EPI Newsletter

Expanded Program on Immunization in the Americas

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Latin American Countries Set 1985 EPI Targets at Lima Meeting

The Second Regional EPI Managers' Meeting for Latin American countries brought 68 participants from 20 countries to Lima, Peru, during the week of 5-9 March 1984. The meeting was a follow-up to the First Regional Meeting held in Quito, Ecuador in May 1981 at which each country defined its major immunization problems and solutions, and developed a work plan for 1981-83.[1]

The main objectives of the Lima meeting were to formulate each country's 1985 targets for vaccination coverage and, insofar as possible, disease reduction; to analyze the strategies and activities programmed to achieve those targets in the 1984-85 work plans; and to update participants on certain technical subjects related to immunizations.

The meeting was organized in response to Resolution XVI of PAHO's 29th Directing Council which recognizes that accelerated progress will be necessary to achieve the 1990 EPI goals, and urges countries to set biennial targets for immunization coverage and for the reduction of the morbidity and mortality of the EPI diseases.[2]

Methodology

The participants were divided into six discussion groups, each including representatives from three or four countries, and met twice a day to review each others' work plans and discuss appropriate targets for the next two years. A representative from each country gave a general presentation including background information on the national EPI, its current status, and proposed targets and activities for the next two years as outlined in the 1984-85 work plans. Each country's plan was then discussed in detail, with other group members acting as technical advisers to suggest changes or additions based on their knowledge and experience in managing immunization programs. By the end of the week, each country had rewritten its work plan in accordance with many of the recommendations made by the group.

A number of expert advisers were invited to the meeting to give technical presentations and answer questions on subjects previously identified by the countries. The topics covered included development of the EPI in the Americas, vaccine production and quality control, development of strategies and objectives in immunization programs, use of serologic tests, prevention and control of communicable diseases in emergency and disaster situations, and programming PAHO technical cooperation. In addition, three round tables were held to discuss cold chain activities in the region, the role of bilateral and multilateral agencies in technical cooperation, and the conclusions of the 1983 EPI Global Advisory Group Meeting.

On the final day of the meeting, a rapporteur from each group presented a consolidated report summarizing each country's immunization program needs, strategies, and 1985 targets.

National immunization managers discuss their 1984-1985 work plans at Lima meeting.

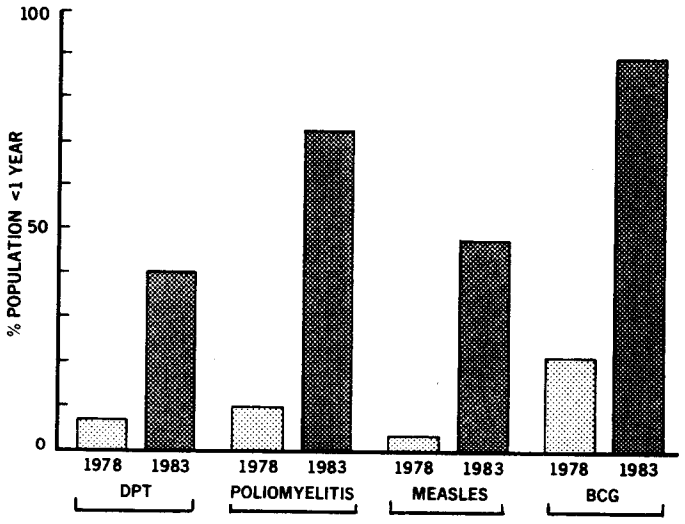
Contents

[1] See *EPI Newsletter* III-3 (June 1981), page 4.
[2] See *EPI Newsletter* V-5 (October 1983), page 4.

Progress to Date and 1984-85 Activities

Immunization coverage in Latin America has improved considerably over the last several years. In 1978, for example, a very small proportion of the children under 1 year of age (less than 5 percent) lived in countries where complete immunization coverage with DPT, polio, measles and BCG was at least 50 percent for this age group. By 1983, this proportion had risen considerably (to about 40 percent). Graph 1 compares the proportions of children under 1 living in countries with at least 50 percent coverage in this age group for each of the vaccines in 1978 and 1983. An even more important indicator of EPI impact is shown in Graph 2 which plots the incidence rates of polio, tetanus, diphtheria, whooping cough, and measles from 1970 to 1983 in the countries which make up the Region of the Americas. The downward trend in disease occurrence is most notable in the last four years.

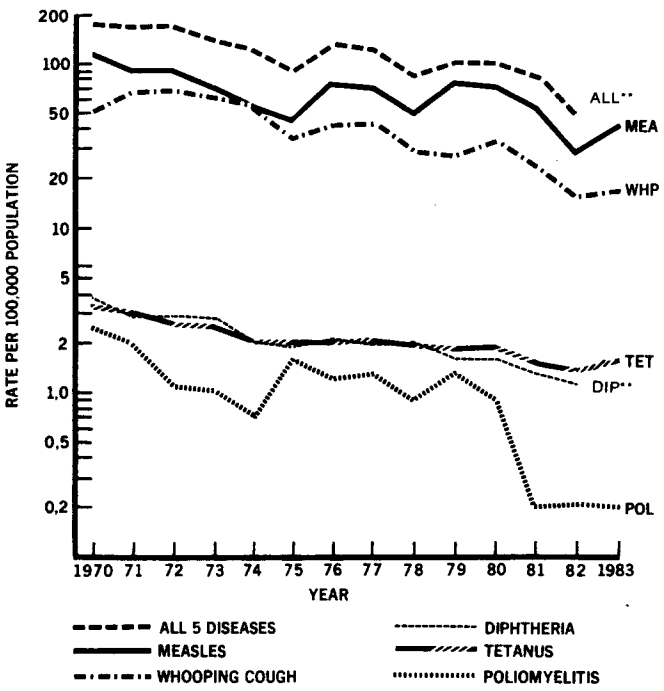
GRAPH 1. Proportion of children under 1 year of age in countries where immunization coverage in this age group is at least 50 percent. 20 Latin American countries, 1978 and 1983.



The overall improvement in coverage rates and decline in disease incidences are the result of the progress made in each country's immunization program, particularly since the 1981 meeting in Quito. Though programs are at many different stages of development, it can generally be said that important advances have been made in the areas of vaccine supply, extension of the cold chain, selection of effective vaccination strategies tailored to particular needs, training, evaluation, and community participation. Most countries still report significant difficulties in the areas of supervision, information systems, and epidemiologic surveillance, and the work plans for 1984-85 reflect these concerns.

Almost all countries report they are receiving sufficient quantities of vaccines to cover their target populations, a

GRAPH 2. Incidence of five vaccine-preventable diseases. Region of the Americas,* 1970-1983 (provisional data).



*Excluding Bermuda, Canada and the United States.
**Data for 1983 incomplete

large majority of them through the EPI Revolving Fund. Most countries have also made notable strides in improving and expanding the cold chain. Acquisition of new freezers, refrigerators, cold boxes, and thermometers is an ongoing activity in most programs, and some countries are training technicians in the repair and maintenance of cold chain equipment. Several countries have had problems obtaining enough tools and spare parts to keep their equipment running, and made specific reference to this problem in their work plans. A few countries are testing solar refrigeration equipment and have programmed activities relating to this new technology.

Another important advance in most country programs has been the identification of an appropriate combination of vaccination strategies to meet their particular needs. Besides vaccination in fixed health centers, these strategies include house-to-house vaccination in urban areas, mini-campaigns in rural areas, mass campaigns for certain vaccines, and mobile brigades to reach remote areas. Many countries already have legislation making vaccination obligatory, and two countries have indicated they are working to have such legislation passed in the near future.

Training has been one of the EPI's most notable successes. Most countries are well into the third phase of training activities, that is, multiplying the EPI workshops at the local level, often with instructional materials especially adapted for their particular epidemiologic situations. Fourteen countries have programmed additional EPI workshops in their 1984-85 plans; ten plan cold chain

workshops; seven, training in supervisory techniques; and six, epidemiologic surveillance courses.

Another notable EPI activity has been the national multidisciplinary evaluations carried out since 1980 in collaboration with PAHO. These evaluations have enabled countries to pinpoint major obstacles to program improvement and make concrete recommendations on how to overcome them. The data collected are used both to diagnose current problems and to provide a point of comparison to measure progress in subsequent evaluations. Over half the countries in Latin America have already held their first national evaluation and 14 countries plan to hold first or second (and, in one case, third) evaluations during the next year.

The importance of community participation in any successful immunization program was clearly brought out during the group discussions and in the work plans. Activities planned in this area can be divided into two general areas: use of the mass media—radio, the press and television—to educate and motivate the community, and use of community organizations to promote and, in some countries, actively take part in, delivery of immunization services. Several countries use already established community organizations, such as agricultural cooperatives, neighborhood committees, and volunteer service groups, while others train community leaders to identify individuals in the target populations, schedule vaccination appointments, and follow up on those who fail to appear.

Supervision is being increasingly emphasized in many countries. Unless programmed as a permanent, ongoing activity, supervisory visits are frequently made only sporadically, in response to problems which have already become critical. To overcome this difficulty, about three-quarters of the countries plan such activities as scheduling a minimum number of supervisory visits at each level of the health system, acquiring additional vehicles and budgeting more *per diem* money for supervisory personnel, conducting training courses for supervisors, and publishing and distributing supervisory guidelines. One country will require that a copy of recommendations made during supervisory visits be left in each health region to use as a basis for evaluating progress during the next visit.

TABLE 1. 1983 vaccination coverages (provisional data) and 1985 vaccination coverage targets, 20 Latin American countries

Country	DPT-3		POLIO-3		MEASLES		BCG	
	1983	1985 targets	1983	1985 targets	1983	1985 targets	1983	1985 targets
Argentina	65[a]	70	94[a]	90	62[a]	80	64[a]	85
Bolivia	7	60	11[b]	85	14	60	30	70
Brazil	49	80	100[c,d]	95	52	95	56	75
Chile	70[a]	90	63[a]	90	100[a]	95	85[a]	95
Colombia	41	80	42	80	42	80	78	85
Costa Rica	56	85	54	85	73[e]	95	...	95
Cuba	91[a]	95	93[d]	95	71[a]	95	91[a]	98
Dominican Republic	24	70	22	90	23	60	41	60
Ecuador	23[a]	60	27[a]	60	28[a]	60	64[a]	80
El Salvador	45[a,d]	85	41[a,d]	85	47[e]	85	49[a]	85
Guatemala	44[d]	55	44[d]	55	12	40	25	45
Haiti	...	55	...	55	...	55	...	65
Honduras	70	80	69	80	66	85	74	85
Mexico	30	80	85	80	85[e]	80	...	80
Nicaragua	24	70	30[b]	80	23	80	89	90
Panama	61	80	60	80	60	80	81	85
Paraguay	38	80/40[f]	47	80/40[f]	37	80/40[f]	54	80/40[f]
Peru	20[a]	30	19[a]	35	27	43	58[a]	62
Uruguay	70	85	74[d]	90	62	95	95	95
Venezuela	49	65	67	80	42	60	48	80

[a] Projected

[b] Does not include national polio campaigns

[c] Reported number of doses exceeded estimated target population

[d] Second dose

[e] 1 year of age

[f] Dual targets: urban/rural

... Information not available

Epidemiologic surveillance and reporting systems are two other areas which are receiving increasing attention in most countries. Over half the countries—in general, those with relatively more advanced programs—have programmed specific surveillance activities, such as surveys to determine immunity levels or target populations in specific areas, institution of a weekly telephone reporting system, implementation of a system to report and follow up on vaccine reactions, and, in a few instances, the use of seroepidemiologic studies.

Effective epidemiologic surveillance depends on the prompt availability of reliable data on the EPI diseases. Among the activities mentioned in the work plans to improve disease notification are the design of computer programs to collect and analyze data, new systems to motivate personnel to submit monthly reports, promulgation of legislation to make disease notification obligatory, creation of feedback mechanisms, such as periodic newsletters or bulletins, and widespread distribution of vaccination cards and reporting forms.

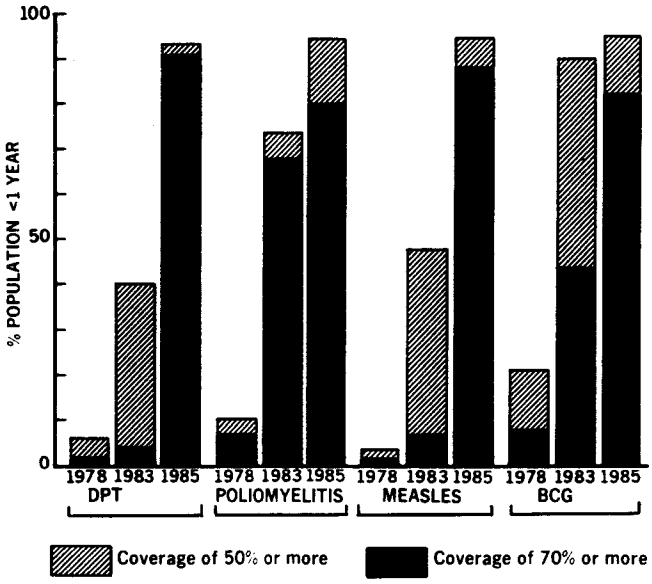
The interchange of ideas and experiences in the working groups prompted several participants to program visits to other countries which use similar vaccination strategies. Some countries will also plan to send representatives as observers to other national EPI evaluations.

In rewriting their work plans during the meeting, countries were asked to specify those areas in which they are receiving or seeking aid from external agencies. The major activities for which funds or technical support are being requested in 1984-85 are training, cold chain acquisitions and evaluations, the purchase of vaccines, national EPI evaluations, and inter-country visits. The identification of these activities in each country will enable agencies to coordinate their technical support with each other and avoid duplication of efforts. Among the external agencies involved in meeting these requests are the Pan American Health Organization (PAHO), the United States Agency for International Development (USAID), the United Nations Children's Fund (UNICEF), the United Nations Fund for Population Activities (UNFPA), and the European Economic Community (EEC).

1985 Targets

All 20 countries at the Lima meeting have set 1985 vaccination coverage targets for DPT, poliomyelitis, measles and BCG vaccines. These are compared to the actual 1983 levels of coverage in Table 1 (page 3). Almost half the Latin American countries listed had coverage levels of at least 50 percent with DPT, polio, and measles vaccines in 1983, though a much smaller fraction attained coverages of 70 percent or more. BCG coverage was generally higher, with 12 countries reporting coverages of greater than 50 percent, 7 of which had coverages of greater than 70 percent. Graph 3 shows the progress made in increasing immunization coverages between 1978 and 1983, and the dramatic improvement which would result if all countries were successful in meeting their coverage targets by 1985.

GRAPH 3. Proportion of children under 1 year of age in countries where immunization coverage in this age group is at least 50 percent, and at least 70 percent. 20 Latin American countries, 1978 and 1983 (reported coverages) and 1985 (coverage targets).



1983 Immunization Coverage in the Americas

The table on the opposite page shows the percent of children under 1 year of age vaccinated in 1983 with DPT, poliomyelitis, measles and BCG vaccines in the countries and territories of the Americas. Dropout rates for DPT and polio vaccines were calculated for countries which provided data on coverages with first and third doses.

The coverage rates are based on data compiled by each country in preparation for the EPI Managers' Meeting in Lima, Peru (5-9 March 1984) and the *1983 Review of Communicable Diseases in the Caribbean*, a report prepared by the Caribbean Epidemiology Center (CAREC) in Port of Spain, Trinidad and Tobago. All data are provisional. National EPI Managers are requested to send updated or final information to the *EPI Newsletter* editor.

1983 Vaccination Coverage in the Americas (provisional data)

Subregion and Country	Population under 1 year	DPT			Poliomyelitis			Measles	BCG
		1st dose	3rd dose	Dropout rate	1st dose	3rd dose	Dropout rate		
NORTHERN AMERICA									
Canada	...	...	...	...	...	...	...	...	...
United States	...	...	...	...	...	...	...	...	...
CARIBBEAN									
Anguilla	100	...	97	...	...	100[a]	...	70	96
Antigua and Barbuda	1,200	...	100[a]	...	...	100[a]	...	48	[b]
Bahamas	4,800	...	65	...	...	65	...	66	[b]
Barbados	4,000	...	69	...	...	62	...	55[c]	...
Bermuda	800	...	48	...	...	48	...	48[c]	[b]
British Virgin Islands	200	...	90	...	...	75	...	77	[b]
Cayman Islands	300	...	89	...	...	90	...	87[c]	69
Cuba	165,708	99[d]	91[d]	8[d]	...	93[d,e]	...	71[d]	91[d]
Dominica	1,700	...	93	...	...	92	...	63	100[a]
Dominican Republic	202,704	49	24	51	44	22	50	23	41
Grenada	2,500	...	68	...	...	72	...	7	[b]
Haiti	...	...	...	...	...	...	...	...	...
Jamaica	62,000	...	51	...	...	47	...	15	56
Montserrat	200	...	95	...	...	95	...	83[c]	91
Saint Lucia	4,000	...	81	...	...	80	...	36	69
St. Kitts and Nevis	1,200	...	90	...	...	91	...	[b]	...
St. Vincent and the Grenadines	3,000	...	80	...	...	84	...	59	[b]
Trinidad and Tobago	28,000	...	60	...	...	61	...	[b]	[b]
Turks and Caicos Islands	200	...	70	...	...	79	...	80	98
CONTINENTAL MIDDLE AMERICA									
Belize	5,136	...	59	...	...	61	...	43	81
Costa Rica	74,173	77	56	27	74	54	27	73[f,g]	...
El Salvador	204,368	59[d]	45[d,e]	24[d]	58[d]	41[d,e]	29[d]	47[d,f]	49[d]
Guatemala	320,927	70	44[e]	37	68	44[e]	35	12	25
Honduras	140,113	97	70	28	98	69	30	66	74
Mexico	~~2,900,000~~	56	30	46	95	85	11	85[f]	...
Nicaragua	121,894	59	24	59	77	30[h]	61	23	89
Panama	55,811	85	61	28	88	60	32	60	81
TROPICAL SOUTH AMERICA									
Bolivia	224,537	32	7	78	77	11[h]	86	14	30
Brazil	3,960,374	...	49	...	...	100[a,e]	...	52	56
Colombia	786,000	76	41	46	78	42	46	42	78
Ecuador	244,875	53[d]	23[d]	57[d]	55[d]	27[d]	51[d]	28[d]	64[d]
Guyana	21,000	...	...	...	...	...	...	...	...
Paraguay	104,838	69	38	45	73	47	36	37	54
Peru	621,300	43[d]	20[d]	53[d]	45[d]	19[d]	58[d]	27[d]	58[d]
Suriname	11,000	...	85	...	...	83	...	71	[b]
Venezuela	443,524	80	49	39	100[a]	67	33	42	48
TEMPERATE SOUTH AMERICA									
Argentina	630,347	98[d]	65[d]	34[d]	100[a,d]	94[d]	6[d]	62[d]	64[d]
Chile	274,414	90[d]	70[d]	23[d]	97[d]	63[d]	35[d]	100[a,d]	85[d]
Uruguay	53,810	98	70	29	93	74[e]	17	62	95

[a] Reported number of doses exceeded estimated target population
[b] Vaccine not administered
[c] MMR vaccine used
[d] Projected
[e] Second dose
[f] 1 year of age
[g] MR vaccine used
[h] Does not include national polio campaigns
... Data not available

Revised Vaccine Retesting Guidelines

WHO's 1981 guidelines for vaccine retesting have been revised in 1984, due largely to the increased costs of breeding and maintaining the animals required for the tests. Consequently, the table below replaces the one published in *EPI Newsletter* III-5 (October 1981). Readers should especially note that the number of doses of all bacterial vaccines required to justify restesting has been doubled since 1981.

Vaccine retesting guidelines

Vaccine	No. of doses involved to justify retesting	No. of doses needed for test*	Conditions of transport of samples	Duration of test (minimum)	Time when answer expected (allowing for repeated test)
Measles (freeze-dried)	2,000	50	4°C - 8°C	10 days	3 weeks
Poliomyelitis (oral)	2,000	50	-20°C	7 days	3 weeks
Poliomyelitis (killed)	20,000	50	4°C - 8°C	4 weeks	3 months
BCG (freeze-dried)	20,000	100	4°C - 8°C	4 weeks	2 months
Diphtheria/Pertussis/ Tetanus (DPT)**	200,000	100	4°C - 8°C	4 weeks	3 months
Quadruple Diphtheria/Pertussis/ Tetanus/Polio (killed) (DPT-P)**	20,000	100	4°C - 8°C	4 weeks	3 months
Diphtheria/ Tetanus Toxoid (DT)	200,000	100	4°C - 8°C	6 weeks	3 months
TetanusToxoid (TT)	50,000	100	4°C - 8°C	6 weeks	3 months

* Taken from at least five different locations in the store.

** The figure given for DPT is based on the assumption that only the pertussis component would be tested and the figure for DPT-Polio (killed) is based on the assumption that only the polio component would be tested.

Source: WHO memo EPI/I8/446 V.1 dated 26 March 1984.

Uses of Serologic Tests in the EPI

One of the most important measures in disease prevention is immunization, which involves the use of a more or less artificial stimulus to induce immunity which protects against the disease. In some situations, however, it is not feasible to measure immunity directly, therefore we use an index of protection—the presence of antibodies in the circulating blood. This index is very useful when protection can be correlated with the presence of a certain type of antibodies. Such a correlation exists, to a greater or lesser degree, for all the EPI diseases except tuberculosis and, for most practical purposes, whooping cough.

There are several types of antibodies and various ways of measuring them. In general, serologic tests can tell us whether antibodies are present or absent and, if present, in what titer. With two or more specimens from the same individual, it is also possible to detect any change in the presence or titer of antibodies. The absence of antibodies is usually viewed as indicative of susceptibility and their presence as indicative of immunity, though it generally cannot be known whether the antibodies result from natural infection or from vaccination.

In some diseases the antibody titer may be related to the degree of immunity. Changes in antibody levels can indicate the presence of an acute infection or a successful vaccination. The disappearance of antibodies can signify loss of immunity, though the relationship is not exact. Serologic studies of groups can bring out the epidemiological pattern of a disease and the susceptibility of specific groups in the population.

Table 1 summarizes the kind of information on EPI diseases that can be obtained from serologic tests. It can be seen that they are of no use for tuberculosis and of very doubtful use for whooping cough. Only for diphtheria and tetanus is it possible to distinguish between infection

Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria and whooping cough, from 1 January 1983 to date of last report, and for same epidemiological period in 1982, by country

Subregion and Country	Date of last report	Measles		Poliomyelitis		Tetanus				Diphtheria		Whooping Cough	
						Non-neonatorum		Neonatorum					
		1983	1982	1983	1982	1983	1982	1983	1982	1983	1982	1983	1982
NORTHERN AMERICA													
Canada	24 Dec.	915	1,064	—	—	5	10	...	...	12	12	2,198	2,314
United States	31 Dec.	1,436	1,728	8	7	75	81	...	...	5	3	2,258	1,882
CARIBBEAN													
Antigua and Barbuda	31 Dec.	10	—	—	—	1	—	—	—	—	—	—	—
Bahamas	31 Dec.	2,868	50	—	—	—	2	—	—	—	—	8	8
Barbados	24 Dec.	6	6	—	—	6	5	—	—	—	2	—	12
Cuba	31 Dec.	3,287	23,408	—	—	24	21	—	—	—	—	275	915
Dominica	26 Nov.	1	2	—	—	1	—	1	—	2	—	11	7
Dominican Republic	31 Dec.	2,960	3,561	7	165	88	89	19	5	125	119	302	209
Grenada	31 Dec.	295	1,713	—	—	—	3	—	—	—	—	—	—
Haiti	26 Nov.	652	936	62	33	162	202	30	47	23	26	392	1,461
Jamaica	31 Dec.	1,147	2,800	—	58	1	11	2	—	9	16	60	324
Saint Lucia	26 Nov.	70	1,795	—	—	1	6	...	...	—	—	—	8
St. Vincent and the Grenadines	10 Dec.	63	757	—	—	...	—	...	—	—	—	...	—
Trinidad and Tobago	31 Dec.	2,392	1,284	—	—	15	11	—	—	—	2	—	3
CONTINENTAL MIDDLE AMERICA													
Belize	31 Dec.	11	6	—	—	1	4	—	3	—	4	1	—
Costa Rica	31 Dec.	39	167	—	—	5	14	2	2	—	—	74	63
El Salvador	3 Dec.	2,282	3,572	80	16	78	127	34	83	14	14	475	1,718
Guatemala	5 Nov.	2,500	3,797	208	136	74	68	...	...	13	13	1,092	1,359
Honduras	31 Dec.	1,168	2,446	8	8	25	29	—	2	—	—	550	1,151
Mexico	*	...	...	...	...	...	...	...	...	...	...	...	...
Nicaragua	31 May	57	131	—	—	66	...	...	...	3	—	36	271
Panama	1 Oct.	509	3,642	—	—	5	4	9	13	—	—	149	58
TROPICAL SOUTH AMERICA													
Bolivia	8 Oct.	1,029	1,145	6	5	86	72	...	...	46	13	1,007	1,145
Brazil	31 Dec.	56,795	39,370	25	69	2,272	2,348	506	462	4,625	3,297	25,752	54,766
Colombia	19 Jun.	4,221	4,393	58	40	196	273	160	...	46	40	2,390	2,483
Ecuador	31 Dec.	2,490	1,647	5	11	97	66	67	70	23	38	803	1,654
Guyana	31 Dec.	9	13	...	...	4	1	...	...	—	—	—	—
Paraguay	31 Dec.	1,109	814	11	71	75	73	131	121	3	14	321	546
Peru	26 Jun.	211	1,087	6	91	18	29	—	...	1	4	276	912
Suriname	31 Dec.	17	36	—	1	...	...	...	...	1	4	—	12
Venezuela	12 Nov.	9,296	11,209	—	12	—	—	—	—	—	3	2,752	2,686
TEMPERATE SOUTH AMERICA													
Argentina	31 Dec.	7,106	4,329	...	—	152	...	...	...	22	36	6,115	6,333
Chile	31 Dec.	6,750	9,522	—	—	16	18	8	12	78	122	149	394
Uruguay	31 Dec.	11	150	—	—	4	16	—	1	—	—	214	599

* No 1983 reports received, therefore 1982 data not shown.

— No cases
... Data not available

(or immunity) of natural origin and that produced by vaccination. Because of these limitations on the information supplied by serologic tests, it is fortunate that other methods of obtaining information are usually available.

TABLE 1. Type of information obtained from serologic tests with relation to the EPI target diseases

Type of information	Disease					
	Tuberculosis	Diphtheria	Tetanus	Whooping Cough	Polio	Measles
Susceptibility	0	+	+	0	+	+
Immunity:						
—Infection	0	0	0	±	+[a]	+[a]
—Vaccination	0	+	+	±	+[a]	+[a]
Seroconversion:						
—Infection	0	0	0	0	+[a]	+[a]
—Vaccination	0	+	+	±	+[a]	+[a]

\+ Information is reliable
± Information is not always reliable
0 No useful information can be obtained

[a] Serologic tests do not distinguish between antibodies induced by infection and those induced by vaccination.

The absence of a history of disease or vaccination can be useful in determining susceptibility. It is of particular value for a disease with a characteristic clinical picture and few subclinical infections, such as measles. It is of less value for an infection such as polio, in which more than 90 percent of the infections are subclinical. From the EPI operational point of view, however, individuals with no history of disease or vaccination may be regarded as susceptible.

Immune individuals may be identified by a positive history of disease or vaccination, particularly if the disease has a characteristic clinical picture or the vaccination is effective in a single dose. With some vaccinations (such as those for diphtheria and tetanus), the degree of protection can be estimated from the time since the last dose. An acute disease can be diagnosed from the general clinical picture or by developing specific clinical definitions. The effectiveness and duration of the protection can be measured by epidemiological field studies of vaccine efficacy.[1]

Serologic tests should be considered in the following situations:

- Studies of epidemiological patterns of disease in virgin or isolated populations, especially with respect to uncharacteristic or inapparent infections (such as rubella) or where there is a complete lack of surveillance.
- Confirmation of the clinical diagnosis.
- Initial trials of vaccines.
- Cases of apparent vaccination failure. The preferred course in this situation is epidemiological investigation of vaccine efficacy and an evaluation of the handling and administration of the vaccine (with titering of the vaccine in some circumstances).[1]

The advantages of serologic tests are that they serve as scientific proof obtained in the laboratory, they are quantitative, and they can be correlated with protection. However they also have a number of disadvantages, including the need to take blood samples, difficulties in test performance or standardization, high cost, delay in obtaining results, impossibility of distinguishing between infection and vaccination in most cases, and the lack of a perfect correlation with protection.

Serologic tests are thus of important but limited use in the EPI. They can be of great value to confirm clinical diagnosis in individuals, and serologic surveys prior to the beginning of a vaccination program can yield very useful information on the epidemiological pattern of a disease. However, they are of little help once a program is implemented, and other methods of obtaining the necessary information are usually preferable.

Source: Dr. Alan Hinman, Director, Immunization Division, U.S. Centers for Disease Control (Atlanta, Georgia). Summary of presentation at Latin American EPI Managers' Meeting in Lima, Peru, 7 March 1984.

[1] See "Measles Vaccine Efficacy: United States," *EPI Newsletter* II-6 (December 1980), page 4.

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