EPI Newsletter

Expanded Program on Immunization in the Americas

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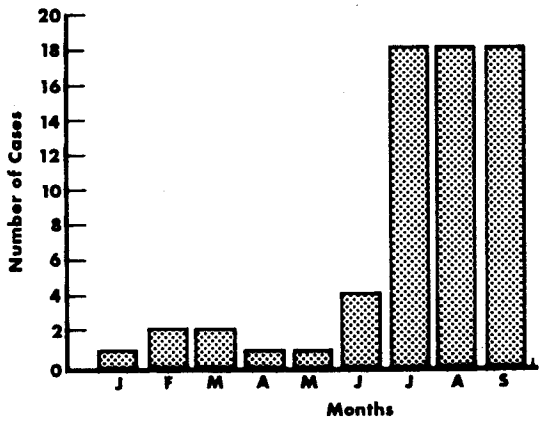
Polio Surveillance

Guatemala

For the period January-September 1982 a total of 65 poliomyelitis cases were referred to the Children's Rehabilitation Institute and Polio Clinic in Guatemala. Figure 1 shows the distribution of these cases by month of hospitalization.

FIGURE 1. Poliomyelitis cases referred to the Children's Rehabilitation Institute and Polio Clinic, by month of hospitalization. Guatemala, 1982.



The 18 cases which occurred during September came from four departments (Guatemala, Escuintla, Baja Verapaz and El Petén). The highest incidence rate (1.12 per 100,000 population) was registered in El Petén, probably because the population used for the calculation was underestimated.

In September two new departments reported poliomyelitis cases (Baja Verapaz and El Petén); four of the departments which had reported cases in July and August did not have any cases in September (Sacatepéquez, Chimaltenango, El Progreso and Quetzaltenango).

Of the departments which had cases in July and August, three new municipalities reported cases (San Pedro Sacatepéquez, San José Pinula and Mixco). The municipalities which contributed the largest proportion of cases were Guatemala, San Pedro Sacatepéquez and San José Pinula which represented 60.8 percent of the total.

Children less than 2 years of age accounted for 72.2 percent of the 18 cases, and 61.1 percent of the cases occurred among females.

It is important to note that 14 of the 18 cases (77.8 percent) did not receive any doses of poliomyelitis vaccine, while one (5.6 percent) had received 1 dose and three (16.6 percent) had received 3 doses.

The intensification of vaccination activities initiated by the Ministry of Health on 18 October is expected to result in a diminishing number of cases in forthcoming months.

Source: Epidemiology Division, Office of Health Services, Ministry of Public Health and Social Welfare, Guatemala.

Brazil

The 1980 adoption of the "Poliomyelitis Control Operation," a strategy whereby national vaccination days are held in addition to the routine vaccinations given at health units, marked the beginning of a sharp drop in Brazil's poliomyelitis incidence (Figure 1).

At the same time, epidemiologic surveillance has been intensified with regard to case reporting, research and laboratory diagnosis.

The 1981 data show 125 confirmed cases of poliomyelitis in Brazil out of a total of 362 suspected cases. The fact that 34.5 percent of suspected cases were subsequently confirmed suggests that, in general, the system is geared to case detection. Regional differences do occur, however, as shown by the figures for the Northeast, where 53.1 percent of suspected cases were confirmed (78/147), and the Southern region, where only 13.2 percent (5/38) of cases were confirmed (Table 1). These differences can

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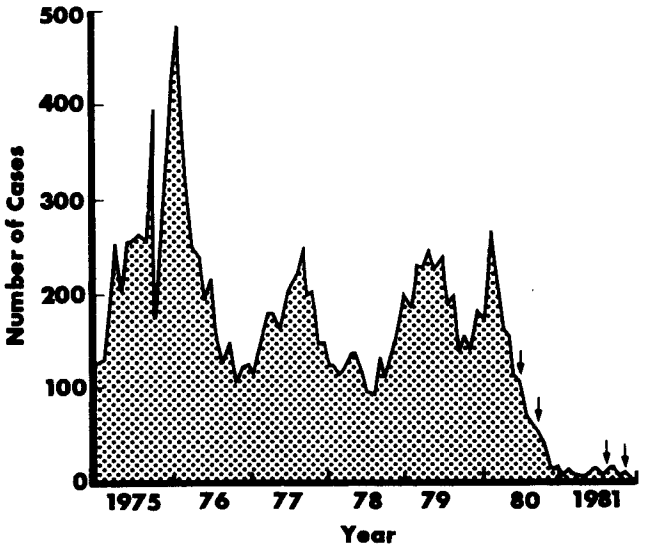
partly be explained by the lack of uniform criteria for a suspected case of poliomyelitis, which should be defined as any acute paralysis.

FIGURE 1. Poliomyelitis cases, by 4-week periods, Brazil, 1975–1981.



Note: The arrows indicate national vaccination days.

TABLE 1. Poliomyelitis cases reported by the state secretariats of health, Brazil, 1981.

Major regions of federal divisions	Reported	Confirmed	Dismissed
BRAZIL	362	125	237
NORTH	67	16	51
Rondônia	—	—	—
Acre	—	—	—
Amazonas	11	6	5
Roraima	1	—	1
Pará	52	10	42
Amapá	3	—	3
NORTHEAST	147	78	69
Maranhão	4	1	3
Piauí	1	—	1
Ceará	37	24	13
Rio Grande do Norte	15	10	5
Paraíba	13	10	3
Pernambuco	32	13	19
Alagoas	9	6	3
Fernando de Noronha	—	—	—
Sergipe	2	2	—
Bahia	34	12	22
SOUTHEAST	84	15	69
Minas Gerais	30	3	27
Espírito Santo	9	2	7
Rio de Janeiro	17	3	14
São Paulo	28	7	21
SOUTH	38	5	33
Paraná	15	3	12
Santa Catarina	11	—	11
Rio Grande do Sul	12	2	10
WEST-CENTRAL	26	11	15
Mato Grosso	1	1	—
Mato Grosso do Sul	8	3	5
Goiás	11	4	7
Distrito Federal	6	3	3

Another factor influencing the differences in proportions of notified (suspected) and confirmed cases is the failure to study sequelae and perform laboratory tests in some cases. Thus, of 125 so-called "confirmed" cases, about one third were accepted as poliomyelitis without definitive confirmation.

The age distribution of the 125 poliomyelitis cases in 1981 (Table 2) reveals a concentration of cases in children 0–4 years (91.2 percent), which is similar to the concentration seen in previous years (91.5 percent between 1975 and 1980). This indicates that the disease incidence has also been reduced in older age groups, which justifies the designation of 0–4 year olds as the target population for national vaccination days.

TABLE 2. Poliomyelitis cases, by age group, Brazil, 1981.

Age group	Number of cases	Partial (%)	Cumulative (%)
Less than 6 months	17	13.6	13.6
6 months—1 year	27	21.6	35.2
1 year	35	28.0	63.2
2 years	25	20.0	83.2
3 years	6	4.8	88.0
4 years	4	3.2	91.2
5–9 years	10	8.0	99.2
10–14 years	1	0.8	100.0
15 years and up	—	—	—
Total	125	100.0	100.0

However, a larger concentration of cases occurred in children under 6 months of age (13.6 percent in 1981 as compared to an average of 7.3 percent from 1975 to 1980); this may be due to the smaller probability of such young children being vaccinated on the national vaccination days.

With regard to case origin, most of the affected individuals came from urban areas, even when the figures are expressed in terms of incidences (Table 3).

TABLE 3. Poliomyelitis cases by urban and rural residence, Brazil, 1981.

Origin	Number of cases	%	Incidence rate per 100,000 pop.
Urban	96	76.8	0.117
Rural	29	23.2	0.074
Total	125	100.0	0.103

Case distribution with respect to vaccination history is given in Table 4; the figures show that 23.9 percent of the cases occurred in unvaccinated children and 59.0 percent in children incompletely vaccinated, for a total of 82.9 percent. The proportion of cases occurring in children who had received three or more vaccine doses was 17.1 percent. There is clearly a predominance of cases in non-vaccinated or incompletely vaccinated children (0–2 doses), though it is lower than the average proportion of previous years, when 76.2 percent of cases occurred in

unvaccinated children (no doses whatsover) and only 4.8 percent in vaccinated children (three or more doses).

TABLE 4. Poliomyelitis cases, by vaccination history, Brazil, 1981.

Number of doses	Number of cases	Partial (%)	Cumulative (%)
None	28	23.9	23.9
One	36	30.8	54.7
Two	33	28.2	82.9
Three	15	12.8	95.7
Four or more	5	4.3	100.0
Unknown	8	—	—
Total	125	100.0	100.0

Note: Percentages calculated from 117 cases with known vaccination history.

When vaccination levels are as high as those attained in Brazil, it is to be expected that, while the absolute number of cases will go down, a higher proportion of them will occur in vaccinated individuals. There are two reasons for this: first, even though the vaccine is highly efficacious, it does not offer 100 percent protection; second, and as a consequence of the first fact, children who have not been vaccinated become fewer and fewer, while those who have been vaccinated but have not developed immunity become relatively more numerous.

As shown in Table 5, the poliovirus predominately associated with the outbreaks in 1981 was type III (55.0 percent).

TABLE 5. Poliomyelitis cases by type of poliovirus isolated, Brazil, 1981.

Type	Number of cases	%
I	19	31.7
II	8	13.3
III	33	55.0
Unknown	65	—
Total	125	100.0

Note: Percentages calculated from 60 cases with known poliovirus types.

With regard to the clinical course of the disease (Table 6), a shift in pattern can be seen in the decline in the proportions of cases of unknown course (from 24.3 to 11.2 percent) and of cases classified as without sequelae (from 5.1 to 1.6 percent). These figures indicate a marked improvement in disease surveillance.

Notwithstanding the above, about half of the 125 cases were accepted based on clinical-epidemiologic criteria, without laboratory confirmation. In most cases this was due to operational problems: delays in collecting material, lack of a second serum sample, or contamination or loss of material.

The data presented herein suggest a need to improve epidemiologic investigation procedures in each state.

TABLE 6. Poliomyelitis cases, by clinical course of the disease, Brazil, 1981.

Course	Number of Cases	% total cases	% known cases (partial)*	% known cases (cumulative)
Minimal sequelae	42	33.6	37.8	37.8
Medium sequelae	37	29.6	33.3	71.1
Severe sequelae	13	10.4	11.7	82.8
Death	17	13.6	15.3	98.1
No sequelae	2	1.6	1.9	100.0
Unknown	14	11.2	—	—
Total	125	100.0	100.0	100.0

*Partial percentages calculated from all cases of known clinical course.

Source: National Secretariat for Basic Health Actions (SNABS), Ministry of Health, Brazil.

The Cold Chain: A Case Study

The experience gained in EPI program evaluations and training courses has shown that even a well organized field program which reaches a high percentage of the target population will be ineffective, and may even undermine public confidence in the whole health care system, if the vaccine is not potent due to improper refrigeration or handling somewhere along the cold chain.

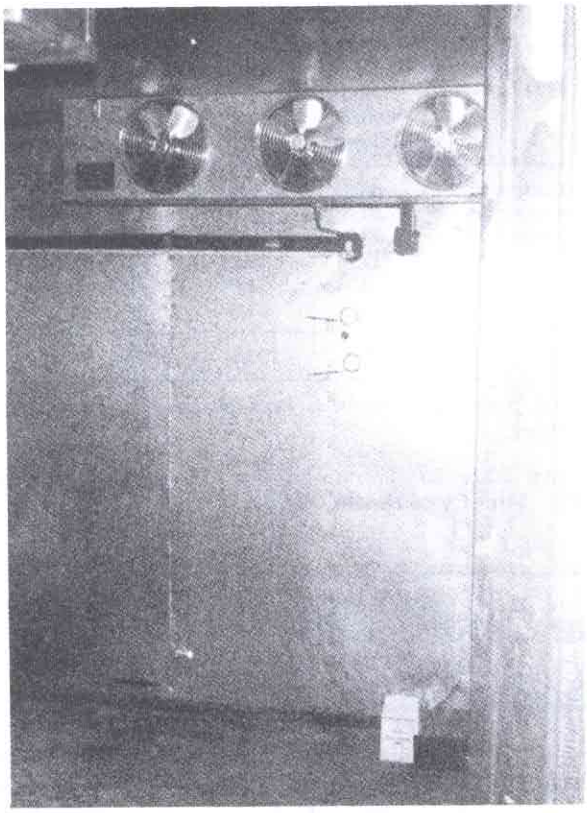
In order to improve documentation of cold chain operations at each level of the health system, recent multidisciplinary EPI evaluations have included photodocumentation of the problems found during vaccine storage and handling. This visual record of the cold chain serves to:

- identify the models of cold rooms, refrigerators, cold boxes and insulated containers most frequently used in a country, possibly for use as illustrations in national cold-chain operations manuals;
- ascertain how vaccines are handled and stored, and whether refrigerators are being used solely for the storage of biologicals, and
- determine if refrigerators are placed in accordance with EPI recommendations, that is, in the coolest, shadiest part of the building, away from heat sources, in a properly ventillated area, at least 15 cm from the wall, and well levelled.

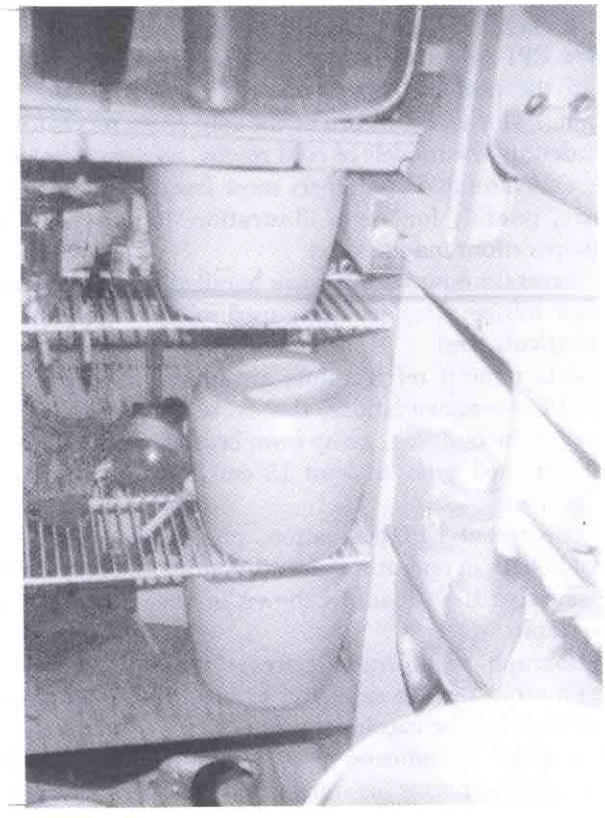
In one recent EPI evaluation, photodocumentaton of the cold chain in operating units (hospitals and health centers) revealed the situations shown in the accompanying photographs.

Photograph 1 illustrates extreme under-utilization of the cold-room storage capacity, as well as the absence of proper shelving for vaccine storage.

Photograph 2 indicates that health staff lack understanding of the norms for storing vaccines in refrigerators. Furthermore, there is no thermometer to monitor temperatures inside the refrigerator.



Photograph 1. Cold room in a hospital catchment area with a total referral population of about 28,000 persons.



Photograph 2. Inside of a refrigerator at a health center.

Photograph 3 shows vaccine that is poorly packed in an unsuitable, outworn cold box. Notice the wear on the edges and deterioration of the cardboard. Even more important is the fact that the health unit receiving this vaccine had no refrigerator in which to store it.

Photograph 3. Cold box for vaccine transportation.

Photograph 4 shows what can happen when a refrigerator's freezing unit is not properly maintained. Failure to defrost the freezer periodically has resulted in the buildup of a thick cap of ice which surrounds the freezing compartment and impedes both efficient operation of the refrigeration unit and the circulation of cold air inside the refrigerator. Furthermore, there are no ice-packs in the freezer.

Photograph 4. Refrigerator at a health center.

Editorial note: These photographs suggest that the cold chain may be one of the weakest components in this country's immunization program. It is evident that the cold chain illustrated herein suffers from poor planning, lack of knowledge and/or understanding of cold-chain norms, use of improper equipment, and lack of routine maintenance of equipment.

Photodocumentation can be a valuable tool to aid the identification of cold-chain problems and their subsequent rectification. Possible solutions for the country described in this case study might be to schedule more EPI workshops emphasizing proper cold-chain operations, and to implement a more effective system of cold-chain supervision.

Measles Surveillance

United States: Imported Cases, First 26 Weeks, 1982

In the first 26 weeks of 1982, 64 imported measles cases were reported in travellers (U.S. citizens and foreign nationals) who arrived in the United States from 22 different countries worldwide. A measles case is considered to be imported if a person has onset of rash within 18 days of arrival in the United States from a foreign country.

These cases represent 7.2 percent of the provisional total of 895 cases of measles reported to the Centers for Disease Control (CDC) during the 26-week period, an increase from 0.7 percent (95/13,506) for the entire year 1980 and 3.6 percent (110/3,032) for all of 1981. An average of 2.5 measles importations was reported each week (range 0–5) compared with 1.8 in 1980 and 2.4 in 1981.

Returning U.S. citizens have accounted for a rising proportion of imported measles cases—65.6 percent (42/64) in the first 26 weeks of 1982, compared with 57.9 percent (66/114) in 1981 and 34.7 percent (33/95) in 1980. United States citizens accounted for 85.7 percent (12/14) of the importations which were reported in travellers from Western Hemisphere nations.

Of the 64 persons with imported measles, 32 (50 percent) were travellers who arrived in the United States from three countries: Great Britain (13), Mexico (10), and India (9) (See Table 1). Only 14 (21.9 percent) arrived from countries in the Western Hemisphere. This was a decrease from the 35.8 percent (34/95) reported in 1980 and the 50.0 percent (57/114) reported in 1981.[1]

Of the 64 imported measles cases, transmission to other persons in the United States (import-associated cases) was documented for 12 (18.8 percent), of which only one case was from the Americas. Importations and import-associated cases accounted for 25.5 percent (228/895) of measles cases provisionally reported in the United States during the first half of 1982.

Histories of prior measles vaccination or prior measles illness were available for 69.0 percent (29/42) of the U.S. citizens and 40.9 percent (9/22) of the foreign nationals with imported measles. Their histories were reviewed to determine the number of imported measles cases which potentially might have been prevented through adherence to current vaccine recommendations in the United States. A case was considered preventable* if the traveller was at least 16 months of age and born after 1956, and lacked documentation of administration of live measles vaccine on or after the first birthday or a history of physician-diagnosed measles illness.

TABLE 1. **Imported measles: Countries of origin First 26 weeks of 1982**

Continent and country of origin	U.S. Citizens	Foreign nationals	Total	Percent
EUROPE	**17**	**10**	**27**	**42.2**
Great Britain	6	7	13	20.3
Spain	5	—	5	7.8
France	3	—	3	4.7
Switzerland	2	—	2	3.1
Finland	—	1	1	1.6
German Fed. Rep.	—	1	1	1.6
Sweden	—	1	1	1.6
USSR	1	—	1	1.6
ASIA	**12**	**9**	**21**	**32.8**
India	5	4	9	14.1
Philippines	3	2	5	7.8
Rep. of Korea	2	1	3	4.7
Israel	1	1	2	3.1
Afghanistan	—	1	1	1.6
Hong Kong	1	—	1	1.6
THE AMERICAS	**12**	**2**	**14**	**21.9**
Mexico	9	1	10	15.3
Canada	1	—	1	1.6
Colombia	1	—	1	1.6
El Salvador	1	—	1	1.6
Jamaica	—	1	1	1.6
AFRICA	**—**	**1**	**1**	**1.6**
Egypt	—	1	—	1.6
OCEANIA	**1**	**—**	**1**	**1.6**
Australia	1	—	1	1.6
TOTAL	**42**	**22**	**64**	**100**

Only 4 (9.5 percent) cases occurring in U.S. citizens were potentially preventable; of these only 2 (4.8 percent) persons would have been accessible to school-based immunization requirements—the major element of measles control in the United States. However, one of those two cases was the index case for an outbreak of 89 measles cases in New York State. Of the 22 cases occurring in foreign nationals, 5 (22.7 percent) were potentially preventable; of these 3 (13.6 percent) were old enough to

*Subsequent to this study, CDC has modified the definition of a *preventable* case as follows: A preventable case is defined as measles illness occurring in a person at least 16 months of age and born after 1956, who lacks adequate evidence of immunity (live vaccine administration on or after the first birthday, or a history of physician-diagnosed measles illness), and who does not have a medical contraindication to receiving vaccine and who has no religious or philosophical exemption under state law.

attend school in the United States, and might have been accessible to state immunization laws if they planned to enroll in school while in the United States.

Discussion

Measles incidence rates continue to decline in the United States. In 1981, a record low of 3,124 cases (1.4 cases per 100,000 population of all ages) was reported. The 895 cases provisionally reported during the first 26 weeks of 1982 represent an additional 60 percent decrease from the same period in 1981.[2] More current data (through week 37 of 1982) show that this trend has continued, with only 1,230 measles cases provisionally reported. The projected annual incidence rate for 1982 is approximately 0.7 cases per 100,000 total population, a new record. Improvements in the investigation of measles cases have made it possible to link epidemiologically over 25 percent of reported cases to sources outside the U.S.

Classification of travellers by age, citizenship, and immunity status[3] has shown that prevention of their cases was not always possible by adherence to current measles vaccination recommendations.[4] Although most imported cases occurred in U.S. citizens who had travelled abroad, less than 10 percent of the cases in U.S. citizens were potentially preventable. To minimize importations among U.S. citizens, travellers should be immune to measles before they leave the U.S.

Although there are currently no vaccination requirements for entry into the United States, efforts are underway to alert foreign travellers (and agencies sponsoring foreign exchange students) to the advisability of measles vaccination for those who lack documentation of measles immunity. Children who enter the United States and plan to enroll in school must be vaccinated against measles unless contraindicated, and must retain documentation to that effect, because all states require that a child be immune to measles before entering school. It is recommended that children who do not plan to enroll in school (e.g., tourists, preschoolers) also be immune to measles before entering the United States.

Source: Turner PM Jr, Amler RW, Orenstein WA. Immunization Division, Center for Prevention Services, Centers for Disease Control, U.S. Public Health Service, Department of Health and Human Services, Atlanta, Georgia 30333 (USA).

References

[1]Amler RW, Block AB, Orenstein WA, Bart KJ, Turner PM, Hinman AR. Measles Importations from the Americas, *EPI Newsletter* III(6):5-6, 1981.

[2]Centers for Disease Control. Measles—United States, first 26 weeks, 1982. *Morbidity Mortality Weekly Report* 31:381-2, 1982.

[3]Amler RW, Bloch AB, Orenstein WA, Bart KJ, Turner PM, Hinman AR. Imported Measles in the United States. *JAMA* 1982 (in press).

[4]Immunization Practices Advisory Committee. Measles prevention. *Morbidity Mortality Weekly Report* 31:217-24, 229-31, 1982.

Argentina Holds EPI Workshop

The School of Public Health of Córdoba, Argentina, held an EPI workshop for 30 health professionals from 30 August to 3 September 1982. The course was organized by the school in conjunction with the provincial Department of Epidemiology.

Following the workshop the students took part in a field exercise to evaluate vaccination coverage in the Department of Colón using the cluster sampling technique. The results of the survey are given in Table 1.

TABLE 1. Results of survey to determine vaccination coverage using cluster sampling technique. Department of Colón, Argentina, September 1982.

Vaccine	Age group	
	1 year	2–4 years
Measles	61.4	77.6
BCG	70.5	58.1
Poliomyelitis (3 doses)	62.8	73.3
DPT (3 doses)	62.3	68.6

After analyzing the data, the group drew up recommendations for provincial health authorities and EPI personnel in each of the survey sites.

Source: Department of Epidemiology and School of Public Health, Province of Córdoba, Argentina.

Control of BCG Vaccine Produced in Latin America

BCG vaccine, in the liquid and/or freeze-dried form, is manufactured by 14 laboratories in ten different countries of the Americas. Except for Cuba, no nations in either the Caribbean or Central America produce BCG. Non-producing countries, and those which do not produce enough BCG to meet their total requirements, import the vaccine, usually through the EPI Revolving Fund.

Three different seeds are used in production: most laboratories use either the Paris 1173 or Copenhagen 1331, while Brazil and Cuba use the Moreau strain.

The Pan American Zoonoses Center (CEPANZO) provides independent quality-control services, though a few laboratories also use the services of the Seruminstitut BCG lab in Copenhagen, Denmark. As a WHO collaborating lab, CEPANZO has been involved in two important international activities: it has participated in a WHO collaborative study to test four different lots of BCG vaccine proposed as candidates for replacement of the WHO international reference preparations; and, also under a WHO arrangement, has exchanged technical cooperation with the BCG lab in Madras, India.

Between January 1981 and August 1982 CEPANZO received 68 different lots of BCG vaccine. Eighteen lots of freeze-dried vaccine were sampled from the field in order to monitor their stability while the remaining 50 lots were

Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria and whooping cough, from 1 January 1982 to date of last report, and for same epidemiological period in 1981, by country.

Country	Date of last report	Measles		Poliomyelitis		Tetanus				Diphtheria		Whooping Cough	
						Non-neonatorum		Neonatorum					
		1982	1981	1982	1981	1982	1981	1982	1981	1982	1981	1982	1981
NORTHERN AMERICA													
Canada	30 Oct.	882	2,045	—	—	7[a]	1[a]	...	...	9	5	1,695	2,108
United States	27 Nov.	1,580	2,856	5	7	74	56	...	...	3	4	1,553	1,116
CARIBBEAN													
Antigua and Barbuda	14 Aug.	—	247	—	—	—	—	—	—	—	—	—	—
Bahamas	4 Dec.	48	42	—	—	2	—	—	2	—	—	7	8
Barbados	25 Sep.	4	1	—	—	3	7	—	—	2	9	11	8
Belize	30 Nov.	5	186	...	...	4	3	3	2	4	...	...	59
Cuba	2 Oct.	22,365	7,793	—	—	17	15	—	—	—	—	828	210
Dominica	30 Oct.	2	26	—	—	—	—	—	—	—	—	5	6
Dominican Republic	30 Sep.	2,408	1,816	165	53	62	70	5	6	86	102	166	148
Grenada	20 Nov.	1,273	9	—	—	3	3	—	—	—	—	—	—
Haiti	30 Jun.	245	493	3	—	76	13	10	4	8	1	431	57
Jamaica	26 Jun.	1,246[b]	3,418[b]	58	—	3[c]	3	—[c]	3	6	4	80[c]	10
Saint Lucia	10 Jul.	90	87	—	—	1	2	...	...	—	—	5	375
St. Vincent and the Grenadines	2 Oct.	747	2	—	—	—	—	—	—	—	—	—	1
Trinidad and Tobago	9 Oct.	1,059	3,472	—	—	10	12	—	—	2	3	1	9
CONTINENTAL MIDDLE AMERICA													
Costa Rica	23 Oct.	140	148	—	—	12	7	1	—	—	—	42	157
El Salvador	16 Oct.	3,420	9,913	16	46	38	29	75	65	2	1	1,606	3,021
Guatemala	23 Oct.	3,716	2,845	65[d]	39	64	64	...	...	13	16	1,284	980
Honduras	30 Oct.	2,295	4,973	8	10	22	19	21	1	—	—	1,296	1,478
Mexico		...	...	...	...	...	...	...	...	...	...	...	...
Nicaragua		...	...	...	...	...	...	...	...	...	...	...	...
Panama	28 Aug.	3,484	1,787	—	—	4	12	12	13	—	—	50	91
TROPICAL SOUTH AMERICA													
Bolivia	30 Jan.	117	353	—	3	13	12	...	...	2	2	171	286
Brazil	14 Aug.	18,343	37,711	14	82	1,158	1,795	...	...	2,320	2,706	31,282	25,429
Colombia	18 May	4,393	6,507	27	82	273	192	...	...	40	54	2,483	1,832
Ecuador	3 Apr.	391	1,606	3	7	9	21	10	7	3	4	468	133
Guyana	26 Jun.	31	19	—	—	2[e]	5[e]	...	...	—	—	...	35
Paraguay	23 Oct.	518	493	62	20	52	69	94	74	13	6	407	478
Peru	23 Oct.	1,641	4,466	111	120	51	196	...	...	5	53	1,292	4,670
Suriname	12 Sep.	32	703	—	—	...	...	...	...	2	2	12	...
Venezuela	6 Nov.	11,014	25,506	9	18	...	...	...	...	3	6	2,640	3,330
TEMPERATE SOUTH AMERICA													
Argentina	17 Jul.	1,714	7,112	3[f]	...	...	...	36	...	...	18	46	3,308	10,877
Chile	20 Nov.	7,678	4,772	—	...	32	19	...	...	128	177	371	1,948
Uruguay	29 May	58	660	—	—	10	4	1	1	—	—	315	148

7 Aug.
.9 May
[c] 1 May

[d] 30 Sep.
[e] 31 Mar.
[f] 18 Nov.

— No cases
... Data not available

referred to CEPANZO to check if they complied with WHO requirements. The results are reported in Table 1.

TABLE 1. Summary of BCG vaccine test results, CEPANZO, January 1981 - August 1982.

Laboratory of origin (country)	Country referring vaccine	No. of lots tested	No. with normal viability[a]	No. with normal stability[a]
Roux Ocefa (Argentina)	Argentina	5	5	4
Japan (Japan)	Argentina	4[b]	4	—
Glaxo (United Kingdom)	Argentina	1[b]	1	0
Lab. CSP La Plata (Argentina)	Argentina	15	9	1[c]
Glaxo (United Kingdom)	Argentina	5	[d]	[d]
Inst. Nac. Salud (Colombia)	Colombia	4	2	0
Connaught (Canada)	Paraguay	1	1	1
Inst. Nac. Higiene (Ecuador)	Ecuador	5	5	5[e]
Glaxo (United (Kingdom)	Peru	10[b]	0	—
Japan (Japan)	Peru	1[b]	0	—
Butantan (Brazil)	Brazil	2	2	[d]
Inst. Nac. Salud (Chile)	Chile	4	4	4[e]
Inst. Albert Calmette (Uruguay)	Uruguay	6	6	6[e]
Japan (Japan)	Costa Rica	2[b]	2	—
L. Finlay (Cuba)	Cuba	3	[d]	[d]
Madras (India)	India (WHO collab. study)	4	4	4

—Not tested for stability
[a] In accordance with WHO Technical Report Series No. 638, 1979
[b] Vaccine samples taken from field (hospitals, vaccination centers, etc.)
[c] Out of 8 lots tested
[d] Study underway
[e] Liquid vaccines

Editorial note: The results reported by CEPANZO show that the liquid vaccines referred for testing were of satisfactory quality. This confirms previous information on the consistency of the BCG vaccines produced by Chile, Ecuador and Uruguay.

The results of tests on the freeze-dried vaccines have been less favorable: only four countries in the Region have referred their product for testing and, of the 26 lots tested, only 18 (69 percent) had satisfactory viability. Only five (29 percent) of the 17 lots for which results are available met WHO stability requirements at 37°C.

Argentina, Colombia and Brazil are in the process of correcting the problems identified with their national BCG vaccine.

As can be seen from the table, many countries have not been taking full advantage of the BCG testing program, which CEPANZO offers free of charge. There is ample scope for the program to be used by more countries, particularly those which produce BCG vaccine commercially and may wish to submit bids for the supply of vaccine through the EPI Revolving Fund.

This collaborative program to improve the quality of BCG vaccine produced in the Americas can be of great value in helping the Region to become self reliant in both production and control. Program Officers in charge of BCG vaccination programs are encouraged to take advantage of CEPANZO's testing program in order to verify and maintain the quality of nationally produced vaccine.

Selected Readings

The following articles have been selected for their possible interest to *EPI Newsletter* readers. Copies may be obtained free of charge by writing to the editor. Please quote the reference code in parentheses when making your request.

(IV-6-1) Eradication of Poliomyelitis in the United States. I. Live Virus Vaccine-Associated and Wild Poliovirus Disease. D. Salk. *Rev Infect Dis* 2(2)228-242, March-April 1980.

(IV-6-2) Eradication of Poliomyelitis in the United States. II. Experience with Killed Poliovirus Vaccine. D Salk. *Rev Infect Dis* 2(2):243-257, March-April 1980.

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References to commercial products and the publication of signed articles in this newsletter do not constitute endorsement by PAHO/WHO, nor do they necessarily represent the policy of the Organization.

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