EIGHTH ANNUAL MEETING OF THE REGIONAL VERIFICATION COMMISSION FOR MEASLES AND RUBELLA ELIMINATION IN THE WESTERN PACIFIC

16–20 September 2019
Hanoi, Viet Nam
Participants of the Eighth Annual Meeting of the Regional Verification Commission for Measles and Rubella Elimination in the Western Pacific
16 to 20 September 2019
Hanoi, Viet Nam
MEETING REPORT

EIGHTH ANNUAL MEETING OF THE REGIONAL VERIFICATION COMMISSION FOR 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 Eighth Annual Meeting of the Regional Verification Commission for 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 Eighth Annual Meeting of the Regional Verification Commission for Measles and Rubella Elimination in the Western Pacific in Hanoi, Viet Nam 16 to 20 September 2019.
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Annex 1. List of participants
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Keywords:
Measles – prevention and control / Rubella – prevention and control / Vaccination / Disease eradication
1. INTRODUCTION

1.1 Meeting organization

The Eighth Annual Meeting of the Regional Verification Commission (RVC) for Measles and Rubella Elimination in the Western Pacific was held in Hanoi, Viet Nam from 16 to 20 September 2019. Participants included 10 RVC members, five staff members from the WHO Regional Office for the Western Pacific, one staff member from WHO headquarters and one technical adviser from the United States Centers for Disease Control and Prevention. The list of participants is available in Annex 1, and the agenda and timetable for the meeting are available in Annex 2.

1.2 Meeting objectives

The objectives of the meeting were:

1) to review and assess the annual progress reports of 16 national verification committees (NVCs) and the Pacific Subregional Verification Committee (SRVC);
2) to verify the achievement or maintenance of measles and/or rubella elimination for countries and areas that report to have achieved the goals; and
3) to prepare country-specific recommendations for the achievement and maintenance of measles and/or rubella elimination.

2. PROCEEDINGS

2.1 Opening session

Dr Yoshihiro Takashima called the meeting to order. Dr Huong Tran delivered the opening remarks on behalf of Dr Takeshi Kasai, WHO Regional Director for the Western Pacific. Dr Huong thanked the participants for their support of measles elimination. She reviewed the resolutions adopted by the WHO Regional Committee for the Western Pacific that established the mechanisms to form NVCs. She acknowledged the verification in 2018 of one more country in the Region as having achieved interruption of endemic measles virus transmission for a period of at least 36 months, and three new countries for being verified as having eliminated endemic rubella. She recognized Member States’ efforts to achieve measles and rubella elimination and thanked the RVC members for their willingness to continue their service. Dr Tran nominated the office bearers as follows: Professor David Durrheim as chairperson, Dr Hiroshi Yoshikura as vice-chairperson and Dr Maria Rosario Capeding as rapporteur.

2.2 Introduction of the draft Regional Immunization Strategic Framework for 2021–2030

Dr Takashima introduced meeting participants to the history of immunization strategies since the establishment of the WHO Expanded Programme on Immunization (EPI) and national immunization programmes in 1974. He presented an overview of the Regional Framework for Implementation of Global Vaccine Action Plan in the Western Pacific, 2014–2020 and the eight immunization goals for the Western Pacific Region. As context for the development of the draft Regional Immunization Strategic Framework for 2021–2030, Dr Takashima introduced the issues and challenges in immunization to be addressed during the next decade; the WHO Thirteenth General Programme of Work 2019–2023; the Regional Director’s White Paper for 2021–2030; and the draft Immunization Agenda 2030. Dr Takashima described how the draft Regional Strategic Framework has three strategic objectives: 1) to strengthen and expand immunization systems and programmes; 2) to manage health intelligence on vaccine-preventable diseases (VPDs) and immunization; and 3) to prepare for and
respond to public health emergencies, which all contribute to the broader strategic goal of achieving accelerated control and elimination of VPDs to achieve a vision of a world free from mortality, morbidity and disability due to VPDs. These strategic objectives also provide support to three synergistic areas: 1) health systems strengthening and universal health coverage (UHC); 2) prevention of noncommunicable diseases and the life-course approach; and 3) health security and emergencies / environment and climate change.

2.3 Measles and rubella elimination in the Western Pacific Region: overview, progress in 2018–2019 and introduction of draft measles and rubella strategy for 2021–2030

Dr José Hagan presented an overview of the progress and achievements for measles and rubella elimination in the Western Pacific Region in 2018–2019, including WHO’s response to the specific recommendations of the RVC at the seventh RCV meeting in September 2018. Dr Hagan described the improvement in measles-containing-vaccine second-dose (MCV2) coverage, the strengthened sensitivity of measles and rubella case-based surveillance at the national level, and the implementation of preventive and outbreak-response supplemental immunization activities (SIAs), including a very successful campaign recently completed in Papua New Guinea despite significant operational challenges. Dr Hagan also described the significant challenges faced by the Region in 2018–2019, including a resurgence of measles in the form of a large nationwide measles outbreak in the Philippines, an increase in measles cases in Viet Nam, and measles outbreaks in many countries with low incidence or that have achieved elimination. Specific challenges were discussed, including the presence of large known residual immunity gaps among children due to chronically poor routine measles–rubella (MR) vaccination coverage (e.g. Philippines); variability in subnational routine immunization coverage; outbreak risk due to unknown immunity gaps among subpopulations not adequately reached by current national strategies (e.g. Lao People’s Democratic Republic); growing immunity gaps among young adults and adolescents in countries and areas achieving measles elimination; multiple importation-related outbreaks in post-elimination or low-incidence countries; unsustainable pressure on countries that have achieved elimination without a regional or global coordinated initiative; lack of leadership to support policies and guidance on preventing and responding to importations through international travel; insufficient capacity for rapid and effective outbreak response; insufficient capacity to prevent nosocomial amplification of measles outbreaks; cross-border, stateless and migrant populations not adequately targeted by immunization or surveillance strategies (e.g. Mekong River Basin, Malaysia); weak case-based surveillance at the subnational level; risk of congenital rubella syndrome (CRS) cases due to rubella outbreaks affecting adults of childbearing age (e.g. Japan, China); and major gaps in funding support for key needs.

2.4 Global update on measles elimination and rubella elimination: introduction of Immunization Agenda 2030 and status of measles and rubella eradication discussions

Dr Katrina Kretsinger presented an overview of the progress and achievements for measles and rubella elimination worldwide in 2018–2019 and the ongoing measles resurgence worldwide. She also discussed the draft Immunization Agenda 2030 document and the status of discussions around setting a global goal for measles and rubella eradication. Dr Kretsinger gave an update on the global coverage figures for measles-containing-vaccine first-dose (MCV1, 86%) and MCV2 (69%), as well as a dramatic increase in global coverage of rubella-containing vaccine (RCV, 69%). However, these figures still fall short of the global targets set by the World Health Assembly in 2010 and the 2012 Global Vaccine Action Plan goals for each region. Only the WHO region of the Americas has achieved elimination of rubella, and the Region of the Americas lost its measles elimination status in 2018.
Multiple countries in 2018 lost their measles elimination status, including countries in the Region of the Americas and the European Region during the ongoing global resurgence. Specific challenges were discussed including increases in measles virus importation and pockets of under-vaccinated people in countries previously achieving elimination, an increase in vaccine hesitancy in many areas, weak and fragile health systems and measles susceptibility across wide age groups.

Dr Kretsinger discussed the WHO response to these global outbreaks. She also shared the conclusions of the SAGE Working Group on Measles and Rubella which include the need to accelerate global progress towards the regional elimination goals and the establishment of a global measles eradication target date based on progress towards achieving key milestones.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

- The RVC notes with concern that Western Pacific Region countries and areas have experienced a substantial burden in deaths and disability, financial cost and impact on other public health programmes and resources from the high pressure of imported measles virus from countries around the world.

- The RVC notes with concern the increasing proportion of measles and rubella among adults in post-elimination and low-incidence countries. Given the added challenges of achieving high coverage of immunization activities targeting adults, as well as the cost and difficulty in responding to measles and rubella outbreaks among adults, regional and global elimination must be urgently accelerated.

- The RVC notes the positive impact that school-entry immunization checks have had on many countries in closing immunity gaps among children and improving coverage equity.

Australia
- The RVC verifies that Australia has sustained elimination of measles and rubella.

- The RVC congratulates Australia for the quality of their report, which has excellent outbreak descriptions including high-quality epidemiological investigation, impressive rates of source identification, specimen collection and analysis of genotyping data.

- The RVC notes the excellent quality of measles and rubella case-based surveillance described in the report.

- The RVC notes that some outbreaks involved measles transmission in the health-care setting.

- The RVC congratulates Australia on multiple innovative and aggressive initiatives to protect travellers, improve vaccination coverage and reach higher-risk communities and individuals. This includes the good practice of school-entry checks reported in three states.

- The RVC notes the increasing proportion of breakthrough measles cases occurring in Australia among fully vaccinated individuals, giving greater urgency to the need to accelerate measles elimination globally.
The RVC notes that there are published standards for conducting IgM avidity testing to determine whether breakthrough measles cases among vaccinated individuals are due to primary or secondary vaccine failure.

**Brunei Darussalam**
- The RVC notes the lack of detail in their report, in particular, the steps taken to respond to the RVC’s recommendations from 2018. However, the RVC notes that there is no evidence of ongoing measles or rubella transmission and verifies that Brunei Darussalam has sustained elimination of measles and rubella.
- The RVC appreciates the NVC’s submission of a detailed outbreak investigation for an imported case.

**Cambodia**
- The RVC verifies that Cambodia has sustained the interruption of endemic measles virus transmission.
- The RVC congratulates Cambodia for the great effort and success in investigating and responding to outbreaks in 2018–2019.
- The RVC notes the high quality of the epidemiological review of the outbreaks and laboratory investigation, including the high rate of genotyping.
- The RVC notes the important role that hospital-associated transmission continues to play in the amplification and spread of measles outbreaks.
- The RVC notes the complex challenges posed by cross-border, highly mobile, ethnic minority populations for microplanning and for determining denominators to estimate immunization coverage and disease incidence.
- The RVC notes that although Cambodia appears to have achieved high estimated immunity among children through non-selective SIAs and routine immunization, the epidemiology of measles in 2019 indicates an immunity gap up to the age of 10 years among some groups. This reflects the failure to target the full immunity gap during the recent SIA for children under 5 years and suggests that some children may continue to be repeatedly missed by these immunization opportunities.
- The RVC notes the significant burden of frequent measles virus importations and import-related outbreaks on the public health system, which may make elimination unsustainable without urgently intensified and coordinated regional and global efforts to reduce measles exportation from endemic countries.

**China**
- The RVC congratulates China for reaching a historically low level of measles incidence in 2018.
- The RVC notes that the predominant genotype in China has switched from H1 to D8, suggesting that China has made remarkable progress towards achieving measles elimination and has achieved sufficient immunity to interrupt continuous chains of measles transmission in many areas.
• The RVC commends China on its strong commitment and innovative programmatic and policy action for measles and rubella elimination, including establishing the first national immunization law in China, revitalizing the National Immunization Technical Advisory Group (NITAG), and for increased collaboration between ministries of health and education to fill immunity gaps among children through school-entry checks.

• The RVC notes that the majority of rubella cases during the 2018 outbreak occurred among older adolescents, as predicted by the immunity gap identified by serosurvey and the absence of activities to close the gap.

Hong Kong SAR (China)
• The RVC verifies that Hong Kong SAR (China) has sustained interruption of endemic measles virus transmission.

• The RVC notes that Hong Kong SAR (China) has submitted evidence that suggests it has very likely achieved rubella elimination.

• The RVC congratulates Hong Kong SAR (China) on the very high quality of outbreak investigation and response, and the excellent airport outbreak description, case investigation and measles source attribution presented in the report.

• The RVC notes the high proportion of breakthrough measles cases occurring in Hong Kong SAR (China) among fully vaccinated individuals (including the occurrence of secondary measles virus transmission from fully vaccinated individuals), giving greater urgency to the need to accelerate measles elimination globally.

• The RVC notes that published standards exist for conducting IgM avidity testing, to determine whether breakthrough measles cases among vaccinated individuals are due to primary or secondary vaccine failure.

• The RVC notes the excellent immunization coverage of Hong Kong SAR (China), as validated by surveys and serosurveys, and notes the innovative efforts to ensure immunization of the temporary foreign workforce.

Macao SAR (China)
• The RVC verifies that Macao SAR (China) has sustained elimination of endemic measles and rubella virus transmission.

• The RVC notes the excellent quality of outbreak investigation descriptions and epidemiological analysis in the report, including a best-practice presentation of data.

• The RVC notes that Macao SAR (China) has done an exceptional job in attempting to obtain genotype information from all cases of measles and rubella, even sporadic cases; carefully investigating and analysing measles and rubella outbreaks to understand the source of infection and immunity gaps; and developing strategies to close immunity gaps.

• The RVC notes the increasing proportion of breakthrough measles cases occurring in Macao SAR (China) among fully vaccinated individuals, giving greater urgency to the need to accelerate measles elimination globally.

• The RVC notes that there were outbreaks in health-care facilities, including infection among health-care providers.
The RVC compliments Macao SAR (China) on sustaining a high immunity level in the general population and outstanding outbreak responses to avoid large outbreaks despite the huge pressure of importation and high force of infection.

The RVC notes that Macao SAR (China) has robust CRS surveillance, including retrospective record review and pregnancy serological screening.

The RVC applauds the online immunization check system, allowing public health programmes as well as citizens to easily verify individual immunization status.

Japan

The RVC verifies that Japan has sustained the interruption of endemic measles virus transmission.

The RVC congratulates Japan for the quality of their report, with excellent outbreak descriptions including high-quality epidemiological investigation, impressive rates of source identification, specimen collection and analysis of genotyping data.

The RVC notes Japan’s excellent programmatic responses to 2018 RVC recommendations, in particular working with local governments to further increase routine vaccination coverage, and successfully investigating and analysing measles outbreaks to understand the source of infection.

The RVC notes the adult male predominance of rubella cases, which clearly reflects the programmatic history of Japan and the immunity gap demonstrated by serological surveys.

The RVC commends Japan for committing to achieving rubella elimination by 2020 and for the concerted effort made to close existing rubella immunity gaps, particularly in adult males.

The RVC notes the high proportion of breakthrough measles cases occurring in Japan among fully vaccinated individuals, giving greater urgency to the need to accelerate measles elimination globally.

The RVC notes the role that nosocomial transmission played in some outbreaks.

The RVC notes the laboratory confirmation of the vast majority of clinically suspected measles and rubella cases and commends Japan in attempting to obtain genotype information from all cases, even sporadic cases.

The RVC notes that published standards exist for using IgM avidity testing to determine whether breakthrough measles cases among vaccinated individuals are due to primary or secondary vaccine failure.

The RVC thanks Japan for publishing important lessons from their best practice in measles molecular epidemiology for confirming elimination.

Lao People’s Democratic Republic

The RVC notes the large measles outbreak that occurred primarily among the Hmong minority ethnic group and congratulates the Lao People’s Democratic Republic on their successful immunization response to control the outbreak in this high-risk community.
• The RVC congratulates the Lao People’s Democratic Republic for successfully obtaining genotype information from measles cases as part of outbreak investigations.

• The RVC notes the wide age range and the high proportion of unvaccinated cases in the outbreak, despite historical SIAs with very high reported administrative coverage, which suggests there may be major systematic challenges to delivering services to discrete population groups such as the Hmong.

• The RVC congratulates the Lao People’s Democratic Republic on working with WHO and external partners to conduct a detailed, high-quality analysis of the root causes of the outbreak.

• The RVC notes the complex challenges posed by cross-border, highly mobile, ethnic minority populations for microplanning, and for determining denominators to estimate immunization coverage and disease incidence.

Malaysia

• The RVC notes the proactive action taken by Malaysia to strengthen the immunization system, including conducting a joint EPI review with WHO and using the findings to develop a country plan of action on VPDs and immunization.

• The RVC commends Malaysia for the initiative to improve immunization coverage among migrant, stateless and cross-border populations, including bilateral engagement with the Government of the Philippines.

• The RVC notes the continued occurrence of measles cases in Malaysia, particularly among mobile populations in Selangor and Federal Territory of Kuala Lumpur and among young children, and notes that ongoing transmission suggests there are immunity gaps not reflected by the estimates of immunization coverage.

• The RVC notes the complex challenges posed by cross-border, highly mobile and ethnic minority populations for microplanning and determining denominators for estimating immunization coverage and disease incidence.

• The RVC notes the good practice and successful use of school-entry checks, which should be expanded and strengthened.

Mongolia

• The RVC congratulates Mongolia for conducting high-quality SIAs in 2019, which have likely filled the immunity gaps identified during the 2016 serological survey.

• The RVC notes that sustained high coverage of routine immunization is critical to prevent further accumulation of susceptible children.

• The RVC notes efforts made to improve the quality of surveillance but notes that performance is still suboptimal at the subnational level, which creates a risk that importation-related outbreaks may not be rapidly detected.

• The RVC notes that although there appears to be no endemic transmission of measles or rubella in Mongolia, the NVC report is inadequate to allow assessment of the sustainability of elimination, especially with regard to the investigation and response to the two identified measles cases.
New Zealand

- The RVC verifies that although a large measles outbreak is ongoing in New Zealand, particularly in Auckland, it has not yet continued uninterrupted for more than 12 months. Therefore, the interruption of endemic measles and rubella virus transmission has been sustained in 2018.

- The RVC echoes the NVC’s alarm that New Zealand’s measles elimination status is threatened in 2019 by the lack of progress with closing the historic immunity gaps identified by the serological survey conducted in 2014–2015 and previous epidemiology.

- The RVC notes that the large ongoing outbreak is disproportionately affecting Maori and Pacific Islander communities, which is consistent with the known immunity gaps from the New Zealand Government coverage figures.

- The RVC notes the large proportion of District Health Boards with suboptimal MR vaccination coverage, particularly among the most deprived groups.

- The RVC notes with concern the correction of a coding error that resulted in inflated coverage estimates for routine MR vaccination in previous reports, placing increased urgency on the need to fill the population immunity gap.

- The RVC notes that while MR immunization rates, in general, have risen since 2005, progress has stalled in recent years and pockets of low immunity have remained unaddressed.

- The RVC acknowledges that some District Health Boards have invested significant effort and resources in responding to outbreaks through SIAs to fill local immunity gaps.

- The RVC notes that New Zealand has an established national immunization register (NIR) that can be used very effectively to identify children up to the age of 14 years.

- The RVC notes that patient registers in general practices could be used to effectively identify children and young and middle-aged adults without two doses of MR vaccine.

- The RVC notes that the outbreak has been met with very high community demand and support for vaccination in New Zealand, which should be effectively capitalized on to ensure high coverage of a systematic vaccination effort.

- The RVC stresses that a full-scale emergency response to fill immunity gaps could prevent loss of elimination status, protect children from serious illness, and prevent widespread measles virus exportation to vulnerable communities, particularly in Pacific island countries and areas.

Pacific island countries and areas (PICs)

- The RVC agrees with the SRVC’s assessment that although PICs have successfully achieved zero endemic measles and rubella incidence for several years, they are still vulnerable to outbreaks due to imported virus.

- The RVC notes that many PICs have achieved high immunity through a combination of routine and supplemental immunization; however, the RVC is concerned that routine immunization remains weak in many PICs, and that some PICs such as Samoa have large immunity gaps, creating a major risk for outbreaks after importation.
• The RVC notes Vanuatu’s plans to introduce a second routine dose of measles and rubella-containing vaccine (MRCV).

• The RVC notes the close links between PICs and Australia, France, New Zealand, Papua New Guinea and the United States of America, which create a substantial risk of rapid transfer of virus between countries when there are outbreaks in those countries. The RVC further draws attention to the large ongoing measles outbreak in New Zealand, affecting communities closely linked to Samoa and other Polynesian countries, creating multiple opportunities for measles virus importation.

• The RVC notes that although sporadic imported measles cases have been successfully detected in Fiji and New Caledonia, surveillance mechanisms may not be strong enough to rapidly detect cases in all countries.

• The RVC notes that, in some PICs, there may be a reliance on clinical diagnosis for surveillance of measles and rubella, and the high cost of laboratory testing to patients may be a barrier to sensitive AFR surveillance.

• The RVC agrees with the SRVC’s assessment that some countries have discrete immunity gaps among adolescents and young adults.

• The RVC notes the special challenges in meeting case-based AFR surveillance indicators for elimination-standard surveillance and agrees with SRVC that novel strategies, mechanisms, and standards of evidence should be established for PICs to ensure that outbreaks can be detected after importation.

Papua New Guinea
• The RVC notes with concern that the NVC did not have a meeting in 2018 and that the majority of recommendations from the last RVC report were not addressed or were addressed with insufficient detail to allow accurate assessment of the impact of the response.

• The RVC congratulates Papua New Guinea on the successful SIA for measles, rubella and oral poliovirus vaccine (MR-OPV) in 2019, leveraging global attention, technical support, and funding from the response to circulating vaccine-derived poliovirus (cVDPV) to ensure high coverage.

• The RVC notes that there has been no genotyping information from Papua New Guinea in many years and that genotyping would help to confirm suspected sporadic, but unlikely, measles cases.

• The RVC notes the significant risk of importation from the Philippines and other countries where measles is circulating, which could trigger a measles outbreak because of the presence of residual immunity gaps among the Papua New Guinea population older than 5 years of age and rapid accumulation of susceptible children from low routine immunization performance.

Philippines
• The RVC is concerned with the sharp increase in measles incidence and mortality in 2018–2019 and the deteriorating performance of the national immunization programme, with persistently low and decreasing MRCV routine coverage, and declining quality of measles and rubella surveillance in the most recent decade.
• The RVC notes the very low coverage of SIAs in response to the measles outbreak, which is inadequate to protect the population and stop transmission.

• The RVC emphasizes the critical contribution of the Philippines in driving the resurgence of measles in the Western Pacific Region in 2018–2019 by exporting cases and causing import-related outbreaks in other countries both in the Region and globally.

• The RVC recognizes numerous challenges faced by the immunization programme; however, it notes the lack of plans to address these challenges or successful action towards filling the large immunity gap in the population.

• The RVC applauds the recent passage of a UHC law, which should be used to support urgent efforts to deliver MR vaccine to chronically missed children.

• The RVC notes the introduction of MMR at 9 months of age into the routine schedule.

• The RVC notes the relatively low number of suspected cases that can be laboratory-confirmed due to having only one accredited national reference laboratory.

• The RVC welcomes initiatives like vaccination of overseas Filipino workers, travellers, seaport and airport personnel through coordination with the Philippine Overseas Employment Administration, which should be expanded and fully applied.

Republic of Korea

• The RVC verifies that the Republic of Korea has sustained the interruption of endemic measles and rubella virus transmission.

• The RVC congratulates the Republic of Korea for the quality of their report, with excellent outbreak descriptions including high-quality epidemiological investigation, impressive rates of source identification, specimen collection and analysis of genotyping data.

• The RVC notes the strong correlation between the epidemiology of adult-aged measles cases and the immunity gaps indicated by serological survey evidence.

• The RVC notes that the Republic of Korea has done an excellent job in laboratory confirming the great majority of clinically suspected measles and rubella cases and attempting to obtain genotype information from all cases, even sporadic cases.

• The RVC notes the high proportion of breakthrough measles cases occurring in the Republic of Korea among fully vaccinated individuals, giving greater urgency to the need to accelerate measles elimination globally.

• The RVC notes that published standards exist for conducting IgM avidity testing to determine whether breakthrough measles cases among vaccinated individuals are due to primary or secondary vaccine failure.

• The RVC notes the good practice and excellent impact of using a national vaccination register to sustain high immunization coverage.

• The RVC welcomes the inclusion of testing from some private laboratories in the denominator of suspected measles and rubella cases.

• The RVC notes the Republic of Korea’s efforts in preventing nosocomial transmission, including implementing mandatory health worker vaccination policies.
• The RVC looks forward to the publication of an article on the success of a school-based vaccination check programme in a peer-reviewed journal.

• The RVC eagerly awaits the results of the planned national serosurvey, with particular interest on the young adult group, and the strategies that the Republic of Korea will implement to close any immunity gaps.

Singapore
• The RVC verifies that Singapore has sustained elimination of measles.

• The RVC notes that Singapore has sustained high enough immunity levels to prevent prolonged chains of transmission despite the high burden of importations.

• The RVC appreciates the detailed description of programmatic actions taken in response to last year's recommendations.

• The RVC notes that Singapore has developed strategies and protocols to fill immunity gaps among adults.

• The RVC congratulates Singapore on the performance of the MR surveillance system but notes the high proportion of cases with an unknown source.

• The RVC notes that cases among tourists and foreigners seeking medical treatment are not included in the reporting of measles and rubella cases, potentially leading to missed imported cases.

• The RVC notes that Singapore has implemented a strategy of ensuring the immunization status of non-permanent resident children.

• The RVC notes that from the evidence presented, it appears that Singapore may have eliminated rubella.

Viet Nam
• The RVC congratulates Viet Nam on efforts to strengthen their immunization programme, in particular, the surveillance review conducted in 2017.

• The RVC notes the implementation of some activities to strengthen surveillance in Viet Nam in response to the 2017 surveillance review, to address challenges in monitoring the vaccination status of children and underperforming surveillance system. These activities include revising the national VPD surveillance standards, implementing the Measles-Rubella Surveillance and Response System (MRSRS) for case-based reporting, and conducting a training of trainers for VPD surveillance.

• The RVC notes that Viet Nam has implemented a national immunization registry to address challenges in monitoring the vaccination status of children and the underperforming surveillance system.

• The RVC notes the general good performance of the Hanoi national reference laboratory, the implementation of quality control mechanisms for private laboratory testing for measles and rubella and increased proportions of specimens tested.
• The RVC notes, however, that a large number of specimens are still pending testing and case classification because of insufficient availability of test kits and other limited resources. In addition, the reported MR cases across Viet Nam may not be geographically representative because of the uneven performance of the national reference laboratories.

• The RVC notes with concern that both reported routine measles and rubella immunization coverage and surveillance performance indicators have fallen in recent years.

• The RVC notes that the most affected group during the ongoing measles outbreak is unvaccinated young children that have been missed by routine immunization.

• The RVC notes the implementation of outbreak response activities including SIAs in high-risk areas and extensive communications about vaccination against measles and rubella.

• The RVC notes persistent issues with the accuracy of coverage monitoring and accuracy and representativeness of surveillance data, which make it difficult to identify and target immunity gaps.

• The RVC notes that significant challenges remain to achieve MR elimination and that they are related to insufficient operational resources at the subnational level, in particular for surveillance, outbreak investigation and response.

• The RVC notes the complex challenges posed by cross-border, highly mobile, ethnic minority populations for microplanning, and for determining denominators to estimate immunization coverage and disease incidence.

• The RVC notes that the true number of measles cases may be much higher than reported because of the large number of unconfirmed cases across the country, suggesting the immunity gap may be much larger than apparent from reported immunization coverage.

• The RVC notes that the reported immunization coverage may be overestimated because of the exclusion of migrant populations and other individuals not registered in the public health system, from the denominator.

3.2 Recommendations

3.2.1 Recommendations for Member States

1. The RVC supports the TAG recommendation that countries, particularly those that are post-elimination and near-elimination, develop strategies to immunize adults in occupations that are at high risk for measles and rubella exposure and spread, such as health-care workers and workers in the tourism and transportation industries.

2. The RVC requests that NVCs present any available estimates of the cost of responding to importations in a future report.

3. The RVC recommends that countries who are planning to conduct serological surveys refer to published WHO technical guidance\(^1\) on planning and implementing quality serological surveys.

4. The RVC recommends that countries increase the use of IHR mechanisms to share information when measles cases are detected in travellers, enabling appropriate coordination of responses from the country of origin, as well as from the broader global community.

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\(^1\) https://www.who.int/immunization/monitoring_surveillance/burden/laboratory/serosurvey/en/
**Australia**

1. The RVC recommends that Australia consider documenting the resources that were expended during the intensive effort to investigate, trace, and respond to imported cases and outbreaks of measles in 2018–2019, and calls on Australia to use these data to advocate for accelerated progress by all countries towards measles elimination goals.

2. The RVC encourages Australia to expand the practice of school-entry checks in all states and territories and to consider a similar strategy in universities, particularly for international students.

3. Given the ongoing outbreak in New Zealand, which may spill over into PICs, Australia may consider mechanisms for ensuring the MR immunity of seasonal migrant workers to reduce the risk of imported virus.

4. The RVC requests that Australia describe measures taken by states and territories to ensure MR immunity of front-line health workers in its next annual report.

**Brunei Darussalam**

1. The RVC reiterates the recommendations from 2018 and requests the NVC to report details of how it has responded or plans to respond to those recommendations.

2. The RVC requests Brunei Darussalam to submit a significantly more detailed report to next year's RVC to allow a comprehensive evaluation of the sustainability of its measles and rubella elimination status.

**Cambodia**

1. The RVC encourages the Ministry of Health of Cambodia to consider all possible risk factors when conducting epidemiological studies to describe the specific characteristics of affected cases (including factors such as ethnicity and access to health care). This will allow Cambodia to better understand how cases are linked and identify which groups may be chronically missed by routine immunization and SIAs.

2. The RVC recommends that Cambodia use available data from post-SIA coverage surveys to identify additional risk factors for not being reached by SIAs, as this may help characterize the residual immunity gap in Cambodia.

3. The RVC recommends that Cambodia ensure that immunization activities are targeted to cover the current age range of the susceptible population up to the age of 10 years, with particular focus on highly mobile groups and chronically unreached populations.

4. The RVC supports the NVC’s focus on improving hospital infection control, particularly in paediatric hospitals, to avoid health care–associated amplification of measles and rubella outbreaks.

5. The RVC stresses the need to engage with neighbouring countries to coordinate strategies for delivering immunization services to migrant and cross-border populations.

6. The RVC urges Cambodia to draw global attention to their challenges in the face of multiple importations and to advocate at the Regional Committee and World Health Assembly for a common goal and coordinated strategy for global measles and rubella elimination. A revitalized and coordinated effort is needed to reduce the pressure of virus importation, which would greatly contribute to the country sustaining its elimination status.
China
1. The RVC reiterates recommendations from 2018, namely, to close the known rubella immunity gap among older adolescents and young adults and to establish CRS surveillance.

2. The RVC recommends that China continue strengthening the school-entry checks policy to ensure vaccination of identified unimmunized children and consider an expansion of the policy to reach all school grades and college students.

3. The RVC recommends that China use their immunization law to support activities to close known immunity gaps and immunize health workers and populations at risk for measles and rubella transmission.

4. The RVC encourages China to implement intensified surveillance for CRS to detect any cases occurring from the rubella outbreak, and to ensure appropriate guidance is provided to hospitals on infection control measures to prevent secondary spread due to prolonged rubella virus shedding by CRS cases.

5. The RVC supports the recommendation by China’s NITAG to use the measles, mumps and rubella (MMR) vaccines for both scheduled doses.

6. The RVC suggests the NVC document and describe the successful immunization approaches and practices that have been implemented by provinces that have made outstanding progress towards measles and rubella elimination.

7. The RVC encourages China to document and publish the impact of the three-dose strategy in highly populated areas where force of infection may be especially high.

8. The RVC recommends that the NVC consider assessing the elimination status of measles in China along the five lines of evidence, province by province, and notes that the RVC would welcome a report that includes a concise summary of progress at the provincial level.

Hong Kong SAR (China)
1. The RVC encourages the NVC to present the five lines of evidence of accomplishing rubella elimination in their next RVC report.

2. The RVC encourages Hong Kong SAR (China) to publish an epidemiological description of the airport outbreak, including the use of additional laboratory testing to classify cases as primary or secondary vaccine failures, and estimate the vaccine effectiveness in adults during the outbreak, given the high proportion of measles in vaccinated individuals.

3. The RVC recommends that Hong Kong SAR (China) consider documenting the resources that were expended during the intensive effort to investigate, trace and respond to imported cases and outbreaks of measles in 2018–2019, and calls on Hong Kong SAR (China) to use these data to advocate for accelerated progress by all countries towards measles elimination goals.

Macao SAR (China)
1. The RVC encourages Macao SAR (China) to maintain a high level of immunization of all birth cohorts and offer additional immunization opportunities based on screening at schools and other educational institutions.

2. The RVC recommends that Macao SAR (China) continue to pursue policies to ensure the immunity of high-risk occupational groups.
3. The RVC encourages Macao SAR (China) to continue sharing the rich experiences from annual measles serosurveys as a birth-cohort analysis in a peer-reviewed journal.

4. The RVC recommends that rubella serological screening in pregnancy include women receiving antenatal care in the private sector.

5. The RVC recommends that Macao SAR (China) validate the IgG test used for rubella seroprevalence surveillance and collaborate with WHO to calibrate this test against international standards.

6. Noting the high proportion of breakthrough measles cases in fully vaccinated individuals, the RVC encourages Macao SAR (China) to conduct a thorough epidemiological investigation of these cases, particularly during outbreaks, including the use of additional laboratory testing to classify these cases as primary or secondary vaccine failure, and to calculate vaccine effectiveness in adults during outbreaks.

Japan

1. The RVC encourages Japan to maintain high immunization coverage of all birth cohorts and to offer additional immunization opportunities based on screening at schools and other educational institutions.

2. As Japan has appropriately identified high-risk occupational groups, the RVC encourages Japan to protect these groups through vaccination.

3. The RVC looks forward to monitoring the success of Japan’s efforts to close the existing rubella immunity gaps in older males, through the annual rubella serosurveillance programme.

4. The RVC recommends that Japan continue to carefully investigate all measles cases for source determination and conduct quality outbreak investigations combining epidemiological and molecular techniques.

5. The RVC encourages Japan to continue intensified surveillance for CRS to detect any cases occurring from the rubella outbreak, and to ensure appropriate guidance is provided to hospitals on infection control measures to prevent secondary spread due to prolonged rubella virus shedding by CRS cases.

6. The RVC recommends that Japan consider documenting the resources that were expended during the intensive effort to investigate, trace and respond to imported cases and outbreaks of measles in 2018–2019, and calls on Japan to use these data to advocate for accelerated progress by all countries towards measles elimination goals.

7. Noting the high proportion of breakthrough measles cases in fully vaccinated individuals, the RVC encourages Japan to conduct a thorough investigation of epidemiology of these cases, particularly during outbreaks, including the use of additional laboratory testing to classify these cases as primary or secondary vaccine failure, and to calculate an estimate of the vaccine effectiveness in adults during outbreaks.

Lao People’s Democratic Republic

1. The RVC recommends that the Lao People’s Democratic Republic use the results of the root cause analysis of the 2019 measles outbreak, and effective approaches such as WHO/EURO Tailoring Immunization Programmes (TIP), to directly engage community leaders in Hmong and other minority populations to understand the specific barriers and enablers for these groups to access immunization services and to design tailored strategies for delivering
immunization services to the Hmong and other minority groups.

2. The RVC recommends that the Lao People’s Democratic Republic update the recently published national action plan for measles and rubella elimination to include specific strategies for ensuring ethnic minority populations benefit fully from immunization services, to support UHC.

3. The RVC recommends that the Lao People’s Democratic Republic increase engagement at the subnational level to ensure successful implementation of national strategies and priorities.

4. The RVC stresses the need to engage with neighbouring countries to coordinate strategies for delivering immunization services to migrant and cross-border populations.

Malaysia

1. The RVC urges Malaysia to accelerate plans that fill the measles and rubella immunity gaps among children under 7 years of age through targeted immunization and expanded implementation of school-based immunization checking.

2. The RVC welcomes the initiatives in Sabah to reach underserved populations and strongly encourages the Government of Malaysia to consider all policy options to further reduce barriers for non-citizen children to be vaccinated, in order to protect them and Malaysian citizens from outbreaks.

3. The RVC recommends that Malaysia consider adding a zero dose (at age 6 months) in states where there is a high proportion of measles affecting children too young for the first dose, noting that this has already been successfully implemented in Sabah.

4. The RVC recommends that Malaysia consider analysing epidemiological and coverage data separately for citizens and non-citizens, and by state, in order to understand the specific challenges in subpopulations.

5. The RVC stresses the need to engage with neighbouring countries to coordinate strategies for delivering immunization services to migrant and cross-border populations.

6. The RVC recommends that Malaysia consider establishing a requirement for foreign workers to demonstrate measles and rubella immunity, prior to assuming employment in Malaysia, to reduce the risk of importation.

Mongolia

1. The RVC requests that Mongolia’s next NVC report include in-depth documentation of case investigations to determine the source of importation, as well as detailed descriptions of contact-tracing activities.

2. The RVC recommends that Mongolia work with WHO to improve the quality of the next report to the RVC, including a complete description of the five lines of measles elimination evidence and progress towards rubella elimination.

3. The RVC recommends that Mongolia strengthen subnational surveillance for measles and rubella and consider developing novel surveillance mechanisms, in collaboration with the mining and industrial sectors, to detect possible imported cases into remote areas where case-based surveillance may be weak.
New Zealand
1. The RVC emphatically endorses the NVC's recommendations, particularly the urgent need to identify and vaccinate susceptible individuals, develop strategies to improve services for marginalized groups and establish mechanisms to protect travellers.

2. The RVC urges New Zealand to respond to the outbreak as a public health emergency and to use available vaccine stock to conduct a targeted vaccination activity, prioritizing high-risk communities, including Maori and Pacific Islanders in Auckland.

3. The RVC recommends that New Zealand undertake a systematic national approach to build on the current intense media focus and public awareness of the outbreak to strengthen demand for routine vaccination and fill immunity gaps.

4. The RVC recommends that New Zealand implement measures to reduce exported measles virus to Pacific island countries and areas through international travel.

5. The RVC urges New Zealand to draw global attention to the challenges faced by post-elimination countries in the face of multiple measles virus importations and to advocate to the Regional Committee and World Health Assembly for a common coordinated goal and strategy for global measles and rubella elimination.

6. The RVC recommends that New Zealand consider temporarily lowering the age of eligibility for a zero dose of MR vaccination dose to 6 months to prevent severe measles outcomes in unvaccinated infants in regions where there are ongoing outbreaks.

Pacific island countries and areas
1. The RVC endorses all of the SRVC's recommendations, particularly that countries and areas develop national action plans for measles and rubella elimination, as urged by the Regional Committee in resolution WPR/68.R1.

2. The RVC recommends that PICs work closely with WHO to establish protocols for clinical screening of AFR cases and laboratory confirmation, to allow importations and outbreaks to be rapidly detected and responded to, noting that WHO will support transportation and testing of samples in accredited regional reference laboratories.

3. The RVC urges all countries that have migration patterns with New Zealand, especially Samoa, to take urgent action to close existing immunity gaps and enhance AFR surveillance.

4. Noting that so many countries have established school-entry checks, the RVC recommends that all PICs establish similar programmes.

5. The RVC recommends that PICs consider establishing checks and processes for encouraging travellers to ensure they are protected against measles and rubella prior to travel.

6. The RVC recommends that PICs increase their use of the IHR (2005) to share information with countries of origin when measles cases are detected in travellers.

Papua New Guinea
1. The RVC reminds the Papua New Guinea NVC of its obligation to meet annually and to engage in both technical review and advocacy to the Government and urges Papua New Guinea to support the critical activities of the NVC.

2. The RVC recommends that Papua New Guinea build on the momentum and lessons learnt from the successful MR-OPV campaign to establish and strengthen structures and mechanisms
to support effective routine immunization that reaches every child.

3. The RVC urges Papua New Guinea to strengthen AFR surveillance as soon as possible, including sample collection for laboratory confirmation and genotyping.

4. The RVC recommends Papua New Guinea continue implementing regular SIAs to close immunity gaps left by historically poor routine immunization coverage.

5. The RVC encourages Papua New Guinea to expand the use of school-entry checks and ensure that unvaccinated children are immunized.

6. The RVC recommends that Papua New Guinea consider establishing a requirement for foreign workers to demonstrate measles and rubella immunity prior to assuming employment in Papua New Guinea to reduce the risk of importation from the Philippines and other countries.

Philippines

1. The RVC reiterates the recommendations issued in 2018, particularly the importance of increasing the role of the NVC in directly engaging with professional medical bodies to provide immunization advocacy and guidance to the Government.

2. The RVC recommends that the Philippines leverage upcoming efforts planned in response to the vaccine-derived polio outbreak to fill the measles and rubella immunity gaps and identify opportunities to strengthen routine immunization.

3. The RVC urges the Philippines to begin planning immediately for a high-quality multi-antigen SIA that is based on WHO guidance, with adequate external technical support and supervision to ensure effective implementation, learning from the recent successful example of Papua New Guinea.

4. The RVC recommends that consideration be given to establishing a subnational network of accredited measles and rubella reference laboratories in order to improve the timeliness of laboratory confirmation of suspected cases.

5. The RVC recommends that the Philippines work with WHO and partners to strengthen capacity and engagement at the subnational level for using epidemiological and surveillance data to understand subnational programme weaknesses and to guide immunization and programme strengthening.

6. The RVC encourages full implementation of important strategies already in place, particularly school-entry checks and vaccination of overseas Filipino workers, to increase access to vaccination and prevent the exportation of measles.

Republic of Korea

1. Noting the high proportion of breakthrough measles cases in fully vaccinated individuals, the RVC encourages the Republic of Korea to conduct a thorough epidemiological investigation of these cases, particularly during outbreaks, including the use of additional laboratory testing to classify these cases as primary or secondary vaccine failure, and to calculate estimates of vaccine effectiveness in adults in these outbreaks.

2. The RVC welcomes the Republic of Korea’s initiative to promote fever–rash reporting by clinicians and encourages the country to continue to raise clinician awareness around measles and rubella surveillance.
Singapore
1. The RVC endorses the excellent recommendations by the Singapore NVC.

2. The RVC requests Singapore to provide a detailed description of how population denominators are calculated for the purpose of planning and reporting coverage of routine immunization, and how these denominators represent the population actually living in the country.

3. The RVC requests Singapore to report details on how cases are investigated to ascertain the source of infection.

4. The RVC requests Singapore to report on imported cases that are detected among foreign visitors, and on the use of IHR mechanisms to share information with the countries of origin when measles cases are detected in travellers.

5. The RVC requests Singapore to further strengthen their reporting of rubella genotype data through phylogenetic analysis and reporting genotype lineages, by epidemic week, as was done for measles.

6. The RVC encourages Singapore to continue efforts to ensure high coverage of MR vaccination among the resident, non-citizen workforce, including those older than 12 years.

7. The RVC encourages the Singapore NVC to consider submitting the five lines of evidence that will allow the RVC to verify rubella elimination.

8. The RVC recommends that Singapore consider documenting the resources that were expended during the intensive effort to investigate, trace and respond to imported cases and outbreaks of measles in 2018–2019, and calls on Singapore to use these data to advocate for accelerated progress by all countries towards measles elimination goals.

Viet Nam
1. The RVC supports the NVC’s recommendation to finalize a national action plan for measles and rubella elimination and recommends Viet Nam to mobilize resources to support the successful implementation of this plan.

2. The RVC recommends the Viet Nam NVC advocate to the Ministry of Health on needed actions to enhance surveillance and improve immunization coverage.

3. The RVC recommends that Viet Nam ensure their national action plan calls for the development of a national outbreak and response protocol. Specific consideration should be given to strategies to deliver routine vaccination to unreached children in high-mobility, urban areas and in migrant, ethnic minority and cross-border communities, in order to support UHC.

4. The RVC stresses the need to engage with neighbouring countries to coordinate strategies for delivering immunization services to migrant and cross-border populations.

5. The RVC urges Viet Nam to continue working towards a simple system for integrated management of VPD surveillance data so that epidemiological data can be used to guide the EPI programme.
6. The RVC recommends the development of protocols and strengthening mechanisms to support improved coordination between laboratory and epidemiologic surveillance to increase the rate of sample collection for case confirmation, increase epidemiological linkage and reduce unnecessary laboratory testing during large outbreaks.

7. The RVC recommends that Viet Nam adopt the WHO definition for outbreaks of measles and rubella.

8. The RVC recommends that Viet Nam ensure the availability of sufficient laboratory tests to conduct timely routine laboratory confirmation of suspected cases.

9. The RVC recommends that Viet Nam consider working with WHO and external partners to conduct a root cause analysis of the specific challenges for understanding and using the epidemiology of measles and rubella to guide the programme.

3.2.2 Recommendations for WHO

1. The RVC recommends that WHO support capacity-building activities for selected NVCs to improve the quality of annual reports and support quality documentation of progress towards elimination.

2. The RVC recommends that WHO work specifically with Mongolia to develop a high-quality report to demonstrate evidence of progress towards measles and rubella elimination.

3. The RVC recommends that WHO develop practical operational guidance for infection control of respiratory diseases, which can be applied in resource-limited settings, and collaborate across divisions to support countries in implementing this guidance to prevent amplification and spread of measles in the health-care setting.

4. The RVC recommends inviting members from other RVCs to participate and share lessons at annual meetings.

5. The RVC emphasizes the importance of facilitating collaboration, coordination and data sharing between countries, particularly those that share borders and cross-border migration.

6. The RVC encourages WHO to fully utilize the MeaNS and RubeNS databases to identify the major global sources of imported measles and rubella viruses, to track pathways of transmission, and to support a comprehensive analysis of measles and rubella transmission patterns using these data.

7. The RVC recommends that WHO continue to strengthen mechanisms by which countries of the Greater Mekong Subregion can implement collaborative and coordinated strategies for measles and rubella elimination.

8. The RVC encourages close collaboration with the WHO Regional Office for South-East Asia to develop resolutions during Regional Committee meetings that support coordinated efforts and commitment to measles and rubella elimination.

9. Noting the large number of cases worldwide that originate in the Philippines and the substantial burden faced by countries responding to measles virus disproportionately exported from this country, and noting the ongoing outbreak in New Zealand among communities closely linked to PICs, the RVC recommends WHO to conduct formal graded emergency risk assessments of the measles outbreaks in the Philippines and New Zealand, in order to mobilize greater political engagement in those countries and among the broader international
community.

10. The RVC recommends that WHO embark on a formal assessment of whether circulating measles virus is a Public Health Emergency of International Concern (PHEIC), given the global resurgence in measles cases, large increase in measles deaths, large ongoing outbreaks in Cambodia, New Zealand and the Philippines, and re-establishment of endemic measles transmission in the Americas and four European countries.

11. The RVC recommends that WHO/EPI contribute to health systems strengthening and efforts to achieve UHC by designing strategies to provide services, including immunization, to marginalized and hard-to-reach populations.

12. The RVC recommends that WHO consider establishing a stockpile of MR vaccine to enable rapid vaccine mobilization for rapid large-scale outbreak responses that may exceed country capacity.
ANNEXES

Annex 1. List of Regional Verification Commission members and Secretariat

1. REGIONAL VERIFICATION COMMISSION MEMBERS

Dr Michael George Baker, Professor of Public Health, University of Otago, 23a Mein Street, Wellington 6242, New Zealand. Tel. No.: (644) 918 6802, email: Michael.baker@otago.ac.nz

Dr Maria Rosario Capeding, Head, Department of Microbiology, Consultant, Pediatrics Infectious Diseases, Medical Department, Medical Specialist IV, Research Institute for Tropical Medicine, Filinvest Corporate City, Alabang, Muntinlupa City 1781, Philippines. Tel. No.: (632) 772 4916, email: leroscap@yahoo.com.ph

Professor David Durrheim, Professor of Public Health Medicine, University of Newcastle District, Locked Bag 10, Wallsend, New South Wales 2287, Australia. Tel. No. (612) 4924 6395, email: david.durrheim@hnehealth.nsw.gov.au, david.durrheim@newcastle.edu.au

Professor Kee Tai Goh, Adjunct Professor of Public Health, Saw Swee Hock School of Public Health, National University of Singapore, 12 Science Drive 2 #10-01, Singapore 117549. Tel No. (65) 6516 4988, email: keetgoh27@gmail.com

Dr Dukhyoung Lee, Director, National Cancer Control Institute, National Cancer Center, 323 Ilsan-ro, Goyang-si, Gyeonggi-do 10408, Republic of Korea. Tel. No.: (8231) 920 2003, email: leedukh@ncc.re.kr; leeduk0125@hanmail.net

Dr Tsang Ho-fai Thomas, President, Hong Kong College of Community Medicine, Room 908, 9/F, Hong Kong Academy of Medicine, Jockey Club Building, 99 Wong Chuk Hang Road, Aberdeen, Hong Kong. email: hftt2057@gmail.com

Dr Jeffrey McFarland, Team Leader, Measles Elimination Team, Accelerated Disease Control and Elimination Branch, Global Immunization Division, Centers for Disease Control and Prevention, Mailstop C-22, 1600 Clifton Road, Atlanta, Georgia 30329, United Stated of America. Tel. No.: (770) 265 6483, email: myp7@cdc.gov; jwm5@cdc.gov

Dr Bounpheng Philavong, Director, National Centre for HIV/AIDS and STI, Ministry of Health of the Lao People’s Democratic Republic, Km3 Thadeua Road, Vientiane, Lao People’s Democratic Republic. Tel. No.: (856) 20 2367 1175, email: pbounpheng@gmail.com

Dr Paul Rota, Team Leader, Measles Team, Measles, Mumps, Rubella and Herpesvirus, Laboratory Branch, Division of Viral Diseases, Centers for Disease Control and Prevention, Mailstop C-22, 1600 Clifton Road, Atlanta, Georgia 30333, United States of America. Tel. No.: (404) 639 4181, email: par1@cdc.gov; prota@cdc.gov

Dr Thian Lian Soo, Clinical Associate Professor, Department of Paediatrics, International Medical University, Malaysia, No. 9, Jalan Puchong Utama, 47100 Jalan Puchong, Selangor, Malaysia. Tel. No.: (6013) 8689 968, email: mtkinabalu@yahoo.com

Dr Hiroshi Yoshikura, Adviser, Department of Food Safety, Ministry of Health, Labour and Welfare, Japanese Government, 1-2-2 Kasumigaseki Chiyodu-ku, Tokyo 100-8916, Japan. Tel. No.: (814) 2344 7355, email: yohikura-hiroshi@mhlw.go.jp
2. SECRETARIAT

Dr Huong Tran, Director, Division of Communicable Diseases, World Health Organization, Regional Office for the Western Pacific, United Nations Avenue, 1000 Manila, Philippines. Tel. No.: (632) 528 9701, email: tranh@who.int

Dr. Yoshihiro Takashima, Coordinator, Expanded Programme on Immunization, World Health Organization, Regional Office for the Western Pacific, United Nations Avenue, 1000 Manila, Philippines. Tel. No (632) 528 9746, email: takashimay@who.int

Dr José E. Hagan, Medical Officer (Measles and Rubella Elimination), Expanded Programme on Immunization, World Health Organization, Regional Office for the Western Pacific, United Nations Avenue, 1000 Manila, Philippines. Tel. No.: (632) 528 9034, email: haganj@who.int

Dr Roberta Pastore, Technical Officer, Expanded Programme on Immunization, World Health Organization, Regional Office for the Western Pacific, United Nations Avenue, 1000 Manila, Philippines. Tel. No.: (632) 528 9034, email: pastorero@who.int

Ms Varja Grabovac, Technical Officer, Expanded Programme on Immunization, World Health Organization, Regional Office for the Western Pacific, United Nations Avenue, 1000 Manila, Philippines. Tel. No.: (632) 528 9034, email: grabovacv@who.int

Dr Katrina Kretsinger, Medical Officer, Expanded Programme on Immunization Plus, World Health Organization, Avenue Appia 20, 1211, Geneva, Switzerland, Tel. No.: (41 22) 79 13454, email: kretsingerk@who.int