Rubella and Congenital Rubella Syndrome Elimination Activities: Colombia, 2005–2006

Lenis Urquijo,1 Desireé Pastor,2 Martha P. Velandia,1 and Andrea S. Vicari2
1Ministry of Social Protection, General Directorate of Public Health, Republic of Colombia, and 2Comprehensive Family Immunization Project, Immunization Program, Pan American Health Organization, Bogotá, Colombia

As part of regional commitments in the Americas aimed at elimination of rubella and congenital rubella syndrome, and consolidation of measles elimination, Colombia conducted mass vaccination of males and females aged 14–39 years in 2005–2006. The target population included 18 238 < 443 persons (44% of the entire population). Vaccination activities were extended because of limited participation and public concerns about vaccine safety. Over a 10-month period, 17 697 717 doses of measles-rubella vaccine were administered, reaching 97% of the target population, including 96.4% of females and 97.6% of males. Estimated coverage exceeded 95% in 33 of 36 departments and districts, and in 3 others, it ranged from 92% to 95%. In rapid monitoring conducted in 504 (45%) of 1119 municipalities, 95% of persons in the target population were vaccinated. The Colombian experience underscores the importance of social mobilization at the local level, political commitment, and microplanning and offers lessons for future mass vaccination campaigns.

Universal vaccination against rubella in Colombia began in 1995 with the introduction of combined measles, mumps, and rubella (MMR) vaccine into the routine infant immunization schedule for children aged 1 year. National coverage with MMR vaccine in children up to 1 year of age rapidly increased from 82% in 1995 to 93% in 2002 and has since been maintained [1]. In addition, 2 national MMR vaccination campaigns were conducted: children 10–12 years were vaccinated in 1996, and adolescents 14–15 years were vaccinated in 1997. In 1998, a second dose of the MMR vaccine was included in the national series for children up to 10 years of age; in 2002, the recommended age for the second dose was lowered to 5 years. In 2000, administration of measles-rubella (MR) vaccine was recommended for women after birth and after abortions. In 2003, Colombia joined other countries in adopting the regional goal to eliminate rubella and congenital rubella syndrome (CRS) from the region of the Americas [2]. On the basis of experiences in other countries of the region [3–5], mass vaccination of adolescent and adult men and women was a necessary strategy to accelerate rubella elimination. To meet the regional goal, Colombia planned mass vaccination of adults and adolescents in 2005. The target population for vaccination, including all males and females aged 14–39 years, was based on analysis of 10 years of rubella epidemiology in Colombia, as well as information on previous vaccination opportunities and coverage. Vaccinating >18 million Colombians was the greatest challenge to date in the history of the country’s immunization program. This article describes the campaign and presents results and lessons learned.

MR Vaccination Campaign for Adolescents and Adults: Organization, Target Population, and Vaccination Strategies

Prior to the campaign, a framework document, national action plan, and operating manuals were prepared with technical guidelines for each level of the health services network. Guidelines included professionals in both public...
and private sectors, including health insurers from the country’s
different social security programs. Manuals described roles for
vaccinators as well as spokespersons. These documents also
defined the social mobilization strategy, standardized entry of
data into the information system, procedures for supervision,
surveillance for adverse events supposedly attributable to vac-
cination or immunization (ESAVI), and notification and
monitoring of vaccination of unknowingly pregnant women.
Because of the decentralized structure of the Colombian Re-
public, these directives were presented at a national meeting
and served as the foundation for the development of de-
partmental plans and microplans at the department, district,
and municipal levels.

The target population was estimated from population projec-
tions for 2005 from the most recent national census in 1993
(National Statistics Department, Republic of Colombia). On
the basis of these projections, there were estimated to be 18 238
443 persons aged 14–39 years in 2005, including 9 206 239
women (50.5%) and 9 032 204 men (49.5%) and representing
44% of the population of Colombia. Although Colombia has
32 departments and 4 districts, 9 093 472 persons (49.9%) in
the targeted age group were concentrated in 1 district (Bogotá,
3 183 361 inhabitants [17.5%] aged 14–39 years) and 4
departments (Antioquia, 2 329 054 [12.8%]; Cauca Valley,
1 870 897 [10.3%]; Cundinamarca, 892 448 [4.9%]; and
Santander, 817 712 [4.5%]). An additional 7 356 302 persons
(40.3%) resided in 16 more populous departments and dis-
tricts, ranging from 317 068 to 656 061 persons in the target age
group, whereas 1 788 784 persons (9.8%) resided in 15 less
populous departments, with 11 218–291 415 persons in
the target population. The less populous departments include the
Colombian Orinoco and Amazon regions, where populations
are scattered geographically across large land areas.

Three vaccination strategies (concentrated populations, in-
stitutional, and door-to-door) were employed on the basis of the
target population, the specific characteristics of each department
or district, and the campaign phase. Vaccination of concentrated
populations began with schools, universities, military barracks,
academies, businesses, factories, banks, workshops, processing
plants, duty-free zones, and industrial parks. Planning of vac-
cination in concentrated populations was based on a list (census)
of persons in the target age group. In addition, mobile vacci-
cination posts were set up in busy public areas, including mar-
ketplaces, shopping centers, transportation terminals, churches,
and stadiums.

Institutional vaccination focused on vaccinating women after
birth and after abortion by setting up fixed vaccination points in
hospitals (Institutional Health Service Providers, Instituciones
Prestadoras de Servicios de Salud). At health care centers and
vaccination posts, program staff took the opportunity to check
vaccination status of parents or caregivers accompanying children
for routine vaccination services. MR vaccine was administered to
previously unimmunized persons in the target population. When “door-to-door” vaccination was indicated in a locality,
mobile vaccination teams coordinated days and times with
community leaders when the target population would most
likely be at home. Mobile vaccination teams were charged with
vaccinating persons missed by other strategies. In addition,
mobile teams conducted rapid monitoring in departments and
municipalities that did not meet coverage goals [6].

At the national and department levels, supervision was de-
veloped as a management process that consisted of monitoring,
verifying data, training, and local problem-solving. In particular,
a supervisor’s manual was prepared with checklists adapted to
local needs. At the conclusion of planned activities in a region,
rapid coverage monitoring was conducted to inform decisions
regarding completion of activities. Rapid monitoring was per-
formed by vaccination teams that had not been responsible
for activities in the selected municipality (cross-checking). In
every department or district, geographical areas where rapid
monitoring was conducted were selected at random to achieve
20%–25% of the target population in monitoring activities.

The results of rapid monitoring were key instruments for the
acceptance of reported administrative coverage. This evaluation
was performed formally in each department and district in
meetings that also included a semi-structured assessment of
campaign planning and implementation. Qualitative information
and lessons learned were included in reports at the national,
department, and district levels. Data and conclusions in the
following sections were compiled from these reports.

**VACCINATION COVERAGE, SURVEILLANCE OF
ESAVI, AND MONITORING OF PREGNANT
WOMEN VACCINATED INADVERTENTLY**

**Vaccination Coverage**

After the campaign launch in August 2005, 3 events resulted in
coverage targets not being met by the originally planned con-
cclusion date of 31 December 2005. One was widespread media
attention to a death that coincided with the vaccination of
a young adult. Second, insurance programs did not vaccinate
their beneficiaries in large numbers. Finally, there was in-
sufficient publicity and reporting of the campaign in the media.
These challenges made it necessary to propose additional op-
portunities for vaccination, especially during Vaccination Week
in the Americas (end of April 2006) and to declare a National
Vaccination Campaign for 24 June 2006 with the theme “get up
to date.” In preparation for this event, an innovative pro-
motional strategy targeting the local level was launched to
stimulate demand for vaccination among the general public,
including local political authorities and neighborhood associa-
tions. Local fairs and productions by theatrical and mime
troupes were organized and large posters were displayed on
highly visible buildings. In addition, the microplanning process
was reinforced in all municipalities that had yet to achieve the goal of 95% coverage.

By June 2006, 17,697,717 doses of MR vaccine had been administered, reaching an estimated 97% of the national target population. The largest number of doses was administered through September 2005, when coverage reached 65.1%. By December 2005, coverage had reached 93%, and final coverage of 97% was achieved by the end of June 2006 (Figure 1). All 4 districts and 29 of 32 departments that constitute the first subnational administrative level reached administrative coverage of >95% (range, 95%–99.3%), whereas 3 departments achieved coverage of 90%–95% (range, 92.1%–94.9%). At the second administrative level (1119 municipalities), 787 municipalities (70.3%) achieved coverage of >95%, 177 (15.8%) reached 90%–94%, 121 (10.8%) reached 80%–89%, and 34 (3%) failed to reach 80%. The country’s major cities—Bogotá, Cali, and Medellín—achieved coverage of >95%.

At the national level, 96.4% coverage was reported for women and 97.6% coverage was reported for men (see Table 1). Although coverage levels of more than 100% were reported for both sexes in the 14–24-year age group, coverage for the 25–39-year age group was lower, with that of men greater than or equal to that of women (Table 1).

### Rapid Coverage Monitoring

During July and August 2006, 2800 rapid monitoring activities were conducted in 504 municipalities (45% of 1119 municipalities). A total of 287,000 people aged 14–39 years were interviewed; of these, 272,650 (95%) were vaccinated during the campaign.

### Surveillance of ESAVI

Twelve serious ESAVIs reported during the campaign were all investigated and documented. One patient died. The symptoms in these cases presented a mean of 2 days after the administration of the vaccine, with the latest case manifesting symptoms during the second week. Among the main findings were that ESAVIs occurred after receipt of vaccine from different lots. Nine cases were classified as coincidental to the vaccination; 3 cases were classified as program errors—in particular, errors associated with deficiencies in aseptic precautions at the time that the vaccine was administered. The occurrence of ESAVI due to program error was the subject of a thorough analysis that highlighted the role of health care workers contracted especially for the campaign and resulted in extensive training accompanied by supervision on the ground.

### Surveillance of Women Unknowingly Pregnant at Time of Vaccination

During the campaign, the Ministry of Health received 8357 reports of vaccination of unknowingly pregnant women. For 7895 (94.5%), serum samples were received and processed: 6636 (84.1%) tested negative, 779 (9.9%) tested positive, and 480 (6.1%) had uncertain results. The women with positive or uncertain results were monitored up to delivery. Although detailed analysis of this monitoring is still pending and will subsequently be presented, none of the children of women who received follow-up presented with congenital malformations.

### CONCLUSIONS AND LESSONS LEARNED

On the basis of analysis of administrative coverage and results of rapid monitoring in the country’s 32 departments and 4 districts, the Pan American Health Organization officially recognized on 16 September 2006 Colombia’s achievement of reaching 95% coverage among adult and adolescent men and women in targeted age groups. For countries seeking to interrupt indigenous circulation of rubella viruses, high levels of immunity to rubella among both males and females are needed [3, 5, 7].

There are several lessons from the experience in Colombia with mass vaccination of adults and adolescents. First, the Colombian

---

**Table 1. Coverage of the Vaccination Campaign Against Measles and Rubella, by Sex, for Persons Aged 14–39 Years, Colombia, 2005–2006**

<table>
<thead>
<tr>
<th>Age, years</th>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>15–19</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>20–24</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>25–29</td>
<td>92.2</td>
<td>94.6</td>
</tr>
<tr>
<td>30–34</td>
<td>95.1</td>
<td>98.3</td>
</tr>
<tr>
<td>35–39</td>
<td>93.9</td>
<td>93.9</td>
</tr>
<tr>
<td>Total</td>
<td>96.4</td>
<td>97.6</td>
</tr>
</tbody>
</table>
campaign underscores the importance of social mobilization for successful implementation of mass vaccination campaigns. Even though estimated coverage surpassed 83% in the first 3 months, final coverage targets were reached by continually evaluating and adapting mobilization and mass communication strategies. The campaign received limited attention in the national media. Purchase of advertising would have entailed high costs. As a result, efforts were reoriented and focused at department and municipal levels. The formation of local committees for political, technical, and operational support improved coordination and implementation of the campaign. Assessments of campaign progress at national, department, and district levels increased ownership and resulted in corrections to achieve effective coverage. Equally important was the creation of a broad partnership through outreach to many sectors of society (eg, education, public safety, faith-based, and non-governmental organizations; industry and trade groups; and community leaders). Community groups and partnerships provided advice that informed communication plans for the campaign that resulted in coverage by mass media, local use of broadcast networks, and the production of educational materials in departments and municipalities. Finally, innovative promotion strategy including use of local participatory events and highly visible messages on buildings proved to be successful toward the end of the campaign.

Other important elements of the campaign included support from professional associations and scientific societies, including the Colombian societies of pediatricians and obstetricians/gynecologists. These societies actively participated in providing general information to the public and in the investigation and resolution of ESAVIS. International experts from the Pan American Health Organization also provided support throughout campaign planning and implementation, particularly in the country’s major cities. At the operational level, supervisory teams composed of persons with experience in campaigns conducted visits to all departments and assisted with creation of situation rooms. Visual aids included maps of important areas, graphs to monitor progress referred to as “vaccine-ometers,” and time-tables of activities. The information system for the campaign was also important for rapidly updating coverage estimates by age group, sex, department, and municipality. Coverage data and results of rapid monitoring were analyzed at weekly group meetings to make decisions. In addition, data were rapidly available for review from information systems for ESAVIS and vaccination of unknowingly pregnant women.

In conclusion, the Colombian experience with mass vaccination of adolescents and adults during 2005 and 2006 offers a series of lessons for similar efforts in the future. Implementation of vaccination campaigns for adolescent and adult populations should be supported by the highest possible commitment from the national to the local level. The planning of large-scale events should begin at least 6 months in advance, with extensive microplanning at all levels. Planning should include development of strategic partnerships with the media as indispensable for achieving the goal by the expected time. The purpose of promotion strategies should be to support social mobilization and community empowerment. In the event of ESAVI or rumors that can discourage people from getting vaccinated, proactive mass media strategies need to be in place, based on a crisis plan and partnerships with the media. On a related topic, training human resources in critical aspects of the immunization program—such as the cold chain, aseptic techniques, vaccination techniques, and biosafety—is indispensable for guaranteeing safe vaccination and preventing ESAVIS. During the vaccination of a captive population, it is necessary to corroborate achievement of the expected vaccination goal (by production) for each institution on the basis of captive population census. Designing a computer program to standardize information prior to the launch of the campaign facilitates the tabulation of information and timely decision-making, particularly where corrective actions are concerned. Oversight (supervision, monitoring, and evaluation) of lower-level staff during all phases encourages the professionals involved and facilitates early identification of problems and technically effective interventions. Finally, the commitment of health care workers at the different levels is an essential ingredient in achieving the goals and should be recognized as such.

**Funding**

This work was supported by the authors’ institutions.

**Acknowledgments**

The vaccination campaign and its certification would not have been possible without the efforts of the health authorities and health care workers of Colombia’s 32 departments, 4 districts, and 1119 municipalities. A similar contribution was made by the coordinators of the Expanded Program on Immunization (EPI) at the departmental, district, and municipal levels. In the Ministry of Social Protection, the National Institute of Health, and other agencies, there was active participation in planning, implementing, and evaluating of the campaign by Diego Palacio (Minister of Social Protection); Eduardo José Alvarado (Vice Minister of Health and Welfare); Ana del Carmen Castañeda, Brigitte Forrest, Ana Karina Harb, Carmen Elisa Ojeda, Jaid Rojas (EPI technical assistants); Orlando Castillo (National Advisor on Measles/Rubella Surveillance); and Gloria Rey (Coordinator of the National Virology Reference Laboratory). PAHO consultants Regina Durón and Aide Ramírez assessed the conclusion of the campaign and the certification process. In addition, Carlos Castillo-Solórzano, Regional Adviser of the PAHO Immunization Program, provided support throughout all phases of the campaign.

**References**


