yet adequate and urgent efforts must be undertaken to improve and maintain coverage. Because coverage in countries is rarely uniform, intensified efforts should be targeted to the highest priority areas, which are typically urban and peri-urban areas.

2.6 Although the Regional network of reference laboratories is functional, the following problems remain which impede full realization of their necessary role:

- a) A relatively low proportion of patients with probable polio are having appropriate stool specimens collected and dispatched to the laboratory in a timely fashion. The stool of a patient with probable polio is an important source of specimens to detect the presence of wild poliovirus. Increased efforts must be made to assure proper collection of specimens from all such patients early in the course of illness with prompt submission and proper transportation of the specimens to the laboratory.
- b) Better communication is needed between epidemiologists and virologists to ensure that samples are taken and transported properly, that full information is provided, and that appropriate priorities are established for the processing of specimens.
- c) In many laboratories the time interval between receipt of the specimen and provision of results is too long for the results to be programmatically useful. These delays must be abolished.

Specimens from areas thought to be free of polio should receive special priority. Isolates of poliovirus from such specimens should be sent immediately to reference laboratories for intratypic characterization.

- d) To ensure credibility of results, all laboratories carrying out polio diagnosis should institute quality control procedures and participate in proficiency testing on an ongoing basis. Competence in isolating polio strains from feces as well as accuracy in determining serologic titer should be established. A separate subgroup of virologists has been asked to develop criteria for certification of laboratories. Laboratories not participating in the proficiency testing program should send duplicate specimens to the reference laboratories.

2.7 The data gathered to date through the laboratory network indicate a relatively low isolation rate from patients with clinically probable (or even confirmed) poliomyelitis. This may be due in part to failure to obtain specimens early in the course of illness, improper transport of specimens, or to the case definition being relatively non-specific. In addition, the isolates obtained indicate a marked predominance of vaccine strains. There is no reason to suspect that these cases all represent vaccine-induced paralysis. However, further investigation is warranted and the following actions were proposed:

- a) A regional registry of wild poliovirus isolates and case information should be established as soon as possible. Each wild poliovirus isolate should be fully characterized and compared with other isolates from the same area and from other parts of the world to determine whether it is indigenous or represents a new introduction.
- b) To encourage a more intensive search for wild viruses, a reward (perhaps US\$100) should be offered to the person who reports in writing the first case in a "municipio" which is subsequently found to be due to wild poliovirus and to the health worker who investigates the case.
- c) Work should continue to refine techniques and protocols to detect wild poliovirus in the presence of vaccine viruses, whether in the environment or in an individual's stool.
- d) At least one and preferably two professional staff members should be added to the Regional Office to serve as full time surveillance officers to assist in the development of reporting; assessment of cases; integrating clinical, laboratory, and epidemiological information; developing criteria for "discarding" cases; assessing the efficacy of control measures; studying the occurrence of vaccine-associated paralysis.

2.8 Recent studies of patients with flaccid paralysis indicate that a substantial number of cases are now categorized as "confirmed" poliomyelitis which, with careful clinical evaluation, could be more properly diagnosed as having Guillain-Barré Syndrome (GBS) or some other illness. However, it is difficult to delineate stricter case criteria, since there were very few culture-confirmed cases of polio for comparison. Two specific changes in procedure have been proposed to address this problem. First, "suspected" cases of poliomyelitis (i.e., persons with acute onset of flaccid paralysis) should not be categorized as "probable" cases if the development of paralysis has extended over an interval of more than seven days. Second, for purposes of final classification of cases, each country should establish a scientific group to review the clinical, epidemiological, and laboratory data on each "probable" case and make a final determination 60 days or more after onset. Further studies should be carried out to determine other modifications in the polio case definition which would make it more specific without compromising sensitivity, for example, lowering the age criterion to 10 years. It should be recognized that as polio becomes less and less common, the predictive value of a clinical case definition will diminish and laboratory findings will assume a more critical role. Development of a standard case definition of GBS which would differentiate it from polio would also be useful.

2.9 The recent adoption by the countries of the English-speaking Caribbean of a target of measles elimination by 1995 (using combined measles-mumps-rubella vaccine) represents another ambitious step forward, and a demonstration that the polio eradication goal does serve as a foundation for enhanced control of other EPI target diseases. Full support should be given to help these countries achieve their target and learn from their experiences in so doing.

2.10 Increased efforts should be made to ensure vaccination of all women of child-bearing age with tetanus toxoid in the high-risk areas.

2.11 Studies of "missed opportunities" for immunization indicate a continuing need to ensure that health personnel are fully aware of the limited contraindications for administering vaccines and do not impose unwarranted barriers to immunization. The necessary steps to ensure that vaccine is offered to all women and children at every contact with the health care system (even if this means opening a vial of vaccine for only one person) should be taken, since this could substantially improve coverage.

Table 1

EPI VACCINATION COVERAGE LATIN AMERICA 1988  
(Provisional Data)

	< 1 YEAR	PERCENTAGE			
		POLIO 3	DPT3	MEASLES	BCG
LATIN AMERICAN CARIBBEAN	602,295	68	59	56	59
Cuba	187,982	94	94	85	98
Dominican Republic	212,606	64	39	26	38
Haiti	201,707	48	49	59	45
CENTRAL AMERICA	986,453	67	60	65	67
Belize	5,270	73	73	70	97
Costa Rica	80,500	86	87	97	87
El Salvador	178,538	62	61	63	65
Guatemala	328,000	55	47	54	38
Honduras	191,019	70	74	76	84
Nicaragua	142,600	83	51	55	89
Panama	60,526	73	75	75	91
ANDEAN COUNTRIES	2,597,030	72	61	59	79
Bolivia	263,800	40	39	44	27
Colombia	816,960	94	74	74	99
Ecuador	338,400	58	54	52	85
Peru	665,000	67	66	57	73
Venezuela	512,870	68	51	49	78
SOUTHERN CONE	1,181,551	78	70	75	79
Argentina	707,770	70	61	68	74
Chile	287,981	96	96	95	98
Paraguay	132,800	82	57	63	56
Uruguay	53,000	82	82	72	98
BRAZIL	4,217,375	89	54	60	67
MEXICO	2,100,000	95	60	70	72
ENGLISH-SPEAKING CARIBBEAN	80,593	81	80	73	94
Anguilla	156	98	98	97	89
Antigua & Barbuda	1,080	98	97	95	0
Bahamas	--	--	--	--	--
Barbados	4,032	72	75	84	75
Cayman Islands	358	94	93	98	86
Dominica	1,648	97	96	89	98
Grenada	3,057	64	65	58	0
Jamaica	52,270	83	82	68	96
Montserrat	199	90	90	65	85
St. Kitts and Nevis	924	92	94	77	75
Saint Lucia	3,722	87	78	82	85
St. Vincent	2,708	97	98	97	95
Suriname	10,000	64	64	83	0
Turks and Caicos Is.	220	91	94	91	94
British Virgin Islands	190	75	84	62	47
Bermuda	895	85	83	86	0
GRAND TOTAL	11,789,841	82	59	63	70

Source: PAHO

---- Data not Available

Table 2

NUMBER AND PERCENTAGE OF MUNICIPALITIES  
WITH CONFIRMED POLIOMYELITIS CASES,  
REGION OF THE AMERICAS, 1986-1988

---

<u>Year</u>	<u>Number of municipalities with confirmed polio cases</u>	<u>% of Total</u>
1986	544	4.0%
1987	457	3.3%
1988	236	1.7%

---

Total no. of municipalities: 13,759  
(Provisional data)

Table 3

PROPORTION OF REFERENCE CENTERS REPORTING WEEKLY  
REGION OF THE AMERICAS, 1986-1988

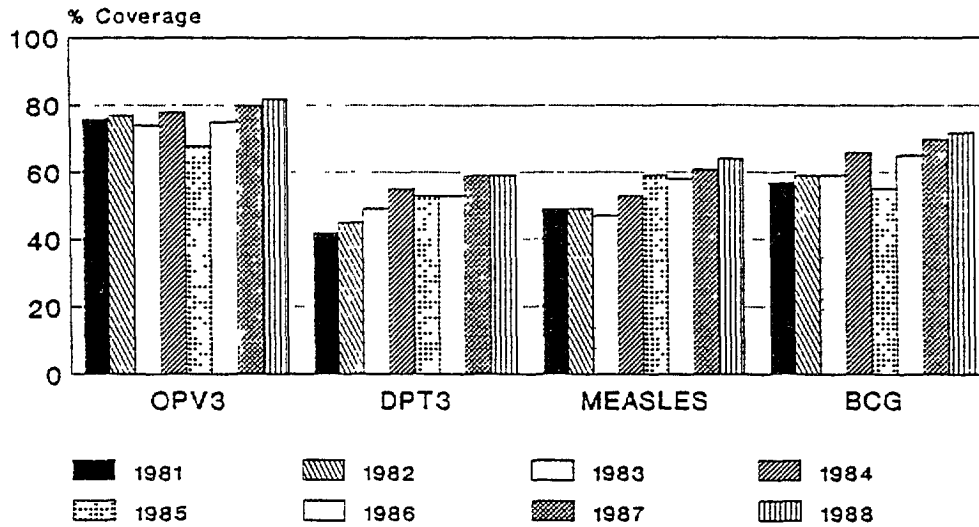
COUNTRY	1986	1987	1988*
ARGENTINA	60%	60%	60%
BOLIVIA	N.A.	N.A.	54%
BRAZIL	N.A.	N.A.	N.A.
CHILE	27%	100%	100%
COLOMBIA	N.A.	N.A.	N.A.
COSTA-RICA	N.A.	N.A.	N.A.
CUBA	N.R.	N.R.	N.R.
DOMINICAN REPUBLIC	N.A.	N.A.	N.A.
ECUADOR	N.A.	N.A.	43%
EL SALVADOR	N.A.	77%	90%
GUATEMALA	N.A.	0%	11%
HAITI	N.A.	N.A.	N.A.
HONDURAS	N.A.	N.A.	37%
MEXICO	N.A.	N.A.	N.A.
NICARAGUA	45%	75%	85%
PANAMA	N.A.	N.A.	N.A.
PARAGUAY	N.A.	55%	80%
PERU	56%	61%	51%
URUGUAY	N.A.	N.A.	N.A.
VENEZUELA	88%	92%	95%

N.A., Information not available

N.R., Report not received

Figure 1

## EPI VACCINATION COVERAGE REGION OF THE AMERICAS, 1981-1988\*

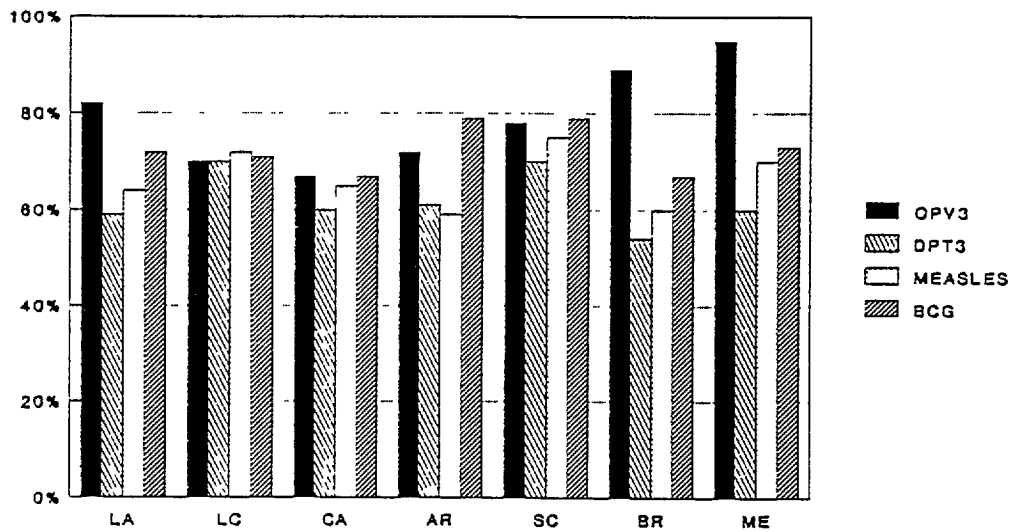


\* 1988 coverage does not include data from English Speaking Caribbean  
Source: PAHO



Figure 2

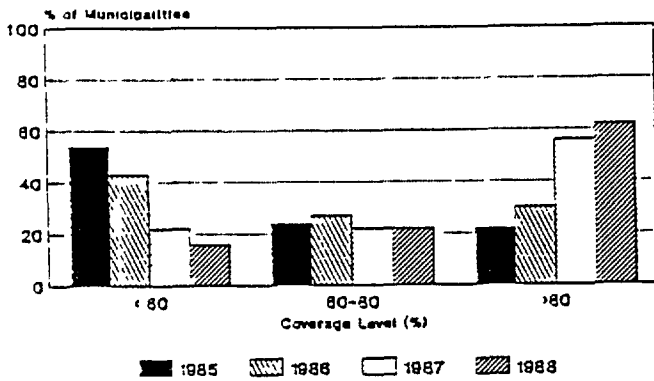
### EPI VACCINATION COVERAGE, LATIN AMERICAN REGION AND SUB-REGIONS, 1988



Source: PAHO  
LA-Latin America, LC-Latin Caribbean, CA-Central America  
AR-Andean Region, SC-Southern Cone, BR-Brazil, ME-Mexico

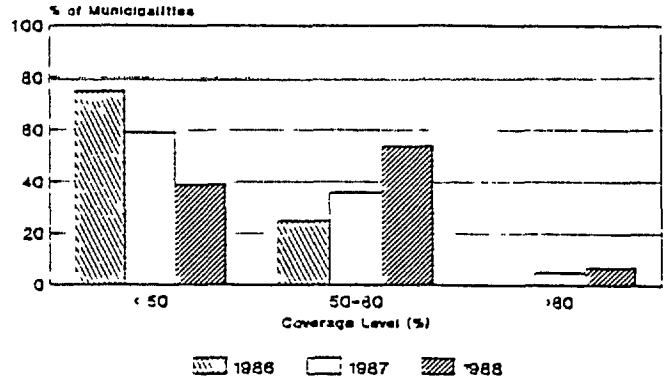
Figure 3

OPV COVERAGE BY MUNICIPALITY  
COLOMBIA, 1985-1988



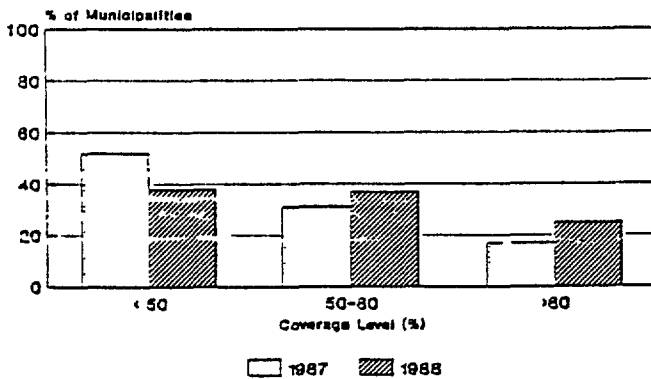
Total Municipalities: 972  
Source: PAHO

OPV COVERAGE BY MUNICIPALITY  
ECUADOR, 1986-1988



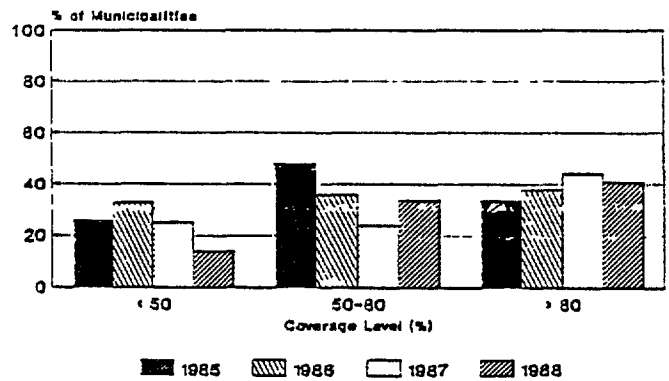
Total Municipalities: 139  
Source: PAHO

OPV COVERAGE BY MUNICIPALITY  
EL SALVADOR, 1987-1988



Total Municipalities: 281  
Source: PAHO

OPV COVERAGE BY MUNICIPALITY  
NICARAGUA, 1985-1988



Total Municipalities: 102  
Source: PAHO

Figure 4

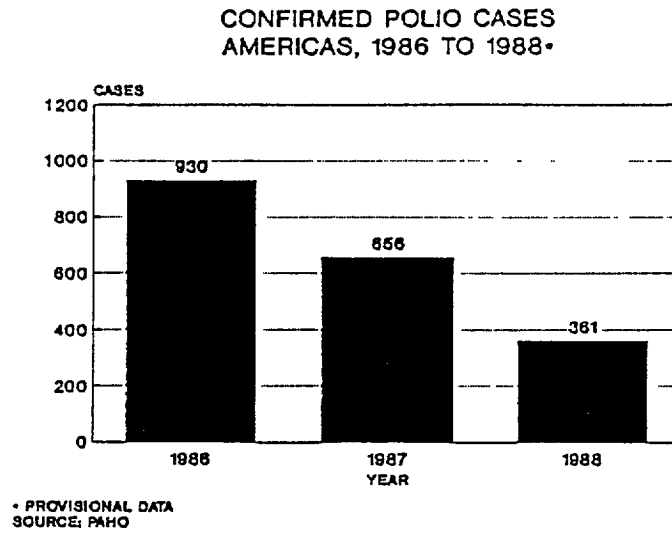
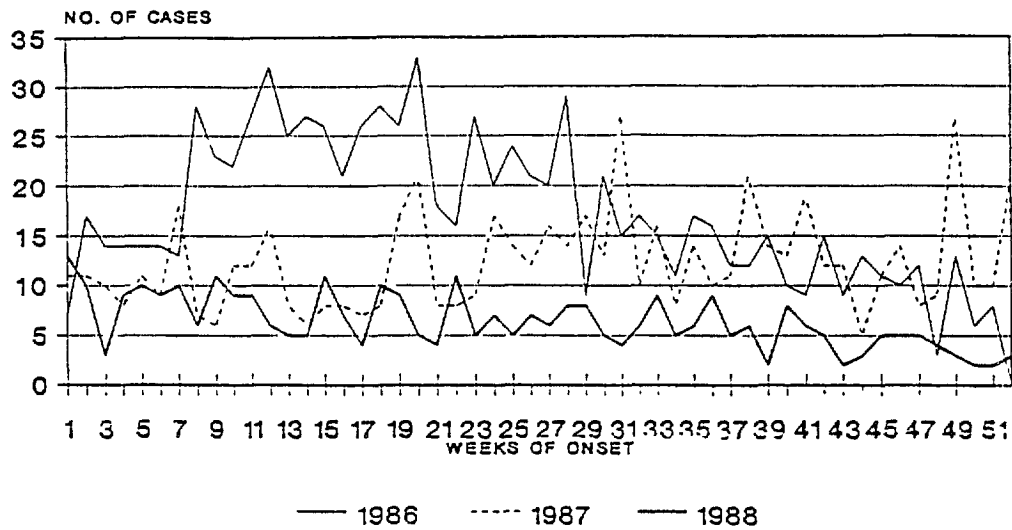


Figure 5

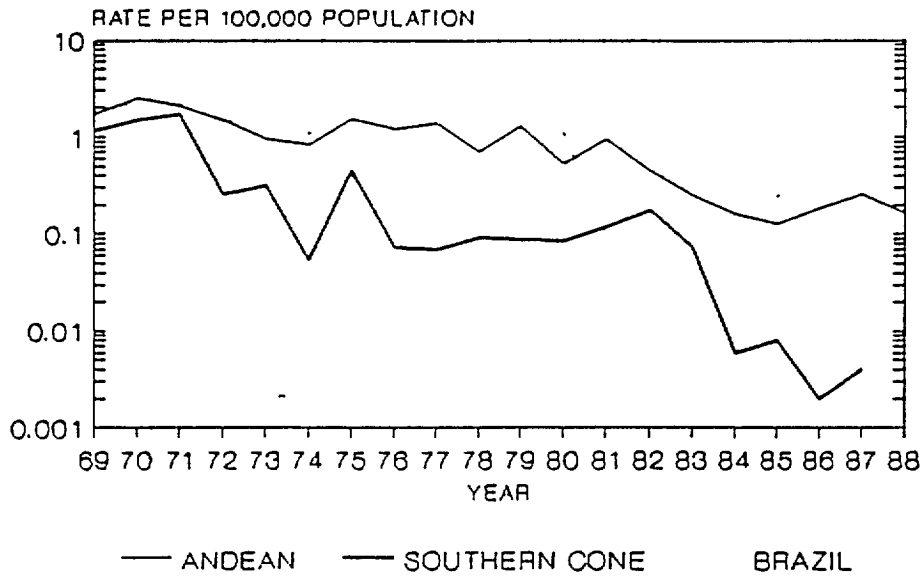
WEEK OF ONSET OF SYMPTOMS  
CONFIRMED CASES OF POLIOMYELITIS  
REGION OF THE AMERICAS, 1986-1988



Note: For 1988 11 cases have unknown date of onset and 155 cases are not yet confirmed or discarded

Figure 6

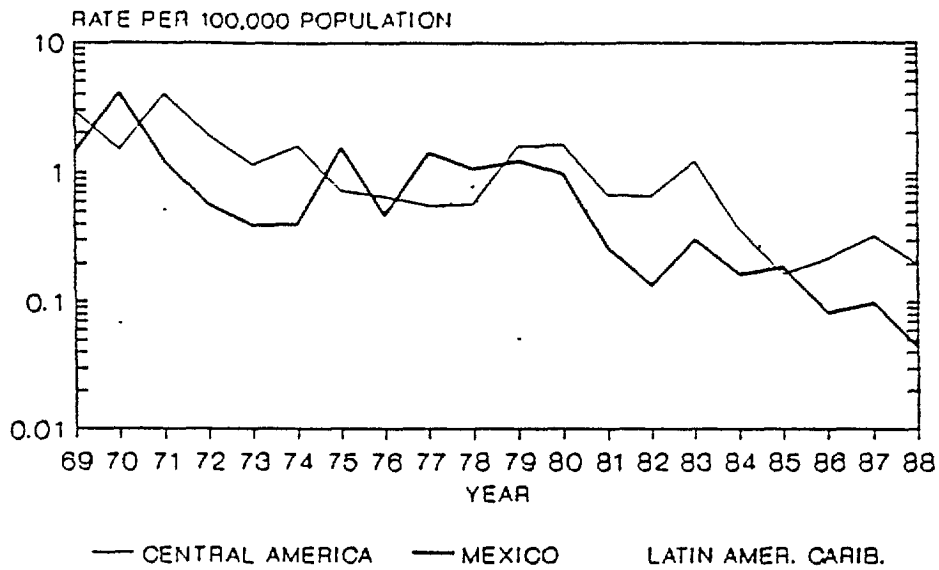
ANNUAL POLIOMYELITIS MORBIDITY RATES,  
BRAZIL, SOUTHERN CONE & ANDEAN SUBREGION  
1969-1988



SOURCE: PAHO, PROVISIONAL DATA

Figure 7

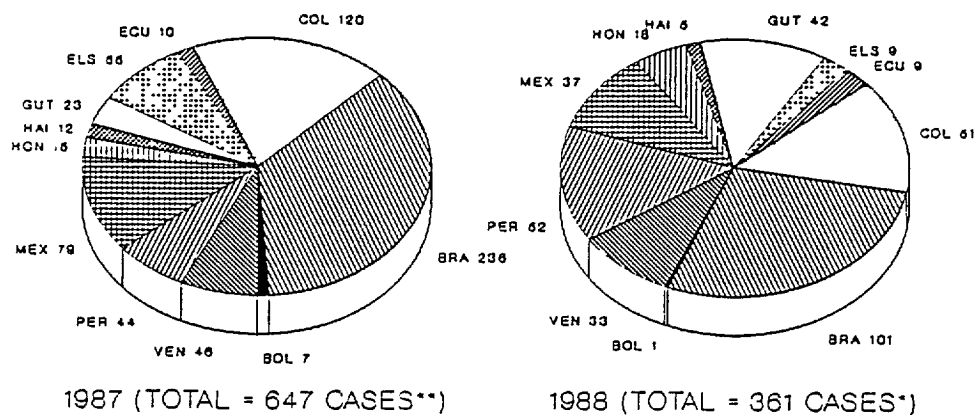
ANNUAL POLIOMYELITIS MORBIDITY RATES,  
MEXICO, CENTRAL AMERICA AND  
LATIN AMERICAN CARIBBEAN, 1969-1988



SOURCE PAHO, PROVISIONAL DATA

Figure 8

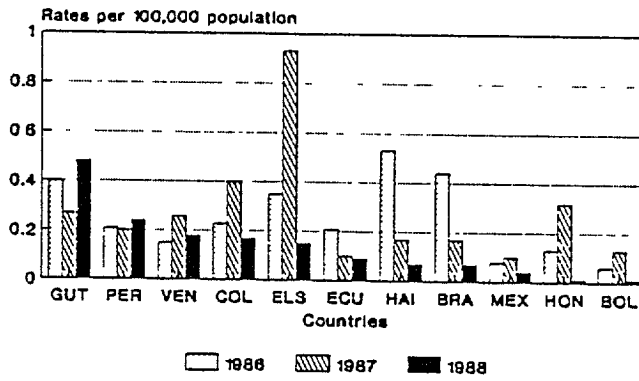
### CONFIRMED CASES OF POLIOMYELITIS REGION OF THE AMERICAS



\* PROVISIONAL DATA  
\*\* EXCLUDES 9 VACCINE-RELATED CASES  
SOURCE. WEEKLY TELEXES FROM COUNTRIES

Figure 9

POLIO MORBIDITY RATES  
REGION OF THE AMERICAS  
1986-1988

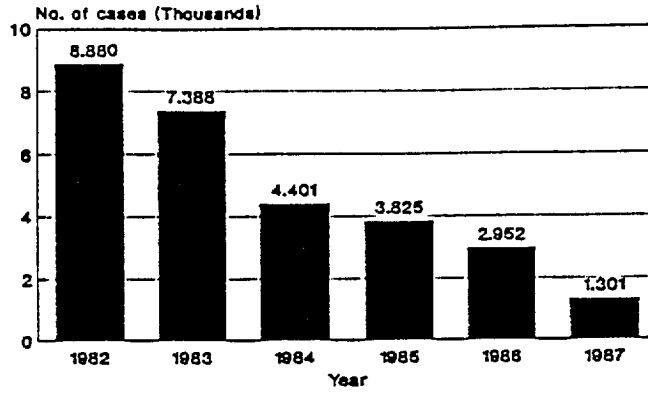


Source: PAHO



Figure 10

REPORTED CASES OF MEASLES  
IN THE ENGLISH-SPEAKING CARIBBEAN  
1982 TO 1987



Source: PAHO

Figure 11

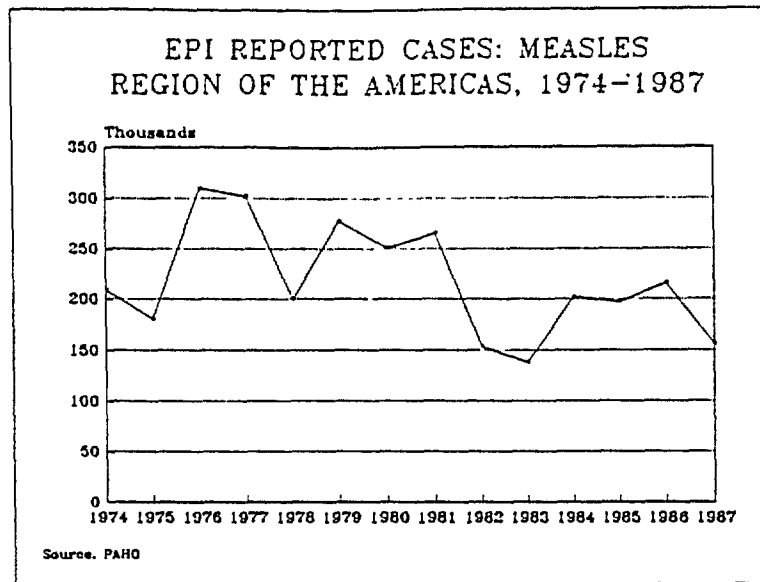


Figure 12

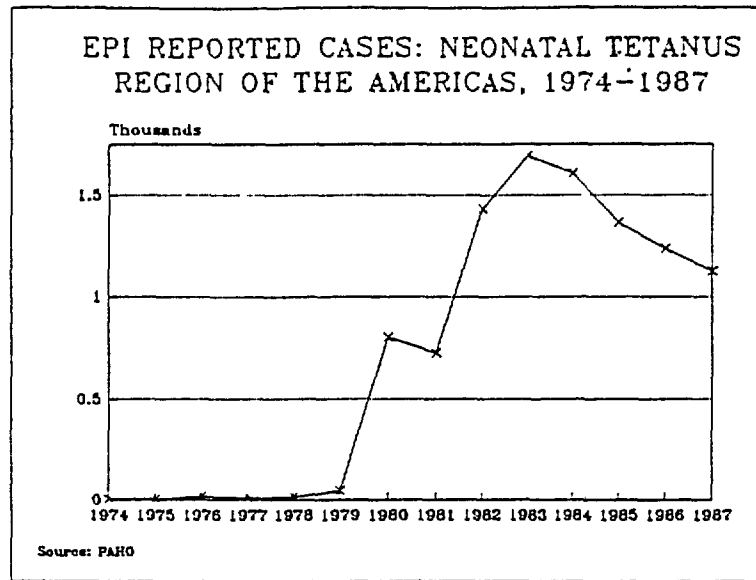


Figure 13

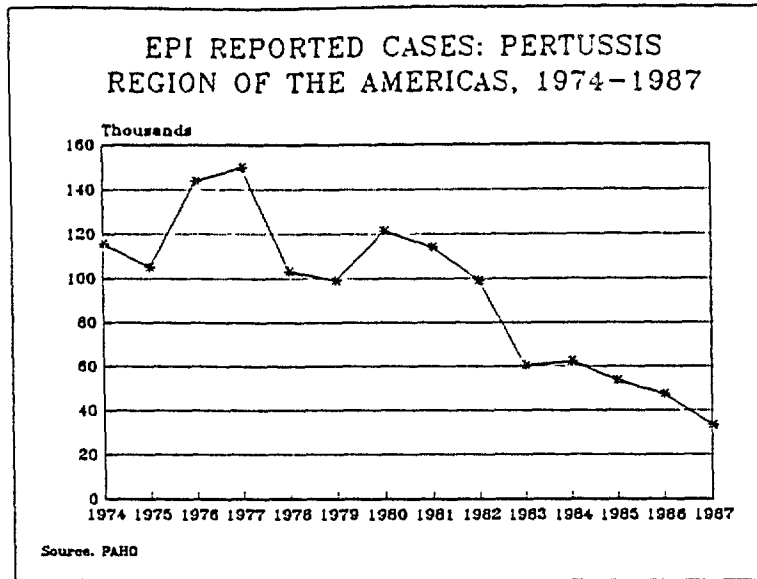


Figure 14

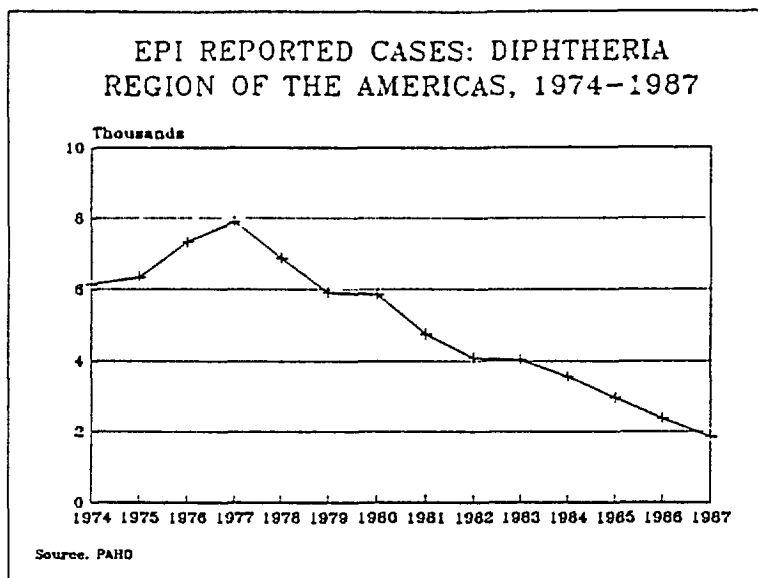
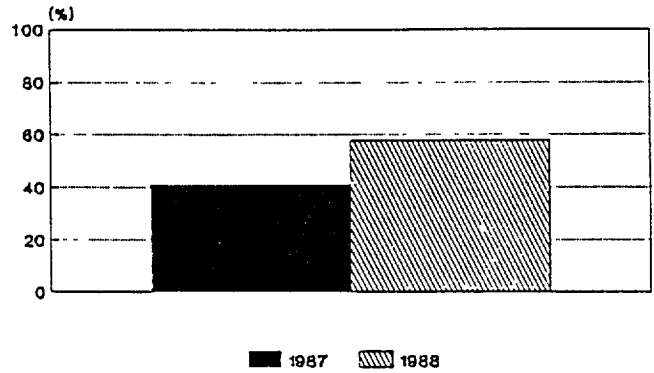


Figure 15

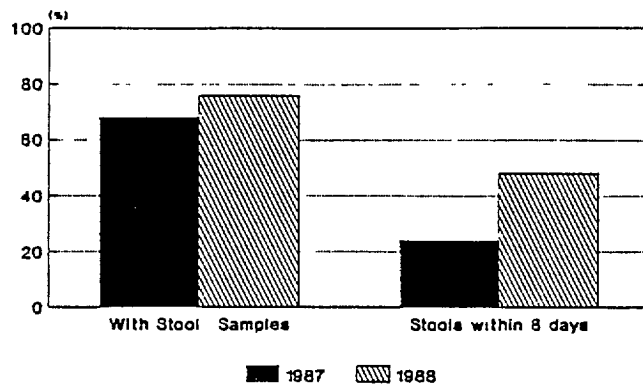
**% OF PROBABLE POLIO CASES REPORTED  
WITHIN 14 DAYS OF ONSET OF PARALYSIS  
REGION OF THE AMERICAS, 1987-1988**



Source: PAHO

Figure 16

**% OF PROBABLE CASES REPORTED WITH STOOL  
SAMPLES TAKEN & TAKEN WITHIN 8 DAYS OF  
ONSET OF PARALYSIS, AMERICAS, 1987-88**



Source: PAHO