EPI Newsletter

Expanded Program on Immunization in the Americas

Volume VI, Number 6 — *IMMUNIZE AND PROTECT YOUR CHILD* — *December 1984*

English-speaking Caribbean and Suriname

Attaining higher coverage: Obstacles to overcome

Significant progress has been made in the improvement of immunization coverage in the countries of the English-speaking Caribbean area including Suriname over the past five years. The countries and territories referred to in this grouping are: Anguilla, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, British Virgin Islands, Cayman Islands, Dominica, Grenada, Guyana, Jamaica, Montserrat, St. Christopher-Nevis, Saint Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, and Turks and Caicos Islands.

In 1978 there were 7 (37%) of the 19 countries which achieved an immunization coverage of at least 50% with 3 doses of DPT among children under 1 year of age. Four countries (21%) had achieved 50% coverage with 3 doses of trivalent oral polio vaccine (TOPV) the same year in the same age group. DPT coverage of over 75% was achieved by 2 countries (11%) while 3 countries (16%) achieved the same level of coverage with TOPV during the same year 1978.

In 1983 there were 8 countries (42%) which achieved at least 50% coverage with DPT and 6 (32%) with TOPV. Most significant of all is that there were 10 countries (53%) and 11 (58%) which achieved over 75% DPT and TOPV immunization coverage among children under 1 year of age in the year 1983.

Despite the progress made so far, there are several factors which continue to impede further improvement of immunization coverage.

Dropouts

There are as many as 25% of infants who receive their first dose of DPT and TOPV but do not return for the third dose in a few countries. The trend is to have a large number of infants receiving their first immunizations and a lesser number returning for the third dose in most situations. Where have the defaulters gone? Can they be located and persuaded to return and complete their course of immunizations as well as receive other forms of primary health care from their respective health centers? Can the media (radio, newspapers, etc.) and other forms of communication be used to improve the situation? Is it that the opening hours and days of the health centers may not be always convenient to the parents? Do parents know why? when? and how many doses are required before their children are completely immunized? Do they know what reactions to expect and what to do about side effects or reactions? If these and other such questions can be pursued and answered positively, the dropout rate should be reduced.

Estimating and monitoring target population

Each health center should estimate its annual target population for immunization at the beginning of each calendar year. This figure can be obtained by estimating the total live births fom the previous calendar year who live within the geographical service (catchment) area of the health center minus infant mortality for the same year. For example, live births in 1983 were 122 and infant mortality 2. The target population for 1984 would then be 122 minus 2, or 120.

The annual target of 120 can then be broken down by dividing by 12 to obtain the monthly target figure for immunization. With the annual and monthly targets

Contents

available, coverage can then be monitored at monthly intervals to determine if progress is adequate to achieve the annual target set for immunization coverage.

For example, a target of 90% immunization coverage is set for children under 1 year of age by the end of the calendar year. Therefore, it will be necessary to completely immunize at least 108 children (90% of 120) annually. Dividing this figure by 12, nine children per month will have to be fully immunized to reach the target set by the health center.

The monitoring chart used by the Expanded Program on Immunization (EPI) in the Caribbean area is ideal for this purpose. *(See EPI Newsletter II-6, December, 1980)*. It should be remembered that the target population is an estimate from the previous year's figures and may not be accurate. At the end of each year, the final figures should be reviewed and adjusted if necessary.

Administering EPI vaccines simultaneously

In some cases health workers are reluctant to administer EPI vaccines simultaneously. This may be the same child who never returns to receive other immunizations nor to complete the DPT or TOPV course.

The EPI Global Advisory Group recommends that on each visit a child should be given as many EPI vaccines as are indicated by the age of the child. For example, a 3 month old could be given DPT (intramuscular injection, *See* **Editorial Note**), BCG (intradermal injection in the upper right arm) and TOPV drops in the mouth. The advantage of simultaneous administration of the vaccines is reduction in the number of visits needed to complete the immunization schedule.

Numerous scientific studies support simultaneous EPI vaccine administration. They also show that when given together vaccines are as effective (or nearly so) as when given separately. Furthermore, simultaneous administration of the EPI vaccines does not increase the risk, reactions, or complications.

Immunizing ill or malnourished children

Some children are seen at the health center only when they are ill and may require treatment. Consequently, the health worker is faced with the problem of whether or not to immunize them. Each country should formulate its own policies, preferably based on the advice of a broadly constituted advisory group. The policy should reflect a practical appraisal of the risks of the disease as well as benefits and risks of immunization. Essential considerations include the availability and accessibility of health care services, patterns of utilization of these services, the ability to identify and follow-up children who are not immunized, the likelihood that children will return for subsequent immunization, and the sociocultural acceptability of specific procedures and recommendations.

Recording and reporting

It is important to keep immunization records on the standard reporting form at each level of the program. It is the responsibility of the supervisor at each level to verify the figures and ensure all necessary actions are taken promptly. This includes forwarding reports to the central authority through a well-defined and efficient procedure.

A number of immunizations performed by private practitioners and institutions are not reported. Both public and private health care providers should agree upon a standardized reporting format and flow of information that will allow for a better estimation of coverage attained.

Source: Henry Smith, CAREC, Adapted from *Taking Care*, 1(5):13-15, 1984.

Editorial note: The last meeting of the EPI Global Advisory Group, which met in Alexandria, Egypt in October 1984, made the following recommendation on this subject. "Countries are urged to review current practices regarding the anatomical site of intramuscular immunization. Taking into account the criteria of safety and ease of administration, **thigh injection** for DPT and arm injection for TT are strongly recommended."

Banishing measles from the world

Can we eradicate measles? Should we eradicate measles? Will we eradicate measles?

The answer to the first question rests on scientific fact. We can eradicate measles. The smallpox eradication program proved that the worldwide eradication of certain infectious diseases is possible. Although there are obvious differences between measles and smallpox, there are also epidemiological similarities. They are both viruses that cause recognizable rashes, a characteristic that is helpful for epidemiological surveillance programs. They both confer lifelong immunity. Neither has an animal reservoir or is harbored in inapparent chronic carriers among human beings.

Since 1963, an effective and safe vaccine for measles has been available, and it has been widely used in the USA and other countries. In the past it has not been put to maximum use because a smoothly functioning cold chain of storage, transportation, and delivery was required to preserve the viability of the vaccine virus. There is now a more heat-stable vaccine that can remain potent in the freeze-dried state for 3-4 weeks at ambient tropical temperatures without refrigeration. The containers that maintain low

The death of a child is an everyday occurrence in many parts of the world; however, the mortality rate of children would be lowered if all children had access to the routine vaccinations that are already commonplace in the developed world. (**Photo**: P. Almasy/WHO)

temperatures and protect vaccines have also been improved. Coupled with this technical progress is an economic advantage—the cost of measles vaccine has declined to only 10 cents per dose.

Measles can be controlled through the widespread and logical use of this vaccine.

The scientific evidence that measles can be eliminated seems to be solid. The second question to be asked is, "Should we eradicate measles?" In an era of scarce global resources, should money and talent be spent on eradication?

Again, the answer is yes—we should eradicate measles for reasons related to both health and economics. Measles is a major source of unnecessary suffering, premature mortality, and expense. Except in isolated populations, measles is nearly universal, most persons being infected before reaching the age of 15. Measles, under any circumstances, can cause serious complications. Among these are diarrhea, encephalitis, otitis media, pneumonia, and exacerbation of protein energy malnutrition. Therapy for measles and its complications is a major drain on medical care resources in most parts of Africa, Asia, and Latin America (1).

It has been estimated that approximately 900 000 deaths from measles occur each year in the developing world (1). In the Inter-American Investigation of Mortality in Childhood it was found that measles is the leading cause of death or the second leading cause in children aged 1-4 years in several cities in Latin America (2). Measles outbreaks in Africa and Asia have case-fatality rates of 5-20% among children, especially malnourished ones.

Measles complications may also result in developmental retardation, lifelong handicaps, and both direct and indirect economic loss. Furthermore, in children in the developing world, measles interacts with diarrheal disease and malnutrition to increase the morbidity and mortality from these conditions. In the developed nations, where the disease is less severe and there are facilities for saving lives, it is still important to eliminate measles.

When the indigenous transmission of measles has ceased, the USA must continue to bear the costs of routine vaccination, surveillance, and response to imported cases until global eradication is achieved. It has been estimated that these costs, for both treatment and prevention, may exceed $50 million a year. The earlier the global target of eradication is achieved, the sooner the USA can discontinue these expenditures. The nation bore the considerable cost of keeping its population free of smallpox for more than 25 years before the global smallpox eradication program began. The $32 million invested in the smallpox eradication program over 12 years is now saved every 3 months in the USA because global progress against the disease made it possible to discontinue routine vaccination and other protective activities. The prevention of measles by vaccination was estimated to have yielded an annual net saving of $130 million for the period 1963-1972 in the USA. The current annual saving is estimated to be approximately $500 million. Measles vaccination in the USA is estimated to have a benefit-cost ratio of 10:1. The return on such an investment in the developing world, where morbidity and mortality for measles are higher, would be even greater. A preliminary analysis of vaccine programs in the Ivory Coast suggests the benefit to cost ratio may well exceed 20:1.

The final question to be asked about the worldwide eradication of measles is the most difficult—will we do it? Can we muster the social will to eliminate another disease from the world? A realistic answer is that, probably, this will not be done for a long time.

While views on measles as a problem differ, its eradication is a worthwhile goal. A mechanism for achieving this goal is already being developed: the global Expanded Program on Immunization, coordinated by the World Health Organization. This program is successfully working with national governments and international donor agencies to ensure that immunization against five diseases will be routinely available to all the world's children by 1990.

The establishment of eradication as a goal might also help to stimulate further action in many developed countries whose populations have immunization levels high enough to reduce measles incidence to a point where the disease persists but is no longer a conspicuous problem.

A realistic answer to the question "Will we eradicate measles?" must also consider serious differences between smallpox and measles. Measles is a highly contagious disease, capable of causing explosive outbreaks and spreading rapidly. This characteristic contrasts with the epidemiology of smallpox, which generally spreads more slowly and could be contained by aggressive control measures. This difference between the two diseases suggests that an essential ingredient of any measles eradication program would be to attain and maintain extremely high immunization levels, probably in excess of 90%. Smallpox was eradicated by the containment of outbreaks and cases in many areas, but the immunity rates of the general population were often less than 50%. Measles immunization will have to reach children in virtually all parts of a country simultaneously and successfully.

Another important difference between smallpox and measles concerns the age of infection. Smallpox frequently involves children of all ages and adults. In the developing world, the usual age for contracting measles is about 12-18 months. Measles vaccine cannot be given effectively before the sixth or ninth month of life, and maximum serum conversion may not occur in some populations until the children concerned are 12-15 months old. From this it would appear that a permanent primary care infrastructure capable of delivering vaccines routinely to the majority of the population is necessary for the elimination of measles transmission.

A final major difference is the greater difficulty of surveillance operations for measles compared with those of smallpox. Measles is more readily confused with other illnesses causing rashes, and it does not leave a visible, easily recognized trace such as the scars that helped to determine who was immune to smallpox. Occasional serological surveys will be required unless reliable records are available, and this will mean additional logistic and laboratory expenses.

Worldwide measles eradication is worth a special effort. The international public health community should strive for it, but the leaders should not hold out false promises of rapid accomplishment. Its achievement will be another major test of will, and failure will be measured by each case of measles that occurs. No measles case is inevitable. Each one is a failure of the public health establishment to convince society that eradication is a feasible goal deserving support.

Source: Dr. William H. Foege, *World Health Forum, An International Journal of Health Development* 5(1):63-65, 1984

REFERENCES

1. WALSH, J.A. & WARREN, K.S. *New England Journal of medicine*, 301:967 (1979).

2. PUFFER, R.R., & SERRANO, C.V. *Patterns of Mortality in childhood. Report of the inter-American investigation of mortality in childhood.* Washington, DC, Pan American Health Organization, 1973 (Scientific Publication No. 262).

Nursing responsibilities in immunization

Probably the greatest responsibility of the nurse in immunization programs is teaching the public the advantages of immunization and encouraging widespread participation. In teaching it is advisable to provide information about diseases, explain why vaccination is desirable, and make sure parents know when it is time for the child to receive additional vaccine doses to be fully immunized.

Persons should be informed of the expected effects after vaccination and instructed to contact the closest hospital or health center if any other symptoms develop. The nurse must explain that the child may have a mild fever, may develop a rash, redness, tenderness, swelling and sometimes ulceration at the site of the injection. General malaise and muscle aching for a day or two are also common. Parents should be assured that all these are signs which show that the vaccine is working and should clear within 24 hours.

The diseases which infants and young children can get if immunization is not given are diphtheria, whooping cough, tetanus, measles, polio, and tuberculosis. If the effects of these are described to parents in a clear and precise manner, they may be more apt to make sure their children are fully vaccinated. This outline can serve as a guide but the nurse knows the patients best.

Disease	Effect
Diphtheria	Attacks the throat and causes suffocation, and death.
Whooping cough (Pertussis)	Coughing which causes vomiting, weakness, and distress.
Tetanus (Lock jaw)	Causes painful spasms and rigidity of body muscles. May cause death.
Measles	Attacks the whole body. Causes very high fever, cold, sore throat, and a rash. After a measles infection, a child may get severe complications such as pneumonia and diarrea and may lose his appetite and become malnourished.
Polio	It is a very serious disease and may cause parts of the body to become paralyzed.
Tuberculosis	May attack any part of the body, but usually attacks the lung. Causes severe coughing, loss of weight and progresses to death if not treated.

To be protected against these serious diseases, children must have the full course of vaccines at the right ages, i.e., three months to five years. Encourage parents to keep to the immunization schedule and stress the value of completing the immunization series.

The amount of work involved in reaching the last few children in a community who have still not taken their vaccinations is always greater than that involved in reaching the majority, whose parents are eager to cooperate. But in the end it is those last few children who really count. Keep searching for them.

Source: Adapted from *Taking Care*, U.W.I Santa Lucia, 1(4):7-8, 1984.

Using a pressure cooker as an autoclave

In recent years an assistant nursing professor of São Paulo University developed and tested a method of sterilization using a domestic pressure cooker and found it to be practical, economic, and comparable in efficiency to an autoclave.

The testing was carried out in response to a need for an inexpensive yet effective means of sterilization that would be available for home use. It was noted that patients frequently appeared at health clinics with infections caused by improperly sterilized objects such as needles, syringes, and nursing bottles.

The two methods of sterilization most frequently used in private homes and small health centers usually involve chemicals or boiling water; however, those procedures do not guarantee the inactivation of virus and bacilli.

Microorganisms' capacity to resist heat varies considerably according to the form in which they are present. Vegetative forms of microorganisms are less resistant to heat than spores; they can be destroyed by a temperature of 100°C for 30 minutes. Exceptions do exist such as the hepatitis virus B, which requires prolonged heat (up to one hour at 100°C or 13 to 30 minutes at 121°C) to completely inactivate the virus.

Because it generates steam just like an autoclave, the pressure cooker is an efficient method of sterilization that is very convenient where more reliable methods of sterilization are not available. The autoclave is the most efficient means of sterilization, but its use is limited due to high costs of installation and maintenance. The model used in most laboratories and small health centers is the vertical autoclave heated by fuel. The pressure cooker, much simpler in construction, is also heated by fuel while standing vertically.

The health staff at São Paulo University, supervised by Nurse Yoriko Kamiyama, carried out their experiment in three phases. After determining the temperature capability of pressure cookers, the staff developed an uncomplicated method for surface and deep sterilization. The last phase tested the effectiveness of the procedure.

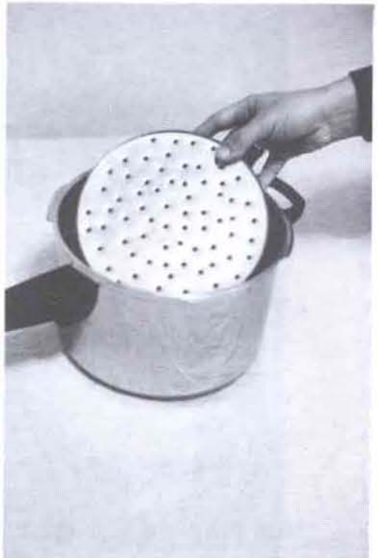
Public health care efforts should increase in times of economic hardship as health care needs increase with recession. One particularly important preventive measure is immunization. (**Photo**: M. Fenyes WHO)

Experiments demonstrated that a domestic pressure cooker could indeed reach temperatures necessary to destroy bacilli that resisted 100°C heat. The average steam generated by pressure cookers varied between 14.5 lb/in^2 ($t = 120.4°C$) and 18 lb/in^2 ($t = 124°C$), depending on the intensity of the flame. This figure compares very well with that obtained in the conventional autoclave which generates steam at 15 lb/in^2 for the sterilization to be effective.

Instructions follow for the procedure that can be used by health workers.

Materials

Use a three, four, or four 1/2 liter capacity pressure cooker with a lid that clamps or screws into position over the outer rim. Support the materials to be sterilized on a metal rack positioned about 6 cms from the bottom of the pressure cooker. A rack may be improvised by using a tin can approximately 17.5 cms in diameter, cut to a height of



Perforate the bottom of a tin can with holes, place it in pressure cooker, and fill only 75% of the space available above the rack. (**Photos**: M. Bevacqua)

6 cms, that has been perforated on the top with nail holes about 0.5 cms in diameter. The support should be made of a material that will not retain water. Wood, for example, is unacceptable.

Procedure

Place 500 ml of water in the pressure cooker. Use unbleached cotton to wrap the materials to be sterilized. Place the packets on the rack or improvised support and arrange them in such a way to allow steam to freely circulate. They should occupy no more than 75% of the space available above the support.

Lock the lid of the pressure cooker without putting on the safety valve and turn on the heat. Boil the water for five minutes to eliminate pockets of hot air and until the steam escapes in a steady flow. Then place the safety valve on the lid. As pressure builds inside the cooker and reaches the limit for which the valve was designed, a whistle is heard as hot steam is released. Lower the burner so that a continuous jet of whistling steam is maintained.

Time the sterilization from this point, 15 to 20 minutes for surface sterilization (syringes, needles, tweezers) and 30 minutes for deeper sterilization• (gauze, dressings).

When the sterilization is complete, turn off the heat and leave the closed cooker on the stove or on a surface that is not too cold (to avoid condensation). After five minutes the pressure will drop. Remove the safety valve but leave on the lid for an additional 10 minutes. Allow the contents to dry with the cooker partly opened.

The unbleached cotton packets are usually dry. However, should the temperature be low and the humidity high, the packets in the middle may be damp. In that case, take out the materials and support, pour away remaining water, return support and material to cooker and heat it over a low heat for five minutes with cooker opened or partly opened.

Once the sterilized packets are cooled, they should be stored under cover in a dry place. Label the storage container with the date of sterilization and the signature of the person who carried out the sterilization procedure.

Testing

The efficiency of **deep sterilization** was tested by using a piece of gauze contaminated with *bacillus subtilis* spores. This was placed in the pressure cooker along with other items for deep sterilization. Four timed sterilizations were carried out at 10, 20, 25, and 30 minutes respectively and then the gauze was removed asceptically and inoculated in a sterile thioglycolate culture medium for a number of days. Results showed that no *bacillus subtilis* growth occurred in the items that had been sterilized for 20-30 minutes.

A similar test for **surface sterilization** revealed that 13 minutes is enough time for safely sterilizing objects such as bottles and needles.

Training

A three day training course which covered principles of sterilization was conducted for five community health workers from the area. The procedure was illustrated first with slides and instructional materials followed by a demonstration and practice session. Workers also learned to fabricate the perforated baseplate which was cut from the bottom of a powdered milk tin.

During the training period and in the weeks which followed, a number of minor difficulties were encountered. Storing sterilized material overnight in the local center was found to be unsatisfactory and it was decided that material should be sterilized on the same day that it is

• Surface sterilization refers to vapor contact only with the surface of a material; deep sterilization refers to vapor contact with all parts of a material and the fibers of a material.

Reported Cases of EPI Diseases

Number of reported cases of measles, poliomyelitis, tetanus, diphtheria and whooping cough, from 1 January 1984 to date of last report, and for same epidemiological period in 1983, by country

Subregion and Country	Date of last report	Measles		Poliomyelitis		Tetanus: Non-neonatorum		Tetanus: Neonatorum		Diphtheria		Whooping Cough	
		1984	1983	1984	1983	1984	1983	1984	1983	1984	1983	1984	1983
NORTHERN AMERICA													
Canada	01 Dec.	4,050	915	1	—	2	5	...	...	3	12	1,129	2,198
United States	01 Dec.	2,499	1,423	3	6	63	70	...	...	2	4	2,039	2,090
CARIBBEAN													
Antigua and Barbuda	06 Oct.	1	4	...	—	—	1	—	—	—	—	—	—
Bahamas	03 Nov.	33	2,851	—	—	1	—	—	—	—	—	—	8
Barbados	03 Nov.	4	5	—	—	4	6	—	—	—	—	—	—
Cuba	11 Aug.	2,734	2,425	—	—	7	14	—	—	—	—	58	227
Dominica	03 Nov.	154	1	—	—	—	1	—	1	—	2	1	11
Dominican Republic	16 Jun.	2,115	1,440	—	7	42	49	1	11	51	41	88	151
Grenada	03 Nov.	8	268	—	—	—	—	—	—	—	—	—	—
Haiti	16 Jun.	1,225	422	13	21	145	83	56	12	18	18	427	221
Jamaica	06 Oct.	225	...	—	...	2	...	4	...	7	...	26	...
Saint Lucia	01 Sep.	12	58	—	—	1	1	...	...	—	—	—	—
St. Christopher-Nevis	15 Sep.	2	556	—	—	1	—	—	—	—	—	—	—
St. Vincent and the Grenadines	07 Jul.	14	55	...	...	...	...	...	...	...	...	15	...
Trinidad and Tobago	08 Sep.	3,303	1,861	—	—	12	12	—	—	—	—	—	—
CONTINENTAL MIDDLE AMERICA													
Belize	01 Dec.	3	11	...	...	—	1	—	—	—	—	1	1
Costa Rica	06 Oct.	6	19	—	—	4	2	—	1	—	—	128	34
El Salvador	08 Sep.	3,248	1,665	15	58	48	33	33	28	12	11	325	344
Guatemala	31 Mar.	868	867	5	31	28	30	...	...	2	6	450	297
Honduras	03 Nov.	2,853	1,073	48	3	13	21	14	—	—	—	448	494
Mexico	*	...	...	...	...	...	...	...	...	...	...	...	...
Nicaragua	08 Sep.	118	...	—	...	...	...	...	...	—	...	42	...
Panama	03 Nov.	338	3,747	—	—	5	5	5	15	—	—	144	66
TROPICAL SOUTH AMERICA													
Bolivia	21 Apr.	805	1	...	13	...	...	...	...	19[a]	46	438	...
Brazil	11 Aug.	36,694	29,294	34	33	1,313	1,344	372	447	2,254	2,452	11,188	18,231
Colombia	*	...	...	...	...	...	...	...	...	...	...	...	...
Ecuador	16 Jun.	4,188	546	—	5	43	32	21	35	62	8	195	502
Guyana	08 Sep.	187	—	—	—	7	—	...	...	—	—	—	—
Paraguay	03 Nov.	707	945	1	10	72	62	72	112	9	3	569	207
Peru	22 Sep.	2,406	...	63	...	189	...	4	...	42	...	2,236	...
Suriname	14 Jul.	21	12	—	—	2	...	—	...	—	1	—	—
Venezuela	06 Oct.	7,273	8,327	—	...	...	...	...	...	2	...	1,163	2,459
TEMPERATE SOUTH AMERICA													
Argentina	06 Oct.	17,246	2,374	2[b]	...	107[b]	...	...	...	10	35	10,703	1,963
Chile	03 Nov.	3,354	4,668	—	—	19	22	...	...	119	77	1,059	113
Uruguay	28 Aug.	28	6	—	—	7	1	—	...	—	...	63	182

[a] 21 Aug.
[b] 21 Jul.
* No 1984 reports received, therefore no information is shown for 1983.

— No cases
. . . Data not available

to be used. At first, the flame of the gas burner was found to be unsteady because a regulating valve had not been fitted between the cylinder and the burner. This was subsequently corrected and the gas flame stabilized. Health workers were not able to accurately time the sterilization period when relying on their own watches because of the high level of activity in the center. Clock timers with an alarm were therefore introduced.

Sterilization by pressure cooker was found to be superior to boiling water primarily because steam under pressure reaches a higher temperature, but also because the possibility of contaminating cotton-wrapped materials by handling them after they have been sterilized is greatly reduced. Pressure cooker sterilization is practical, economical, without serious difficulties in implementation, and is easily carried out at the health facility or at home as well as in rural areas.

Editorial note: Water boils at 100°C (at sea level). At higher altitudes, as the atmospheric barometric pressure drops, water boils at much lower temperatures. Because of this, boiling is certainly not an effective means of sterilization. Steam under pressure is far more reliable. The efficiency of pressure cookers as sterilizing devices depends on their air tightness. Rubber washer rings attached to the lid tend to wear out causing steam leaks and rendering sterilization ineffective. It is essential, therefore, that those who consider this method should have extra rings so that worn out washers can be replaced.

Source: From a paper prepared by Yoriko Kamiyama of São Paulo University's Department of Medico-Surgical Nursing Care: *Experience sur l'utilisation de la marmite a pression en tant qu'autoclave.*

Revolving Fund contracts set vaccine prices

Prices which will be in effect for the period 1 January 1985 to 31 December 1985 for vaccines purchased under EPI annual contracts are provided below for information.

Participants are reminded that a lead time of four to six weeks is necessary for delivery once an order has been placed with a supplier. To be sure that vaccines arrive in time for immunization activities, it is best to order three months before they are needed.

Vaccine	Number of doses per vial	Price per dose F.O.B. US$
DPT	10 doses	.021
	20 doses	.016
POLIO	10 doses	.025
	20 doses	.01625
	50 doses	.0135
MEASLES	1 dose	.16
(Edmonston)	1 dose with syringe	.215
MEASLES	1 dose	.32
(Schwartz)	10 doses	.067
	10 doses w/2ml syringe	.120
BCG	10 doses	.078
	20 doses	.041
	50 doses	.0234
TT	10 doses	.0135
	20 doses	.010
DT	10 doses	.014
(adult)	20 doses	.014
DT	10 doses	.018
(pediatric)	20 doses	.014

The *EPI Newsletter* is published bimonthly, in English and Spanish, by the Expanded Program on Immunization (EPI) of the Pan American Health Organization (PAHO), Regional Office for the Americas of the World Health Organization (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.

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.

Editor: Ciro de Quadros
Assistant Editors: Peter Carrasco
Kathryn Fitch

Contributors to this issue:
Maureen Anderson, PAHO
Jacqueline Barth, PAHO

ISSN 0251-4710

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.