EPI Newsletter

Expanded Program on Immunization in the Americas

Volume V, Number 3 | IMMUNIZE AND PROTECT YOUR CHILD | June 1983

International Symposium on Poliomyelitis Control

Some 400 polio experts from over 50 countries attended the International Symposium on Poliomyelitis Control held 14-17 March at the Pan American Health Organization in Washington, D.C. The symposium was jointly sponsored by Fogarty International Center of the U.S. National Institutes of Health, the World Health Organization, the Pan American Health Organization, and a number of other institutions.

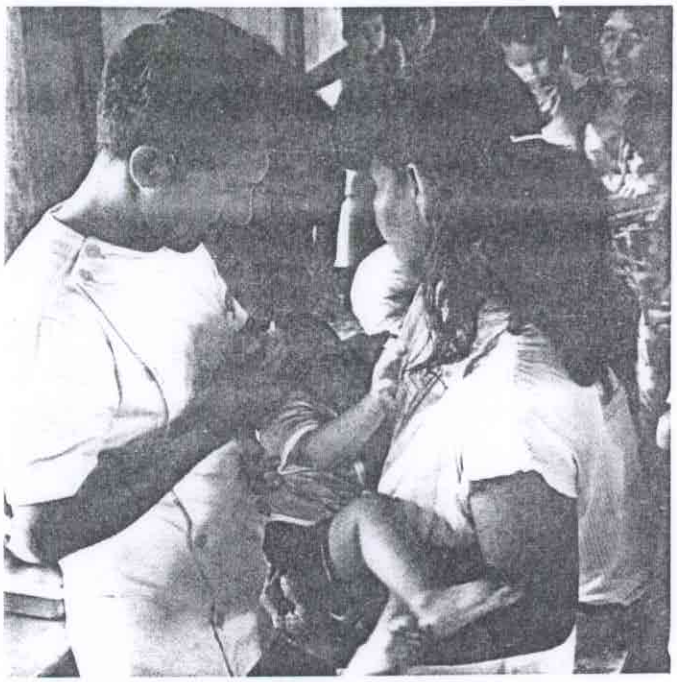
The main objectives of the meeting were to assess the latest knowledge concerning polioviruses, currently available vaccines, and the status of polio in various parts of the world; to consider the political, economic and administrative effects of various immunization strategies and the feasibility of eliminating paralytic poliomyelitis in the foreseeable future; to identify research needs; and to develop recommendations for future control programs.

Dr. Frederick Robbins, President of the National Academy of Sciences' Institute of Medicine, served as Chief Rapporteur for the Symposium. The following excerpts from his summary paper point out the major questions discussed and the recommendations which came out of the meeting.

Control vs. Eradication

"The key question before this conference was: what are the prospects for global control or eradication of polio in this century? It would seem that from the scientific point of view the tools are at hand to control the disease if we define control as elimination of paralytic disease or its reduction to an insignificant level. Control has been achieved in many countries, both industrialized and less developed (in the tropical zone). Clearly, however, it will not be easy to achieve world-wide control.

The central problem is probably a lack of political will that results from a lack of recognition that polio is an important public health problem in tropical and developing countries since these countries need to ration resources that are pitifully small. Under such conditions it is understandable that control of polio would not achieve a high priority ranking. A demonstration of the magnitude of the problem (such as by lameness surveys), explanation of the feasibility of control, and recognition that efforts to control polio can strengthen the overall health efforts of their country rather than detract from them, can all help to stimulate missing or weak political will. It is also important to rally support of the medical profession whose orientation, unfortunately, is often more towards curative medicine than towards public health and preventive interventions. Finally, external assistance such as that available through the Expanded Program on Immunization (EPI) can make the difference.



One of the major challenges facing countries in their efforts to control poliomyelitis is to assure that all children complete the 3-dose vaccination schedule.
(Photo: Julio Vizcarra, PAHO)

Contents

The possibility of eradicating polio from the globe was little discussed; a few countries have accomplished local eradication, but only by achieving and maintaining a very high rate of vaccination, considerably higher than rates attained in most of the world. It is not yet known just what level of immunity within a population is required in order to interrupt viral transmission so that the agent will be eradicated. This is particularly true in situations where the virus is widely disseminated, and infection occurs primarily by the fecal-oral route in early life.

The problem of eradicating the polio virus is considerably different than was the case with smallpox. Polio virus is more readily communicable, causes inapparent infection more often than not, and vaccination, particularly with IPV, while conferring long lasting immunity to disease, does not prevent infection of the gastrointestinal tract. Furthermore, surveillance can be complicated by the fact that, without laboratory investigation, other causes of paralysis can be difficult to distinguish from polio. The temperature sensitivity of OPV, and the considerable cost of IPV and the need to give it parenterally, pose practical problems that need to be surmounted if global eradication is to be considered.

Thus it would appear that a practical and potentially feasible goal is world-wide control of paralytic polio within this century, but global eradication should not be abandoned as the ultimate goal. The obvious cost-effectiveness of eradication makes it something to work for in spite of the significant difficulties involved.

Recommendations

From the state of knowledge about polio vaccine as summarized at this meeting, certain recommendations seem warranted.

1. Each country should assess its situation in regard to polio and develop a plan to achieve control within the country.
2. The EPI and other components of the WHO and the UN should extend their responsibility to encourage and assist developing countries to plan, conduct and evaluate control programs.
3. Although the eventual goal should be to incorporate polio vaccination into routine primary health services, a flexible approach should be adopted. Special polio vaccination campaigns should not be discouraged, particularly since they can be used to increase motivation of the government, professions and public, and to develop a public health oriented infrastructure. Each country will have to adapt its program to the particular situation existing at the time.
4. It is important that experiments with the more potent IPV as a one- or two-dose regimen be pursued vigorously.
5. Efforts should be encouraged to develop more-attenuated vaccines that are more heat stable.
6. Additional field tests are needed to evaluate the problems associated with immunizing populations in tropical countries.
7. A new "vaccinology" is made possible by the developments of modern molecular genetics and immunology. One can now envision the development of new, more specific, standardized and inexpensive vaccines for a variety of conditions, including polio. This new "vaccinology" deserves some priority in research funding.
8. International cooperation in regard to the standardization, regulation and testing of vaccines as well as research in the field has proved invaluable and should be encouraged and extended."

The complete Proceedings of the Poliomyelitis Symposium will be published in a future issue of the *Reviews of Infectious Diseases*.

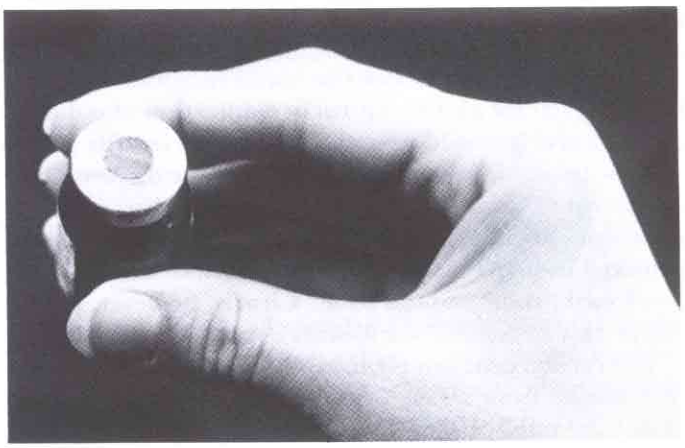
Source: Frederick C. Robbins, International Symposium on Poliomyelitis Control: Summary and Recommendations (to be published in the Proceedings of the Symposium).

Measles Vaccine Indicator Trial in Peru

The Peruvian Ministry of Health is collaborating with PAHO/WHO and the Program for Appropriate Technology in Health (PATH)[1] to field test a time-temperature indicator developed to monitor measles vaccine exposure to heat during its transport along the cold chain.

The indicator consists of a red paper disk which contains a chemical[2] with thermal characteristics similar to those of measles vaccine. The dot changes color from bright red, to dark red, and finally to black following

[1]PATH is a non-profit, non-governmental organization devoted to the development and application of appropriate health technologies for primary health care programs in developing countries.
[2]The chemical was developed by Allied Corp., USA.



The red paper disk on the vial of measles vaccine contains a chemical which causes it to turn black following accumulated exposures to high temperatures. ***(Photo: PATH)***

accumulated exposures to high temperatures. After seven days at 37°C the indicator will turn black, a warning to the health worker that the vaccine has dropped below its minimum required potency and should not be used.

The indicator is designed to fit on the metal cap of a vial of vaccine. It has a pressure-sensitive adhesive back and is coated with a clear plastic material to protect health workers from the chemical and to minimize mechanical damage to the indicator. The color change is non-reversible.

PATH developed the indicator with the assistance of WHO/EPI, the London School of Hygiene and Tropical Medicine, OXFAM and the Edna McConnell Clark Foundation. The indicator's performance was verified in direct comparison to the heat degradation of measles vaccine made by various manufacturers. The results of laboratory tests demonstrate that the indicator's color change from red to black closely follows the degradation of measles vaccine. The indicator is calibrated to turn black when the vaccine titer is within 8% of the minimum potency recommended by WHO/EPI.

Field Trials

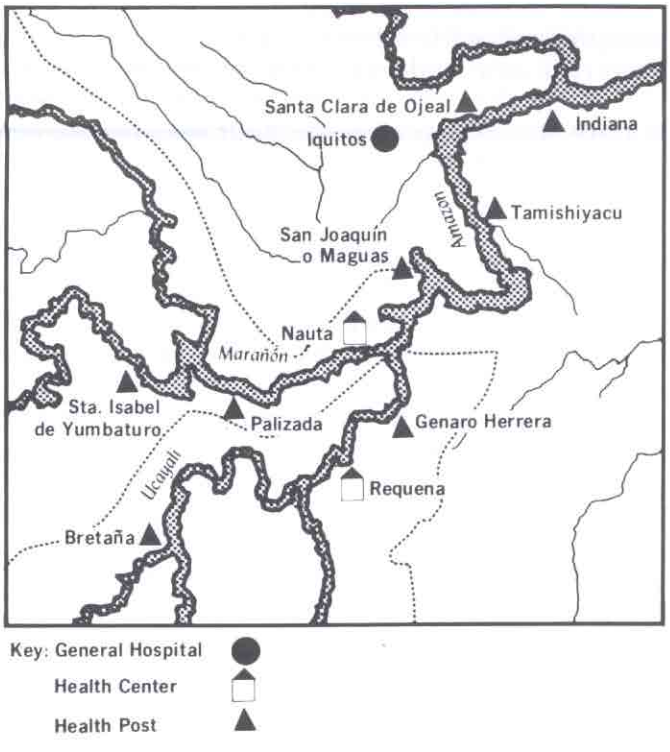
To test the indicator the Ministry of Health selected Region XVI (Loreto) where the ambient temperatures average +28°C and vaccine transportation along the cold chain is difficult. The particular strand of the cold chain chosen is shown in the accompanying map (Figure 1).

The EPI vaccines are airfreighted from Lima to Iquitos, where they are shipped by boat up the Amazon River to the health centers and posts. The time necessary to transport vaccine from Iquitos to Requena, for example, can vary from six to 14 hours depending on the kind of boat used.

A protocol for the study was prepared together with a chronogram of the activities required for its execution. The field trial was designed to meet the following objectives:

- to confirm the validity and reliability of the indicator;
- to confirm that color changes are correctly interpreted by health personnel;
- to evaluate the indicator's acceptability by health personnel;
- to evaluate the indicator's mechanical performance.

FIGURE 1. Sites chosen for measles indicator field trials. Loreto, Peru, 1983.



Health workers learn how to use the time-temperature indicator. ***(Photo: Nancy Newton, PATH)***

The field test will last six months, ending around December 1983. During that time 1,100 indicators will be tested in the study area. Twenty-five vials with *red* indicators will be tested for titer levels during the study to confirm the sensitivity and specificity of the indicators. All vaccine vials with black indicators are automatically tested to verify if their titers have fallen below the minimum levels established by WHO as necessary to induce immunity.

Twenty-four health workers were trained to use the indicator. A set of instructions and accompanying forms on indicator use were developed for each level of the cold chain. Results of the post-test given to participants after their training yielded average scores of over 82 percent.

The question most frequently missed showed that the students did not fully understand the time-temperature basis for the color change in the indicator.

At the end of the study the participants will be interviewed to determine their reactions to the indicator and its performance in the field.

Field trials of the indicator are also being conducted in the Phillipines, People's Republic of China, Pakistan, Yemen Arab Republic, Egypt, Nepal, Kenya, Zimbabwe, and Argentina. The trials are supported by the Expanded Program on Immunization of PAHO and WHO, UNICEF, and the International Development Research Center (IDRC). A full report on the results should be available in early 1984.

Neonatal Tetanus Meeting:
Strategies for Control

The Eastern Mediterranean and South-East Asia Regional Offices of the World Health Organization (EMRO and SEARO respectively) jointly convened a Meeting on the Prevention of Neonatal Tetanus in Lahore, Pakistan, 22-25 February 1982.

The purpose of the Meeting was to review the magnitude of the problem of neonatal tetanus in the countries of the two Regions, to study all available experience in the control of the disease, and to formulate strategies for prevention.

Disease-Reduction Targets

In most developing countries, it should be feasible to attain by 1990 an incidence of death from neonatal tetanus of less than one per 1,000 live births. This rate refers not only to national averages, but also to the situation within each significant administrative sub-division within each country. A *goal of zero deaths* is suggested by the year 2000. Countries now experiencing neonatal tetanus deaths should consider including them among their indicators for monitoring progress in achieving "Health for All by the Year 2000." For many such countries, the goal of zero deaths should be feasible considerably before the year 2000. It was thought operationally preferable to monitor reductions in neonatal tetanus mortality, rather than morbidity, since deaths are more likely to be reliably reported.

Immunization

1. **Target groups and strategies**: The immunization of *pregnant women* to confer protective antitoxin levels can be an effective measure in controlling neonatal tetanus in areas where most pregnant women seek prenatal care and report to health centers reasonably early in their pregnancy to be given two spaced doses of tetanus toxoid. Such a policy of routine immunization of pregnant women should be considered as a long-term program.

However, in many countries the routine coverage of pregnant women with TT immunization is very low. The Meeting considered, therefore, that *all females of childbearing age* visiting any governmental or non-governmental health facility for any reason (e.g., bringing their children for immunization, attending MCH clinics, seeking medical care in hospitals or out-patient clinics, etc.) should be immunized with tetanus toxoid, consistent with their previous TT vaccination history. In this regard, all health providers should be made aware of the importance of and need for their contribution.

The Meeting recognized that it would be easiest to reach women who had ready access to health services, such as women residing in urban areas and those attending school. Depending on the circumstances, *vaccination at school entry and school departure* with either DT, TT or Td vaccine should be offered at least to all girls, and also to boys if resources permit, since this is a captive audience; as a result, women will require fewer doses of tetanus toxoid for protection later on during their child-bearing years. *Immunization of children* in the first years of life with DPT already exists as a priority within the EPI.

Although services might be easiest to deliver in urban areas, rural areas contain most of the population and generally have the highest incidence rates of neonatal tetanus. The Meeting considered that, whenever feasible and necessary, TT immunization could be offered through *outreach clinics* to large congregations of women attending markets or festivals. In short, every institutionalized point of contact should be used to increase coverage.

Although some rural populations could be covered using outreach services from hospitals and health centers, many rural areas could not at this time be covered in this way. Although mobile teams might have to be considered to reach such remote areas, the difficulties of cost, fuel availability, and vehicle maintenance were recognized. If used, mobile teams should ideally be multi-purpose, providing a core of primary health care services of highest relevance to the communities in question.

Under certain circumstances, tetanus immunization of the entire population might be envisaged. In rural areas, every advantage should be taken of all workers who could support the programs, as, for example, malaria workers, health promotors and sanitary inspectors. It was noted that the relative *heat stability* of tetanus toxoid might permit it to be used under circumstances where the cold chain was not yet sufficiently developed to permit the use of the other EPI vaccines; however, even this vaccine could be quickly destroyed at high temperatures (above 55°C) for short periods of time.

Although the Meeting did not recommend *mass campaigns* as a generally applicable strategy, it was acknowledged that there may be certain countries where these

could rationally be implemented, e.g. where there are already mass campaigns, such as for yellow fever vaccination in West Africa, or where the government believes that mass campaigns can be cost-effective and that, by such a strategy, it can achieve high levels of coverage which can be maintained afterwards.

As it was not possible to define an ideal approach suitable for all countries, the Meeting suggested that each country should develop, on the basis of further analysis, the most appropriate strategy which would reach the highest-risk women. Outreach strategies might be evolved which would selectively increase coverage of high-risk women more quickly than coverage of all women in the country.

Regardless of the exact strategies adopted in any country, general *public information and promotional campaigns* to encourage the acceptance of TT immunization by women in the priority groups were suggested.

In countries where it is feasible, evidence of tetanus immunization could be made a requirement for the issuance of a *marriage certificate*.

For all people, male or female, it should be reemphasized that the *care of wounds* or injuries should include not only disinfection, but also the administration of tetanus toxoid in all cases where there is reason to believe the person has been previously immunized. Antitoxin, in addition to two doses of tetanus toxoid, should be reserved only for those who have not previously been immunized, so as to provide passive and active immunity simultaneously.

2. **Immunization Schedule**: In unimmunized women, two doses of adsorbed tetanus toxoid should be administered with a four-week interval between each dose. Shorter intervals will lead to lower protection but should be used if necessary.

In the case of pregnant women, the second dose should be given not later than two weeks before the expected date of delivery.

In women previously immunized, immunization with one dose during the current pregnancy is recommended unless it is documented that at least a third dose of TT (DPT or DT) has been given within the previous five years.

Additional doses may be given with each pregnancy. However, children will be protected in the neonatal period if women have received a third dose within five years, or a fourth dose within ten years. A fifth dose is likely to provide life-time protection.

Steps should be taken to ensure that *only vaccines fulfilling WHO requirements* are used in the program.

General Strategies

National commitment to achieving the control of neonatal tetanus should be obtained. This should be reflected in part by including tetanus among the *notifiable diseases* and by including a specific category for neonatal tetanus.

Recognizing the inadequacies of current information on neonatal tetanus available through the routine reporting systems, emphasis should be placed on:

- conducting *sample surveys* to define baseline incidence and mortality rates for subsequent planning and evaluation (see editorial note); and
- developing *sentinel reporting* sites to monitor the impact of prevention strategies.

Countries should develop plans for the control of this disease which take into account the specific risk factors existing within each country and which specify a disease reduction target and date. National commitment should extend beyond the Ministry of Health, as help from other ministries will be needed, for example, the help of the Ministry of Education in sensitizing teachers and pupils to this problem, and the Ministry of Information in promoting general information and education.

Public information and health education in support of the national strategy for neonatal tetanus prevention should be promoted.

The target of the education is essentially the mother. She can be reached directly by health staff at centers and also indirectly by some of the following potentially important agents of change: the husband, the TBA (traditional birth attendant), schoolchildren, religious and other local leaders or volunteers, and the mass media.

The *participation of the community* in controlling this disease must be secured. Specific information concerning neonatal tetanus should be given to community leaders (including religious leaders) and their help should be sought in *teaching birth attendants* and mothers to recognize cases of neonatal tetanus and to make them aware that it is a major killer of newborns and that it can be prevented by:

- immunizing the mothers prior to delivery;
- assuring that the delivery is carried out and the cord cut under clean conditions; and
- ensuring that no unclean dressings are placed on the cord while it is healing.

TBAs and community leaders could be involved in reporting deaths from neonatal tetanus. In West Africa, it was noted that some communities had improved infant survival by providing shelters where mother and child could stay, under the supervision of a TBA, until the cord healed.

Community involvement in the prevention of neonatal tetanus is most likely to be effective where this is promoted within the general approach of primary health care, and where strong links have already been established between the community, represented by a village health or development committee, and the health providers, represented by the voluntary and professional health workers.

Institutions which train health manpower ought to include in their curricula the basic information on neonatal tetanus and its control.

It is recognized that *improved maternal and child health care* has a vital role to play in the reduction of neonatal tetanus as well as in the general reduction of neonatal and

maternal morbidity and mortality.

All countries with high neonatal tetanus rates are also countries where a large proportion of women are delivered by untrained and unsupervised TBAs. The official policy of governments should be to increase the percentage of deliveries attended by trained persons, the ultimate goal being 100% coverage.

All governments should favorably consider the *registration of all TBAs* so that training can begin, with emphasis on the referral of high-risk cases, safe delivery and adequate hygiene, including care of the cord.

In brief, the sequence should be:

- Register TBAs.
- Train them at the most peripheral point feasible.
- Equip and supply them to the health team.
- Supervise and support them.
- Give them refresher training.
- Renew registration periodically.
- Evaluate their training and performance.
- Convene periodic meetings, to give feedback and to air problems.

Supervision should be directed towards strengthening the MCH or basic health service network of centers and trained staff, so that, for example, approximately every ten TBAs have *supportive supervision* from a nurse or midwife, or whatever is the appropriate ratio for the resources, the geography and the transport.

Similar supervision should also be provided for assistant or village midwives or TBAs who are already trained, and not only to newly-trained TBAs.

The nurse-midwives themselves require and desire supportive supervision and retraining. This should be organized in a regular and systematic manner, using a standardized format, on every visit made by the officer from the district, provincial or central level.

The *involvement of hospitals* in the prevention of neonatal tetanus should be improved. Hospitals have a major role to play in providing immunization services within the hospital itself, in providing outreach primary health care and in providing training, supervision and back-up referral services for peripheral workers. Directors of the relevant hospital departments should be actively involved in the prevention of neonatal tetanus.

Traditional healers should be involved in the prevention of neonatal tetanus, as appropriate. An example would be barbers who might be involved with circumcision, ear piercing or tattooing.

The Meeting considered it very important for the program's success to motivate continuously the health staff at every level.

The Meeting acknowledged that the keeping of *cattle and horses* in or near the house is an essential part of the rural economy in many countries of the Regions, and that change will come only gradually. However, there are a few situations in towns where it is possible to forbid the stabling of horses or cows overnight within the municipal limits.

In addition to the research required on improving survey methodology, *research* needs which have been identified include:

- the development of save adjuvants and more potent tetanus toxoid;
- the factors influencing the acceptance of tetanus toxoid by the community; and
- the epidemiology of neonatal tetanus (for example, the role of circumcision, identification of high-risk groups, etc.).

Appropriate *sentinel surveillance sites* should be identified that will map the distribution of the origin of the cases, so that by means of outreach or house-to-house programs efforts can be concentrated in these localities.

Once countries have gained more experience in implementing their control programs, a follow-up meeting in a few years' time to evaluate progress would be most useful.

Resources

Much can be accomplished using existing resources, but additional resources will be needed to achieve satisfactory control of this disease, just as these are needed for the EPI and for primary health care as a whole. As evidenced by the coverage rates now being achieved in children, vaccines are already being made accessible to significant proportions of the population; thus, without increased resources, immunization rates among pregnant women and women of child-bearing age should be able to be brought close to those for children. However, in addition to the extra resources needed to increase the general coverage of immunization services, some special further investments for neonatal tetanus prevention are also needed. These include the development of special health education and promotional materials concerning this disease, investments in additional epidemiological studies to better define high-risk women, and evaluations of neonatal tetanus prevention initiatives so that the most successful and cost-effective approaches can be identified and promoted.

Constraints and Obstacles

It can be anticipated that constraints and obstacles similar to those in other health programs will be found, e.g.:

- inadequate system of supervision;
- lack of coordination with other health programs;
- lack of staff motivation; and
- poor community participation.

A major problem at present is that neither the providers nor the public at large is aware of the extent of the problem of neonatal tetanus nor is comitted to its control. Much remains to be done in the areas of information and educa tion, and governments will need to identify specifi resources to do it. This will best be done in the context of efforts to sensitize the public to other related issues, such as the importance of the immunization of children and of prenatal care of mothers.

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

Sub-Region 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	16 Apr.	287	395	—	—	—	4	...	...	7	2	603	737
United States	4 Jun.	837	692	1	1	22	29	...	...	—	—	715	463
CARIBBEAN													
Antigua and Barbuda	23 Apr.	3	—	—	—	—	—	—	—	—	—	—	—
Bahamas	4 Jun.	2,391	11	—	—	—	2	—	—	—	—	7	4
Barbados	23 Apr.	3	1	—	—	5	2	—	—	—	—	—	3
Belize	10 May	5	2	...	...	—	2	—	—	—	4	1	—
Cuba	26 Feb.	690	10,296	—	—	4	6	—	—	—	—	55	105
Dominica	9 Apr.	—	1	—	—	—	—	—	—	—	—	9	—
Dominican Republic	*	...	...	...	...	...	...	...	...	...	...	...	...
Grenada	21 May	255	224	—	—	—	2	—	—	—	—	—	—
Haiti	*	...	...	...	...	...	...	...	...	...	...	...	...
Jamaica	9 Apr.	521	753	—	—	1	1	—	—	3	3	12	79
Saint Lucia	19 Mar.	—	421	—	—	1	—	...	...	—	—	—	—
St. Vincent & the Grenadines	9 Apr.	41	298	—	—	...	—	...	—	—	—	...	—
Trinidad and Tobago	26 Feb.	375	155	—	—	5	2	—	—	—	—	—	—
CONTINENTAL MIDDLE AMERICA													
Costa Rica	23 Apr.	8	34	—	—	1	1	—	—	—	—	9	7
El Salvador	30 Apr.	773	1,543	25	12	15	26	12	48	9	1	151	1,089
Guatemala	21 May	1,563	2,199	56	7	40	29	...	...	8	6	470	420
Honduras	30 Apr.	509	1,175	3	5	13	9	—	—	—	—	206	571
Mexico	*	...	...	...	...	...	...	...	...	...	...	...	...
Nicaragua	*	...	...	...	...	...	...	...	...	...	...	...	...
Panama	1 May	310	2,314	—	—	3	3	4	5	—	—	68	13
TROPICAL SOUTH AMERICA													
Bolivia	*	...	...	...	...	...	...	...	...	...	...	...	...
Brazil	*	...	...	...	...	...	...	...	...	...	...	...	...
Colombia	3 Jun.	...	...	43	...	...	...	...	...	...	...	...	...
Ecuador	*	...	...	...	...	...	...	...	...	...	...	...	...
Guyana	27 Feb.	4	4	...	...	...	...	...	...	—	—	—	—
Paraguay	16 Apr.	142	80	4	39	10	19	23	32	1	7	70	119
Peru	26 Mar.	49	91	—	13	3	4	—	—	—	—	89	76
Suriname	27 Mar.	6	11	—	—	...	...	...	...	1	—	—	1
Venezuela	19 Mar.	2,131	3,161	—	—	—	—	—	—	—	1	513	334
TEMPERATE SOUTH AMERICA													
Argentina	7 May	422	1,477	11	—	58	26	...	...	13	10	696	3,104
Chile	14 May	1,342	2,011	—	—	13	14	1	...	36	53	66	194
Uruguay	*	...	...	...	...	...	...	...	...	...	...	...	...

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

— No cases
... Data not available

Promotion of the prevention of neonatal tetanus should accompany promotion of the approach of *primary health care* in general. The control of neonatal tetanus and other diseases included within the EPI can and should be used as an opening wedge in the development of primary health care.

Identification of Immunized Women

The Meeting concluded that the identification of immunized women, using a card retained by them, was highly desirable as a tool of program management and evaluation, as an aid for health education and motivation of the mother, and as a safety measure to ensure women were not excessively immunized.

Where a home-based mother's card or family health record was in the possession of the women immunized, this should serve as the record. Otherwise a special card should be issued. Immunization cards should be made widely available for use by private physicians, as well as for use in the public sector.

Source: *Report of the EMR/SEAR Meeting on Prevention of Neonatal Tetanus* (Lahore, Pakistan, 22-25 February 1982), World Health Organization, Eastern Mediterranean Region.

Editorial note: The availability of accurate data on disease incidence and mortality is crucial to health planners in developing the most appropriate control strategies for a particular area. In 1983 some countries of the Americas will carry out sample surveys to define the magnitude of the neonatal tetanus problem in order to aid their planning efforts.

Beginning in the second semester of this year, PAHO will collaborate with the Ministries of Health in Colombia and Ecuador in carrying out such studies, with the results to be available by the end of the year. It is expected that other countries where the extent of the neonatal tetanus problem is still largely unknown will also be implementing sample surveys in the near future.

1983 EPI Revolving Fund Vaccine Prices

The EPI Revolving Fund, now in its fifth year of operation, is continuing its efforts to provide good quality vaccine at low prices. Table 1 shows the vaccine prices and suppliers for 1983 purchases.

As an additional service to participating countries, Diphtheria-Tetanus vaccine (both adult and pediatric) may be procured through the Revolving Fund in 1983.

TABLE 1. 1983 EPI Revolving Fund vaccine prices and suppliers.

Vaccine	Supplier	Vial size	Price per dose (FOB US$)
DPT	Merieux	10 dose	.0229
	Torlak	20 dose	.0177
Poliomyelitis	Torlak	10 dose	.0280
	Smith Kline-RIT	20 dose	.0205
	Connaught	50 dose	.0195*
Measles	Merieux/Smith Kline-RIT	1 dose	.3025
	Smith Kline-RIT	1 dose w/syringe	.3650
	Merieux/Smith Kline-RIT	10 dose	.0710
BCG	Japan BCG Lab.	10 dose	.0933*
	Japan BCG Lab./Evans Medical (Glaxo)	20 dose	.0551*
	Japan BCG Lab.	50 dose	.0274*
TT	Merieux	10 dose	.0150
	Torlak	20 dose	.0110
DT (adult)	Torlak	10 dose	.0250
	Torlak	20 dose	.0155
DT (pediatric)	Merieux	10 dose	.0191
	Torlak	20 dose	.0155

*Price subject to revision in the event of significant increases or decreases in exchange rate during 1983.

The *EPI Newsletter* is published bimonthly, in English and Spanish, by the Expanded Program on Immunization (EPI) of the Pan American Health Organization, Regional Office for the Americas of WHO. Its purpose is to facilitate the exchange of ideas and information concerning immunization programs in the Region in order to promote greater knowledge of the problems faced and their possible solutions.

Editor: Dr. Ciro de Quadros
Assistant Editors: Mr. Peter Carrasco
Ms. Kathryn Fitch

Contributors to this issue:
Ms. Maureen Anderson, PAHO

Expanded Program on Immunization
Maternal and Child Health Program
Pan American Health Organization
525 Twenty-third Street, N.W.
Washington, D.C. 20037
U.S.A.

ISSN 0251-4710