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#### **B. PLAN OF ACTION FOR THE SUSTAINABILITY OF MEASLES, RUBELLA, AND CONGENITAL RUBELLA SYNDROME ELIMINATION IN THE AMERICAS 2018-2023: PROGRESS REPORT**

##### **Background**

1. The objective of this document is to report to the Governing Bodies of the Pan American Health Organization (PAHO) on the progress made in the implementation of the Plan of Action for the Sustainability of Measles, Rubella, and Congenital Rubella Syndrome Elimination in the Americas 2018-2023 (Document CSP29/8 and Resolution CSP29.R11 [2017]) (1, 2). This plan of action was approved for the Member States to establish the necessary interventions to ensure the sustainability of the elimination of these diseases, based on the four strategic lines of action included in the plan.

##### **Analysis of Progress Achieved**

2. For over 40 years, the Region of the Americas has been a world leader in the eradication, elimination, and control of vaccine-preventable diseases. In April 2015, the Region was declared free of endemic rubella, and in September 2016, free of endemic measles. At the time of this report, 33 Member States of the Region are measles-free, and all 35 Member States are free of endemic rubella.

3. The six regions of the World Health Organization (WHO) are targeting measles elimination and three regions are targeting rubella elimination. However, the Region of the Americas is the only region that has managed to reach these targets. Given this global situation, there is a permanent risk of importation of the measles and rubella viruses, making it necessary to consolidate effective global elimination strategies and political commitment at the highest level in global public health forums.

4. In addition, some countries in the Region of the Americas face national contexts that have affected the provision of health services and, consequently, access to vaccination services for the most vulnerable population. In some countries of the Region, the speed

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with which epidemiological surveillance systems detect imported cases has been affected, as has the implementation of the recommendations of this plan of action. The latter would have enabled a rapid response to prevent the measles virus from spreading in those countries in 2018. Despite this, the majority of the countries that reported measles outbreaks in the Region detected imported cases in a timely fashion and responded quickly, ensuring that circulation of the virus was interrupted and preventing major outbreaks in their national territories.

### ***Measles outbreaks in the Region of the Americas***

5. In 2018, there were 16,821 confirmed cases of measles in the Region of the Americas, with a regional incidence rate of 16.7 per million inhabitants: the highest rate in the post-elimination period.

6. In this unusual increase in cases, the risk factors are directly related to low vaccination coverage in recent years in Member States. In Brazil and Venezuela, low coverage in some states led to the reestablishment of endemic transmission in June 2018 and in February 2019, respectively, after 12 months of continuous circulation of the measles virus (genotype D8, lineage MVi/HuluLangat.MYS/26.11) in their national territories.

7. In 2018, migration from Venezuela to other South American countries was one of the main factors that enabled the virus to spread quickly. In turn, this facilitated rapid importation of cases and the emergence of outbreaks in six countries: Argentina (14), Brazil (10,326), Chile (24), Colombia (209), Ecuador (19), and Peru (42). Except for Colombia and Ecuador, the other four countries also reported imported cases from other regions of the world. As the number of measles cases doubled worldwide, five countries reported cases imported from other regions: Antigua and Barbuda (1), Canada (29), Guatemala (1), Mexico (5), and United States of America (372) (3). Canada and the United States of America reported cases associated with imported cases.

8. Between 1 January and 16 August 2019, a total of 3,272 confirmed cases of measles, including one death, were reported in 14 countries and territories of the Region of the Americas; of this total, 78% were reported from Brazil (42%) and the United States (36%).

### ***Measles outbreak in Venezuela (2017-2019)***

9. Between July 2017 and 16 August 2019, Venezuela confirmed 6,923 cases (727 in 2017, 5,779 in 2018, and 417 in 2019), for a national cumulative incidence rate of 22 cases per 100,000 population. In 2017 and 2018, 78 deaths were reported: two in 2017 (in Bolivar) and 76 in 2018 (37 in Delta Amacuro, 27 in Amazonas, eight in Miranda, three in the Capital District, and one in Bolivar). The age group most affected was children under 15 years of age (incidence rate of 65 per 100,000 population), especially in children under 1 and from 1 to 4 years old (incidence rates of 316 and 303 per 100,000 population, respectively). Both sexes were equally affected. Among the documented deaths from

measles, 79% were among indigenous people of the Warao and Sanema communities, and in other indigenous communities in Delta Amacuro, Amazonas, Monagas, and Zulia. In July 2017, the first case was detected in an unvaccinated 1-year-old child living in Bolivar state, based on importation of measles virus genotype D8, lineage MVi/HuluLangat.MYS/26.11, which had already been reported in 17 countries around the world that year. The source of the outbreak could not be established.

10. This outbreak occurred in a complex national context that—combined with low vaccination coverage, a growing susceptible population in children under 15, and a delayed response to the first confirmed case—allowed the virus to spread quickly. On 30 June 2018, endemic transmission of measles was reestablished (4). The states most affected in 2018 were: the Capital District, Miranda, Vargas, Delta Amacuro, Bolivar, and Amazon. In 2019, two states still have active virus transmission: Zulia and Anzoátegui, where the country's critical conditions and scarcity of health workers has made it impossible to control transmission of the virus. However, in these states, the available vaccination teams continue to work energetically to contain outbreaks.

11. Despite the delicate situation of the Venezuelan health system, in the second half of 2018 the country managed to organize a national campaign (5) vaccinating 8.8 million children from 6 months to 15 years of age, and 460,844 people over age 15. This campaign achieved the expected impact of a rapid reduction in measles cases, reaching 97% coverage at the national level. PAHO/WHO has provided continuous support to implement actions to contain measles and diphtheria outbreaks throughout the country, including mobilization of financial resources for the large-scale national vaccination campaign, hiring vaccination teams, providing 36 national and international consultants, and contracting urban and rural transportation. The result has been a sharp reduction in confirmed cases since September 2018.

#### ***Measles outbreak in Brazil (2018-2019)***

12. Since 2017, Brazil has been receiving a migratory flow of Venezuelans, mainly in the states along the border between these countries, where the first measles cases were imported. In late 2018, a total of 10,330 cases were confirmed in 11 states, for a national incidence rate of 5 per 100,000 population. The highest incidence rates, by age, were observed in infants under 1 year and children 1 to 4 years of age (63.2 and 10.3 per 100,000 population, respectively), and in the 15-19 age group (12.46 per 100,000 population); the 15-29 age group had 46% of all cases and infants under 1 year, 17%.

13. In 2018, Amazonas was the state with the most confirmed cases and the highest incidence rate (9,803 cases; 240 per 100,000 population), accounting for 95% of all cases in the country, mainly in Manaus, the capital city of the state (9,012 cases). Roraima was the state with the second most confirmed cases (361 cases; 62.6 per 100,000 population). Also, sporadic cases imported from other regions of the world were detected in Rio Grande do Sul, São Paulo, and Rio de Janeiro.

14. On 19 February 2019, endemic transmission was reestablished in Brazil after 12 months of continuous circulation of the same genotype (D8, lineage MVi/HuluLangat.MYS/26.11) imported originally from Venezuela. As of 16 August 2019, 12 weeks have elapsed since the last endemic measles case occurred in the state of Pará (onset of rash 5 May). However, in 2019, Brazil confirmed 1,388 cases in nine federal units; of this total, 1,307 cases (94%) were reported in the state of São Paulo, where measles virus has spread into 32 of 645 municipalities. Genotype D8 lineage MVs/Gir Somnath.IND/42.16 was identified. The three age groups with the highest cumulative incidence rates among confirmed cases are: children under 1 year (9.5 cases per 100,000 population); 1 to 4 years (3.6 cases per 100,000 population); and 20 to 29 years (2.9 cases per 100,000 population). The outbreak remains active, with potential virus spread within and outside of the state and country due to high population density and global interconnectivity.

15. In Brazil, the risk factor related to the biggest outbreaks in Amazonas and Roraima was the large number of susceptible children under 5 and equally susceptible adolescents and young adults who were not vaccinated during the catch-up campaigns to eliminate rubella (2008). In general, vaccination coverage of all vaccines has declined in the last two years in Brazil. In 2018, coverage with the first dose of the trivalent MMR vaccine stood at 84%, and 75% for the second dose.

16. In August and September 2018, Brazil carried out a national measles vaccination campaign (target: 11.2 million children aged 1-4 years). In Roraima and Amazonas (Manaus), vaccination of infants starting at 6 months of age was added. In Amazonas, vaccination of adolescents and young adults was added. National-level coverage of 97.8% was achieved: approximately 10.9 million vaccinated children. Based on these assertive, large-scale actions, the country managed to dramatically reduce circulation of the virus in Amazonas. Consequently, transmission of the virus to other states was avoided. By late 2018, Brazil had vaccinated 22,962,051 people between 6 months and 49 years of age.

### ***Measles outbreak in Colombia (2018-2019)***

17. Since March 2018, Colombia has faced a large migratory flow and multiple imports of the measles virus from Venezuela. There have been 383 confirmed cases of measles (208 cases in 2018 and 175 in 2019), and 10,305 suspected measles cases have been investigated (7,186 in 2018 and 3,119 in 2019). In July 2019, one death was reported, a 3-month-old Colombian male of the Wayúu indigenous ethnic group, from Uribia in La Guajira. The same genotype originally imported from Venezuela was identified (D8, lineage MVi/HuluLangat.MYS/26.11).

18. The first confirmed case was a Venezuelan citizen traveling through Medellín, who presented with a skin rash on 8 March 2018; and the last confirmed case was a nonresident Venezuelan who presented with rash on 10 March 2019 in the department of La Guajira. Initially, the confirmed cases were Venezuelans arriving in Colombia or were import-related, with transmission chains that did not last more than three months. The first case in

a Colombian, which originated chains of virus transmission, occurred on 27 July 2018 in Cartagena. At present, only two departments have recently imported cases from Venezuela, with transmission during the past 12 weeks: La Guajira and Norte de Santander and Cartagena District.

19. A total of 14 departments reported cases, as well as the districts of Barranquilla, Bogotá, Cartagena, and Santa Marta; 68% of confirmed cases were reported in Cartagena, Barranquilla, and Norte de Santander. The highest incidence rate has been observed in children under 1 year (six cases per 100,000 children under 1 year), followed by the 1-4 year age group (1.74 per 100,000 population). Colombia did not implement a national vaccination campaign as Argentina, Brazil, and Venezuela did, but it has managed to successfully interrupt circulation of the virus by stepping up efforts to find and vaccinate unvaccinated children under 5 and by providing free doses of measles and rubella vaccine to children between 6 and 11 months of age living in municipalities and districts with outbreaks. This reflects the high level of population immunity that the country has achieved in the last 15 years, the adequate surveillance for timely detection of suspected cases, and the capacity to respond rapidly to each imported case.

#### ***Measles outbreak in the United States (2018-2019)***

20. From January 2018 through 25 July 2019, 1,536 measles cases were confirmed in the United States: 372 in 2018 and 1,164 in 2019. This is the greatest number of cases reported since the United States was declared measles-free in 2000. The United States has had high national vaccination coverage with measles-containing vaccines for many years, however, in certain communities, vaccination coverage is lower.

21. Measles outbreaks are ongoing in four states: California (Los Angeles County), New York (New York City and Rockland County), Texas (El Paso), and Washington. These outbreaks are linked to travelers that visited other countries, such as Israel, the Philippines, and Ukraine. The two outbreaks in New York have had 10 months of measles virus circulation. These outbreaks are occurring in under-immunized, close-knit communities and there has been limited spread to surrounding communities. The majority of cases in 2019 were unvaccinated or have unknown vaccination status (89%). The highest proportion of the cases were reported in children aged 1-4 years old (32%) followed by children and adolescents aged 5-19 years old (27%). Genotypes D8 and B3 were identified in measles cases in 2019.

#### ***Measles and Rubella Regional Monitoring and Re-verification Commission and national commissions to monitor the sustainability of measles and rubella elimination***

22. The Measles and Rubella Regional Monitoring and Re-verification Commission was created by the Director of PAHO in January 2019. As an external entity that is independent of PAHO, its purpose is to monitor countries' efforts to fulfill the strategic lines of action, objectives, and indicators of the Plan of Action for the Sustainability of Measles, Rubella, and Congenital Rubella Syndrome Elimination in the Americas 2018-2023.

23. The Commission's terms of reference include the development of a regional framework with new principles, essential criteria, and a structure for sustainability plans that will allow the Region to guide the steps of Member States in which endemic transmission has been reestablished and that need to present evidence of the interruption of endemic circulation of the virus. Between January and May 2019, the Commission held two virtual meetings and two visits to countries with measles outbreaks: Brazil and Colombia. The ministries of health of these countries expressed satisfaction with the reports on these visits.

24. National commissions to monitor the sustainability of elimination play an important role in supporting the work of the Regional Commission and following up on its recommendations. This plan of action has a specific strategic line of action that addresses the need for countries to maintain their national commissions in order to continuously monitor their annual plans for the sustainability of elimination.

### ***Lessons Learned***

25. One of the most important lessons of the post-elimination period in the Region of the Americas is that the more quickly a well-organized rapid response is organized, the more likely it will be that measles virus transmission is interrupted as soon as an imported case is detected. It is not enough to maintain high vaccination coverage with two doses of vaccine or to detect suspected cases through a passive surveillance system: these strategies should always be accompanied by a rapid response with appropriate interventions. PAHO/WHO has held 10 training workshops on rapid response for the national and subnational levels and three for the subregional level, facilitating good practices for timely interruption of virus transmission in the remaining countries with imported cases.

### ***Achieving the indicators and targets of the plan***

26. With regard to progress made in 2018 on the plan's four strategic lines of action, and toward achieving its objectives and indicators, the table below summarizes the official data consolidated up 30 June 2019 compared with the performance in 2018.

| <b><i>Strategic line of action 1: Guarantee universal access to measles and rubella vaccination services for the population targeted in the routine vaccination program and other at-risk age groups.</i></b>   |   |
|---|---|
| <b>Objective 1.1: Achieve at least 95% vaccination coverage in children under 5 in order to achieve high immunity in the general population.</b>  |   |
| <b>Indicator, baseline, and target</b>  | <b>Status</b>   |
| <p><b>1.1.1</b> Number of countries reporting 95% coverage or higher at the national level with the first dose of MMR vaccine</p> <p>Baseline: 20/35 countries (2015)<br/>Target: 30/35 countries</p>   | <p>In 2018, 15 out of the 34 countries in the Region that reported data met the target of 95% coverage at the national level with the first dose of MMR vaccine.</p>  |
| <p><b>1.1.2</b> Number of countries reporting 95% coverage or higher with the first dose of MMR vaccine in at least 80% of municipalities (or equivalent political division)</p> <p>Baseline: 15/35 countries (2015)<br/>Target: 25/35 countries</p>    | <p>In 2018, 11 out of the 34 countries in the Region that reported data met the target of 95% coverage at the national level with the first dose of MMR vaccine in at least 80% of municipalities.</p> <p>The United States did not report the first doses administered by municipality and is thus excluded from the target.</p>   |
| <p><b>1.1.3</b> Number of countries reporting 95% coverage or higher at the national level with the second dose of MMR vaccine</p> <p>Baseline: 6/30 countries* (2015)<br/>Target: 15/30 countries*</p>   | <p>In 2018, 8 out of the 35 countries in the Region that reported data met the target of 95% coverage at the national level with the second dose of MMR vaccine</p> <p>By 2018, all countries had introduced the second dose of the triple viral vaccine.</p>   |
| <p><b>1.1.4</b> Number of countries reporting 95% coverage or higher with the second dose of MMR vaccine in at least 80% of municipalities (or equivalent political division)</p> <p>Baseline: 4/30 countries* (2015)<br/>Target: 12/35 **countries</p> | <p>In 2018, 8 out of the 33 countries in the Region that reported data met the target of 95% coverage at the national level with the second dose of MMR vaccine in at least 80% of their municipalities.</p> <p>By 2018, all the countries had introduced the second dose of triple viral vaccine. The United States and Canada did not report second doses administered by municipalities and are thus excluded from the target.</p> |
| <p><b>1.1.5</b> Number and proportion of countries that conduct follow-up campaigns and achieve at least 95% of the national target</p> <p>Baseline: 4/6 countries (66%) (2015-2016)<br/>Target: 80% of campaigns with more than 95%**</p>              | <p>In 2018, three of four countries that implemented follow-up campaigns achieved the target of at least 95% coverage.</p>  |

\* Only 30 countries include the second dose of MMR vaccine in their national vaccination schedules.

\*\* The number of countries achieving the target will be defined as the number of countries that conduct campaigns between 2018 and 2023; the proposal is for at least 80% of the countries to achieve a national target of 95%.

| <b><i>Strategic line of action 2: Strengthen the capacity of epidemiological surveillance systems for measles, rubella, and congenital rubella syndrome</i></b>  |   |
|--|---|
| <b>Objective 2.1:</b> Monitor the quality and sensitivity of epidemiological surveillance of measles, rubella, and congenital rubella syndrome.  |   |
| <b>Indicator, baseline, and target</b>   | <b>Status</b>   |
| <p><b>2.1.1</b> Number of countries that meet the established minimum annual rate of suspected measles/rubella cases (at least 2 per 100,000 population) plus at least three of the following five additional indicators:</p> <ol style="list-style-type: none"> <li>1) At least 80% of suspected cases are adequately investigated.</li> <li>2) Adequate serum samples are obtained from at least 80% of suspected cases.</li> <li>3) At least 80% of samples reach the laboratory within five days.</li> <li>4) At least 80% of laboratory results are reported within four days.</li> <li>5) The annual rate of suspected cases of congenital rubella syndrome is at least 1 per 10,000 live births.</li> </ol> <p>Baseline: 6/33 (2016)<br/>Target: 15/33*</p> | <p>In 2018, 13 of 33 countries achieved the established minimum annual rate of suspected measles and rubella cases, and at least three of the other five indicators—an increase of seven countries with respect to the 2016 baseline.</p> |
| <p><b>2.1.2</b> Number of countries with an active surveillance system for congenital rubella syndrome</p> <p>Baseline: 12/33* (2016)<br/>Target: 20/33*</p>   | <p>In 2018, 10 of 33 countries had an active surveillance system for congenital rubella syndrome—a decline of two countries with respect to the 2016 baseline.</p>  |

\* Only 33 countries report suspected cases of measles, rubella, and congenital rubella syndrome to PAHO.

| <b><i>Strategic line of action 3: Develop national operational capacity to maintain measles and rubella elimination.</i></b>  |   |
|---|---|
| <b>Objective 3.1:</b> Implement and monitor plans to ensure the sustainability of elimination by strengthening national response capacity in the event of imported cases of measles, rubella, or congenital rubella syndrome. |   |
| <b>Indicator, baseline, and target</b>  | <b>Status</b>   |
| <p><b>3.1.1</b> Number of national committees that monitor the plans of sustainability of measles and rubella elimination</p> <p>Baseline: 24/24* (2016)<br/>Target: 24/24*</p>   | <p>In 2018 and the first quarter of 2019, 14 of 24 national committees were established to monitor the plans for the sustainability of measles and rubella elimination.</p> |



| <i>Strategic line of action 3: Develop national operational capacity to maintain measles and rubella elimination.</i>  |   |
|--|---|
| <p><b>3.1.2</b> Number of countries that present annual reports on the implementation of their plans to ensure the sustainability of measles and rubella elimination</p> <p>Baseline: 35/35 (2016)<br/>Target: 35/35</p> | <p>In 2018, 18 out of the 35 countries of the Region, had annual reports on the implementation of their plans for the sustainability of measles and rubella elimination</p> |

\* There are 23 national committees at the country level and a subregional committee for the English-speaking Caribbean that were created to verify elimination. The goal is to keep the same number of committees to monitor the sustainability of elimination.

| <i>Strategic line of action 4: Establish standard mechanisms for rapid response to imported cases of measles, rubella, and congenital rubella syndrome in order to prevent the reestablishment of endemic transmission in the countries.</i>                |   |
|---|---|
| <p><b>Objective 4.1:</b> Establish plans and rapid response teams in the countries to deal with imported cases of measles, rubella, and congenital rubella syndrome in order to prevent the reestablishment of endemic transmission.</p>                    |   |
| <b>Indicator, baseline, and target</b>  | <b>Status</b>   |
| <p><b>4.1.1</b> Number of countries and territories in which endemic transmission of measles or rubella virus has been reestablished.</p> <p>Baseline: 0/47 (2016)*<br/>Target: 0/47*</p>   | <p>Endemic measles transmission was reestablished in two of the 52 countries and territories of the Region: Venezuela (July 2018) and Brazil (February 2019).*</p>  |
| <p><b>4.1.2</b> Percentage of countries and territories with measles or rubella outbreaks that have a rapid response team trained to prevent the spread of transmission of the viruses that cause these diseases</p> <p>Baseline: 100%<br/>Target: 100%</p> | <p>In 2018, 92% of countries and territories in the Region (11/12) deployed a national and subnational rapid response team to prevent the spread of the measles virus. In 2019, 88% of countries and territories (8/9) deployed a rapid response team to prevent the spread of the measles virus in the Region.</p> |
| <p><b>4.1.3</b> Percentage of countries and territories with measles or rubella outbreaks that have a rapid response plan for dealing with imported cases</p> <p>Baseline: 100%<br/>Target: 100%</p>  | <p>In 2018, 92% of countries and territories in the Region (11/12) with measles outbreaks implemented a rapid response plan for imported cases, preventing the spread of the virus.</p>   |

\* There are 47 countries and territories (35 countries and 12 territories) in the geographic area covered by the Region of the Americas and all of them must remain free from measles and rubella in order to maintain the status of elimination.

**Action Needed to Improve the Situation**

27. The Region of the Americas is facing one of the biggest challenges in post-elimination history, with multiple imports of measles virus from inside and outside the Region. This makes it necessary to implement all the actions for prevention and control that PAHO has been recommending since 2012. The following is a summary of actions needed to improve the situation:

- a) The countries in which endemic transmission of measles has been reestablished should interrupt circulation of the virus by implementing strategies for the sustainability of elimination aimed at increasing population immunity through vaccination, detecting and rapidly classifying suspected cases, and respond quickly and efficiently to prevent the spread of the virus. All this will prevent long periods of endemic circulation of the virus, which puts the Region's achievements at risk. Furthermore, to achieve the reverification of elimination, these countries will have to present the respective evidence to the Measles and Rubella Regional Monitoring and Re-verification Commission for Sustainability of the Elimination of Measles, Rubella, and Congenital Rubella Syndrome.
- b) In their public health policy agenda, countries should prioritize presenting information and achieving the indicators of the four strategic lines of action in order to sustain the elimination of measles, rubella, and congenital rubella syndrome. This is the only way to monitor the efforts made to prevent the circulation of the measles and rubella viruses and, consequently, to prevent the reestablishment of endemic transmission of these viruses in the Member States.
- c) All countries should strengthen inter-country coordination and, especially, actions to increase vaccination coverage, epidemiological surveillance, and training of rapid response teams in order to prevent the spread of the virus when it is detected in their national territories.
- d) Countries should reactivate national commissions to monitor the sustainability of elimination, prepare annual plans for the sustainability of elimination, and present these plans to PAHO at the beginning of each year. They should also ensure the necessary national financing to support the actions established in the plans.
- e) Countries should implement social communication strategies to ensure public trust in vaccination with a view to achieving high population immunity through increased vaccination coverage in children and older age groups, and in health workers and people working in high-risk jobs (tourism, airports, hotels, tourist transportation, borders, etc.).
- f) Countries should advocate at the highest political level in global public health forums in order to achieve the greatest commitment to advancing toward the goal of global elimination of measles and rubella.

**Action by the Directing Council**

28. The Directing Council is invited to take note of this report and make any comments it deems pertinent.

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