

# Immunization Newsletter

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Immunize and Protect Your Family

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## XXV Meeting of the Pan American Health Organization's Technical Advisory Group on Vaccine-preventable Diseases is Celebrated in Colombia



Participants at the XXV Meeting of PAHO's TAG, July 2019. Credit: PAHO/WHO.

The XXV Meeting of the Pan American Health Organization's Technical Advisory Group (TAG) on Vaccine-preventable Diseases was celebrated from 9-11 July 2019 in Cartagena de Indias, Colombia.<sup>1</sup> The slogan for the meeting was "Let's do our part to protect our communities!" to parallel the slogan for this year's Vaccination Week in the Americas (VWA) campaign. The objectives of this meeting included reviewing the progress on several initiatives focused on controlling and eliminating vaccine-preventable diseases (VPDs) and issuing recommendations on ways to address the many challenges faced by national immunization programs in the Americas.

TAG Chair Peter Figueroa, PAHO/WHO Representative in Colombia Gina Tambini, PAHO Assistant Director Jarbas Barbosa, and Colombia's Minister of Health, Juan Pablo Uribe, started the meeting with remarks on the importance of the meeting to continue the Region's efforts to improve the immunization program's reach and impact at the national and regional levels, as well as to face current challenges. Dr. Tambini mentioned that Cartagena is an appropriate setting for the meeting, both because it is Colombia's capital of Human Rights and because the country has demonstrated its commitment to immunization through one of the most updated and comprehensive vaccination schedules in the Americas. Other topics touched upon during these opening remarks included continuing to address the measles outbreaks in Brazil and Venezuela and closing immunization gaps to reach as many unvaccinated individuals as possible.

As is customary at the end of the meeting, Peter Figueroa announced the winner of 2019's PAHO Immunization Award selected by the TAG, Beryl Irons. Please visit <http://bit.ly/PAHO-IM-Award> for information on past winners. ■

<sup>1</sup> The topics presented in this issue of the Immunization Newsletter were marked "For decision" at the 2019 TAG Meeting. A complete list of topics and recommendations can be found in the final TAG 2019 Report, accessible at [www.paho.org/immunization/TAG-Reports](http://www.paho.org/immunization/TAG-Reports).

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## Update on the Regional Immunization Program

The Expanded Program on Immunization (EPI) of the Region of the Americas was created by PAHO in 1977 and has been a flagship program for the Region due to achieving the eradication, elimination and control of various vaccine-preventable diseases (VPDs) through extensive work done by PAHO's Member States. This has allowed the regional immunization program to be recognized as one of WHO's most important and successful programs in the world.

Globally, vaccination coverage has grown rapidly over the past ten years, and the number of available vaccines has significantly increased over the past 20 years. Challenges remain however, including the fact that three countries continue to have endemic polio transmission; the lack of WHO measles-free regions; and 19 million children that have not completed their vaccination schedules.

Progress in the Region has been significant since the creation of the EPI 42 years ago. Comparing vaccination coverages for each of the WHO regions from 1980 to 2017, we see that progress in the Americas has been very significant, despite the presence of unvaccinated or incompletely vaccinated children. Additionally, the Region of the Americas has been the Region with the earliest and most comprehensive introduction of new vaccines (pneumococcal, rotavirus and human papillomavirus [HPV]), and the first Region to eliminate smallpox, polio, rubella, congenital rubella syndrome (CRS), measles, and neonatal tetanus. Important challenges remain, generated by population displacement, large urban growth, social crises caused by economic or political unrest, natural disasters and the high levels of inequity that exist in the Region.

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Immunization activities in the Americas are coordinated and guided in accordance with the Regional Immunization Action Plan (RIAP) 2016-2020 approved by Resolution CD54.R8 in 2015 and developed under the framework of the Global Vaccine Action Plan (GVAP). A progress report of the RIAP was submitted to PAHO's Governing Bodies in 2017 and an update will be presented subsequently in 2019.

The RIAP has four Strategic Lines of Action: 1) Sustain the achievements; 2) Complete the unfinished agenda in order to prevent and control VPDs; 3) Tackle new challenges in the introduction of vaccines and assess their impact; and 4) Strengthen health services for effective vaccine administration.

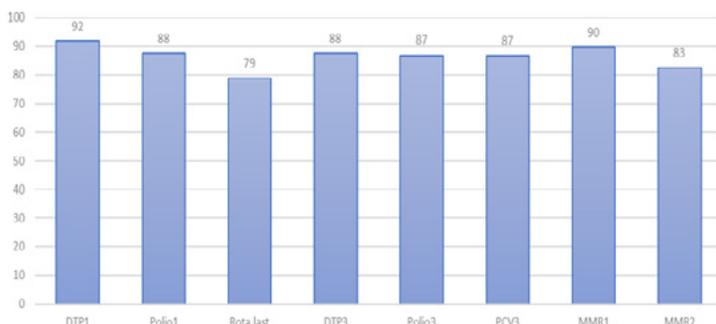
This Plan consists of 13 objectives (6 strategic and 7 general) and is monitored through 29 indicators. According to information from 2018, 15 of these indicators have adequate progress, six are considered in progress and eight have less than the expected progress.

In Strategic Line of Action **1) Sustain the achievements**, some examples of progress are: The Region remains polio-free, as well as free of the endemic transmission of rubella and CRS, and Member States have maintained vaccination as one of their priorities. Unfortunately, the elimination of endemic measles in the Region was not maintained as Venezuela and Brazil re-established endemic measles. The other 33 Member States keep their status as "free of endemic measles." Additionally, it is necessary to work on making individuals and communities understand the value of vaccines and their right and responsibility to demand immunizations.

Strategic Line of Action **2) Complete the unfinished agenda** has the following achievements: Haiti eliminated neonatal tetanus; we have begun to address inequity in immunization in the Region, and numerous immunization activities were conducted during Vaccination Week in the Americas (VWA) aiming at improving vaccination coverage at all levels and increasing the visibility of immunization at the regional level. However, maintaining high and homogenous vaccination coverage at all levels remains a challenge:

**1)** Considering coverage with the diphtheria-pertussis-tetanus containing vaccine, third dose (DTP3) as a tracer, the latter was 88% at the regional level (**figure 1**), implying that around 1.5 million children had not been vaccinated at the age at which they should have been vaccinated (with no information available on the number of children that were subsequently vaccinated). This means that, for every 25 children in the Americas, two are left behind and one does not complete the schedule in a timely manner.

**Figure 1. Vaccination Coverage by Biological in the Americas Region, 2018**



**2)** The number of children under one year of age who have not received the DTP3 vaccine in a timely manner has increased in recent years (**figure 2**), mainly due to declining coverage in countries with large cohorts of children under one year of age, such as Argentina, Brazil, Mexico, Peru, and Venezuela. Haiti continues to have a significant number of unvaccinated children or children who complete their schedule at a later age than recommended, although their situation improved in 2018.

**Figure 2. Populations under One Year of Age Who Have Not Been Vaccinated with the DTP3 Vaccine (in Thousands) in the Americas, 2010-2018**



**3)** Coverage with the DTP3 vaccine analyzed by country income level (according to the World Bank) shows small differences between intermediate and high-income levels, and even though the gap has reduced in recent years, there are still major challenges for low-income countries.

**4)** A major challenge is not only to achieve high coverage at the national level, but to have homogeneous coverage at the subnational and local levels as well. According to 2018 data, 34% of children under one year of age in Latin America and Caribbean (LAC) live in municipalities with DTP3 coverage under 80%, that can also reach a low of 50%.

Significant progress has been made in Strategic Line of Action **3) Tackle new challenges in the introduction of vaccines and assess their impact**, such as the fact that 41 out of 52 (79%) countries and territories in the Region have introduced at least one new vaccine (i.e. rotavirus, pneumococcal or HPV vaccines).

There is a need for more operational research to be conducted to guide immunization actions. Another gap is the absence of comprehensive strategies addressing vaccine acceptance and demand, and confidence in the safety of vaccines through advocacy, education, training, and other interventions targeting all audiences. Therefore, it is necessary to take a more holistic approach to the problem of under-vaccination, understanding the social and behavioral determinants of vaccination and involving experts in social sciences, and communication, expanding the traditional skillset of immunization program managers and staff.

With regards to Strategic Line of Action **4) Strengthen health services for effective vaccine administration**, immunization has contributed significantly to achieving the Sustainable Development Goals (SDGs) and through PAHO's Revolving Fund, the availability of vaccines has been guaranteed for most countries and territories in the Americas. Another example of progress in this area is that 33 out of

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52 (65%) countries and territories administer the influenza vaccine to pregnant women as a result of integration between immunization and maternal health systems; and 14 countries (27%) have made progress in developing and/or implementing electronic immunization registries (EIRs). However, more efforts are needed to provide disadvantaged populations with timely access to vaccines, examples of these are indigenous people, migrants and populations affected by natural disasters or social crises.

Considering the four areas of the RIAP, we can see that while the immunization program has been successful thanks to the broad

commitment of Member States, there are still major challenges to tackle. Some are beyond the control of immunization program, such as the political de-prioritization of immunization, program management difficulties that sometimes result from health reforms, and insufficient and delayed funding. There are also challenges directly related to the program, such as the need for appropriate strategies to ensure timely access to and availability of vaccines, information systems that allow analyses at all levels for timely decision-making, ongoing training for human resources and employing clear communication strategies at all levels. ■

### Recommendations

- Countries should have a strong policy and legal framework to support vaccination as a human right and a social responsibility, with exemptions only for medical reasons, and with a dedicated budget for procurement and program operations, as an integral component of universal health coverage.
- Countries should promote vaccine confidence in immunization services and ensure that there is ready access to vaccination through primary health care services, as well as through a range of other opportunities, such as outreach, evening and weekend services.
- Countries should strengthen VPD surveillance and improve the monitoring of vaccination coverage and the quality and use of data to guide public health action.
- Countries need to achieve timely and complete immunization coverage in infancy and improve coverage for vaccines provided in the second year of life (e.g. DTP4, MR2 or MMR2).

## Monitoring and Re-verifying Measles, Rubella and Congenital Rubella Syndrome (CRS) Elimination in the Americas

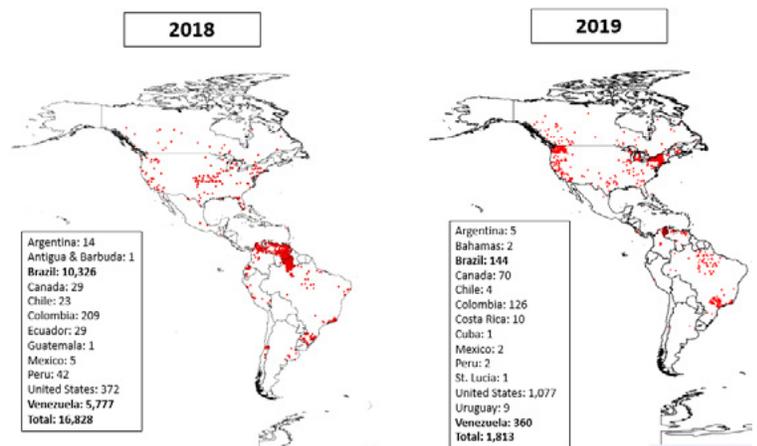
### Measles Outbreaks in the Americas

In 2018, there were 16,828 confirmed measles cases reported by 12 countries in the Region of the Americas, with a regional incidence rate of 16.8 per million population. This rate is the highest recorded during the post-elimination period. This unusual increase in cases related to low vaccination coverage in recent years in several countries. In Venezuela and Brazil, low vaccination coverage led to the reestablishment of endemic measles transmission in June 2018 and February 2019, respectively, following 12 months of continuous circulation of the measles virus (genotype D8, lineage MVi/HuluLangat.MYS/26.11) in their territories.

The rapid measles virus spread within and outside Venezuela resulted in importations and import-related cases in eight countries: Argentina (n=9 cases), Brazil (10,304 cases), Canada (n=1 case), Chile (26 cases), Colombia (335 cases), Ecuador (n=19 cases), Peru (24 cases), and the United States of the Americas (USA) (n=4 cases). Except for Colombia and Ecuador, the other six countries also reported imported cases from other regions of the world.

In 2019, there have been 1,813 measles cases in 14 countries, with an incidence rate of 1.8 per million population<sup>2</sup>; Brazil, Colombia, USA and Venezuela have had ongoing measles transmission since 2018, while the remaining ten countries have either interrupted transmission following isolated imported cases or are closely following up on secondary cases to ensure the rapid interruption of virus transmission (**figure 3**).

Figure 3. Distribution of Confirmed Measles Cases by Sub-national Level in the Americas, 2018-2019



Sources: Surveillance country reports sent to PAHO/WHO's Comprehensive Family Immunization Unit, and Ministry of Popular Power of Venezuela.

During 2018 and 2019, Brazil (56%), Colombia (2%), USA (8%) and Venezuela (33%) reported the highest proportions of measles cases in the Region. The table below summarizes the main characteristics of these outbreaks. The proportions of cases by age group presented refer to two main age groups affected in each country.

<sup>2</sup> Data as of epidemiological week 25, 2019

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**Table 1. Characteristics of Measles Outbreaks Reporting the Highest Proportion of Cases in the Americas, 2018-2019\***

	Venezuela**	Brazil	Colombia	United States <sup>(a)</sup>
<b>Total of Confirmed Cases</b>	6,864	10,474	343	1,453
<b>Ages of Cases (%)</b>	<1y (20%); 1-4y (46%)	<1y (17%); 15-29y (46%)	<1y (26%); 1-4y (33%)	1-4y (32%); 20-39y (16%)
<b>Unvaccinated<sup>(b)</sup> (%)</b>	93%	74%	91%	89%
<b>Affected states (%)</b>	23/24 (95%)	13/27 (48%)	16/37 (43%)	2018: 26/50 (52%) 2019: 28/50 (56%)
<b>Affected municipalities (%)</b>	113/335 (34%)	99/5570 (1,6%)	34/1122 (3%)	No data
<b>Last Onset</b>	06/04/2019	05/25/2019	06/15/2019	06/19/2019
<b>Genotype</b>	D8	D8, B3	D8	D8, B3, D4
<b>Risk Factors</b>	Difficulty for a rapid response at the state and municipal levels; cumulative low coverage; nosocomial transmission; lack of human and logistic resources; virus spreading in indigenous communities	High migration; difficulty for a rapid response at the state and municipality levels; cumulative low coverage; nosocomial transmission; lack of laboratory kits; virus spreading in indigenous communities	High migration; overload of field outbreak investigation; nosocomial transmission; pockets of susceptible children in some departments; virus spreading in indigenous communities	Under vaccination due to philosophical or religious beliefs; unvaccinated residents traveling internationally
<b>Virus Spreading</b>	Quick virus spreading inside and outside of the country	Quick virus spreading to 13/27 states; Amazonas and Roraima concentrated 97% cases.	Virus spread in places with pockets of susceptible individuals in some departments; high vaccine coverage and rapid public health response has limited spread in Colombia.	Virus spread within close-knit communities due to vaccine hesitancy and other community-specific issues; high vaccine coverage and rapid public health response limited the spread
<b>Deaths</b>	<b>79</b>	<b>12</b>	<b>0</b>	<b>0</b>

Source: ISIS, MESS, country reports to FPL-IM/PAHO \*Data as of epidemiological week 26, 2019. \*\* Data as of 2017-2019 for Venezuela.

a) Includes all cases and outbreaks. In US an outbreak is defined as a chain of transmission of 3 or more cases linked in time and space.

b) Includes non-eligible cases, unvaccinated cases, with unknown vaccination history or no data.

Despite the delicate situation of the Venezuelan health system, health authorities managed to organize a national campaign vaccinating 8.6 million children aged 6 months to 15 years old, and 460,844 individuals aged 15 years and older during the second half of 2018. This campaign that reached 97% coverage at the national level was followed by a rapid decline in measles cases. Brazil also carried out a national measles vaccination campaign, vaccinating 10.9/12 million (98%) children 1-4 years of age. In the Amazonas state, vaccination of infants aged 6 months, adolescents and young adults was additionally conducted. In Roraima, vaccination of infants was also carried out. Colombia did not conduct a national vaccination campaign, but the country has managed to successfully interrupt circulation of the virus by responding rapidly to the outbreak, stepping up efforts to find and vaccinate unvaccinated children under 5 years of age and by providing free doses of the measles and rubella vaccine to 88,819 children aged 6-11 months living in municipalities with ongoing measles outbreaks (82% coverage). The country also applied more than 1.1 million doses of the measles and rubella containing vaccine to Venezuelan migrants, targeting children younger than 15 years of age.

In response to the multiple and challenging measles outbreaks in the Americas, PAHO's Comprehensive Family Immunization Unit (IM) intensified its technical cooperation by a) advocating at the

highest political country level for immunization solidarity and strong outbreak response; b) mobilizing \$7.4 million (USD), of which 87% were for Venezuela; c) continuing deployment of regional technical assistance and experienced consultants for outbreak response; d) conducting ten national outbreak response trainings and three sub-regional training workshops; e) strengthening in-country coordination of immunization and surveillance; and f) procuring laboratory reagents and strengthening national molecular epidemiology capacities in eight countries.

### Molecular Epidemiology on Measles

Measles is an RNA virus of the *Morbivirus* genus of the family *Paramyxoviridae*. The single-stranded negative RNA genome consists of 15,894 nucleotides which code for six structural proteins (N, P, L, M, F and H) and two non-structural proteins (C and V). Measles is probably a monotypic virus, as genetic and antigenic variations have been detected in wild-type viruses. Twenty-four measles genotypes have been identified (A, B1, B2, B3, C1, C2, D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, E, F, G1, G2, G3, H1 and H2). Genetic analysis of the 450 nucleotides region of the N gene has been used as a tool for molecular epidemiology to track transmission pathways, characterize outbreaks, contribute to interrupting endemic transmission and document importations.

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Measles sequence data has been made available in the Measles Nucleotides Surveillance database (MeaNS, available on <http://www.who-measles.org>) supported by WHO. Measles virologic surveillance has been expanded through the laboratories of the global and regional laboratory network. However, in recent years, a reduction in the diversity of circulating genotypes has been observed, creating a challenge to discriminate between closely related viruses within a single genotype. The phylogenetically similar strains observed within a genotype have been designated as “named strains” that represent an epidemiologically significant viral lineage. Named lineages represent at least 50 identical sequences reported within the last two years, and from at least three different countries. Further genetic analyses allowing for a better resolution of the genetic divergences would be useful, especially to document multiple importations of the same genotype and estimates of measles virus mutation rates during long chains of virus transmission.

The Region of the Americas is experiencing a similar situation. During 2017, a total of 159 measles sequences were reported to MeaNS in four countries (Argentina, Canada, USA and Venezuela) and three measles genotypes were identified within multiple importations: B3 (52.8%), D8 (45.9%), and H1 (1.3%). Different B3 and D8 lineages were identified (five and three lineages, respectively).

In 2018, eleven countries reported a total of 460 measles sequences to MeaNS (1 in Antigua and Barbuda, 8 in Argentina, 105 in Brazil, 27 in Canada, 17 in Chile, 79 in Colombia, 16 in Ecuador, 1 in Guatemala, 2 in Mexico, 198 in the USA, and 6 in Venezuela); in 91.5% of the sequences reported, genotype D8 was identified and in 8%, genotype B3; only two sequences (0.5%) were associated with the D4 genotype. One interesting issue was related to the multiple importations of D8 genotypes and the documentation of different lineages within countries of the Region; in Argentina, two lineages; Canada, four different lineages and in the USA, six different lineages.

For the first time in the history of measles elimination in the Americas, a country in the Region had multiple importations of the same genotype and lineage. Colombia reported a total of 79 measles sequences to MeaNS in 2018; 61 of these were identical (same genotype and lineage); 34/61 were identified in imported cases and 27/61 were identified in cases without history of travel.

18/79 sequences were identified with 1 nucleotide of change; 8/18 had history of recent travel and 10/18 had an unknown source.

This situation raises the concern that sequencing the N-450 gene is probably not enough to differentiate between new importations or chains of transmission. Amplifying the measles genomes of other regions can facilitate the identification of different chains of transmission. More deep sequence analysis is needed to achieve a better understanding of the mutation rate of the virus during the chains of transmission and to facilitate the identification of multiple importations of the same genotype and lineage coming from different sources.

### **Proposal for a Regional Framework to Monitor and Re-verify Measles and Rubella Elimination**

The Regional Monitoring and Re-verification Commission (RVC) for Measles and Rubella Elimination met in June to develop consensus on the elements from the original 2011 Plan of Action for verifying elimination that should be maintained and those that need updating. The Commission agreed to the framework developed during the meeting, with substantial modifications to the original objectives, basic principles and essential criteria. The Commission also concluded that endemic countries applying for re-verification would need to document absence of transmission for more than one year, using rigorous criteria developed by the Commission. Those who did not meet the criteria would not be re-verified as free of measles.

During the TAG meeting in Colombia, TAG members emphasized the importance of using the standard and sensitive suspected measles case definition (fever and rash), as re-verification of elimination will require the review of one year of use of this case definition. TAG also reminded countries that during outbreaks, countries may consider the criteria of clinical and epidemiological links to a confirmed case for case confirmation. However, it is important that countries temporarily altering measles case definitions, such as during arbovirus outbreaks or outbreaks of other fever-and-rash-causing diseases, document their use.

Finally, countries may consider reactivating their national measles committees to monitor the sustainability of elimination, to promote the development and implementation of annual national plans for the sustainability of measles elimination, and to ensure that these reports are submitted to PAHO at the beginning of each year. ■

### **Recommendations**

- TAG expresses serious concern about ongoing measles outbreaks in the Region and urges the affected countries to take urgent action to interrupt measles transmission and stop further spread of the virus.
- TAG strongly encourages the global community to set a target and develop a program for the global eradication of measles and rubella and calls on countries of the Americas and PAHO, in partnership with other Regions, to advocate for establishing this at the next meeting of the World Health Assembly in 2020.
- TAG endorses the proposed regional framework for the monitoring and re-verification of measles and rubella elimination. The standard, sensitive measles case definition should be used in all countries of the Region. Endemic countries will have to document absence of measles virus transmission for more than one year, to meet re-verification criteria.
- TAG strongly urges Member States to achieve 95% vaccination coverage levels at all administrative levels for the two recommended doses of measles and rubella vaccines and ensure high quality surveillance and rapid response. Follow-up campaigns should be conducted based on risk assessments.

## Update on the Progress towards Polio Eradication

### Global Update

There has been an increase in wild poliovirus type 1 (WPV1) cases this year. As of epidemiological week (EW) 24 2019, there have been 29 cases of WPV1, compared to 12 cases during the same time in 2018. All cases are from Pakistan (75%) and Afghanistan (25%). Insecurity and access remain critical issues in these countries.

Also, there are multiple type 2 circulating vaccine-derived (cVDPV2) outbreaks occurring on the continent of Africa. The emergence of new strains of cVDPV2 in areas where mOPV2 has been used and tOPV and mOPV2 vials have been found, the recent spread of cVDPV2 into southern Nigeria, including the densely populated Lagos State, and evidence of missed transmission in Nigeria and Somalia, suggest that the situation continues to deteriorate. Insufficient coverage with IPV exacerbates the growing vulnerability on the continent to cVDPV2 transmission. Additionally, cVDPV1 outbreaks in Papua New Guinea and Indonesia and cVDPV3 in Somalia highlight gaps in population immunity due to pockets of persistently low routine immunization coverage in many parts of the world.

Major risks to global polio eradication include: growing risk of cVDPV spread, falling poliovirus type 2 immunity, weak routine immunization, low quality supplementary immunization activities (SIAs), surveillance gaps, lack of access, and population movement. To confront these challenges, the Global Polio Eradication Initiative (GPEI) has recently launched a new plan: The Polio Endgame Strategy 2019-2023. Additionally, they have published updated guidelines on polio surveillance, including polio surveillance among persons with primary immunodeficiency disorder.

### Regional Update

This year marks the 25th anniversary since the International Commission for the Certification of Poliomyelitis Eradication in the Americas (ICCPE) declared the Americas free of polio. However, while recognizing and celebrating this milestone, countries of the Americas must remain vigilant. The TAG is concerned that regional coverage for the polio-3 vaccine is declining. The lowest regional polio-3 vaccine coverage since certification in 1994 was reported for the last two years (2017 and 2018). Additionally, pockets of disparity remain a concern. More than a quarter (28%) of all districts in the Region have coverage below 80%. 2018 data shows that 7 out of 10 children live in a district where coverage is below the regional standard (95%).

Currently, 33/52 of countries and territories of the Region use two or more doses of IPV, including Ecuador and Cuba, whom introduced two fractional doses of IPV following TAG's recommendation. However, 19 countries are still using only one dose of IPV. This is of concern because population immunity against type 2 polioviruses continues to decrease, as the cohort of children born after OPV2 withdrawal grows, and the potential risk of importation of cVDPV 2 rises.

Regarding surveillance, only six countries in 2018 met all three key acute flaccid paralysis (AFP) surveillance indicators (Bolivia, Cuba, Mexico, Nicaragua, Panama, Paraguay). However, the quality of AFP surveillance has not been sustained; in just the last 52 weeks, Mexico and Nicaragua have met the three key indicators. Additionally, there is lack of compliance with the standards for final classification of AFP cases.

Countries are not conducting the 60-day follow-up of AFP cases, which is a major concern, particularly in cases where an adequate stool sample was not obtained. In 2018, only 15% of cases received a 60-day (+/- 7 days) follow-up. In addition, there is late final classification of AFP cases. In fact, eight countries have AFP cases reported in 2018 that are pending final classification.

PAHO has updated the analysis of the risk of vaccine-associated paralytic poliomyelitis (VAPP) in LAC, as follow-up of the work done by Andrus et al. (1989-1991) and Landaverde et al. (1992-2011). The results show that from January 2012 to April 2016 (before the switch from tOPV to bOPV), the overall risk was estimated to be 1 case per 10.1 million doses of OPV administered. After the switch, this risk dropped to 1 case per 15.5 million doses of OPV administered. These results showed an important decrease compared to the previous risk estimations made by Andrus and Landaverde.

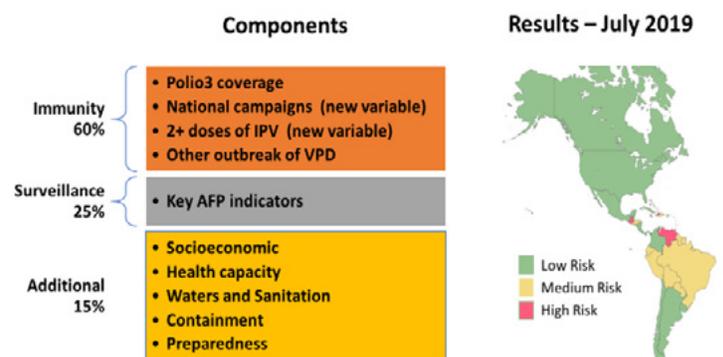
In two countries at high-risk for polio, PAHO with support from the CDC, has implemented environmental surveillance (ES) in Haiti (March 2016-current) and Guatemala (November 2018-current) to supplement AFP surveillance. Two VDPV were isolated in Guatemala (one VDPV1, one VDPV 3) through ES. These are two isolated events, and no evidence of circulating VDPV have been found to date. In the last five years, there have been three iVDPV cases notified in the Region, two from Argentina and one from Colombia. The two in Argentina received antiviral treatment with positive results. Actions have been taken according to the WHO guidelines: collection of stool samples, vaccination of family, vaccination of contacts, active case search, vaccination of the area and control and monitoring of viral excretion.

As part of the global certification process and since 2018, every country has been required to submit an Annual Report on the Documentation of Polio Eradication Status to the Regional Certification Commission (RCC). The evidence in these reports, validated by the NCCs, was used to respond to the request of the Global Certification Commission (GCC) to confirm that the Americas remain free from WPV3. All but six Caribbean countries presented their report (Antigua and Barbuda, Bahamas, Curacao, Guyana, Monserrat and St. Kitts and Nevis).

On 16 May 2019, the RCC certified that the Americas has been free of WPV3 for almost 29 years, with the last endemic case of WPV3 occurring in October 1990 in Mexico. In July 2019, the RCC updated the regional risk assessment for polio. The results show that three countries are at high-risk of having an importation or emergence of polio (Guatemala, Haiti, and Venezuela), 17 countries and territories are at medium-risk, and the remaining 24 are low-risk (**figure 4**).

In coordination with WHO, PAHO has updated the regional standard operating procedures for responding to a poliovirus event and outbreak. The RCC has requested that all countries have a national outbreak response plan. All countries and territories, except for Antigua and Barbuda, Curacao and Montserrat have submitted at least one version of their national plan. After each submission, PAHO conducts detailed reviews of the plan and provides recommendations to update the plan. As of July 2019, 29 countries have conducted polio outbreak simulation exercises (POSE).

**Figure 4. RCC Polio Risk Assessment**



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### Poliovirus Containment Status

Efforts to contain poliovirus type 2 were implemented progressively in 2016 and 2017 and intensified in 2018. WHO has published guidance to minimize risks for facilities collecting, handling or storing materials potentially infectious for poliovirus.

The SAGE Polio Working Group met in February 2018 to harmonize recommendations between SAGE and GAPIII on the post-eradication polio immunization schedule and to review other issues regarding the GPEI. Regarding immunizations requirements for countries with poliovirus essential facilities (PEFs), SAGE recommended that countries implement a routine immunization schedule with a minimum of two IPV doses, maintain high population immunity with  $\geq 90\%$  IPV2 coverage among infants in the area surrounding the PEFs (100 km), have outbreak plans specifying responses to containment breaches, and conduct outbreak simulation exercises.

At the 71st World Health Assembly in May 2018, WHO Member States unanimously adopted Resolution WHA71.16, urging international commitment to full implementation of GAPIII requirements. With adoption of the resolution, countries are expected to complete inventories of type 2 polioviruses (PV2), destroy unnecessary PV2 materials and advance their inventories of WPV1 and WPV3 materials in accordance with WHO guidance. In addition, countries must reduce the number of facilities designated to retain polioviruses to a minimum, appoint a national authority for containment (NAC) by the end of 2018 and formally engage designated PEFs in containment certification by no later than the end of 2019.

Poliovirus containment includes management of biorisk in laboratories, vaccine production sites, and in other facilities that retain the viruses after eradication; the initial milestone is for containment of PV2. By August 2018, 29 countries had designated 81 facilities to retain PV2 materials; 22 of them had established a NAC.

### Implementation of the GAP III in the Americas

The Region is committed to completing all goals outlined in the Polio Eradication and Endgame Strategic Plan, including the GAP III, which has been adapted for the Region as the Regional-GAP III, endorsed by PAHO's TAG in July 2015. All countries have submitted an average of four reports (range 2-6) on Phase I of GAP III: containment of WPV2/VDPV2 and Sabin2 to the RCC. Between March 2016 and October 2018, the RCC reviewed 99 updated containment reports during RCC

meetings. In 2017, the RCC validated 32 switch reports, including the retrieval and destruction of all vials of tOPV.

In an October 2018 meeting, the RCC fully validated 18/23 (22 countries + 1 Caribbean Sub-region) expected reports for infectious and potentially infectious WPV2/VDPV2 materials and 16/ 23 for infectious Sabin2 materials. By October 2018, five countries in the Region had designated 20 Poliovirus Essential Facilities (dPEFs), Brazil: 1, Canada: 5, Cuba: 1, Mexico: 1, and USA: 12. Eighteen of these will retain WPV2/VDPV2 and Sabin2. In agreement with WHO's Containment Certification Scheme (CCS), the five countries with dPEFs have nominated a NAC. Six dPEFs have submitted the documentation required for the Certificate of Participation (CP) to the NAC for the United States and to the GCC, which is the first step of the global certification process. PAHO and WHO provided a second regional auditors training on April 2019, to support the CCS implementation in the five countries with dPEFs.

Regarding WPV1 and WPV3 materials, 16/23 reports have received RCC validation for inventory of facilities and countries are advancing with the elimination of all unneeded WPV1 and WPV3 materials. The 56th Directing Council, 70th Session of the Regional Committee of WHO for the Americas in Washington, DC, 23-27 September 2018, was informed of Resolution WHA71.16 "Poliomyelitis - containment of polioviruses." A report about the implication and progress in the Region was presented and is available at: <http://bit.ly/2krq9vY>

In January 2019, PAHO Director, Dr. Carissa Etienne, sent letters to the Ministers of Health of all the countries of the Region of Americas to urge their personal engagement and leadership to fully implement Resolution 71.16 to ensure the long-term sustainability of the eradication of poliomyelitis. For countries with dPEFs (Brazil, Canada, Cuba, Mexico and USA), the letter highlights the commitment to apply strict safeguards to keep their countries and the world safe from the risk of facility-associated re-introduction of poliovirus.

The RCC has requested that all countries submit updated containment reports by August 2019, with a complete inventory for type 2 polioviruses, advances for polioviruses types 1 and 3, and destruction of all unneeded poliovirus type 1 and 3 materials. These updated country reports will be reviewed at the 11th RCC meeting planned for October 2019. All dPEFs should have formal engagement with the CCS process no later than 31 December 2019. ■

### Recommendations

- TAG urges countries to fully implement the end game strategy for polio eradication, including maintaining high vaccination coverage, conducting active AFP surveillance, meeting poliovirus containment requirements, conducting risk assessments, developing and implementing mitigation plans and updating outbreak response plans.
- The TAG strongly recommends that the 19<sup>3</sup> countries that currently use only one dose of IPV, introduce a second IPV dose into their routine immunization schedules.
- In countries where VDPV is detected through environmental surveillance, such as Guatemala, TAG underlines the importance of countries maintaining high vaccination coverage and high-quality surveillance. TAG supports the decision of Guatemala to conduct a nationwide vaccination campaign using bOPV and MMR vaccines. Other high-risk countries in the Region should take appropriate measures to prevent the re-introduction of WPVs or emergence of cVDPVs.
- TAG recommends that PAHO adapt the SAGE Primary Immunodeficiency Guidelines for the Region.

<sup>3</sup> Belize, Bolivia, British Virgin Islands, Curaçao, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Nicaragua, Paraguay, Saint Kitts and Nevis, Saint Lucia, Suriname, Trinidad and Tobago, Islands of Turks and Caicos, and Venezuela.

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**Editors: Octavia Silva, Martha Velandia and Cuauhtemoc Ruiz Matus**

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## Comprehensive Family Immunization Unit

525 Twenty-third Street, N.W.  
Washington, D.C. 20037 U.S.A.  
<http://www.paho.org/immunization>



# PAHO

## In Memoriam: Dr. Reinaldo de Menezes Martins, Physician and Professor (1936-2019)



**Dr. Reinaldo de Menezes Martins (1936-2019).**

Born in Mimoso do Sul (ES) on 28 October 1936, Dr. Reinaldo graduated from the National School of Medicine (University of Brazil) in 1960. After graduation he worked as a pediatrician in emergency hospitals, in the Fernando Magalhães maternity hospital, and in health centers in the city of Rio de Janeiro where

he was head of Childcare and Pediatric Services from 1966 to 1976. He worked in the pediatric unit of the Bank Employees Retirement and Pension Institute (IAPB) (now Hospital da Lagoa) from 1963 to 1995. He was head of the pediatric unit at Hospital da Lagoa (1977-1992) and director of the hospital's research center. He obtained a doctoral degree in Infectious and Parasitic Diseases from the Oswaldo Cruz Foundation.

He was a professor of pediatrics at the Institute of Carlos Chagas Postgraduate Medical School (1981). He held various positions and titles in the Brazilian Society of Pediatrics (SBP), including vice president (1978-1979) and chairman (1980-1982). He was a member of the SBP commission that coordinates scientific committees, also serving as secretary of the commission (1984), and as chairman and member of the Infectious Diseases Committee. He was a founding member

of the Brazilian Academy of Pediatrics and held various positions including secretary for two terms and president for two terms (1997-2006).

His involvement in the area of immunization included:

- In the 1970s, when there was divergence between the BSP and the Ministry of Health on the vaccination schedule, he prepared a letter with suggestions to improve the vaccination schedule and promote cooperation among institutions.
- Participated in the national smallpox eradication campaign.
- Conducted vaccination campaigns in collaboration with the Ministry of Health and UNICEF, contributing decisively to a decrease in infant mortality in Brazil.
- With Dr. Álvaro Aguiar, he published "History of Brazilian Pediatrics" in 1996. He was author or coauthor of numerous scientific papers and book chapters, mainly in the fields of immunization, infectious diseases, and social pediatrics.
- Acted as a consultant to the National Commission for Measles Eradication and Rubella Control.
- Member of the Technical Advisory Committee on Immunization of the Ministry of Health.

- Member of the Interinstitutional Committee for Drug Surveillance of Vaccines and other Immunobiologicals (CIFAVI).
- He was in the Council for International Organizations of Medical Sciences, an international group affiliated with the WHO that studies post-vaccination adverse events. Also cooperated with Brighton Collaboration, an international organization devoted to vaccine safety.
- He participated as an external consultant in several working groups on vaccine-preventable diseases such as yellow fever, measles, rubella, and hepatitis B, among others.

As a clinical researcher, he led many studies of vaccine used in Brazil's national immunization program including: Multicenter study of active surveillance of adverse/reactogenicity events associated with the DTP-Hib vaccine (diphtheria, tetanus, whooping cough, and *Haemophilus influenzae* type b [Hib]) used in the national program (2004); and a clinical trial on severe adverse events following vaccination against yellow fever in partnership with the Rockefeller Foundation (USA) (2017).

Dr. Reinaldo leaves a legacy of friendships, initiatives, partnerships, and ethics in the field of immunization in Brazil and the Region of the Americas. ■