

# Meeting Report

## Fourth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific



24–27 March 2015  
Macao Special Administrative Region of China



Participants of the Fourth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific

24–27 March 2014, Macao SAR (China)

WORLD HEALTH ORGANIZATION  
REGIONAL OFFICE FOR THE WESTERN PACIFIC

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MEETING REPORT

FOURTH ANNUAL MEETING OF THE REGIONAL VERIFICATION COMMISSION  
FOR MEASLES ELIMINATION IN THE WESTERN PACIFIC

Convened by:

WORLD HEALTH ORGANIZATION  
REGIONAL OFFICE FOR THE WESTERN PACIFIC

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## NOTE

The views expressed in this report are those of the participants of the Fourth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific and do not necessarily reflect the policies of the convener.

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 Fourth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific in Macao Special Administrative Region of China from 24 to 27 March 2015.

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- Annex 1. List of participants
- Annex 2. Meeting programme

Keywords:  
/Immunization/Measles-prevention and control/Rubella-prevention and control/Vaccination/

## SUMMARY

The Fourth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific was held in Macao SAR (China) from 24 to 27 March 2015.

The objectives of the fourth annual meeting were to review the annual progress reports of the 16 National Verification Committees (NVCs) and the Sub-Regional Verification Committee (SRVC) and make recommendations for the achievement of measles elimination; to make a determination about the achievement of measles elimination for countries and areas where requested by the NVCs/SRVC; to monitor ongoing maintenance in countries and areas that had previously been verified to have interrupted endemic measles transmission, and to monitor progress towards control of rubella and congenital rubella syndrome.

The Regional Verification Commission (RVC) members reviewed the annual progress report submitted by 16 NVCs and the SRVC. Australia, Macao SAR (China), Mongolia, and the Republic of Korea were confirmed to have sustained measles elimination after being verified in 2014. Among countries requesting verification of measles elimination, Brunei Darussalam, Cambodia, and Japan were verified as having achieved measles virus elimination for a period of at least 36 months since the time of the last known endemic case in the presence of high quality surveillance and supportive genotyping evidence.

RVC members made country- or area-specific recommendations to each of the NVCs and SRVC, as well as to WHO Regional Office for the Western Pacific and the Measles and Rubella Initiative (MRI).

## ABBREVIATIONS

cMYP	comprehensive multi-year plan
CPHL	Central Public Health Laboratory
CRS	congenital rubella syndrome
EPI	Expanded Programme on Immunization
IgG	Immunoglobulin G
IgM	Immunoglobulin M
MCV	measles containing vaccine
MCV1	first dose of measles-containing vaccine
MCV2	second dose of measles-containing vaccine
MMR1	first dose measles mumps rubella vaccine
MMR2	second dose measles mumps rubella vaccine
MR	measles-rubella vaccine
MRI	Measles and Rubella Initiative
NIID	National Institute of Infectious Diseases
NIP	National Immunization Programme
NIR	national immunization register
NVC	national verification committee
PAHO	Pan American Health Organization
PHLS	Public Health Laboratory Services
RCV	Rubella containing vaccine
RVC	Regional Verification Commission for the Western Pacific
SIA	supplementary immunization activity
SRVC	sub-regional verification committee
UNF	United Nations Foundation
UNICEF	United Nations Children's Fund
US CDC	United States Centers for Disease Control and Prevention
WHO	World Health Organization



## **1. INTRODUCTION**

### **1.1 Meeting organization**

The Fourth Annual Meeting of the Regional Verification Commission for Measles Elimination in the Western Pacific was held in Macao SAR (China) from 24 to 27 March 2015. Participants included the 14 members of the RVC, six WHO staff members from the WHO Regional Office for the Western Pacific and one staff member from WHO headquarters. Representatives from the Measles and Rubella Initiative (MRI) partners, the United Nations Foundation (UNF) and the United States Centers for Disease Control and Prevention (US CDC) also attended. The list of participants is available at Annex 1, and agenda and timetable for the meeting are available at Annex 2.

### **1.2 Meeting objectives**

The objectives of the meeting were:

- 1) to review the annual progress reports of the 16 National Verification Committees (NVCs) and the Sub-Regional Verification Committee (SRVC) and make recommendations for the achievement of measles elimination;
- 2) to make a determination about the achievement of measles elimination for countries and areas where requested by the NVCs/SRVC; and
- 3) to monitor progress towards control of rubella and congenital rubella syndrome.

## **2. PROCEEDINGS**

### **2.1 Opening session**

The meeting was called to order by Dr Sergey Diorditsa, and Dr Mark Jacobs delivered the opening remarks on behalf of Dr Shin Young-soo, Regional Director of the Western Pacific. Dr Jacobs thanked the participants for their support of measles elimination. He reviewed the resolutions of Regional Committee for the Western Pacific that established the mechanisms to form national verification committees. He acknowledged the achievement in 2014 of verifying four countries or areas in the Region as having achieved for a period of at least 36 months interruption of endemic measles virus transmission. He recognized Member State efforts to achieve measles elimination and thanked the RVC members for their willingness to continue their service.

Dr Jacobs nominated the office bearers as follows: Chair: Professor David Durrheim; Vice Chair: Dr Hiroshi Yoshikura; and Rapporteur: Dr Rose Capeding.

### **2.2 Background**

Professor David Durrheim reminded the RVC of the meeting objectives and expected outcomes.

Expected outcomes:

- to make a determination about whether the three countries requesting verification (Brunei Darussalam, Cambodia, and Japan) were successful in providing documentation that confirmed that endemic measles virus transmission was interrupted for a period of at least 36 months since the time of the last known endemic case in the presence of high quality surveillance and supportive genotyping evidence. This assessment will be done on the basis of the three elimination criteria and against the five lines of evidence.

- to make a determination about whether the four countries and territories who were verified in 2014 (Australia, Macao SAR (China), Mongolia, and the Republic of Korea) were successful in sustaining measles elimination in the past 12 months.
- to review the annual progress reports submitted by nine other NVCs and the SRVC to monitor progress towards measles elimination and control of rubella and congenital rubella syndrome.
- To make recommendations to NVCs and the SRVC about specific strategies to achieve or sustain measles elimination.

## 2.3 Global progress on measles elimination and rubella control

An update on global progress towards measles elimination and rubella control highlighted the substantial impact of vaccination on reducing morbidity and mortality. Measles has reached historically low levels with an estimated 15 million child deaths averted by measles vaccination from 2000 to 2013. Globally, routine immunization coverage with MCV1 has levelled off at 83–84% for the past five years. There is steady progress with country introductions of measles second dose and rubella vaccine. Despite these efforts, the rate of progress towards global 2015 coverage and incidence targets has slowed and these targets will not be met on time. The 2014 Report on the Global Vaccine Action Plan concluded that regional measles elimination targets were either off track (European Region, Eastern Mediterranean Region) or at risk (Western Pacific Region). Partners in the Measles and Rubella Initiative (MRI) are working with countries and regions to strengthen immunization systems, close coverage gaps, strengthen surveillance and the laboratory network, stimulate research and innovation (e.g., development of MR microneedles), and mobilize human and financial resources.

## 2.4 Regional measles elimination and rubella control progress

An update on regional progress towards measles elimination and rubella control outlined the status of countries in the Region then briefly summarized the progress towards these targets against the five lines of evidence that are used for Regional verification.

Table 1. Country classification by progress towards measles elimination in the Western Pacific Region as of March 2015

Category	Countries, Areas, Epidemiological blocks
Verified in March 2014 as having achieved elimination	Australia, Macao SAR (China), Mongolia, Republic of Korea (n=4)
Verification reports to be reviewed in March 2015	Brunei Darussalam, Cambodia, Japan (n=3)
Plan to submit verification report in March 2016	New Zealand (n=1)
May be ready for verification	Hong Kong SAR (China), Singapore (n=2)
Large outbreaks in 2013-2014 but temporally (less than 12 months) or geographically limited	Lao People's Democratic Republic, Pacific island countries and areas (n=2)
Endemic or re-established endemic transmission	China, Malaysia, Papua New Guinea, the Philippines, Viet Nam (n=5)

## 3. FINDINGS

### 3.1 NVC reports

Progress towards, achievement of, or sustainment of elimination was reviewed country by country. Documentation for verification or progress towards measles elimination was submitted by 17

countries, areas, or epidemiological blocks. Cambodia, the Lao People's Democratic Republic and the Pacific islands countries and areas submitted their first progress reports in 2015.

### **3.1.1 Australia**

**Epidemiology:** Australia was verified as having eliminated measles in 2014. There were 150 imported measles cases from January 2013 to June 2014, more than the entire previous four years. In 79% of all chains of transmission there was evidence that the index case acquired infection outside Australia. Transmission chains had a median duration of less than three weeks, and the median number of chain cases was less than four. The largest proportion of cases occurred among adolescents and young adults. A thorough analysis of unknown source cases was provided. The calculation of reproductive rate using epidemiological data was below 1 for 2013–2014.

**Quality of surveillance:** The quality of epidemiological and laboratory surveillance systems remains high with indicators achieved where data was available. Australia used laboratory submission to determine a non-measles discard rate. Consistent detection of imported cases, isolated cases and small chains of transmission demonstrate sensitivity of the surveillance system.

**Population Immunity:** In 2013, coverage estimates were close to 94% for MCV1 and above 92% for MCV2. The 2012 serosurvey indicates significantly lower seropositivity than in 2007, but the proportion of the population with no evidence of immunity is 10%. Most of the increase in susceptibility is among adolescents. National plans are being developed to address immunity gaps. In New South Wales a measles action plan has been developed for maintaining measles elimination from 2014 to 2018.

**Sustainability:** Australia has a comprehensive, publicly funded universal vaccination programme with two doses of MCV.

**Genotyping:** The genotyping pattern from January 2013 to June 2014, whereby a variety of genotypes (B3, D8, D9, G3, and H1) were identified is consistent with importations and elimination of endemic virus.

**Conclusion:** The RVC verifies that Australia has sustained the interruption of endemic measles virus transmission.

### **3.1.2 Brunei Darussalam**

**Epidemiology:** The last significant outbreak occurred in 1996, with only sporadic cases since then, commonly affecting children under-10 years. Only six laboratory-confirmed measles cases were reported from 2011 to 2014; all were laboratory-confirmed, three were imported from countries with endemic measles, two were of unknown origin, and there was one vaccine reaction.

**Quality of surveillance:** The national virology laboratory was accredited by WHO in 2014 and is now part of the WHO measles laboratory network in the Western Pacific Region. Epidemiological surveillance indicators are being met, but laboratory performance indicators are missing.

**Population Immunity:** From 2008 to 2013, MCV1 and MCV2 coverage have remained over 90%. All four districts have reported MCV1 coverage above 90% since 2000 and MCV2 over 90% since 2008. A serosurvey in 2011 among school children in Primary 4 found 78.7% of students were positive for Measles IgG. In 2008–2009, a nationwide catch-up campaign targeting children born from 2003 to 2005 and those born from 2004 to 2006 achieved MCV2 coverage of 91.9% and 98.4%, respectively. Annual screening by School Health Services found that Primary 1 students missing MCV2 has declined from 6.7% in 2010 to 0.8% in 2013.

**Sustainability:** Annually a specific budget is dedicated for vaccine procurement and outbreak management. The National Task Force for Measles, Rubella and Congenital Rubella Syndrome (CRS) Elimination monitors and reviews progress towards elimination and reports to the independent NVC.

**Genotyping:** Capacity for genotyping is not available at the national laboratory, so a formal arrangement has been made with the Victorian Infectious Diseases Reference Laboratory in Australia since November 2014 to send specimens of confirmed measles cases for genotyping.

**Conclusion:** The RVC verifies that Brunei Darussalam has achieved the interruption of endemic measles virus transmission for a period of at least 36 months in the presence of high quality surveillance.

### **3.1.3 Cambodia**

**Epidemiology:** Cambodia experienced a large outbreak with over 25 000 cases in 1999–2000. A phased, large-scale measles catch-up campaign from 2001 to 2004 resulted in a decreased incidence from 94 cases per 100 000 population in 2000 to 2.3/100 000 in 2004. There were also measles outbreaks in 2008 (4211 cases) and 2009 (4570 cases). Since 2012, Cambodia has reported no measles cases.

**Quality of surveillance:** The national reporting rate of non-measles, non-rubella cases and discarded cases has been consistently over the target, and the subnational level reached the target in 2014. Of the four provinces that did not meet the target rate, two have a population of less than 100 000. Cambodia does not meet the indicator for proportion of suspected cases with adequate investigation or proportion of specimens received at the laboratory within five days of collection. The latter is due to Cambodia using a standard of arrival of seven days.

**Population Immunity:** National measles first-dose coverage has remained above 90% since 2009. Major supplementary immunization activities (SIAs) were conducted in 2007, 2011, and 2013 (MR introduction) – all reported over 100% administrative coverage. Population immunity by birth cohort for 0–19 year olds demonstrates that most birth cohorts are covered by routine vaccination with MCV1 and SIAs. A seroprevalence study among women aged 15–39 also suggests high population immunity. High-risk areas comprise 10% of the population and were specifically targeted for SIAs in 2005 (multi-antigen) and 2014 (MR).

**Sustainability:** The Royal Government of Cambodia provides funding for routine immunization services (including MR), and has steadily increased funding for vaccines since 2013.

**Genotyping:** Genotyping data are available since 2009. D9 circulated from 2009 to 2011. H1 is believed to have been imported in 2011, and circulated for approximately six months, although the source of infection was not identified.

**Conclusion:** The RVC verifies that Cambodia has achieved the interruption of endemic measles virus transmission for a period of at least 36 months in the presence of high quality surveillance.

### **3.1.4 China**

**Epidemiology:** Measles incidence has decreased since the initiation of the elimination programme in 2006. However, in 2013 and 2014, incidence increased to 24 per million and 35 per million respectively. In 2014, 39.4% of cases were over-25 years, a larger proportion of adult cases than had been previously seen. The age distribution of cases varies considerably among the provinces.

Quality of surveillance: Most surveillance performance indicators are being met, with the exception of district-level sensitivity and certain aspects of laboratory surveillance. In 2013, specificity indicators were met, and 79.6% of the 19 measles outbreaks reported were confirmed by serology.

Population Immunity: National MCV1 and MCV2 coverage remained above 95% for 2006–2013. A national coverage survey in 2013 found MCV1 coverage of 96.3% and MCV2 coverage of 87.2%. Local coverage surveys conducted as part of outbreak investigations found MCV coverage lower than administrative coverage. In Gansu, a review reported 87% MCV1 and 72% MCV2 compared to administrative coverage above 95%. In 2010, a nationwide SIA reported overall coverage of 97.5%. In 2013, SIAs were conducted in every province, with varying target-age groups, selection criteria, and outbreak response purposes.

Sustainability: The elimination of measles is a priority public health issue for China. In 2013, China National Health and Family Planning Commission requested a national and international consultation on measles elimination and strengthening routine immunization.

Genotyping: In 2014, 2977 of 3004 measles virus isolates tested were identified as H1 genotype, the predominant genotype that has been circulating in China. Additionally 4 D9, 3 D8, 8 B3, and 1 G3 imported viruses were identified.

Conclusion: The RVC takes note of ongoing endemic measles virus transmission in China and efforts to strengthen surveillance and measles immunization coverage.

### **3.1.5 Hong Kong SAR (China)**

Epidemiology: Annual incidence of measles from 2009 to 2012 was low, reaching 1.1 per million in 2012. However, in 2013, incidence rose to 5.3 per million. Most of the cases from 2009 to 2012 occurred among children aged 0–4 years; although in 2013 58% of cases were over-15 years. In 2013, 38 cases were reported; all cases were sporadic infections and no epidemiological linkage was recorded.

Quality of surveillance: Surveillance indicators have improved, with most surveillance indicators met from 2011 to 2013. Public Health Laboratory Services serves as a WHO-accredited Regional Reference Laboratory.

Population immunity: Administrative coverage has been above 98% for MCV1 and MCV2 since 2006. Annual convenience seroprevalence studies showed greater than 95% immunity in all age groups except among adolescents 15–19 years in 2008. Onsite vaccination is provided at all primary schools in Hong Kong SAR (China).

Sustainability: The cMYP includes measles elimination, and the Government is committed to financially supporting measles elimination. The Department of Health has a multi-year plan of achieving and sustaining measles elimination for 2014–2015.

Genotyping: From 2009 to 2013, H1 and D9 genotypes have been consistently identified; B3 and D8 have also been identified.

Conclusion: The RVC concludes that Hong Kong SAR (China) may have already achieved interruption of endemic measles virus transmission and would welcome a detailed report along the five lines of evidence once the NVC has determined that the evidence supports the elimination criteria.

### **3.1.6 Japan**

**Epidemiology:** From 2008 to 2013, there was a 98% reduction in measles cases from 11 013 to 232. In 2014 there was a resurgence compared to the previous two years due to importations from other Asian countries. More than 80% of measles cases were from nine prefectures, and 53% of cases were under 19 years. Of the 386 cases confirmed in the first half of 2014, 91% were recorded as imported or import-related.

**Quality of surveillance:** In 2014, 91.8% of confirmed measles cases were laboratory-confirmed. Although the overall discard rate cannot be calculated, an analysis of private laboratories showed a national measles discard rate of 13/100 000, and 87.4% of laboratory results were available within four days. The measles and rubella laboratory at the National Institute of Infectious Diseases (NIID) is WHO accredited and serves as a Global Specialized Laboratory.

**Population immunity:** From 2009 to 2013, MCV1 coverage remained above 95% and MCV2 coverage above 90%. A successful mass vaccination campaign targeting two school-age cohorts between 2008 and 2012 addressed immunity gaps. In 2013, a serosurvey found 95.1% seropositivity for measles in people over 2 years of age. Vaccination coverage monitored annually found 1.7% of municipalities had areas where the vaccination rate was relatively low from 2008 to 2011.

**Sustainability:** An infectious diseases control law that includes measles was established in 2008. Funding for measles elimination efforts are provided through Japan's national and local governments.

**Genotyping:** Since 2011, B3, D4, D8, D9, G3, and H1, have been isolated, but evidence provided indicates that no strain has continued to circulate for 12 months. The previously endemic genotype D5 strain has not been detected since May 2010. In 2014, 77.5% of measles cases were genotyped.

**Conclusion:** The RVC verifies that Japan has achieved the interruption of endemic measles virus transmission for a period of at least 36 months in the presence of high quality surveillance and supportive genotyping evidence.

### **3.1.7 Lao People's Democratic Republic**

**Epidemiology:** The Lao People's Democratic Republic has experienced measles outbreaks in different provinces in recent years, with 58 laboratory confirmed cases in 2014. Fatal cases were reported in children as well as young adults. The majority of cases from 2011 to 2014 were reported from the Hmong Ethnic group.

**Quality of surveillance:** Case-based measles surveillance began in 2008. The national laboratory is accredited by WHO, but does not have genotyping capacity. The proportion of districts achieving the discard rate is only 26%, and 43% of districts have reported no cases in 2012–2014. A regional breakdown of surveillance indicators shows that there are gaps in each region.

**Population immunity:** The administrative national measles vaccine coverage has increased steadily from 40% in 2007 to 82% in 2013. However, there is a wide range of coverage across the districts, with 10 districts with less than 50% measles coverage. SIAs were conducted in 2007 (MCV), 2011 (MR), and 2014 (MR) targeting wide age groups and attaining coverage more than 95% for each. In 2014, preliminary serosurvey results found that among children 1–10 years, less than 80% were positive for measles antibodies, but among people over-11 years, seropositivity was above 90% for all age groups.

**Sustainability:** The Government is committed to immunization services, and there is an action plan in 2015 for achieving measles elimination. The Government has been increasing health expenditure and its contribution for purchasing vaccines; however, a fiscal deficit threatens budget cuts.

Genotyping: All measles cases in the Lao People's Democratic Republic from 2010 to 2014 were H1 genotype.

Conclusion: The RVC acknowledges the progress towards interruption of endemic measles virus transmission in the Lao People's Democratic Republic.

### **3.1.8 Macao SAR (China)**

Epidemiology: Macao SAR (China) was verified as having eliminated measles during the RVC meeting in 2014. There were three imported cases in 2013 and one imported case in 2014, all of which were laboratory confirmed, imported from mainland China, and in children under or at 1 year of age.

Quality of surveillance: Surveillance performance indicators were met. The Macao Public Health Laboratory is part of the Measles Rubella Laboratory network and was accredited in 2013.

Population Immunity: Administrative coverage in 2013 continues to be high, 98.6% for MCV1 and 96.0% for MCV2. Seroprevalence surveys were conducted annually since 2002; in 2013 the survey continued to show less than 5% seronegativity among children 2 years and older. Nursery and school entry checks, including immigrant children, are performed and updated annually. Immunizations provided in the private sector are included in the government health information system.

Sustainability: The Expanded Programme on Immunization (EPI) in Macao SAR (China) has strong policies, sufficient financial resources, an established primary health care system to assure high coverage of routine immunization, and a sensitive surveillance system. A measles outbreak response plan is reviewed regularly, as the risk of importation is significant due to tourism.

Genotyping: The only case reported in 2014 was genotyped as H1 with a history of travel to mainland China.

Conclusion: The RVC verifies that Macao SAR (China) has sustained the interruption of endemic measles virus transmission.

### **3.1.9 Malaysia**

Epidemiology: Malaysia experienced a reduction in measles cases from 2008 to 2010. However in 2011–2012, massive measles outbreaks occurred in four states, and in 2014, there were outbreaks in refugee temporary immigration depots. The percentage of measles cases attributed to the migrant population increased from 11.9% in 2011 to 47.3% in 2014. The proportion of imported measles cases increased from 0.1% in 2011 to 31.6% in 2014.

Quality of surveillance: Malaysia has met the sensitivity indicator for non-measles, non-rubella discard rate since 2009. The percentage of suspected cases with an adequate investigation and percentage of outbreaks with virological specimens were not met.

Population Immunity: Malaysia introduced MCV2 in 2002. Reported coverage with MCV1 has been above 95% since 2009 and for MCV2 above 95% since 2008. In 2011, risk assessments were done for every district and health centre operational area. Based on these findings, targeted SIAs were done to close immunity gaps among children aged 1–6 years. In 2014, targeted SIAs were conducted in the regions of Sabah, Selangor, and Kelantan.

Sustainability: Funding for immunization is secure, and measles elimination remains a stated priority. Risk assessments will be conducted once every three years; the next one is due in 2015.

Genotyping: Genotyping data since 2008 suggests D9 is endemic in Malaysia. In 2010, B3 was isolated in an area with many foreign workers. In 2011, D8 was isolated in the Klang Valley and persisted until 2014. In 2014, H1 was detected in Turkish refugees from China.

Conclusion: The RVC takes note of ongoing endemic measles virus transmission in Malaysia and efforts to strengthen surveillance and measles immunization coverage especially among migrant populations.

### **3.1.10 Mongolia**

Epidemiology: Mongolia was verified as having eliminated measles during the RVC meeting in 2014. Before the introduction of MCV, Mongolia experienced measles outbreaks every year. However since 2011, Mongolia has reported no measles cases. In 2014, Mongolia was verified as having interrupted the transmission of endemic measles for at least 36 months.

Quality of surveillance: The national non-measles discard rate is greater than 2 per 100 000, but sub-nationally sensitivity remains low. The proportion of cases with adequate investigation has improved steadily from 22% in 2008 to 100% in 2014. Adequate specimen collection has been above 80% since 2008. The national laboratory has been WHO accredited since 2005.

Population Immunity: Mongolia introduced MCV1 in 1973 and added MCV2 in 1989. In 2009, the schedule of two doses of MMR at 9 months and 2 years was adopted. Administrative coverage for both doses has been above 95% since 2006. The MICS survey found 86% MCV1 and 79% MCV2 coverage. SIAs were conducted in 2007 and 2012. A serosurvey in 2004 found children over-5 years had more than 86% seropositivity for measles.

Sustainability: Immunization services are regulated by law and provided at all levels of the health system.

Genotyping: H1 was detected in 2001, 2008 and 2009. D6 was detected in 2006.

Conclusion: The RVC verifies that Mongolia has sustained the interruption of endemic measles virus transmission.

### **3.1.11 New Zealand**

Epidemiology: Since 1997, two significant outbreaks have occurred in 2009 and 2011. The latter persisted with ongoing measles virus transmission for a period of 13 months. In 2014, 268 cases were reported. All of these cases were classified as imported or import-related, in particular from the Philippines.

Quality of surveillance: Epidemiological surveillance sensitivity indicators were met in 2014. Although timeliness indicators are not reported by WHO standards, they are likely to be met, and adequate investigation data will be systematically collected in the future. The national measles and rubella laboratory is WHO-accredited. Analysis of 2011–2012 data suggests all laboratory indicators for surveillance were met.

Population Immunity: Birth cohort analysis shows that MMR1 vaccination coverage has been over 94% since 2009 but has never reached 95%. MMR2 coverage is around 89% for children born from 2006 to 2008. A serosurvey from 2005 to 2007 estimated that the population born between 1990 and 2000 has the lowest immunity, 87–89%. Maori children have traditionally had lower vaccination coverage. The rate of refusals for MMR appears to be decreasing over time.

Sustainability: Immunization is one of the Government's 10 key priority areas. The national immunization register facilitates tracing children who have not received MMR vaccination.



Genotyping: The main outbreaks for 2013–2014 were due to B3 genotypes imported from the Philippines. Importations of other genotypes did not result in outbreaks.

Conclusion: The RVC concludes that New Zealand appears to be well on track to achieving sustained (36 months) interruption of endemic measles virus transmission.

### **3.1.12 Pacific island countries and areas**

Epidemiology: From 2006 to 2013, no measles outbreaks were reported. However, in 2014, the Federated States of Micronesia had an outbreak in three of four states, believed to have been imported from the Philippines. All of the measles cases occurring in the Pacific since 2012 are considered imported or import-related. Solomon Islands and Vanuatu have had large-scale outbreaks subsequent to report submission.

Quality of surveillance: Hospital Based Active Surveillance was established in 1997, with 61 hospitals in 21 Pacific island countries and areas reporting. In 2010, syndromic surveillance was established for acute fever and rash, and the reporting rate is now 75%. The sensitivity of surveillance for the countries and areas as a block meets the target, but sensitivity at country and area level is below the target indicator. No laboratory surveillance indicators were presented.

Population Immunity: All Pacific island countries and areas provide MCV1 and all but Solomon Islands and Vanuatu provide MCV2. Samoa, Solomon Islands and Vanuatu reported less than 80% MCV1 coverage, and the six United States affiliated Pacific Islands are considered to have sub-optimal coverage. In 1997–1998, 14 countries and areas conducted a synchronized catch-up campaign, and coverage ranged from 77% –100%. SIAs are conducted regularly when the estimated susceptible population is estimated to be more than one birth cohort or as part of rubella containing vaccine introduction.

Sustainability: Sustainability varies among Pacific island countries and areas, with 10 countries funding their own vaccine procurement and 11 relying on donor funding. Nine of the countries and areas have school immunization laws requiring measles containing vaccine prior to school entry. There is generally strong government support for immunization programmes.

Genotyping: Limited virus isolates from the Pacific island countries and areas have been genotyped. The 2014 outbreak from the Federated States of Micronesia shows all genotype B3 identical to B3 from the Philippines, Harare lineage.

Conclusion: The RVC acknowledges the progress towards interruption of endemic measles virus transmission in the Pacific islands countries and areas.

### **3.1.13 Papua New Guinea**

Epidemiology: Since the outbreak of measles in 2004, no confirmed measles case was detected until 2012. Papua New Guinea reported 2320 lab confirmed measles cases from 22 provinces from September 2013 to December 2014 and 60 823 clinically confirmed measles cases, with 365 deaths.

Quality of surveillance: Case-based surveillance started in 2008, but epidemiological surveillance indicators have not reached the required targets. The national laboratory is accredited by WHO. Surveillance sensitivity was sufficient to detect rubella outbreaks in 2011–2012 as well as dengue and chikungunya outbreaks in 2011–2012 and the measles outbreak in 2013.

Population Immunity: The reported national MCV 9 month coverage has increased from 54% in 2008 to 67% in 2012, and coverage surveys showed improvement from 82% in 2005 to 86% in 2007–2009. The SIA coverage in 2012 achieved 88% coverage and delivered routine vaccines to hard-to-reach communities. Introduction of a second dose of measles will be using MR vaccine at 18–24 months.

**Sustainability:** The Government funds 81% of the costs for routine immunization vaccines and is committed to sustaining routine immunization. The measles elimination activities are outlined as a line budget item in the cMYP 2011–2015. The Reaching Every District (RED)/Reaching Every Child (REC) initiative was developed to improve EPI coverage.

**Genotyping:** No genotyping data provided.

**Conclusion:** The RVC takes note of ongoing measles virus transmission in Papua New Guinea, and efforts to strengthen surveillance and measles immunization coverage.

### **3.1.14 Philippines**

**Epidemiology:** In 2013–2014, the Philippines experienced the highest number of measles cases (21 489 confirmed, 31 594 compatible) in over 10 years, and virus continues to circulate despite a nationwide SIA with 91% coverage and several smaller outbreak response immunization activities. The age group most affected was children under-5 years. The outbreak affected all 17 regions in 2014, and measles deaths increased from 63 in 2013 to 312 in 2014.

**Quality of surveillance:** The widespread outbreak resulted in increased reporting of suspect measles cases; however, this overwhelmed the surveillance system. Only 48.0% of cases were adequately investigated, and 69.1% had adequate specimens. Monitoring visits in 2014 identified surveillance gaps. The national laboratory is WHO-accredited and activated an incident command system to increase capacity and prioritize testing of specimens during the peak of the outbreak in 2014.

**Population Immunity:** In 2014 MCV1 and MCV2 coverage was 74% and 54% respectively, and SIA coverage was 91%. A post-disaster SIA and outbreak response immunizations reached almost 2 million children 6–59 months old. An immunity profile identified approximately 2.7 million susceptible children.

**Sustainability:** The Philippines cMYP for 2015–2019 has been drafted. A school-based MR vaccination for students 10–15 years was introduced in 2012, but not all schools are included. Provisions have been made for routine immunization strengthening through the Reach Every Province strategy, SIAs to interrupt measles transmission, sharing outbreak response immunization guidelines, capacity-building, and strengthening measles surveillance and laboratory capacity.

**Genotyping:** Genotyping data is limited prior to 2010. G3 was detected from 2008–2010; D9 in 2009–2012 and 2014; and B3 in 2013–2014.

**Conclusion:** The RVC takes note of ongoing endemic measles virus transmission in the Philippines and efforts to strengthen surveillance and measles immunization coverage.

### **3.1.15 Republic of Korea**

**Epidemiology:** The Republic of Korea was verified as having eliminated measles during the RVC meeting in 2014. In 2014, 438 confirmed measles cases were reported, the highest number since the Republic of Korea declared elimination in 2006. Cases were distributed across all age groups, and 31.5% of cases reported having received 2 doses of MMR. Twenty-two outbreaks accounted for 90.4% of cases, with a median duration of four weeks. All cases were laboratory confirmed, and 97.0% were imported or import-related.

**Quality of surveillance:** Since the sensitivity indicator was not met by the passive surveillance system, the country implemented an active surveillance programme which had an 11.5/100 000 discard rate, with 94% of counties achieving the target. The specificity indicator of suspected cases with adequate blood specimens was not met, as respiratory specimens were preferred in outbreaks that mostly

affected infants. The Republic of Korea has established a Measles Expert Committee for case classification.

**Population immunity:** Nationwide coverage surveys found MMR1 coverage of 99.6% in 2013, and MMR2 coverage of 97.3% in 2012. According to registry data for school entry, MCV2 coverage has remained above 97.0% since 2008. In 2010, overall seropositivity was 86.0%, and birth cohorts 1994–1996 showed lower levels of seropositivity than other birth cohorts. A national serosurvey is being done in 2015.

**Sustainability:** The Republic of Korea has had a national measles elimination programme since 2001. Funding for two doses of MMR vaccine is provided by the Government.

**Genotyping:** In 2013–2014, the predominant genotype was B3, with a few cases of H1 and D8. The B3 cases without identified epidemiological linkage were in 3 areas and were separate outbreaks, with a three month interval and geographic distance. Genetic sequencing of the B3 virus suggests that they were from different sources of importation. Thus B3 did not circulate for 12 months; no cases have been reported since August 2014.

**Conclusion:** The RVC verifies that the Republic of Korea has sustained the interruption of endemic measles virus transmission.

### **3.1.16 Singapore**

**Epidemiology:** A total of 262 laboratory confirmed cases of measles were reported between 2009 and 2013. The highest incidence rate was among infants under 1 year of age. Among the three major ethnic groups, Malays had the highest incidence rate. Of the 132 cases in 2014, 95 were classified as locally acquired and 37 imported, mostly from the Philippines.

**Quality of surveillance:** The national laboratory is WHO accredited and meets laboratory surveillance indicators, but epidemiological surveillance indicators have not yet been met. Singapore does not meet the adequate blood specimen indicator because more respiratory specimens than blood specimens are collected.

**Population Immunity:** Measles first dose coverage has remained around 95% since 2004. The second dose of MMR vaccine was brought forward from 11–12 years to 6–7 years in 2008, and down to 15–18 months in 2011 based on the epidemiology of measles cases. The National Immunization Registry is used in following up children that are not fully vaccinated. A seroprevalence survey among children 1–17 years from 2008 to 2010 found a prevalence of 83.1% for measles-specific antibodies.

**Sustainability:** No data were presented, although country commitment appeared to be very high.

**Genotyping:** The dominant genotypes were B3/D9 in 2012, G3/D9 in 2013, and B3 in 2014. The variation and pattern of genotypes (D8, G3, and H1 in 2014) detected is indicative of importations from other countries.

**Conclusion:** The RVC concludes that Singapore may have already achieved interruption of endemic measles virus transmission and would welcome a detailed report along the five lines of evidence once the NVC has determined that the evidence supports the elimination criteria.

### **3.1.17 Viet Nam**

**Epidemiology:** In 2013–2014, Viet Nam experienced an unprecedented rise in measles outbreaks, with 5567 confirmed cases from all 63 provinces in 2014. The incidence rate was highest among under-1 year olds, and children under 10 years of age accounted for 72% of cases. Measles incidence mostly correlated with unvaccinated status.

Quality of surveillance: Case-based surveillance started in 2002. In general, epidemiological surveillance indicators improved from 2012 to 2014, with all specificity indicators being met; however timeliness indicators remain low. There are four measles laboratories, two of which have been certified by WHO.

Population Immunity: MCV1 coverage has remained more than 95% since 2008. MCV2 coverage was more than 95% from 2005 to 2010 but dropped below 90% from 2012 to 2014, when the target age was changed from 6 years to 18 months. Coverage varies among provinces, but 56 of 63 achieved MCV1 above 95% in 2013. In 2014–2015, Viet Nam conducted the largest nationwide SIA, targeting 23 million children aged 1–14 years with MR vaccine. There is concern for the under-reached population in mountainous territories.

Sustainability: The EPI programme is a high priority and vaccines are provided at no cost for all children.

Genotyping: Since 2006, most genotyped viruses in Viet Nam have been H1. In 2013, D3 was identified, and in 2014, D8 and B3 were also identified.

Conclusion: The RVC notes ongoing measles virus transmission in Viet Nam and efforts to strengthen surveillance and measles immunization coverage.

### 3.2 General Conclusions

- The RVC considered the utility of identifying genotype A (vaccine genotype) specimens as an indicator of surveillance performance, but concluded that the disadvantages outweighed possible benefits.
- The RVC advises NVCs that in populations with more than 95% vaccination coverage, the majority of confirmed measles cases will occur in vaccinated people<sup>1</sup> and that this “vaccine paradox” should be expected and is not necessarily an indication of decreased vaccine potency nor waning population immunity.
- Occasionally among vaccinated people, measles will present with less severe symptoms. These cases should be investigated and reported similarly to all other confirmed measles cases.

## 4. RECOMMENDATIONS

### 4.1 General recommendations to all NVCs

The RVC acknowledges the excellent reports received from the NVCs and thanks the NVCs and their secretaries for their work in preparing such high-quality, thorough reports.

- 1) The RVC emphasizes the need for collection of clinical specimens from all suspected measles cases. When large-scale outbreaks occur, clinical specimens should be collected from all cases early in the outbreak. However, depending on the epidemiological and laboratory capacity after initial confirmation, specimens may be collected only periodically (e.g., if the outbreak persists more than 30 days) or when suspected cases are reported from new districts/provinces where the diagnosis has not yet been confirmed. Serological testing for measles specific IgM or viral detection by PCR are the preferred methods for laboratory confirmation of measles. In settings where blood collection is not practical (e.g. young infants) respiratory or urine samples should be collected and this indicated in the NVC report.

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<sup>1</sup> Poland, G. Jacobson, R. Failure to reach the goal of measles elimination. Apparent paradox of measles infections in immunized persons. Arch Intern Med. 1994 Aug 22;154(16):1815-20 (accessed on 13 May 2015 at <http://www.ncbi.nlm.nih.gov/pubmed/8053748>).

- 2) In all suspected measles and rubella cases (or acute febrile rash illness cases), testing for both measles and rubella should be completed.
- 3) The RVC notes that after verification of interruption of endemic measles virus transmission, import-related measles cases and chains of transmission will continue to occur. To sustain “elimination” status, countries and areas should achieve rapid interruption of measles virus transmission through sustained high immunization coverage.
- 4) Total measles incidence is a useful measure for progress towards elimination but is not an essential criterion for verification of measles elimination.
- 5) The RVC requests that all countries with CRS surveillance begin including CRS information in their annual NVC reports.
- 6) The RVC requests that all countries submit measles risk assessments, and outbreak and response plans with their annual NVC reports, if not previously provided. The recently published risk assessment standardized global method by Lam et al (2015)<sup>2</sup> is a useful approach.

#### **4.1.1 Recommendations to the NVC of Australia**

- 1) The RVC congratulates Australia on the thorough report, their ongoing efforts to sustain measles elimination, and appreciates the progress report on implementation of the 2014 RVC recommendations, including a commitment to close the immunity gap amongst teenagers in New South Wales.
- 2) The RVC recommends consideration of a national plan to address the emerging immunity gap in teenagers and young adults in other states. Historical review of immunization coverage using the immunization register may assist in targeting lower coverage communities.
- 3) The RVC encourages the publication of the elimination assessment to share success and methods with other countries.
- 4) The RVC requests that the next report include:
  - a. the non-measles, non-rubella discard rate for NSW;
  - b. the results of:
    - i. the analysis of data at the national laboratory on what proportion of specimens are received within 5 days of collection;
    - ii. coverage of MCV2 with the strategy of moving MMR-V down to 18 months;
    - iii. the serosurvey refinements, particularly the seropositivity in the adolescent age group.
  - c. evidence towards rubella elimination, and further evidence of elimination should be provided by presenting rubella/CRS epidemiology, source of infection, surveillance, population immunity and genotyping in parallel to measles data.

#### **4.1.2 Recommendations to the NVC of Brunei Darussalam**

- 1) The RVC congratulates Brunei Darussalam on the thorough report and detailed responses to additional queries provided by the NVC of Brunei Darussalam.

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<sup>2</sup> Lam E., Schluter WW, Maresha BG., Tebeb N., Bravo-Alcantara P., Shefer A., et al. Development of a District-Level Programmatic Assessment Tool for Risk of Measles Virus Transmission. *Risk Anal.* 2015. doi: 10.1111/risa.12409.

- 2) The RVC requests that future reports include:
  - a. performance against the laboratory surveillance indicators included on page 10 of the verification guidelines;
  - b. more detail on the measles vaccination of foreign workers;
  - c. a section on the line of evidence for programme sustainability;
  - d. a section on the line of evidence for genotyping data;
  - e. a completed risk assessment;
  - f. an outbreak preparedness and response plan;
- 3) The RVC endorses the recommendations made by the NVC.
- 4) The RVC recommends that any future chains of transmission be genotyped, which may require the collection of virological specimens at the time of first contact with a suspected case and not waiting until serological confirmation.

#### **4.1.3 Recommendations to the NVC of Cambodia**

- 1) The RVC congratulates Cambodia on the thorough report and detailed responses to additional queries provided by the NVC of Cambodia.
- 2) Although Cambodia has achieved elimination of measles, the RVC notes with concern gaps in routine immunization and surveillance that should be addressed including:
  - a. variable and heterogeneous MCV1 and MCV2 coverage;
  - b. sensitivity of surveillance at the subnational level; and
  - c. adequacy of case investigation.
- 3) As measles elimination was achieved through the administration of regular high quality SIAs, Cambodia should plan to continue with regularly scheduled SIAs to prevent the accumulation of susceptibles until more than 95% coverage is achieved with both doses of MR vaccine in the routine programme.
- 4) The RVC strongly endorses the plan to continue with the high risk community approach and proposed school entry screening and vaccination programmes.
- 5) The RVC takes note of the risk of measles importation due to population movements from neighbouring countries. Cambodia should develop strategies to address this risk in partnership with these countries.
- 6) High childhood mortality may be indicative of weaknesses in the health-care system that would be strengthened by further improvements in routine immunization rather than reliance on SIAs.
- 7) Hospital-based surveillance for suspected measles cases or complications of measles may be considered for enhanced measles surveillance.
- 8) The RVC looks forward to completion of the risk assessment and outbreak preparedness and response plans.

#### **4.1.4 Recommendations to the NVC of China**

- 1) The RVC congratulates China on the thorough report and supports the recommendations of the China NVC.

- 2) The RVC notes efforts to study why measles outbreaks are occurring among children in provinces/districts with very high reported administrative vaccination rates and welcomes the results of these analyses in future reports.
- 3) The RVC recommends finalizing the province-specific risk assessments.
- 4) The RVC notes greatly reduced measles virus transmission following the implementation of the high quality nationwide measles SIAs in 2010. Based on province-specific risk assessments, strategies including additional SIAs may be considered as a mechanism to interrupt ongoing measles virus transmission.
- 5) The progress towards measles elimination is heterogeneous across China's provinces. The preparation of province-specific progress reports along the five lines of evidence would assist the China NVC to provide province-specific recommendations to address immunity and surveillance gaps.
- 6) The RVC would welcome additional provincial level details in future NVC reports.
- 7) The RVC recommends consideration of health worker vaccination against measles and strengthening of infection control practices to reduce nosocomial transmission risks.
- 8) The RVC acknowledges the importance of cross border collaboration in controlling the spread of measles virus across province and country borders.

#### **4.1.5 Recommendations to the NVC of Hong Kong SAR (China)**

- 1) The RVC congratulates Hong Kong SAR (China) for the thorough report but notes that a detailed epidemiological analysis of confirmed cases/chains of transmission, preferably with genotyping data, will be required to confirm sources of infection.
- 2) The RVC suggests the development of a targeted approach to address vulnerable groups, including migrants to ensure no pockets of susceptibility remain.
- 3) The RVC looks forward to the outcomes of the 2014–2015 action plan for achieving and sustaining measles elimination in Hong Kong SAR (China).

#### **4.1.6 Recommendations to the NVC of Japan**

- 1) The RVC congratulates Japan on the thorough report and detailed responses to additional queries provided by the NVC of Japan.
- 2) Additional points that would strengthen future reports include:
  - a. more complete description of all outbreaks rather than examples;
  - b. detail on the age of cases to identify immunity gaps;
  - c. mapping of cases with unknown source by genotype, and temporal and geographic distribution.
- 3) The RVC recommends that the NVC of Japan encourages maintaining the high MCV1 coverage and consider mechanisms to improve MCV2 coverage.

#### **4.1.7 Recommendations to the NVC of the Lao People's Democratic Republic**

- 1) The RVC congratulates the NVC of the Lao People's Democratic Republic on its first report and acknowledges that considerable progress has been made towards achieving interruption of endemic measles virus transmission.

- 2) The RVC notes with concern the high proportion of measles cases in recent years among children of an age that should have been protected through routine or supplemental vaccination.
- 3) The RVC is also concerned that recommended targets for the following are not being met:
  - a. MCV1 routine coverage in many districts;
  - b. proportion of districts reporting at least 2 non-measles, non-rubella cases per 100 000 population; and
  - c. proportion of cases with adequate specimen collection.
- 4) The RVC strongly endorses the recommendations of the NVC that include:
  - a. increase MCV coverage, particularly among high-risk ethnic groups;
  - b. strengthen outbreak preparedness and response capacity, particularly in provinces bordering countries where measles is endemic; and
  - c. achieve the surveillance performance targets.
- 5) The RVC recommends continuing regular SIAs to prevent the accumulation of susceptibles until more than 95% coverage is achieved with two doses of MR vaccine in the routine programme.

#### **4.1.8 Recommendations to the NVC of Macao SAR (China)**

- 1) The RVC congratulates Macao SAR (China) on the thorough report and their ongoing efforts to sustain measles elimination.
- 2) The RVC requests Macao SAR (China) to provide a formal risk assessment that includes strategies to protect infants traveling to locations with measles outbreaks or endemic measles virus transmission.
- 3) The RVC recommends the development of a national plan for rubella elimination and CRS prevention if not in place. The RVC requests the NVC to provide rubella epidemiology, source of infection, surveillance, population immunity and genotyping in parallel to measles data.
- 4) The RVC encourages the publication of the elimination assessment to share success and methods with other countries.

#### **4.1.9 Recommendations to the NVC of Malaysia**

- 1) The RVC congratulates Malaysia for this year's more thorough report.
- 2) In future reports, the RVC requests the submission of detailed MCV2 coverage.
- 3) Strategies to address district level immunity gaps may be further considered. Nationwide SIAs may be urgently considered to close immunity gaps.
- 4) The RVC recommends the use of the recently finalized global measles risk assessment tool.
- 5) In section 6.3.1. of the NVC report reference is made to the RVC recommending lowering the age of MCV1. This is not correct; the RVC does not recommend decreasing the age of MCV1. The 2014 RVC recommendation supports the 2012 and 2013 TAG recommendations to provide MCV2 in the second year of life.



#### **4.1.10 Recommendations to the NVC of Mongolia**

- 1) The RVC congratulates Mongolia on the thorough report.
- 2) The RVC requests that future reports include:
  - a. additional details of ongoing surveillance strategies in Ulaanbaatar, other cities and provinces, as a result of the low proportion of second administrative level units reporting at least two discarded measles cases; and
  - b. additional details on survey methods, noting the difference between reported administrative coverage (Tables 18 & 19) and surveyed coverage (Table 20).
- 3) A detailed risk assessment should be completed with particular attention to settings where measles outbreaks may be more likely, such as universities or the military.

#### **4.1.11 Recommendations to the NVC of New Zealand**

- 1) The RVC congratulates New Zealand on the thorough report.
- 2) The RVC recommends that New Zealand finalize the establishment of an independent NVC.
- 3) The RVC requests that future reports:
  - a. use standardized case definitions consistent with those defined in the *Guidelines on Verification of Measles Elimination in the Western Pacific Region*, particularly cases with no known source of infection should be classified as “unknown” rather than as import-related;
  - b. Provide detailed descriptions of outbreaks and chains of transmission to accompany the detailed genotyping data.
- 4) The RVC noted the trend of decreasing routine immunization coverage among Maori populations despite recent efforts to increase coverage in this population.
- 5) The RVC looks forward to the results of the planned 2015 serosurvey.

#### **4.1.12 Recommendations to the SRVC of Pacific island countries and areas**

- 1) The RVC congratulates the SRVC for the Pacific island countries and areas on its first report and acknowledges the progress towards achieving interruption of endemic measles virus transmission in this huge geographic area.
- 2) The RVC supports the recommendations of the SRVC in particular:
  - a. closing immunity gaps;
  - b. strengthening surveillance sensitivity, including capacity-building;
  - c. that Solomon Islands and Vanuatu should take steps to introduce routine measles second dose vaccination and that Vanuatu should introduce rubella vaccine following a wide age range catch up campaign. Once rubella vaccine is introduced more than 80% coverage should be achieved through routine immunization or SIAs.
  - d. clear mapping of laboratories to be used for testing of clinical specimens collected for disease confirmation. This mapping should include instructions for clinical specimen collection and shipping.
- 3) The RVC requests that detailed reports on the 2014 and 2015 outbreaks, including lessons learnt, be included in the next SRVC report.
- 4) The RVC recommends strengthening the diagnostic capacity of the subregional laboratories.

#### **4.1.13 Recommendations to the NVC of Papua New Guinea**

- 1) The RVC congratulates Papua New Guinea on its comprehensive assessment of the current situation and supports the recommendations of the NVC.
- 2) The RVC requests that a detailed report of the 2014–2015 outbreak, with lessons learnt, be included in the next NVC report.
- 3) The RVC suggests that steps be taken to harmonize the HMIS and measles case-based data so that all suspected cases are investigated with a laboratory specimen.
- 4) The RVC welcomes Papua New Guinea's plan to conduct a wide-age-range MR SIA followed by the introduction of rubella and measles second dose in the routine programme. Once rubella vaccine is introduced more than 80% coverage should be achieved through routine or SIAs.
- 5) The RVC endorses the implementation of RED/REC strategies to provide routine immunizations to every child.
- 6) The RVC recommends continuing regular SIAs to prevent the accumulation of susceptibles until more than 95% coverage is achieved with two doses of MR vaccine in the routine programme.

#### **4.1.14 Recommendations to the NVC of the Philippines**

- 1) The RVC congratulates Philippines on the thorough report and acknowledges achievement of 91% coverage during the 2014 nationwide MR SIA especially given recent natural disasters.
- 2) The RVC endorses the recommendations of the NVC but recognizes that these activities may need to be prioritized to fit the available resources. In particular, the RVC supports:
  - a. implementation of the high-risk-communities approach and development of strategies to vaccinate hard-to-reach children; and
  - b. the school-based immunization strategy.
- 3) The RVC recommends continuing regular SIAs to prevent the accumulation of susceptibles until more than 95% coverage is achieved with two doses of MR vaccine in the routine programme.

#### **4.1.15 Recommendations to the NVC of Republic of Korea**

- 1) The RVC congratulates the NVC of the Republic of Korea on the thorough report and ongoing efforts to sustain measles elimination.
- 2) The RVC appreciates the progress report on implementation of the 2014 RVC recommendations.
- 3) The RVC notes the apparent lower immunity that was found among birth cohorts born from 1994 to 1998 in the 2002 and 2010 serosurveys as well as the report of several university related outbreaks. If lower immunity is confirmed in this age group in the 2015 serosurvey, strategies should be considered to close this immunity gap.
- 4) The RVC notes with appreciation the establishment of a measles expert committee to classify suspected cases as best practice.

- 5) The RVC recommends consideration of health worker immunization and strengthened infection control practices to reduce the risk of nosocomial transmission.
- 6) The RVC requests that future reports include:
  - a. a systematic risk assessment; and
  - b. more detailed descriptions of outbreaks, including the duration of each outbreak.

#### **4.1.16 Recommendations to the NVC of Singapore**

- 1) The RVC congratulates Singapore on the thorough report, and recommends that the Singapore NVC provide detailed epidemiological and genotyping data (including sequence analysis, if available) of cases in recent years.
- 2) The RVC recommends the use of standardized case classification for source of transmission. Cases identified as “locally acquired” should be re-classified by source of transmission: “import-related”, “unknown” or “endemic”.
- 3) The RVC notes that total measles incidence is not an essential criterion for measles elimination.
- 4) The RVC recommends that serological confirmation and genotyping be completed on as high a proportion of cases as possible.

#### **4.1.17 Recommendations to the NVC of Viet Nam**

- 1) The RVC congratulates Viet Nam on the thorough report and endorses the recommendations of the NVC in particular:
  - a. the need to improve MCV1 and MCV2 coverage;
  - b. use of school entry as an opportunity to ensure that all children have received two documented doses of MR vaccine.
- 2) The RVC recommends continuing regular SIAs to prevent the accumulation of susceptibles until more than 95% coverage is achieved with two doses of MR vaccine in the routine programme.
- 3) The RVC acknowledges the importance of cross border collaboration in controlling the spread of measles virus across country borders.

### **4.2 Recommendations to WHO and MRI partners**

#### **4.2.1 Recommendations to WHO headquarters**

- 1) The RVC requests that WHO headquarters finalize the guidelines on best practices for implementing serological surveys.

#### **4.2.2. Recommendations to WHO Regional Office for the Western Pacific**

- 1) The RVC requests that the WHO secretariat update the *Guidelines on Verification of Measles Elimination in the Western Pacific Region* to include:
  - a. a revised definition of a measles outbreak as "two or more linked cases".
  - b. a more useful definition of epi-linked cases by providing epidemiological examples.
  - c. a note that classification of import-related can be based on genotyping data in the absence of supportive epidemiological data.
  - d. modified reporting requirements for documenting maintenance of elimination for previously verified countries.

- e. revised terms of reference for the RVC in relation to rubella elimination and CRS control.
  - f. additional guidance on reporting of genotyping data for both measles and rubella.
  - g. guidance on monitoring progress towards and achievement of rubella elimination along the five lines of evidence and suggested reporting format.
- 2) The RVC requests that the Secretariat consider optimal timing for holding annual RVC meetings to allow review of the most current country data, including immunization coverage.
  - 3) The RVC requests that the Secretariat seek permission to share NVC reports from verified countries with NVCs of countries close to verification.

#### **4.2.3 Recommendations to SAGE**

- 1) The Global Laboratory Network (LabNet) and the Strategic Advisory Group of Experts (SAGE) on Immunization are requested to provide additional guidance on the diagnostic and programmatic implications of accepting respiratory or urine specimens as adequate for surveillance purposes.
- 2) The RVC requests guidance on the optimal age of first routine dose vaccination based on the immunogenicity and safety of combination (MR and MMR) vaccines in children aged 6 to 12 months.

#### **4.3 Partner comments**

Ms. Andrea Gay recognized the preparation and participation by all RVC members. She stressed the importance of the Western Pacific's achievements to the world, as the Americas needs another region to eliminate measles. The Western Pacific Region's efforts to publicize the progress being accomplished, distinguishes this Region from others. Given that the 2015 goals are unlikely to be met, it is critical to report this Region's progress to encourage other regions. The South-East Asia Region's commitment to elimination by 2020 is a good opportunity to coordinate efforts and share experiences, given shared borders and importations across the regions. The MRI is committed to supporting the Western Pacific Region, and has done so traditionally with communications support. The MRI is also willing to support the Region in other ways, including advocacy visits, as required. Lastly she expressed appreciation to the WHO secretariat for their support to the meeting.

Dr. Steve Cochi expressed the value of the RVC to the Region and the world. He thanked the RVC members for their work and noted global level innovation in the Western Pacific Region. The RVC is ahead of other regions in grappling with issues, finding solutions, and this will reap benefits globally. As the South-East Asia Region is preparing to create an RVC, Dr. Cochi noted the value for the chair of SEAR to attend next year's meeting. The RVC process provides a complete regional picture and guides the secretariat on how to support countries most effectively. Finally, the RVC's most important value is at the country level because it has increased the visibility of the challenges and needs within each country, and created a process of greater ownership by countries to evaluate their situation through NVCs.

#### **4.4 Closing session**

Closing comments on behalf of the Regional Director for the Western Pacific were shared by Dr Mark Jacobs. The MRI were recognized as important partners who have continued to move forward the agenda of measles and rubella elimination in the Western Pacific Region and worldwide. The members of the RVC were thanked for their efforts in reviewing the NVC reports, preparing for the RVC meeting, and identifying country-specific conclusions and recommendations. Finally, the verification of the three additional countries along with the four countries and areas verified in 2014 represents an important stride forward in the Region's goal of achieving measles elimination.

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FOURTH ANNUAL MEETING OF THE REGIONAL VERIFICATION COMMISSION FOR MEASLES ELIMINATION  
 IN THE WESTERN PACIFIC  
 Macao SAR (China), 24–27 March 2015

12 March 2015  
 English only

TIMETABLE

Time	Tuesday, 24 March 2015	Time	Wednesday, 25 March 2015	Time	Thursday, 26 March 2015	Time	Friday, 27 March 2015
08:00–08:30	<b>REGISTRATION</b>	08:00–08:30	10. Review recommendations from Day 1	08:00–08:30	21. Review recommendations from Day 2	08:00–08:30	34. Review recommendations from Day 3
08:30–09:00	Opening Session <ul style="list-style-type: none"> <li>• Opening remarks</li> <li>• Self-introduction</li> <li>• Administrative announcements</li> </ul>	08:30–09:15	11. Report from Australia	08:30–09:00	22. Report from Hong Kong SAR (China)	08:30–09:00	35. Report from the Philippines
		09:15–09:45	12. Draft recommendations for Australia	09:00–09:30	23. Draft recommendations for Hong Kong SAR (China)	09:00–09:30	36. Draft recommendations for the Philippines
09:00–09:45	<i>GROUP PHOTO AND COFFEE BREAK</i>	09:45–10:15	<i>COFFEE BREAK</i>	09:30–10:00	<i>COFFEE BREAK</i>	09:30–10:00	<i>COFFEE BREAK</i>
09:45–10:00	1. Meeting objectives	10:15–11:00	13. Report from Macao SAR (China)	10:00–10:30	24. Report from the Lao People's Democratic Republic	10:00–10:30	37. Report from Singapore
10:00–10:30	2. Global progress on measles elimination and rubella control	11:00–11:30	14. Draft recommendations for Macao SAR (China)	10:30–11:00	25. Draft recommendations for the Lao People's Democratic Republic	10:30–11:00	38. Draft recommendations for Singapore
10:30–11:00	3. Regional progress on measles elimination and rubella control	11:30–12:15	15. Report from Mongolia	11:00–11:30	26. Report from Malaysia	11:00–11:30	39. Report from Viet Nam
11:00–12:00	4. Report from Brunei Darussalam			11:30–12:00	27. Draft recommendations for Malaysia	11:30–12:00	40. Draft recommendations for Viet Nam
12:00–13:00	<i>LUNCH BREAK</i>	12:15–13:15	<i>LUNCH BREAK</i>	12:00–13:00	<i>LUNCH BREAK</i>	12:00–13:30	<i>LUNCH BREAK</i>
13:00–13:30	5. Draft recommendations for Brunei Darussalam	13:15–13:45	16. Draft recommendations for Mongolia	13:00–13:30	28. Report from New Zealand	13:30–14:00	41. Review recommendations from Friday morning session
13:30–14:30	6. Report from Cambodia	13:45–14:30	17. Report from the Republic of Korea	13:30–14:00	29. Draft recommendations for New Zealand	14:00–14:30	42. Closing session: <ul style="list-style-type: none"> <li>• Comments by Observers                             <ul style="list-style-type: none"> <li>○ UN Foundation</li> <li>○ US CDC</li> </ul> </li> <li>WHO Closing remarks</li> </ul>
14:30–15:00	7. Draft recommendations for Cambodia	14:30–15:00	18. Draft recommendations for the Republic of Korea	14:00–14:30	30. Report from Pacific island countries and areas		
				14:30–15:00	31. Draft recommendations for the Pacific island countries and areas		



15:00–15:30	<i>COFFEE BREAK</i>	15:00–15:30	<i>COFFEE BREAK</i>	15:00–15:30	<i>COFFEE BREAK</i>	14:00–14:30	<i>COFFEE BREAK</i>
15:30–16:30	8. Report from Japan	15:30–16:15	19. Report from China	15:30–16:00	32. Report from Papua New Guinea		
16:30–17:00	9. Draft recommendations for Japan	16:15–16:45	20. Draft recommendations for China	16:00–16:30	33. Draft recommendations for Papua New Guinea		
19:00–20:00	Dinner hosted by the Government of Macao SAR (China)	18:00–19:00	Regional Director's Reception				



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