EPI Newsletter

Expanded Program on Immunization in the Americas

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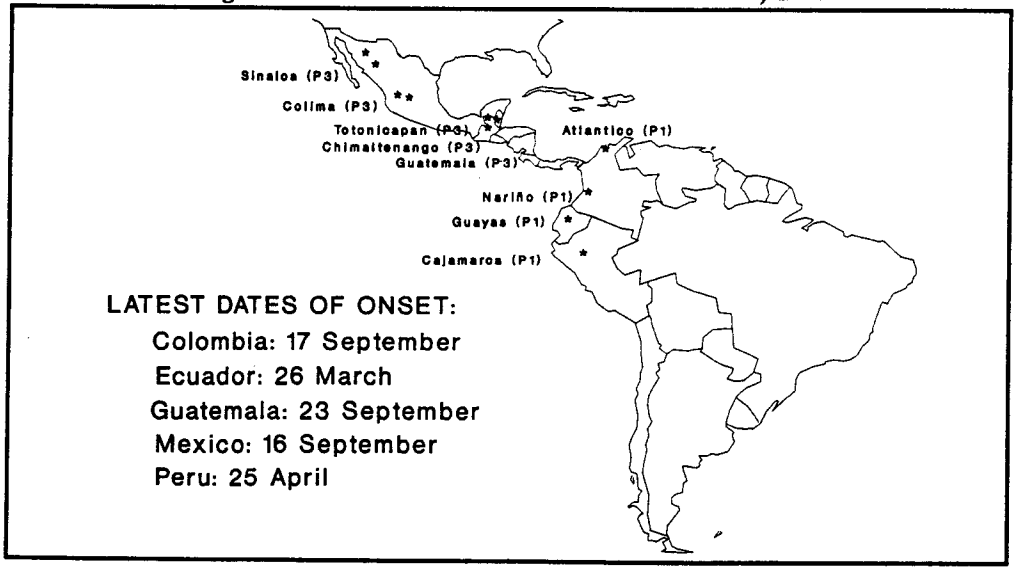
Wild Poliovirus Surveillance

In 1990, there were 2 461 reported cases of acute flaccid paralysis (AFP), of which 2 091 (85%) had a stool specimen taken for virus culture. Of the 2 091 who had stool specimens submitted for analysis, 1 671 (80%) had their specimens taken within the first 15 days after paralysis onset. The percentage of stool specimens obtained within the first 15 days after onset of paralysis varied by subregion, with the Andean subregion being the lowest at 73% and Central America being the highest at 93%.

The percentage of enteroviruses (excluding vaccine-like polioviruses) isolated from cases of AFP who had stool specimens taken increased from 13% in 1988 to 22% in 1990. In contrast, the proportion of enterovirus isolates (excluding vaccine-like polioviruses) that were wild poliovirus isolates has decreased from 20% in 1988 to 3% in 1990. Despite the increase in enterovirus isolation rates over time, there has been a decrease in the proportion that are wild poliovirus.

To date, 11 of the AFP cases reported in 1990 have been confirmed as polio cases (Figure 1); 57 were compatible; five were vaccine related; 477 are still under investigation; and 1 911 have been discarded. Of the 57 compatible cases reported, 55% occurred in areas at risk for transmission of wild poliovirus: Mexico (5), and the northern Andean subregion in the countries of Colombia (5), Ecuador (1), Peru (15), and Venezuela (5). The remaining 45% occurred in Brazil (23) and Paraguay (3). The onset date for the most recent confirmed case was September 23, 1990, from Guatemala.

Figure 1. Wild Poliovirus Isolated in the Americas, 1990



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EPI Global Advisory Group Report

The EPI Global Advisory Group met from 14-18 October, 1990 in Cairo, Egypt. A summary of the conclusions and recommendations follows.

Overall Program Status:

Immunization programs in developing countries have made remarkable progress since the inception of the Expanded Program on Immunization (EPI) in 1974 when it was estimated that less than 5% of the world's infants were adequately immunized. Today, some 70% are being reached with a protective course of immunization by the first year of life. The development of the capacity to achieve these levels of coverage of infants represents a major public health triumph for the end of the decade of the 1980s.

Achieving and sustaining full immunization coverage:

High immunization coverage levels need to be achieved and sustained. Intensified immunization activities, including the use of *national or local immunization days*, should be directed at areas of low immunization coverage or where there is continuing transmission of disease. Each country should have an Immunization Plan of Action which integrates the targets of achieving at least 90% immunization coverage with all EPI antigens, poliomyelitis eradication, neonatal tetanus elimination and measles reduction, and, in areas of risk, delivery of appropriate micronutrient supplementation.

The following areas are priorities for achieving and sustaining immunization programs: donor coordination, donor support, management supervision and training, communications, and costing and budgeting.

Controlling the Target Diseases:

Eradication of poliomyelitis:

Trivalent oral polio vaccine (TOPV) remains the vaccine of choice for poliomyelitis eradication. Routine immunization with TOPV will provide individual protection for most recipients and, if high coverage is achieved, will markedly reduce the incidence of acute poliomyelitis.

To reach high immunization coverage in all geographical areas in which the incidence of poliomyelitis and other EPI target diseases must be reduced, program managers should plan accelerated immunization activities such as *national or local immunization days*, wherever indicated. The mass administration of TOPV to all children in an appropriate age range, within a limited period of time, is an effective way of eradicating wild poliovirus and is an epidemiologically sound policy. When accelerated immunization activities are conducted, all EPI vaccines should be used, including TT for women of childbearing age.

In countries where, for the greater part, poliomyelitis transmission has been interrupted, there may be some areas which continue to have a high risk of indigenous cases. Such areas would be indicated by (1) currently reported cases of acute poliomyelitis, (2) the occurrence of recent cases, and (3) immunization coverage significantly below the national average. In these areas, "mopping-up" activities should be encouraged. These activities become important priorities for countries that are close to interrupting transmission of wild poliovirus. WHO should energetically pursue implementation of global and regional plans of action for the development of the laboratory networks required to support poliomyelitis eradication.

New information from the Region of the Americas on the differential diagnosis of flaccid paralysis should be integrated into global training materials.

Elimination of neonatal tetanus:

By the end of 1991, countries should identify high risk localities in which to implement NNT elimination activities, having taken into consideration: (1) reported or estimated incidence, (2) size of the population at risk, and (3) the operational feasibility of any interventions.

In such high risk localities, women should be appropriately immunized whenever they have any contact with health care systems, at the least when they bring a child for immunization or attend for antenatal care, unless they can show evidence of previous immunization.

Measles reduction:

Increasing immunization coverage along with improving disease surveillance are the two key elements to control measles and will achieve, by 1995, reduction by 95% in measles deaths and 90% in measles cases compared to pre-immunization levels. In localities with high population densities, very high coverage rates will be needed to achieve this target. Outbreaks must be expected even in programs with relatively high coverage, and they should be analyzed to ensure that there is high vaccine efficacy and that immunization schedules and delivery strategies are epidemiologically appropriate.

To meet the 95% mortality reduction target and to reduce morbidity associated with acute attacks of measles, treatment guidelines should be developed. As a priority, vitamin A should be administered in large doses to children with measles in high risk areas following the joint WHO/UNICEF guidelines to reduce post-measles deaths and complications (including blindness).

BCG vaccine and vaccination policy:

BCG should be given to newborns as protection against the most severe forms of childhood tuberculosis.

Immunization of infants suspected of being HIV infected continues to be recommended. BCG should be withheld only in cases of symptomatic HIV infection.

Improving Surveillance:

Disease surveillance provides information on which planning and action can be based. Surveillance is a manage-

ment necessity to measure progress towards disease eradication, elimination and reduction and to direct program resources to the areas of greatest need. Effective surveillance identifies needs for program improvement, serves as a tool for motivation of involved staff, and assists in sustaining political will for immunization.

Surveillance should be developed through strengthening of routine systems. Notifiable diseases of high importance should be reported immediately to the level where action is to be taken. WHO should develop guidelines on surveillance of preventable infectious diseases, including the EPI target diseases.

For poliomyelitis, surveillance should aim to detect all cases of flaccid paralysis as early after onset as possible. Laboratory services should be available for virus identification. Surveillance should form the basis for national and local poliomyelitis eradication strategies.

To monitor the reduction in NNT incidence, and to ensure the accuracy of routine reporting, the following should be performed in high risk areas:

- review records at health services, at least once a year during supervisory visits or annual program reviews;

- establish and maintain a "vital event" registry at the community level which includes lists of pregnant women, birth outcomes, neonatal deaths by age in days, and maternal deaths.

- train immunization, MCH and curative staff, in case investigation and review processes, to improve their knowledge of NNT, record keeping and the use of surveillance data at local level; and

- WHO should develop a set of guidelines to certify NNT elimination in a country or in a district of a country.

The usefulness of computerized EPI information systems is reaffirmed as important management tools for disease surveillance as well as for monitoring immunization coverage.

Inclusion of Existing Vaccines and Introduction of New or Improved Vaccines:

The GAG welcomed and endorsed the Children's Vaccine Initiative enunciated in the Declaration of New York on 10 September 1990: this envisions the development of vaccines which require fewer doses, can be given earlier in life, can be combined, are more heat stable, and are affordable.

Yellow fever vaccine:

Yellow fever (YF) vaccine is recommended for use from six months of age and can be administered at the same time as measles, polio, DPT, BCG, and/or Hepatitis B vaccines. Countries that include YF vaccine in their immunization programs should monitor immunization coverage and disease incidence.

Hepatitis B vaccine:

Hepatitis B (HB) vaccine has been shown to be stable, safe, immunogenic and effective. Indeed, the scale of the global problem of hepatitis B virus infection makes its use a matter of urgency. The paramount task is to develop national programs and obtain financial resources to provide this important antigen to the world's children. Global control of hepatitis B is now feasible and it is recommended that WHO work towards the following targets:

- long-term control of hepatitis B virus infection through complete integration of HB vaccine into immunization programs;

- in areas of high or intermediate hepatitis B virus endemicity, immunization of infants. In areas of lower endemicity, infants of high risk groups with higher endemicity could be immunized before universal infant immunization is introduced;

- reduction in price of HB vaccine and development, in collaboration with UNICEF, of a global revolving fund for HB vaccine procurement;

- promoting appropriate local production of HB vaccine through transfer of technology, when financially appropriate;

- development of HB vaccines that are effective with a single injection and are stable outside the cold chain as part of the Children's Vaccine Initiative; and

- continue research and develop guidelines on the introduction of HB vaccine into routine immunization programs.

Micronutrient Supplementation:

All countries where there are serious vitamin A or iodine deficiency problems should consider taking advantage of contacts with children and women of childbearing age to deliver vitamin A and iodine supplements.

Previous recommendations for vitamin A and iodine supplementation through immunization programs are reaffirmed.

Specialized Topics:

Monitoring of adverse events following immunization:

All immunization programs should monitor adverse events following immunization, the extent depending on the priorities of the program. WHO should assist in the standardization of definitions of adverse effects, develop field guides and training materials, develop guidelines for monitoring adverse effects in routine immunization programs, disseminate data on them available from specialized monitoring activities and provide materials on the risks and benefits of vaccination.

Cold chain and logistics:

Individual vial thermal exposure indicators should be introduced as soon as manufacturers confirm that the response of such indicators satisfactorily mimics the stability of the vaccines. The first priority should be for TOPV in view of its thermolability.

Autodestruct syringes, as they become available, should be promoted in areas where single use syringes are being used.

Provisional Vaccination Coverage in the Americas, 1989 and 1990

REGION AND COUNTRY	% OPV3		% DPT3		% MEASLES		% BCG	
	1989	1990	1989	1990	1989	1990	1989	1990
Andean Region	**71**	**75**	**61**	**70**	**61**	**67**	**76**	**81**
Bolivia	50	50	40	41	70	53	70	48
Colombia	93	95	75	88	73	82	90	96
Ecuador	64	66	55	69	57	62	91	89
Peru	60	73	58	72	52	64	62	83
Venezuela	67	70	55	61	50	64	68	71
Brazil*	**97**	**92**	**54**	**65**	**58**	**77**	**70**	**79**
Central America	**72**	**79**	**65**	**70**	**68**	**79**	**77**	**64**
Belize	71	80	71	84	68	81	87	80
Costa Rica	91	89	89	68	88	85	---	---
El Salvador	72	76	64	76	73	75	62	60
Guatemala	58	72	52	64	53	68	---	53
Honduras	83	85	78	77	86	91	75	60
Nicaragua	83	86	64	63	62	81	90	84
Panama	72	86	71	86	76	99	90	97
Southern Cone	**84**	**91**	**79**	**90**	**80**	**97**	**90**	**98**
Argentina	81	89	74	86	79	94	94	99
Chile	95	99	95	99	91	98	95	97
Paraguay*	71	84	67	87	58	77	58	84
Uruguay	82	88	82	88	76	82	97	99
Latin Caribbean	**71**	**74**	**62**	**67**	**56**	**73**	**57**	**79**
Cuba*	95	94	95	92	97	94	97	98
Dominican Republic	75	90	47	69	46	96	41	68
Haiti	50	40	50	41	31	31	40	72
Mexico*	**96**	**96**	**65**	**75**	**85**	**66**	**80**	**70**
English Caribbean	**82**	**87**	**82**	**87**	**72**	**74**	**95**	**88**
Anguilla	99	99	99	99	92	99	99	99
Antigua	99	99	99	99	95	89	-	-
Bahamas	82	86	86	87	87	86	-	-
Barbados	80	90	78	91	85	87	-	75
Bermuda	---	---	---	---	---	---	---	---
British Virgin Islands	97	99	99	99	87	99	99	99
Cayman Islands	93	---	93	---	89	---	81	---
Dominica	94	---	92	---	88	---	99	---
French Guiana	---	---	---	---	---	---	---	---
Grenada	86	74	87	85	89	63	-	-
Guadeloupe	---	---	---	---	---	---	---	---
Guyana	79	---	77	---	69	---	76	---
Jamaica	84	87	85	86	71	74	99	98
Martinique	---	---	---	---	---	---	---	---
Montserrat	93	99	93	99	89	99	60	99
Netherlands Antilles	---	---	---	---	---	---	---	---
St. Kitts/Nevis	99	99	99	99	90	99	-	>5
St. Lucia	93	90	92	89	91	82	99	94
St. Vincent	97	---	98	---	99	---	99	---
Suriname	71	97	72	97	73	74	-	-
Trinidad/Tobago	77	---	77	---	59	---	-	-
Turks/Caicos Islands	89	98	89	97	76	81	99	99
TOTAL**	**87**	**87**	**62**	**71**	**67**	**75**	**75**	**79**

- Vaccine not in use
* OPV Coverage is for two doses

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

Mexico: Quality Control of Stool Specimens

Introduction

The program to eradicate wild poliovirus is based on three fundamental strategies: a) to reach and maintain high vaccination coverage rates, b) to apply effective control measures surrounding cases and outbreaks, and c) to establish an epidemiological surveillance system with the maximum sensitivity and specificity.

Since 1987, Mexico has implemented a system of epidemiological surveillance with the goal of identifying the probable cases of paralytic poliomyelitis (all cases of acute flaccid paralysis (AFP) in children less than 15 years of age), as quickly as possible, in order to complete this thorough and exhaustive study and arrive at an adequate diagnosis and classification. Within this system, one priority has been the virological diagnosis through the isolation of poliovirus in stool samples.

As the date set for the eradication approaches and, above all, while the incidence of poliomyelitis in Mexico and in the whole continent decreases, laboratory diagnosis remains important.

Currently, the classification of confirmed cases is based on the isolation of wild poliovirus as the cause of acute flaccid paralysis. Moreover, the principal criteria for certifying the eradication of wild poliovirus is proof of its absence in cases of AFP over the course of three consecutive years in the general population and in the environment.

It is clear that laboratory studies are critical. The key aspects are outlined as follows:

-Quality of the specimens:

-Care in the collection process

-Handling procedures, from receipt to arrival at the laboratory

-Quality of laboratory work

-Technical capacity

-Availability of resources and materials

Therefore, it is extremely important in optimizing the possibilities of isolating wild poliovirus, to continuously monitor the quality of the stool samples and their transport. The results of the analysis of some of the critical points of stool samples are presented below.

Methods

The information pertains to stool samples of patients with acute flaccid paralysis (AFP) and some of their contacts, received in the Poliovirus Laboratory of the General Director of Epidemiology beginning in May 1990 when monitoring for quality of specimens began.

In order to collect information, a form was designed on which laboratory personnel could indicate the condition of specimens upon their arrival.

It is important to point out that the information available for each specimen varies, hence the tables differ in the total number of samples, including in each table, the information for the different variables (entity, institution, and region) changes and the totals do not coincide. In any case, the processing and analysis of these data has revealed important defects and established several recommendations to modify and correct the errors.

Results:

The results of the analysis of sample quality are presented in Tables 1-3. The following are the most important aspects:

a) The kits provided for the optimal management of the samples are used a minimum percentage (18.8%) of the time.

b) A quarter of the specimens arrived in insufficient quantity.

c) Of the specimens received, half arrived with refrigerated temperature, the rest at more than 8°C, in fact several were received at room temperature.

d) Up to October, 72% of the cases of AFP had the first stool sample, of which only 62% had a second sample and only six samples from contacts had been received.

e) With regard to the arrival temperature and the means of transport used, the best results were found with personal delivery; nevertheless, even with this method of delivery, 30% of the samples arrived at temperatures higher than 8°C.

f) 67% of the samples were sent three or more days after collection.

g) Only 17% of the samples were received within 24 hours after having been sent.

Through this monitoring it was possible to identify the deficiencies in the collection and transport of the samples, which allows adequate corrective measures to be taken.

The principal factors, such as the temperature of the samples on arrival at the laboratory, depend on various circumstances, such as the use of special transport equipment, hermetic sealing of the container of samples and the transport box, the cold source, the means of transportation, and the amount of time in transit. The viability of the virus depends, also, on the timely collection of samples and the conditions and duration of storage and transport.

Recommendations

- When a case of AFP is reported, emergency measures should be taken, and all of the procedures for case investigation should be performed immediately.

- It is most efficient for samples to be sent at the state level, so that the adequate management can be assured, such as the immediate shipment to the laboratory, and by the best means available.

- The person responsible for the shipment should verify the receipt of the samples and their condition upon arrival, directly with the laboratory and within a reasonable amount of time (48 hours), in order to be able to make necessary claims and, if the case calls for it, collect new samples.

- Apparently, the best cold source is dry ice, and it should therefore be used whenever possible. As a second choice, ice packs are recommended. Dry ice requires special handling, since it releases gases that could cause a serious accidents, and therefore, emphasis should be placed on using a hermetic seal on any box containing dry ice.

- Sending samples through messenger services of airlines and trucks should be avoided, since delivery (if it in fact gets delivered) is deficient.

- Upon sending samples by personal delivery, the person should be advised of what they are transporting, the care they should take, and they should make it top priority to deliver the samples directly and immediately.

- Where possible, the kits provided should be used for transport. The regional epidemiologist should supply this material to the states.

- Ensure that samples are of sufficient quantity, avoiding the use of rectal swabs.

- All cases should have at least two samples taken, at an interval of 24 hours (approximately). Likewise, it is important that for each case, samples be taken from five contacts under five years of age that live in the same home, or from playmates who have not been vaccinated in the last 30 days.

As observed, the quality of laboratory samples and, in general, of case studies of AFP depends on a series of details that should be observed, without neglecting a single one, in order to ensure the accuracy of the results.

Source: Adapted from the Boletín Mensual de la Dirección General de Epidemiología Poliomielitis y Otras Enfermedades Prevenibles por Vacunación, Vol. II, No. 7, Mexico.

Table 1
Evaluation of the Quality of Stool Samples
Adequate Information

Information	Percent
Name	96.6
Date taken	65.5
Clinical information	75.9
Type of samples	52.9
Institution	73.6
Entity	98.8

Source: General Coordinator of Epidemiological Surveillance on Acute Flaccid Paralysis and Vaccine-Preventable Diseases, Mexico.

Table 2
Evaluation of the Quality of Stool Samples
Handling of the Samples

Procedure	Percent
Use of kits	18.8
Sufficient ice	48.8
Ice packs	54.4
Samples received with adequate temperature	50.6
Correct identification on box	88.5
Hermetically sealed box	83.9
Adequate sample container	81.6
Sealed sample container	72.4
Sufficient sample quantity	75.3

Source: General Coordinator of Epidemiological Surveillance on Acute Flaccid Paralysis and Vaccine-Preventable Diseases, Mexico.

Table 3
Evaluation of Quality of Stool Samples
Handling of Samples

Characteristics	Percent
Temperature:	
0°C	7.4
2 - 8°C	43.2
10 - 14°C	27.2
15 and higher	22.2
Cold Source:	
Dry ice	2.3
Ice	23.0
Ice packs	55.2
Other	10.3
Unknown	9.2
Transportation Medium:	
DHL	35.6
Other courier	5.7
Personal delivery	47.1
Air	3.4
Unknown	8.0

Source: General Coordinator of Epidemiological Surveillance on Acute Flaccid Paralysis and Vaccine-Preventable Diseases, Mexico.

Reported Cases of EPI Diseases

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

Subregion and country	Date of last Report	Measles		Poliomyelitis #		Tetanus				Diphtheria		Whooping Cough	
						Non Neonatal		Neonatal					
		1990	1989	1990	1989	1990	1989	1990	1989	1990	1989	1990	1989
LATIN AMERICA													
Andean Region													
Bolivia	20 Oct.	453	778	0	0	...	...	56	84	1	6	200	750
Colombia	30 Sept.	1 831	4 528	2	5	0	68	54	63	7	15	339	454
Ecuador	1 Apr.	523	3 649	1	2	19	93	17	58	1	3	145	256
Peru	31 Dec.	418	1 145	1	1	141	389	93	183	17	68	776	1 714
Venezuela	31 Dec.	9 442	5 314	0	1	65	13	28	29	0	0	1 215	173
Southern Cone													
Argentina**	16 Sept.	997	1 749	0	0	44	55	...	...	7	5	1 346	1 584
Chile	23 Dec.	1 697	12 292	0	0	20	14	0	2	33	34	61	200
Paraguay	31 Dec.	984	220	0	0	87	121	37	37	8	7	78	37
Uruguay	23 Dec.	108	...	0	0	5	0	0	0	0	...	145	...
Brazil	11 Aug.	...	21 446	0	2	...	1 553	...	339	...	802	...	11 301
Central America													
Belize	31 Dec.	61	5	0	0	0	0	0	0	0	0	3	1
Costa Rica	2 Jun.	6	10	0	0	1	0	0	0	0	0	41	15
El Salvador	30 Sept.	860	13 753	0	0	40	24	13	16	0	0	165	19
Guatemala	2 Jun.	7 257	50	3	0	22	21	1	7	1	0	27	51
Honduras	31 Dec.	9 008	64	0	0	21	7	26	4	0	0	59	19
Nicaragua	20 Oct.	13 604	71	0	0	29	42	10	7	0	0	209	230
Panama	28 Oct.	895	301	0	0	...	...	8	7	0	0	18	36
Mexico	1 Sept.	58 159	8 166	4	13	136	128	28	53	0	6	569	1 286
Latin Caribbean													
Cuba	23 Nov.	16	0	0	0	3	0	0	0	0	...	6	...
Haiti	30 Jun.	...	...	0	0	...	...	...	...	...	...	...	...
Dominican Republic	2 Nov.	2 755	...	0	0	49	...	14	...	13	...	157	...
CARIBBEAN													
Antigua & Barbuda	13 Oct.	0	0	0	0	1	0	0	0	0	0	0	0
Bahamas	31 Dec.	65	21	0	0	0	0	0	0	0	0	0	0
Barbados	9 Dec.	51	0	0	0	4	0	0	0	1	0	2	0
Dominica	29 Sept.	7	5	0	0	0	0	0	0	0	0	0	0
Grenada	29 Sept.	2	1	0	0	0	0	0	0	0	0	0	0
Guyana	24 Mar	8	3	0	0	0	0	0	0	0	0	0	0
Jamaica	29 Sept.	3 617	14	0	0	...	...	...	...	...	...	...	...
St. Kitts/Nevis	29 Sept.	61	12	0	0	...	...	...	...	...	...	...	...
St. Vincent	24 Mar.	0	0	0	0	3	0	0	0	...	...	...	...
Saint Lucia	14 Oct.	23	6	0	0	0	0	0	0	0	0	4	0
Suriname	30 Jun.	...	...	0	0	...	...	...	...	...	...	...	...
Trinidad & Tobago	25 Nov.	2 166	1 657	0	0	11	0	0	0	0	0	7	5
NORTH AMERICA													
Canada	31 Dec.	876	275	0	0	0	0	0	0	5	0	3 074	286
United States**	31 Dec.	26 520	15 956	0	0	60	...	0	...	4	...	4 188	3 760

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

Cholera in the Americas

The first confirmed cases of cholera that have occured in this century in the Region of the Americas, were reported on 31 January 1991 from the Peruvian coastal provinces. It is speculated that the disease could have been introduced through contaminated disposal from ships, in turn contaminating fish and shellfish which the population is accustomed to eating raw, or directly through transmission from persons coming from endemic zones.

The Peruvian health authorities have taken control measures, which have proven to be effective, since cases seek help in a more timely manner, are better managed, and a low case fatality has been maintained. Through 22 February, 33 202 cases had been treated, of which 6 535 (23%) had been hospitalized, and 136 deaths had been reported.

In the countries of Latin America, especially those bordering Peru (Ecuador, Bolivia, Brazil, Chile, and Colombia), Committees for Surveillance of Cholera have been organized to observe whether there are increases in the number of cases of diarrhea among young adults and children over two years of age.

Cholera is an acute enteric disease, of bacterial origin. Its sudden onset manifests itself in abundant, whitish, liquid stools. It is also associated with vomiting and cramps. Fever is low or absent. The affected person can lose as much as one or two liters of water through their stools. If the loss is not replaced with oral fluids, dehydration can appear rapidly, and send the person into shock within a few hours.

The agent is *Vibrio cholerae*, which has two serotypes: Inaba and Ogawa. Both serotypes are made up of the classic biotype and the El Tor biotype. The latter is responsible for the current pandemic of cholera, the seventh registered. The epidemic which is affecting Peru is caused by the El Tor biotype, serotype Inaba.

The reservoir for cholera is human, and it is transmitted through ingestion of water and food contaminated with the feces of infected persons. The incubation period can last a few hours or five days, although the average is two to three days. The period of transmission persists as long as *V. cholerae* is in the feces.

Susceptibility and resistance are variable, although a decrease in gastric acids favors the survival of the causal agent in the stomach. The adult population and older children are affected more, although cases of all ages can appear.

The fundamental aspect of treatment is the timely and adequate oral administration of water and electrolytes. Oral rehydration solution prepared with WHO-UNICEF oral rehydration salts (ORS)should be used, which in addition to electrolytes contains glucose to facilitate sodium and water absorption. If there are signs of severe dehydration and shock (irregular or absent pulse, arterial hypotension, sensory involvement) immediately initiate intravenous liquids including Saline solution (sodium chloride, 0.9%) or Ringer lactate solution (Na: 130 K:4 Ca:3 Cl:109 Lactate: 28), which are useful for expanding the volume in a short time. This is the best form of therapy. It is also possible to administer antibiotics (tetracycline or furazolidone) which reduces fecal loss. It is not necessary to use other medicaments. There is no effective vaccine available for cholera prevention or control of outbreaks.

To avoid contracting cholera, it is recommended that persons at risk only drink boiled water, avoid eating raw foods, and wash their hands with soap and water after defecating, before preparing and serving food, and before eating. Case contacts should be monitored for five days.

As far as epidemiological measures, it is important to keep the public informed and educated so that they may participate in control measures. The information disseminated should include information aimed at assuring the adequate elimination of human feces and guaranteeing a safe supply of water and food.

It is emphasized that at this moment it is extremely important that all countries finding themselves at risk of V. cholerae reinforce the surveillance of diarrheal diseases in older children and young adults. If an increase in cases of diarrhea is seen among these populations, the possibility that it is due to cholera should be investigated. Investigation should include laboratory tests, as well as implementation of the control measures described above.

Source: Ministry of Health of Peru, and the Working Group on the Cholera Epidemic in Peru, PAHO/WHO (HST, HPM, HPT, HPE, HSD, PED).

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