

Paving the Way for Immunization

XX Meeting of the Technical Advisory Group on Vaccine- preventable Diseases (TAG)

17-19 October 2012

Final Report



TECHNICAL ADVISORY GROUP ON VACCINE-PREVENTABLE DISEASES
XX MEETING: “PAVING THE WAY FOR IMMUNIZATION”
Washington DC, 17-19 October 2012

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Acronyms

AFP	Acute Flaccid Paralysis
aP	Acellular Pertussis vaccine
BMGF	Bill and Melinda Gates Foundation
bOPV	Bivalent Oral Polio Vaccine
CDC	Centers for Disease Control and Prevention of the United States
CFR	Case Fatality Rate
CRS	Congenital Rubella Syndrome
cVDPV	(circulating) Vaccine-derived Poliovirus
DoV	Decade of Vaccines
DPT	Diphtheria-Pertussis-Tetanus vaccine
DPT3	Third dose of the Diphtheria-Pertussis-Tetanus vaccine
DTaP	Diphtheria, Tetanus and Acellular Pertussis vaccine (pediatric)
DT	Diphtheria-Tetanus vaccine (pediatric)
EPI	Expanded Program on Immunization
EW	Epidemiological Week
GACVS	Global Advisory Committee on Vaccine Safety
GPEI	Global Polio Eradication Initiative
GVAP	Global Vaccine Action Plan
Hib	<i>Haemophilus influenzae</i> type b
ICC	Interagency Coordinating Committee
IEC	International Expert Committee (for the documentation and verification of measles, rubella, and CRS elimination in the Americas)
IPV	Inactivated Polio Vaccine
MR	Measles-Rubella vaccine
MSF	Doctors without Borders (from the French <i>Médecins sans Frontières</i>)
NIP	National Immunization Program
NITAG	National Immunization Technical Advisory Group
NLN	National Laboratory Network
NNT	Neonatal Tetanus
NRA	National Regulatory Authority
OCV	Oral Cholera Vaccine
OPV	Oral Polio Vaccine
PAHO	Pan American Health Organization
PoA	Plan of Action
RF	PAHO's Revolving Fund for the Purchase of Vaccines and Immunization Supplies
RIVS	Regional Immunization Vision and Strategy
SAGE	Strategic Advisory Group of Experts on Immunization for the WHO
TAG	PAHO's Technical Advisory Group on Vaccine-preventable Diseases
Tdap	Tetanus, Diphtheria, and acellular Pertussis vaccine (adolescents/adults)
tOPV	Trivalent Oral Polio Vaccine
TT	Tetanus Toxoid
UNEP	United Nations Environment Program
UNICEF	United Nations Children's Fund
WHA	World Health Assembly
WHO	World Health Organization
wP	Whole-cell Pertussis Vaccine

Introduction

The XX Meeting of the Technical Advisory Group (TAG) on Vaccine-preventable Diseases of the Pan American Health Organization (PAHO) was held in Washington, D.C. on 17-19 October 2012. The slogan for the meeting, “Paving the Way for Immunization”, reflected the Region’s global leadership in immunization.

The purpose of the meeting was to make recommendations on how to address current and future challenges facing immunization programs in the Americas.

The Deputy Director of PAHO, Dr. Jon Andrus, opened the meeting by welcoming the participants and providing introductory remarks.

Dr. Ciro de Quadros chaired the meeting and began by asking the participants to take a minute of silence in memory of Dr. Claudio Marcos da Silveira, who passed away on 28 August 2012. During his years in PAHO, he collaborated in the development and implementation of several immunization strategies that resulted in the regional control and elimination of various vaccine-preventable diseases, notably the regional elimination of polio and measles and the elimination of neonatal tetanus as a public health problem in most countries of the Americas.

The TAG recognized the contributions of the PAHO secretariat to the success of this meeting and thanked PAHO headquarters for hosting it.

The Global Polio Eradication Initiative (GPEI) continues to make progress towards eradication. Following the successful interruption of the circulation of polio in India in 2011, the virus is currently endemic in only three countries (Afghanistan, Nigeria and Pakistan). Nigeria is the only country in the world where the type 2 vaccine-derived poliovirus (cVDPV2) has circulated for over 5 years.

In 2011, wild polioviruses which originated in Nigeria and Pakistan caused epidemics in countries that had been polio-free, emphasizing the constant risk of importation or exportation of the virus to areas where polio had already been eliminated.

At its most recent meeting held in Geneva on 10-12 April, the Strategic Advisory Group of Experts (SAGE) on Immunization recommended that, the World Health Organization (WHO) should promote switching from the trivalent oral polio vaccine (tOPV) to the bivalent oral polio vaccine (bOPV) for routine vaccination. This change should take place in a synchronized manner in order to minimize the risk of cVDPV2 circulation and outbreaks, as well as to accelerate the elimination of type 1 and type 3 wild viruses, since the bivalent vaccine provides better protection against those virus types than the trivalent vaccine.

The SAGE recommendation is based on the fact that “poliovirus type 2 was eliminated in 1999 and that the continued use of tOPV, in areas where coverage is not adequate, contributes to ongoing type 2 vaccine-associated paralytic poliomyelitis and vaccine-derived polio virus outbreaks (cVDPV2).” The SAGE working group emphasized that before interrupting the use of the type 2 vaccine, the following conditions should be met: the current outbreak of cVDPV2 in Nigeria must be interrupted; absence of outbreaks caused by cVDPV2 for at least one year; adequate epidemiological surveillance that makes it possible to detect and control any cVDPV2 outbreak; adequate quantities of bOPV available; an inactivated polio vaccine (IPV) at an affordable price, a global reserve of type 2 monovalent vaccine (mOPV); and an international agreement to discontinue the global use of tOPV.

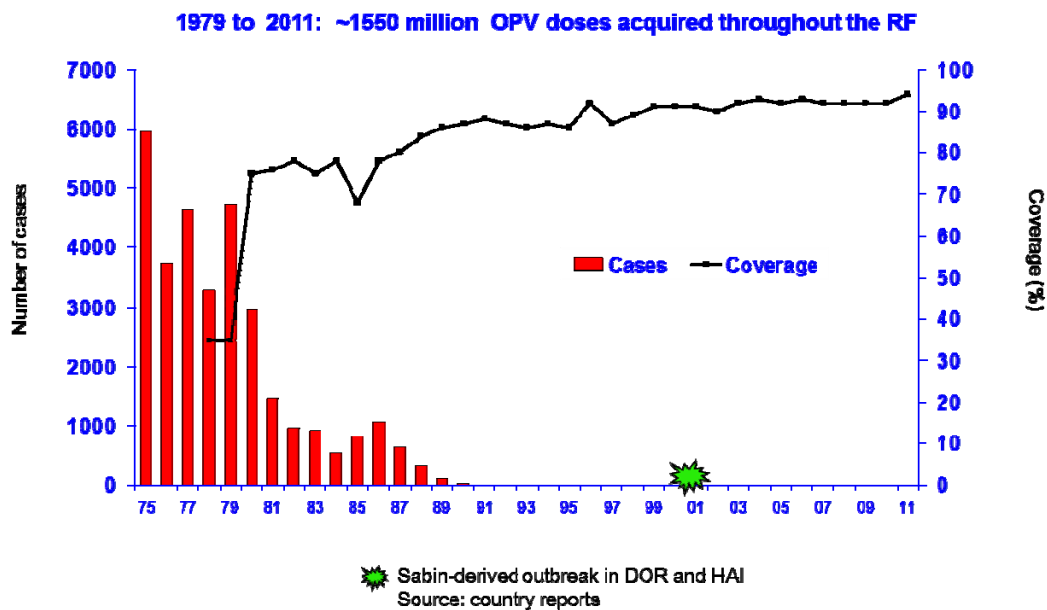
During its 65th meeting in May 2012, the World Health Assembly (WHA) adopted Resolution WHA65.5, which states that “substantial planning is required for a globally synchronized switch from trivalent to bivalent oral poliovirus vaccine for routine immunization and, potentially, the introduction beforehand of one or more doses of inactivated poliovirus vaccine. In 2012, the SAGE will provide recommendations on the actual implementation of this strategy based on broad-based consultations across a number of work streams.” In the Resolution, the WHA asks WHO’s Director-General to undertake the development, scientific vetting, and rapid finalization of a comprehensive polio eradication “endgame” strategy, and inform Member States of the potential timing of a switch from trivalent to bivalent oral poliovirus vaccine for all routine immunization programs.

Currently, there are still knowledge gaps to support this recommendation. To address this issue several research projects are under way, promoted by WHO and the Bill and Melinda Gates Foundation. The research promoted by the BMGF will be conducted in 5 countries of Latin America and will evaluate the use of bOPV and IPV in sequential schedules.

The last indigenous case of wild poliovirus in the Region of the Americas was detected in 1991, and the Region was certified as polio-free in 1994. Since its elimination in 1991, the only cVDPV outbreak

occurred in 2000-2001 in the Dominican Republic and Haiti, and it was caused by a type 1 polio-derived virus (Figure). In 2010, the Region completed phase 1 of the laboratory containment of polioviruses. Since the elimination of polio in the Americas, countries continued to vaccinate and conduct surveillance of acute flaccid paralysis (AFP), with surveillance indicators similar to the pre-elimination era.

OPV3 coverage in children under 1 year of age and Polio cases in the Americas, 1975- 2011



During this meeting, PAHO's TAG discussed the implications of a potential change in vaccination recommendations, noting that the Region of the Americas managed to eliminate wild poliovirus in 1991; and since then has remained free of polio without outbreaks due to importation, using the tOPV vaccine.

Recommendations:

1. TAG awaits the World Health Organization's comprehensive polio eradication and *endgame* strategy, as well as results from ongoing and planned research to revisit its recommendations for the Region of the Americas. At the present time, the trivalent oral poliomyelitis vaccine (tOPV) remains the vaccine of choice for the Americas. To this end, PAHO, in collaboration with WHO, should negotiate with providers to ensure sufficient supply of tOPV for countries of the Americas.
2. Countries considering the introduction of the inactivated polio vaccine (IPV) should first fulfill the sanitation and vaccination coverage conditions recommended during TAG's previous meeting (Argentina 2011). If a country does not meet these basic conditions, it should conduct at least two annual vaccination campaigns, administering the tOPV to every child aged <5 years, without taking into account their previous vaccination status. Countries making plans to introduce the IPV should be able to guarantee its long-term supply, in addition to considering the price of the vaccine.

3. Countries should reinforce surveillance of AFP, attain adequate levels in all basic surveillance indicators, and continue working to achieve $\geq 95\%$ polio coverage in every municipality.
4. As IPV will be considered for use in the polio endgame requested by the WHA, it will be important for WHO to maintain a fluid dialogue with vaccine manufacturers to ensure an adequate IPV supply at an affordable price for countries of all income levels, as this will be a factor in the rapid adoption of the vaccine.
5. PAHO is in an advantageous position to work with the GPEI, in the development of the *endgame* strategy and for the synchronized cessation of vaccines containing poliovirus type 2, and supporting cost-effectiveness studies for different scenarios. Additionally, the World Immunization Week could be used as an effective platform for globally coordinated actions.

Use of Thiomersal in Vaccines

Mercury exists in different forms and compounds that can be found in the environment. Major sources of exposure include an accumulation of methylmercury within the food chain and through fish consumption. Methylmercury is a neurotoxic of major public health concern, with a half-life of approximately 50 days.

Thiomersal, which is also known as thimerosal, mercuriothiolate and sodium 2-ethylmercuriothio-benzoate, is a compound that contains ethylmercury, and not methylmercury. It is used to prevent the proliferation of bacteria and fungus during storage and, above all, during the use of open multi-dose vials of certain vaccines. Ethylmercury has a very short life with a half-life of roughly a week, it is quickly excreted, and therefore does not accumulate in the human body.

Some vaccines contain traces of thiomersal (<0.5 µg per dose) if a preservative has been used during their manufacture, but has not been added to the end product. Other vaccines contain thiomersal in varying concentrations (from 10 to 50 µg per dose) added as a preservative in order to avoid contamination by microorganisms when multi-dose vials are produced. The diphtheria, pertussis, tetanus (DPT) vaccine, the diphtheria tetanus vaccine (DT), the tetanus toxoid (TT) vaccine, and the hepatitis B, *Haemophilus influenzae* type b (Hib) and influenza vaccines are part of this group. These vaccines are used in over 120 industrialized and developing countries to immunize at least 64% of the annual world birth cohorts, averting at least 80 million deaths per year, as well as illness and hospitalizations.

For over 10 years, through its Global Advisory Committee on Vaccine Safety (GACVS), WHO has closely followed scientific evidence pertaining to the use of thimerosal as a vaccine preservative for over 10 years. Following the examination of available epidemiological information and the pharmacokinetic profile of this compound, it concluded that there was no evidence of mercury toxicity in infants, children or adults exposed to thiomersal from vaccines. Therefore, there is no safety-related reason to change current vaccination practices involving vaccines containing this preservative.

Based on the above discussions, at its most recent meeting held in April 2012, the SAGE acknowledged that vaccines containing thiomersal are safe and that replacing this compound with an alternative preservative could affect the quality, safety and effectiveness of vaccines. In addition, it established that available information justifies the recommendation not to change the WHO immunization policy on vaccines containing thiomersal. Other expert groups (the Institute of Medicine of the United States, the American Academy of Pediatrics, the United Kingdom's Committee on Safety of Medicines, and the European Agency for the Evaluation of Medicinal Products) have reached similar conclusions.

In response to the United Nations Environment Program's (UNEP) proposal to approve a world treaty to prohibit the use of mercury in every product or process, which would entail replacing thiomersal in vaccines, the SAGE reaffirmed its conclusion that thiomersal-containing vaccines are essential and irreplaceable components of immunization programs, especially in developing countries. It also encouraged continuous dialogue between countries' health and environmental sectors, in order to facilitate a common understanding of the important role of thiomersal-containing vaccines in their population's health.

Finally, during the fourth session of the Intergovernmental Negotiating Committee (INC4), held in Uruguay from 27 June to 2 July 2012, to prepare a global legally binding instrument on mercury, the terms of prohibition – with exemptions and the provisional allowable use with or without deadlines for use – for the list of products containing mercury (list that includes thiomersal) were discussed during this meeting.

Recommendations:

1. Continue using ethylmercury (thiomersal)-containing vaccines, following current vaccination schedules for children.
2. PAHO should mount an aggressive strategy and plan to effectively communicate and educate health care workers, as well as ministries of health and environment, parliamentarians, and other decision-makers, and the media on the safety of thiomersal-containing vaccines.

Rotavirus Vaccination Schedule

Rotavirus infection is the leading cause of diarrhea in children aged <5 years worldwide. In 2008, it was estimated that 453,000 deaths (95% CI: 420,000-494,000) in children under 5 were attributable to rotavirus diarrhea. Five countries account for half of the deaths attributable to rotavirus: the Democratic Republic of the Congo, Ethiopia, India, Nigeria and Pakistan. Based on the data available, it has been estimated that rotavirus caused approximately 75,000 hospitalizations and close to 15,000 deaths annually in the Region of the Americas prior to the introduction of the vaccine in several countries in the Region.

There are two rotavirus vaccines available that have been pre-qualified by WHO and recommended for use by the SAGE since 2009, which are the monovalent and pentavalent vaccines. Since 2006, in Latin America and the Caribbean, 15 countries and one territory have introduced this vaccine into their national vaccination schedules: in 2006, Brazil, El Salvador, Mexico, Nicaragua, Panama, the United States and Venezuela; in 2007, Ecuador; in 2008, Bolivia; in 2009, the British territory of the Cayman Islands, Colombia, Honduras and Peru; in 2010, Guatemala, Guyana and Paraguay; and in 2012, the Dominican Republic. Four Canadian provinces also include rotavirus vaccine in publicly funded immunization programs.

Currently, the vaccination schedules used in Latin America and the Caribbean follow the most recent WHO position paper, which recommends administering the first dose of the vaccine between 6 and 15 weeks of age and the last dose no later than 32 weeks of age (2nd dose for the monovalent rotavirus vaccine and 3rd dose of the pentavalent rotavirus vaccine).

Based on rotavirus vaccination coverage found in Latin America in the first years following introduction, there is a significant difference between DPT3 and rotavirus (2 or 3) coverage. This is probably due to two factors: adjustments related to the introduction of a new vaccine into the national vaccination schedules and the fact that the rotavirus vaccine has age restrictions for administration of the first and last dose. Beginning the third year following introduction, DPT3 coverage and rotavirus (2 or 3) coverage have been increasingly similar. This means that countries are vaccinating children at younger ages, since coverage of the rotavirus vaccine, with its age restrictions, is similar to that of DPT3.

A systematic review of mean ages for the occurrence of rotavirus infection shows that 10% of infections occur before 17 weeks of age and 32% before 32 weeks of age. In addition, mathematical models have been developed to estimate the risk/benefit of administering the rotavirus vaccine without age restrictions. The results indicate that globally, 47,200 (18,700 – 63,700) deaths would be averted and 294 (161-471) additional deaths would occur due to intussusception associated with the vaccine.

During the SAGE meeting in April 2012, considering all of the above mentioned aspects, risk/benefit analysis continues to favor early immunization, but current age-related restrictions on administration of the first dose (<15 weeks) and the last dose (<32 weeks) prevent vaccinating many vulnerable children. If these restrictions were eliminated, children who are currently excluded from the benefits of rotavirus vaccines could be immunized, and it is likely that these include some of the children most vulnerable to this serious disease. Thousands of deaths could be averted, with just a minimal increase in cases of intestinal intussusception. SAGE also stated that based on the age distribution of rotavirus disease, vaccinating children over 24 months of age would have few beneficial effects.

Recommendations:

1. In the Region of the Americas, countries should continue making efforts to administer rotavirus vaccines on their routine immunization schedules, at the recommended ages, usually at 2 and 4 months or 2,4, and 6 months. This schedule favors the early immunization of children at greater risk of morbidity and mortality due to rotavirus diarrhea. However, in areas of difficult access and /or high diarrheal mortality, vaccine can be administered later, at any time of immunization contact and before 1 year of age.
2. TAG encourages countries that have not introduced rotavirus vaccine to reassess the burden of disease in order to consider the introduction of rotavirus immunization. This in light of the current evidence demonstrating the huge impact of rotavirus vaccine administered in the current schedule in reducing the morbidity and mortality from rotavirus diarrhea in the Region of the Americas.

Decade of Vaccines (DoV): From Planning to Action

The Global Vaccine Action Plan (GVAP) is the result of global consultation efforts, which gathered input from more than 1,100 people from 142 countries and 297 organizations in Asia, Africa, the Americas, Europe, the Middle East and the Western Pacific. The GVAP builds on the success of the WHO/UNICEF 2006-2015 Global Immunization Vision and Strategy (GIVS), which was launched in 2005 as the first 10 year strategic framework for immunization. The plan reiterates existing goals and sets new goals for the Decade of Vaccines (DoV) 2010-2020, proposes six strategic objectives and provides an initial estimate of resource requirements and return on investments.

On May 25, 2012, the 65th World Health Assembly (WHA) endorsed the GVAP and passed resolution 65.17 in support of it. Beyond the action plan, country, regional and global stakeholders need to take responsibility for specific actions, translate the action plan into detailed operational plans, complete the development of the monitoring and accountability framework for the DoV, and mobilize resources to ensure the vision for the DoV becomes a reality.

In the Americas, the GVAP will complement the existing Regional Immunization Vision and Strategy (RIVS), which was developed to translate the GIVS into regional priorities in the late 2000s. The RIVS has three strategic areas to guide the implementation of successful immunization programs in Latin America and the Caribbean, including strategies for: maintaining the achievements; completing the unfinished immunization agenda, with the control of vaccine-preventable diseases; and facing new challenges, such as the introduction of new vaccines. Likewise, the GVAP encompasses these same strategies but with a more horizontal approach, highlighted in its six strategic objectives (SOs):

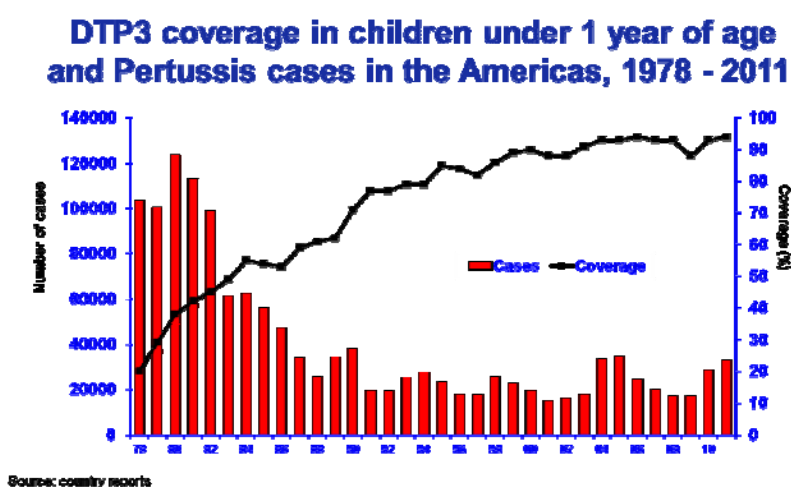
- (SO1):** All countries commit to immunization as a priority
- (SO2):** Individuals and communities understand the value of vaccines and demand
- (SO3):** The benefits of immunization are equitably extended to all people
- (SO4):** Strong immunization systems are an integral part of a well-functioning health system
- (SO5):** Immunization programs provide sustainable access to predictable funding, quality supply and innovative technologies
- (SO6):** Country, regional and global research and development innovations maximize the benefits of immunization

The six strategic objectives set forth in the GVAP will help bring new focus to the existing RIVS. PAHO's regional immunization program will work to incorporate the six strategic objectives described in the GVAP into its existing RIVS framework by developing a regional vaccination action plan to 2020 and beyond. For this regional action plan, PAHO will lead discussions with Member States to develop and define indicators to track progress towards achieving regional goals and targets.

Evidence on Pertussis

Pertussis continues to be a significant cause of child mortality worldwide and a disease that causes serious public health concern, even in countries with high levels of vaccination coverage. The WHO estimates that in 2008, there were nearly 16 million cases worldwide, 195,000 of which resulted in death.

In the Region of the Americas, coverage with DPT3 among children aged <1 year is over 90%, and the annual number of cases has ranged from 15,000 to 34,000 over the last 10 years, with significant increases in the number of cases in Argentina, Brazil, Chile, Colombia and the United States in the last year.



During its last two meetings, the TAG discussed matters related to this disease and issued recommendations. It also clearly stated that in order to change or issue new recommendations, it requires new epidemiological information to support them. In response to this call for action, a project titled “Improving Epidemiological Surveillance of Pertussis in Latin America” is now being carried out in Argentina, Mexico and Panama, with support from the Sabin Vaccine Institute, the US Centers for Disease Control and Prevention (CDC) in Atlanta, the and PAHO. Its objectives include: improving diagnostic capacity, developing a reliable and valid method of improving surveillance of pertussis in Latin America, and making the project findings and results available by the end of 2012.

In October 2007, PAHO convened a meeting of experts on pertussis, whose recommendations were presented at the XVIII TAG meeting held in 2009. At that time, the TAG issued the following recommendations: to consider controlling pertussis as a priority and to improve epidemiological surveillance; to include a 4th dose of DPT as a component of the routine vaccination schedule; to begin DPT vaccination at 6 weeks of age during outbreaks, especially if this age group is affected; and to carefully consider the impact of introducing the acellular vaccine in place of the whole-cell vaccine currently used in vaccination programs. As of September 2012, fifteen countries in Latin America and the Latin Caribbean, and 9 countries in the British Caribbean reported vaccination coverage with the 4th dose of DPT. Sixteen Latin American countries, as well as 8 Caribbean states, Canada and the United States include a 5th dose of a pertussis-containing vaccine in their schedules. In addition to the Canada

and the United States, four Latin American countries (Argentina, Costa Rica, Mexico and Panama) are using an acellular pertussis-containing vaccine (Tdap).

In March 2012, 32 professionals from 12 countries in the Region participated in a meeting called by PAHO to define what information is needed or could be presented to request that the TAG issue new recommendations or to implement the current recommendations. The countries were invited to present new epidemiological evidence. The conclusion drawn from the meeting was that the disease continues to appear among children under five without completed vaccination schedules for their age. No additional new evidence was presented to support new recommendations. The goal continues to be adequate implementation of the current recommendations.

During this meeting, the TAG received an update on the global pertussis situation, new trends in vaccination policies such as the “cocoon” strategy and vaccination of pregnant women, and a report on the current status of the “Improving Epidemiological Surveillance of Pertussis in Latin America” project. Argentina, Chile, Mexico, and the United States presented information on recent pertussis outbreaks and the measures taken for their control. It was highlighted that a significant proportion of cases and deaths occur among infants, often in the first months of life.

There is growing evidence of an increase in the incidence of the disease in adolescents in some settings, which suggests that the immunity conferred by the acellular vaccine is short-lived. In September 2012, WHO convened an informal expert meeting to discuss the current situation of pertussis in Australia, Canada, the United Kingdom, and the United States. The experts concluded that there are limitations to aP, but that the problem remains poorly defined. At that meeting, it also was highlighted that countries are utilizing a range of strategies, including maternal vaccination and cocooning; and that use of aP or the Tdap booster is being contemplated. However, the data available to support these strategies is weak. Similarly, at this time there is insufficient evidence to support the use of a 5th DTP dose. It is expected that SAGE will review pertussis vaccination strategies in use at upcoming meetings.

Recommendations:

1. Countries should ensure vaccination coverage $\geq 95\%$ with 3 doses of pertussis-containing vaccines in children aged <1 year; and encourage timely vaccination and completion of the schedule. The 4th dose of the DPT vaccine should be incorporated into the regular vaccination program in every country, and the coverage attained with this dose (as with all vaccine doses) should be the object of careful recording, monitoring, reporting and evaluation.
2. Every pertussis outbreak should be thoroughly investigated to improve the understanding of the current epidemiology of the disease in the Region of the Americas. PAHO should provide countries with specific guidance for outbreak investigation.
3. Countries should improve surveillance and the use of adequate diagnostic tools. The present surveillance pilot project being implemented in Argentina, Mexico and Panama by the Sabin Vaccine Institute, CDC and PAHO should be expanded to other countries of the Region.
4. Considering new evidence suggesting that the immunity conferred by the acellular vaccine may be shorter-lived than the immunity conferred by wP vaccines, countries that are using whole-cell vaccine (wP) should not switch to an acellular vaccine (aP). Similarly, countries currently using aP should not switch back to the use of wP until more evidence is available to support changes in vaccination strategies for pertussis.

Proposal for Standardizing Procedures of PAHO's Technical Advisory Group on Vaccine-preventable Diseases

Originally established in 1985 to recommend evidence-based strategies for polio eradication, the PAHO Regional Technical Advisory Group (TAG) on Vaccine-preventable diseases has held 19 meetings to date. Progressively expanding its mandate to the current aim of strengthening the immunization policy dialogue among key stakeholders in the Americas involved in efforts to control vaccine-preventable diseases, TAG functions as the leading regional forum to review and promote regional goals and strategies for immunization. Specifically, the TAG reviews national immunization program progress and results, monitors the advancements in the implementation of the Regional Immunization Vision and Strategy (RIVS), assists in the identification of research needs, and oversees the progress of research efforts under way.

The TAG is currently composed of nine experts in areas related to vaccinology and immunization; additional experts can be identified as needed to address special areas related to vaccine-preventable diseases. TAG members are recruited and selected as recognized experts from the Americas in the fields of epidemiology, public health, vaccinology, pediatrics, infectious diseases, immunology, program management, health economics and health care administration. TAG members are appointed by the PAHO Director. The PAHO Comprehensive Family Immunization Project serves as the Secretariat for the TAG.

TAG members are appointed for a period of 4 years, with the option of one-term renewal. It is preferable for at least one TAG member to also be a member of WHO's Strategic Advisory Group of Experts (SAGE) on Immunization.

TAG meetings are convened annually, with the following format:

	Odd-numbered years (ex. 2011)	Even-numbered years (ex. 2012)
Participants attending in person	TAG members, PAHO Secretariat, Regional and International immunization experts, all EPI managers and all NITAG chairs.	TAG members, PAHO Secretariat, selected Regional and International immunization experts and selected EPI managers.
Virtual participants	None.	All other EPI managers, all other regional and international experts, all NITAGs.
Location	LAC country	PAHO HQ, Washington DC
Scope of the meeting	Discuss the progress of national immunization programs	Discuss the progress of national immunization programs and focus on specific rising issues
	Monitor the implementation of GVAP for the Region of the Americas and make recommendations.	
	Discuss progress and barriers to implement TAG recommendations	

EPI: Expanded Program on Immunization; NITAG: National Immunization Technical Advisory Group; LAC: Latin America and the Caribbean; GVAP: Global Vaccine Action Plan [of the Decade of Vaccines].

The dates of TAG meetings should be strategically set to precede the meeting of PAHO's Governing Bodies, preferably the meeting of the Executive Committee.

TAG members shall be required to complete a Declaration of Interest similar to that requested of WHO SAGE members.

Functions of the TAG are the following:

1. Advise the PAHO Director with respect to program priorities;
2. Advise and guide the PAHO Secretariat concerning the optimal strategies to reach the overall goals of the immunization program, including rubella and measles elimination, maintenance of a polio-free status, and introduction of new and underutilized vaccines in the Americas;
3. Monitor the implementation of the Regional Plan of Action to accomplish the above stated goals and those outlined by the Decade of Vaccines Global Vaccine Action Plan (GVAP);
4. Promote understanding and support for program goals among technical institutions, bilateral, multilateral and private agencies, as well as among political leaders;
5. Convene and chair working groups when necessary to inform TAG recommendations with the necessary evidence-based information; and
6. Promote activities geared towards strengthening National Immunization Technical Advisory Groups (NITAGs), including encouraging the participation of NITAG members in TAG meetings and other PAHO Immunization Regional and Sub-Regional meetings.

Ad hoc working groups could be formed as deemed necessary by the TAG and the Secretariat. These working groups will work on specific topics by reviewing and providing evidence and options for recommendations to be discussed by TAG members. The working groups will function for a limited period of time and should always be led by a TAG member.

The PAHO Revolving Fund and the Current Global Vaccine Market

For over three decades, as part of the Regional Expanded Program on Immunization (EPI) established in 1977, PAHO has managed the Revolving Fund (RF) for the procurement of vaccines and vaccination supplies on behalf of Member States.

The EPRF began its operations in 1979 with the participation of 8 countries and territories, procuring 6 biologicals. In 2011, 28 biologicals were purchased by 39 countries and territories along with syringes, cold chain equipment and vaccination supplies. A total of 178 million vaccine doses costing nearly US\$400 million were purchased in the same year. For 2012, the forecasted purchase expenditures will be US\$469 million. Through joint, active participation of these 39 countries and territories, the RF is an important mechanism of technical cooperation, which brings economy of scale for procuring high quality vaccines, syringes and related supplies at affordable prices. This mechanism was also a major facilitator for the rapid, equitable and sustained introduction of new and under-utilized vaccines.

As a strategic mechanism, with these achievements the RF has contributed to: the continuous strengthening of its management and planning tools; to the consolidation of procurement and overseeing a timely supply of products; and to supporting the development of a more structured and reliable market for vaccine producers.

In addition to its contributions, one of the strengths of the mechanism is its capital fund, which enables countries to reimburse PAHO 60 days after an order arrives, thereby obtaining a timely supply without being affected by delays in the release of national funds. Today, 32 countries make their procurements using the RF line of credit, with no need to obtain funds in advance. As of 2011, the capital fund reached US\$85 million and is expected to reach US\$100 million in 2012, as a result of the capitalization fee of 3% of the value of the purchases countries make.

In 2012, the Revolving Fund has identified opportunities to create and maintain strategic regional stockpiles, such as a measles-rubella vaccine to be used in response to outbreaks. Other regional stockpiles are being explored.

Although the RF has gained relevant strengths and made significant contributions, it also faces considerable challenges including an insufficient supply of vaccines such as yellow fever vaccine, a reduction of the global supply of trivalent oral polio vaccine, a limited supply base of one or two laboratories for new vaccines and the existence of other stakeholders whose plans have an impact on the world vaccine market, specifically dose availability and prices of some vaccines for the Region.

The RF continuously seeks to address these challenges, while preserving its principles of Pan-Americanism, equity, universal access and quality.

Other important international actors related to vaccine procurement include UNICEF, GAVI Alliance, Bill and Melinda Gates Foundation (BMGF) and Doctors without Borders (*Médecins Sans Frontières* or MSF). These organizations were convened to the TAG meeting, highlighting the importance of having all of the key stakeholders involved in vaccine procurement and deployment strategies at the table for this discussion.

UNICEF procures immunization supplies on behalf of roughly 100 countries annually, amounting to approximately \$1.03 billion. Annual vaccine procurement has increased since 2000, mainly due to OPV, DTP-Hep B-Hib and pneumococcal conjugate vaccines. UNICEF's procurement strategies are focused on achieving vaccine security—sustainable, uninterrupted supply of affordable vaccines of assured quality—based on three pillars: (i) accurate forecasting, (ii) available funding and (iii) appropriate contracting. Given the diversified market situations, new strategies are required to achieve healthy market objectives. UNICEF is also developing a strategy for middle income countries, working on a hybrid strategy of pooled procurement and price ceilings references.

The GAVI Alliance's strategy and business plan for the period 2011-2015 has four pillars: (i) the vaccine goal; (ii) the health system goal; (iii) the financing goal; and (iv) the market-shaping goal. GAVI is currently supporting vaccines for routine, campaigns and stockpiles. The cash outflow is estimated in \$1.7 billion, per year, for the period of 2012-2015, and \$1.6 billion, per year, for the period of 2016-2020. For shaping the market, the key objectives are supply and procurement strategies, balance supply demand, vaccines prices and appropriate products. GAVI is currently supporting low income countries, facilitating access to lower vaccine prices, even after graduation, and also UNICEF's middle income countries tender.

BMGF theory of change, focusing on the poorest countries in the world, states that overcoming the key barriers to delivery will drive adoption and uptake of necessary products and interventions. This strategy focuses on two main groups: routine immunization and new vaccines. BMGF market innovation has four strategies: (i) take every opportunity to close program funding gap; (ii) engage with all parties willing to work with global health goals; (iii) invest in specific product development projects; and (iv) seek novel and potentially transformative opportunities. Those strategies have a multi-faced approach that spans from the demand side to product development, launch and scale-up production with the common goal of broadening access to vaccines in the poorest settings.

MSF activities in the Region support work on areas such as Chagas, violence and mental health. In other regions, MSF also supports vaccination activities; in that aspect, MSF procures directly from manufacturers. MSF proposals for a healthy vaccine market rely on some aspects, such as: competition and multiple sources of supply, strengthening manufacturing capacity in developing countries; strengthening the government's negotiation capacity through global and regional procurement strategies; and influencing the market to promote both innovation and access through the purchasing power of existing mechanisms and strategies (PAHO RF, UNICEF and the GAVI Alliance).

Recommendations:

1. TAG congratulates PAHO's EPI Revolving Fund for vaccine procurement and reaffirms its support to the Fund as a key pillar of immunization programs in the Americas.
2. TAG recommends that Member States continue to participate in the Revolving Fund to continue obtaining the benefits of a strong economy of scale in the procurement of vaccines, syringes and supplies.
3. The Revolving Fund should continue improving vaccine forecasting, including newly available vaccines.
4. PAHO should maintain its commitment to strengthen operating and financial management of the Fund in order to provide increasingly better service and greater credit capacity to participating countries and territories.

5. In light of current challenges, PAHO should continue building its knowledge of global markets and strive for continuous communication and coordination with its major partners in the global immunization field, to maintain updated information on the markets where it participates, for the development of its procurement strategies.
6. TAG recommends that all those agencies that deal with vaccine forecasting, procurement and distribution meet periodically to exchange information on their activities and strategies to identify those areas in which closer collaboration could facilitate the availability of vaccines, enhance security of supply, and encourage high quality at affordable prices.

Improving Regional Vaccine Production Capacity to Meet the Needs of the Americas

As a result of the use of high-quality, safe, efficient vaccines in national immunization programs (NIPs), over 2.5 million deaths have been averted in Latin America and the Caribbean (LAC) since 1974.

In addition, LAC countries have successfully introduced new and/or improved vaccines in their NIPs that have contributed to controlling a significant number of communicable diseases.

PAHO's Revolving Fund for vaccine procurement (RF) has effectively facilitated the provision of traditional vaccines and the introduction of new vaccines in the Region of the Americas. However, currently, supplying priority vaccines to countries of the Region to guarantee sustaining achievements made in the control and elimination/eradication of vaccine-preventable diseases continues to be a challenge.

The supply of traditional vaccines, such as the oral polio vaccine, the yellow fever vaccine and the DPT vaccine remains erratic and often insufficient to cover demand from countries in the Region that purchase them through the RF. Although these vaccines continue to be essential, they are of little commercial interest to pharmaceutical companies, which in many cases have discontinued their production or diverted their interests toward the manufacture of other vaccines, such as the pentavalent vaccine (DPT-HepB-Hib).

In the case of new vaccines, their massive use in NIPs is frequently delayed due to the high prices for these vaccines and the impact of their cost to the healthcare systems of low and middle-income countries. Improvement in the supply of traditional vaccines and competition in the new vaccine market would provide a good opportunity to improve access to these products of public health interest.

The Region of the Americas has proven experience in vaccine development and production. Also, in LAC there are national regulatory authorities (NRAs) with improved capacity for monitoring vaccine quality, safety and effectiveness during the pre and post-marketing phases.

Vaccine production in the public, as well as the private field, has served to meet a significant portion of the demand from NIPs. Despite this fact, installed capacity has not necessarily been sufficient to cover growing regional demand, since in many cases the production volume is only geared toward fulfilling domestic needs, with little possibility of exporting vaccines. The establishment of technology transfer agreements between the transnational pharmaceutical industry and regional producers has not yet led to improvements in local capacity to produce new vaccines; therefore, a more thorough analysis of the role regional producers can play in meeting the needs of countries in the Region for safe, effective and high quality vaccines is needed.

Recommendation:

1. PAHO should convene a task group with representatives from vaccine manufactures from Latin America and the Caribbean (LAC) to identify common areas of work and brainstorm a LAC regional strategy for vaccine research, development and production. PAHO should then report back to TAG on this topic.

The last measles case due to endemic transmission was reported in the Region of the Americas in November 2002. From 2003 to 2010, a historically low number of measles cases were reported in the Region. During this eight-year period, 34 out of 45 countries and territories (76%) did not report cases of measles, and another 5 countries (11%) reported 10 confirmed cases of measles altogether. The remaining 6 countries (13%) reported a total of 1,239 cases, which account for 99% of the 1,249 cases confirmed in the Americas during this period. The appearance of measles was mainly limited to cases that were imported from other countries or related to importation. However, in 2011, 1,374 measles cases were reported in the Americas. This figure is more than eight times the previous annual average of 156 cases from 2003 to 2010. This increase coincided with several extensive outbreaks in Europe and Africa. Of 45 countries and territories, 33 (73.3%) did not report measles cases, and 9 (20%) reported a total of 14 confirmed cases. Three countries — Canada, Ecuador and the United States (6.7%) — reported a total of 1,290 cases representing 93% of the 1,374 confirmed cases in the Region in 2011.

The outbreak in Ecuador spread to nine different provinces throughout the country. In 2011, there were 260 confirmed cases of measles in six provinces and 69 more cases in three provinces in 2012 (data through epidemiological week (EW) 39/2012). The most affected age group was that of children aged <5 years. Cases with genotype B3, which are commonly found in Africa, have been detected along with a case of D4, which is usually found in Europe. In order to guarantee a rapid response to this measles outbreak, the start of a follow-up campaign targeting children aged up to 15 years was moved to an earlier date. The Ministry of Health reports vaccination coverage $\geq 95\%$ in the majority of provinces. The last case of measles was reported in EW 28/2012 (data as of September 2012).

During 1998–2006, confirmed rubella cases in the Americas decreased by 98%, from 135,947 to 3,005. Starting in 2007, however, the Americas experienced a resurgence of rubella cases due to importations of rubella virus into countries that initially targeted only females during mass vaccination campaigns. The last confirmed endemic rubella case was reported in Argentina in February 2009. As an unfortunate consequence of the rubella outbreaks of 2008–2009, a total of 27 CRS cases were reported in two countries. The last confirmed CRS case was a child born in Brazil in August 2009. No indigenous CRS cases were reported in 2010 or 2011.

In October 2007, considering the elimination of measles in 2002 and the progress made toward the goal of eliminating rubella and CRS, the 27th Pan American Sanitary Conference approved Resolution CSP27.R2 calling for the documentation and verification of the elimination of measles, rubella and CRS in the Region of the Americas. The TAG was informed of the progress made on the implementation of Resolution CSP27.R2 and the challenges and risks that still exist in keeping the Region free of these diseases.

In response to the 2007 Pan American Sanitary Conference Resolution CSP27.R2, an International Expert Committee (IEC) was formed and 23 national commissions were established, including the Commission for French Overseas Departments in the Americas. In addition, a Sub-regional Commission for English-speaking and Dutch-speaking countries and territories in the Caribbean, including Suriname, was established. As of 30 September 2012, 20 commissions, including those for the French Overseas Departments in the Americas and for the English-speaking and Dutch-speaking countries and territories in the Caribbean, had submitted their final reports on disease elimination to PAHO for the consideration

of the IEC. The four remaining countries (Colombia, Ecuador, Haiti and Peru) will submit their reports in late November. Following a detailed analysis of the reports submitted by the national commissions and the Sub-regional Commission, it appears that the interruption of endemic transmission of measles and rubella has been achieved.

However, the Region of the Americas is still exposed to a high risk of importation of viruses, given the continued circulation of measles and rubella in other parts of the world. In addition, all countries, with one exception, have reported weaknesses and flaws in their national surveillance systems and routine vaccination programs, which make them particularly vulnerable to the risk of virus reintroduction that could cause outbreaks.

Maintenance of the elimination of measles, rubella and CRS in the Region of the Americas will be achieved if all Member States continue conducting integrated surveillance of measles and rubella, strengthen CRS surveillance and continue implementing effective immunization interventions, including strengthening routine vaccination services and conducting follow-up campaigns.

In 2012, an emergency plan of action to maintain the elimination of endemic transmission of measles, rubella and CRS in the Region was presented to and approved by the Pan American Sanitary Conference (Document CSP28/16).

TAG congratulated the members of the IEC, Member States and their national commissions for their efforts to document and verify the elimination of measles, rubella and CRS in their respective countries and to maintain regional elimination. The Region of the Americas has demonstrated that measles can be eliminated and that this can be sustained over time. The experience of this Region should be shared as an example for other regions struggling to reach elimination targets.

Recommendation:

1. The TAG endorses and urges countries to implement the Emergency Plan of Action to maintain the elimination of measles, rubella and CRS in the Americas, as stated in Resolution CSP28.R14 of the Pan American Sanitary Conference 2012.

Haiti's Immunization Program

The vaccine-preventable diseases currently targeted by Haiti's immunization program remain a source of concern for the country's health system.

Measles, rubella and polio have been eliminated from Haiti, as well as from the rest of the Americas. Nevertheless, the risk of importing the viruses responsible for these three diseases is a reality for Haiti as it is for all countries in the Americas. At the beginning of 2012, the number of children susceptible to measles and rubella likely accumulated in Haiti (273,860) was above the national average birth cohort size (252,664); a condition that makes implementing mass vaccination activities imperative.

Neonatal tetanus (NNT) ranks sixth among the leading causes of neonatal death, while diphtheria is endemic/epidemic in the country. Additionally, it has been established that among children aged <5 years, the main etiological agents causing deaths due to acute respiratory infections (ARIs) and meningitis are *Haemophilus influenzae* type b and *Streptococcus pneumoniae*; and the main etiological agent causing deaths due to diarrhea is rotavirus. The importance of mortality resulting from ARIs, meningitis, and diarrhea in children under 5—and the role attributable to these agents in the etiology of these diseases—formed the basis for the introduction of Pentavalent (DTP-Hib-Hep B) vaccine, as well as the pneumococcal conjugate and rotavirus vaccines, within the framework of the country immunization multi-year plan.

The following table shows the routine coverage in the last 4 years:

Table 1: Vaccination coverage %, Children aged <1 year, Haiti 2008-2011

Year	BCG	Measles-Rubella	DTP3	Polio3
2008	61	54 ^(a)	53	52
2009	66	60	68	65
2010	64	45	69	62
2011	82	58	85	79

Source: Country reports to PAHO (JRF)

(a) Value 2007 for measles vaccine

A strong demand for vaccines exists among the population. However, deficiencies have been recognized in immunization service delivery that limit vaccinating young children in health facilities and through mobile posts, as part of the outreach strategy; missed opportunities happen all the time. In addition, supervision, in terms of frequency and quality, merits strengthening.

Based on these challenges, the following are Haiti's Immunization Program priorities for the period 2011–2015:

- Strengthening program governance in all aspects falling under the competence/jurisdiction of the national health authority (NHA).

- Developing routine capacities in order to achieve and maintain satisfactory immunization coverage throughout the country—including rural, peri urban, and difficult to reach marginal areas, especially in the Metropolitan Area.
- Achieving financial viability by mobilizing and utilizing national resources, as well as external resources both efficiently and reliably. This to meet current and future vaccination objectives in terms of access, utilization, quality, safety, and equity.

The main strategic lines for Haiti's Immunization Program are the following:

1. Strengthening routine vaccination to significantly improve coverage, including the harmonization of the first measles at 12 months of age as previously recommended by TAG.
2. Broadening the range of targeted vaccine-preventable diseases and target groups, first through the introduction of new vaccines, beginning in 2012 with the pentavalent vaccine; and second, through the transition from a program for children and mothers to one for the entire family.
3. Revitalizing the offer of immunization outreach, using the following mechanisms:
 - Ensuring that mobile vaccination teams hold immunization events with vaccination posts at least quarterly, utilizing the existing platforms of Child Health Week and Vaccination Week in the Americas.
 - Optimizing support from non-governmental organizations (NGOs) for routine vaccination.
 - Defining and implementing a feasible policy of remuneration and training for community health workers, thus guaranteeing the recruitment and retention of a capable and motivated community workforce to secure the outreach strategy.
4. Increasing cold chain capacity at all levels to meet the increased cold storage needs resulting from the introduction of new vaccines.
5. Improving management practices for the cold chain, vaccines, and other supplies in order to reduce wastage and avoid stock-outs.
6. Strengthening communications and social mobilization activities to optimize demand and improve service delivery, especially in difficult to reach areas.
7. Strengthening epidemiological surveillance through improved collaboration between the national immunization program (DPEV) and the Epidemiology Department (DELR), as well as through support from the main technical partners, particularly PAHO/WHO, UNICEF, and CDC.
8. Revitalizing support and monitoring activities at the local level—especially micro-planning, supervision, and vaccination coverage monitoring.
9. Strengthening managerial capacities and advisory bodies: Immunization Technical Committee and Inter-Agency Coordination Committee.

To strengthen the national immunization program, PAHO is providing technical cooperation in three phases:

1. First, implementing supplementary immunization activities (SIAs) and active case search at the community level to reduce the risk of outbreaks. Both activities were implemented during the first semester of 2012. Between April and June 2012, more than 3 million children aged <10 years were vaccinated against measles, rubella and polio, reaching an administrative coverage of 99%. Rapid coverage monitoring found 96% of interviewed people to be vaccinated and an

independent coverage survey estimated that 91% children aged <10 years had ever received a measles-rubella vaccine.

2. Second, implementing a short-term plan of action from July to December 2012 to strengthen the routine program and epidemiological surveillance. The focus of this plan of action is to continue building national capacities and to support introducing pentavalent vaccine; ensuring the cold chain capacity and operation; and finalizing the documentation and verification process of measles, rubella and CRS elimination.
3. Third, improving and sustaining the performance of the routine immunization program.

TAG congratulates Haitian national health authorities and health workers for their leadership and dedication and for all these accomplishments, including the results of the vaccination campaign, and urges them to maintain their efforts for the success of the activities that are currently being implemented.

Similarly, TAG thanks Haiti's strategic partners for their firm commitment, technical and financial cooperation to maintain a coordinated effort towards a common goal: strengthening Haiti's immunization program. TAG also requests continued support to mobilize additional resources to guarantee the successful implementation of the planned activities.

Since October 2010, when cholera emerged in the Island of Hispaniola, 597,306 and 26,995 cases have been reported (as of September 29, 2012), in Haiti and the Dominican Republic, respectively. During the same period, 7,625 cholera-related deaths (case-fatality rate [CFR] = 1.28) were reported in Haiti and 407 (CFR = 1.51) in the Dominican Republic. Although incidence is lower in 2012 (January 1–September 29) compared to previous years, cholera still remains a significant public health problem in the Island: 79,302 suspect and confirmed cases and 607 cholera-related deaths (CFR = 0.77) were reported in Haiti and 5,433 cases and 37 deaths (CFR = 0.68) in the Dominican Republic. In 2010–2011, eight countries in the Americas reported 92 cases imported from the Island of Hispaniola (38 confirmed and 54 epidemiologically linked cases). In June–August 2012, 296 confirmed cases and 3 deaths were reported in Cuba.

A detailed epidemiologic analysis shows that cholera transmission is widespread and ongoing in the Island of Hispaniola. While transmission in the Dominican Republic is limited to some geographical areas, transmission in Haiti is more widespread. Compared to the 12-month period from October 2010 to September 2011, transmission has declined substantially in the 12-month period from October 2011 to September 2012. In Haiti, the majority (74%) of patients with diarrheal diseases that consulted since April 2012 at cholera treatment centers (CTC) and were captured through an enhanced surveillance system were diagnosed with a cholera infection. In contrast, only 25% of children aged <5 years in non-CTC facilities had cholera. A seroepidemiologic survey carried out in the Artibonite River delta during March–April 2011 (when cholera transmission had already subsided in the area) shows 2.5 unapparent cholera infections per each reported clinical cholera case. Access to CTCs is highly variable across the 140 Haitian communes, as does the level of care and travel time to facilities across departments. While 74% of internally displaced people who resided in camps in March 2011 received drinking water, only 12% did in August 2012. In contrast, provision of sanitation remained stable (toilet provision coverage of 82% and 78%, respectively). Recent and local data on access to drinking water and sanitation are not available.

In January 2012, the presidents of Haiti and the Dominican Republic, together with representatives of PAHO/WHO, UNICEF, and the CDC, issued a call to action to eliminate cholera transmission from both countries through new investments in water and sanitation infrastructure. This call led, in June 2012, to the creation of the Regional Coalition on Water and Sanitation for the Elimination of Cholera Transmission in the Island of Hispaniola, which will bring together the necessary technical expertise, raise new funds, and mobilize previously committed pledges. As of October 2012, the Coalition has expanded to include 17 signatory partners. This coalition presents a unique opportunity to reach out more extensively to the private sectors and non-governmental organizations. This work is a priority for PAHO and is grounded in the overarching strategy of safe water and sanitation for all the citizens of Haiti and the Dominican Republic.

Deployment of oral cholera vaccine (OCV) has been considered since October 2010. At that time, also considering the rapidly spreading epidemic and the limited vaccine supplies, PAHO recommended focusing emergency efforts on time-tested measures for cholera outbreak response, namely on treatment to prevent deaths and traditional preventative actions to halt transmission (i.e. delivery of safe potable water, provision of supplies for hand washing and other hygienic measures, sanitation, and proper waste disposal). An expert consultation convened by PAHO in December 2010 recommended

that the limited vaccine supply be used for demonstration projects and that efforts be initiated to increase OCV availability.

Two oral cholera vaccines are marketed globally under the names of Dukoral and Shanchol and are now WHO-prequalified. When compared to Dukoral, Shanchol offers operational advantages such as: 1) it does not require administration with a buffer solution; 2) requires significantly less cold chain volume; 3) can be administered from 1 year of age (versus 2 years of age); and 4) costs one third per dose at current prices. As published in October 2011, results of Shanchol clinical trials show a 66% overall efficacy at three years of follow-up. Within a community, vaccination with OCV may also provide herd protection and thus reduce cholera burden among persons who remain unvaccinated. Shanchol's manufacturer has indicated the immediate availability of up to 600,000 doses and the capacity to scale up production to 2–4 million doses in 2013 and to 10–20 million doses in 2014 and thereafter, provided there is demand. This availability is not exclusively reserved for the Americas; WHO and partners are working toward the establishment of a 2-million-dose global stock and large vaccination initiatives are taking place in West Africa.

Following the above-mentioned recommendation of a PAHO-convened expert consultation, the two non-governmental organizations GHESKIO and Zanmi Lasante/Partners in Health conducted, between April and June 2012, separate but coordinated cholera vaccination in one urban and one rural area of Haiti. Overall, 97,725 persons received at least one vaccine dose and completion rate for the two-dose immunization series was 91%. Key lessons from these cholera vaccination demonstration projects in Haiti were community acceptance of cholera vaccination and feasibility of administering the vaccine on a large-scale in both rural and urban settings. At the same time, the demonstration underscored the need for substantial planning prior to vaccination, a reliable cold chain and other logistic resources, an ongoing monitoring of vaccination activities, and communication activities involving the community, opinion leaders and the media. Impact evaluation is now being planned.

Some knowledge gaps persist and activities of evaluation and research should be an integral part of deploying OCV. Research priorities include the development of a single-dose vaccine, efficacy proof of a single dose of current two-dose vaccines, safety studies of OCV use in pregnant women, occasional environmental bacteriology testing, serosurveys to determine which fraction of the population is already immune to cholera, and effectiveness studies of vaccine (including nested case-control studies).

National immunization programs throughout the Region remain committed to maintaining the elimination of polio, measles and rubella, reducing within-country inequalities in vaccination coverage, and advancing in the evidence-based and sustainable introduction of new vaccines. For instance, the local Ministry of Health, PAHO, and partners made significant progress in Haiti during the first semester of 2012 to improve routine vaccination and to carry out a nationwide intensification of measles/rubella/polio vaccination. In Haiti, vaccination with pentavalent vaccine (DTP-HepB-Hib vaccine) began in September 2012 and introduction of rotavirus and pneumococcal conjugate vaccines is planned for 2013.

At least four elements warrant a reconsideration of OCV deployment in the Island of Hispaniola: the ongoing occurrence of cholera now almost two years after the epidemic began; the WHO-prequalification in September 2011 of a second OCV (Shanchol) that eases some operational challenges; the immediate availability in principle of up to 600,000 OCV doses; and the demonstration that, with substantial planning and logistic resources, OCV deployment is feasible on the Island.

Most important, interventions to decrease cholera transmission through improvements in water and sanitation, as well as the provision of clean water and sanitation to every household will take years to accomplish and will require the mobilization of billions of dollars, while immunization against cholera offers immediate short-term benefits to support the long-term vision.

Recommendations:

1. TAG commends the work of PAHO and partners for establishing and recently expanding the Regional Coalition on Water and Sanitation for the Elimination of Cholera in the Island of Hispaniola.
2. Advocated by this Coalition, the elimination of cholera transmission in the Island of Hispaniola, defined as cholera no longer being a public health burden, will only be achieved in the long run through considerable investments towards significant and sustained improvements in access to potable water and sanitation. To achieve the overarching goal of cholera transmission elimination, TAG considers that several short-term actions should also be considered, including the expanded use of OCV. However, if water and sanitation are not improved in the long run, the Island will likely remain vulnerable to repeated epidemics, even with a large-scale cholera vaccination program in place.
3. TAG recommends that OCV be used in Haiti, leveraging its delivery to strengthen the provision of other cholera prevention measures (i.e., social mobilization and active case-finding) and national immunization services. To reach this objective, incremental advances are needed in the integration of OCV use with Water, Sanitation, and Hygiene (WASH) development plans, in assuring sufficient OCV availability and financial sustainability of its purchase and delivery, and in developing operational and monitoring immunization capacities. These advances need to build national and local capacity of immunization programs and the health system as a whole. The timeframe during which vaccination will be needed depends on the advances in access to potable water and provision of sanitation and on the evolution of natural and vaccine immunities at population level. Contingent on firm orders, global production capacity could be scaled up to 2–4 million doses in 2013 and to 10–20 million doses in 2014 and thereafter. Therefore, a phased introduction based on global supply will need to be used in Haiti. OCV deployment could be prioritized in the following areas:
 - a) OCV introduction as part of the routine national schedule for children aged one year linked to the delivery of the MR vaccine, b) in the metropolitan area, supplemental immunization activities (SIA) targeting internally displaced people residing in camps (i.e., a group with low immunity likely transitioning to higher risk circumstances) and/or larger populations residing in shanty towns (a group with current moderate to high immunity, but ongoing high risk circumstances), and c) in rural areas, through SIA targeting the population who have difficult access to health care. Vaccination in rural areas will most likely require additional prioritization based on geospatial analyses of a defined set of criteria defined *a priori*. Regardless of the time and eventual scope of a cholera vaccination program, additional resources and funds will be needed for the program to be successful, and without ongoing attention to strengthening water, sanitation, and hygiene, OCV use will not prevent long-term risk of disease outbreaks and resurgence.