



# EPI Newsletter

## Expanded Program on Immunization in the Americas

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IMMUNIZE AND PROTECT YOUR CHILDREN

June 1993

### Wild Poliovirus Imported into the Americas

*No cases of poliomyelitis caused by indigenous wild poliovirus have been detected in the American Region for 20 months and national health systems have been gearing up to meet International Certification Commission for Polio Eradication's stringent criteria for final certification. One of the ICCPE's requirements is that national systems be capable of detecting and containing the spread of any wild poliovirus that may be imported from other parts of the world.*

*As a result of the outbreak of wild poliovirus polio cases in the Netherlands in late 1992 and early 1993 (see previous issues of this newsletter) PAHO/WHO urged member countries that have closed, unvaccinated communities to carry out active searches in addition to their routine surveillance, especially if those communities are known to have contact with similar communities in the Netherlands.*

*Mexico and Canada were the first to carry out active searches, and the U.S.A. is currently taking measures to determine whether there has been any importation. Imported wild poliovirus was found in Canada; results are still pending in Mexico.*

*PAHO/WHO meanwhile has alerted all countries of the hemisphere to strengthen their surveillance systems and make special efforts to contact any closed, unvaccinated communities and enlist their support for the eradication effort by accepting vaccination. Stool surveys in these and nearby communities and high vaccination coverage levels are also important to ensure that susceptibles are not exposed to imported poliovirus. The reports below summarize where things stand.*

#### Canada

During September 1992-February 1993, 68 cases of poliomyelitis occurred among members of a religious community in the Netherlands (1). Because members of an affiliated religious community in Alberta, Canada, had direct contact (i.e., travel to and from the Netherlands) with members of the affected community, health authorities in Alberta conducted an investigation during January-February 1993 to determine whether this poliovirus had been imported (2).

The investigation focused on a small rural community in southern Alberta that reported the only case of poliomyelitis from that province during the last outbreak (11 cases) of poliomyelitis in Canada during 1978 (3,4). The community comprises members of a religious group that generally opposes vaccination.

Wild poliovirus type 3 (P3) was isolated from stool specimens obtained from 21 (47%) of 45 persons (primarily

children). Laboratory investigations conducted by the National Center for Enteroviruses in Halifax, including application of molecular techniques in collaboration with laboratories at the CDC [Centers for Disease Control and Prevention, Atlanta, U.S.A.] determined that this PV3 was virtually identical with the strain that caused the recent outbreak in the Netherlands.

No cases of paralytic poliomyelitis have been identified in Canada since 1988. Provincial epidemiologists in Canada, in collaboration with the Laboratory Center for Disease Control in Ottawa, have enhanced surveillance for cases of acute flaccid paralysis. In addition, poliovirus vaccine has been offered to members of all unvaccinated communities. Studies are under way to determine whether poliovirus is circulating among unvaccinated communities in British Columbia and Ontario.

*Adapted from:* Canada Communicable Disease Report 1993;19:57-8.  
Reported by: Div of Viral and Rickettsial Diseases, National Center for Infectious Diseases; Div of Immunization, National Center for Prevention Svcs, CDC.

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## U.S.A.

The findings in this report represent the first documented importation and circulation of any wild poliovirus in the Western Hemisphere since the apparent eradication of wild poliovirus infection in August 1991 (5). No cases of paralytic poliomyelitis have been reported from the affected community in Alberta; however, because the clinical:subclinical case ratio for PV3 infection may be as low as 1:1000 (6), wild poliovirus can circulate in a population group for several months before paralytic disease occurs. The last outbreak of poliomyelitis in the United States occurred in 1979 when 10 paralytic cases were reported from four states (Iowa, Missouri, Pennsylvania, and Wisconsin). That outbreak originated in the Netherlands in 1978 when poliovirus type 1 spread from the Netherlands to Canada and then to the United States (3,4,7,8).

In each of these outbreaks, clinical cases of poliomyelitis and asymptomatic infections occurred almost exclusively among religious groups objecting to vaccination. Subgroups of susceptible persons residing within otherwise highly vaccinated general populations can periodically support epidemic transmission of poliomyelitis (3,4,7,8). However, the risk for exposure, infection, and paralytic disease among vaccinated persons in the general population is low. Therefore, persons fully vaccinated with poliovirus vaccine (i.e., three to four doses of vaccine) are not considered at increased risk for poliomyelitis, and special efforts (i.e., additional vaccination) are not recommended.

Because of the risk for importation and spread of poliovirus, all persons aged under 18 years who are not fully vaccinated should initiate or complete the primary series of poliovirus vaccine according to the recommendations of the Advisory Committee on Immunization Practices (9,10). In addition, special efforts are necessary to increase acceptance rates of vaccination and to provide poliovirus vaccines to unvaccinated or incompletely vaccinated members of religious groups who do not generally accept vaccination. Oral poliovirus vaccine (OPV) is recommended for all unvaccinated persons residing in these communities, including those aged 18 years or older, because of its ability to limit community spread if poliovirus is introduced.

Because of the outbreak in the Netherlands and detection of PV3 in Alberta, surveillance of poliomyelitis in the United States has been augmented to include clinical and laboratory investigations of any case of acute paralysis or aseptic meningitis occurring among members of religious groups objecting to vaccination, as well as unvaccinated persons in the general population residing in the vicinity of these religious groups. In addition, studies are under way to document the presence or absence of wild poliovirus in the United States among communities that do not accept vaccination.

The documentation of imported wild poliovirus in Alberta—following a period of 18 months during which wild poliovirus was absent in the Americas—demonstrates the potential for reintroduction of poliovirus into areas where poliomyelitis was considered eliminated. Persons belonging to religious communities objecting to vaccination are currently at greatest risk for paralytic poliomyelitis in the

United States. Although efforts are ongoing to protect these communities, the effectiveness of previous vaccination efforts in these communities has been limited.

Only global eradication of poliomyelitis—a health goal for the year 2000 adopted by the World Health Assembly in 1988—will ensure that poliovirus infection will not cause paralytic disease in the United States or the rest of the world.

Source: Monthly Morbidity and Mortality Report, Vol. 42/No.17 May 1993, Centers for Disease Control, Atlanta, Georgia, USA.

## References

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## Mexico

Given that wild poliovirus probably imported from Europe by [religious] groups [may be circulating], and given the traveling habits of these groups, the National Executive decided to set up an intensive epidemiologic surveillance system in each state, to include the direct operational participation of the regional epidemiologists and the health ministry.

The steps that should be taken are as follows:

- a) Map the states or areas that have [closed, unvaccinated religious communities].
- b) Establish contact with state health authorities to inform them of the situation and enlist their collaboration.
- c) Choose the largest and most representative of these communities in each state.
- d) Contact the authorities in each "governor community" to inform them of the situation and enlist their collaboration.
- e) Obtain information on: the age and sex distribution of the population; its traveling habits at home and abroad; its morbidity due to vaccine-preventable diseases and to AFP; and vaccine coverage rates by age group.

f) Carry out stool sampling especially among children under five years of age and, depending on vaccination status, among other age groups.

#### **Activities Carried Out**

In the first approach, the regional epidemiologists visited two or three communities in each state and interviewed community leaders and members directly. The following information was thus obtained:

The size of [closed, unvaccinated religious] communities varies; some are several families large, others are colonies of several thousand inhabitants. (Several years ago, these communities were concentrated in the north-central region of the country; today they can be found in almost every state.) Vaccination coverage has increased recently; they generally accept immunization with the Sabin (OPV) vaccine. The incidence of vaccine-preventable diseases among these groups is similar to or lower than it is among the general population.

These groups move among their communities both within national territory and abroad, for commercial purposes and reasons of personal friendship. They are also visited by members of communities in Canada and the U.S.

#### **Laboratory**

Of the 98 stool samples taken in four states 27 were negative for poliovirus, 11 were positive for enteroviruses pending characterization, and 51 are still being processed.

#### **Conclusions**

In light of the fact that wild poliovirus type 3 is circulating in [closed, unvaccinated] communities in Canada and given the results obtained during the visits of [Mexican] regional epidemiologists it is necessary to intensify and continue these activities to cover all of the [these] groups in the country. A surveillance system can thus be established that includes monitoring poliovirus until it is no longer circulating anywhere on the continent. The following actions are to be carried out:

- \* Locate all the [closed, unvaccinated religious] communities in the country.
- \* Include them every month in random environmental sampling for poliovirus.
- \* Make periodic visits to survey morbidity and travel patterns among these groups.

*Source:* Epidemiology Department, Subsecretariat for Coordination and Development, Ministry of Health, Mexico.

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## **Cartagena, Colombia: Active search finds no polio**

*In August of this year the Region of the Americas will have gone two years without recording a single case of poliomyelitis caused by an indigenous wild poliovirus. As a result of what appears to be the success of the eradication campaign launched eight years ago, the countries of the Region have entered the phase of certification of eradication.*

*As has been detailed in previous issues of this Newsletter, surveillance of acute flaccid paralysis is the cornerstone of the certification process. The International Commission for the Certification of the Eradication of Poliomyelitis (ICCPE) requires that strict AFP surveillance criteria be met to verify that the circulation of indigenous wild virus has ceased (see EPI Newsletter, Vol. XV, No. 2, April 1993, p. 2). The countries of the Region are making extraordinary efforts to strengthen their surveillance systems and the number of them that satisfy the requirements of the Commission is increasing steadily.*

*As a complementary step, PAHO is testing a methodology for the active search for AFP cases, through sources that are independent of the established surveillance systems. The aim is to check whether the latter are properly detecting all such cases. To this end, the methodology, which is akin to one that was used*

*during the smallpox eradication campaign, was first tested in Cartagena, Colombia.*

*Surveys were conducted of key community centers and individuals, and institutional records were reviewed in an active search for cases of AFP.*

*The following is an abstract of the preliminary results obtained.*

Cartagena is in the department of Bolivar. One case of confirmed poliomyelitis was reported there in 1990 and three confirmed cases were reported in 1991, the last one in April of that year. No confirmed case has been notified for over two years. The active search for AFP cases was carried out in March 1993, in Cartagena's southeastern region, where there are approximately 80,000 children under 15 years of age.

The heads of 338 community "organizations" were interviewed. At some of these organizations, such as schools and neighborhood associations, more than one person was interviewed.

Nearly 29% of the organizations were "community homes," that is, private dwellings in which a mother cares for neigh-

neighborhood children during the day while their mothers are at work. Close to 24% of the institutions surveyed were "stores," small businesses that are operated out of the owners' homes.

*Community leaders*, who made up around 20% of those interviewed, were individuals who participate in community groups, have other leadership roles in the community, or know the people in their neighborhoods well.

"*Schools*" included kindergartens, nursery schools, and elementary schools. They made up just over 13% of the organizations surveyed.

The "*community associations*" interviewed (around 9% of the total sources interviewed) included senior citizen clubs, civic groups, neighborhood committees, and mothers' groups.

Those interviewed were asked if they knew of any child under fifteen years of age who had trouble walking.

Of the 338 community organizations in which interviews were conducted, 151 (44.7%) reported having knowledge of children who had trouble walking and were under 15 years of age in March 1993. A total of 156 cases of such children were identified.

<b>Final diagnosis of the cases of children* reported by community sources to have trouble walking. Cartagena, Colombia, March 1993.</b>					
Age in Months	Poliomyelitis		Not Poliomyelitis		Total
	Number	%	Number	%	
< 1	0	-	0	-	0
1-2	0	-	1	0.8	1
3-5	0	-	0	-	0
6-8	0	-	1	0.8	1
9-11	0	-	1	0.8	1
12-17	0	-	3	2.5	3
18-23	0	-	5	4.1	5
24-35	3	8.6	15	12.4	18
36-47	1	2.9	8	6.6	9
48-59	0	-	6	5.0	6
60-119	8	22.9	40	33.1	48
120-155	12	34.3	29	24.0	41
156-179	11	31.4	12	9.9	23
<b>Total</b>	<b>35</b>	<b>100.0</b>	<b>121</b>	<b>100.0</b>	<b>156</b>

\* Children less than 15 years of age on 01/03/93

The nongovernmental organizations (NGO) and health institutions had the greatest reporting frequency, while community homes fell in the middle of the range, and the stores had the least knowledge of cases (74% did not report any).

Medical exams of the 156 children determined that 35 of them (22% of the total) had poliomyelitis as a final diagnosis. When these children were grouped according to the year of onset of paralysis, the onset times were found to concentrate in the years 1980 and 1981, both of which were poliomyelitis epidemic years, according to the records of the Epidemiologic Surveillance system of the Department of Bolivar. The last cases of poliomyelitis reported by community sources occurred in 1991, which coincides with the data available in the surveillance system.

While the survey of community sources was being conducted, an active search for cases of acute flaccid paralysis was carried out in the health institutions of the city of Cartagena. About 15,000 discharge diagnoses and 216,000 outpatient charts from walk-in clinics were reviewed for 1992. Two unreported cases of acute flaccid paralysis (onset 1992) were found that had been classified as Guillain Barré Syndrome at the attending institution. Information available in the corresponding medical histories confirmed the diagnoses. The cases occurred before that institution joined the negative notification system for cases of acute flaccid paralysis.

### Conclusions

The study found that all of the cases of acute flaccid paralysis reported to the Epidemiologic Surveillance System of Bolivar that occurred in the survey area between 1989 and 1993, and were still alive in March 1993, and had sequelae at the time of their last medical examination, were also known to the community sources interviewed.

The results of the survey and the active search for cases of acute flaccid paralysis in the records of local medical institutions suggests that there have not been any cases of poliomyelitis for more than two years in the area investigated. The fact that all of the cases reported by community sources were also known to the local AFP surveillance system suggests, furthermore, that the latter is functioning well in Cartagena.

Additional studies of this kind are needed, particularly in areas where poor surveillance is the norm, before the methodology is applied routinely on a larger scale.

*Source:* Active search for acute flaccid paralysis; a study of the sensitivity of community sources. Dr. José Cassio de Moraes, Consultant PAHO/WHO.

# Classifying Acute Flaccid Paralysis

Surveillance of acute flaccid paralysis is the core of the polio eradication campaign and standard case definitions are essential to its success. AFP surveillance is intended to detect all cases of acute flaccid paralysis and not just those presumed to be poliomyelitis.

The terms "probable" and "acute" flaccid paralysis are synonymous in an eradication program. Adequate stool samples should be obtained from probable cases and from their contacts.

All probable cases should be reclassified no later than 10 weeks after the onset of paralysis as "Confirmed," "Compatible," or "Discarded."

The accompanying chart provides a quick reference for diagnosing and classifying those cases of AFP that are not caused by a clear alternative etiologic diagnosis (such as a tumor or sudden trauma).

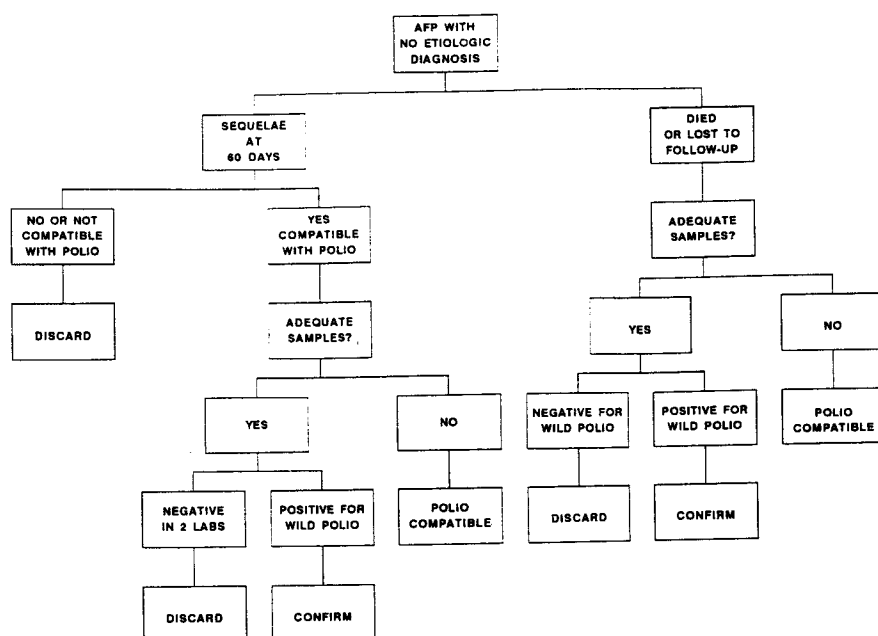
**Confirmed Polio:** Acute paralytic illness with or without residual paralysis AND for which wild poliovirus was isolated from the stools of either the case or its contacts.

**Polio Compatible:** Cases are Polio Compatible when two adequate stool specimens were not collected from a probable case within two weeks of the onset of paralysis, AND there is either an acute paralytic illness with polio-compatible residual paralysis at 60 days, OR death takes place within 60 days, OR the case is lost to follow up.

**Discarded (Not poliomyelitis):** Acute paralytic illness for which two adequate stool specimens were obtained within 2 weeks of the onset of paralysis and were negative for poliovirus AND stools from 5 contacts under 5 years of age who have not been vaccinated within the past 30 days, were negative for poliovirus.

Any probable case who dies, is lost to follow up, or has residual paralysis at 60 days should have part of the original stool specimen examined by two other laboratories in the PAHO laboratory network. If all specimens were adequate AND negative, the case should be considered to be not polio and Discarded. A committee of experts may be needed to decide the final outcome.

Cases should not be classified as "Discarded" unless thorough justification can be provided.



## National Plans of Action and EPI Sustainability

In 1985, PAHO, the Inter-American Development Bank, Rotary International, UNICEF, USAID, and, later, the Canadian Public Health Association, joined forces with national governments to form the Interagency Coordinating Committee (ICC) that launched the campaign to eradicate poliomyelitis in the Americas. They based their work on a Regional Plan of Action that called for creating an ICC in every country. Each ICC would in turn make five-year plans of action for national EPI activities and the resources assigned to them.

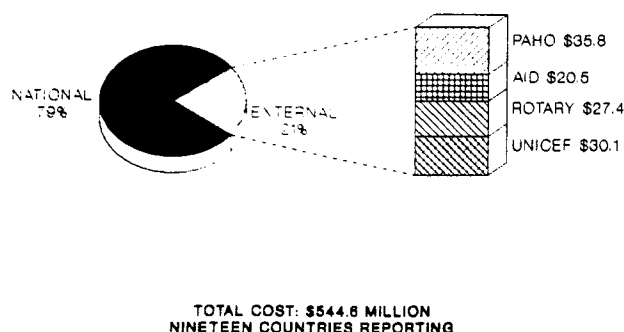
The newly created national ICCs developed their first National Plans of Action (NPAs) for the 1987-1992 quinquennium. The NPAs serve to coordinate the work of the Inter-Agency Coordinating Committee, non-governmental organizations (NGOs), and other organizations that support EPI. NPAs also make it easier for national EPI managers to plan and budget their use of resources in detail, including the analysis of the cost of activities by type (capital/recurrent) and source (national/external).

The analysis of NPA data also makes it possible to predict the financial sustainability of national EPIs within the larger health service infrastructures. Comparing the budgets of the first and second five-year work plans, for example, makes it possible to project what portion of the budget will be covered by national resources and what by external resources. Figure 1 shows the total costs involved in the first five-year plan (1987-91) of 19 countries. Seventy-nine percent of the US\$544.6 million were identified as national sources and 21% as external sources.

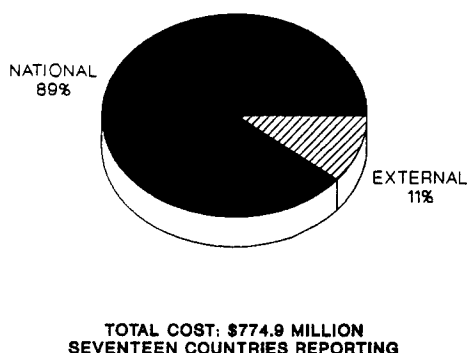
Data reported by 17 countries for the second five-year plan (1992-96) indicate that a total of \$774.9 million has been budgeted, of which 89% will be provided by national sources and 11% by external sources (see Figure 2).

The projected budget of \$774.9 million represents a 43% increase over the previous five-year plan. Simultaneously, the relative proportion assigned to national sources is expected to increase by 60% while that from external sources will show a 25% decrease overall.

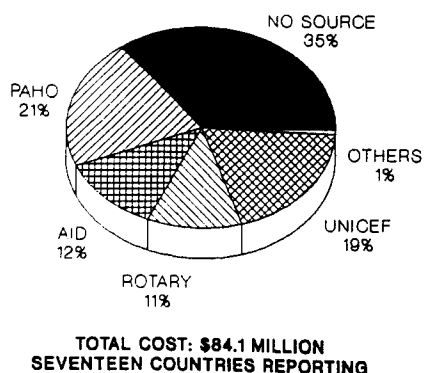
**FIGURE 1: NATIONAL & EXTERNAL FUNDING  
EPI NPAs, 1987-91, US\$ IN MILLIONS**



**FIGURE 2: NATIONAL & EXTERNAL SOURCES  
EPI NATIONAL PLANS OF ACTION, 1992-96  
US\$ IN MILLIONS**



**FIGURE 3: REQUEST FOR EXTERNAL FUNDS  
EPI NATIONAL PLANS OF ACTION, 1992-96  
US\$ MILLIONS**



A closer examination of the external resources committed to date by ICC members reveals that of the \$84.1 million requested for the second five-year plan, there remain \$29.69 million for which no source has yet been identified (see Figure 3). If this portion continues to go unfunded, the actual decrease in contributions by external sources during the 1992-1996 period would amount to 39% when compared to 1987-1991, and its impact on national EPIs would be more acute.

#### *Editorial Note:*

The 1992-96 NPAs show a significant increase in the level of national commitment to their EPIs that may offset the lower external contributions. This indicates promise for sustainability, especially since the bulk of vaccine costs is now covered by national budgets.

The list of NGOs and other external sources participating in the 1992 NPAs' is lengthy. A few of those appearing in more than one country include the UN Refugee Program (PRODERE), Project Hope, Christian Children's Fund, European Economic Community, the Swedish International Development Agency (SIDA), and the Governments of Brazil, France, Italy and Spain. Their contributions ranged from Brazil's donation of 7 million doses of measles vaccine to six Central American countries, to the Christian Children's Fund's mini-projects in Colombia and Mexico, that identified specific EPI activities for specific population groups. More often than not these contributions were in-kind in lieu of cash.

As the nature of the relationship between national programs and outside sources of support continues to evolve the make-up of the national ICC and levels of commitment in the NPAs will change accordingly. Identifying other indicators in the NPA to measure the sustainability of the EPI will be fundamental to continued success of the program in the future.

Among these new indicators, it will be important to identify the proportion of funds that is assigned to high-risk areas, that is, those that have low immunization coverage and a higher disease incidence. PAHO is developing a methodology to apply this criterion. It was field tested in one country earlier this year and will be field tested in a second country in the coming months. The use of this indicator will be refined and applied widely as one way to ensure equity of access to immunization services.

Other issues may be clarified as well, including:

- What are the consequences resulting from changes in the level of external funding to the NPA?
- Is there evidence of increased national funding on an annual basis?
- Is there evidence of improved management to maximize the coordination and impact of limited resources?
- Is there evidence of a change in surveillance indicators (such as coverage or disease incidence) relative to a change in contribution levels?

# Reported Cases of Selected Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria, and whooping cough, from 1 January 1992 to date of last report, and the same epidemiological period in 1991, by country.

Subregion and country	Date of last Report	Measles		Poliomyelitis		Tetanus				Diphtheria		Whooping Cough	
		1992	1991	1992	1991	Non Neonatal		Neonatal		1992	1991	1992	1991
						1992	1991	1992	1991				
LATIN AMERICA													
Andean Region													
Bolivia	31 Dec.	3 610	2 012	0	0	...	1	42	53	20	2	188	56
Colombia	31 Dec.	4 968	10 391	0	8	86	94	100	141	15	10	596	685
Ecuador	31 Dec.	4 356	1 802	0	0	58	130	72	59	10	3	320	596
Peru	31 Dec.	22 252	1 401	0	1	118	39	128	95	6	3	364	187
Venezuela	31 Dec.	11 130	14 466	0	0	81	119	27	36	1	0	412	919
Southern Cone													
Argentina	31 Dec.	20 551	42 093	0	0	41	56	7	18	4	2	2 166	2 325
Chile	31 Dec.	412	2 080	0	0	15	11	3	0	7	21	234	58
Paraguay	31 Dec.	864	471	0	0	38	88	17	38	5	1	372	112
Uruguay	31 Dec.	187	2 040	0	0	4	5	0	0	0	0	43	47
Brazil	31 Dec.	7 747	41 914	0	0	1 365	1 692	250	261	295	477	3 640	7 320
Central America													
Belize	31 Dec.	11	7	0	0	...	1	0	1	0	0	0	4
Costa Rica	31 Dec.	...	6 340	0	0	...	1	...	0	...	0	...	19
El Salvador	31 Dec.	509	751	0	0	30	57	25	14	0	0	33	92
Guatemala	31 Dec.	93	209	0	0	...	0	8	7	0	1	147	149
Honduras	31 Dec.	58	95	0	0	13	22	9	18	0	0	425	89
Nicaragua	31 Dec.	2 498	2 867	0	0	21	23	9	11	0	0	346	96
Panama	31 Dec.	845	2 430	0	0	3	8	3	6	0	0	26	107
Mexico	31 Dec.	792	5 392	0	0	192	370	129	145	0	1	136	194
Latin Caribbean													
Cuba	31 Dec.	14	19	0	0	4	1	0	0	0	0	1	0
Dominican Republic	31 Dec.	...	7 512	0	0	...	54	...	4	...	11	...	10
Haiti	31 Dec.	...	...	0	0	...	...	...	...	...	...	...	...
CARIBBEAN													
Antigua & Barbuda	31 Dec.	0	0	0	0	0	0	...	0	...	0	...	0
Bahamas	31 Dec.	0	0	0	0	0	1	0	0	0	0	5	0
Barbados	31 Dec.	0	2	0	0	1	4	0	0	0	0	0	0
British Virgin Islands	31 Dec.	0	4	0	0	...	0	...	0	...	0	...	0
Cayman Islands	31 Dec.	0	0	0	0	...	0	...	0	...	0	...	0
Dominica	31 Dec.	0	6	0	0	...	1	...	0	...	0	...	0
Grenada	31 Dec.	0	2	0	0	...	1	...	0	...	0	...	0
Guyana	31 Dec.	0	12	0	0	...	0	...	0	...	0	...	0
Jamaica	31 Dec.	0	308	0	0	...	15	...	0	...	1	...	20
Montserrat	31 Dec.	0	0	0	0	...	0	...	0	...	0	...	0
St. Kitts/Nevis	31 Dec.	0	0	0	0	...	0	...	0	...	0	...	0
Saint Lucia	31 Dec.	0	2	0	0	...	1	...	0	...	0	...	0
St. Vincent	31 Dec.	0	0	0	0	...	0	...	0	...	0	...	0
Suriname	31 Dec.	0	10	0	0	...	0	...	0	...	0	...	0
Trinidad & Tobago	31 Dec.	0	118	0	0	8	10	0	0	0	1	4	4
Turks & Caicos Islands	31 Dec.	0	8	0	0	...	0	...	0	...	0	...	0
NORTH AMERICA													
Bermuda	31 Dec.	...	2	0	0	...	0	...	0	...	0	...	0
Canada	31 Dec.	3 004	6 364	0	0	3	4	...	0	...	2	3 328	2 784
United States	31 Dec.	...	9 461	0	0	...	48	...	0	...	2	...	2 522

... Data not available.

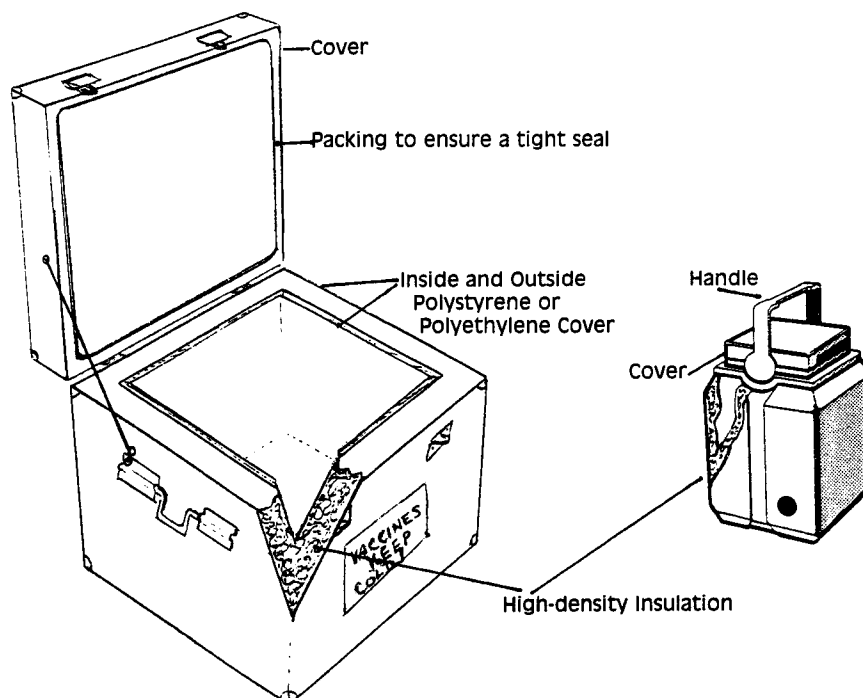
# The "Cold Life" of Cold Boxes and Thermoses

Are you familiar with your cold box's properties and "cold life?"

\* The "cold life" or "cooling life" is the amount of time that a cold box is able to maintain the 0-8° C temperature required to store vaccines properly.

\* The length of a cold box's cold life may range from one hour to more than 100 hours. Variations are due mainly to design, quality of the materials used to make the box, and the amount of ice that is placed in it with the vaccine.

An efficient cold box or thermos will have the following properties:



- \* Identify and classify the type of cold boxes and thermoses available in your work area.
- \* Test and establish the length of the "cold life" of each box so that you will know which is the most appropriate to use at a given time.
- \* Any cold box or thermos can be adapted to transport vaccines.
- \* Make sure you use all the cold packs that come with each cold box.

Drawing: Victor Gómez

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