EPI Newsletter

Expanded Program on Immunization in the Americas

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The Use of Rapid Coverage Monitoring: The Vaccination Campaign against Measles and Rubella in Ecuador

Background

In Ecuador, the results of immunization campaigns are generally measured against the administrative coverage. On occasion, international agencies have carried out cluster surveys at the national and provincial level, with the support of external researchers. The results of these surveys were rapidly produced, but the information did not reach immunization managers in a timely manner to undertake the necessary corrective steps.

It is not unusual for coverage rates in some provinces and health areas to exceed 100% while in others repeated reports of low coverage are registered, with health workers claiming an overestimation of the assigned population. This has led PAHO to recommend that simple methods for rapid coverage monitoring (RCM) be used to validate the percentage of individuals vaccinated, but without replacing the use of administrative coverage information.

Methodology

Staff at the provincial and local (health areas) levels were trained to use RCM as a supervisory tool for local level staff (**internal RCM**) during the implementation of a vaccination campaign, and also as a final evaluation tool to be used by staff from the province or health area level after the campaign ended (**external or crossed RCM**).

The following criteria were used to select areas with probable low coverage: remote areas, border areas, marginal urban areas, indigenous communities, communities of African descent, and migrant communities. Since the blocks or localities were chosen intentionally or by convenience, the results cannot be applied to the health area. The methodology recommends having a map or sketch, choosing three to four non-bordering blocks, visiting homes to identify children within the ages targeted for vaccination, proceeding to the following block after surveying five to seven children in a block, and ending the process after surveying at least twenty members of each age group: 6 months to 4 years (less than five years old) and 5 to 14 years (school children). Two to three RCMs were programmed in each selected locality.

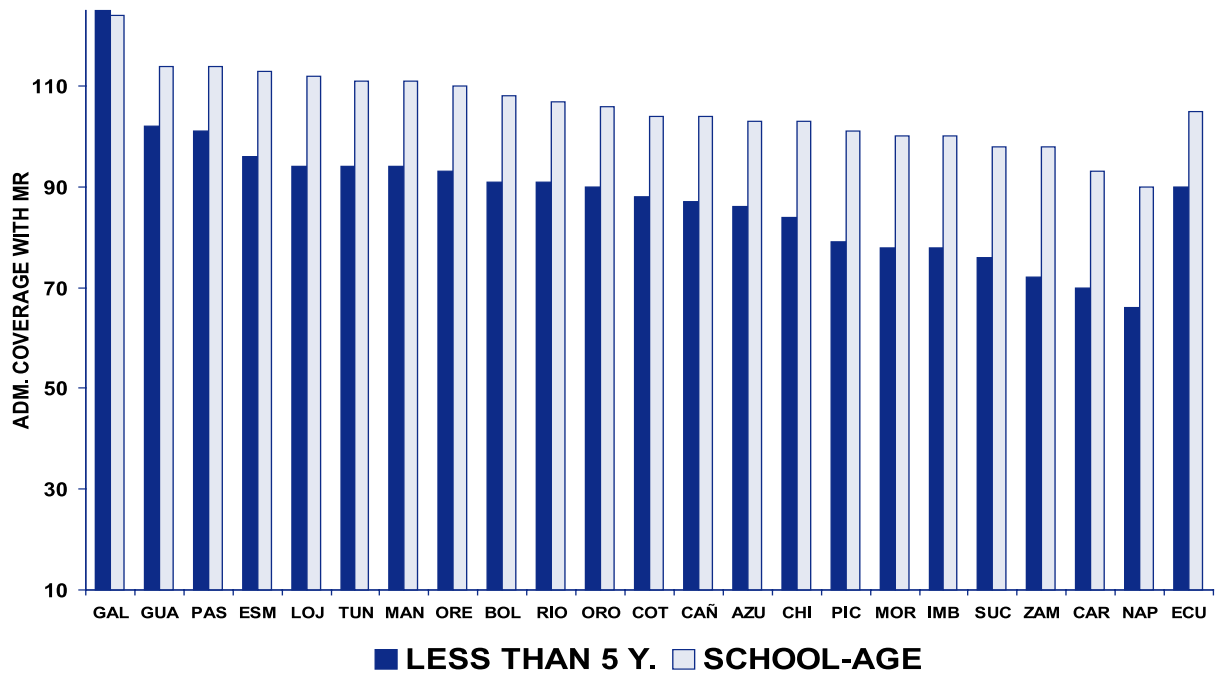
A form was designed to register the homes, the number of children surveyed, and the number of children vaccinated with MR (measles/rubella) vaccine during the campaign, and the percentage of vaccinated was calculated. The results of each RCM at the health area and provincial levels were tabulated on a separate form. An internal RCM was carried out in all health areas, while an external RCM was programmed in some urban and rural areas at the end of the campaign, due to budget limitations.

Among the variables collected were the number of health areas with RCM, number of internal and external RCMs carried out, number of children under five and school-age in each RCM, number of vaccinated children with MR according to each RCM, the range of the number of children in RCMs in every health area and province; administrative vaccination coverage according to province; and the range in coverage of the operational units within each health area.

Indicators for the analysis included: the percentage of vaccinated children in each RCM according to age group; average number of children by RCM; percentage of RCMs with 18 or more children of each age group; classification of RCMs according to range of the number of vaccinated children found (< 90%, 90–94%, > 94%).

In this issue:

Figure 1.
Administrative coverage with MR vaccine among children less than 5 years old and school-age in follow-up campaigns, by province – Ecuador, 2002



Results

The national administrative coverage was 100.7% in the target population (range: 85.3%-124.4% in provinces), 90% in children under 5 (range: 66%-125.2%), and 105.4% in school-children (range: 89.6%-124%), as seen in Figure 1. Seventeen provinces (77%) exceeded 95% administrative coverage, two (9%) did not reach 95%, and three (14%) were below 90%.

Among children under 5, four provinces (18%) had more than 95% administrative coverage, seven (32%) had between 90% and 94%, and eleven (50%) had less than 90%.

In 18 out the 22 provinces (88%), both internal and external RCMs were carried out, 2 provinces (9%) conducted only internal RCMs, and another 2 provinces (9%) conducted only external RCMs. Sixty nine percent of the 167 health areas (116) carried out both RCMs, 7% carried out only the internal RCM, 5% carried out only the external RCM;19% did not conduct a RCM.

In total, 1,172 internal RCMs were carried out in 127 health areas (average: 9 RCMs per area) and 574 external RCMs were carried out in 107 health areas (average: 5 RCMs per area). On average, 25 children under 5 (Range: 2–302) were questioned through internal RCM and 23 children under 5 (Range: 2–101) were questioned through external RCM. The average among schoolchildren was 34 (Range: 2–700) for internal RCMs and 27 (Range: 6–180) for external RCMs.

In the group of children under 5 years of age, 76% of internal RCMs and 69% of external RCMs indicated a percentage of vaccinated children of 95% or above, while 14% of internal RCMs and 18% of external RCMs indicated that the percentage of vaccinated children was below 90% (See Figure 2). In schoolchildren, 80% of internal and external RCMs showed 95% or more of schoolchildren were vaccinated, while 10% of internal RCMs and 7% of external RCMs showed that less than 90% were vaccinated.

Seventy four percent of internal RCMs and 89% of external RCMs included 18 or more children under five per RCM. Eighty five percent of internal RCMs and 96% of external RCMs surveyed 18 or more school-age children per monitoring.

Conclusions

It bears repeating that RCM results are exclusively applicable to the small number of children questioned and the percentage of vaccinated obtained cannot be used for statistical purposes since it is not the objective of the RCM.

In the majority of health areas where both internal and external RCMs were performed, the classification of health areas according to the percentage of vaccinated children was similar, which means that the analysis and decisions taken were consistent. As a consequence of this finding, it is recommended that internal RCM be solely used as an efficient method for validating coverage.

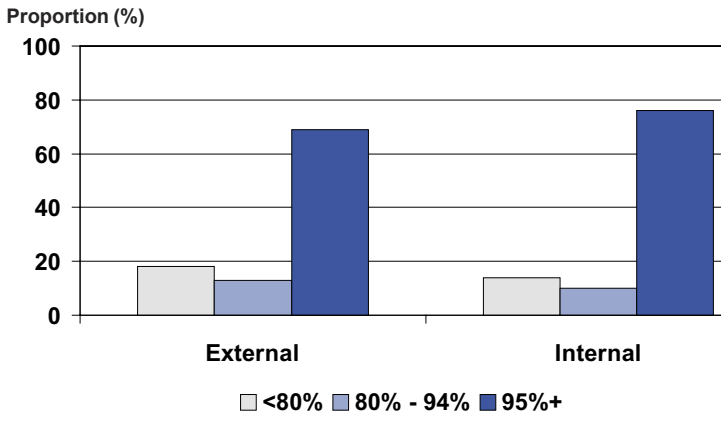
RCMs are recommended to be conducted once activities by the vaccination brigade have ended in the area or when the activities are no longer announced on loudspeakers and when the number of vaccinated in fixed posts or health units has decreased. In many health areas, mention was made that the decision to launch mop-up activities was due to non-satisfactory results of the RCM. However, no information was available regarding subsequent RCM or the number of doses applied during mop-up.

RCM is recommended for use mainly in urban or marginal urban areas, and centers of rural parishes, so as to survey in a relatively short time the twenty individuals required by the methodology.

It is recommended the number of RCMs be expanded to four in the catchment area of each operational unit and that they be carried out according to a schedule suitable to the dynamics of the community.

The RCM tool can easily be adapted to different vaccines or various circumstances depending on the objective pursued, such as assessing the percentage of vaccinated children or those with completed schedules during regular EPI supervision. Also, during supervision of a campaign, it might be necessary to learn the percentage of participation or the number of people having received any dose included in the schedule, be it a booster or additional shot. It is essential and of great assistance for local managers to be able to analyze the reasons for non-vaccination, because it indirectly pinpoints the existence and type of missed opportunities for vaccination and is an indication of the adjustments needed in the management of EPI.

Figure 2.
Distribution of external and internal RCMs among children under five according to percentage range of vaccinated in MR campaigns – Ecuador, 2002

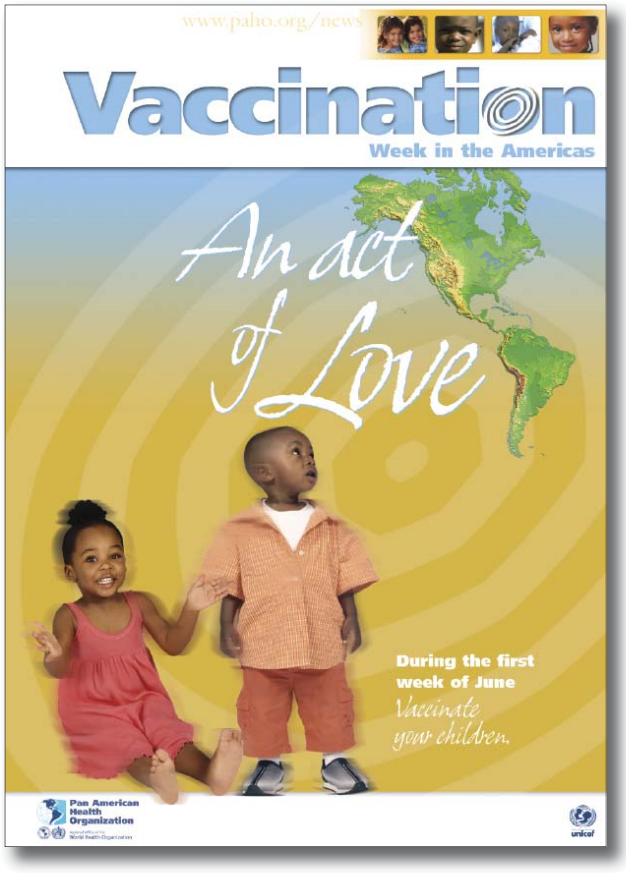


Finally, RCM should be a widely-used tool to guide supervision, programming, and training; to validate the reporting of FNVRI cases when used in conjunction with active search; to create opportunities for community participation; and to evaluate EPI at the local level.

Source: Nancy Vásconez (EPI/Ministry of Public Health), Nelly Idrobo (EPI/MOH), Jackeline Pinos (EPI/MOH), María del Carmen Grijalba (EPI/MOH), Fátima Franco (EPI-DPS Guayas), María Pazos (EPI-DPS Pichincha), Gonzalo Macías (EPI-DPS Esmeraldas), Mariana Nagua (EPI-DPS Los Ríos), Vance Dietz (PAHO-Immunization, Washington, DC), and Rodrigo Rodríguez (PAHO-Immunization, Ecuador)

Vaccination Week in the Americas

The first multi-country Vaccination Week in the Americas is set for June 2003. On 23 April 2002, the Ministers of Health of the Andean Region and Chile signed the *Sucre Agreement* recommending the simultaneous implementation of a National Immunization Week in all countries of the Andean Region. The Agreement outlined a series of steps aimed at preventing the regionalization of the measles outbreak that was affecting Venezuela and Colombia at the time. A key recommendation of the *Sucre Agreement* was the simultaneous implementation of an annual National Vaccination Week, beginning in 2003, with an emphasis on reaching high-risk population groups within countries. During the II Meeting of the Ministers of Health from South America, carried out in November 2002, in Lima, Peru, the initiative was expanded to include the countries of South America, and the first week of June 2003 was declared "Week of Measles Vaccination and Intensification of Epidemiological Surveillance for Vaccine-Preventable Diseases". Countries of Central America, Mexico and the Caribbean were also invited to join the initiative. In total, 19 countries will participate in the Region's first Vaccination Week with the goal of reaching 15 million children under five years of age and 2.7 million women of childbearing age.



Working meetings have taken place between health authorities and health staff of countries in the Southern Cone (8 March) and Andean regions (18 March). There have also been numerous border meetings to coordinate activities in areas being covered by the Vaccination Week. During the 13th Inter-American Meeting on Health and Agriculture (25 April), in Washington, DC, attending Ministers of Health proposed the implementation of a Pan American and Ibero-American Immunization Week for 2004. Work is underway to introduce the topic at PAHO's Governing Bodies through the Executive

Committee taking place in late June, and the meeting of the Directing Council that brings together all Ministers of Health in September. The issue will also be presented at the annual Meeting of Health Ministers of Central America (RESSCAD) in August, in Panama, and during the Meeting of the First Ladies to be held in October in the Dominican Republic. PAHO has met with several partners in an effort to mobilize resources. So far, UNICEF and the Centers for Disease Control and Prevention (CDC) have contributed US $278,000 and PAHO US $376,000. These resources have already been allocated to participating countries.

Paraguay and Bolivia have initiated *follow-up* measles vaccination campaigns which will end during the first week of June and coincide with the vaccination initiative. Brazil will be carrying out immunization activities in all its border municipalities during the first week of June, and simultaneously launch a national polio immunization campaign. In Ecuador and Peru, border vaccination will be inaugurated by the First Ladies. Other countries are aiming their efforts at districts or municipalities reporting low vaccination coverage, in order to complete the immunization schedule, or develop activities focused on smaller territorial units with indigenous or migrant populations, underserved population groups in marginal urban or rural areas, and population groups in border communities.

The Vaccination Week requires that each participating country prepare a Plan of Action. Vaccination will either take place at health facilities or other institutions, door-to-door campaigns, and through mobile and fixed posts. Activities of rapid coverage monitoring and active case-finding are being incorporated in the planning of the Vaccination Week. Some countries have also planned to carry out additional activities such as joint activities of Vitamin A supplementation. This multi-country effort demonstrates the commitment of countries in the Americas to cooperate towards a common goal. Achieving high vaccination coverage in each country is critical to maintaining a low incidence of vaccine-preventable diseases in the Region.

The evaluation of this initiative will take place in September, in Lima, Peru, with the participation of the 19 countries involved. The evaluation will focus on the following indicators: (1) goal of 95% of the population vaccinated with each antigen; (2) percentage of Rapid Coverage Monitoring (RCM) performed; (3) percentage of RCMs performed over the 95% goal; (4) number of homes visited during active search; (5) number of suspected measles cases found and percentage of suspected cases found that were already registered through the surveillance system; (6) percentage of sectors or areas where social communication evaluation interviews took place; and (7) number of sectors or areas where social communication evaluation interviews took place and 80% of the mothers interviewed had heard about the Immunization Week.

Upcoming Meetings

• XVII Sub-regional Meeting on Vaccine-Preventable Diseases, Central American Region, Mexico, and Latin Caribbean Countries	12-13 June 2003 Mexico City, Mexico
• Regional Meeting on Rotavirus Surveillance Implementation	1-2 September 2003 Lima, Peru
• Immunization Week Evaluation	3 September 2003 Lima, Peru
• Sub-regional Meetings on Vaccine-Preventable Diseases, Andean Region, Chile and Brazil (XIII) & Southern Cone Region and Brazil (XVII)	4-5 September 2003 Lima, Peru
• XX Caribbean EPI Managers Meeting	17-20 November 2003 Curaçao, Netherland Antilles

Steps to accelerate the Use of Rotavirus Vaccines in the Americas

Rotavirus remains the leading cause of morbidity and mortality due to diarrhea in children worldwide, both in developed and developing countries. Recent estimates suggest that annually 111 million diarrheal episodes among children under the age of 5 years worldwide are attributable to rotavirus, leading to some 25 million outpatient visits, 2 million hospitalizations and between 352,000 and 592,000 deaths. Every child will have at least one episode of rotavirus diarrhea by the time they are 5 years old. One in 5 children will require treatment in a health clinic for rotavirus diarrhea, 1 in 65 will be hospitalized, and 1 in 293 will die.

More than 80% of rotavirus associated deaths occur in the world's poorest countries (Figure 1). The risk of death faced by children in developing countries are likely higher due to compromised nutritional status, co-infections, co-morbidities and limited access to health care.

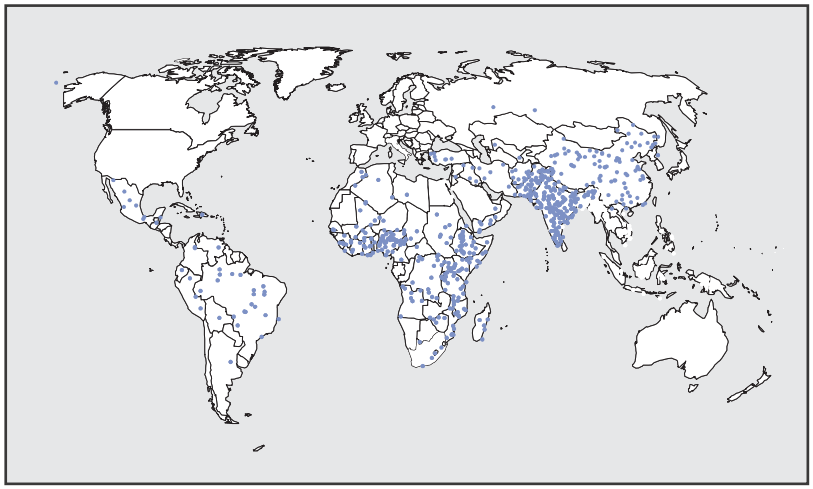


Figure 1. Estimated global distribution of 444, 000 annual rotavirus deaths in children less than five years old. One dot represents 1, 000 deaths
Source: Emerging Infectious Diseases, May 2003, 9(5): 565-572.

Rotavirus includes a genetically diverse variety of strains. These are categorized into groups, subgroups and serotypes. One (group A) of the seven major antigenic groups (groups A to G) has been most commonly associated with human illness. It contains two subgroups (I and II), further characterized by two specific proteins (G and P). Prevalence of rotavirus strains varies geographically and multiple strains may circulate concurrently. A limited number of serotypes are common worldwide (P[8]G1, P[8]G3, P[8]G4, P[8]G2). However, in developed countries, a limited number of strains tend to cause illness while in developing countries strain diversity seems more diverse.

Diagnosis of rotavirus illness depends on detection of the virus in stool. Antigen detection by enzyme immunoassay (EIA) is a widely used and accepted diagnostic modality. These tests are easy to perform, require limited training and resources and provide results rapidly. For virus characterization purposes, polymerase chain reaction based tests are used. For research purposes, electron microscopy and RNA electrophoresis are available. For surveillance purposes, EIAs retain acceptable sensitivity, specificity and usability.

The development and introduction of rotavirus vaccines have been identified by WHO as the best methods to reduce the global burden or rotavirus disease. Although the predominant mode of transmission of rotavirus is fecal-oral, improvements in sanitary conditions and water quality do result in decreases of total diarrheal deaths but do not eliminate rotavirus-attributable diarrheal deaths. With respect to treatment, oral rehydration therapy treats only the dehydration, is dependent on access to some form of healthcare during each diarrheal illness episode and is most effective in mild to moderately severe illness.

Rotavirus vaccine development has a long history hindered by the genetic diversity of rotavirus, and has varying immunogenicity, efficacy, and safety concerns. Development began in the late 1970s. Early vaccines often had lower efficacy in developing countries. Licensure of the first rotavirus vaccine, a live, oral, rhesus tetravalent rhesus-based rotavirus vaccine (RRV-TV), did not occur until 1998. By late 1999, the vaccine was withdrawn in the United States following reports of intestinal intussusceptions. Vaccine development efforts continue. Several vaccines are either in the late stages of development or in clinical trials, such that a viable, safe and effective rotavirus vaccine may be available in the next three years.

To accelerate the evaluation and potential use of rotavirus vaccines when they become available, the Pan American Health Organization's (PAHO) Immunization Unit is collaborating with the Children's Vaccine Program (CVP) implemented by Program for Appropriate Technology in Health (PATH). An objective of this collaboration is pursuing common advocacy goals in relation to rotavirus vaccine introduction and use. To achieve this, rotavirus surveillance projects to assess actual disease burden and establish a surveillance network in Latin America have been fostered. A generic protocol to serve as a general guide for these projects has been developed.

To date, three countries (El Salvador, Paraguay and Venezuela) and PAHO's Caribbean Epidemiology Centre (CAREC) have prepared and submitted proposals to undertake such surveillance projects. In each proposal, Ministries of Health, academics and clinicians will collaborate to systematically collect stool samples along with limited epidemiologic and clinical data from children presenting to selected hospitals for acute diarrheal illness over a two-year period. Stools samples will be tested for rotavirus and a selection of positive samples will be further tested to determine strain type. Finally, national disease burden estimates will be made in each participating

country to produce data from which to make decisions about rotavirus vaccine need. At one site, these activities may be supplemented by intussusception surveillance. Complementary activities of cost-effectiveness analyses and community-based health care services utilization surveys may be considered. The data resulting from all these activities will serve in the final analysis that will determine local vaccine need, introduction and use. The three countries and CAREC would represent the initial step in the formation of a rotavirus surveillance network in Latin America. As resources allow, additional countries would be incorporated to the network.

Selected laboratories would serve as reference laboratories for strain characterization through molecular techniques. This activity would build local laboratory capacities. Moreover, it will be important in monitoring circulation of strains before and after vaccine introduction.

Rotavirus activities in the Americas represent the collaboration of public and non-public sectors in assessing the local magnitude of a significant worldwide problem and the need for intervention and will lead to the prevention of many deaths and hospitalizations in the Region.

USAID-PAHO renew their Partnership

The United States Agency for International Development (USAID) has extended its grant agreement, *Immunization Initiative for Latin America and Caribbean Region*, for an additional two years. The grant in the amount of US $910,000 was previously scheduled to end September 2002, and is now extended until 2004. The Initiative is focused on the delivery of sustainable, high quality immunization services in 10 USAID priority countries for child survival (Bolivia, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Paraguay and Peru). The PAHO-USAID partnership includes regional and multi-country technical cooperation and highlights public and private sector partnerships, as well as policy development and technical guidance to guarantee the optimum performance of immunization delivery services, epidemiological surveillance, the flow of epidemiological information from local levels to the center, and diagnostic capabilities in the ten countries.

The PAHO-USAID partnership in immunization will focus on improving the policy environment related to expanded immunization programs, improve national capabilities of such programs, and strengthen and expand surveillance systems for vaccine-preventable diseases in 10 USAID priority countries. The Dominican Republic and Paraguay have been included as priority countries in this new phase.

USAID has been a key partner of the Americas in the control and/or eradication of infectious diseases that can be prevented through vaccination. Between 1987 and 1991, USAID supported PAHO and countries in eradicating polio in the Western Hemisphere with a grant in the amount of US $22 million. In 1991, PAHO and USAID signed a new grant agreement in the amount of US $20 million for a second phase that covered the period of 1991-1996. The second grant sought the consolidation of polio eradication efforts, enhanced control of neonatal tetanus and measles, and increased and sustainable high-level immunization coverage.

Accomplishments of the current USAID-PAHO partnership

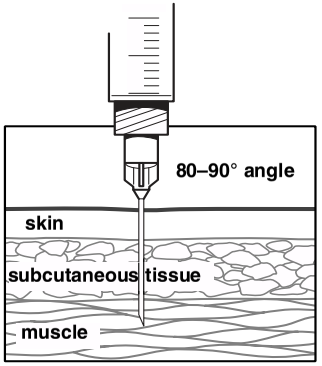
- Significant contributions towards the establishment of an immunization infrastructure in eight USAID priority countries for child survival, allowing for widespread immunization with the basic EPI vaccines
- Reduction of measles cases in all priority countries
- Revitalization of the Inter-agency Coordinating Committee (ICC) mechanism at the national level
- Honduras, Peru, El Salvador, Nicaragua, Bolivia, and Ecuador (6 of 8 countries) have formed National Committees on Immunization Practices (NCIP). NCIP duties includes reviewing new vaccine introduction into the national immunization schedule, providing guidelines and standards for immunization practices, as well as issuing recommendations for surveillance of vaccine-preventable diseases and the collection of data
- Seven of the eight priority countries are paying *all* recurrent costs of vaccines and syringes for the basic EPI vaccines with national resources
- Six of the eight priority countries have introduced new vaccines in their routine immunization programs
- National immunization programs have become a platform for the implementation of other health services that include the delivery of vitamin A supplementation and treatment of parasitic diseases, particularly in Bolivia, Nicaragua and Peru. Joint efforts have also been undertaken with the Integrated Management of Childhood Illnesses (IMCI) Initiative for the development of interventions aimed at reducing missed opportunities for vaccination in Bolivia and Guatemala.

How to administer Intramuscular (IM) Injections

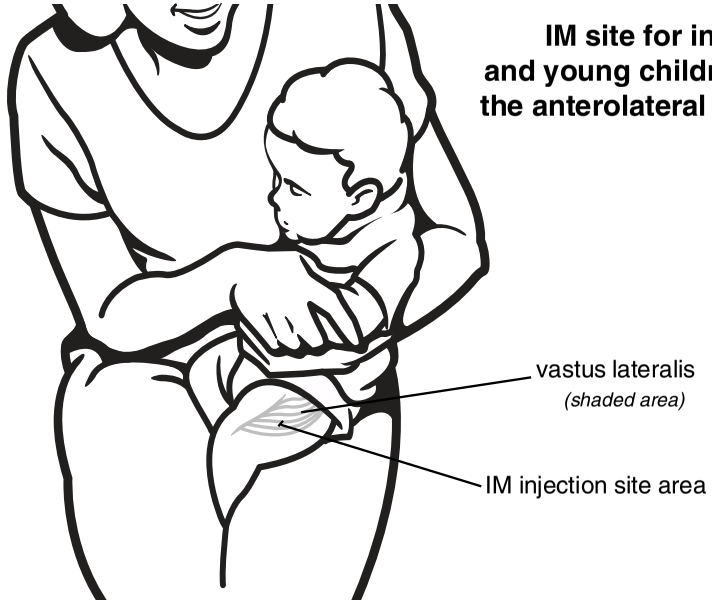
Administer these vaccines via intramuscular (IM) route: DTaP, DT, Td, Hib, hepatitis A, hepatitis B, influenza, PCV7. Administer IPV and PPV23 either IM or SC.

Patient age	Site	Needle size	Needle insertion
Infants (birth to 12 mos. of age)	Vastus lateralis muscle in anterolateral aspect of middle or upper thigh	7/8" to 1" needle, 23–25 gauge	Use a needle long enough to reach deep into the muscle. Insert needle at an 80–90° angle to the skin with a quick thrust. There are no data to document the necessity of aspiration.* Multiple injections given in the same extremity should be separated by a minimum of 1".
Young children (12 to 36 mos. of age)	Vastus lateralis muscle preferred until deltoid muscle has developed adequate mass	7/8" to 1" needle, 23–25 gauge	
Older children (>36 mos. of age) and adults	Thickest portion of deltoid muscle—above level of armpit and below acromion	1" to 2" needle, 23–25 gauge	

*American Academy of Pediatrics. *2000 Red Book: Report of the Committee on Infectious Diseases*: p.18.

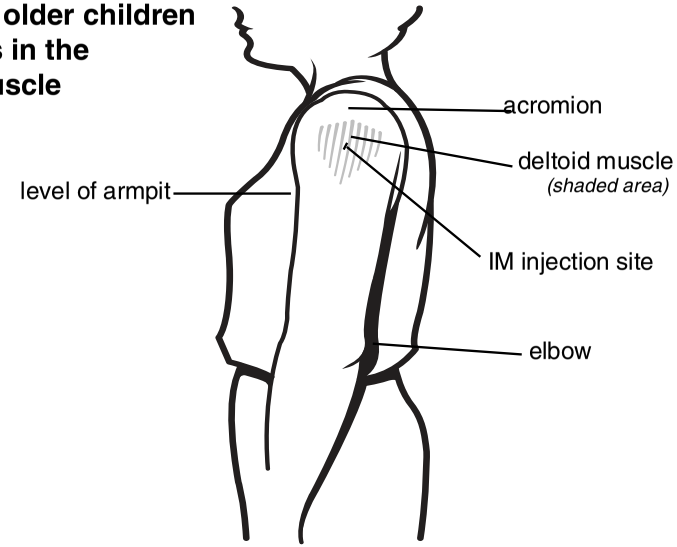


IM site for infants and young children in the anterolateral thigh



Insert needle at an 80–90° angle into vastus lateralis muscle in the anterolateral aspect of middle or upper thigh.

IM site for older children and adults in the deltoid muscle



Insert needle at an 80–90° angle into densest portion of deltoid muscle—above the level of armpit and below the acromion.

Adapted by the Immunization Action Coalition courtesy of the Minnesota Department of Health

Source: Immunization Action Coalition. Needle Tips, 2002; Vol.12(1): 10 www. immunize.org

Note: Following issue will include information on Subcutaneous (SC) Injections.

PAHO's Revolving Fund Vaccine Prices for 2003

The PAHO Revolving Fund for Vaccine Procurement has continued to provide the required vaccines, syringes and cold chain equipment to participating countries in the Americas that follow the Fund's procedures. In 1979, year the Fund was established, a total of US $2 millions of critical immunization supplies were purchased. This amount has grown to a total of US $144, 652,030 in 2002. In 2003, the Fund established contracts with countries to procure 18 different vaccines (Table 1).

Table 1.
2003 Prices for Vaccine purchased through the PAHO Revolving Fund

Vaccine	Doses per vial	Prices per Dose FOB US$
BCG	10	0.1167
DPT	10	0.0905
DT (Adult)	10	0.0490
DT (Pediatric)	10	0.0650
DPT Hib Lyophilized	1	3.0000
DPT Hib Liquid	10	2.5000
DPT/HEP B/Hib	1	3.7600
Hib Lyophilized	1	2.9200
HEP B 10 MCG recombinant pediatric	1	0.5200
HEP B 20 MCG recombinant	1	0.7200
	10	0.2900
Measles (Edmonston)	1	0.8000
	10	0.1200
Measles Rubella	1	1.1000
	2	0.8000
	10	0.4800
Measles/Mumps (URABE) Rubella=MMR	1	1.4900
	10	1.1154
Polio (Glass Vial)	1	0.1400
	10	0.1350
Polio (Plastic Vial)	10	0.1430
	20	0.1350
	25	0.1300
Rabies Human Inactivated Purified Vero Cell	1	8.5000
TT	10	0.0400
Yellow Fever	5	0.5300
	20	0.8000

Table 2.
Comparison of the cost* to fully vaccinate a child with different vaccine combinations

	Combination	Price per combination (US$)		Percent Increase
		2002	2003	
A	BCG (1), Pentavalent (3), MMR (1), OPV(3)**	12.80	13.32	4.06%
B	BCG (1), Pentavalent (3), MMR (1), OPV(3) ***	12.36	12.92	4.49%
C	BCG (1), DPT/Hib (3), MMR(1), OPV(3), HepB (3)****	Not available	11.10	N/A

(1), (3) Number of doses required
* Delivery and administration costs not included in price calculations
** MMR in single dose vials, OPV in 10 dose vials
*** MMR in 10 dose vials, OPV in 20 dose vials
**** DPT/Hib in 10 dose (liquid) vials, MMR in single dose vials, OPV in 10 dose vials, Hep B Pediatric in single dose vials.

Since the introduction of new vaccines into childhood immunization schedules, countries can select different combinations of vaccines and use different vial sizes for their immunization programs to fully immunize a child (Table 2). In Combination A and B, the formulation of PAHO's pentavalent vaccine consists of DPT/Hep-B/Hib. From 2002 to 2003, the cost for a fully vaccinated child increased in Combination A by 4.06% and in Combination B by 4.49%. In 2003, the cost of using smaller vials (Combination A) is US $0.44 more per child than using larger vials (Combination B). At the request of selected countries, contracts were established to procure Hep-B Pediatric. Using Hep-B Pediatric vaccine with DPT/Hib presents the least costly combination (C). However, three additional syringes need to be procured for each child when using Combination C (DPT/Hib is separately administered from Hep-B). The advantage of using the pentavalent formulation is that uniform coverage is more easily obtained when all antigens are administered in one injection (i.e., DPT/Hep-B is mixed with freeze dried Hib). The cost of yellow fever vaccine should be considered in each combination for countries requiring it as part of their immunization schedule.

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