Progress Toward Rubella and Congenital Rubella Syndrome Elimination in the Western Hemisphere, 2003-2008

Introduction:

Enhanced measles elimination activities in the Region of the Americas during the early 1990s underscored significant rubella and congenital rubella syndrome (CRS) morbidity in the Western Hemisphere. In 2003, the 44th Directing Council of the Pan American Health Organization (PAHO) adopted a Resolution (CD44.R1) calling for rubella and congenital rubella syndrome (CRS) elimination in the Americas by the year 2010[1]. The elimination of rubella and CRS in the Americas is defined as the interruption of endemic transmission of rubella virus in all countries of the Region for more than 12 months and no occurrence of CRS cases attributed to endemic transmission [2]. To that end, PAHO developed a rubella and CRS elimination strategy [3] which includes: 1) introducing rubella-containing vaccines in the routine childhood program at 12 months of age and reaching ≥95% coverage in all municipalities; 2) conducting periodic follow-up campaigns with measles-rubella (MR) vaccine [4]; 3) conducting a one-time mass campaign with MR vaccine targeting adolescents and adults (men and women); 4) integrating measles and rubella surveillance; 5) implementing CRS surveillance; and 6) strengthening laboratory capacity for rubella virus detection and isolation. Despite the reduction of 97.8% in confirmed rubella cases reported between 1998 and 2006, rubella outbreaks in 2007 occurred in countries that vaccinated only women during mass campaigns providing one example of the challenges that remain to eliminate rubella and CRS from the Americas. This report summarizes the overall progress toward reaching the 2010 goal of elimination of rubella and CRS.

Routine Immunization:

All 38 countries and territories in the Americas, with the exception of Haiti, have introduced measles-mumps-rubella vaccine (MMR) in the routine immunization schedule. Beginning in 2009, Haiti will introduce MR vaccine in the routine immunization program after the completion of its one-time MR mass vaccination campaign targeting persons aged 1-19 years.

Vaccination coverage with MMR is calculated annually for most countries using the administrative method, or number of doses administered. Since 2003, reported regional routine first dose MMR coverage at 12 months of age has remained >93%. In 2007, MMR1 coverage of ≥95% was reported in 19 (51%) countries; 90%-94% in 7 (19%) countries, 80-89% in 7 (19%) countries and <80% in 4 (11%) countries. In 2007, of the 20 countries and territories reporting a second routine MMR dose coverage, reported coverage was ≥ 95% in 3 (15%) countries, 90%-94% in 3 (15%) countries, 80%-89% in 8 (40%) countries, and <80% in 6 (30%) countries. In 2009, 10 additional countries will begin monitoring and reporting MMR2 dose coverage.

Supplementary Immunization Activities (SIAs):

As part of the PAHO rubella and CRS elimination strategy, two different types of targeted supplemental immunization activities (SIAs) are recommended: one-time SIAs

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1 information included up until September 2008
targeting adolescents and adults, and periodic follow-up SIAs usually targeting children aged 1-4 years. The principal rationale for implementing SIAs targeting adolescent and adult men and women is to quickly interrupt rubella virus transmission and prevent future CRS cases [5]. Almost all countries (94%) have vaccinated men and women up to 39 years of age. The periodic follow-up campaigns provide a second opportunity to vaccinate children who were never vaccinated or failed to develop an immune response.

From 1998 through the end of 2008, more than 250 million adolescents and adults (male and female) will have been vaccinated against measles and rubella during SIAs in the context of rubella and CRS elimination efforts.

As of September 2008, 32 (84%) countries and territories in the Region of the Americas successfully implemented SIAs among adolescents and adults. Three Latin American countries (Argentina, Brazil, Chile) initially vaccinated adult women only. Because of continued rubella virus transmission largely among adult men, subsequent SIAs targeting adolescents and adults were conducted during 2007 and 2008 in Chile (1.3 million males aged 19-29 years in 2007), Brazil (70 million males and females aged 20-39 years and 12-39 years in 5 selected states in 2008), and Argentina (6.5 million males aged 16-39 years in 2008). Aruba and the Netherlands Antilles, Canada, the French Departments, Panama, the United States, and Uruguay introduced rubella-containing vaccine in the routine schedule more than 20 years ago, thus protecting large cohorts of the adult population (Table 1).

Following the introduction of the rubella vaccine in the countries, all Latin American and Caribbean countries in the Region have implemented at least one follow-up campaign since 1995 (Table 1).

**Surveillance Activities:**

*Integrated Measles/Rubella Surveillance*

Since 1996, serum specimens from all patients with suspected measles cases that tested negative for measles immunoglobulin M (IgM) antibody were tested for rubella-specific IgM antibody. In 1999, regional rubella surveillance was integrated with the existing case-based measles surveillance system, allowing for simultaneous laboratory analysis of these two diseases [6] in the PAHO regional measles/rubella laboratory network of 21 national and 124 sub-national laboratories. Improvements in the laboratory network have led to an increase in the number of specimens collected for virus detection, from 26 specimens in 2003 to 576 specimens in 2007. Rubella virus was detected in 5 specimens during 2007. For the period 2003-2007, the wild-type rubella viruses of genotypes 1C and 2B were endemic in the Americas and viruses of genotypes 1E, 1G, 1j and 2B have been linked to imported cases in epidemiologic investigations.

The PAHO recommended surveillance performance indicators have been modified over time based on available epidemiological data and the operational realities of the Region. The current standardized indicators and targets to monitor progress towards elimination

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2 Chile used the monovalent rubella vaccine in the 1999 campaign.
3 Data from the Measles Elimination Surveillance System (MESS) and country reports to PAHO.
include: 1) weekly notification by 80% of reporting units, 2) ≥ 80% of suspected measles/rubella cases investigated adequately\(^4\), 3) ≥ 2 suspected cases of measles or rubella\(^5\) per 100,000 persons detected and reported (to monitor the sensitivity of the surveillance)\(^6\) and 4) ≥ 80% of suspected measles/rubella cases with serologic testing.

In 2007, among the 34 reporting countries and territories, the regional percentage for sites reporting weekly was 88%, the regional percentage for adequacy of case investigations was 72%, and the regional percentage for monitoring surveillance sensitivity and serologic testing was 71% and 85%, respectively. Canada, the French Departments, Aruba and the Netherlands Antilles, and the United States do not regularly report indicator data to PAHO.

Beginning in 2009, data will be available on the following indicators and targets for monitoring progress towards elimination: 1) ≥ 80% of confirmed cases with follow-up of contacts for 30 days (to monitor occurrence of secondary cases) and 2) ≥ 80% of outbreaks with adequate specimens for virus detection/isolation.

**CRS Surveillance**

In 2007, a total of 34 countries with CRS surveillance reported 975 suspected CRS cases- four countries (Brazil, Chile, Colombia, and Peru) accounted for 97% of all suspected CRS cases. Of these, 19 were confirmed by detection of rubella IgM antibody, 17 from Brazil and two from Peru. As of 20 September 2008, one CRS case has been reported in Argentina, three in Brazil, and two in Chile.

**Monitoring Rubella Elimination:**

Following implementation of the rubella and CRS elimination strategy, the number of confirmed rubella cases decreased by 97.8% between 1998 and 2006 (from 135,947 to 2,998) (Figure 1). The increase in cases in 2007 was due to outbreaks in Argentina (96 cases), Brazil (8,683 cases), and Chile (4,235 cases), countries that vaccinated only women in the first stage of rubella vaccination campaigns; these countries accounted for 99% of all reported cases. Countries that have fully implemented the rubella and CRS elimination strategy have not reported any endemic rubella cases after completion of adolescent and adult campaigns. In 2005, the United States was the first country in the Region to declare elimination of endemic rubella virus transmission [7]. Additional countries in the Region will begin the process of verifying the interruption of rubella virus transmission in 2009.

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\(^4\) includes 2 criteria: 1) % of suspected case-patients with home visit within 48 hours following notification and 2) % of case-patients with the following relevant data: date of notification, date of investigation, date of rash onset, date sample taken, type of rash, presence of fever, date of prior vaccination, and pregnancy status if case is female.

\(^5\) Cases must be investigated and discarded as non-measles or non- rubella cases.

\(^6\) for municipalities with less than 100,000 persons, at least 1 suspected case reported

\(^7\) Provisional data

Editorial Note:
Countries of the Western Hemisphere have demonstrated remarkable progress toward the rubella and CRS elimination goal. By the end of 2008, all countries and territories of the Americas will have implemented the recommended vaccination strategies. To prepare for verification of elimination of measles, rubella and CRS in the Western Hemisphere, PAHO is currently developing a strategic plan which will provide guidance to countries in documenting elimination. To be included in this plan are new performance indicators for CRS surveillance, developed based on lessons learned through the implementation and strengthening of CRS surveillance in the Region. The five principal new CRS surveillance indicators include: 1) 100 % of sentinel units reporting weekly, 2) a minimum reporting rate of 1 suspected CRS case per 1,000 live births, 3) 100% of suspected cases with serologic testing, 4) 100% of suspected cases with adequate investigation, and 5) 100% of confirmed cases with adequate specimens for virus detection/isolation. In addition, in 2007 the 27th Pan American Sanitary Conference approved a Resolution (CSP27.2) that defined the final steps for reaching the rubella elimination goal by 2010, calling for the formation of an independent International Expert Committee to be responsible for the documentation and verification of the interruption of endemic rubella and measles virus transmission in the Americas [8].

As the final stage of elimination approaches, challenges, such as the continued risk of measles and rubella importations and limited samples for virus detection/isolation, remain to sustain regional achievements, including ensuring high vaccination coverage and maintaining high quality integrated measles-rubella surveillance and CRS surveillance. To confront the challenges, PAHO has been working with countries to: 1) maintain high population immunity through high routine vaccination coverage and completion of high quality mass campaigns; 2) maintain high quality integrated measles-rubella surveillance and CRS surveillance including distributing practical field guides, monitoring confirmed CRS cases for virus excretion with at least 2 consecutive negative specimens, and incorporating the private sector into surveillance activities, 3) strengthen the Regional Measles/Rubella Laboratory Network including emphasis on obtaining specimens for genotyping and 4) increase training opportunities for health workers and interdisciplinary teams of epidemiologists, virologists and clinicians.

In addition to eliminating the significant morbidity associated with CRS, the principal cause of vaccine—preventable birth defects, the rubella and CRS elimination initiative in the Region of the Americas has benefitted measles elimination efforts, increased the visibility of national immunization programs, strengthened health services for newborns, children, and adults, reduced inequities in maternal health outcomes, created a culture of prevention, generated lessons learned which have implications for the introduction of new vaccines [9], created a sense of ownership for immunization activities at all levels,
and facilitated the transition from child-centered to family-centered immunization programs [10]. The vast array of these experiences serve as a model for other WHO regions embarking on rubella elimination activities.

References:


Figure 1. Impact of Measles and Rubella Elimination Strategies, The Americas, 1990–2008*

Source: Country reports.
*Includes rubella cases reported to PAHO as of epidemiological week 38/2008.
Table 1: Vaccination campaigns with measles and rubella containing vaccines in Latin American and the Caribbean, 1995-2008

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>Age</th>
<th>%</th>
<th>Year</th>
<th>Age</th>
<th>%</th>
<th>Year</th>
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</thead>
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<tr>
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<td>1-4yr</td>
<td>87</td>
<td>2005</td>
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<td>78</td>
<td>2006</td>
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<td>1-4yr</td>
<td>95</td>
<td>2006</td>
<td>2-15yr</td>
<td>96</td>
<td>2008</td>
<td>men only</td>
<td>going</td>
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<td>99</td>
<td>2004</td>
<td>1-4yr</td>
<td>93</td>
<td>2008</td>
<td>20-39yr</td>
<td>88</td>
</tr>
<tr>
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<td>92</td>
<td>2001</td>
<td>1-4yr</td>
<td>90</td>
<td>2001</td>
<td>1-4yr</td>
<td>84</td>
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<tr>
<td>Chile</td>
<td>1999</td>
<td>women only</td>
<td>(a) 98</td>
<td>2005</td>
<td>1-4yr</td>
<td>93</td>
<td>2007</td>
<td>men only</td>
<td>93</td>
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<tr>
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<tr>
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<td>2007</td>
<td>18-39yr</td>
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</tr>
</tbody>
</table>

Source: Country reports to PAHO
(a) Rubella-containing vaccine only
1 Preliminary results
2 Includes 17 countries (13 Caribbean + 4 UK territories that report to CAREC)
3 Most frequent age group selected