Measles and Rubella
Surveillance and Monitoring
Vaccination Coverage in
Countries with Complex
Health Care Systems

Paris, France, 20-21 September 2004

Vaccine-preventable Diseases and
Immunization
ABSTRACT

The Strategic plan for measles and congenital rubella infection in the WHO European Region, was developed and implemented in 2002 and includes two objectives for 2010: interruption of indigenous measles transmission and the prevention of congenital rubella infection (CRI; less than one case of congenital rubella syndrome [CRS] per 100 000 live births). It has been recommended that the plan be revised to include the objective of measles and rubella elimination by 2010 along with CRI prevention. The Surveillance guidelines for measles and congenital rubella infection in the WHO European Region, published in 2003, were developed to meet the previous measles and rubella control targets but need to be revised to strengthen the CRS surveillance component and accommodate the rubella elimination objective. Thirty-five participants representing 20 Member States and WHO participated in a technical consultation to address outstanding surveillance issues related to these diseases. Eight recommendations were made regarding definitions and surveillance performance indicators for use in the WHO European Region.

Keywords

MEASLES – PREVENTION AND CONTROL
RUBELLA – PREVENTION AND CONTROL
RUBELLA SYNDROME, CONGENITAL – PREVENTION AND CONTROL
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Executive Summary

The WHO Regional Office for Europe and the French Ministry of Health co-hosted a meeting in Paris, 20-21 September 2004, whose objectives were to provide a forum for countries in Western Europe and North America with more complex health systems to exchange experiences, best practices and methods for laboratory surveillance and the measurement of vaccine coverage. The meeting was attended by 44 persons from 15 countries and representatives from WHO Geneva and the regional offices in Europe and the Americas. Eighteen recommendations were developed in the areas of: 1) Vaccination coverage measurement, 2) Unvaccinated or hard-to-convince populations, 3) Laboratory investigation of measles/rubella cases: patient and primary health care physician issues, and 4) Laboratory-supported surveillance: laboratory network and surveillance strategy. The recommendations are intended for use by WHO and Member States of the WHO European Region to assist them in meeting the 2010 objectives for measles and rubella in the WHO European Region.

Introduction

The Strategic plan for measles and congenital rubella infection in the WHO European Region has two overall objectives for 2010:

1. To interrupt the indigenous transmission of measles; and
2. To prevent congenital rubella infection (< 1 case of congenital rubella syndrome (CRS) per 100,000 live births).

To achieve these targets, high levels of coverage with measles and rubella vaccines and sensitive, specific and timely surveillance of vaccination coverage and disease incidence are required.

The 52 Member States in the WHO European Region are very diverse in the structure, administration and funding of health systems, virology services and childhood vaccination programmes. Some of these countries have quite complex systems with regionalized public health decision-making, multiple public and private health care providers and an extensive number of private laboratories and private laboratory networks. The WHO Regional Office for Europe (EURO) and the French Ministry of Health co-hosted a meeting, whose objectives were to provide a forum for countries in Western Europe and North America with more complex health systems to exchange experiences, best practices and methods for laboratory surveillance and the measurement of vaccine coverage. Planning for the meeting was done through the assistance of an organizing committee. Members of the organizing committee and meeting participants are identified in Annex 1, and the agenda can be found in Annex 2.

The meeting was opened by Professor William Dab, Director General of Health, French Ministry of Health, who identified the need for such a meeting as a means to achieve common end points despite highly varied health care systems in the WHO European Region. To achieve the Regional targets for measles and rubella, it will be necessary to have strong national policies and direction; to address concerns of physicians and the public about the need for and effectiveness
of immunization; and to overcome barriers to accessing immunization services. In France over the last 20 years, immunization services have been decentralized; however, in 2005 there will be a nationally coordinated approach as the result of a bill recently passed by the National Assembly.

Dr Nedret Emiroglu, Regional Advisor, Vaccine Preventable Diseases and Immunization, EURO, stated in her opening remarks that the Strategic plan for measles and congenital rubella infection in the WHO European Region was an integrated approach to the control of these diseases that took into account the current extensive use of combined measles-rubella vaccines in the Region and recognized the need for country-specific solutions for achieving the objectives.

Following the plenary sessions, which included presentations from the WHO European and American regional offices and from most of the participating countries, participants were divided into breakout groups to address specific questions. The breakout groups were:

- Measuring vaccination coverage
- Addressing unvaccinated or hard-to-convince populations
- Laboratory investigation of measles/rubella cases: patient and primary health care physician issues
- Laboratory-supported surveillance: laboratory network and surveillance strategy

A summary of each working group’s discussion and recommendations are included as part of this meeting report. EURO will use these recommendations to help with planning and prioritizing its activities in the coming years.

**Recommendations of working groups**

**Vaccination coverage measurement**

**Summary of discussion**

Vaccination coverage data can be obtained from routine administrative data or through use of surveys; some of the participating countries used both approaches. Given the complexity of the health care systems, some countries had developed administrative methods for measuring coverage that relied on health certificates or number of children completing a primary immunization series; the denominator being derived from census data or based on the number of health certificates.

Surveys can provide valid information on immunization coverage, particularly among pre school children; however, there are growing difficulties related to these methods due to the large sample sizes required to get precise estimates, the expense associated with trace back to physician records to verify the responses and the increasing use of mobile telephones and unlisted telephone numbers.

Vaccination registries and computerized health records at the local/provincial level have been used and may provide a good alternative in the future. School-based surveys may also be an inexpensive alternative, providing good quality data on older children; however, surveys at
school entry depend upon an adequate culture of record retention, and they do not give timely information on MCV1 or MCV2 coverage if the latter is given before school entry.

**Recommendations**

1. Countries without comprehensive computerised child health register should consider moving towards employing such systems;

2. Countries with multiple providers of vaccination and fragmented administrative arrangements for child health should seek to obtain samples representing the total birth cohort and immunisation status by representative sampling of the childhood population at appropriate settings, such as Public and private GP clinics and mother and child health clinics;

3. Use birth cohort registries or census data when possible to determine immunization coverage; however, administrative databases may need to act as proxies if these databases do not exist or cannot be accessed;

4. Establish reliable and representative surveys of individuals within target age groups and setting, particularly children and pregnant women at local surveillance sites, such as child health and other relevant points of access to the health care system.

**Unvaccinated or hard-to-convince populations**

**Summary of discussion**

Hard-to-reach individuals and groups in the WHO European Region were classified as: 1) hard core opponents (i.e., persons opposed to immunization based on religious or philosophical beliefs), 2) the inadequately informed (e.g., parents who seek more information than what is routinely provided), and 3) those with decreased access to the health system (e.g., immigrants, migrants, and ethnic minorities); groups #2 & #3 were felt to be “reachable” through media (journalists and internet), through general practitioners and other health care professionals, and possibly through school-based health professionals, where these existed.

Better country- and/or culture-specific information was felt to be needed in many countries regarding immunization knowledge, attitudes and practices among hard-to-reach populations and the health professionals who care for them. An evaluation would be useful of previous initiatives, currently available tools, and the interest and ability of health professionals to access existing tools. More effort was also needed to increase the availability of information for health care professionals and the public using list serves (e.g., Immunization Action Coalition); linked immunization safety websites (e.g., Vaccine Safety net); information sources providing health professionals with answers to specific immunization-related questions (e.g., Infovac); and possibly through media workshops on immunization-related issues.

**Recommendations**

1) An immunization day or week should be considered by countries as a way to increase awareness of health professionals about immunization. While this may be too complex an undertaking to implement soon throughout the WHO European Region, the implementation of these activities on a pilot basis could provide an opportunity to encourage countries to develop and use approaches specific to them and to assess the efficiency and effectiveness of these approaches.
2) WHO/EURO or other organizations not directly linked to vaccine manufacturers should consider developing more high-quality, internet-based information sources, including a newsletter similar to that of the Immunization Action Coalition. These sources should have web links; a place to ask questions or provide comments; and news on outbreaks, training activities, supplementary immunization activities, research; and innovative communication tools; however, it was appreciated that ensuring completeness and timeliness of information would be difficult.

3) WHO/EURO develop a questionnaire on with a range of issues targeting countries participating in the meeting, including items on:

- Recent outbreaks, press releases, news “stories”
- Operational research
- Evaluation studies
- Tools developed
- Actions carried out/being planned
- Websites
- Current curriculum, training/information available for physicians
- Specific actions for migrant communities
- Cost-benefit information available
- Political interest in immunization

### Laboratory investigation of measles/ rubella cases: patient and primary health care physician issues

**Summary of discussion**

Most countries estimated a 30%-40% sample collection rate from suspected cases of measles and rubella, although the UK and Spain were close to the target of >80%; problems were not felt to occur with testing or reporting of results. Sample collection was relatively easy during outbreaks but difficult in the low incidence, inter-epidemic periods. Successful policies and strategies for achieving >80% laboratory assessment included teaching medical students about the importance of reporting clinically suspected cases to health authorities; having laboratory testing free of charge to patients and physicians; and improving links between private and public health systems. Mandatory reporting can encourage physicians to report, but additional financial compensation was felt to be a needed incentive in some Member States. The rapid reporting of results from laboratories, and the regular analysis and reporting of national data are essential to keep health practitioners aware of measles control efforts, as are use of monitoring and reporting performance indicators.

Serum specimens should remain the gold standard for case confirmation, but oral fluid and dried blood samples could add value to measles surveillance efforts. These alternative sampling techniques (AST) would be useful for increasing the collection of samples from suspected cases in specific situations such as in logistically difficult or geographically remote areas. Programmatic, financial and logistical issues on the use of AST have yet to be fully evaluated, and it was felt to be too early to develop national policies on their use.

Measles and rubella genotype information is critical for assessing progress in achieving measles and rubella elimination. Private laboratories are reliable and frequently well accredited, but they only perform tests paid for by the Ministry of Health. Countries with private laboratories felt the necessity to develop parallel infrastructures to obtain specimens for virologic and genotypic
analysis. Most countries did not test measles-negative samples for rubella IgM and did not have good data on the incidence of rubella, although all had established rubella antenatal screening. Limited CRS surveillance was performed in some countries.

Operational research was needed in the field of rubella diagnosis for validation of the newly developed rubella oral fluid assay; validation of the rubella dried blood method; validation of existing rubella kits for use on dried blood and oral fluid; and the investigation on the stability of IgM and RNA in oral fluid specimens. The need for methods for collecting reliable CRS surveillance data was also identified.

**Recommendations**

1. Countries are encouraged to monitor and report the number of suspected cases of measles and rubella and the percentage of these from whom samples were collected and tested.

2. Countries need to make individual assessments on use of methods for oral fluid and dried blood samples in the laboratory-supported investigation of measles and rubella.

3. National measles and rubella laboratories should report within three months their molecular epidemiological data to the WHO/EURO M/R Laboratory Network.

4. Countries are encouraged to develop an infrastructure to collect samples for investigation of measles and rubella chains of transmission detected through primary health services.

5. Opportunities to integrate measles and rubella surveillance should be utilized and rubella IgM testing conducted on measles-negative specimens.

6. Countries are encouraged to strengthen CRI/CRS laboratory-supported surveillance activities.

**Laboratory-supported surveillance: laboratory network and surveillance strategy**

**Summary of discussion**

There were general concerns about the quality of case-based surveillance for suspected measles infection and of surveillance for clusters of rash-fever illness. The WHO definition for “suspected” measles is broad enough to ensure sensitive detection of cases by clinicians using the existing approach; however, the optimal approach for surveillance of rubella will depend on the specific rubella control strategy adopted, i.e., should surveillance be targeting congenital rubella syndrome, rubella in the general population, pregnant women, specific age groups or high risk populations (e.g., immigrants or case contacts).

General practitioners and paediatricians are the most common access points for suspected measles and rubella cases to the health care system, and they need to be provided with all that is required to send specimens for laboratory testing, to obtain results of these tests, and to notify local public health authorities of the positive results. Charges to the physician or patient for laboratory testing of clinical specimens for measles and rubella antibody can be an impediment to the effectiveness of the surveillance system.

Public health laboratory networks, including private diagnostic laboratories, have a key function for ensuring and/or providing accredited services for measles and rubella testing. Quality
assurance is best maintained through proficiency testing programs. Since clinicians can confuse measles and rubella, these laboratories need to test for both whenever a specimen from a suspected measles or rubella case is submitted; however, allocation of resources for rubella surveillance and testing should be carefully considered with other immunization-related priorities. The interpretation of rubella laboratory test results can also have consequences for the patient, so appropriate expertise should be readily available to assist with this. Criteria to monitor the effectiveness and efficiency of the laboratory network include the timeliness and completeness of reporting of: all test results to physicians; all positive results to public health authorities; and at least aggregate reporting of all negative test results on a monthly basis to public health authorities.

Incentives can be useful for clinicians and laboratories to encourage the timely submission specimens and the reporting of test results. Incentives can include feedback in the form of surveillance reports; continuing medical education credits to physicians; and direct or indirect payments, e.g., reimbursement for reporting could be tied up to proper reporting.

The linkage of clinical and laboratory data in surveillance data bases is needed for analysis at local and national levels. Mechanisms to ensure patient confidentiality and anonymous reporting are needed. Regular external validation (e.g. comparison of incidence in countries in the same elimination phase, or randomly test serum samples for measles in a given age group with rash fever diagnosis) helps to ensure good implementation.

Recommendations
1. National laboratory surveillance networks should have sound administration, ensured funding for public health work and surveillance reporting, and provide timely integration of data from laboratories within networks.

2. Local, regional and national surveillance need to be strengthened to ensure the timely collection of clinical and laboratory data, record linkage of clinical and laboratory data, and complete and thorough investigation of cases for possible chains of transmission of measles and rubella.

3. Financial impediments should be removed for testing and reporting of test results from designated public health surveillance laboratories.

4. The objectives of surveillance for rubella should be better defined within the context of the existing Regional strategy to prevent congenital rubella infection.

5. Operational research should assess the long-term rubella immunity in the general population in countries where the second dose of vaccine is given at a young age and natural infection no longer occurs.
Annex 1

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Annex 2

Meeting Programme

Monday 20th September

8:30 Registration & breakfast

9:00 Opening remarks and meeting objectives
   Prof. William Dab, DG Health, France,
   Dr. Nedret Emiroglu, Regional Adviser WHO/EURO

9:30 Measles and rubella elimination, regional approaches
   a. EURO (Dr. John Spika)
   b. PAHO (Dr. Jon Andrus)

10:00 Vaccine coverage
   Methods for measuring immunization coverage in the US (Dr. Lance Rodewald, USA)
   Experience:
      i. Germany – School entry surveys (Dr. Sabine Reiter)
      ii. France – 3-year survey cycles (Dr. Daniel Lévy-Bruhl)
      iii. Spain – Use of administrative coverage data (Dr. Isabel Pachón)
   Discussion

10:50 Coffee break

11:20 Unvaccinated populations
   Approaches to reach unvaccinated groups and individuals, addressing concerned parents, anti vaccination groups, missed individuals, e.g. immigrants, gypsies, the poor (Dr. Anneke Ambler-Huiskes, The Netherlands)
   Experience:
      i. Switzerland – Opposition to vaccination in Germanic countries (Dr. Daniel Koch)
      ii. France – Profile of non-vaccinated population (Dr. Marta Balinska)
   Discussion
12:10 Surveillance for laboratory-confirmed cases of measles and rubella

Laboratory supported surveillance in countries approaching measles elimination phase - experiences obtained by mandatory notification and sentinel methods (Dr. Annedore Tischer, Germany)

Experience:
1. Canada – Surveillance of lab-confirmed cases of measles and rubella: Canadian experience (Dr. Sam Ratnam)
2. Belgium – Laboratory services paid for by patient (Dr. Tinne Lernout)
3. Israel – Laboratory services paid for by health-care provider (Dr. Ella Mendelson)
4. France – Implementation of laboratory-based measles surveillance in France: involvement of private and public sectors (Dr. Isabelle Parent du Châtelet)

Discussion

13:30 Lunch

14:30 Laboratory-based surveillance

Approaches for assessing the strength of laboratory-based surveillance (Dr. Jean-Luc Richard, Switzerland)

Experience:
1. USA – Methods to assess frequency of testing (Dr. Melinda Wharton)
2. Spain – Laboratory investigation of suspected cases in Spain by the net of laboratories (Dr. Juan Emilio Echevarría)
3. The Netherlands – Laboratory differentiation of viral exanthemas (Dr. Robert van Binnendijk)

Discussion

15:30 Alternative sampling techniques

Alternative sampling techniques (Dr. Brenda Thomas, UK)

Experience:
1. Switzerland – Use of salivary tests (Dr. Jean-Luc Richard)
2. WHO – Use of dried blood spots (Dr. David Alexander Featherstone, WHO Geneva)

Discussion

16:30 Break

17:00-19:00 Breakout Groups (discussion on specified topics)
Tuesday 21st September

**8:30 Breakout groups** (finalise discussion of the group and prepare plenary discussion points)

**10:00 Break**

**10:30 Plenary** (Presentations and discussions for each group)

**13:15 Lunch**

**14:00 Break out groups** (integration plenary discussions comments to make recommendations)

**15:30 Break**

**16:00 Plenary** (presentations and final discussion of the recommendations)

**17:30 conclusions/recommendations**