

CONSULTATION ON REGIONAL MEASLES AND RUBELLA ELIMINATION IN THE WESTERN PACIFIC



19–21 April 2017
Manila, Philippines



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WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR THE WESTERN PACIFIC

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MEETING REPORT

**CONSULTATION ON REGIONAL MEASLES AND RUBELLA
ELIMINATION IN THE WESTERN PACIFIC**

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NOTE

The views expressed in this report are those of the participants of the Consultation on Regional Measles and Rubella Elimination in the Western Pacific and do not necessarily reflect the policies of the conveners.

This report has been prepared by the World Health Organization Regional Office for the Western Pacific for Member States in the Region and for those who participated in the Consultation on Regional Measles and Rubella Elimination in the Western Pacific in Manila, Philippines from 19 to 21 April 2017.

ABBREVIATIONS

China CDC	Chinese Center for Disease Control and Prevention
CRS	congenital rubella syndrome
EPI	Expanded Programme on Immunization
IEC	information, education and communication
IgM	immunoglobulin M
MCV	measles-containing vaccine
MMR	measles–mumps–rubella
MR	measles–rubella
MRCV	measles–rubella containing vaccine
NVC	national verification committee
RCV	rubella-containing vaccine
RVC	Regional Verification Commission
SIA	supplementary immunization activity
SRVC	Subregional Verification Committee
TAG	Technical Advisory Group on Immunization and Vaccine-Preventable Diseases in the Western Pacific Region
VIDRL	Victorian Infectious Diseases Reference Laboratory

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Keywords:

Measles – prevention and control / Rubella – prevention and control / Disease eradication

SUMMARY

The Consultation on Regional Measles and Rubella Elimination in the Western Pacific was held on 19–21 April 2017 in Manila, Philippines. The Consultation was attended by 27 participants from 17 countries and areas; chairpersons from the Technical Advisory Group on Immunization and Vaccine-Preventable Diseases in the Western Pacific Region (TAG), Regional Verification Commission for Measles Elimination in the Western Pacific and Subregional Committee for the Verification of Measles Elimination in Pacific island countries and areas; 4 representatives of partner organizations; and 10 World Health Organization (WHO) staff members from the Regional Office for the Americas, Regional Office for Europe and Regional Office for the Western Pacific.

The participants discussed progress towards achieving measles and rubella elimination since the establishment of the measles elimination target date for the Western Pacific Region in 2005, the recent resurgence in measles in 2013–2016, as well as the challenges, issues and lessons learnt by countries and areas. Participants discussed the unrecognized burden of congenital rubella syndrome (CRS) in the Western Pacific Region due to rubella infection in pregnant women. Participants discussed in detail the strategies proposed in the draft regional strategy and plan of action for measles and rubella elimination. Finally, participants discussed possible target dates for regional rubella elimination.

The Consultation concluded that all countries and areas in the Western Pacific should act urgently to address the disease burden due to CRS by enhancing efforts to achieve progress towards rubella elimination. It was concluded that it is critical to establish the earliest achievable regional target year for rubella elimination as soon as possible to enhance the commitment of Member States and partners to rubella elimination in the Region. Acknowledging the target date of 2020 recommended by the TAG and set by the Global Vaccine Action Plan, the Consultation concluded that while many countries can achieve rubella elimination by 2020, some countries with particular challenges such as large and diverse populations will require a phased approach and need a slightly longer period to interrupt endemic rubella virus transmission.

The Consultation recommended that all countries and areas in the Western Pacific Region further collaborate and coordinate with other Member States, WHO and partners in achieving and sustaining measles elimination in the Region. A further recommendation was for all countries and areas in the Region to set a regional target year for rubella elimination as soon as possible to urgently address immunity gaps among current adolescents and young adults while they can be reached for immunization, as well as to benefit from increased political commitment, coordinated efforts between government sectors, and mobilization of resources by governments and partners. Finally, the Consultation also recommended that the TAG consider proposing a regional target year for rubella elimination in the Western Pacific between 2022 and 2024 to be discussed with national immunization programmes in the 26th TAG meeting in June 2017 to determine the final proposed target year.

1. INTRODUCTION

1.1 Meeting organization

The Consultation on Regional Measles and Rubella Elimination in the Western Pacific was held on 19–21 April 2017 in Manila, Philippines. It was attended by 27 participants from 17 countries and areas; chairpersons from the Technical Advisory Group on Immunization and Vaccine-Preventable Diseases in the Western Pacific Region (TAG), Regional Verification Commission (RVC) and Subregional Verification Committee (SRVC); 4 representatives of partner organizations; and 10 World Health Organization (WHO) staff members from the Regional Office of the Americas, Regional Office for Europe and Regional Office for the Western Pacific. The list of participants and meeting programme are included in Annex 1 and Annex 2, respectively.

1.2 Meeting objectives

The objectives of the Consultation were:

- 1) to review and discuss progress, current status and issues on measles and rubella elimination in the Western Pacific Region;
- 2) to discuss a target year for regional rubella elimination in the Western Pacific to be proposed to the TAG in its 26th meeting in June 2017; and
- 3) to review, discuss and finalize the draft *Measles and Rubella Elimination in the Western Pacific: Regional Strategy and Plan of Action* for submission to the sixty-eighth session of the WHO Regional Committee for the Western Pacific in October 2017.

2. PROCEEDINGS

2.1 Opening session

Dr Sergey Diorditsa, then Acting Director, Division of Communicable Diseases, WHO Regional Office for the Western Pacific, welcomed participants and commended Member States for their efforts towards achieving measles and rubella elimination in the Western Pacific. In 2012, the Region achieved historically low measles incidence. In 2013–2016, however, the Western Pacific experienced a Region-wide measles resurgence. Dr Diorditsa encouraged the Consultation to come up with conclusions and recommendations for further progress towards the regional elimination of measles and rubella as well as proposals for consideration by the Regional Committee.

2.2 Achievements: Measles elimination and strengthening the Expanded Programme on Immunization

2.2.1 Experiences in the Region of the Americas

The measles elimination initiative in the Region of the Americas benefited from high political will and country ownership; so-called Pan-Americanism, which created a unified sense of purpose; the concept of vaccination as a public good; and the application of standardized elimination strategies throughout the Americas. In addition, measles and rubella strategies were aligned, through the use of catch-up, keep-up and follow-up campaigns using measles–rubella (MR) vaccine and integrated surveillance for measles and rubella. As a result, measles was eliminated in 2002 and rubella in 2009. The *Plan of Action for the Documentation and Verification of Measles, Rubella, and Congenital Rubella Syndrome Elimination in the Region of the Americas* was endorsed by the TAG in 2011. The

International Expert Committee for Measles and Rubella Elimination in the Americas declared rubella eliminated in 2015 and measles in 2016. Measles elimination strengthened routine immunization by leading to increased sustainability of immunization services through increased visibility of the Expanded Programme on Immunization (EPI); investment in human resources and operational activities; increased vaccination coverage; equitable investments in all countries through the Pan-American effort; and the promotion of integrated health interventions to reach marginalized populations, including nutrition and other vaccines. All components of the routine system have been strengthened through investments in the elimination campaign.

Some challenges remain. High coverage of the two-dose measles–mumps–rubella vaccine (MMR2) is still a challenge in some countries, where follow-up campaigns are required every 4–5 years. Outbreaks occur frequently due to importation of measles; however, outbreak response has been consistent with few exceptions and the WHO Regional Office for the Americas is developing new outbreak response guidelines. Further, competing priorities such as Zika have created the need to develop coordinated responses.

2.2.2 Experiences in the European Region

The 2015 target year for measles and rubella elimination in the European Region was not met. There have been large measles outbreaks in several countries in recent years, including an ongoing outbreak in Romania. In 2016, there were over 5000 measles cases reported in 33 out of 53 Member States, with 82% of reported cases from Romania, Italy, the United Kingdom of Great Britain and Northern Ireland, and Germany and affecting a wide range of age groups. Most cases were due to non-vaccination or under-vaccination. Measles epidemiology varies greatly between countries and settings. There are multiple susceptible populations, including mobile populations and religious groups. In addition, health-care workers and schools are also a source of outbreak propagation in some countries. Almost all countries in the Region use MMR vaccine for two-dose coverage.

Europe has four main challenges to achieving measles and rubella elimination: (1) closing immunity gaps, particularly given the large subnational variability in coverage and general resistance to large immunization campaigns in most countries; (2) establishing high-quality surveillance (currently the rate of reporting of suspected cases is low; the laboratory testing rate is suboptimal; genotyping, especially rubella, is insufficient; and national operating procedures for epidemiological and laboratory investigation are lacking); (3) maintaining high-quality surveillance; and (4) improving knowledge and training.

2.2.3 Experiences in the Western Pacific Region

The Western Pacific Region did not meet the 2012 target date for measles elimination. However, the investments in routine and supplementary immunization activities, surveillance, and outbreak response by the measles elimination initiative led to a significant decline in cases to the historically lowest level of transmission in 2012. Measles elimination verification was achieved by six countries and two areas in the Region. However, regional resurgence of measles occurred in 2013–2016, when multiple countries experienced nationwide outbreaks or re-established endemic measles transmission. In addition, there was an observed shift in epidemiology, with changes in the age distribution and circulating genotypes. Similar setbacks were experienced in the Region of the Americas on the pathway to elimination; the Western Pacific Region has the challenge of implementing a contingency process to adjust strategies in response to the issues revealed by this resurgence. A redoubled effort to achieve measles elimination is needed, or there will continue to be large occasional outbreaks

affecting older adults and infants who are too young to be vaccinated, with increasing case fatality due to the increased incidence among these high-risk groups. This will require confronting the challenge of maintaining will among the communities, governments and public health agencies, as well as strengthening programme management.

2.3. Issues, lessons learnt and proposed strategies towards regional measles elimination in the Western Pacific

2.3.1 Regional measles resurgence in the Western Pacific in 2013–2016

After experiencing a period of historically low measles incidence in the Region in 2012, coinciding with the target date for measles elimination, the Western Pacific experienced a resurgence of measles transmission in 2013–2016. This resurgence revealed new epidemiological challenges to measles elimination: first, the population immunity gap has shifted to adolescents and young adults who are not targeted by existing immunization strategies; and second, significant geographic diversity exists in the age distribution of susceptible individuals within countries with large populations. In addition, challenges related to programme capacity or preparedness have been revealed, including: epidemiological surveillance; laboratory support; outbreak preparedness and response; and partnership and collaboration.

In response to recommendations of the June 2015 TAG meeting, to address and overcome the issues and emerging challenges identified in the Region as well as to accelerate achievement of and promote the sustainability of both measles and rubella elimination in the Western Pacific, a draft of the regional strategy and plan of action for measles and rubella elimination has been prepared. The new regional strategic document proposes 31 strategies organized within eight strategic areas: (1) overall planning and immunization system; (2) immunization; (3) epidemiological surveillance; (4) laboratory support; (5) programme review and risk assessment; (6) outbreak preparedness and response; (7) partnership, advocacy, information, education and communication (IEC), and social mobilization; and (8) progress monitoring and verification of elimination.

2.3.2 Lessons learnt from Japan

Planning, coordination, implementation and monitoring by subnational committees; involvement of other sectors and communities

During a nationwide outbreak of measles in 2006–2008, Japan developed the Special Guidance for Measles, which included a plan to achieve measles elimination by 2012, with verification by 2015. Nationwide strategies were introduced. These included strengthening of outbreak response and laboratory testing, and implementing a catch-up campaign for older children through yearly immunization for those aged 13 and 18 years from 2008 to 2012. The plan also established in each prefecture a local government Measles Elimination Committee that was responsible for microplanning and social mobilization through engagement of medical associations, paediatric societies and celebrities. This approach successfully closed the immunity gap among older children in all 47 prefectures. This was confirmed by comparing serological surveys in 2007 and 2015. The RVC verified measles elimination in Japan in 2015.

2.3.3 Lessons learnt from Malaysia

Measles outbreaks in 2010–2013 and 2015–2016; new routine vaccination schedule for accelerating progress towards measles elimination

The measles elimination initiative in Malaysia resulted in a significant decrease in measles incidence in 1980–2010. Routine measles-containing vaccine (MCV) was given at 9–12 months (MCV1) and at 7 years (MCV2). However, outbreaks occurred in 2010–2013 and 2015–2016 that predominantly affected children below the age of 7 years, in particular infants below the age of 1 year. In response, the routine immunization schedule was changed in 2016 to give MCV1 at 9 months (measles–mumps–rubella, or MMR), and MCV2 at 12 months (MMR), with continuation of the previous MCV dose at 7 years of age (measles–rubella, or MR) planned until 2023. In addition, a nationwide targeted MR supplementary immunization activity (SIA) was planned for 2017.

2.3.4 Proposed strategies for overall planning and immunization system strengthening

Resurgence of endemic measles and large outbreaks have occurred in countries with high reported MCV coverage at the national level for several years. In addition, the epidemiology of measles in recent outbreaks has shifted to include increased incidence among infants who are too young to be vaccinated and adults who are not targeted by current strategies. Likewise, the epidemiology of rubella has shifted to older populations, especially young adults, which is particularly concerning because of the high risk for congenital rubella syndrome (CRS) after infection in women of childbearing age. Although rubella elimination was set as a goal by the Regional Committee for the Western Pacific and several countries have introduced rubella-containing vaccine (RCV), many countries have not yet developed a national strategy for rubella elimination or set a target date. Four strategies are proposed: (1) update national strategies and plans of action for measles and rubella elimination in all countries and areas; (2) develop subnational plans and strategies for measles and rubella elimination in countries with large populations; (3) establish and sustain supply systems and practices strong enough for measles and rubella elimination activities; and (4) further improve immunization practices, for example practices related to safety, correct eligibility criteria, and planning and surveillance for adverse events following immunization.

2.3.5 Proposed strategies for partnership, advocacy, IEC, and social mobilization

The 2013–2016 measles resurgence in the Western Pacific Region revealed that partnerships for regional measles and rubella elimination are not yet strong enough. The “advocacy” function of the RVC, SRVC, and national verification committees (NVCs) has not been fully implemented yet. The general public and minority groups in several countries still have very limited knowledge about measles, rubella, CRS and the importance of their prevention by vaccination. Further, several countries have no regular activities to mobilize local governments, the private sector, societies, communities and families for the promotion of measles and rubella elimination activities. To counter these issues, the proposed regional strategy and plan of action proposes four strategies: (1) revitalize or establish immunization partnerships for measles and rubella elimination at both national and regional levels; (2) enhance advocacy activities by the RVC, SRVC, and NVCs for measles and rubella elimination; (3) develop and implement IEC strategies for increasing the knowledge of the general public; and (4) mobilize local governments, the private sector, societies, communities and families regularly to promote measles and rubella elimination activities.

2.3.6 Lessons learnt from China

Developing and enhancing epidemiological surveillance and laboratory network; maintaining surveillance performance and laboratory function during the measles resurgence in 2013–2016

Surveillance for measles was introduced in China in 1998, case-based measles surveillance started in 2009, and rubella surveillance has been integrated with measles surveillance since 2014. The national measles and rubella laboratory was established in 2001 and has passed WHO annual accreditation since 2003, serving as the regional reference laboratory in charge of the China laboratory network, which makes up 50% of the laboratories in the global measles and rubella laboratory network. The measles and rubella surveillance system functions very well in China with high surveillance performance indicators in recent years. Lessons learnt include the importance of: strong government funding and policy support; strong leadership from the Chinese Center for Disease Control and Prevention (China CDC) and the national/regional reference laboratory; continuous training and technical support; strong cooperation among the national, provincial, city and county levels of China CDC and laboratories; establishment of effective quality control systems; and funding and technical support from WHO, CDC, and other international and national organizations.

2.3.7 Lessons learnt from Cambodia

Outbreak response in 2016–2017; developing outbreak response capacity through the measles elimination initiative

Cambodia was verified as having eliminated measles in 2015 and experienced an importation-related measles outbreak in 2016–2017. A total of 65 cases out of 960 suspected measles cases were reported from 24 provinces between 1 January 2016 and 31 March 2017. All the cases were imported and import-related and were genotype B3 and D8. An immediate measles outbreak response campaign was conducted in Cambodia after the outbreak was identified. Lessons learnt from the outbreak response are: to include immediate investigation and a standard process for contact tracing in enhanced surveillance activities throughout the country; to communicate immediately with provinces, local authorities and communities; and to assess and plan for immediate immunization response activities.

2.3.8 Proposed strategies for epidemiological surveillance

The proposed strategy to increase the sensitivity of measles and rubella surveillance and enable detection of all cases is to adopt acute fever and rash as a definition for suspected cases. Laboratory testing should be conducted in an integrated manner for measles and rubella. For countries experiencing a high incidence of diseases characterized by acute fever and rash, this strategy may require a staged introduction. Strategies to increase surveillance performance are: to assure all suspected measles and rubella cases are detected and reported by all health facilities; and to establish sufficient capacity and resources for case investigation and specimen collection/transportation for each outbreak or virus transmission in all districts. Involvement of the private sector, intersectoral communication and social mobilization could play important roles. Linkage with existing surveillance networks (e.g. early warning and response system, influenza) could be instrumental. As all 36 countries in the Western Pacific Region have introduced RCV, one strategy to monitor the effectiveness of the rubella vaccination programme is to establish or expand CRS surveillance.

2.3.9 Proposed strategies for laboratory support

For laboratory support, three strategies are proposed to support the measles and rubella elimination programme in the Region: (1) ensure timely and appropriate laboratory diagnostic confirmation of suspected measles and rubella cases; (2) ensure the collection of appropriate clinical specimens for obtaining genotype information from each outbreak and transmission; and (3) conduct quality assurance to ensure the quality and accuracy of laboratory testing to support the measles and rubella elimination programme, and collaborating with the WHO Regional Office for the Western Pacific to further improve the performance of the Regional Measles and Rubella Laboratory Network.

2.3.10 Proposed strategies for outbreak preparedness and response

The recent resurgence of measles in the Region revealed that sufficient outbreak response capacity and procedures have not yet been established at national and provincial levels, and inadequate mechanisms are in place for coordination of outbreak response activities. Outbreak detection and investigation are not carried out promptly and properly due to insufficient investigation materials and contingency funds at the provincial or district level, inadequate training, and lack of protocols and procedures. Six strategies are proposed: (1) ensure that standardized outbreak response procedures are in place at all levels; (2) ensure that necessary resources are in place before or right after an outbreak is detected; (3) conduct prompt and thorough outbreak investigations; (4) conduct timely outbreak response immunization targeting appropriate for geographical areas and birth cohorts; (5) ensure all health facilities provide appropriate clinical management of suspected measles, rubella and CRS cases; and (6) prevent nosocomial transmission.

2.3.11 Lessons learnt from the Lao People's Democratic Republic

National Immunization Week as an opportunity for periodic intensification of routine immunization programme and measles elimination

The Lao People's Democratic Republic has conducted repeated periodic intensification of routine immunization. Measles is recognized as a key national challenge by high-level government and partner representatives who maintain awareness about the disease and conduct SIAs. Such activities for measles and rubella are integrated with additional services (i.e. deworming and vitamin A) and are an opportunity to vaccinate children who missed out on routine immunization. During World Immunization Week 2016, using the call to action to "close the immunization gap", the National Immunization Programme conducted integrated hospital-based immunization activities and organized a five-day intensive mobile outreach health education activity for vulnerable and remote communities, and ethnic groups in 10 selected districts. Starting during World Immunization Week 2017, the National Immunization Programme is planning to dedicate one month to intensify routine immunization, including measles and rubella, in 58 high-risk districts. Particular focus will be on ethnic minority groups using tailor-made IEC materials.

2.3.12 Lessons learnt from the Republic of Korea

School-entry immunization requirement for preventing measles virus transmission among school-aged children

In 2001, following a large measles outbreak among school-aged children, the Republic of Korea introduced the requirement to submit a certificate for the second dose of MMR at entry into elementary school; the inspection of completion of vaccination is regulated by the School Health Act.

Ascertaining the completion of vaccinations, based on the Infectious Disease Control and Prevention Act, is extended to the kindergarten level. The Korea Centers for Disease Control and Prevention established the immunization registry system in 2002. Completeness of data in the registry is high, especially since 2009 when a vaccination fee started to be paid upon recording of the vaccination into the registry. To increase the capacity to detect unimmunized children and immunize them before school entry (MMR2 as well as the fourth-dose diphtheria–tetanus–pertussis, four-dose inactivated polio and Japanese encephalitis vaccines), the immunization registry was linked to the information system of the Ministry of Education in 2012. Coverage for MMR2 has been above 95% since 2001.

2.3.13 Lessons learnt from Mongolia

Nationwide measles outbreak; wide age-range MR SIA to close immunity gaps among young adults

In March 2014, Mongolia was verified as having achieved measles elimination. In March 2015, measles was reported in Ulaanbaatar and rapidly expanded nationwide. On 15 May, a national SIA targeting children aged 6 months to 5 years was conducted with reported coverage of 93.4%. This age group, however, was not the main contributor in sustaining the outbreak, which mainly affected young infants and young adults. By August, there were 19 021 reported measles cases. Measles transmission continued at a much lower incidence due to summer holidays and movement of people from Ulaanbaatar to the provinces. In January 2016, another peak occurred with 27 363 reported cases and higher case fatality, likely due to a coincidental peak of influenza-like illnesses. A second SIA was conducted in May 2016 targeting those aged 18–30 years, the age group that represented 50% of 2016 measles cases. SIA coverage was 88% despite the challenge of reaching an unusual target group for immunization. The measles outbreak increased awareness about the importance of immunization among all people in Mongolia, from politicians to parents.

2.3.14 Proposed strategies for immunization

Six strategies are proposed for immunization: First, to optimize MCV1, MCV2, and RCV schedules for measles and rubella elimination. It is proposed to combine the first MCV and RCV dose as MR or MMR at 9 months and to give MCV2 before the second birthday, as well as to improve coverage of the first dose of MR-containing vaccine (MRCV1) and introduce MRCV2. The second proposed strategy is to establish and maintain a population immunity that is sufficiently high to achieve and sustain interruption of measles and rubella virus transmission among children younger than 24 months of age through an intensified routine immunization programme so that all children are provided with both MRCV1 and MRCV2 before their second birthday. The third proposed strategy is to establish and maintain a population immunity that is high enough to achieve and sustain interruption of measles and rubella virus transmission among pre-school-age children by catch-up vaccination at entry to child care service and/or by periodic follow-up SIAs. The fourth proposed strategy is to establish and maintain a population immunity that is high enough to achieve and sustain interruption of measles and rubella virus transmission among schoolchildren. The fifth and sixth proposed strategies are to prevent measles and rubella transmission among young adults and in workplaces, as well as in high-risk populations, communities or groups.

2.3.15 Proposed strategies for programme review and risk assessment

Appropriate planning, programme strengthening and immunization activities should be guided by regular and detailed review of programme strengths and weaknesses as well as identification of high-risk areas and populations. This involves annual review of MR vaccination coverage, surveillance data, surveillance performance indicators, coverage data quality and programme capacity to identify

programme deficiencies, communities at risk and immunity gaps by geographic area and by birth cohort. The WHO Measles Programmatic Risk Assessment Tool may be useful in synthesizing data to identify high-risk districts and generate summary results that can help plan and prioritize programme responses, target immunization activities tailored to level of risk, and help with advocacy and resource mobilization.

2.3.16 Lessons learnt: advocacy and country visit by the RVC in the European Region

Established in 2012, the European Regional Verification Commission for Measles and Rubella Elimination provides feedback to the Regional Committee for Europe on the status of measles and rubella elimination upon evaluation of a country's annual status in an evidence-based, measurable and independent manner. Extensive work is ongoing with NVCs for advocacy, capacity-building and country support. In January 2017, a capacity-building workshop was organized for German-speaking countries and another workshop is planned to take place in November for countries in the Balkan region. Country support missions are organized throughout the year to work with NVCs in each country to achieve or maintain the elimination status.

2.3.17 Proposed strategies for progress monitoring and verification of elimination

Following the recommendations from the 2010 Regional Committee for the Western Pacific, an independent RVC was established in 2012. In 2016, the verification guidelines were revised and rubella elimination was included. As of 2016, a subregional verification committee, covering 21 Pacific island countries, territories and areas, as well as all 16 NVCs have been convened. The Western Pacific RVC provides further guidance for countries through evidence-based report review and strong technical judgement, and it determines if countries have eliminated measles or rubella. Since 2014, eight countries and areas have been verified as having achieved measles elimination: Australia, Japan, Mongolia, Brunei Darussalam, the Republic of Korea, Macao SAR (China), Cambodia and Hong Kong SAR (China). There has been a significant improvement in the quality of country verification reports, though some challenges remain, mostly to do with timeliness of submission. The NVCs and SRVC should play a larger role in advocacy for measles and rubella elimination, such as inclusion of the recommendations for rubella and CRS surveillance in progress reports.

2.4 Rubella elimination: Overview

2.4.1 Rubella, CRS, and elimination of rubella

Although rubella is a mild disease, by causing CRS, it is the reason for high chronic morbidity, mortality and significant cost to families and societies in caring for affected children. The best strategy for elimination of rubella and CRS is to interrupt transmission through vaccination. A combined approach for rubella and CRS elimination is considered a more effective path to elimination than targeting individual diseases separately. Setting a goal for elimination of rubella will also aid in eliminating CRS and ultimately will help achieve measles elimination goals. Effective strategies for combined elimination of measles, rubella and CRS include: integrated surveillance for rubella and CRS with existing platforms for measles surveillance; introducing RCV into routine immunization and maintaining high vaccination coverage; using surveillance data to identify the appropriate target gender and age groups for speed-up campaigns; and establishing high-quality surveillance.

2.4.2 Background of rubella elimination in the Western Pacific Region

The goal of rubella elimination specified by the Regional Framework for Implementation of Global Vaccine Action Plan in the Western Pacific was endorsed by the Regional Committee in 2014. By 2016, all Member States had introduced RCV into the national immunization programme. Rubella transmission in the Region peaked in 2008 and has steadily declined since then. Rubella cases in 2015 were at their lowest level, although it remains endemic in many countries. In recent years, most cases have been reported from the Cambodia, China, Japan, Mongolia, Philippines and Viet Nam. Most CRS cases have been reported from Cambodia, Japan and Viet Nam. Many countries have not established CRS surveillance. Because CRS surveillance is not in place in many countries and functional only in sentinel sites in others, modelling has been used to estimate the regional burden of CRS. In 2010, the estimated number of cases in the Western Pacific was over 9000. In 2014–2016, most regional rubella cases occurred in older adolescents and young adults in countries with large populations. This leads to a high risk of CRS due to infection among pregnant women.

2.5 Rubella elimination in countries and areas of the Western Pacific Region

2.5.1 Australia

Australia introduced universal MMR1 in 1989 and universal MMR2 in 1993. Immunization coverage is high and in 2016 the policy of “No jab, no pay” was implemented. Rubella is a nationally notifiable disease, although there is no specific case definition for suspected rubella. All confirmed cases require laboratory evidence based on the standard laboratory case definition for rubella. Genotyping capability has been developed at the Victorian Infectious Diseases Reference Laboratory (VIDRL) since 2016. The rubella notification rate has been fewer than 10 per 1 million population since 2003, and fewer than 20 cases per year have been reported since 2014. A change in the age distribution towards older age groups has been observed. In the most recent outbreak in 2015, one imported adolescent case transmitted the infection to siblings. A serosurvey indicated an immunity gap in males aged 30–44 years and children aged less than 1 year.

CRS is a nationally notifiable disease according to the nationally agreed case definitions for confirmed and probable cases. Active case search has been conducted by sentinel sites since 1993 in collaboration with the Australian Paediatric Society. Very few CRS cases are reported; mostly from women acquiring rubella overseas. Evidence indicates that rubella and CRS are well controlled and Australia plans to submit a report for rubella elimination verification in 2018.

2.5.2 Brunei Darussalam

Brunei Darussalam introduced universal MMR1 in 1988 and universal MMR2 in 1996 (with changing target age group). Immunization coverage for MMR2 has been over 90% since 2004 and a catch-up measles vaccination programme targeting 2003–2008 birth cohorts was conducted in 2008–2009. Vaccination status is checked in schools. Rubella surveillance has been piggybacked on to measles surveillance since 2008 with good performance indicators. The case definition is acute fever and rash plus adenopathy. Capacity for genotyping has been developed, but no genotyping testing has been conducted yet. The rate of rubella notification was decreasing over time and it was zero in 2015–2016. No rubella outbreak has been reported since 2004, and the country has no specific response plan. CRS is non-notifiable and no case has been reported in the last decade. Brunei Darussalam is willing to establish rubella elimination target as per WHO recommendation.

2.5.3 Cambodia

Cambodia introduced RCV1 (as MR) in 2013 through a wide-range SIA; RCV2 was introduced in 2015. Immunization coverage for MR1 is around 95% and for MR2 around 70%; the reported coverage for 2016 is not reliable because children above 1 year of age who were vaccinated during catch-up activities as a response to the measles outbreak are reported in the numerator. Multiple SIAs have been conducted since 2013. High-risk community outreach vaccination is conducted quarterly. Rubella surveillance was integrated into measles case-based surveillance in 2012. Cambodia has the capacity for serological testing but specimens are shipped to reference laboratory for genotyping. Performance of surveillance varies across provinces. Rubella confirmed cases dropped drastically from 2011 to 2016 (from 1092 to 4). A seroprevalence study conducted in 2012 shows immunity of over 80% among those aged over 20 years in all provinces. Two CRS surveillance sentinel sites were established in 2011 in a national paediatric hospital and a provincial hospital, and 50 suspected CRS cases were identified up to 2015. In total, 16 cases were clinical or laboratory confirmed, with a decreasing trend, and no CRS cases in 2015. Cambodia has a national elimination plan and set the national target for rubella elimination for 2020.

2.5.4 China

The China National Immunization Programme introduced RCV in 2008 with the first dose given as MR at 8 months and as MMR at 18–24 months (with some provincial variation). However, due to a shortage of vaccines until 2010, RCV coverage started increasing in 2011 and has been above 95% from 2012 onwards. Rubella is a notifiable disease, reported nationally since 2004. Rubella surveillance has been integrated into national measles surveillance since 2014, having achieved good performance. The case definition for a suspected case is fever and rash, with at least one sign or symptom from the following: cough, coryza, conjunctivitis, lymphadenopathy or arthritis/arthritis. A gene bank was established in 1999, which made it possible to observe a change in prevalent genotype in 2002 (genotype 1F) and 2014 (genotype 2B). During the last decade, rubella incidence decreased from 9.1 per 100 000 population in 2008 to less than 1 in 2016. Cases are reported by all provinces, although epidemiology varies. Most cases still occur in those younger than 20 years with the highest proportion among those aged 10–19 years; over 75% of cases are unvaccinated or with unknown vaccination history. Two outbreaks have been reported: in a day care centre in 2011 and in a middle school in 2014.

China does not have national CRS surveillance. In 2009–2013, a CRS surveillance pilot project was conducted in four prefectures to follow up with pregnant women with suspected rubella, investigate suspected CRS cases and strengthen cooperation with birth defects surveillance. A total of 1670 suspected CRS cases were reported with only 5 cases confirmed. A 2014 rubella serosurvey showed an immunity gap among those aged 5–19 years. School-entry checks and catch-up vaccination for this age group are being considered. To prevent the risk of CRS, women registering for marriage are offered rubella immunoglobulin G testing – and rubella vaccine if testing negative.

2.5.4.1 China, Hong Kong SAR

Hong Kong SAR (China) introduced the rubella vaccine to the immunization programme in 1978 and established case-based rubella and CRS surveillance in 1994 and 2008, respectively. Small-scale outbreaks occurred in 2011 and 2012. The Hong Kong Department of Health closely monitors vaccine coverage to prevent any immunization gaps and conducts serosurveys every three years to verify that immunity is maintained in all age groups. On average, RCV coverage is over 80% in

males and females below the age of 35 years. Rubella and CRS incidence in Hong Kong SAR (China) continues to be very low and plans to sustain this status include ongoing strategies such as: continuing case-based surveillance with laboratory support; sustaining high vaccine coverage; checking immunization history during prenatal visits and providing post-partum immunization; and continued programmes for public education on rubella and CRS prevention.

2.5.4.2 China, Macao SAR

The rubella vaccine was introduced to school-age girls in 1987. At least one dose of rubella vaccine has been offered to girls and boys since 1990. The current schedule is two doses of MMR given to both sexes, at age 12 months and 18 months. Estimated RCV coverage has remained consistently above 95% for both doses. Rubella is a notifiable disease, and case-based hospital nationwide surveillance has been in place since 2011. Challenges exist in enrolling private providers in the rubella reporting system as disease awareness is not high enough among private providers. Incidence of rubella disease is low, though a few sporadic cases have been reported – all in adolescents with unknown vaccination history.

CRS is also a notifiable disease (since 1999), with only one case reported in 2001. A target date of 2018–2020 was established to achieve rubella elimination through several strategies: strengthening rubella surveillance; updating guidelines for notification; enhancing capacity for clinical diagnosis; launching sero-surveillance among all age groups; maintaining high vaccination coverage; enhancing awareness and knowledge of MMR vaccination; and addressing vaccine hesitancy.

2.5.5 Fiji

Rubella is a notifiable disease in Fiji, and epidemiological and laboratory data are regularly reported to the surveillance system. However, some challenges remain, in particular with laboratory testing, which can only be performed in the Fiji Centre for Communicable Disease Control (Mataika House), though it does not have capacity for genotyping. Surveillance for CRS has not yet been established, although a survey done in 2012 showed an increasing trend in CRS cases in Fiji. RCV was introduced in 1970 as a monovalent vaccine and replaced in 2003 with MR vaccine. Challenges exist with vaccine supply and national distribution of vaccines due to the country's geographical diversity (vast highland and maritime areas). Strategies for ensuring progress in rubella and CRS elimination include strengthening surveillance for rubella and CRS, and achieving 95% immunization coverage. International support is needed for supplementary MR immunization campaigns, strengthening laboratory capacity for genotyping and laboratory investigation for CRS, as well as support for cold-chain capacity.

2.5.6 Japan

Japan introduced RCV into routine immunization targeting girls in 1977, and it was expanded to cover both sexes in 1989. Rubella and CRS surveillance have been established and epidemiological and laboratory data are reported regularly. Several rubella outbreaks have occurred in the last five years; most cases reported were in male factory workers aged 30–50 years who were born before routine immunization included vaccination of males against rubella. Forty-five cases of CRS have been reported since 2012, none from mothers who received two doses of RCV. National plans for rubella and CRS elimination were developed in 2014. These set a goal for elimination of rubella and CRS by 2020 by maintaining routine immunization at 95% coverage and implementing voluntary supplemental immunization for adults and high-risk groups such as women during pre-conception clinic visits, health-care workers and males in the age group 30–50 years.

2.5.7 Lao People's Democratic Republic

Nationwide coverage with MR vaccine in 2015 and 2016 was 88% and 76%, respectively, but greatly varied subnationally. Several outbreaks have occurred since 2013 with variable success in performing epidemiological linkage and laboratory confirmation of cases. Using measles risk assessment as a proxy for rubella risk assessment, it was demonstrated that there was improvement at the national level, decreasing from an overall risk assessment of medium-high in 2015 to medium-low in 2016. The national plan for rubella and CRS elimination set a target date of 2020, by aiming to achieve high population immunity with two doses of MR vaccine, with at least 80% coverage of RCV1 in every district. Strategies in the national plan include: strengthening routine immunization; organizing supplementary immunization campaigns; and strengthening surveillance monitoring and evaluation, outbreak investigation and response, and IEC.

2.5.8 Malaysia

Surveillance of rubella was integrated with measles as a mandatory notifiable disease in 1988. Rash and fever case-based surveillance was implemented in 2010. CRS is not notifiable, but surveillance for CRS is performed retrospectively using inpatient discharge records. Suspected CRS cases are tested for toxoplasmosis, rubella, cytomegalovirus, herpes simplex and syphilis (or TORCHES) by the virology lab at the Institute for Medical Research and Kuala Lumpur Hospital. MMR was introduced to babies aged 12 months in 2002, and a second dose was introduced to 7-year-old schoolchildren beginning 2004. The schedule for MRCV1 and MRCV2 was changed to 9 months and 12 months, respectively, in 2016. MRCV1 coverage has remained above 85% since 2007. Malaysia experienced an outbreak of rubella in 2009 and 2012–2013, predominantly affecting older adolescent and young adult males. Malaysia plans to improve surveillance for CRS by combining lab-based surveillance, retrospective case investigation at hospitals and follow-up of pregnant mothers with rubella. It is worth improving the CRS surveillance system through lab-based surveillance as the entry point, retrospective case investigation in hospitals and follow-up with mothers by offering RCV.

2.5.9 Mongolia

In Mongolia, MMR was introduced in 2009 and given at 9 months and 2 years of age. Vaccination coverage for RCV1 and RCV2 in 2016 was 99% and 98%, respectively. Mongolia was verified by the RVC as having achieved measles elimination in 2014; however, a large import-related measles outbreak occurred in 2015–2016. Rubella has been a notifiable condition since 1992, and active surveillance for measles and rubella was initiated in 1996. WHO has accredited the national measles laboratory at the National Center for Communicable Diseases annually since 2004. Syndromic reporting of rash and fever, which are included in the rubella surveillance case definition, began in 2008. Rubella testing is currently done for suspected measles cases by the national measles lab. No CRS surveillance is performed at the moment except for a one-year pilot in the National Center for Maternal and Child Health in 2009 that detected zero lab-confirmed cases out of 37 suspected CRS cases. A national rubella elimination plan is under development. Technical support is needed for establishment of CRS surveillance and development of the rubella elimination plan.

2.5.10 New Zealand

Rubella was made a notifiable disease in New Zealand in 1996; rubella surveillance in the country is both active and comprehensive. Canterbury Health Laboratories is the WHO National Measles and Rubella Laboratory. There were no issues with capacity, timeliness or performance of rubella

diagnostic services in 2013–2016. Rubella polymerase chain reaction (or PCR) on nasopharyngeal swabs is the test of choice. Positive samples are genotyped.

CRS is a notifiable condition under New Zealand law, requiring reporting of all cases to the public health authorities. Additional surveillance for CRS is undertaken by the New Zealand Paediatric Surveillance Unit. There have been no cases of CRS in New Zealand since 1998. Between 1982 and 1997, 16 cases of CRS were reported in the country, or roughly 2 cases per 100 000 live births. New Zealand's rubella rates are sufficiently low that further plan development and target assignment are not currently a priority. Rubella elimination verification processes and target date will be addressed through the NVC currently being implemented for measles elimination.

2.5.11 Papua New Guinea

MRCV1 is administered as MR vaccine at 6 months. Coverage varies greatly by district, from below 50% to over 100%. Rubella laboratory testing was performed at VIDRL, Australia during 2003–2007 and since 2008 now occurs as part of measles case-based surveillance at the Central Public Health Laboratory. The case definition of suspected rubella is acute fever and rash plus lymphadenopathy or arthritis. A seroprevalence study in Madang in 2007–2008 showed that 55% of pregnant women were immune to rubella, which points to a risk of CRS cases due to a large proportion of susceptible women of childbearing age. Laboratory-based CRS sentinel surveillance was established in 2014, as well as laboratory testing of cases meeting a broad case definition for suspected CRS. Primary challenges to achieving high vaccination coverage are financial constraints, cold-chain equipment, topography, weather, and accessibility of communities, human resource limitations due to an ageing workforce, leadership and management, and commitment and partner mapping.

2.5.12 Philippines

RCV was introduced in the Philippines as MMR vaccine, first through a phased approach in 2010 and then fully in 2012. Epidemiological surveillance for rubella is implemented through the Philippine Integrated Disease Surveillance and Response system, linked with national measles surveillance with sequential testing of samples: samples that test negative for measles immunoglobulin M (IgM) are tested for rubella IgM. In 2016, parallel testing for measles and rubella IgM was started. The National Measles Laboratory was designated as the National Reference Laboratory for Measles and other Exanthemata by the Department of Health in 2000 and accredited by WHO in 2008. Rubella incidence has decreased since rubella introduction nationwide, but cases continue to occur, in recent years predominantly affecting age groups older than 10 years, particularly older adolescents. Current strategies of the EPI will be to focus on improving RCV coverage of routine immunization; improving RCV coverage through school-based immunization; following up with infants born to pregnant women who tested positive for rubella IgM or who have been exposed to persons with a confirmed rubella infection; strengthening coordination and reporting by private hospitals; and including disease surveillance in licensing accreditation of public and private hospitals and laboratories.

2.5.13 Republic of Korea

The Republic of Korea first introduced a monovalent rubella vaccine in 1978. MMR vaccine was added to the national immunization programme in 1983. An increased number of rubella cases among adolescents in the mid-1990s led to a change in immunization policy from only universal vaccination of infants to adding periodic SIAs for adolescent girls in middle and high school. This lasted from 1996 to 2000. Two-dose MMR vaccine was introduced in 1997 and currently constitutes

childhood routine immunization against rubella, with the first dose administered at age 12–15 months and the second dose at 4–6 years. Large measles outbreaks in 2000 and 2001 prompted the Government of the Republic of Korea to implement a nationwide MR catch-up vaccination campaign that targeted the population between the ages of 8 and 16 years. Rubella incidence rapidly decreased following the campaign. Mandatory hospital case-based reporting for rubella and CRS began in 2000, and laboratory-based reporting of rubella began in 2016. Sentinel CRS reporting began in 2015.

2.5.14 Solomon Islands

Solomon Islands introduced RCV in 2013 (single dose of MR at 12 months), following a rubella outbreak in 2012 (451 suspected cases), and an outbreak response campaign targeting children aged 12–59 months. A second dose is planned to be introduced in 2018. During a measles outbreak in 2014, MR was used for a measles outbreak response campaign, targeting the population 6 months through 30 years, with over 100% reported coverage. A rapid convenience assessment after this outbreak response campaign indicated coverage of 95.4%. Hospital based active surveillance system for acute fever and rash surveillance began in 1997 and syndromic surveillance for acute fever and rash started in 2011. Coordination between the two surveillance systems has improved since 2014 with WHO support. Measles and rubella surveillance is currently case-based with mandatory reporting by health workers.

CRS is not yet a notifiable disease, and there is a need to sensitize clinicians and nurses about rubella and CRS. Laboratory testing for measles and rubella cannot be performed in Solomon Islands, and all samples are sent to VIDRL (Australia) or Mataika House (Fiji). Rubella is not tested routinely, except in the case of a suspected rubella outbreak to confirm the outbreak. No outbreaks of rubella have occurred since 2012. Following the 2012 outbreak, there was an increase in CRS cases in 2013. There is not yet a target or national plan for rubella elimination, although Solomon Islands has identified priority actions, which include: improving immunization coverage for RCV; improvement of cold chain; strengthening of routine immunization; and retrospective identification of CRS cases, which would benefit from technical and financial support from partners.

2.5.15 Viet Nam

RCV was introduced into the routine schedule in Viet Nam in June 2015 (single dose of MR at 18 months). Routine coverage since introduction has varied subnationally and improved in 2016, ranging from 86% (Highland Region in 2015) to 97% (Central Region in 2016). Catch-up campaigns in 2014–2015 and 2016 targeted children aged 1–14 years (92% reported coverage) and 16–17 years (95% reported coverage), respectively. Case-based rubella surveillance was implemented nationwide in 2003 using a combined suspected MR case definition. A large rubella outbreak occurred in 2011 and a smaller outbreak in 2015–2016, with 88% of rubella cases in 2016 occurring in the age group of those above 15 years, most in young adult females in a factory setting. Case-based sentinel CRS surveillance was implemented in 2012 at three paediatric hospitals; increases in CRS cases were detected in 2011–2012 and 2016, corresponding to the rubella outbreaks. No national rubella elimination target and plan have yet been identified. Technical support is needed to help develop a national rubella elimination strategic plan, and financial and logistical support is needed from partners for IEC activities and MR SIAs targeting high-risk areas as well as young women and adults.

2.5.16 Pacific islands

RCV has been introduced in all Pacific island countries and areas since 2015, with routine RCV1 immunization coverage in 2015 ranging from 65% to 100%. Rubella surveillance is weak in most of the Pacific islands and 10 Pacific islands do not have any surveillance system in place. In all countries where rubella surveillance is in place, this is integrated with measles surveillance. In most countries, rubella is not a notifiable disease, however, and case-based reporting only occurs in Fiji and Solomon Islands. Data from the Pacific islands affiliated with the United States of America and the French territories are limited, but reporting from Guam has improved. Three Pacific islands laboratories are participating in an annual external quality control programme for testing measles and rubella antigen (IgM), and all of them have passed proficiency testing. Outbreaks of rubella occurred in 2002 (Tonga and Fiji), 2003 (Samoa, spreading to Tokelau), 2011 (Fiji) and 2012 (Solomon Islands). Young adult males (21–30 years) were predominantly affected in the 2011 outbreak in Fiji, although a retrospective review of congenital abnormalities revealed a large number (294 of 977) of infants with congenital abnormalities born between 1995 and 2010 that met the clinical criteria for CRS. An increase in CRS cases was also observed in Solomon Islands following the 2012 rubella outbreak. CRS surveillance is weak or non-existent in most PICs. Some US-affiliated Pacific islands have sentinel site surveillance. Only US-affiliated Pacific islands, French Polynesia, Niue and Nauru have mandatory case-based CRS reporting and there is widespread lack of awareness of CRS among clinicians. No rubella elimination target and strategic plans have been set by any Pacific islands. They would benefit from technical and financial support from partners to improve and sustain high routine RCV coverage in low-performing countries.

2.6 Experiences and lessons learnt on regional rubella elimination from the WHO Region of the Americas and European Region

2.6.1 Region of the Americas

In 1997–1999, WHO estimated CRS cases per year in Latin America and the Caribbean at 16 000–20 000. In 2003, the Directing Council of the Pan American Health Organization called Member States to eliminate rubella and CRS from their countries by 2010. To do this, countries in the Americas carried out Region-wide, synchronized and fast-paced mass vaccination campaigns between 2003 and 2009. They were called “speed-up” campaigns, targeting 250 million male and female adolescents and adults aged 15–39 years in 32 countries, nearly 40% of the Latin American and Caribbean population. Benefits of rubella and CRS elimination in the Americas include: (1) sustainability of measles elimination in the Americas assured through “speed-up” campaigns delivering combined MR vaccine to adolescent and adult populations (male and female); (2) case investigation improved and laboratory capacity strengthened as a result of integration of MR surveillance; (3) political commitment maintained and enthusiasm of health workers renewed; (4) ties with existing strategic partners and scientific associations enhanced; and (5) additional opportunity obtained to document the feasibility and effectiveness of elimination efforts for vaccine-preventable diseases in the Americas.

2.6.2 European Region

In 2000, more than 620 000 rubella cases were reported in the WHO European Region. While a rubella outbreak occurred in Romania in 2012 with more than 20 000 rubella cases and in Poland in 2013 with around 40 000 rubella cases, the European Region reduced rubella incidence by 99.8% in 2016 compared with the incidence in 2000. In 2012–2015, progress was made towards eliminating

rubella and a substantial number of countries have been verified as having eliminated endemic transmission of rubella. In 2015, 24 countries were verified to have interrupted endemic rubella transmission for more than 36 months, and 9 and 2 countries, respectively, were confirmed to have interrupted rubella virus transmission for more than 24 and 12 months. However, the rubella virus is still endemic in 16 countries and more work is needed, particularly on surveillance and laboratory confirmation.

2.7 Regional target year and proposed regional strategies for the Western Pacific

2.7.1 Proposed regional strategy and plan of action for measles and rubella elimination in the Western Pacific (fifth draft)

Setting a regional target year for rubella elimination will be a critical first step to help build political will, to support a coordinated approach between government sectors, and to mobilize resources from governments and partners so that the urgently needed activities can be implemented successfully and in a timely manner. Setting a regional target year will also promote a synchronized effort across the Western Pacific Region, which was a key to success for rubella elimination in the Region of the Americas. The target date should be chosen balancing what is achievable and still being soon enough to encourage urgent action.

The draft of the “Measles and Rubella Elimination in the Western Pacific: Regional Strategy and Plan of Action” has been developed with three objectives: The first is to propose operational targets for 2020 to attain the regional goal, which is to achieve and sustain elimination of measles and rubella (interruption of the transmission of measles and rubella viruses) in all countries and areas of the Western Pacific Region. The second is to propose strategies and activities to address and overcome unsolved issues and emerging challenges identified during the regional measles resurgence and to achieve the proposed operational targets by 2020. The third is to provide a framework for countries and areas in the Region to use when they develop or update national plans to accelerate activities for both measles and rubella elimination to achieve the proposed operational targets by 2020.

2.7.2 Application of the proposed regional strategy to develop national plans of action for countries with large populations in the Western Pacific

The proposed regional strategy and plan of action represents a framework to guide all countries and areas in achieving measles and rubella elimination, while responding to the diverse specific challenges in the Region. A presentation was given, which focused on the application of this framework to select strategic actions for rubella elimination in four countries with large populations: Malaysia, the Philippines, Viet Nam and China, with particular attention to selecting approaches to interrupt endemic transmission through immunization activities targeting key susceptible groups. Following a detailed analysis of the rubella epidemiology and estimated immunity gap for rubella and measles, it was demonstrated that rubella elimination can be feasibly achieved in these large countries between 2022 and 2024. In particular, however, older adolescents and young adults represent a key population that is highly susceptible to rubella, that is at risk of outbreaks, and that must be urgently immunized to prevent a surge in CRS. A series of possible approaches to immunize these populations was presented from the strategic plan, including engagement of the education sector to use school-based and university-based immunization checks, as well as engagement of the labour sector and other sectors to conduct immunization activities targeting adults in congregated settings such as factories, prisons, the military and urban migrant groups. Finally, urgent action to strengthen

surveillance and outbreak response capacity was stressed so that outbreaks among adults can be detected rapidly and contained before it spreads to the broader community.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

3.1.1 Measles elimination

- The regional measles elimination initiative in the Western Pacific has successfully strengthened and expanded national and regional immunization programmes and systems since its inception in 2003. Progress has been accelerated by political commitment of Member States and partners since the regional target year for measles elimination was established by the WHO Regional Committee for the Western Pacific in 2005.
- The enhanced political commitment and increased engagement of Member States and partners enabled the Region to continuously and significantly decrease regional measles incidence between 2005 (the year in which the regional target year was set) and 2012 (the target year for regional measles elimination), marked by a historically low incidence of measles.
- Despite the tremendous achievements by Member States and partners, the Western Pacific experienced a Region-wide measles resurgence in 2013–2016. This resurgence was caused by unresolved issues and emerging challenges in the Region, which were not targeted by existing measles elimination strategies.

3.1.2 Rubella elimination

- Regional incidence of rubella has decreased significantly in the Western Pacific since 2011 with the introduction of MRCVs to national immunization programmes and MRCV SIAs for a wide age range in many countries and areas.
- However, rubella outbreaks continue to occur in some countries and areas in the Region. This has led to an increased number of cases of CRS, which is a devastating consequence of rubella infection among pregnant women. Due to lack of surveillance in many countries and areas, the disease burden associated with CRS has been seriously underestimated and unrecognized in the Western Pacific Region. In 2010, 94% of rubella cases in the Region were reported from countries and areas without established routine CRS surveillance. A study estimated that around 9000 CRS cases occurred in the Western Pacific in 2010.¹ Recently, the proportion of adolescents and young adults aged 15–24 years infected with rubella has been increasing significantly in China, the Philippines and Viet Nam. As these birth cohorts are entering their peak fertility years, there is a high risk of increased CRS cases due to infection of pregnant women. Prevention of CRS is the most important reason for introduction of RCV; elimination of rubella by interrupting circulation of rubella virus is the only way to prevent all CRS occurrence.

¹ Vynnycky E, Adams EJ, Cutts FT, Reef SE, Navar AM, Simons E, et al. Using seroprevalence and immunisation coverage data to estimate the global burden of congenital rubella syndrome, 1996–2010: a systematic review. PLoS ONE. 2016 Mar 10.

- Rubella can be eliminated at a lower level of herd immunity compared to measles. Rubella elimination has been achieved successfully by a combined measles and rubella elimination initiative in the Region of the Americas and some countries in the Western Pacific Region.
- The rubella elimination initiative in the Western Pacific Region has achieved key milestones towards elimination of the disease. MRCV has been introduced into the national immunization programme in all countries and areas of the Region. Many countries have protected a wide age range of their child population through national routine immunization and MRCV SIAs. Additionally, many countries have incorporated rubella reporting and laboratory support into the case-based measles surveillance and measles laboratory network.
- Rubella elimination is not easy but technically feasible and could be achieved more rapidly than measles elimination in the WHO Region of the Americas. All countries and areas in the Western Pacific Region have already established the necessary technical experience and programmatic foundations to achieve rubella elimination. Some countries have set, or are ready to set, a national rubella elimination target year between 2018 and 2020. However, countries with large and diverse populations may need a slightly longer period to interrupt rubella virus transmission.
- Susceptible adolescents and young adults, age groups that recently have experienced an increase in rubella infections in several countries, should be targeted for immunization activities using innovative methods, in addition to the continuation of routine immunization programmes. Coordinated approaches involving multiple government sectors should be developed urgently and carried out immediately so that susceptible individuals among these age groups can be accessed and immunized to prevent rubella infection resulting in CRS occurrence.
- Setting a regional target year for rubella elimination will be a critical first step to help build political will, to support a coordinated approach between government sectors, and to mobilize resources from governments and partners so that the urgently needed activities can be implemented successfully and in a timely manner. Setting a regional target year will also support a synchronized effort across the Western Pacific Region, which was a key to success for rubella elimination in the Region of the Americas. The target date should be chosen balancing what is achievable and still being soon enough to encourage urgent action.

3.1.3 Overall conclusions

- All countries and areas in the Western Pacific Region should act urgently to address the disease burden due to CRS by enhancing efforts to achieve progress towards rubella elimination. It is critical to establish the earliest achievable regional target year for rubella elimination to enhance the commitment of Member States and partners. Investments and activities aimed at reaching regional rubella elimination by the target year will also further accelerate strengthening of national and regional immunization programmes and systems in the Region.

- The Consultation acknowledged the TAG’s recommendation to set 2020 as the target year for rubella elimination, corresponding to the target set in the *Global Vaccine Action Plan 2011–2020*.² The participants recognized, however, that, while many countries in the Western Pacific Region can achieve rubella elimination by 2020, it may be challenging for others, particularly those with large and diverse populations. These countries will require a phased approach and need a slightly longer period to interrupt endemic rubella virus transmission.

3.2 Recommendations

3.2.1 Recommendations for Member States

- 1) All countries and areas in the Western Pacific Region should further collaborate and coordinate with other Member States, WHO and partners in achieving and sustaining measles elimination in the Region under the guidance of the new regional strategy.
- 2) All countries and areas in the Western Pacific Region are urged to set a regional target year for rubella elimination as soon as possible to benefit from increased political commitment, coordinated effort between government sectors, and mobilization of resources by governments and partners in order to urgently address immunity gaps among adolescents and young adults.

3.2.2 Recommendations for WHO

- Recognizing that some countries require a phased approach and need more time beyond 2020 to achieve rubella elimination, the consultation requested the TAG to carry out further discussions with representatives of national immunization programmes at the 26th TAG meeting in June 2017 to determine the final proposed target year for rubella elimination for the Western Pacific Region, considering a regional target year between 2022 (five years from 2017) and 2024 (seven years from 2017).

² Rubella eliminated in at least five WHO regions by 2020.

ANNEXES

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Annex 2. Meeting programme

Time	Wednesday, 19 April 2017	Time	Thursday, 20 April 2017	Time	Friday, 21 April 2017
08:00–08:30	Registration	08:30–08:45	Wrap-up of Day 1 and overview of Day 2	08:30–08:45	Wrap-up of Day 2 and overview of Day 3
08:30–08:50	1. Opening session <ul style="list-style-type: none"> Welcome remarks by the Responsible Officer Opening remarks of the Regional Director Self-introduction, Announcement of Officers Administrative announcements 	08:45–09:00	4. Agenda item 2 (<i>cont.</i>) 4.16 Lessons learned 8: Advocacy and country visit by RVC in the European Region		6. Agenda item 4 (<i>cont.</i>) <u>Country report on progress towards rubella elimination</u>
08:50–09:00	Group photo	09:00–09:15	4.17 Proposed strategies for "progress monitoring and verification of elimination"	08:45–09:00	6.16 Republic of Korea
		09:15–09:25	Discussion	09:00–09:15	6.17 Solomon Islands
		09:25–09:45	5. Agenda item 3. Rubella elimination: Overview	09:15–09:30	6.18 Pacific Islands
		09:45–10:00	5.1 Rubella, congenital rubella syndrome and rubella elimination	09:30–09:45	Discussion
		10:00–10:10	5.2 Background of rubella elimination in the Western Pacific		
			Discussion		
09:00–09:30	COFFEE BREAK	10:10–10:40	COFFEE BREAK	09:45–10:15	COFFEE BREAK
09:30–09:35	2. Objectives of the consultation		6. Agenda item 4. Rubella elimination in countries of the Western Pacific Region		7. Agenda item 5. Experiences and lessons learned from AMR and EUR on regional rubella elimination
09:35–09:55	3. Agenda item 1. Achievements: Measles elimination and strengthening EPI	10:40–10:55	<u>Country report on progress towards rubella elimination</u>	10:15–10:45	7.1 PAHO
09:55–10:15	3.1 Experiences in the Americas	10:55–11:10	6.1 Australia	10:45–11:15	7.2 EURO
10:15–10:35	3.2 Experiences in Europe	11:10–11:25	6.2 Brunei Darussalam	11:15–11:30	Discussion
10:35–10:45	3.3 Experiences in the Western Pacific	11:25–11:40	6.3 Cambodia		
	Discussion	11:40–12:00	6.4 China		
	4. Agenda item 2. Issues, lessons learned and proposed strategies towards regional measles elimination in the Western Pacific		Discussion		
10:45–11:00	4.1 Regional measles resurgence in the Western Pacific 2013-2016				
11:00–11:15	4.2 Lessons learned 1: (a) planning, coordination, implementation and monitoring by subnational committees; and (b) involvement of other sectors and communities				
11:15–11:30	4.3 Lessons learned 2: (a) measles outbreaks in 2010-2013 and 2015-2016; and (b) new routine vaccination schedule for accelerating progress towards measles elimination				
11:30–11:45	4.4 Proposed strategies for "overall planning and immunization system"				
11:45–12:00	4.5 Proposed strategies for "partnership, advocacy, IEC and social mobilization"				
12:00–12:10	Discussion				
12:10–13:30	LUNCH BREAK	12:00–13:00	LUNCH BREAK	11:30–13:00	LUNCH BREAK

13:30–13:45	4.6 Lessons learned 3: (a) developing and enhancing epidemiologic surveillance and laboratory network; and (b) maintaining surveillance performance and laboratory function during measles resurgence in 2013-2016	13:00–13:15	<u>Country report on progress towards rubella elimination (cont.)</u>	13:00–13:15	8. Agenda item 6. Regional target year and proposed regional strategies for the Western Pacific
13:45–14:00	4.7 Lessons learned 4: (a) outbreak response 2016-2017; and (b) developing outbreak response capacity through measles elimination initiative	13:15–13:30	6.5 Hong Kong SAR (China)	13:15–13:30	8.1 Proposed Regional Strategy and Plan of Action for Measles and Rubella Elimination in the Western Pacific (5th draft)
14:00–14:15	4.8 Proposed strategies for "epidemiologic surveillance"	13:30–13:45	6.6 Macao SAR (China)	13:30–13:45	8.2 Application of proposed regional strategy to development of national plan of action for countries with large population in the Western Pacific
14:15–14:30	4.9 Proposed strategies for "laboratory support"	13:45–14:00	6.7 Fiji	13:45–14:00	8.3 Regional target year for rubella elimination in the Western Pacific
14:30–14:45	4.10 Proposed strategies for "outbreak preparedness and response"	14:00–14:15	6.8 Japan		Discussion
14:45–15:00	Discussion	14:15–14:30	6.9 Lao People's Democratic Republic		
			Discussion		
15:00–15:30	<i>COFFEE BREAK</i>	14:30–15:00	<i>COFFEE BREAK</i>	14:00–15:00	<i>COFFEE BREAK / Preparation of draft conclusions and recommendations</i>
15:30–15:45	4.11 Lessons learned 5: National Immunization Week as an opportunity for periodic intensification of routine immunization programme and measles elimination	15:00–15:15	<u>Country report on progress towards rubella elimination (cont.)</u>	15:00–16:00	9. Conclusions and recommendations
15:45–16:00	4.12 Lessons learned 6: School-entry immunization requirement for preventing measles virus transmission among school-aged children	15:15–15:30	6.10 Malaysia	16:00–16:40	10. Closing session
16:00–16:15	4.13 Lessons learned 7: (1) Nation-wide measles outbreak; and (2) wide-age-range MR-SIA to close immunity gaps among young adults	15:30–15:45	6.11 Mongolia		
16:15–16:30	4.14 Proposed strategies for "immunization"	15:45–16:00	6.12 New Zealand		
16:30–16:45	4.15 Proposed strategies for "programme review and risk assessment"	16:00–16:15	6.13 Papua New Guinea		
16:45–17:00	Discussion	16:15–16:30	6.14 Philippines		
		16:30–16:45	6.15 Viet Nam		
			Discussion		

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