Technical Consultation on Verification of Measles Elimination in the Western Pacific Region

Manila, Philippines
15–16 June 2010
REPORT

TECHNICAL CONSULTATION ON THE VERIFICATION OF MEASLES ELIMINATION IN THE WESTERN PACIFIC REGION

Convened by:

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Keywords:

Measles—prevention and control/Verification

This report has been prepared by the World Health Organization Regional Office for the Western Pacific on behalf of the participants of the Technical Consultation on the Verification of Measles Elimination in the Western Pacific Region, which was held in Manila, Philippines, from 15 to 16 June 2010.
SUMMARY

A Technical Consultation for the Verification of Measles Elimination in the Western Pacific Region was held at the Regional Office for the Western Pacific in Manila, Philippines on 15-16 June 2010. Financial support for the meeting was provided by the United States Centers for Disease Control and Prevention.

The objectives of the consultation were:

1. to review and discuss existing regional poliomyelitis eradication certification processes and criteria and measles elimination verification processes and criteria of other WHO Regions;

2. to propose a verification process and criteria for measles elimination in the Western Pacific Region; and

3. to identify the next steps to implement the verification process and criteria for measles elimination in the Western Pacific Region, including how countries and areas may use measles elimination for accelerating the control of rubella and prevention of congenital rubella syndrome (CRS).

During the course of the consultation, the participants agreed that verification should be carried out both for individual countries and for the Region as a whole. National Verification Committees (NVCs) may submit evidence of national elimination to the Regional Verification Commission (RVC) when they believe their respective countries or areas have achieved absence of endemic measles virus circulation for at least 12 months. However, regional elimination would require an absence of endemic measles cases throughout the Region for at least 36 months. The principle of independence for the RVC and NVC members was affirmed, recognizing that in some countries and areas the requirement for absolute independence from the national immunization programme may be waived on a case-by-case basis. Participants agreed that the Western Pacific Region should define the five components of verification criteria for measles elimination as follows:

1. high population immunity in birth cohorts at least since measles vaccine introduction;

2. incidence and epidemiologic analysis as far back as possible;

3. virologic analysis in as many chains of measles transmission as possible;

4. high-quality epidemiologic surveillance, using a defined set of indicators and targets; and

5. sustainability of measles elimination in the context of national immunization programme functions and that is included in a comprehensive multi-year plan or equivalent.

Potential core and complementary indicators for the verification components were discussed. These indicators could form the basis for the documentation that NVCs will be required to prepare for submission to the RVC. It was also agreed that discretionary consideration should be given to countries unable to provide data satisfying the core and/or complementary indicators.
Participants agreed that opportunities presented by measles elimination activities to accelerate rubella control and CRS prevention should be utilized with an aspirational target date of 2015, and that targets should be operationally established as reduction of rubella incidence to \( \leq 10 \) per million population and reduction of CRS incidence to \( \leq 10 \) per million live births in accordance with 2009 recommendations from the Technical Advisory Group for Vaccine Preventable Diseases in the Western Pacific Region (TAG). However, in view of some constraints in particular Member States, it was not considered appropriate to set a firm target date at this stage.

Participants agreed that recommendations from this consultation may be referred to the TAG for endorsement at its next meeting in August 2010, and that TAG may further request the Regional Director to seek endorsement by the Regional Committee at its sixty-first session in October 2010.
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMMARY</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF ACRONYMS</td>
<td>vi</td>
</tr>
<tr>
<td>1. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>1.1 Objectives</td>
<td>1</td>
</tr>
<tr>
<td>1.2 Organization</td>
<td>1</td>
</tr>
<tr>
<td>1.3 Opening ceremony</td>
<td>1</td>
</tr>
<tr>
<td>2. PROCEEDINGS</td>
<td>2</td>
</tr>
<tr>
<td>2.1 Overview</td>
<td>2</td>
</tr>
<tr>
<td>2.2 Lessons from other WHO regions and programmes</td>
<td>5</td>
</tr>
<tr>
<td>2.3 Verification of measles elimination in Western Pacific Region</td>
<td>6</td>
</tr>
<tr>
<td>2.4 Accelerating rubella control and CRS prevention</td>
<td>13</td>
</tr>
<tr>
<td>2.5 The way forward</td>
<td>18</td>
</tr>
<tr>
<td>3. CONCLUSIONS AND RECOMMENDATIONS</td>
<td>18</td>
</tr>
<tr>
<td>3.1 Verification</td>
<td>18</td>
</tr>
<tr>
<td>3.2 Accelerating rubella control and CRS prevention</td>
<td>19</td>
</tr>
<tr>
<td>3.3 Way forward</td>
<td>20</td>
</tr>
<tr>
<td>ANNEXES:</td>
<td></td>
</tr>
<tr>
<td>ANNEX 1 - ANNOTATED AGENDA</td>
<td></td>
</tr>
<tr>
<td>ANNEX 2 - LIST OF TEMPORARY ADVISERS, OBSERVERS AND SECRETARIAT</td>
<td></td>
</tr>
<tr>
<td>ANNEX 3 - PROPOSED INDICATORS FOR COMPONENTS OF THE VERIFICATION PROCESS FOR MEASLES ELIMINATION IN THE WESTERN PACIFIC REGION</td>
<td></td>
</tr>
<tr>
<td>Acronym</td>
<td>Definition</td>
</tr>
<tr>
<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>AFP</td>
<td>acute flaccid paralysis</td>
</tr>
<tr>
<td>CBAW</td>
<td>childbearing-age women</td>
</tr>
<tr>
<td>cMYP</td>
<td>comprehensive multi-year plan</td>
</tr>
<tr>
<td>CRI</td>
<td>congenital rubella infection</td>
</tr>
<tr>
<td>CRS</td>
<td>congenital rubella syndrome</td>
</tr>
<tr>
<td>DHS</td>
<td>demographic and health surveys</td>
</tr>
<tr>
<td>ELISA</td>
<td>enzyme-linked immunosorbent assay</td>
</tr>
<tr>
<td>GIVS</td>
<td>Global Immunization Vision and Strategies</td>
</tr>
<tr>
<td>IgG</td>
<td>Immunoglobulin G</td>
</tr>
<tr>
<td>IgM</td>
<td>Immunoglobulin M</td>
</tr>
<tr>
<td>JRF</td>
<td>Joint Reporting Form</td>
</tr>
<tr>
<td>MCV1</td>
<td>first dose of measles-containing vaccine</td>
</tr>
<tr>
<td>MCV2</td>
<td>second dose of measles-containing vaccine</td>
</tr>
<tr>
<td>MICS</td>
<td>multiple indicator cluster surveys</td>
</tr>
<tr>
<td>MMR</td>
<td>measles–mumps–rubella</td>
</tr>
<tr>
<td>MR</td>
<td>measles–rubella</td>
</tr>
<tr>
<td>NCC</td>
<td>National Certification Committee</td>
</tr>
<tr>
<td>NIP</td>
<td>national immunization programme</td>
</tr>
<tr>
<td>NITAG</td>
<td>National Immunization Technical Advisory Group</td>
</tr>
<tr>
<td>NVC</td>
<td>National Verification Committee</td>
</tr>
<tr>
<td>ORI</td>
<td>outbreak response immunization</td>
</tr>
<tr>
<td>OPV</td>
<td>oral polio vaccine</td>
</tr>
<tr>
<td>PAHO</td>
<td>Pan American Health Organization</td>
</tr>
<tr>
<td>RC</td>
<td>Regional Committee</td>
</tr>
<tr>
<td>RCA</td>
<td>rapid coverage assessment</td>
</tr>
<tr>
<td>RCC</td>
<td>Regional Certification Commission</td>
</tr>
<tr>
<td>RCV</td>
<td>rubella-containing vaccine</td>
</tr>
<tr>
<td>RVCC</td>
<td>Regional Verification Commission</td>
</tr>
<tr>
<td>SAGE</td>
<td>Strategic Advisory Group of Experts</td>
</tr>
<tr>
<td>SIA</td>
<td>supplementary immunization activity</td>
</tr>
<tr>
<td>SRCC</td>
<td>Subregional Certification Committee</td>
</tr>
<tr>
<td>SRVC</td>
<td>Subregional Verification Committee</td>
</tr>
<tr>
<td>TAG</td>
<td>Technical Advisory Group</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

The WHO Regional Committee for the Western Pacific established measles elimination as a regional goal at its fifty-fourth session in 2003, and established the target date of 2012 at its fifty-sixth session in 2005. Measles elimination is defined as the absence of endemic measles cases in a defined geographical area (e.g. in a country or a region) for a period of at least 12 months, in the presence of a well-performing surveillance system. As with polio eradication, measles elimination requires an objective, external verification process. The WHO Regional Offices for the Americas, Eastern Mediterranean and Europe have measles elimination goals, and all have established or are establishing processes and criteria for verification of measles elimination, including the establishment of regional verification commissions and national verification committees. However, the processes and criteria, while very similar, are not identical.

With an agreed-upon external and objective process and criteria for verification of measles elimination in place, countries that have eliminated measles will be officially recognized, and for those that have not, clear standards and resources will help policy-makers and programme managers to do what is needed to eliminate measles. To that end, a technical consultation was held on 15-16 June 2010 as a first step to determine the processes and criteria for verification of measles elimination in the Region for further consideration by the Technical Advisory Group (TAG) on Immunization and Vaccine-Preventable Diseases in the Western Pacific Region.

1.1 Objectives

(1) To review and discuss existing poliomyelitis eradication certification processes and criteria and measles elimination verification processes and criteria of other WHO Regions.

(2) To propose a verification process and criteria for measles elimination in the Western Pacific Region.

(3) To identify the next steps to implement the verification process and criteria for measles elimination in the Western Pacific Region, including how countries and areas may use measles elimination for accelerating the control of rubella and prevention of congenital rubella syndrome.

1.2 Organization

The timetable of the meeting is provided in Annex 1. The list of participants is included in Annex 2.

1.3 Opening ceremony

Dr Linda Milan, Acting Regional Director, WHO Regional Office of the Western Pacific, opened the meeting and highlighted the progress towards measles elimination in the Western Pacific Region in the past decade. By 2009, reported regional vaccination coverage with a first dose of measles-containing vaccine (MCV1) reached 96%, and in 32 countries providing two routine doses of measles-containing vaccine (MCV2), reported MCV2 coverage reached 94%. Thirty-one of 37 countries and areas have conducted catch-up supplementary immunization
activities (SIAs). As a result, regional measles incidence fell to 34 per million population in 2009, representing a 58% decrease compared to 2008 and an all-time low for the Region. All 37 countries and areas in the Western Pacific Region are conducting case-based measles surveillance; China, Papua New Guinea, the Philippines and Viet Nam plan to conduct measles SIAs in 2010, and Japan will continue its five-year rolling SIA targeting 13- and 18-year-old persons. Twenty-five countries and areas have likely achieved or nearly achieved measles elimination, and the Region is on track to achieve the 2012 goal provided upcoming SIAs reach at least 95% of their target populations.

Dr Milan encouraged those participating in the consultation to consider the establishment of a Regional Verification Commission (RVC) and National Verification Committees (NVCs) for measles elimination that would serve in a manner similar to those for polio eradication, and ways in which the Region can incorporate control of rubella and prevention of congenital rubella syndrome (CRS) into measles elimination activities.

2. PROCEEDINGS

2.1 Overview

Dr Liang Xiaofeng, Director, National Immunization Program, China, was elected Chair for the first session of the meeting. Dr Robin Biellik was designated as Rapporteur for the entire meeting.

2.1.1 Global overview

In 2003, the World Health Assembly set a global goal to reduce measles mortality by 50% by 2005 compared with a baseline level in 1999 of 873,000 measles deaths, which was achieved ahead of schedule. This led to setting a further goal to reduce measles mortality by 90% by 2010, which has been achieved in all WHO regions except the South-East Asia Region, and in all but one country (India) in the South-East Asia Region. Reported measles incidence has declined over the past two decades, and in 2008 was less than 100 cases per million population in all regions. The last endemic cases of measles and rubella in the WHO Region of the Americas were reported in November 2002 and in February 2009, respectively. Five of the six WHO regions have set regional measles elimination goals by 2020 or earlier, and the sixth region (South-East Asia) will decide on establishing a target date for measles elimination in September 2010.

In 2009, the Executive Board requested WHO to assess the feasibility of global measles eradication and to prepare a report on progress in seven areas of study by 2010. The biological, programmatic and vaccine market feasibility of measles eradication has been established. The WHO Director-General has confirmed her belief that measles eradication can be achieved, and in May 2010, the World Health Assembly set three milestones for 2015 to monitor progress towards global eradication:

(1) reduce measles mortality by 95% compared to year 2000 levels;

(2) achieve Global Immunization Vision and Strategies (GIVS) goals for MCV1 coverage, that is, 90% nationally and 80% in every district;

(3) achieve measles incidence <5 per million population.
At a meeting scheduled for July 2010 in Washington, DC, all existing scientific and programmatic evidence regarding the feasibility of global eradication will be presented and discussed in depth. The recommendations from this meeting will be reported back to Strategic Advisory Group of Experts (SAGE) and from SAGE to the World Health Assembly to inform the decision on whether and when to establish a target date for the global eradication of measles.

2.1.2 Global measles genotype distribution and evidence for importations

Dr Paul Rota, United States Centers for Disease Control and Prevention (CDC), Atlanta, highlighted the critical importance of virologic surveillance on the process of verifying measles elimination. The absence of an endemic genotype for a period of one year indicates interruption of transmission of that strain. It has been established that elimination can be successfully maintained despite importations of measles virus into large geographic areas and regions that have eliminated endemic transmission. However, when a sufficient number of measles-susceptible individuals accumulate, measles virus importation can result in reestablishment of endemic transmission. High-quality case investigation including adequate specimen collection is critical to understanding pathways of virus transmission and their interruption. Databases have been established to capture the current status of virologic surveillance and demonstrate chains of transmission within and between WHO regions. A global network of accredited laboratories has been established and extensive training on standardized methods for characterizing virus isolates has been implemented.

The current status of measles virus strain circulation in China, Japan, the Philippines and Viet Nam was presented, and the source and speed of virus importations from Europe and the Western Pacific Region into the Americas, and from the Western Pacific and South-East Asia Regions into Europe were highlighted. It was noted that China, Japan, the Philippines and Viet Nam have the largest populations in the Western Pacific Region and are currently taking major steps to reduce measles transmission.

2.1.3 Status of measles elimination in Western Pacific Region

Progress, challenges and plans for the future regarding measles elimination in the Western Pacific Region were presented. Measles catch-up SIAs have been conducted in all but a few small countries, and recent acceleration of measles elimination activities in China and Japan have led to a 58% decrease in regional measles incidence from 2008 to 2009 and an all-time low for the Region at 34 per million population. The four most populated Member States of the Region, China, Japan, the Philippines and Viet Nam, are all planning national SIAs in 2010. For the first time ever, China will conduct a nationwide measles SIA in September, targeting approximately 96 million children and adolescents, that will comprise catch-up SIAs in five provinces that have not yet conducted them and follow-up SIAs in the remaining 26 provinces. Viet Nam and the Philippines have demonstrated prior success in interrupting measles virus transmission with a single nationwide SIA. If the SIAs planned in these four countries are conducted well, the Region may very well succeed in achieving its 2012 measles elimination goal.

All countries and areas in the Region conduct case-based measles surveillance, and all but China report case-based data to the WHO Regional Office. China reports aggregate data, and Australia, New Zealand and Singapore report only laboratory-confirmed cases. Among the remaining countries that also report suspected measles cases that were discarded as non-measles, the regional discarded measles rate in 2009 was 2.8 per 100 000 population, exceeding the 2.0 target. However, only 41% of second-level administrative units reported ≥1.0 discarded cases per 100 000 population. Overall, 71% of suspected cases had an adequate blood specimen collected, but the laboratory results of only 60% of those specimens were available within seven days after arrival in the laboratory. It was noted that, in some countries, discrepancies in the numbers of
laboratory-confirmed cases exist between measles databases maintained by national immunization programme (NIP) or surveillance units and the national measles laboratories.

It is likely that 25 countries and areas (Australia, Brunei Darussalam, the Republic of Korea, Macao [China] and 21 Pacific island countries and areas) may already have eliminated measles; however, these represent only 4% of the total population in the Region. A further five countries and areas (Hong Kong [China], Malaysia, Mongolia, Singapore and Viet Nam) appear likely to achieve the goal on target by 2012, provided measles elimination activities are done well in these countries. These countries represent a further 8% of the Region's population. Achieving measles elimination by 2012 in the remaining countries of Cambodia, China, Japan, the Lao People's Democratic Republic, New Zealand, Papua New Guinea, and the Philippines is possible, provided additional efforts to interrupt transmission are made in these countries that account for 88% of the Region’s population.

Measles elimination status was reviewed in Japan, the Philippines and Papua New Guinea. Japan introduced a second routine dose of measles vaccine (MCV2) at age 5–7 years in 2007. A large nationwide outbreak that began that same year involving a large proportion of older adolescents and young adults led Japan to establish a measles elimination plan that included the following: a rolling measles SIA targeting 13- and 18-year-olds each year in from 2008 through 2012; additional social mobilization and communication efforts to improve routine MCV1 and MCV2 coverage; making measles a notifiable disease nationwide; designating 10 national centres for enzyme-linked immunosorbent assay (ELISA) testing; and establishing prefecture­level intersectoral committees on measles elimination to oversee progress towards measles elimination. The number of reported measles cases declined 93% from 2008 to 2009, with 705 confirmed cases reported to the WHO Regional Office, corresponding to an incidence of 5.5 per million population.

Measles transmission in the Philippines was likely interrupted following the 2004 Ligtas Tigdas SIA that targeted children 9 months to 7 years old. Virtually no laboratory-confirmed measles cases were reported following the 2004 SIA until 2007, when two new genotypes (G3 and D9) were identified. The circulating D3 genotype that was present before 2004 has not been identified since. However, measles virus transmission of G3 and D9 genotypes was identified in 2007, and despite an SIA conducted in the fourth quarter of 2007, measles transmission has increased. A particularly large increase in measles cases occurred in the first quarter of 2010, primarily in Metropolitan Manila but also involving a large number of regions and provinces. Outbreak response immunization (ORI) was implemented in March, targeting children 6 months to 7 years of age (up to 14 years of age in some settings), and appears to have markedly reduced and possibly interrupted transmission, as only two confirmed cases were reported during epidemiologic weeks 18–21.

The national vaccination schedule in Papua New Guinea includes a “supplemental dose” of MCV at 6 months of age, and a “first dose” at 9 months of age. While reported MCV1 coverage among infants was 54% in 2008 and 2009, a large percentage of children receive MCV in their second year of life through seldomly conducted “patrols”. Thus, actual MCV1 coverage among children <24 months old is likely to be 80% or more. Papua New Guinea plans to conduct follow-up SIAs for children 6–35 months of age every two years; the next is planned to start in August 2010.

During the next two years, the major emphasis for measles elimination in the Western Pacific Region will be placed on conducting very high-quality SIAs and on addressing immunity gaps among children in certain countries. This may include reducing the age of administration of MCV2 to the second year of life to decrease the accumulation of susceptibles, particularly in countries providing MCV1 at 9 months of age, and strengthening school-entry requirements for
proof of measles (and other) vaccination. Improvements are needed in the quality of measles surveillance and in communication between national programme and laboratory staff in key countries. The Western Pacific Region has developed an estimated budget for priority countries to achieve measles elimination by 2012 and maintain it through 2020. The total estimated budget to achieve measles elimination by 2012 is US$ 49 million; an additional US$ 6.6 million would be required to sustain measles elimination through 2015 and US$ 10 million to maintain measles elimination from 2016 to 2020.

2.2 Lessons from other WHO regions and programmes

2.2.1 Americas, Eastern Mediterranean and European Regions

The process and indicators for verification of measles elimination (and rubella and CRS elimination) developed in the WHO Regions of the Americas, Europe and Eastern Mediterranean were presented and compared. Five components of the verification process were examined in depth:

1. vaccination coverage
2. disease incidence
3. virologic surveillance
4. overall surveillance quality
5. sustainability of national immunization programmes.

Recommended indicators for vaccination coverage, overall surveillance quality and the sustainability of NIPs were listed. The membership and terms of reference for the establishment of a Regional Verification Commission and National Verification Committees used in the three regions also were presented, and the format and content for national data compilation, analysis and reporting from NVCs to the RVC were described.

2.2.2 Certification of polio elimination in Western Pacific Region

The target year for achieving polio-free status in the Western Pacific Region was 1995. The last indigenous polio case was confirmed in Cambodia in 1997, and the last confirmed imported polio case was identified in China in 1999. Polio eradication strategies include high routine vaccination coverage with oral polio vaccine (OPV), SIAs, case-based surveillance, and laboratory-based diagnostic confirmation and virologic surveillance. The regional polio-free certification process included the establishment of a Regional Certification Commission (RCC) and National Certification Committees (NCCs). Both RCCs and NCCs developed plans of action that included activities to be conducted after regional polio-free status had been certified and until global eradication could be declared. Certification of regional polio-free status also included laboratory containment of wild polioviruses and environmental surveillance.

The RCC disseminated a Manual of Operations to guide the documentation process, reviewed all national submissions, undertook site visits when required, made recommendations and/or requested additional or revised information where necessary, and eventually declared the Region polio-free. The role of NCCs included the periodic review of vaccination coverage and disease surveillance data, site visits, regular reporting, data validation and the submission to the RVC of full national documentation for elimination. Since elimination was declared, NCCs have submitted annual progress reports to update the RCC on current status.
2.2.3 Certification of polio eradication in the Pacific island countries

The 21 Pacific island countries were treated as a single subregional epidemiologic block for the purposes of certification, and a subregional certification committee (SRCC) was established in 1996. Terms of reference and a timetable were provided by the RCC. The SRCC, which included five members who were appointed by the WHO Regional Director, met four times from 1996 to 2000. After certification, SRCC met annually until 2006 and then again in 2009. The SRCC also served as the expert panel for final classification of acute flaccid paralysis (AFP) cases reported in the Pacific island countries. Some adjustments had to be made in the distribution of reporting sites and the application of surveillance indicators in view of the small population size of most of them. The accredited polio laboratory for Pacific island countries was established in Australia. Since AFP due to wild poliovirus had not been seen in the Pacific since the 1980s, most physicians tended to assume that AFP was caused by Guillain-Barre Syndrome and did not collect specimens or undertake clinical investigation for polio. A similar problem may arise with measles elimination, since many physicians may not have seen measles cases for many years. The risk of the importation of wild poliovirus into Pacific island countries remains high - OPV coverage has slipped in some countries, residents travel to India and the Middle East, soldiers serve in peace-keeping operations in Africa, and tourists arrive from all over the world. It was proposed that the SRCC could be extended to serve as a subregional verification committee (SRVC) for measles elimination.

2.3 Verification of measles elimination in Western Pacific Region

Dr Geun-Ryang Bae, Director, National Immunization Programme, the Republic of Korea, was elected Chair for the first part of this second session of the meeting, covering agenda items 8 to 11. Dr Robert Menzies, Deputy Director for Surveillance, Kids Research Institute, Westmead Children's Hospital, Australia, was elected Chair for the second part of the session, covering agenda items 12 and 13.

2.3.1 Structure and function of the RVC and NVCs

In the Western Pacific Region, it was proposed that the process for the verification of regional measles elimination should be external and independent, apply standard criteria, follow well-defined procedures and be based on high-quality and comprehensive documentation. The process should follow general principles that were followed in the course of certifying regional polio elimination. Members of the RVC and NVCs should not be involved directly in the management and operations of their respective NIPs or epidemiologic and laboratory case-based measles surveillance, should be senior subject-matter experts from different fields of expertise and be professionally committed to the process. The WHO Regional Office would serve as the secretariat for the RVC, and the WHO country offices would serve as secretariat for NVCs for those countries with WHO country offices.

The RVC would be appointed by and report to the WHO Regional Director and remain independent of the TAG. The proposed functions of the RVC would be to verify national and regional measles elimination status on the basis of documentation submitted by NVCs, provide terms of reference for and guide NVCs, conduct field visits when needed, and advocate for measles elimination. The NVC members would be appointed by their respective ministers of health and report to the RVC. It may be useful to appoint one NVC member from the National Immunization Technical Advisory Group (NITAG) or equivalent body to provide coordination and communication linkages. The primary functions of the NVCs would be to assess when countries and areas are ready to request verification of measles elimination by the RVC, to advise their respective NIPs and surveillance and laboratory staff on the requirements for documenting elimination, to compile and analyse the data provided, to conduct field visits where indicated, to
propose solutions if data are not adequate to meet established criteria, to advocate for
elimination, and to submit reports to the RVC. The NVC would not be responsible for declaring
national elimination as this function is reserved for the RVC. The SRVC would serve as a
verification committee for the 21 Pacific island countries as a group. The WHO Regional
Director would appoint the SRVC members, and the WHO South Pacific Office would serve as
secretariat.

During the discussion it was noted that in Japan, national and prefecture-level
multisectoral technical committees support the implementation of the measles elimination plan of
action. Rather than creating a new body, it was proposed that the existing committee could
extend its terms of reference to provide guidance on the quality of data required for
documentation. In response, the importance of creating an independent NVC to avoid potential
conflicts of interest was highlighted. In other countries, such as Cambodia and the
Lao People's Democratic Republic, almost all national experts are connected to their respective
ministries of health, making it impossible to avoid all potential conflicts of interest. In such
situations, the RVC would need to be satisfied that NVC members are sufficiently objective
when controversial issues or data quality problems arise.

2.3.2 Process and components of the verification process

Five components of the verification process for measles elimination were proposed for
consideration by the Western Pacific Region.

2.3.2.1 Population immunity

The purpose of this component is to demonstrate that all persons born after the year that
measles vaccine was introduced into the national schedule are adequately protected against
measles. Most persons born before measles vaccine introduction likely developed natural
immunity through prior infection. Population immunity may be measured by annual reports of
MCV1 and MCV2 vaccination coverage at national and subnational levels as reported in the
WHO/UNICEF Joint Reporting Form (JRF) and other mechanisms. Additional data sources may
be available to and used by NVCs to assess population immunity. For example, coverage surveys
such as WHO 30-cluster surveys, demographic and health surveys (DHS) and multiple indicator
cluster surveys (MICS), as well as rapid coverage assessments (RCAs), serosurveys and other
potential data sources may be used to supplement administrative data. However, routine
population-based coverage surveys and serosurveys may be associated with certain technical
limitations related to representativeness and inability to identify potentially large pockets of
susceptible individuals. Moreover, serosurveys may be subject to limitations associated with the
sensitivity and specificity of the laboratory tests used for measles immunoglobuline G (IgG).

2.3.2.2 Incidence and epidemiological analysis

Incidence

In describing incidence of measles, it is necessary to classify confirmed measles by source
of infection and by mechanism of confirmation. Source of infection may be endemic, imported,
import-related or unknown. Mechanism of confirmation may be by laboratory, epidemiologic
linkage, or clinical criteria.
NVCs and the RVC should pay particular attention to the different cells in the above table. As clinically confirmed cases represent failures of surveillance due to lack of laboratory evidence, the numbers of confirmed cases in cells 3, 6, 9 and 12 should be minimal. Measles elimination status will be determined ultimately by the absence of cases in cells 1 and 2, as depicted by the yellow shading in the above table. As import and import-related cases would be expected to continue after measles has been eliminated, cells corresponding to these sources of infection would be expected to be populated by a limited number of cases. A large number of confirmed cases of unknown origin, as well as clinically confirmed cases as noted above, would raise questions regarding quality of surveillance and the ability of a country to confidently determine the absence of endemic measles cases. As such, NVCs and the RVC may consider the following operational targets as consistent with measles elimination: an incidence of <1 per million of laboratory-confirmed and epidemiologically linked cases excluding imported cases and the absence of laboratory-confirmed and epidemiologically linked endemic measles cases. In addition, the percentage of unknown source and clinically confirmed cases should be small.

Epidemiologic analysis

Measles elimination activities usually alter the epidemiology of measles over time, especially in regard to temporal and spatial characteristics of measles cases as well as age distribution and vaccination status of cases. NVCs and the RVC should review the evolution of measles epidemiology to assess progress and the likelihood of measles elimination. Analysis of epidemic curves should reveal increasing intervals between clusters/outbreaks, decreasing numbers of cases in clusters/outbreaks, decreasing duration of clusters/outbreaks, increase in sporadic cases and a loss of seasonality. Spot maps indicating index cases separately from secondary and tertiary cases, as well as importation status over consecutive time intervals can help confirm progress towards and eventual achievement of measles elimination. Similarly, measles elimination activities usually alter case characteristics such as age and vaccination status over time, with an increasing percentage of cases occurring at the extremes of age (infants and young adults) and an increasing percentage of cases that were previously vaccinated (usually with a single MCV dose). Examples of such detailed analyses from New Zealand, the Philippines and Viet Nam were presented.

Outbreak investigations can provide extremely useful data, and may facilitate the analysis of trends over time. The use of one proposed outbreak-related indicator that suggests high population immunity, ≥80% of measles chains of transmission with <10 cases, requires intensive case-searching to ensure that the full extent of each outbreak is ascertained. Otherwise,
programme managers and NVC and RVC members may incorrectly conclude that high population immunity exists when in fact it does not. It is imperative as countries and areas approach measles elimination that contact tracing and additional case finding occur for every confirmed case. In fact, the measles elimination guidelines used in the Region of the Americas include an additional indicator related to the proportion of confirmed cases with follow-up of contacts for 30 days to ensure complete case-finding.

2.3.2.3 Laboratory surveillance and molecular epidemiology

The WHO Regional Office for the Western Pacific has established a measles laboratory network consisting of 382 laboratories, including one global specialized laboratory, three regional reference laboratories, 16 national laboratories and, in China, 31 provincial and 331 prefectural laboratories. Among these, the global specialized laboratory and two national laboratories are not yet accredited. In addition, laboratories in Guam and French Polynesia have passed proficiency tests but are not accredited. Measles genotype data are available from all countries except Mongolia, Papua New Guinea, Fiji and most other Pacific island countries.

Three hands-on training courses have been conducted in the Region since 2005 to strengthen laboratory capacity to perform measles immunoglobulin M (IgM) ELISA using serum and dried blood spot samples and ensure the quality of laboratory performance as well as to build up and enhance the capacity for virologic and genotypic analysis. In 2009, endemic measles virus strains in the Region included H1, D9, D5 and G3.

China established an extensive measles and rubella laboratory network. All provincial laboratories as well as China CDC can perform virus isolation and molecular detection of measles and rubella viruses. In 2009, approximately 90% of outbreak-related measles cases and 50% of sporadic measles cases were laboratory-confirmed by IgM ELISA in China.

Indicators proposed for laboratory surveillance in the Western Pacific Region were as follows:

1. all designated laboratories should be accredited;
2. ≥80% of specimens should be confirmed in WHO-accredited laboratories;
3. all specimens should be labelled with unique epidemiologic (EPID) numbers in coordination with NIP, surveillance and laboratory staff;
4. the number of laboratory-confirmed cases reported by the laboratory compared NIP/surveillance sources should be the same, demonstrating adequate communication between the units;
5. ≥80% of suspected cases, sporadic or outbreak-related, should be laboratory-tested; epidemiologically linked cases should be excluded from the denominator;
6. ≥80% of suspected outbreaks should have specimens collected from cases for virus isolation and genotype information should be available for ≥80% of all chains of transmission;
7. all countries with WHO-accredited laboratories should create a baseline genotype database by testing archival specimens;
(8) the results of serologic testing should be shared with the WHO Regional Office in accordance with existing criteria for completeness and timeliness;

(9) genotypic and viral sequence data from ≥80% of specimens should be shared with WHO Headquarters within two months of identification; and

(10) timely and complete monthly data submission to the WHO Regional Office: 80%.

2.3.2.4 Surveillance quality

The measles surveillance performance indicators proposed at a measles meeting in Capetown, South Africa in 2003, and included in the Field Guidelines for Measles Elimination in the Western Pacific Region in 2004 were reviewed and compared with an updated list of indicators that have been used by the WHO Regional Office since 2007. The algorithm for measles and rubella case classification currently in use in the Western Pacific Region, as well as the differential diagnosis of fever and rash illness and experience in the Region of the Americas, was presented to illustrate the technical justification and operational feasibility for the surveillance sensitivity indicator of ≥2 discarded cases per 100 000 population. Lastly, the similarities in the indicators used for AFP and suspected measles surveillance were noted.

A spreadsheet with case-based surveillance core variables requested for monthly submission to the WHO Regional Office by Member States was shown to illustrate the minimum data elements required to calculate surveillance performance indicators and conduct descriptive epidemiologic analysis. The most common missing data elements include date of specimen collection, vaccination status and date of rash onset. In 2009, the Western Pacific Region achieved a detection rate of 2.8 cases per 100 000 population, with wide variations between countries; 43% of second-level administrative units reported ≥ 1 discarded case per 100 000 population. Several countries including Australia, China and New Zealand and Singapore do not report total suspected or discarded cases. Excluding these countries, adequate investigations were conducted for 43% of suspected measles; 72% of suspected cases had “adequate” specimens collected, and 60% of serologic results were available within seven days of receipt of specimens in the laboratory.

The surveillance performance indicators of the WHO Regional Office for the Western Pacific Region were compared with those from the Americas, Europe and Eastern Mediterranean. Based on experience from the other regions, additional indicators for use in the verification exercise in the Western Pacific Region were proposed:

(1) separate timely and “adequate” investigation indicators (as done by the Americas);

(2) include the “proportion of IgM serology results available within seven days of receipt of specimens in the laboratory” in the laboratory performance indicators;

(3) additional indicators:

(a) agreement in the number of laboratory-confirmed cases reported by NIP/surveillance units and laboratories (already proposed in the laboratory section above),

(b) maximum percentage of clinically confirmed cases among all confirmed cases (target ≤10%).
During discussion, participants noted that although serology was the method of choice for confirmation programmatically, cases could also be laboratory-confirmed by methods other than serology, e.g., by virus isolation/detection, and that a separate classification category should be established for reported suspected cases that are vaccine associated. Furthermore, it was noted that NVCs and the RVC should pay special attention to laboratory-confirmed and epidemiologically linked cases without viral isolates whose origin was unknown, as these may represent ongoing endemic transmission. Participants also discussed concerns about discarding suspected cases that satisfy a simpler surveillance case definition of fever and rash used by some countries and areas in the Western Pacific Region, such as Cambodia, resulting in very high and unmeaningful discarded case rates. When uniformly applied, such a surveillance case definition also results in a very large number of specimens being evaluated by the laboratory. The Australian delegation reminded participants that it had not complied with the RCC requirement to determine non-polio AFP rates and questioned how NVCs and the RVC would verify measles elimination in countries that could not calculate indicators of case-based measles surveillance performance. As with polio, it is likely that some flexibility will be needed and both NVCs and the RVC will need to consider complementary and/or alternative evidence of measles elimination.

The advantages and disadvantages of monthly versus weekly reporting frequency from countries and areas to the WHO Regional Office were discussed. The Philippines delegation explained that, internally, disease reporting is conducted weekly. The Japanese delegation noted that weekly reporting would not be feasible in view of internal constraints. The WHO Regional Office mentioned that it had requested the Philippines to report weekly during its outbreak of measles and that such requests could be made as needed for other countries and areas if and when large measles outbreaks occur.

2.3.2.5 Sustainability of measles elimination through sustainable national immunization programmes

Another component of the verification process, which was proposed for consideration by the Western Pacific Region, is an assessment of the sustainability of NIPs. Mechanisms that could be used to assess programme sustainability were presented by the Regions of the Americas, Europe and Eastern Mediterranean. The European Region, for example, proposed monitoring the following four components of programme sustainability:

1. programme development;
2. political priority and legal basis;
3. human, material, financial and operational resources; and
4. vaccination, monitoring and evaluation strategies.

Sources of information for NIP sustainability include JRF reports, comprehensive Multi-Year Plans for immunization (cMYPs), national EPI reviews, and other sources. It was noted that such a review of NIP sustainability also may be of value for programme reviews, assessing the feasibility of launching other EPI-related initiatives, strengthening health systems, and other purposes.

A question was raised as to whether one or more countries that met the indicators for vaccination coverage, disease incidence and disease surveillance but failed to show evidence that their NIPs were sustainable could prevent the RVC from verifying regional measles elimination. A number of participants mentioned that including evidence for the sustainability of NIPs is...
important to demonstrate the integrated nature of the measles elimination initiative and ensure that its achievements will be sustained in the long-term. Nevertheless, participants ultimately agreed that while useful, this was the least important of the five components for verification of measles elimination and should not be considered essential for verification.

2.3.2.6 Review of the process and five criteria and discussion

Dr Peter Strebel, Medical Officer, Immunization, Vaccines and Biologicals Division, WHO Headquarters, Geneva, was elected as Chair and moderator for the discussion session.

Before the discussion, the five proposed components of measles verification were contrasted with the components used to certify polio elimination. It was noted that certification of regional polio-free status included laboratory containment and environmental surveillance. Alternative evidence for certification of polio-free status was considered admissible from countries where polio had been non-endemic for many years and where high levels of sanitation and strong health systems existed.

In addition, summaries were presented of recent articles by Heath Kelly, et al. and Anita Heywood, et al. which questioned the need and ability of countries to satisfy potential indicators for verifying measles elimination, particularly related to surveillance performance. These issues are especially relevant for Australia and the Republic of Korea, whose surveillance systems are not structured in a manner that allows for reporting these indicators. In Australia, many believe that measles has been eliminated using alternative criteria, including evidence from mathematical models that suggest the measles reproductive number (R) has been <1 for several years. These models use three different methods of calculating the measles reproductive number: (1) proportion of cases identified as imported; (2) distribution of outbreak size; and (3) distribution of outbreak duration. It should be noted, however, that each of these three parameters depend on sensitive surveillance to provide the necessary data. Mathematical modelling to estimate the measles reproductive number was also used by the Republic of Korea in support of its claim of measles elimination in 2006; the Republic of Korea's deterministic compartmental model incorporated the SEIR methodology (susceptible - exposed - infectious - removed with immunity) for six different age groups assuming heterogeneous populations.

Finally, an article on evidence of measles elimination in the United States of America by Mark Papania, et al. was reviewed. According to the authors, evidence included: (1) no endemic virus - based on incidence, majority of cases imported and long periods without unknown source cases; (2) high population immunity - based on administrative coverage and serosurvey data; (3) adequate surveillance - based on the number of suspected cases with a laboratory test to be >1 per 100,000 population per year, epidemiologic characteristics of cases that were isolated or with very small size outbreaks, and source of infection determined for most cases to be imported; and (4) a low reproductive number (R<1) - based on short outbreak duration, small outbreak size, and the majority of cases imported or import-related.

The Chair led a participatory discussion regarding the final definition of the components that will be used to guide the verification of measles elimination in the Western Pacific Region. The meeting participants agreed that the RVC should be established in the near future. However, the need to establish NVCs before countries felt they were close to achieving measles elimination required further consideration. Experience from NCCs for polio eradication suggested that establishing NVCs sooner rather than later would support measles elimination efforts within the countries. It was also suggested that countries should consider establishing expert review committees to objectively classify measles cases as was done for polio eradication.
The importance of both the RVC and NVCs was emphasized, and lessons learnt from polio eradication NCCs included the important advocacy and technical roles of NCCs in moving polio eradication forward. Countries that believe they have been free of endemic measles for at least one year should be invited to submit their accumulated evidence for elimination as soon as the RVC is in place. Thereafter, those countries would continue to submit annual update reports. Participants agreed on the importance of establishing NVCs whose members can demonstrate a significant degree of objectivity and independence from operational and managerial responsibility for their respective NIPs.

Among the many criteria that could be used to verify measles elimination, a set of proposed criteria was reviewed in detail:

1. absence of endemic measles virus
   (a) genotype analysis
   (b) percentage of cases imported and import-related
   (c) very low incidence of unknown cases (excluding clinically confirmed cases)

2. good surveillance
   (a) suspected or discarded rate (national and subnational)
   (b) specimen collection rate
   (c) percentage of clinically confirmed cases
   (d) low reproduction numbers (R) (derived from outbreak size, outbreak duration, or proportion of imported cases)

3. high population immunity
   (a) vaccination coverage (administrative & survey)
   (b) seroprevalence surveys.

After discussion, a series of core and complementary indicators for each of the verification components was proposed (Annex 3).

2.4 Accelerating rubella control and CRS prevention

Dr Makoto Takeda, Director of Virology, National Institute of Infectious Diseases, Tokyo, Japan, was elected Chair for these sessions.

2.4.1 Using measles elimination to accelerate rubella control

The rationale and potential opportunities to use measles elimination strategies and infrastructure to accelerate rubella control and CRS prevention were emphasized.

Both measles and rubella are viral human diseases spread through the respiratory tract, with similar clinical presentations of fever and maculopapular rash. Case-based measles surveillance systems, which exist in all countries and areas of the Western Pacific Region, are used to identify rubella cases. Serologic specimens that are IgM negative for measles are
routinely tested for rubella IgM. In some case-based measles surveillance systems, over 30% of the suspected measles cases reported are found to be rubella.

Vaccines available are monovalent rubella, combined measles and rubella (MR) and measles, mumps and rubella (MMR). Currently, the UNICEF global price for measles vaccine is about US$ 0.22 per dose, whereas MR vaccine costs about US$ 0.53 per dose. One manufacturer in India is currently offering MR vaccine for the same price as monovalent measles vaccine. Measles vaccine used in routine vaccination or SIAs can be substituted with MR vaccine. Sustained use of rubella-containing vaccine (RCV) among young children, as in combination with measles vaccine, will likely result in a shift in the mean age of the remaining rubella cases upward into the teens and 20s after 10 to 15 years of vaccine use. However, if rubella vaccine coverage is high, the risk of acquiring rubella is reduced in these older age groups. Alternatively, if rubella vaccination coverage is low, incidence of rubella in these older age groups could increase and with it the risk of CRS. Vaccination of childbearing-age women (CBAW) would ameliorate this potential risk.

In light of the proven efficacy and safety of the RA 27/3 rubella vaccine, WHO recommends its use in all countries where control or elimination of rubella and CRS is considered a public health priority. Current efforts in global measles control and regional measles elimination may be used as opportunities to pursue control of rubella through the use of MR and MMR vaccines instead of monovalent measles vaccine.

Two WHO regions have established joint measles and rubella elimination goals. In the Western Pacific Region, the 2003 Regional Committee resolution that established the twin goals of measles elimination and hepatitis B control also urged Member States to use these initiatives to prevent CRS. Integration of measles and rubella elimination/control activities will provide opportunities for increased programme efficacy, including use of integrated surveillance and combined vaccine strategies.

2.4.2 Use CRS surveillance to monitor the impact of vaccination programme

The goal of rubella vaccination is to prevent congenital rubella infection (CRI) that results in fetal death and CRS. Among pregnant women infected with rubella virus during the first 10 weeks of pregnancy, 90% will result in CRS. Rubella infection may have a subclinical presentation. As many as 50% of mothers that give birth to infants with CRS are unaware they had rubella during pregnancy. The rationale for establishing CRS surveillance is to measure the impact of vaccination with rubella-containing vaccine. There are two entry points for CRS surveillance: (1) using pregnancy registries for women with known rubella exposure, and (2) surveillance for congenital abnormalities consistent with CRS.

Examples of evolving strategies for rubella control in Singapore and the English-speaking Caribbean were presented. Singapore experienced a community-wide rubella outbreak in 1969, which resulted in a subsequent CRS incidence of 8.5 cases per 100 000 deliveries; 40%-50% of CBAW remained susceptible to rubella after the outbreak. Singapore took a stepwise approach to control rubella and prevent CRS. Beginning in 1976, monovalent rubella vaccine was provided only to 11- and 12-year-old girls graduating from primary school; from 1982 to 1998, 11- and 12-year-old boys graduating from primary school as well as military recruits were also targeted. MMR vaccine was later provided to 1- and 6-year-old children as the dose provided at 11 and 12 years was phased out in 1998. As a result, the incidence of rubella decreased significantly from the peak of 13.3 cases per 100 000 population in 1996 to 1.8 per 100 000 in 2007, and CRS has virtually disappeared.
In 1996, a prototype surveillance system for CRS was implemented in the English-speaking Caribbean. In 1998, the Pan American Health Organization (PAHO) convened a working group that reviewed and refined the existing rubella and CRS surveillance guidelines. During the period between 1997 and 2004 (week 42), 18% of 187 suspected CRS cases were laboratory confirmed as CRS. Between 1996 and 2004 (week 42), a total of 43 confirmed CRS cases were reported from seven countries. The last confirmed case of CRS was reported in 1999.

In 1969, the United States of America established a CRS surveillance system using passive reporting from state and local health departments. In the 1999s, the case definition for confirmed CRS was modified to include single birth defects such as congenital deafness. CRS cases are ultimately classified as suspected, probable, confirmed or infection only. Incidence of rubella in the United States of America has fallen from about 27 per 100 000 population when surveillance began in 1969 to <1 per 100 000 population since 1983 and <1 per million population since 2000; CRS incidence decreased from nearly 1.5 per 100 000 live births to <1 per 100 000 since 1980.

2.4.3 Status of rubella control in the Western Pacific Region

The current status of rubella control and CRS prevention in the Western Pacific Region was presented. Before the use of rubella vaccines, rubella infection was virtually universal, with epidemics occurring periodically. The age distribution of rubella cases varies between epidemic and inter-epidemic years, corresponding to similar variability in CRS incidence, from 1–4 per 1000 live births following epidemic years to 0.1–0.2 per 1000 live births during inter-epidemic years. In the Western Pacific Region, rubella cases have been identified increasingly because of improved case-based measles surveillance in countries and areas. The greatest number of rubella cases are reported from China.

In 2009, 34% of rubella cases among females occurred in women of childbearing age (15–44 years old). In Viet Nam, 55% of rubella cases among females occurred in CBAW; in Cambodia, 36% of rubella cases among females occurred in CBAW. In the Philippines, CBAW accounted for <25% of rubella cases.

The burden of CRS in the Western Pacific Region is underreported and under-recognized. A study in 1996 by Cutts et al. estimated a mean of 12 600 CRS cases (range of 1500–21 400 cases) likely occur in the Western Pacific Region annually. However, no CRS case was reported that year through the WHO/UNICEF JRF officially submitted by countries; only 27 CRS cases were reported from seven countries from 2000 to 2009.

Countries and areas in the Western Pacific Region use different rubella vaccination strategies. Thirty countries and areas have incorporated RCV into their routine immunization schedules; some have also included selective vaccination targeting young adolescent and susceptible adult females and incorporation of RCV into SIAs.

Countries and areas in the Western Pacific Region can be categorized according to the age groups of females and males likely to be protected against rubella, based on the introduction and scale of different RCV immunization strategies:

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(1) Sixteen countries and areas with long-standing RCV immunization programmes have likely protected males and females up to at least 20 years of age as of 2010 (Hong Kong [China], Macao [China], New Zealand, Republic of Korea, Singapore and 11 Pacific island countries).

(2) Four or five countries with an early history of selective vaccination programmes for females have protected females but not males up to at least 20 years of age as of 2010 (Australia, Japan, Cook Islands, Fiji and possibly Brunei Darussalam).

(3) Four Pacific island countries and areas are believed to have introduced RCV more than 10 years ago and protected both female and male birth cohorts up to at least 15 years but under 20 years of age as of 2010 (French Polynesia, New Caledonia, Niue, and Wallis and Futuna).

(4) Five countries and areas have introduced RCV more recently, and protected birth cohorts have not yet reached childbearing age (i.e. age 15 years) as of 2010. Tokelau introduced MR vaccine in 1998 (for 12- and 15-month-olds) and has likely protected children up to 12 years old. Nauru introduced MR vaccine for 12- and 15-month-old children in 2006, and has likely protected children up to 4 years old. Mongolia introduced MMR vaccine for 9- and 24-month-old children in 2009, thereby protecting children up to 3 years old. China introduced RCV in 2008, but has only recently been able to scale up vaccine production to cover the entire country such that children up to 2 years are likely to be protected. The Philippines began a phased introduction of MMR vaccine for 12-month-old children in 2009; only 1-year-old children are likely to be protected as of 2010.

(5) Six countries have not yet incorporated RCV into their routine immunization programmes (Cambodia, the Lao People's Democratic Republic, Papua New Guinea, Solomon Islands, Vanuatu and Viet Nam). Among these, routine MCV1 coverage in Cambodia and Viet Nam is sufficiently high (≥ 80%) to justify inclusion of RCV into the routine schedule.

The above categorization of countries and areas in the Western Pacific Region is helpful to customize immunization strategies that could be used to accelerate rubella control. During the discussion, it was noted that as China had only scaled up production of RCV to meet the national demand very recently, it should be considered as a category 4 country.

2.4.4 Plan for accelerating rubella control in Western Pacific Region

Rubella and CRS are endemic in countries that have not yet or have recently introduced RCV. Bundled MR vaccine, at US$ 0.65 per child, is relatively cheap and cost effective. Surveillance for rubella is being conducted in most countries and areas of the Region as a component of case-based measles surveillance. Incorporating RCV into measles SIAs is a simple and cost-effective way to rapidly increase population immunity against rubella. The 2003 Regional Committee resolution on measles elimination also called on Member States to use measles elimination to prevent congenital rubella syndrome. In light of these facts, in 2009 the TAG recommended the following:

(1) Countries and areas should plan to decrease rubella incidence to <10 cases per million population and CRS incidence to <10 cases per million live births by utilizing measles elimination to accelerate rubella control and CRS prevention activities. To maximize opportunities to utilize measles elimination activities, Member States should plan to achieve this level of rubella control and CRS prevention by 2015.
(2) Countries may employ a combination of routine and supplementary immunization strategies to achieve accelerated rubella control and CRS prevention.

(3) Childbearing-age women should be targeted with RCV at suitable opportunities (e.g. postpartum, when bringing children for vaccination or well-baby examinations, before marriage) to help reduce the risk of rubella infection in pregnant women and thus CRS. However, EPI staff should be reminded that such strategies alone will not substantially reduce rubella transmission or protect women before their first pregnancy.

(4) Countries with MCV coverage of >80% that have not introduced RCV into the routine immunization programme are encouraged to do so. Countries with MCV coverage <80% may require special efforts to achieve and maintain high RCV coverage through periodic SIAs using MR vaccine.

(5) Where feasible, countries that are conducting measles SIAs should use the opportunity to use RCV with measles vaccine (e.g. MR).

(6) All countries should maintain high-quality case-based MR surveillance; in addition, sentinel CRS surveillance should be established to monitor trends in CRS incidence and programme impact.

(7) The WHO Regional Office for the Western Pacific, in consultation with Member States and partners, should finalize the Strategic Plan of Action for Accelerated Rubella Control and Prevention of CRS. Countries and areas may then formulate national plans of action laying out the strategies and activities required to achieve accelerated rubella control and CRS prevention.

A proposed draft regional plan for accelerating rubella control and CRS prevention, incorporating the above TAG recommendations, was presented.

Referring to the above grouping of countries under section of 2.4.2, the particular immunization approaches to accelerating rubella control were proposed as follows:

(1) For the 21 countries and areas under categories 1 and 2, proposed strategies included maintaining high routine RCV coverage and monitoring susceptibility status.

(2) For the four countries under category 3, susceptible age groups (both females and males up to at least 19 years) may be vaccinated through SIAs or routine adolescent programmes with a coverage target of 90%.

(3) Among the 11 countries under categories 4 and 5, SIAs may target appropriate age groups in those countries that have a rubella control goal such that both male and female birth cohorts up to at least 20 years of age are protected.

(4) Cross-cutting approaches for most countries and areas include further strengthening of measles-rubella surveillance, establishing or improving CRS surveillance, selective vaccination for CBAW who have not already received RCV, and access to an accredited laboratory.

It was proposed that the RVC and NVCs should monitor progress towards both measles elimination and rubella control in an integrated fashion. It was noted that most countries in the Western Pacific Region have not prepared a plan of action for rubella control, but have piggy-backed rubella activities onto measles elimination.
The preliminary budget for the combined measles-rubella initiative has been casted at US$ 92.5 million for the period 2010-2015, of which US$ 31.6 million is for measles elimination alone. However, funding sources for accelerating rubella control have not been identified at this time. Some participants (e.g. China) expressed concern that, due to stiff competition for scarce resources, it may be extremely difficult to convince ministry-level decision-makers to support and finance the implementation of broad target-age SIAs to achieve high population immunity against rubella, especially among adolescents and young adults. The delegation from Viet Nam noted that although measles vaccine is produced domestically, RCV is not; as such, the Government would have to procure RCV on the international market at considerable expense. It was proposed that the WHO Regional Office for the Western Pacific might continue to develop its strategic plan with aspirational goals and targets, and to develop operational guidelines, but exhibit flexibility in the achievement of these operational targets in recognition of the funding and logistical constraints that some countries face.

2.5 The way forward

Recommendations from this consultation may be referred to the TAG for endorsement at its next meeting in August 2010. The TAG may request the Regional Director to seek endorsement by the Regional Committee at the sixty-first session in October 2010. The Regional Committee may seek renewed commitments from Member States to achieve regional measles elimination by 2012. The Regional Committee may propose that an RVC should be established in 2011 and that NVCs should be created in countries and areas. Furthermore, the Regional Committee may encourage countries to use measles elimination activities to accelerate rubella control and CRS prevention.

Assuming a Regional Committee resolution is forthcoming, the Regional Director may nominate the RVC Chair and members by January 2011. At its first meeting, possibly in March 2011, the RVC should establish terms of reference for itself and for NVCs, and agree upon the verification process, criteria and indicators for verifying measles elimination. In countries where endemic measles cases have been absent for ≥12 months and that consider themselves ready to initiate the verification process, NVCs may prepare documentation on measles elimination for submission to the RVC by September 2011. The RVC will review verification documentation and provide feedback to countries. The RVC may propose field visits, if required, to collect additional information or clarify inconsistencies in the documentation.

During 2012 or beyond, those remaining countries that have not yet initiated the verification process should prepare documentation on measles elimination for submission to the RVC. At a subsequent meeting, the RVC will review verification requests and provide feedback to countries. Again, the RVC may propose field visits, if required, to collect additional information or clarify inconsistencies in the documentation. Given the three-year requirement for measles-free status for regional verification, measles elimination from the Western Pacific Region will not be verified at least until 2015.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Verification

3.1.1 Guiding principles, structure and function
During the course of the consultation, a number of important issues were discussed and resolved. In particular, the principle of independence for RVC members was reaffirmed, that is, RVC members should have no managerial or operational responsibility for NIPs. In exceptional cases, the requirement for absolute independence of some NVC members from the NIP may be waived.

Verification will be carried out both for individual countries and for the Region as a whole. NVCs may submit evidence of national elimination when they believe their respective countries or areas have achieved absence of endemic measles virus circulation for at least 12 months. However, regional elimination would require an absence of endemic measles cases throughout the Region for at least 36 months. NVCs in countries and areas that are verified as measles-free will be required to provide annual update reports.

3.1.2 Components of verification

The consultation participants agreed that the Western Pacific Region will define the five components of the verification criteria for measles elimination in the following manner:

(1) high population immunity in birth cohorts at least since MCV introduction;
(2) incidence and epidemiologic analysis as far back as possible;
(3) virologic analysis in as many chains of measles transmission as possible;
(4) high-quality epidemiologic surveillance using a defined set of indicators and targets; and
(5) sustainability of measles elimination in the context of NIP functions and that is included in a cMYP or equivalent.

The consultation participants further agreed to utilize current WHO definitions of: measles elimination; endemic measles transmission; re-established endemic measles transmission; and categories of source classification (import, import-related, endemic, unknown).

However, as some countries have used "reduction of incidence to <1 per million population" as an operational definition of measles elimination, it was agreed that countries may monitor progress towards measles elimination using this indicator, but that verification will depend on demonstration of the absence of endemic measles cases.

Furthermore, a series of core and complementary indicators for each of the verification components was proposed (Annex 3). These indicators could form the basis for the documentation that NVCs will be required to prepare for submission to the RVC. However, it was also agreed that discretionary consideration will be given to countries unable to provide data satisfying the core and/or complementary indicators so that alternative yet comprehensive evidence of measles elimination may be admissible for verification purposes.

3.2 Accelerating rubella control and CRS prevention

It was agreed that, in accordance with TAG recommendations, targets for rubella control and CRS prevention will be operationally established as "reduction of rubella incidence to ≤ 10 per million population" and "reduction of CRS incidence to ≤ 10 per million live births". Moreover, it was agreed that rubella control and CRS prevention should be accelerated in the context of national rubella control goals and plans by incorporating RCV into planned measles
SIAs, improving reporting of suspected rubella cases, evaluating measles IgM-negative specimens for rubella IgM, and developing and/or expanding CRS surveillance. Wide-age-range SIAs using MR vaccine against rubella in countries with rubella control plans will have an added benefit in the elimination of measles, but will require additional RCV manufacturing capacity in some countries such as Viet Nam and China and additional internal and external resources for all priority countries. In view of these constraints, it was not considered appropriate to set a firm target date for the achievement of regional rubella control and CRS prevention at this stage, but, to maximize opportunities to utilize measles elimination activities, Member States should plan to control rubella and prevent CRS with an aspirational target of 2015, as recommended by the TAG in 2009.

3.3 Way forward

Recommendations from this consultation may be referred to the TAG for endorsement at its next meeting in August 2010. The TAG may request the Regional Director to seek endorsement by the Regional Committee at the sixty-first session in October 2010. The Regional Committee will seek renewed commitments from Member States to achieve regional measles elimination by 2012. The Regional Committee may propose that the RVC should be established in 2011 and that NVCs should be established in countries and areas. The Regional Committee also may encourage countries to use measles elimination activities to accelerate rubella control and CRS prevention.
### ANNOTATED AGENDA

**15 June 2010**  
**Tuesday**

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenters</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-0830</td>
<td>Registration</td>
<td>G-staff</td>
</tr>
<tr>
<td>0830-0845</td>
<td>1. Opening</td>
<td>Regional Director</td>
</tr>
<tr>
<td>0900-0915</td>
<td>2. History of regional measles elimination and status of global measles eradication</td>
<td>Dr Peter Strebel</td>
</tr>
<tr>
<td>0915-0930</td>
<td>3. Global measles genotype distribution and evidence for importation</td>
<td>Dr Paul Rota <em>(by teleconference)</em></td>
</tr>
<tr>
<td>0930-1000</td>
<td>4. Status of measles elimination in the Western Pacific Region and rationale for verification</td>
<td>Dr David Sniadack</td>
</tr>
<tr>
<td>1000-1030</td>
<td><strong>Coffee break</strong></td>
<td></td>
</tr>
<tr>
<td>1030-1130</td>
<td>5. Process and indicators for measles elimination in the Regional Office for Europe (EURO), the Regional Office for the Americas (AMRO/PAHO) and the Regional Office for the Eastern Mediterranean (EMRO)</td>
<td>Dr Robin Biellik</td>
</tr>
<tr>
<td>1130-1200</td>
<td>6. Process and criteria for Regional Certification of Polio Eradication in the Western Pacific Region</td>
<td>Dr Sigrun Roesel</td>
</tr>
<tr>
<td>1200-1300</td>
<td><strong>Lunch break</strong></td>
<td></td>
</tr>
<tr>
<td>1300-1330</td>
<td>7. Experience of the Subregional Committee for Certification of Poliomyelitis Eradication in Pacific Island Countries and Areas</td>
<td>Dr Lisi Tikoduadua</td>
</tr>
<tr>
<td>1330-1430</td>
<td>8. Structure and function of regional and national verification committees</td>
<td>Dr Wang Xiaojun</td>
</tr>
<tr>
<td>1430-1500</td>
<td>9. Review of proposed criterion #1: Population immunity</td>
<td>Dr Jorge Mendoza-Aldana</td>
</tr>
<tr>
<td>1500-1530</td>
<td><strong>Coffee break</strong></td>
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<tr>
<td>1530-1615</td>
<td>10. Review of proposed criterion #2: Epidemiologic analysis</td>
<td>Dr David Sniadack</td>
</tr>
<tr>
<td>1615-1700</td>
<td>11. Review of proposed criterion #3: Laboratory surveillance and molecular epidemiology</td>
<td>Dr Youngmee Jee</td>
</tr>
<tr>
<td>Time</td>
<td>Activity</td>
<td>Presenter</td>
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<tr>
<td>0830-0930</td>
<td>Review of proposed criterion #4: Surveillance quality</td>
<td>Dr David Sniadack</td>
</tr>
<tr>
<td>0930-1015</td>
<td>Review of proposed criterion #5: Sustainability of National Immunization Programmes</td>
<td>Dr Yoshihiro Takashima</td>
</tr>
<tr>
<td>1015-1045</td>
<td><strong>Coffee break</strong></td>
<td></td>
</tr>
<tr>
<td>1045-1200</td>
<td>Review of the five criteria and discussion</td>
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<tr>
<td>1200-1300</td>
<td><strong>Lunch break</strong></td>
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</tr>
<tr>
<td>1300-1400</td>
<td>Summary of process and criteria for measles elimination in the Western Pacific Region</td>
<td>Dr Robin Biellik</td>
</tr>
<tr>
<td>1400-1415</td>
<td>Using measles elimination to Accelerate Rubella Control</td>
<td>Dr Susan Reef</td>
</tr>
<tr>
<td>1415-1430</td>
<td>Status of rubella control in the Western Pacific Region</td>
<td>Dr Wang Xiaojun</td>
</tr>
<tr>
<td>1430-1500</td>
<td>Review of Regional Plan of Action to accelerate rubella control</td>
<td>Dr David Sniadack</td>
</tr>
<tr>
<td>1500-1530</td>
<td><strong>Coffee break</strong></td>
<td></td>
</tr>
<tr>
<td>1530-1600</td>
<td>Discussion on accelerated rubella control in the Western Pacific Region</td>
<td></td>
</tr>
<tr>
<td>1600-1630</td>
<td>Way forward – time frame and responsibilities</td>
<td></td>
</tr>
<tr>
<td>1630-1700</td>
<td>Closing</td>
<td>Regional Director</td>
</tr>
</tbody>
</table>
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Annex 3: Priority indicators for components of the verification process for measles elimination in WPR

1. Population immunity

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Core</th>
<th>Complementary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrative MCV1 coverage, national and by district</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Administrative MCV2 coverage, national and by district</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>SIAs vaccination coverage</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Sero-survey data, DHS, MICs, etc.</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Measles reproductive number</td>
<td></td>
<td>✓</td>
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</table>

2. Incidence and epidemiologic surveillance

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Core</th>
<th>Complementary</th>
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<tbody>
<tr>
<td>Zero incidence of lab-confirmed or epidemiologically-linked endemic measles</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Incidence of lab confirmed or epidemiologically linked measles of unknown source &lt;1 per million</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Genotype analysis</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Discarded measles detection rate at national level</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Discarded measles detection rate at sub-national level</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>% cases with &quot;adequate investigation&quot;</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>% cases with &quot;adequate specimens&quot; collected</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>% clinically confirmed cases</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>% cases imported or import-related (may be used to calculate R)</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

3. Laboratory performance

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Core</th>
<th>Complementary</th>
</tr>
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<tbody>
<tr>
<td>100% labs WHO-accredited</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>80% cases tested in accredited lab</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>80% outbreaks with virologic analysis</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>100% concurrence of lab-confirmed cases between surveillance and lab units</td>
<td></td>
<td>✓</td>
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</table>
### ANNEX 3

<table>
<thead>
<tr>
<th>Testing archival specimens</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sharing genotype data with WPRO and WHO HQ within 2 months</td>
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4. Sustainability of the National Immunization Program

<table>
<thead>
<tr>
<th>Criterion</th>
<th>Core</th>
<th>Complementary</th>
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</thead>
<tbody>
<tr>
<td>Sustainability of measles elimination in the context of NIP sustainability and that is included in a cMYP or equivalent</td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>