

C. ELIMINATION OF MEASLES, RUBELLA, AND CONGENITAL RUBELLA SYNDROME IN THE REGION OF THE AMERICAS

Introduction

1. In 1994, during the 24th Pan American Sanitary Conference, ministers of health adopted Resolution CSP24.R16, setting a goal to eliminate measles from the Region of the Americas by 2000. Approval of the resolution was based on the impressive and rapid reduction in measles demonstrated by countries that pioneered the use of immunization strategies for elimination. The measles elimination goal was reaffirmed by subsequent Resolutions CD38.R6 (1995), which approved a Plan of Action for Measles Elimination in the Americas,¹ and CE118.R14 (1996), which urged all countries to allocate the necessary human and financial resources to fully implement the strategies outlined in the Regional plan. The Region of the Americas achieved the goal of measles elimination in November 2002.

2. The strengthening of measles surveillance also revealed that rubella and congenital rubella syndrome (CRS) had emerged as significant public health problems in the Region. In 1999, the Pan American Health Organization's (PAHO) Technical Advisory Group on Vaccine-Preventable Diseases (TAG) recommended accelerated rubella control and CRS prevention with campaigns targeting a wide age range, including young adults. In light of the lessons learned from vaccinating large and heterogeneous populations with measles-rubella vaccine, as well as the documented cost-effectiveness of rubella vaccination, in 2003 the 44th Directing Council adopted Resolution CD44.R1, calling on Member States to eliminate rubella and congenital rubella syndrome from their countries by 2010. Toward this end, the countries were requested to draft national plans of action within one year. In addition, the resolution called on the Director to "elaborate a regional plan of action and mobilize resources in support of a rubella/CRS elimination goal for 2010." The last endemic rubella and CRS cases in the Region were reported in 2009.

3. In October 2007, considering the elimination of measles in 2002 and the progress achieved toward the rubella and CRS elimination goals, the 27th Pan American Sanitary Conference approved Resolution CSP27.R2. This resolution urged Member States to establish National Commissions to document and verify measles, rubella, and CRS elimination in each country, and it authorized the formation of an International Expert Committee (IEC) to document and verify the interruption of transmission of endemic measles and rubella viruses in the Region of the Americas. To ensure a standardized

¹ The Plan of Action (contained in Document CD38/15) targets achievement and maintenance of at least 95% measles vaccination coverage in all municipalities or districts in every country of the Region. This is to be done by supplementing routine vaccination activities with periodic follow-up campaigns aimed at preventing the accumulation of susceptible preschool-aged children.

approach to documentation and verification, PAHO developed a regional plan of action that was endorsed by the TAG and approved by the IEC. The plan was created to guide countries and their National Commissions in compiling and analyzing evidence that endemic measles and rubella transmission has been interrupted.

4. This document summarizes the progress to date in documenting the elimination of measles, rubella, and CRS in the Region of the Americas and the remaining challenges and risks to maintaining the Region free of endemic measles, rubella, and CRS. It also proposes an emergency plan of action to ensure the maintenance of elimination of these diseases in the Region.

Progress to Date

5. In accord with Resolution CSP27.R2 of the Pan American Sanitary Conference, an International Expert Committee has been formed and 23 National Commissions have been established, including a Commission for the French Overseas Departments in the Americas. In addition, a Subregional Commission was established for the English-speaking and Dutch-speaking Caribbean countries and territories, including Suriname.

6. As of April 2012, 19 commissions, including those for the French Departments and the English/Dutch-speaking Caribbean, have submitted their final elimination reports to PAHO for review and comment by the International Expert Committee. The remaining countries (Brazil, Colombia, Ecuador, Haiti, and Peru) will submit their reports by the end of June, or after the countries ensure that measles transmission has been interrupted by completing active and retrospective searches, implementing outbreak response vaccination, and implementing successful vaccination campaigns to close immunity gaps.

7. After careful analysis of the reports submitted by the National Commissions and Subregional Commission, it appears that the interruption of endemic measles and rubella virus transmission has been achieved. However, countries that reported sustained measles outbreaks in 2011 will need to provide evidence that virus transmission did not extend over a period of 12 months or more. For rubella, a country with unknown source cases identified through the documentation process will need to conduct careful investigation to ensure that the cases are not due to endemic circulation.

8. As part of the documentation and verification process, several PAHO Member States have identified challenges in maintaining elimination of measles, rubella, and CRS. Moreover, some of the countries have reported weaknesses and failures in national surveillance systems and routine immunization programs, which need to be addressed.

Challenges to Maintaining Elimination

9. Between 2003 and 2010, historically low numbers of measles cases were reported in the Americas. During this eight-year period, 34 of 45 countries and territories (76%)

reported no measles cases, and another 5 countries (11%) together reported 10 confirmed measles cases. The remaining 6 countries (13%) reported a total of 1,239 cases, 99% of the 1,249 confirmed cases in the Region during this period. The occurrence of measles was mainly limited to cases that were internationally imported or import-linked. Moreover, all the genotypes identified from outbreaks occurring in the Americas since 2003 have been imported to the Region.

10. In 2011, however, 1,379 measles cases were reported in the Americas, an eightfold increase over the previous annual average of 156 cases between 2003 and 2010. This increase coincided with several large outbreaks in Europe and Africa. Of the 45 countries and territories, 33 (73.3%) reported no measles cases, and 9 (20%) reported 14 confirmed measles cases. Three countries—Canada, Ecuador, and the United States (6.7%)—reported a total of 1,290 cases, 93% of the 1,379 confirmed cases in the Region (unconfirmed data for 2011, as of EW18/2012). The most commonly identified genotypes in these three countries include D4, which is circulating on the European continent; B3, from Africa; and D8 and D9, from Southeast Asia and the Pacific.

11. The most recent measles outbreaks, with several secondary transmissions, have similar characteristics. The vast majority of cases have occurred in specific groups of unvaccinated persons (religious groups or other groups that reject vaccination) or in specific geographic areas, such as in indigenous communities, in large cities (especially on the peripheries), and in rural and border areas with limited access to health care. Almost all measles cases are import-associated.

12. The current outbreaks in the Region put measles elimination at risk. In 2011, 171 outbreaks due to imported measles viruses were documented, and the imported viruses have caused persistent transmissions in at least three countries. To highlight the challenges, the three largest outbreaks are summarized below.

13. The largest outbreak, with a duration of seven months (EW14/2011–EW40/2011), occurred in Canada and resulted from an importation of D4 measles virus from Europe. It accounted for 803 cases, 61% of all reported cases in the Region in 2011. A large proportion of these cases (70%) were centered in a single province, Quebec, where 79% of the cases detected were not vaccinated or had no proof of vaccination. The authorities implemented a province-wide school-based vaccination activity, targeting children who were not fully immunized against measles with the recommended two doses of measles-mumps-rubella vaccine.

14. The second-largest outbreak in the Region occurred in Ecuador, where it appears that children in some rural indigenous localities have continued to be missed during routine and supplementary immunization activities, thus creating pockets of susceptible population. The outbreak spread to nine different provinces across the country. A total of 265 confirmed measles cases occurred in six provinces in 2011 and 53 additional cases among children in three provinces in 2012 (data as of May 2012). The most affected age

group has been children under five years old. Cases with genotype B3, which is commonly found in Africa, have been identified along with one case of D4. To ensure rapid response to this measles outbreak, a follow-up campaign targeting children up to 15 years of age was rescheduled to start early. According to the Ministry of Health, vaccination coverage among children up to 5 years of age was $\geq 95\%$ in the majority of the provinces. Ecuador has also completed vaccination activities for the age group from 5 to 14 years. The last measles case was reported in EW16/2012 (data as of May 2, 2012). After the country has not reported any new measles case for a 12-week period, health authorities will implement three main activities to verify the interruption of measles virus circulation: (a) rapid coverage monitoring; (b) active case searches for measles; and (c) retesting negative dengue specimens for measles. Once these activities are concluded, the National Commission will submit the final report on the interruption of endemic transmission of measles, rubella, and CRS in Ecuador.

15. The state of São Paulo (Brazil) reported the third-largest outbreak, with six isolated cases and three chains of transmissions, resulting in 27 confirmed cases in seven municipalities. Only two of the six isolated cases reported previous travel abroad. In two cases, genotype D4 was isolated. Additionally, a 7-month-old infant was reported to have a rash with an onset date of 24 December 2011, which was eventually confirmed as measles with genotype D4. Despite complete epidemiological investigations, it was not possible to identify the source of infection for any case or to link any of the confirmed cases to importations. The National Commission for documenting/verifying measles and rubella elimination will review the epidemiology and results of the retrospective case searches at the end of April 2012 to either rule out or confirm circulation of measles virus in the area.

16. During 1998–2006, confirmed rubella cases in the Americas decreased by 98%, from 135,947 to 3,005. 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. Confirmed rubella cases increased from 3,005 in 2006 to 13,187 in 2007 as a result of outbreaks in three countries. A total of 4,536 confirmed rubella cases were reported in the Region in 2008; cases in two countries accounted for 98% of them. As an unfortunate consequence of the rubella outbreaks of 2008–2009, a total of 27 CRS cases were reported in these two countries. The last confirmed CRS case was a child born on 26 August 2009. In response to these outbreaks, countries intensified surveillance activities and vaccination interventions by conducting supplementary immunization activities among adolescents and adults. Countries that completed campaigns for adolescent and adult males and females have not reported any endemic rubella cases. The last confirmed endemic rubella case was reported in February 2009. In 2009, two countries reported 7 import-associated rubella cases; in 2010, the Regional total was 15 import-associated rubella cases; and in 2011, it was again 7 import-associated rubella cases (provisional data as of April 2012). No endemic CRS cases were reported in 2010 or 2011.

17. Despite limited molecular epidemiology information, the rubella virus genotype 1C has been identified as endemic only in the Americas, as it has not been identified in other regions of the world. The last occurrence of 1C virus transmission was in 2005. Between 2006 and 2009, the genotype 2B was isolated from the outbreaks reported in three countries and was considered to be endemic to the Americas, but endemic transmission was interrupted in 2009. Since 2009, viruses of genotypes 1E, 1G, 1J, and 2B have been linked to imported cases.

18. During the process of verifying measles, rubella, and CRS elimination, Colombia identified several cases of clinical and laboratory-confirmed rubella in 2008, 2009, and 2011. The first detected case was a laboratory-confirmed rubella case from 2011, without genotype information available. Retrospective investigations in the same department of Colombia revealed eight more rubella cases with laboratory or clinical confirmation between 2008 and 2009. The majority of affected people had no vaccination history. Retrospective and active case searches were conducted to complement the epidemiological investigation, but they were not able to identify the source of infection of all these cases. Colombia will need to implement active case searches in the epidemiologically silent areas of the country.

19. Although progress toward the goal of documenting and verifying the elimination of measles, rubella, and CRS was on track by the end of 2011, some of the National Commissions have concluded that the epidemiological surveillance is not sufficiently robust to ensure maintenance of the elimination of rubella and CRS. Nevertheless, the Commissions state that documentation to verify the absence of the endemic diseases in the Region can be achieved if the weaknesses identified are corrected promptly. Toward this end, countries are urged to take prompt actions to correct challenges identified during the verification process to ensure that the achievements in eliminating endemic diseases will be maintained.

20. Ensuring timely vaccination responses to imported measles and rubella viruses has become increasingly important as progress is made toward documenting and verifying elimination of the endemic viruses. Member States have taken costly additional measures to reduce the risk of new outbreaks caused by the international spread of measles and rubella viruses. These measures include supplementary and routine immunization activities to close gaps in population immunity, rapid coverage monitoring, vaccination of vulnerable populations, and timely investigations of each imported case. In the supplementary campaigns for measles and rubella elimination in the Region, 485 million people have been vaccinated, often with simultaneous campaigns taking place in border areas of neighboring countries. Actions to contain outbreaks pose substantial direct costs to public health and the health care system, with a net public

sector cost of as much as US\$ 10,000 per case.²

21. The Region of the Americas continues to be at risk of importations, given continuing circulation of measles and rubella viruses in other regions of the world. Also, announcing the elimination of endemic measles and rubella may be misinterpreted by the general public or by people who are not familiar with the technical distinctions between imported and endemic cases.

22. In light of the remaining challenges for maintaining elimination of measles and rubella in the Region of the Americas, it is proposed the 150th Session of the Executive Committee recommend that the 28th Pan American Sanitary Conference adopt a resolution on an emergency plan of action. This resolution should urge Member States to strengthen active surveillance of these diseases and to maintain high population immunity through vaccination.

Regional Emergency Plan of Action 2012–2014 for Maintaining Measles and Rubella Elimination

23. With a view to maintaining the Regional goal of elimination of measles, rubella, and congenital rubella syndrome, and following guidance from TAG, the IEC, and PAHO, an emergency action plan was formulated for the next two years to address weaknesses identified in the immunization and surveillance programs for measles, rubella, and CRS.

24. Member States were requested to verify the interruption of endemic measles, rubella, and CRS cases in all the countries of the Americas for a period of at least three years from the last known endemic case, in the presence of high-quality surveillance and with coordination and guidance from PAHO. Elimination means the interruption of endemic disease transmission for a period of at least 12 months under high-quality surveillance. To sustain and build on this elimination achievement, PAHO urges Member States to implement the following actions, which are highly recommended by the IEC:

- (a) Maintain high-quality, elimination-standard surveillance in all Member States and ensure timely and effective outbreak response measures to any wild virus importation. To ensure high-quality surveillance, the following activities should be conducted:
 - i. Implement external rapid assessments of measles, rubella, and CRS surveillance systems to increase robustness and quality of case detection and reporting and strengthen registries of congenital anomalies.
 - ii. Conduct active case searches and review the sensitivity of surveillance

² Sugeran DE, Barskey AE, Delea MG, et al. Measles outbreak in a highly vaccinated population, San Diego, 2008: Role of the intentionally undervaccinated. *Pediatrics* 2010;125(4):747–55.

- systems in epidemiologically silent areas.
- iii. Issue health alerts for mass-gathering events (such as the Olympic Games and the FIFA World Cup).
 - iv. Involve the private sector in disease surveillance with a special focus on inclusion of private laboratories in the Regional Measles and Rubella Laboratory Network.
 - v. Enhance collaboration between epidemiological and laboratory teams to improve measles and rubella surveillance and the final classification of suspected cases.
 - vi. Improve molecular genotyping of the confirmed cases throughout outbreaks.
 - vii. Address gaps and failures in surveillance systems, as identified by the National Commissions.
- (b) Maintain high population immunization coverage against measles and rubella ($\geq 95\%$) in all Member States. Toward this end, the following activities are recommended:
- i. Implement rapid coverage monitoring to identify populations susceptible to measles and rubella, focusing particularly on high-risk populations with any of the following characteristics:
 - Live in high-traffic border areas.
 - Live in densely populated areas such as urban fringe settlements.
 - Live in areas with low vaccination coverage or high vaccination dropout rates.
 - Live in areas not reporting suspected cases (epidemiologically silent).
 - Live in areas with a high density of tourists.
 - Are geographically, culturally, or socioeconomically difficult to reach.
 - Are dedicated to commerce/trade (e.g., through fairs, markets) or live in highly industrialized areas.
 - ii. Implement immediate vaccination activities in the areas where rapid coverage monitoring finds coverage to be under the recommended threshold of 95%.
 - iii. Implement high-quality follow-up vaccination campaigns. To ensure high levels of immunity, countries have made commitments to implement such

campaigns while the Region is in the process of verifying its status as free of endemic transmission of measles and rubella (2008–2014).

25. Full implementation of intensified vaccination activities to maintain elimination status will be essential to ensure high immunization coverage, especially in areas that have susceptible populations. In the areas where measles and rubella viruses are still circulating, further efforts to interrupt virus transmission and conduct epidemiological investigations should focus on unvaccinated vulnerable population groups and on high-risk areas.

26. Countries should integrate the proposed activities for maintaining measles, rubella, and CRS elimination in their annual plans of action for national immunization programs, which will reflect an ongoing political commitment and sufficient financing.

27. To ensure implementation of the emergency plan of action 2012–2014 for maintaining the Region free of measles, rubella, and CRS, the budget of US\$ 1.5 million must be fully financed.

Action by the Executive Committee

28. The Executive Committee is invited to review the information provided in this document and to consider whether it is appropriate to move this item from “Matters of Information” to “Program Policy Matters,” in order to adopt a resolution during the 28th Pan American Sanitary Conference.