

Meeting Report

25th Meeting of the Technical Advisory Group on Immunization and Vaccine-Preventable Diseases in the Western Pacific Region



26–29 July 2016
Manila, Philippines



25TH MEETING OF THE TECHNICAL ADVISORY GROUP ON IMMUNIZATION AND
VACCINE-PREVENTABLE DISEASES IN THE WESTERN PACIFIC REGION
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WORLD HEALTH ORGANIZATION
REGIONAL OFFICE FOR THE WESTERN PACIFIC

MEETING REPORT

**25th Meeting of the Technical Advisory Group on Immunization and
Vaccine-preventable Diseases**

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 25th Meeting of the Technical Advisory Group on Immunization and Vaccine-preventable Diseases in the Western Pacific Region and do not necessarily reflect the policies of the conveners.

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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 25th Meeting of the Technical Advisory Group on Immunization and Vaccine-Preventable Diseases in the Western Pacific Region in Manila, Philippines, from 26 to 29 July 2016.

1. CONTENTS

SUMMARY.....	8
1. INTRODUCTION.....	9
1.1 Meeting organization	9
1.2 Meeting objectives	9
2. PROCEEDINGS	9
2.1 Opening session	9
2.2 Update on Implementation of Global Vaccine Action Plan (GVAP)	10
2.3 Update from Strategic Advisory Group of Experts.....	10
2.4 Sustaining polio-free status and implementation of polio endgame strategies.....	11
2.4.1 Global update	11
2.4.2 Regional update.....	11
2.4.3 Polio laboratory network and environmental surveillance update	12
2.4.4 Global Polio Eradication Initiative outbreak response.....	12
2.4.5 Country presentation – outbreak of circulating vaccine-derived poliovirus	12
2.4.6 Trivalent oral polio vaccine bivalent oral polio vaccine switch and inactivated polio vaccine supply	13
2.4.7 Country presentations.....	13
2.4.8 Laboratory containment	14
2.5 Hepatitis B accelerated control	14
2.5.1 Global/regional update	14
2.6 Japanese encephalitis (JE) accelerated control.....	15
2.6.1 Global/regional update	15
2.6.2 Western Pacific Region JE laboratory network	15
2.6.3 JE outbreak in the Philippines.....	15
2.6.4 Ethics Review Committee update (targets, strategies and timeliness)	16
2.7 Measles and rubella elimination.....	16
2.7.1 Global update	16

2.7.2	Regional overview and draft regional strategy.....	16
2.7.3	Country presentations.....	17
2.7.4	Proposed strategy for immunization	19
2.7.5	Country presentation – epidemiologic surveillance	20
2.7.6	Proposed strategy for epidemiologic surveillance.....	20
2.7.7	Country presentation – laboratory support.....	21
2.7.8	Proposed strategy for laboratory support	21
2.7.9	Country presentation – outbreak preparedness and response.....	21
2.7.10	Proposed strategy for outbreak preparedness and response	23
2.7.11	Regional Verification Commission.....	23
2.7.12	National Verification Commission	23
2.7.13	Proposed strategy for other strategic areas.....	24
2.8	Maternal and Neonatal Tetanus Elimination (MNTE).....	24
2.8.1	Regional Update.....	24
2.9	Strengthening immunization systems (including strengthening routine immunization programme).....	24
2.9.1	Global perspective on strengthening routine immunization programme: Global Routine Immunization Strategies Practices	24
2.9.2	Closing gaps: addressing inequity in the regional context	25
2.9.3	Achieving high and equitable immunization in urban settings	25
2.9.4	Life-course approach, school-based immunization – New Zealand.....	26
2.9.5	Vaccine security: implementation plan for Effective Vaccine Management (EVM) in Papua New Guinea.....	27
2.9.6	Diphtheria in the Philippines.....	27
2.9.7	Strengthening evidence-based decision-making	28
2.9.8	Lessons learnt: functional National Immunization Technical Advisory Groups	28
2.9.9	Data quality in Western Pacific Region countries: overview, challenges and opportunities	28
2.9.10	Data quality assessment and data improvement plan.....	29
2.9.11	Lessons to be learnt from implementing an electronic immunization registry	29
2.9.12	Regional vaccine regulatory update.....	29

2.9.13	Global and regional vaccine safety update.....	30
2.10	Introduction of New and Underutilized Vaccine (NUVI).....	30
2.10.1	Global/Regional NUVI update.....	30
2.10.2	Surveillance networks.....	30
2.10.3	Western Pacific Regional rotavirus and invasive bacterial diseases laboratory networks.....	31
2.10.4	Country presentation – pneumococcal conjugate (PCV) introduction.....	31
2.10..	Dengue vaccine update	32
2.10.6	Safety surveillance in dengue vaccine introduction: the Philippines experience.....	32
2.11	Implementation of Western Pacific Regional Framework for Global Vaccine Action Plan.....	32
2.11.1	Regional update	32
2.12	Partners Meeting	33
3.	CONCLUSIONS AND RECOMMENDATIONS.....	34
3.1	Conclusions.....	34
3.1.1	Sustaining polio-free status and implementation of polio endgame strategies.....	34
3.1.2	Hepatitis B accelerated control	35
3.1.3	Japanese encephalitis (JE) accelerated control.....	35
3.1.4	Measles and rubella elimination.....	35
3.1.5	Maternal and neonatal tetanus elimination.....	36
3.1.6	Strengthening routine immunization systems-equity and sustainability	36
3.1.7	Strengthening evidence-based immunization decision-making	37
3.1.8	Strengthening routine immunization – data quality	38
3.1.9	Strengthening vaccine safety surveillance and regulatory capacity	38
3.1.10	Evidence-based introduction of new vaccines	38
3.1.11	Dengue	39
3.2	Recommendations for Member States	39
3.2.1	Sustaining polio-free status and implementation of polio endgame strategies.....	39
3.2.2	Hepatitis B accelerated control	40
3.2.3	Japanese encephalitis (JE) accelerated control.....	40
3.2.4	Measles and rubella elimination.....	41

3.2.5	Maternal and neonatal tetanus elimination.....	42
3.2.6	Strengthening routine immunization systems-equity and sustainability	42
3.2.7	Strengthening evidence-based immunization decision-making	43
3.2.8	Strengthening routine immunization – data quality	43
3.2.9	Strengthening vaccine safety surveillance and regulatory capacity	43
3.2.10	Evidence-based introduction of new vaccines	44
3.2.11	Dengue	44
3.3	Recommendations for WHO Secretariat.....	45
3.3.1	Sustaining polio-free status and implementation of polio endgame strategies.....	45
3.3.2	Hepatitis B accelerated control	45
3.3.3	Japanese encephalitis (JE) accelerated control.....	45
3.3.4	Measles and rubella elimination.....	45
3.3.5	Strengthening routine immunization systems – equity and sustainability	46
3.3.6	Strengthening evidence-based immunization decision-making	46
3.3.7	Strengthening vaccine safety surveillance and regulatory capacity	46
3.3.8	Evidence-based introduction of new vaccines	47

Annex 1. List of participants

Annex 2. Meeting programme

Keywords

Immunization / Vaccines-standards / Vaccination / Encephalitis, Japanese / Measles / Rubella / Hepatitis B / Poliomyelitis / Tetanus / Dengue

SUMMARY

The 25th Meeting of the Technical Advisory Group (TAG) on Immunization and Vaccine-Preventable Diseases in the Western Pacific Region was held on 26–29 July 2016 in Manila, Philippines. The meeting was attended by seven TAG members, six temporary advisers, 28 participants from 16 countries and areas, and 76 representatives from partner organizations, and WHO staff from headquarters, the Regional Office for the Western Pacific and representative country offices.

The meeting participants discussed progress towards achieving targets and indicators for the polio endgame; elimination of measles, rubella, and maternal and neonatal tetanus (MNT); and accelerated control of hepatitis B and Japanese encephalitis (JE). Discussions also covered evidence-based introduction of new vaccines and decision-making processes, as well as vaccine safety and regulatory capacity. The regional immunization coverage goals aim to ensure equity and sustainability in immunization services to reach underserved populations and improve data quality.

TAG's key recommendations included setting a regional rubella elimination target date of 2020 and finalizing the *Regional Strategy and Plan of Action* on measles and rubella. It was recommended that Member States prioritize available stocks of inactivated poliovirus vaccine (IPV) for high risk areas and explore the programmatic feasibility of using a fractional dose via intradermal administration. The TAG recommended the use of a JE incidence target of < 0.5 cases per 100 000 in the targeted population (typically children aged <15 years) in affected areas. The TAG reiterated the importance of establishing a second year of life platform for immunization as an opportunity to reach all children. Member States were encouraged to work with WHO and partners to ensure vaccine security and avoid stock-outs through regular vaccine forecasting, timely procurement and adequate resource allocation, making use of the Middle Income Country Strategies and the Vaccine Product, Price and Procurement (VP3) platform to overcome potential risks to vaccine security. Member States were encouraged to take a cautious approach when considering the use of dengue vaccine and closely follow advice in the current position paper and any additional recommendations from the Strategic Advisory Group of Experts (SAGE).

1. INTRODUCTION

1.1. Meeting organization

The meeting was attended by seven Technical Advisory Group (TAG) members, six temporary advisers, 28 participants from 16 countries and areas, and 76 representatives from partner organizations, and WHO staff from headquarters, the Regional Office for the Western Pacific and representative country offices. The timetable of the meeting is provided in Annex 1. The list of participants is included in Annex 2.

1.2. Meeting objectives

The objectives of the meeting were to:

- (1) review progress, identify critical issues, discuss key activities and priority actions to achieve regional immunization goals as specified in the *Regional Framework for Implementation of the Global Vaccine Action Plan in the Western Pacific* to achieve the *Global Vaccine Action Plan 2011–2020* strategic objectives; and
- (2) identify opportunities to enhance collaboration and coordination among immunization partners to support countries in implementing the *Regional Framework for Implementation of the Global Vaccine Action Plan in the Western Pacific*.

2. PROCEEDINGS

2.1. Opening session

Dr Shin Young-soo, WHO Regional Director for the Western Pacific, welcomed TAG members and participants to the 25th TAG meeting in the Western Pacific Region.

Dr Shin acknowledged the progress made by Member States towards achieving the goals of the *Regional Framework for Implementation of the Global Vaccine Action Plan* (GVAP) in the Western Pacific. He noted the framework was endorsed by the Regional Committee for the Western Pacific in 2014 and highlighted achievements against three of the eight framework goals. First, as of 2015, a total of 16 countries have achieved the regional target of coverage above 95% with three doses of diphtheria-tetanus-pertussis (DTP) vaccine, and a further 21 countries achieved coverage of 90% or above.

Second, Dr Shin noted that the 2017 regional goal of reducing the prevalence of hepatitis B in 5-year-old children to less than 1% has been achieved ahead of time.

Third, despite the circulating vaccine-derived poliovirus (cVDPV) emergence in the Lao People's Democratic Republic, the Region has sustained its polio-free status because of timely and comprehensive response efforts. In addition, the Region has been implementing strategies of the *Polio Eradication & Endgame Strategic Plan 2013-2018* and has successfully completed the switch from tri-valent to bi-valent oral polio vaccine.

The Regional Director concluded his remarks by noting that financial sustainability is a growing issue for many Member States of the Region, particularly as the costs of national immunization programmes increase. Although achievements have been made with the support of donors and partners, Member States now need to find ways to support programmes beyond donors. Eventually programmes must be self-sustaining.

Dr Shin noted that WHO and the Member States appreciate the TAG deliberations on the issues raised and that further guidance is vital to remain on track to meet the goals and objectives of the regional framework.

2.2. Update on Implementation of Global Vaccine Action Plan (GVAP)

The presentation highlighted the conclusions and recommendations of the SAGE GVAP 2015 assessment report¹ presented to the World Health Assembly in May 2016. The presentation included a data update for 2015.

SAGE concluded that five of the six mid-point targets remained off track with little or no progress for most. In 2015, 126 (65%) Member States reached 90% or above national DTP3 coverage but only 52 (27%) reached 80% or above coverage in all districts and met the GVAP target. Some countries experienced recent substantial declines in coverage due to conflicts, outbreaks or stock-outs, such as in the Philippines. In 2015, 65 countries reported a national level stock-out versus 50 in 2014.

Globally, the coverage and number of unvaccinated children has remained fairly stable at around 20 million since 2010, although a temporary all-time low was experienced in 2015 of 19.4 million unvaccinated children, mostly due to improved coverage in India and Nigeria.

The only target achieved relates to new and underutilized vaccine introductions with 160 introductions, excluding inactivated poliovirus vaccine (IPV), occurring in 99 low and middle-income countries during the first half of the Decade of Vaccines.

SAGE concluded that if successes achieved by some countries through leadership and accountability at all levels can be replicated, the GVAP implementation will progress in the second half of the decade. SAGE identified the following factors critical to success: improving quality and use of data; community involvement; improved access to immunization services for marginalized and displaced populations; strengthening health systems; securing and sustaining the supply of vaccines at all levels; and leadership and accountability.

The SAGE report was favourably received by the World Health Assembly which requested WHO to facilitate the GVAP implementation by: updating existing guidance for vaccination in humanitarian emergencies and providing further guidance on sustaining routine immunization in conflict areas and countries facing crisis; improving the management of the international emergency vaccines stockpiles; supporting countries to make evidence-based decisions on new vaccines introductions; supporting developing countries' capacity to develop and produce vaccines to achieve affordable pricing; facilitating the provision of affordable life-saving vaccines to countries facing humanitarian emergencies and to humanitarian organizations; and calling for an indicator that aligns with GVAP and helps track progress in immunization during the Sustainable Development Goals period.

In October, SAGE will discuss the 2016 GVAP assessment with focus on 10 priority countries and a review of maternal and neonatal tetanus (MNT) and measles elimination strategies. A resolution will be expected at the 2017 World Health Assembly.

2.3. Update from Strategic Advisory Group of Experts

The TAG was updated on the conclusions and recommendations made by SAGE during their October 2015 and April 2016 meetings. Key issues included, but were not limited to, measles and rubella elimination progress, malaria and dengue vaccine and responding to vaccine shortages. The full

¹ http://www.who.int/immunization/global_vaccine_action_plan/SAGE_GVAP_Assessment_Report_2015_EN.pdf

SAGE reports are available online². Throughout 2017–2018, SAGE will be considering topics, such as the use of vaccines in immunocompromised populations, involvement of the private sector, strengthening National Immunization Technical Advisory Groups (NITAGs) and rabies vaccine.

2.4. Sustaining polio-free status and implementation of polio endgame strategies

2.4.1. Global update

The programme continues to strive to interrupt wild poliovirus (WPV) transmission in 2016 and make the world polio-free by 2019. There have been only 19 cases in two countries, Afghanistan and Pakistan in 2016, the lowest number ever recorded. In addition, there have been 20 cases of cVDPV in four countries in the last 12 months (the Lao People's Democratic Republic, Myanmar, Guinea and Madagascar). A type 2 cVDPV was isolated from sewage in Nigeria, which appeared to have circulated undetected for almost two years.

Pakistan and Afghanistan are on track to stop polio in 2016, but critical gaps need to be addressed to increase the likelihood of eradication in 2016, particularly access in eastern Afghanistan, improving supplementary immunization activity (SIA) quality in southern Afghanistan, and parts of Pakistan, including Karachi and northern Sindh.

While the programme's response to VDPV outbreaks is good in most countries, it was substantially delayed and had poor performance in Guinea. In Nigeria, the monovalent oral poliovirus vaccine type 2 (mOPV2) stockpile was utilized for the first time.

The Global Polio Eradication Initiative (GPEI) priorities for the next six months are as follows:

- (1) Provide continued support to Pakistan and Afghanistan to implement all activities of the national emergency action plans, especially to achieve an improvement of SIA quality.
- (2) Close the Guinea and Nigeria outbreaks by enhanced surveillance and quality of response.
- (3) Support the rapid use of mOPV2 post-switch authorized by WHO Director-General, where needed.
- (4) Strengthen outbreak response capacity at global and regional levels.
- (5) Undertake political advocacy and resource mobilization to sustain efforts in non-endemic countries.

2.4.2. Regional update

The Western Pacific Region has remained polio-free since certification in 2000. The four areas critical to sustaining polio-free status are: (i) risk assessments; (ii) routine vaccination and SIAs; (iii) surveillance for polioviruses; and (iv) preparedness and response to polio importation and outbreaks.

In 2015, the Regional Certification Commission (RCC) identified two countries (Papua New Guinea and the Philippines) at high risk for poliovirus importation and transmission. High risk areas/locations were still present in medium- and low-risk countries. Coverage with the third dose of polio vaccines at the national level in 2015 was high in the Region (90% or more), as well as quality of surveillance for acute flaccid paralysis (AFP) cases. There are still countries/areas with immunity gaps due to

² http://www.who.int/immunization/sage_conclusions/en/

suboptimal coverage with polio vaccines. AFP surveillance performance varies notably among the countries/areas.

In 2015 and 2016, countries addressed population immunity gaps by conducting polio SIAs. AFP surveillance assessments were conducted or are planned in priority countries (the Lao People's Democratic Republic and the Philippines).

2.4.3. Polio laboratory network and environmental surveillance update

The regional polio laboratory network (RPLN) plays a crucial role in monitoring the presence of poliovirus (both WPV and VDPV), confirmation of results of AFP cases and documentation of the elimination of type 2 polio viruses following the switch. Regional polio network laboratories are conducting intratypic differentiation (ITD) of polioviruses using the WHO-recommended protocol. As of June 2016, of 43 polio laboratories in the Western Pacific Region, 38 have implemented intratypic differentiation (ITD) testing, including 27 provincial laboratories in China. Environmental surveillance (ES) has been used successfully in assessing the extent and duration of epidemic poliovirus circulation in specific populations. Four countries to date have implemented ES in the Western Pacific Region, including Australia, China, Japan and Malaysia. The Philippines will be the next country to include ES in the Region and is expected to start testing of environmental samples in 2016.

2.4.4. Global Polio Eradication Initiative outbreak response

Outbreak Standard Operating Procedures (SOPs) have been updated and divided into two parts in relation to the new context following the global tOPV–bOPV switch. The protocol for post-switch response to type 2 poliovirus (PV2) is now included in a separate document, which specifies that any PV2 detection post-switch should have the highest priority and the response should be faster and more active. It also includes a mOPV2 stockpile release procedure.

Evidence of circulation (distinguishing PV events from PV outbreaks:

- event: defined as a single PV isolate without current evidence of circulation and where transmission risk is medium to low; and
- outbreak: defined as evidence of circulation, with a high risk of further transmission.

The response needs to be calibrated accordingly, depending on evidence of transmission, risk of spread, country capacity, area/zone history of previous polio, and quality of response and surveillance.

So far, the global mOPV2 stockpile has only been used in the cVDPV2 outbreak in Nigeria, together with one fractional IPV (fIPV) round planned. In an event in Hyderabad, India, fIPV was also used.

The use of mOPV2 has implications for type 2 poliovirus containment that are also ongoing and careful management of stock and validation of disposal of unused vaccine is required.

2.4.5. Country presentation – outbreak of circulating vaccine-derived poliovirus

The Lao People's Democratic Republic has reported 11 cVDPV1 cases from three provinces, as well as the identification of 25 infected household and community contacts. The last laboratory confirmed case was 11 January 2016. Two cases have died. All of the cases are from the Hmong ethnic community and the affected age ranged from 7 months to 44 years. As part of the response to the VDPV1 outbreak, the Lao Ministry of Health deployed an investigation team within 24 hours of receipt of laboratory result and the Emergency Operations Centre was activated within 48 hours. The Prime Minister of the Lao People's Democratic Republic declared the outbreak a “national public

health emergency". Despite several challenges during the implementation, eight rounds of OPV SIAs have been conducted with a final coverage of above 97% in each of the rounds. AFP surveillance has also been strengthened across all provinces resulting in achieving a non-polio AFP rate of $\geq 3/100\ 000 < 15$ population. Through to the end of the year, the Lao Ministry of Health plans to conduct two bOPV SIAs covering ages 0–5 years. One dose of measles-rubella (MR) vaccine will be included in the round planned for December 2016.

2.4.6. Trivalent oral polio vaccine bivalent oral polio vaccine switch and inactivated polio vaccine supply

In 2013, the World Health Assembly endorsed the introduction of IPV in 126 Member States by the end of 2015, as part of Objective 2 of the *Global Polio Eradication & Endgame Strategic Plan (2013-2018)*. To date, 102 of 126 countries have successfully introduced the vaccine. Due to global supply constraints, Mongolia and Viet Nam will not be able to introduce the plan until the end of 2017. Furthermore, three additional countries (China, Papua New Guinea and the Philippines) are facing IPV shortfalls, and eight Pacific island countries and areas may face stock-outs prior to the next replenishment scheduled at the end of 2017. To stretch supplies, the World Health Assembly in 2016 endorsed the resolution for Member States to explore the feasibility of instituting dose-sparing strategies, such as intradermal administration of fractional-dose IPV (one-fifth of a full dose). Syringe adaptors and needle-free jet injectors will be available by early 2017 to help facilitate administration technique. While the inadequate supply is a concern, the key role for IPV is to prime populations in case of emergence of type 2 vaccine-derived polioviruses post-switch. For that reason, the most important measure for risk mitigation is for countries to ensure the maintenance of a high-performing surveillance system, both AFP surveillance and ES, where relevant. A global stockpile of both mOPV2 and IPV is available to all Member States. The mOPV2 stockpile can only be released on the authority of the Director-General. The remarkable dedication and enthusiasm of all stakeholders in-country lead to resounding success in synchronizing the switch from tOPV to bOPV across all of the 155 countries during the timeframe of 17 April to 1 May. Member States in the Western Pacific Region are to be highly commended for achieving this important milestone in the path to eradicating polio.

2.4.7. Country presentations

China

China successfully stopped the use of tOPV on 29 April 2016. The self-assessment and external monitoring validated that all tOPV was withdrawn and disposed of properly. As of 1 July 2016, IPV and bOPV are in use in 21 provinces, and 30 provinces, respectively. The bOPV is available to meet demands. The most significant polio problem is insufficient IPV, with a shortfall of two million doses in 2016 and an estimated eight million doses in 2017, out of an annual need of 20 million doses. To mitigate the risk of IPV shortage, China is initiating an emergency expansion of Sabin IPV production, directing IPV out of the private market and into the government programme, pursuing antigen-sparing techniques to stretch the Sabin IPV supply, and accelerating approval of Sabin IPV from other suppliers. Additionally, the preparedness for poliovirus outbreak responses is proceeding, including discussing the regulatory pathway for emergency use authorization for the global stockpiled mOPV2, revising poliovirus outbreak response guidelines and strengthening surveillance.

Philippines

On 27 April 2016, the Philippines switched from using tOPV to bOPV for routine immunization. Monitoring activities were conducted before, during and after the switch to ensure full compliance with the switch and recommended disposal of unused tOPV and to ensure that bOPV vials were available onsite at vaccination sites. A total of 301 health facilities from different administrative levels were monitored. By 22 July 2016, the Department of Health completed the disposal of 38 330 tOPV

vials collected from the different health facilities. After the switch, many areas of the country may be at risk for polio outbreaks because many children were left unprotected due to OPV stock-outs before and after the switch. Other factors like the low OPV3 coverage (74%) in 2015 and underperforming AFP surveillance (non-polio AFP rate at 0.68 and adequate stool rate of 61%) aggravate this risk. While risk mitigation activities are in place, the OPV supply insecurity continues to put the country at risk.

Viet Nam

In line with global polio endgame strategy, Viet Nam developed a plan to maintain polio-free status from 2016 to 2020, which was approved on 14 April 2016. Viet Nam stopped using tOPV on 1 May 2016 as planned, then all remaining tOPV was collected from all immunization sites and destroyed. The bOPV was introduced in June 2016 with a one month gap, due to some importation regulation issues. All children who missed OPV in May received bOPV in June. The tOPV SIAs were conducted with over 95% coverage, with more than 1.2 million children vaccinated in selected high risk areas. Viet Nam shows concern for the lack of IPV for at least 18 months until the fourth quarter 2017, due to global IPV supply constraints, which means more than 2.5 million children in Viet Nam will remain unimmunized against polio type 2. This puts the country and neighbouring countries at risk for a VDPV2 outbreak, even though Viet Nam is currently categorized as a Tier 4 country. As preparation, Viet Nam will strengthen AFP surveillance and finalize its national polio outbreak preparedness and response plan. The Ministry of Health, Viet Nam, agreed with a mechanism for mOPV2 fast track importation.

2.4.8. Laboratory containment

The Western Pacific Region successfully completed the first part of Phase I for destruction and/or containment of wild type (WT) and VDPV type 2 by February 2016. Four countries/areas in the Region will handle and store WT/VDPV PV 2: Australia, China, Hong Kong SAR (China) and Japan. The preparation for destruction and/or containment of Sabin PV2, initially planned to be completed by end of July 2016, was extended, and is to be completed by end of December 2016, due to operational reasons and the complexity of identification of Sabin 2 in potentially infectious materials. New guidance developed by WHO, which is expected to be distributed soon, will assist countries in identification of Sabin 2 in potentially infectious materials and classification of these materials into three categories based on the likelihood of being potentially contaminated with PV2. Further guidance is expected on the role of the Global Certification Commission (GCC) in the polio containment process and finalization of Containment Certification Scheme (CCS) document for certification of poliovirus-essential facilities.

2.5. Hepatitis B accelerated control

2.5.1. Global/regional update

Dr Joseph Woodring reported that according to the May 2016 vaccine study results, the ambitious regional goal of reducing hepatitis B seroprevalence among five-year-old children to less than 1% by 2017 has been achieved. As a result of the proactive hepatitis B immunization programmes, over 7 million deaths and 37 million chronic infections among children born after vaccine introduction have been averted from 1990 to 2014. Continued commitment is needed to ensure that all Member States reach this regional 1% goal. Discussion centred on the need to widely publicize this vaccine success story.

The Western Pacific Region Hepatitis B Expert Resource Panel (ERP) met in January 2016 and recommended, among other things, that WHO urge procurement agencies to include in their tender requirements that vaccine manufacturers include on their labels the suitability for controlled temperature chain (CTC) use of monovalent hepatitis B vaccines, and that ministries of health

encourage the delivery of newborns in health facilities, help strengthen coordination between the Expanded Programme on Immunization (EPI) and Mother and Child Health (MCH) for timely administration of hepatitis B birth dose, and to ensure effective monitoring and reporting of birth dose coverage. Hepatitis B birth dose coverage improvement strategies were discussed, highlighting countries' effort to increase health facility deliveries; hepatitis B education during antenatal care; and the linking of communities and outreach vaccination; and to use hepatitis B outside the cold chain where needed, provided that NRA approval and proper monitoring conditions are in place. Increasing hepatitis B birth dose and hepatitis B third dose are cost-effective cornerstones of hepatitis viral control upon which care and treatment can build to ensure viral hepatitis elimination by 2030, as described in the *Global health sector strategy for viral hepatitis 2016–2021*.

2.6. Japanese encephalitis (JE) accelerated control

2.6.1. Global/regional update

Dr James Heffelfinger presented on JE burden globally and in the Western Pacific Region. He discussed accelerated control of JE in the Region and provided JE vaccine guidance updates, highlighting support for JE vaccination from Gavi, the Vaccine Alliance (Gavi) and PATH. He also presented on regional progress of JE vaccination programmes. Eight of 12 countries and areas with endemic JE transmission in the Region have introduced JE vaccine in some or all JE risk areas; of the other four, Singapore has very low levels of disease without vaccination, Brunei Darussalam uses immunization for outbreak response only, the Philippines is planning a phased introduction in 2017, and Papua New Guinea is collecting JE burden data in preparation for making a decision about introduction. In addition, Dr Heffelfinger briefly described JE surveillance in the Region.

2.6.2. Western Pacific Region JE laboratory network

Comprised of 20 laboratories (one global, two regional, seven national and 10 subnational), the JE laboratory network in the Region is supporting surveillance with laboratory confirmation of JE suspected cases.

Completeness of data reported has been satisfactory and exceeded the 80% indicator target, but timeliness of reporting is still very low and requires constant reminders for laboratories to send data. The 14 laboratories (70%) participating in the external quality assurance programme are achieving very good results. Monitoring of quality control is conducted through confirmatory testing at global and regional reference laboratories and all laboratories have greater than 90% concordance rate for testing. To ensure building laboratory capacity and good quality of laboratory testing, the WHO Western Pacific and South-East Asia Regions convened a biregional laboratory meeting and training for laboratory diagnosis, held in August 2015, in Thailand. A new laboratory algorithm was introduced and recommendations were developed to strengthen laboratory capacity and improve collaboration between surveillance and laboratory in all JE control stakeholders.

2.6.3. JE outbreak in the Philippines

The Department of Health Philippines has established the Acute Meningo-Encephalitis Syndrome (AMES) surveillance with the cooperation of nine sentinel site hospitals nationwide in 2014 to detect JE and bacterial meningitis, such as *Haemophilus influenzae* type b, *Streptococcal pneumoniae* and *Neisseria meningitidis*. Simultaneously, WHO has supported the establishment of a national reference laboratory for JE and bacterial meningitis.

Through the newly established sentinel surveillance system of AMES in 2015, the Department of Health Philippines identified 138 JE positive cases (14% positivity) nationwide, while the retrospective study found only 73 JE positive cases between 2011 and 2014. However, in 2016, even

in the dry season of the first six months of the year, 121 JE positive cases (18% positivity) were reported, which exceeds the total number of cases detected in 2015. Of these cases, 50% were reported from Region 3. Case fatality for all cases reported from sentinel sites was more than 15% and sequelae varied from mild, including behaviour changes or confusion, to severe, including permanent disability and mental retardation. The age distribution has consisted primarily of cases less than age 15. The Department of Health, Philippines, recognizes the severe endemicity of JE in the country and is currently preparing JE vaccine introduction into EPI. WHO and UNICEF are assisting the Department of Health with this introduction.

2.6.4. Ethics Review Committee update (targets, strategies and timeliness)

Dr James Heffelfinger gave an overview of the March 2016 Expert Consultation on Accelerated Control of Japanese Encephalitis (JE) in the Western Pacific Region and described the Regional Framework for Implementation of GVAP in the Western Pacific. He presented recommendations on strategies and targets to achieve the regional framework goals for accelerating control of JE. Recommendations on strategies included proposing the use of a one-time campaign in the primary target population, as defined by local epidemiology (typically children aged <15 years), followed by routine immunization for incoming birth cohorts. Recommendations on targets included proposing a coverage target ($\geq 95\%$ coverage with the primary JE vaccine series in the targeted population) and an incidence target (≤ 0.5 JE cases among 100 000 in the targeted population).

2.7. Measles and rubella elimination

2.7.1. Global update

In 2010, the World Health Assembly established three milestones for measles control by 2015: (1) increase routine coverage with the first dose of measles-containing vaccine (MCV1) for children aged one year to $\geq 90\%$ nationally and $\geq 80\%$ in every district; (2) reduce global annual measles incidence to fewer than five cases per million population; and (3) reduce global measles mortality by 95% from the 2000 estimate. In 2012, the World Health Assembly endorsed the GVAP with the objective of eliminating measles in four WHO Regions by 2015. In 2015, 119 (61%) countries had MCV1 coverage $>90\%$; 133 (69%) countries reported measles incidence <5 per million; and measles mortality has been reduced by 79% since 2000. No regions have eliminated measles and only one (the Region of the Americas) has achieved rubella elimination. A 2015 assessment report on GVAP noted that elimination strategies for measles and rubella are in need of urgent change and adequate resourcing. A midterm review was conducted in 2016 to determine why progress on global measles and rubella elimination has slowed and what should be done to get back on track. The midterm review notes that it is premature to set a timeframe for eradication, but provides midcourse change and refocuses strategies, with emphasis on surveillance and outbreak response. The report will be finalized and submitted to the SAGE in October and included in the GVAP report presented to the World Health Assembly in May 2017. Other new opportunities include the new Gavi measles and rubella strategy that will make available over US\$ 800 million during 2016–2020 and funding for the development of a MR micro-array patch vaccine.

2.7.2. Regional overview and draft regional strategy

In 2003, the WHO's Regional Committee for the Western Pacific decided that measles elimination should be one of the pillars to strengthen immunization programmes, and endorsed the *Western Pacific Regional Plan of Action for Measles Elimination* (resolution WPR/R54.R3) and urged Member States to develop or strengthen national plans for measles elimination and use measles elimination strategies to strengthen EPI and other public health programmes, such as prevention of congenital rubella syndrome.

Dr Yoshihiro Takashima summarized progress and achievements in implementation of the *Western Pacific Regional Plan of Action for Measles Elimination* from the following aspects:

(1) immunization; (2) measles incidence; (3) epidemiologic surveillance; (4) laboratory support; (5) preparation for rubella elimination; and (6) interruption of endemic measles virus transmission in several countries; and analyzed the region-wide measles resurgence in 2013–2015. He also introduced the contents of a proposed new strategic document for measles and rubella elimination in the Region: *Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action*.

All countries and areas in the Western Pacific have actively conducted the strategies and activities for measles elimination proposed by the 2003 Regional Plan of Action, strengthened national immunization programmes, and significantly reduced measles transmission, morbidity and mortality towards 2012, the regional target year for measles elimination. Despite these achievements, the Western Pacific experienced a regionwide measles resurgence from 2013 to 2015. The regional measles incidence rate (per one million population) increased from 5.9 in 2012 to 19.5 in 2013, 70.1 in 2014 and 36.0 in 2015. The regionwide measles resurgence in 2013–2015 was attributed to (i) resurgence of on-going measles virus transmission in endemic countries, (ii) increased importation of measles virus from endemic countries; (iii) large-scale outbreaks following importation in countries with low or no documented transmission for a certain period; and (iv) multiple importations, resulting in increased measles incidence in countries having achieved or approached interruption of endemic measles virus transmission.

To address these issues and challenges, in June 2015, the TAG recommended WHO to update the 2003 Regional Plan of Action with strategies for rubella elimination and support Member States to develop or update national plans to accelerate activities for both measles and rubella elimination. In response to the TAG's recommendations in 2015, the WHO Regional Office for the Western Pacific prepared *Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action*, proposing 31 strategies with accompanying activities in the following eight Strategic Areas: (1) overall planning and immunization system; (2) immunization; (3) epidemiologic surveillance; (4) laboratory support; (5) programme review and risk assessment; (6) outbreak preparedness and response; (7) partnership, advocacy, information, education and communication (IEC) and social mobilization; and (8) progress monitoring and verification of elimination.

2.7.3. Country presentations

Republic of Korea

Dr Yang Taeun summarized the history, challenges and strategies for maintenance of measles elimination in the Republic of Korea.

The Republic of Korea experienced the country's largest measles outbreak in 2000–2001 with 55 526 cases and seven deaths since MCV-1 (MMR) was introduced into the routine immunization programme in 1983. Since a serosurvey carried out in 2001, among approximately 23 000 students aged 7–18 years revealed that the prevalence rate of immunity to measles among children and adolescents aged under 17 years was <95%, a nationwide MR-SIA targeting children aged 8–16 years was carried out between May and July 2001. In the MR-SIA, 5.8 million children aged 8–16 years were vaccinated (97.1%). To maintain coverage of MCV-1 over 95% for children aged 12–15 months and MCV-2 for children aged 4–6 years, school entry requirement for MCV-1 and MCV-2 started in 2001. During the elimination process, the school-entry immunization requirement – based on interministerial coordination and collaboration by matching different databases – has had a great effect on filling the immunity gap. Considering that there had been no transmission of endemic measles virus since 2002, in March 2014 the Republic of Korea was verified by the Regional Verification Commission for Measles Elimination in the Western Pacific (RVC) to have achieved measles elimination.

Recent challenges to maintenance of measles elimination in the Republic of Korea include: (1) repeated measles importation from other countries by Koreans returning from international travel and international immigrants entering the country; (2) late detection of imported or import-related measles cases due to low awareness and mild symptoms of measles cases, which results in difficulty in establishing epidemiologic linkage and identifying the source of infection; (3) residual immunity gap among people aged 14–22 years in 2015, who were 0–8 years old in 2001 and not targeted by the 2001 MR-SIA, likely due to unvaccinated or waning immunity; (4) advocacy and information to maintain high population immunity; and (5) sensitivity of the surveillance system.

To address these challenges, the Republic of Korea is focusing on the following four areas: (1) maintaining high population immunity through maintaining high performance of the national immunization programme, sustaining school entry immunization requirement programme, performing a periodic seroprevalence study to identify immunity gaps, and encouraging vaccination among unvaccinated people identified by the Immunization Information System (IIS); (2) maintaining high performance of the surveillance system, consisting of passive case-based measles surveillance and active laboratory measles surveillance; (3) outbreak preparedness and response to ensure prompt and thorough epidemiologic investigation; and (4) strengthening advocacy and information through publicity campaigns.

Japan

Dr Nobuhisa Yoshikawa summarized background, justification, implementation and impact of the immunization strategy for measles elimination in Japan.

Measles was endemic in Japan with an annual resurgence of transmission until 2003. In 2000, it was estimated that approximately 200 000 measles patients in total visited health facilities across the country. While the total number of measles cases reported by sentinel measles surveillance decreased year by year from 2001 to 2005 and the second dose of MR was introduced into the routine immunization programme in 2006, a nationwide measles outbreak occurred due to genotype D5 virus starting in 2007, which mainly affected adolescents and young adults. The national serosurvey in 2007 revealed that there was a significant immunity gap to measles among people who had been born from 1990 to 1999, with the prevalence rate of immunity to measles <95%. Since it was unfeasible to conduct a one-time nationwide mass vaccination campaign with MCV to close immunity gaps identified among adolescents and young adults (the estimated number of people born from 1990 to 1999 was >12 million) due to budgetary constraints and insufficient capacity of vaccine production by domestic manufactures, the Ministry of Health in Japan decided to conduct a “year-round” catch-up MR vaccination programme targeting people aged 12 and 17 for five years from 2008 so that 10 birth cohorts born from 1990 to 1999 could be vaccinated up to 2012.

Every year from 2008 to 2012, children aged 12–23 months, 5 years and 12 years and adolescents aged 17 years were given the opportunity to be vaccinated with MR (“multiple gatekeepers for vaccination”) any day when they were at their 1st, 5th, 12th or 17th years of age (each target was given year-round opportunity, meaning 365 days for vaccination). Planning and implementation of all activities for measles elimination, including advocacy and communication, was carried out in coordination and collaboration among local governments, schools, civil societies, parents and students, with technical advice provided by the central government.

From 2008 to 2012, the routine MR-1 and MR-2 were administered to 5 439 381 children aged 12–23 months and 5 559 636 children aged five years, respectively, and catch-up MR was given to 5 986 438 children aged 12 years and 6 088 238 adolescents aged 17 years, respectively. A 2014 result of the national serosurvey showed that the prevalence rate of immunity to measles among people who had been born from 1990 to 1999 had reached >95%. The endemic measles virus (D5) disappeared in Japan in the middle of 2010 and was never detected in 2011–2015. Measles virus with other genotypes (H1, D4, D8, D9 and B3) were repeatedly imported to Japan from endemic countries but never established endemic transmission in 2010–2015. In March 2015, Japan was verified by

RVC to have achieved measles elimination.

Cambodia

Dr Young Vuthikol, Deputy Manager of National Immunization Programme, presented on achievements and interventions for the interruption of measles virus transmission in Cambodia. The presentation started with a brief history of measles elimination in Cambodia. Then, he shared the strategies to achieve the measles elimination goal, which were developed in 2006 and implemented since that time. To achieve the goal, the National Immunization Programme conducted several rounds of SIAs, introduced a routine second dose of MCV into the national immunization schedule in 2012, increased population immunity by conducting a nationwide high risk communities strategy, and strengthened measles surveillance.

Cambodia was verified as having achieved measles elimination status in March 2015, noting that there had been no laboratory-confirmed measles cases reported in the country since November 2011. From January to June 2016, there were eight confirmed measles case reported in Cambodia, all of which were imported. Case investigation and planned immunization response for recent cases were reviewed. The National Immunization Programme is planning to conduct a larger SIA in August 2016 to stop the transmission of measles virus. All 2016 cases are imported or import-related, with many of the reported cases related to ongoing nosocomial transmission in one of the major hospitals in Phnom Penh.

2.7.4. Proposed strategy for immunization

In 2003, the WHO's Regional Committee for the Western Pacific urged Member States to offer all children two doses of measles vaccine to achieve and maintain 95% population immunity of each birth cohort in every district, country and area in the Region. Routine immunization programmes have been significantly improved in many countries in the Region since 2003, when the regional measles elimination initiative was launched. MCV-1 coverage has significantly increased in Cambodia, the Lao People's Democratic Republic, New Zealand and Papua New Guinea. China, Hong Kong SAR (China), Mongolia and the Republic of Korea maintained >95% reported vaccination coverage with both MCV-1 and MCV-2 between 2010 and 2015. Viet Nam has maintained >95% vaccination coverage with MCV-1 since 2010 with MCV-2 coverage increasing from 83.2% in 2012 to 94% in 2014. Almost all non-Pacific island countries and areas (except the Lao People's Democratic Republic, Papua New Guinea and the Philippines) achieved >90% reported vaccination coverage with both MCV-1 and MCV-2 since 2010. Despite this progress, the Western Pacific experienced a regionwide measles resurgence from 2013 to 2015.

Dr Yoshihiro Takashima summarized causes for the resurgence and outbreaks of measles and rubella in countries of the Region from 2013 to 2015: (1) children aged less than two years were affected by increased measles virus transmission; (2) children aged 2–5 years experienced increased measles virus transmission; (3) children born after the previous MCV-SIA still experienced increased measles virus transmission; (4) school-aged children still experienced measles virus transmission; (5) adults experienced measles virus transmission; (5) large-scale rubella outbreaks occurred among young adults in workplaces; and (6) specific communities or groups continued to be affected by measles outbreaks and triggered large-scale measles outbreaks in several countries during resurgence and outbreaks from 2013 to 2015.

To address these causes of resurgence and outbreaks of measles and rubella, prevent future outbreaks and achieve and sustain interruption of transmission of measles and rubella virus, Dr Takashima proposed six strategies with accompanying activities to: (1) optimize MCV1, MCV2 and RCV schedules; (2) establish and maintain sufficiently high population immunity to achieve and sustain interruption of measles and rubella virus transmission among children <24 months old by an intensified routine immunization programme; (3) establish and maintain a sufficiently high population

immunity to achieve and sustain interruption of measles and rubella virus transmission among pre-school-age children by catch-up vaccination at entry to child-care service and/or by periodic follow-up SIA; (4) establish and maintain adequate population immunity to achieve and sustain interruption of measles and rubella virus transmission among school children; (5) prevent measles and rubella virus transmission among young adults and in workplaces; and (6) prevent measles and rubella outbreaks in high-risk populations, communities or groups.

2.7.5. Country presentation – epidemiologic surveillance

Hong Kong SAR (China)

In Hong Kong SAR (China), medical practitioners report suspected measles, rubella and congenital rubella syndrome (CRS) cases to the Department of Health which conducts investigations on each reported case, including active case-finding. Cluster investigation entails implementation of control measures: health advice to susceptible contacts; post-exposure prophylaxis as appropriate; mop-up vaccination to those not fully immunized; and medical surveillance and advice on disinfection of the affected institution.

Collection of specimens for laboratory testing is done on all suspected cases. Viral culture, IgM detection and/or reverse transcription polymerase chain reaction (RT-PCR) are performed for confirmation of measles and rubella by Public Health Laboratory Services Branch (PHLSB). For measles laboratory confirmed cases genotyping is performed.

In 2011–2015, 126 measles cases were reported with 83% laboratory confirmed. Of 104 laboratory confirmed cases, 51% were imported and 5% import-related. Genotyping was available for 90 wild-type measles cases: 56 H1, 18 B3, 10 D9 and 6 D8. The majority of cases had chains of transmission subsequent to an imported source and the genotype was typically consistent with the country of origin (H1 for mainland China and B3 for the Philippines). A total of 10 small outbreaks were recorded in 2011–2015, each involving 2–5 persons with the duration ranging from 9.5 to 25 days.

2.7.6. Proposed strategy for epidemiologic surveillance

One strategy to increase sensitivity of measles and rubella surveillance and to enable detection of all cases is to adopt acute rash and fever as a definition for suspected cases. For countries experiencing a high incidence of measles, rubella or other diseases characterized by acute rash and fever, this strategy may not be immediately implementable.

Strategies to increase surveillance performance are to ensure all suspected measles and rubella cases are detected and reported by all health facilities to establish sufficient capacity for investigating suspected cases and for collecting/shipping specimens from suspected cases from each outbreak or transmission in all provinces and districts. Involvement of the private sector and intersectoral advocacy, communication and social mobilization could play an important role. Securing sufficient, readily available resources is paramount. Linkage with existing surveillance networks (that is, Early Warning and Response (EWAR), influenza) could be instrumental.

As all 37 Member States in the Western Pacific Region have introduced RCV, establishing or expanding CRS surveillance is strategic to monitor the effectiveness of the rubella vaccination programme and to identify CRS cases to implement control measures.

2.7.7. Country presentation – laboratory support

China

China started universally using a web-based measles-rubella surveillance system to collect both epidemiological and laboratory data in 2009. From 2009 to June 2016, 47 880 to 139 249 suspected measles-rubella cases were reported each year for laboratory confirmation. To share the workload of testing and to timely confirm cases for programme intervention, China set up a measles-rubella laboratory network at prefecture, provincial and national levels, with serology and rRT-PCR diagnosis operation at prefecture level, virus isolation and genotyping and quality control at provincial level, and genotyping, quality control and accreditation and technical support at national level. All performance indicators (such as the proportion of sporadic cases with serum, serology results available within four days in 2015) reached WHO-specified targeted levels. The serologic data indicated 17–64% of samples were positive for measles IgM, and 3–18% of samples were positive for rubella IgM. Virologic data proved that H1a genotype was still the predominant genotype of measles virus, 2B and 1E became the predominant genotype of rubella virus. In addition to continuous quality control, training and cooperation, the central Government invested US\$ 39 million for equipment, reagents and supplies in maintaining the operation of the laboratory network.

2.7.8. Proposed strategy for laboratory support

Laboratory support is included in the Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action. The strategies were proposed in three major areas: Strategy 4.1: ensure timely laboratory diagnostic confirmation of suspected measles and rubella cases; Strategy 4.2: assure collection of appropriate clinical specimens for obtaining genotype information from each outbreak and transmission; and Strategy 4.3: collaborate with the WHO Regional Office for the Western Pacific to further improve the performance of the WHO measles and rubella laboratory network in the Western Pacific Region.

2.7.9. Country presentation – outbreak preparedness and response

Viet Nam

Measles incidence in Viet Nam has been reduced since introduction of MCV1 in 1984. Viet Nam introduced MCV2 to be given to children age 6 in 2006, but the schedule was later changed to be given at 18 months of age in 2011. Though Viet Nam maintains high routine coverage with MCV, the country experienced large outbreaks in 2013–2014, with nearly 16 000 cases confirmed nationwide. The age distribution of cases showed the majority of cases among those less than 9 months or among older adolescents and young adults. Viet Nam conducted a nationwide MR-SIA targeting children 1 to 14 years of age in 2014–2015 followed by an SIA targeting 16–17 year olds in 2016. In total, more than 20 million children were vaccinated. These SIAs have made an impact in reducing the number of cases so far, however, Viet Nam still has several challenges regarding measles elimination. Viet Nam should address population immunity gaps among young adults, and in specific, hard to reach areas, as well as maintaining high coverage with routine MR immunization in such areas; implementing a school entry requirement; and conduct regular measles SIAs in high risk areas as planned. A serosurvey is planned to assess maternal antibody. To improve surveillance performance, Viet Nam is planning training for hospital and laboratory staff.

Mongolia

Mongolia has a long history of measles control and the country was verified by the RVC as having achieved measles elimination in March 2014 by meeting the three criteria for verification, with no reported measles cases during the period from 2010 to 2014 in the presence of verification standard case-based surveillance for measles.

However, Mongolia has been facing a large measles outbreak since March 2015 affecting two dominant age groups – infants less than 9 months and young adults aged 18–30.

Although the Government of Mongolia has implemented outbreak response measures in collaboration with immunization partners, including conducting two MCV-SIAs targeting two different age groups, the national EPI team is aiming to close immunity gaps (non-selective SIAs by using stockpiled vaccines, and to ensure vaccination coverage data quality through the use of an electronic immunization registry), and strengthen country capacity for outbreak response, through development and implementation of a comprehensive plan encouraging multidisciplinary collaboration within the health system, based on lessons learnt from the event.

The key strategy for maintaining measles elimination status is to ensure financial sustainability for a serosurvey at regular intervals in order to monitor population immunity level.

Australia

In 2014, Australia was verified as having achieved measles elimination. However, numerous importations continued to occur in 2015 and 2016 (year to date), with 74 and 75 measles cases confirmed each year, respectively. In 2015, 83% were definitively classified as imported or import-related. Of the 74 cases in 2015, 47 (63%) were outbreak-related. Median duration of outbreaks was 23 days, with a median number of four cases (range 2–11) per outbreak. Australia has detailed national guidelines on the response to imported measles cases that include information on case definition, laboratory testing, case management, education and contact tracing and management, including isolation, restriction and post-exposure prophylaxis. Detailed advice is available for possible measles virus transmission in schools, health-care facilities, and airplanes. In 2015, 62 (83%) of confirmed measles cases acquired the infection overseas. The majority of those infected (56 or 75%) were not vaccinated or had unknown vaccination status.

China

From 2009 to 2015, China reported 1426 measles outbreaks. The median number of cases per outbreak was two cases and median duration for outbreaks was eight days. One typical measles outbreak, with 280 cases reported in one county of Inner Mongolia in 2014, demonstrated that 77.6% of cases were among persons under 20 years of age, 8.6% were among infants and toddlers aged 8–23 months, 7.9% were among infants under 8 months, and the remaining 5.9% were among children 2–19 years old. The infections were mainly acquired in the community, health-care facilities, or in households. Outbreak response immunization activities were implemented by non-selective SIAs, achieving 51.3% of the targeted 5–19 year-old children and adolescents, and 30.2% of targeted adults 20–49 years old. This outbreak highlighted that despite high population immunity among children and adolescents, sustained measles virus transmission still occurred among adults in the community. Adult measles immunity gaps might threaten measles elimination, highlighting the importance of targeting susceptible adults during outbreak response immunization.

Philippines

A sudden increase in measles cases, followed by a nationwide outbreak in 2013, stressed the surveillance system and resulted in delays in sample processing and stock-outs of testing kits at the national laboratory. Challenges included limited funding for staffing, supplies and logistics, specimen storage, and data analysis and reporting.

Key interventions maintaining surveillance and laboratory functionality included training, emergency procurement, strategizing the algorithm for laboratory testing, rationing of test kits and the promotion of epi-linking in areas with documented laboratory-confirmed cases.

Positive outcomes of the outbreak on surveillance included increased sensitivity for measles reporting, increased awareness of the need for cluster monitoring and epi-linking, updated surveillance and laboratory confirmation guidelines, laboratory expertise on PCR and genotyping analysis, and strengthened laboratory capacity and compliance with international standards.

Since the outbreak, the age distribution of confirmed cases continues in a bimodal distribution among very young children and young adults. More innovative measles control methods that also target young adults must be considered.

2.7.10. Proposed strategy for outbreak preparedness and response

The draft Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action addresses separately proposed strategies in programme review and risk assessment, as well as outbreak preparedness and response. Conducting an annual programme review to identify deficiencies followed by proactive corrective actions is an essential component of outbreak preparedness. An outbreak risk assessment tool has been developed by the United States Centers for Disease Control and Prevention (US CDC) and WHO to assess the overall risk of an outbreak based on indicators in four functional categories: population immunity, surveillance quality, programme delivery performance and threat probability. SOPs for responding to outbreaks should be developed at the national level and disseminated. These SOPs should include details on conducting an outbreak investigation, when and how to collect laboratory specimens and provide information on steps to consider for implementing effective control measures. Clinical management of confirmed measles cases and mechanisms to prevent nosocomial transmission of disease should also be addressed.

2.7.11. Regional Verification Commission

In 2010, the Regional Committee requested the Regional Director to establish a regional verification mechanism for measles elimination. The Regional Verification Commission was established by the Regional Director in 2012 and meets annually. To date, seven countries and areas (Australia, Brunei Darussalam, Cambodia, Japan, Macao SAR (China), Mongolia and the Republic of Korea) have been verified as having achieved interruption of endemic measles virus transmission for a period of at least 36 months. The *Guidelines on Verification of Measles Elimination in the Western Pacific Region* were finalized in 2013. Additional guidance was provided to the chairs of National Verification Committees and Secretariats in 2014, after the RVC reviewed the first annual progress reports submitted. After the Region adopted a rubella elimination goal (with target date not yet specified) in 2014, the RVC requested that the guidelines be updated to include criteria and lines of evidence for elimination of rubella and prevention of CRS in addition to measles.

2.7.12. National Verification Commission

In 2015, Japan was verified as having interrupted endemic measles virus transmission for a period of at least 36 months. Partnership among stakeholders and intense advocacy with various sectors were critical for Japan to achieve elimination. In 2001, Japan experienced a large outbreak of measles that resulted in spread of measles virus from Japan to the United States and subsequent widespread transmission in Brazil. In 2007, Japan was also the source of measles virus that resulted in a multistate outbreak in the United States. Around this time, the Japanese Paediatric Society, Japanese Society of Child Health and Japanese Vaccine Society called on the Ministry of Health, Labour and Welfare to establish a measles elimination policy. The first national measles elimination plan was finalized in December 2007 and revised in 2012, with the goal of achieving elimination and verification by WHO by 2015. The goal was achieved only by adopting a multisectoral strategy of communication and advocacy.

2.7.13. Proposed strategy for other strategic areas

Dr Takashima proposed four strategies with accompanying activities for improving overall planning and strengthening the immunization system for assuring measles and rubella elimination: (1) update the national strategies and plan of action for measles and rubella elimination; (2) develop subnational (such as provincial or regional) strategies and plan of action for measles and rubella elimination in countries with a large population; (3) establish and sustain a supply chain system and practices strong enough for measles and rubella elimination activities; and (4) further improve immunization practices.

Dr Takashima also proposed four strategies with accompanying activities for strengthening partnership, advocacy, IEC and social mobilization: (1) establish or revitalize current immunization partnerships for measles and rubella elimination at both national and regional levels; (2) enhance advocacy activities by RVC, Subregional Committee for the Verification of Measles Elimination (SRVC) and national verification committees (NVCs) for measles and rubella elimination; (3) develop and implement IEC strategies for increasing knowledge of general public about measles, rubella, CRS and the importance of their prevention by vaccination; and (4) mobilize local governments, private sectors, societies, communities and families regularly for promoting measles and rubella elimination activities (including defaulters, MR vaccination and case detection and reporting).

Dr Takashima then proposed further steps to be taken to finalize the draft Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action.

2.8. Maternal and Neonatal Tetanus Elimination (MNTE)

2.8.1. Regional Update

In 1999, 57 priority countries were identified for elimination of maternal and neonatal tetanus (MNT). This number was later expanded to 59 when East Timor and South Sudan became independent countries in 2002 and 2011, respectively. Six countries from the Western Pacific Region were included on this list. Viet Nam was validated as having achieved MNT in 2005, China in 2012, the Lao People's Democratic Republic in 2013, and most recently, Cambodia in 2015. In addition, 16 of 17 regions of the Philippines were validated in 2015, but due to lack of security it was not possible to conduct a validation survey in the remaining region (the Autonomous Region of Muslim Mindanao or ARMM). To overcome this obstacle, an independent team of experts suggested that the risk of MNT be reviewed in all districts of ARMM followed by three rounds of tetanus SIAs for women of reproductive age in high risk districts. As of July 2016, two rounds of tetanus-diphtheria SIAs have been completed. A programme review was completed in the one remaining country, Papua New Guinea.

2.9. Strengthening immunization systems (including strengthening routine immunization programme)

2.9.1. Global perspective on strengthening routine immunization programme: Global Routine Immunization Strategies Practices

The *Global Routine Immunization Strategies and Practices (GRISP)* document was created to highlight and provide guidance on routine immunization aspects of the GVAP. The document contains two sections: a comprehensive framework of routine immunization system strengthening strategies to describe the universe of strategies to improve coverage; and a section on the areas that should be prioritized in the next five years. These are described as the “nine transformative investments” of GRISP, and highlight the key areas of engagement that will transform national EPI programmes in the near future. Most important among these is investment in a capable and sufficiently resourced national programme management team in each country. In the Western Pacific Region, where many countries have reached very high levels of routine immunization coverage,

strategies should be selected that diagnose coverage challenges locally, highlighting communities and individuals that are under vaccinated, and designing specific and locally adapted strategies to reach these individuals.

2.9.2. Closing gaps: addressing inequity in the regional context

At the midway point of the Decade of Vaccines, the Western Pacific Region is making progress towards achieving many of the regional framework goals. One of GVAP's guiding principles is to improve equity in access and use of routine immunization services to maximize the population reached. Since 2009, the Region as a whole has sustained coverage above 95% with three doses of DTP vaccine. As of 2015, 17 countries have achieved DTP coverage of 95% or above. In 2015, 15 countries and areas in the Region reached DTP3 coverage of 90% or above in all districts. Despite this progress, however, vaccination coverage is uneven across countries, and particularly remains a major problem in low- and middle-income countries in the Region. Uneven coverage is a result of inequitable immunization services delivery, particularly at subnational level. Eleven countries have failed to achieve 90% coverage for DTP3 in at least 90% of districts. These disparities at subnational level can negatively impact efforts to achieve elimination and control of VPDs by creating pools of susceptible individuals that can sustain transmission of VPDs.

During 2015, 20 vaccine stock-out events (at both national and subnational levels) were reported in 11 countries (*Source JRF 2015*). In seven countries, 11 occasions of vaccine stock-outs caused interruption of immunization services. In 2015, five reports of stock-outs took place in Multiple Indicator Cluster Surveys (MICs). Some were due to internal planning and distribution issues, while others were due to vaccine shortages in the international market (such as shortage of *Bacillus Calmette–Guérin* (BCG) and IPV vaccines).

Despite compelling evidence of the benefits of vaccines in preventing diseases, vaccine hesitancy has become a growing focus of attention and concern in the Region, given its potential to lead to vaccine delays and refusals, which place individuals and populations at risk of outbreaks of VPDs. In the 2015 JRFs, 20 countries indicated they had concerns about vaccine hesitancy and concerns among 13 countries were recorded as opinions and seven were based on documented evidence.

The important role and responsibilities of private providers in achieving the goals of the GVAP has been recognized. With this context, the WHO Regional Office for the Western Pacific has conducted a survey in 13 countries and areas in the Region to map the scope and characteristics of the provision of immunization services by private providers. The survey found that private providers' contribution to immunization service is varied throughout the Region. Their engagement is supported by national policies, regulations and guidelines, but there is a notable lack of systems for monitoring and evaluation. Private provider services were found to be more favoured by urban wealthier populations across all age groups. The private sector was found to offer vaccines both within and outside of those used in national immunization programmes, and deviation from National Immunization Programme schedules was reported. Reporting on coverage, Adverse Events Following Immunization (AEFI) and VPDs was seen to be low. There is a gap in communication and involvement of private providers in decision-making.

2.9.3. Achieving high and equitable immunization in urban settings

Despite continued efforts to strengthen immunization systems, major disparities still exist in immunization coverage across different population subgroups throughout the Region. With rapid urbanization and rural–urban migration ongoing in low- and middle-income countries, recent available data suggests children's health outcomes, as well as immunizations coverage of urban poor, are similar to or worse than rural populations and far worse than the urban richest. Due to the low coverage of routine immunization among children in urban poor, slums have become a hotspot for

outbreaks.

In the context of rapid urbanization, the complexity of urban management presents a unique challenge, which includes: (1) parents or care-givers have to pay high opportunity costs to take children to urban health centres; (2) health centre staffing is inadequate to meet the demands of large and rapidly increasing urban poor populations; (3) urban poor population numbers are rarely known because children are often unregistered, as well as living in informal settlements; and (4) there is a high movement of population into and out of urban poor areas for work, which makes follow up and defaulter tracing extremely difficult.

Considering the current rapid urbanization trend in the Region, immunization and disease control goals could be at risk if no appropriate attention is paid to the immunization gaps among poor urban children. It is recommended that: (1) health service delivery models need to adapt to urban poor challenges and new technology, such as Rapid Pro, can contribute to addressing this; (2) there is a need to develop an effective and tailored urban strategy; and (3) exchanges should be promoted through South-South collaboration in the Region.

2.9.4. Life-course approach, school-based immunization – New Zealand

The New Zealand National Immunization Programme implements a whole-of-life approach, offering vaccines from pregnancy to old age. The Human Papillomavirus (HPV) Immunization Programme, introduced in 2008, is an example of this whole-of-life approach and offers the HPV vaccine in school settings to girls aged 12 years and in general practice for older girls.

School-based programmes are associated with higher coverage rates and reduced inequalities compared to vaccine delivery in other settings. The National Immunization Register is critical to the success of the National Immunization Programme as a tool to monitor coverage and evaluate programme implementation.

The programme was designed to address the equity gap in cervical cancer, especially for Māori and Pacific women who are most at risk of cervical cancer and have lower immunization coverage rates.

The programme has experienced both success and challenges in addressing equity. As of June 2016, the programme has achieved coverage of 65% for girls aged 12. Immunization coverage for Maori and Pacific girls is now higher than for New Zealand girls of European descent.

Research has shown that New Zealand parents of European descent in particular perceive the HPV vaccine as relatively new and may lead to early promiscuity and would rather wait and vaccinate their daughters when they are older.

A downside of the current programme is that it is only offered in schools for girls aged 11–13 years, although it is also available in general practice for girls aged up to 20 years. Early in the programme, negative media coverage was experienced and HPV vaccine safety concerns are still being aired on social media.

In 2014, the programme was revitalized to increase coverage and acceptance of the programme as part of the routine childhood immunization schedule. An HPV vaccine recall process in general practice for adolescents aged 14 years aims to capture children whose parents choose to delay their immunizations and have yet to follow-up on immunization. It is expected this recall process will also improve adolescent immunization coverage for tetanus, diphtheria, and acellular pertussis (Tdap vaccine) and measles.

From 1 January 2017, the programme is moving to a two-dose schedule for children under age 15 and is being expanded to include boys. A three-dose schedule will also be available through general practice for males and females aged 15 to 26 years. It is hoped these changes and the increased focus

by general practice will improve immunization coverage and continue to reduce the equity gap.

2.9.5. Vaccine security: implementation plan for Effective Vaccine Management (EVM) in Papua New Guinea

Papua New Guinea suffers from a high burden of under-five mortality³ and VPDs continue to be a major cause. For almost a decade, national DTP3 coverage has plateaued around 60%. As per the JRF 2015, 43 of 89 districts had coverage of both DTP3 and MCV1 below 50%, and 79 districts had more than 10% drop-out from DTP1 to DTP3.

Immunization services are affected by weak health systems with insufficient vaccinators and supervisors, inadequate cold chain capacity, poor management and procurement of vaccines and supplies, lack of outreach efforts, and weak technical and management capacity at national and provincial levels. The delegates explained that a 33% budget cut across the health sector in 2016 has contributed to challenges, such as outreach implementation.

The recently conducted Effective Vaccine Management Assessment (EVMA) showed a challenging situation regarding cold chain and vaccine management that threatens vaccine security. Except for storage capacity, none of the nine criteria of effective vaccine management met the 80% level of effectiveness at national level. The weakest areas were shown to be vaccine arrival, temperature management, stock management, and distribution and reporting. Findings at provincial and district levels showed the situation to be even weaker.

An EVM improvement plan has been developed and includes training and capacity building of EPI staff, distribution of new cold chain equipment to 745 health facilities, construction of a transit store, vaccine and cold chain management training for 22 provinces and quarterly updating of cold chain equipment inventory. Specific plans for low performing districts to improve vaccine security include regular training and capacity building; quarterly programme review/supervision; strengthening monitoring and evaluation, reporting and feedback; and engagement of communities in immunization activities.

Financial sustainability also affects vaccine security. Only 50% of the total required resources (US\$ 93 million) for the draft multiyear plan 2016–2020 are secured. New and under-utilized vaccines account for almost 96% of total vaccine costs. To date, US\$ 6.4 million has been secured against the US\$ 32.2 million required for vaccines.

2.9.6. Diphtheria in the Philippines

Penta3 coverage in the Philippines has significantly declined from 84% in 2013 to 55% in 2015. As a result of this effect, diphtheria cases have increased. As of 16 July, the number of reported cases reached 42, which is almost half of the cases (105) reported in 2015. The current positivity rate is 64% and the case fatality ratio is 36%. The most affected age group is 1–5 year-olds, although many cases are also among ages 6–10. The majority of cases are from Regions III, IVA and the National Capital Region (NCR). RCA conducted during a field investigation revealed penta3 coverage of 42% among under-5 children. A 6-month stock-out of penta vaccine in 2015 led to the high incidence observed this year. WHO donated 100 vials of life-saving diphtheria antitoxin and an additional 600 vials will be donated this July. In response to this high incidence of diphtheria, the Department of Health will preposition 2000 vials of diphtheria antitoxin in key hospitals, strengthen local case response capacity and routine immunization coverage prioritizing Regions IVA and NCR, and explore the feasibility of providing a diphtheria booster dose at age 12 months.

³ 57 per 1000 live births as per the UN Inter-agency Group of Mortality Estimates in 2015

2.9.7. Strengthening evidence-based decision-making

A key objective of both the GVAP and the regional framework for implementation in the Western Pacific is to strengthen national capacity to formulate evidence-based immunization policies through the establishment and strengthening of NITAGs or equivalents.

The Western Pacific Region requires some work yet to meet this objective as NITAGs operate at varying levels of functionality and some countries have no such systems in place. Pacific island countries and areas, in particular, require an innovative approach to improving their decision-making processes. It is not feasible for each to have their own committee and alternative methods should be explored, such as assessing the feasibility of a subregional TAG or considering the use of external expertise. A NITAG evaluation tool has been developed and is available at the online NITAG Resource Centre and can be a valuable tool in improving NITAGs' functionality.

In addition, collaboration between NITAGs throughout the Region on common technical topics and challenges has the potential to reduce the burden on NITAG members and Secretariats.

2.9.8. Lessons learnt: functional National Immunization Technical Advisory Groups

To demonstrate the learning and development processes that NITAGs or their equivalents undertake, Ms Hope Peisley presented the experience of the Australian Technical Advisory Group on Immunization (ATAGI). Established in 1997, ATAGI provides technical advice to the Minister for Health, research funding bodies (through the Department) and the Pharmaceutical Benefits Advisory Committee. It is supported technically by the National Centre for Immunization Research and Surveillance and together they produce the *Australian Immunization Handbook*.

ATAGI has undergone several key organizational changes, such as developing a new process for appointing members through public calls for expression of interest and the introduction of a transparent conflict of interest policy. ATAGI plans to continue to identify the means to strengthen their work, for example, through the establishment of a Strategic Priorities Group, which will identify gaps and areas and looks forward to collaborating with other NITAGs on evidence-based summaries and other areas of common value.

2.9.9. Data quality in Western Pacific Region countries: overview, challenges and opportunities

Monitoring of progress towards GVAP and the regional framework relies on completeness and timeliness of information submitted through the WHO-UNICEF Joint Reporting Form (JRF). Quality of JRF information is particularly poor for financing indicators, district-level coverage, vaccine manufacturers and procurement mechanism.

Analysis of national coverage data shows that data quality issues are affecting both numerators and denominators (often reported bottom-up within the health sector). In several countries, comparison between WHO-UNICEF coverage estimates, country official estimates and administrative data show discrepancies.

Data quality should be assessed through periodical data quality reviews and routine desk reviews of data. Based on the findings of data review, a data improvement plan should be developed and implemented. Approaches to increase quality of coverage monitoring include revision of reporting framework and data management guidelines, implementation of high quality coverage survey and digitization of immunization information using aggregated systems or an electronic immunization registry, depending on the country setting.

2.9.10. Data quality assessment and data improvement plan

Dr Chansay Pattamavong presented an overview of the recent efforts made by the Lao People's Democratic Republic to improve immunization data quality. She noted that the international EPI review in 2012 identified data quality as one of the priority areas for the national immunization programme. The repeated VPD outbreaks in the Lao People's Democratic Republic necessitated an evaluation of the quality of data generated by the health system. The main vision of the national immunization programme was to conduct the "data quality assessment" on a regular basis using simple assessment tools. An assessment was conducted in December 2015, using an adapted WHO's Data Assessment Module 2015. It was found that while availability of reporting and recording tools was good, the use of data for local action was lacking at all levels. Data inconsistencies were observed between health centre and district reporting.

The Lao People's Democratic Republic plans to develop a comprehensive data quality improvement plan addressing issues at all levels in line with the comprehensive multiyear plan.

The Lao People's Democratic Republic also plans to establish a system of focused, subprovincial hands-on training mechanism on data integrity and use of data for action.

2.9.11. Lessons to be learnt from implementing an electronic immunization registry

Samoa requested WHO assistance in developing an electronic immunization registry (eIR) to improve inaccurate vaccine coverage monitoring, depending on the difficulty in monitoring vaccination in highly mobile populations and low reliability of subnational population estimates.

In April 2015, with the support of WHO, Samoa conducted a situation analysis. Based on recommendations, Samoa set-up a steering committee, defined responsibilities for project management and financing, selected g-IIS open-source software (WHO-PATH Optimize project) and defined its functionalities, namely, registration of births/children, registration of vaccinations, vaccine stock management and reporting. In October 2015, national EPI and National Health Services staff were trained at the WHO Regional Office for the Western Pacific and they conducted subsequent training in all 11 health facilities between January and February 2016. The eIR was launched on 25 February 2016 and 2015–2016 birth cohort data were entered in the system. Challenges identified to date are linked to slow connectivity to the National Health Services server and the unavailability of dedicated computers at health facilities. Samoa will start analysing and sharing data to demonstrate the benefits of the e-registry for improving EPI services.

2.9.12. Regional vaccine regulatory update

WHO published a revised Model List of Essential Medicines (EML) and Model List of Essential Medicines for Children (EMLc), including 23 VPD vaccines in 2015. Since January 2015, 12 products including BCG, Flu, oral cholera vaccine (OCV), Penta and Polio were added to the list of WHO prequalification, to which China and the Republic of Korea contributed. Developing country regulators and manufacturers have played important roles in the improvement of the global supply of quality-assured, affordable vaccines in the past decade. A WHO revised HPV vaccine regulatory standard and implementation workshop in the Region is underway. WHO adopted guidelines for extended controlled temperature conditions. Since the last TAG meeting, an assessment of regulatory systems was conducted in Mongolia. The Regional Alliance for National Regulatory Authorities (NRAs) for Vaccines convened its third steering committee and the fourth NRA workshop in Seoul, Republic of Korea, and initiated discussion on regional adaptation of revised global NRA assessment policy, process and indicators. Working groups discussed strength, weakness, opportunities and threats and key performance indicators as per strategic planning of each of workgroup streams. The Regional Office made progress on advocating WHO guidelines on extended controlled temperature conditions to support an on-label controlled temperature chain (CTC) programme for a special EPI programme and strategies, such as hepatitis B birth dose CTC. While faced with many challenges in strengthening the capacity of the regulatory system in lower- and middle-income countries, and in

providing technical support to Pacific island countries and areas, the WHO Regional Office will continue to support these countries by identifying opportunities.

2.9.13. Global and regional vaccine safety update

The Global Vaccine Safety Initiative (GVSII) is comprised of a framework of eight strategic objectives focussed on building and supporting a systemic approach to vaccine pharmacovigilance in all low- and middle-income countries. GVSII is in the process of developing a communications tool kit, which is a comprehensive set of training materials identified for each level of the AEFI surveillance cycle to be used by the National Immunization Programme. GVSII has also developed tools for AEFI reporting, investigation and causality assessment.

The comments by the Global Advisory Committee on Vaccine Safety (GACVS) on HPV vaccine safety were highlighted, as it has not found any safety issues that would alter GACVS recommendation on use of the vaccine. Reviews of pre- and post-licensure data provide no evidence that Complex Regional Pain Syndrome and Postural Orthostatic Tachycardia Syndrome are associated with HPV vaccination. Further, GACVS recommendation on the need for attention on the cluster of anxiety-related reactions following immunization was highlighted.

Strengthening the AEFI surveillance system is necessary to effectively respond to immunization safety incidents which are critical to build and maintain public trust in national immunization programmes. Reporting rates of AEFI in the Region has significantly improved, and as of 2015, 17 countries are maintaining higher reporting rates, compared with the WHO set AEFI reporting rate of 10 AEFI cases/100 000 surviving infants. Improving AEFI reporting, timely and comprehensive investigation, data analysis and training at subnational level are the areas of attention in vaccine safety.

2.10. Introduction of New and Underutilized Vaccine (NUVI)

2.10.1. Global/Regional NUVI update

Dr James Heffelfinger gave a global and regional update on introduction of new and underutilized vaccines. He summarized the recently published WHO vaccine position papers and the 2014 WHO guidance on new vaccine introduction and gave an update on global and regional introduction of *Haemophilus influenzae* type b (Hib) vaccine, human papillomavirus (HPV) vaccine, influenza vaccine, pneumococcal conjugate vaccine (PCV), and rotavirus vaccine. He also gave an update on global and regional progress toward achieving the Global Vaccine Action Plan target of introducing ≥ 1 vaccine in all low- and middle-income Member States by 2020. Of the 21 low- and middle-income Member States in the Region in the period 2010–2014, 11 introduced a new vaccine (Hib vaccine, HPV vaccine, PCV, rubella vaccine, and/or rotavirus vaccine) and seven did not; three Member States introduced all five vaccines prior to 2014.

2.10.2. Surveillance networks

Dr Nyambat Batmunkh presented on the new vaccines surveillance network. The Global Sentinel Site Invasive Bacterial Vaccine-preventable Disease (IBVPD) and Rotavirus (RV) Surveillance Networks were established from existing surveillance systems and standardized across all WHO Regions in 2008. WHO provides managerial oversight, technical assistance to countries, and financial support to countries for surveillance activities, with a focus on Gavi-eligible countries. There are 52 (114 sentinel sites) WHO Member States reporting data to IBVPD surveillance and 53 (114 sentinel sites) reporting to the RV surveillance network. Dr Batmunkh shared the surveillance objective and mechanism, as well as results from both IBVPD and RV surveillance networks with meeting participants. In conclusion, he highlighted that surveillance for laboratory confirmed diseases, including pneumococcal disease that are actually reported, reflect only “the tip of the iceberg” and are

providing only part of the picture. However, most surveillance sites performed well and maintained or improved their performance in 2015–2016 compared with previous years. Surveillance is essential to generate evidence for the decision-making process before vaccine introduction and for continued monitoring of pneumococcal, Hib, meningococcal, and rotavirus diseases after vaccine introduction. There is a need to coordinate, harmonize and integrate with other surveillance and VPDs (such as JE surveillance) and create a strong, sustainable network for the future, with greater country ownership and financing.

2.10.3. Western Pacific Regional rotavirus and invasive bacterial diseases laboratory networks

Laboratory networks for rotavirus and invasive bacterial-vaccine preventable diseases (IB-VPD) have been established in the Western Pacific Region to support surveillance systems, provide an evidence-base for burden of diseases and vaccine introduction, as well as monitoring vaccine impact. Laboratories have been using WHO-recommended protocols for testing and are implementing recommended quality assurance and quality control mechanisms for monitoring laboratory proficiency and performance indicators. Laboratory capacity and proficiency are constantly being improved and monitored, but challenges remain and are being addressed through training, on-site visits and laboratory assessment. Reduced funding from donors has affected support provided for laboratory surveillance and it will be important to ensure that countries maintain sustainability and ownership of surveillance systems.

2.10.4. Country presentation – pneumococcal conjugate (PCV) introduction

Cambodia

Mr Ork Vichit, Manager, National Immunization Program provided a presentation on Pneumococcal Conjugate Vaccine (PCV) introduction into the routine immunization programme in Cambodia. With financial and technical support from Gavi, WHO and UNICEF, the National Immunization Program has introduced PCV in January 2015 following a fixed site and outreach delivery strategy.

Mr Vichit highlighted that pneumonia was one of the major contributors to morbidity and mortality among < 5 children in Cambodia, therefore, the National Immunization Program could prevent two thirds of invasive pneumococcal disease cases through PCV vaccination and the number of deaths from the disease could be reduced by 61%. The National Immunization Program, with the support of partners, developed a micro-plan, organized cascade training for all health workers, procured and supplied adequate cold chain equipment, developed appropriate communication materials, revised the immunization schedule and recording-reporting tools, and ensured timely distribution of vaccines and logistics before implementation.

He then stated that to reach high risk communities, special emphasis was placed on developing local level micro-planning, with the involvement of the village health support group. Mr Vichit mentioned that the Government is highly committed and ensured additional funding for the immunization programme would be available from 2015. Mr Vichit finally shared three main lessons learnt from the PCV introduction implementation.

Fiji

On behalf of the Ministry of Health and Medical Services, Fiji, Dr Jayaprakash Valiakollerli gave an overview of PCV introduction. The family health unit developed a proposal for vaccine introduction based on high disease burden. This was endorsed by the executive and approved by the cabinet in May 2011. Funding for vaccine introduction was through a five-year sliding scale support from the Australian Government. Pre-introduction activities included effective vaccine management assessment, training of all health workers, social mobilization activities and a launching ceremony. The vaccine was introduced in September 2012. Post-introduction evaluation showed the vaccine

introduction, overall, was a success. The vaccine evaluation project showed that although the full impact will manifest over many years, given the high burden of pneumococcal disease before the vaccine was introduced, and that the vaccine shows early promise in preventing pneumonia, pneumococcal sepsis, and meningitis and a decline in pneumococcal transmission in the community.

2.10.5. Dengue vaccine update

Professor Terri Nolan (SAGE Member and Co-Chair Dengue working group) presented an update on dengue epidemiology, clinical presentation and preventive measures against this important disease in the Region. Dengue vaccine (CYD-TDV, Dengvaxia) was pre-qualified by WHO and has been licensed by five countries (Brazil, El Salvador, Mexico, Paraguay and the Philippines). Professor Nolan briefly presented SAGE recommendations: (1) countries should consider introduction of CYD-TDV in geographic settings (national or subnational) with high dengue transmission; (2) co-administration with other vaccines recommended (but no data yet); (3) CYD-TDV should be introduced as part of a routine immunization programme in appropriate settings; (4) catch-up campaigns targeting priority age groups for greater immediate impact; (5) and vaccination is not recommended under age 9. In addition, the dengue vaccine has not formally been licensed for use in travellers. In travellers who have already been previously infected with dengue, vaccination for travel to high transmission settings may be beneficial. The position paper was published in the WHO Weekly Epidemiologic Record (WER) on 29 July 2016.

2.10.6. Safety surveillance in dengue vaccine introduction: the Philippines experience

Dr Maria Wilda T. Silva from the Department of Health, Philippines, presented their experience on recent dengue vaccine introduction. Dengue remains the leading vector-borne infectious disease in the Philippines with an increasing trend of reported cases and deaths in the past five years (200 415 suspected dengue cases were reported nationwide in 2015). Region 3, 4A and the National Capital Region (NCR) reported the most number of cases and deaths, with children aged 5–14 most affected. The Philippines was the first country to implement dengue vaccination through a school-based immunization approach and aimed to vaccinate (three doses six months apart) about one million Grade 4 children aged 9 and above enrolled in public schools in Regions III, IV-A, and NCR. Based on the campaign results (after first dose), a total of 486 181 (67% coverage) children were vaccinated. The second dose will be given during October–December 2016 and the last dose April–June 2017. There were 901 (18.5%) minor AEFIs (including fever, dizziness, headache, rash and vomiting) and 27 (0.7%) serious AEFI (including coincidental reaction, vaccine product-related reaction and immunization anxiety-related reactions) reported during the campaign. Overall, the vaccination campaign was successful despite some challenges, including timing of the introduction of the dengue vaccine (summer break, national election and no WHO SAGE recommendation), long intervals between doses and controversy on the safety and efficacy of dengue vaccine by other stakeholders.

2.11. Implementation of Western Pacific Regional Framework for Global Vaccine Action Plan

2.11.1. Regional update

WHO Regional Offices agreed to establish a yearly review process, through their TAGs, on lessons learnt, progress made, remaining challenges and updated action to reach immunization challenges to be reported to the Regional Committees. These reports will also be shared with SAGE to contribute to the Global 2016 GVAP Report. The TAG Chairperson noted that the Western Pacific Region is making significant progress towards achieving many of the regional framework goals: polio-free status has been maintained; MNT elimination has been achieved in nearly all countries; rubella elimination is on track; and there have been tremendous strides in the accelerated control of hepatitis B. Innovative methods are being developed to reach those previously unreached and to better communicate with communities. However, significant challenges persist in ensuring that remaining gaps are addressed and that achievements made are sustained. Maintaining achievements, such as high

vaccination coverages and prevention and control of multiple vaccine preventable diseases during past decades, will be a challenge in coming years. The TAG identified four overarching challenges that need to be addressed; (1) providing equitable access to vaccines to maximize reach; (2) ensuring sustainability to maintain gains; (3) addressing the changing landscape of immunization services; and (4) creating demand for vaccination. The Global Routine Immunization Strategies and Practices and Middle Income Strategy were identified as valuable tools in addressing these challenges.

2.12.Partners' meeting

On the final day of the TAG, a partners' meeting was held to provide updates and key highlights on partners' collaboration on immunization throughout the Region.

The Sabin Institute presented their Sustainable Immunization Financing Programme which aims to introduce institutional change events through targeted advocacy efforts focused on developing new best practices. Examples of their work in supporting the development of a Ugandan immunization law and domestic advocacy work in Viet Nam and Mongolia demonstrated the value of evidence-based advocacy for contributing to immunization sustainability.

Dr Raj Kumar discussed Gavi's work on sustainable transition in the Western Pacific, explaining the Gavi eligibility threshold and support through the transition process, emphasizing the importance of country ownership and an integrated framework. He noted the current phase of each Gavi eligible country and that countries still have access to Gavi secured prices after having fully transitioned.

WHO initiatives in the area of vaccine affordability were presented, particularly the Middle Income Country Strategy approach to enhancing sustainable access to vaccines and efforts to increase vaccine price transparency through the WHO Vaccine Product, Price and Procurement (V3P) Web Platform. The Middle Income (MICS) Task Force is a multi-partner collaboration that seeks to enhance access in middle-income countries to affordable vaccines. The focus of the MICS strategy is four-fold: to strengthen decision-making, increase political commitment, enhance equitable delivery of immunization services, and improve access to timely vaccine supplies. Price transparency is a component of the MICS strategy, which WHO addresses through the V3P Web Platform initiative. The V3P database is a web-based collaborative platform that expressly makes data easily accessible to all Member States. The success of the V3P is contingent on Member States being willing to share their price and contract information on vaccine purchases. Forty-seven countries, of which seven are from the Western Pacific Region, have shared their vaccine pricing data. More countries are encouraged to engage in VP3 and share information, to help all countries benefit from price transparency.

John Snow, Inc.'s Immunization Centre works to improve routine immunization systems to increase coverage in a sustainable and equitable way, with attention to quality. They explained that they work with a systems thinking and health development approach for cohesive routine immunization programmes and utilize a multifaceted approach, building capacity, working from village level to the global setting, supporting new vaccine introduction as a mechanism for routine immunization strengthening and contributing to disease control targets.

PATH's Centre for Vaccine Innovation and Access work with vaccine manufacturers to develop vaccine candidates for use in low- and lower-middle-income countries that are of lower cost, higher quality and useful. They have also supported HPV demonstration projects and JE introduction and sustainability projects throughout the Region.

The US CDC works on many collaborative efforts throughout the Region, ranging from their STOP programme (now re-formatted to address all VPDs as well as polio) to supporting response to the measles outbreak in Mongolia and evaluating congenital rubella syndrome surveillance in Papua New Guinea. Mr Gabriel Anaya noted that the US CDC is committed to continuing this support.

The National Institute of Infectious Diseases (NIID) Japan described their work supporting the Region with epidemiological and laboratory expertise, specifically related to polio, measles/rubella, JE and influenza. NIID also supports development of serosurveys, outbreak investigations, and regional training in epidemiology and laboratory methods.

Rotary International and Rotary District 2650 presented their longstanding engagement in and support for public health, especially the polio eradication efforts across the Region. Both look forward to continuing their support in the future.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 Conclusions

3.1.1 Sustaining polio-free status and implementation of polio endgame strategies

1. The TAG acknowledges the progress made in implementing the global *Polio Eradication & Endgame Strategic Plan 2013-2018*. The TAG congratulates the 16 countries still using oral poliovirus vaccine (OPV) in 2016 on their successful switch from trivalent OPV to bivalent OPV, as well as the three countries and areas that transitioned to an inactivated poliovirus vaccine (IPV)-only schedule in 2015.
2. The TAG notes with disappointment and concern the global supply shortages that have led to significant delay in IPV introduction in Mongolia and Viet Nam, the insufficient IPV supply currently reported in China, Papua New Guinea and the Philippines, and the anticipated stock-outs expected in eight Pacific island countries and areas. The TAG reaffirms the key role of IPV in priming populations in case of emergence of vaccine-derived polioviruses type 2, and to a lesser degree, in decreasing the potential occurrence of type 2 outbreaks in the post-switch period.
3. The TAG notes the need for development and implementation of strategies to provide protection against type 2 poliovirus to populations unprotected due to delayed introduction or stock-out of IPV, including vaccine dose-sparing and priority allocation to higher risk districts/provinces. The TAG commends China for its efforts in accelerating its production of IPV in order to respond to anticipated supply shortfalls in 2017.
4. The TAG notes that, in 2015, two countries (Papua New Guinea and the Philippines) were identified as being at high risk for ongoing poliovirus transmission following importation.
5. Coverage with three doses of polio vaccine at the national level is high in the Region (90% or more); however, there are still countries or areas not achieving this level. The TAG notes the high quality of surveillance for acute flaccid paralysis cases at the regional level, but surveillance performance varies among countries and areas. These factors, in combination with reports of periodic vaccine stock-outs, highlight the importance of all countries and areas remaining vigilant and to sustain high performance in poliovirus surveillance indicators.
6. The TAG commends the quick and comprehensive response by the Lao People's Democratic Republic to the circulating vaccine-derived poliovirus (cVDPV) type 1 outbreak leading to interruption of virus transmission within 120 days.
7. The TAG urges countries and areas to refer to the revised polio outbreak response protocol and the monovalent OPV (mOPV) type 2 management and removal procedures as guiding documents.
8. The TAG notes the need to ensure the presence of national mechanisms to facilitate expedited importation and use of mOPV type 2 in case of a polio type 2 event/outbreak.

9. The TAG acknowledges the plan for the Global Polio Laboratory Network (GPLN) to expand the number of laboratories in the Region with the capacity to perform intratypic differentiation and to introduce an optimized intratypic differentiation method to increase sensitivity for detecting and identifying polioviruses quickly.
10. The TAG notes that four countries in the Region (Australia, China, Japan and Malaysia) are performing environmental surveillance and recognizes efforts to establish environmental surveillance in the Philippines in 2016.
11. The TAG is pleased to note that by the end of 2015 all countries in the Region have nominated national polio containment coordinators.
12. The TAG notes the need to support implementation of Phase I (second part) of the third *WHO global action plan to minimize facility-associated risk after type-specific eradication of wild polioviruses and sequential cessation of routine OPV use (GAPIII)* for preparation for containment of Sabin/OPV poliovirus type 2 by 31 December 2016.

3.1.2. Hepatitis B accelerated control

The TAG is pleased that the ambitious regional goal of reducing hepatitis B seroprevalence among 5-year-old children to less than 1% by 2017 has been achieved, notably ahead of schedule in many Member States. While the TAG celebrates the impressive success in reducing hepatitis B prevalence to less than 1% among immunized cohorts within the Region, the TAG encourages continued commitment to assure that all countries within the Region reach this 1% goal and recognize the importance of developing post-2017 regional goals. The TAG endorses the 2016 recommendations of the hepatitis B Expert Resource Panel (ERP), noting it is important that ministries of health encourage the delivery of babies in health facilities, help strengthen coordination between the Expanded Programme on Immunization (EPI) and Maternal and Child Health (MCH) for timely administration of hepatitis B birth dose and ensure effective monitoring and reporting of birth-dose coverage.

3.1.3. Japanese encephalitis (JE) accelerated control

The TAG notes several important advances in JE control during the past year. In March 2016, the JE Expert Resource Consultation convened and proposed strategies and targets to achieve the regional goal for accelerated control of JE. These strategies, targets and timelines, together with advances in vaccines and new WHO guidance and programmatic steps by Member States, promise to move the Region towards achievement of the regional goal. Two countries took significant steps in increasing JE vaccine coverage: the Lao People's Democratic Republic successfully introduced JE vaccine nationally in 2015 following completion of the final phase of a nationwide catch-up campaign earlier in the year; and Cambodia conducted a successful national JE catch-up campaign in March 2016 and has initiated national introduction of routine JE vaccination. In addition, Viet Nam successfully applied for Gavi funds in September 2015 and will soon begin a JE vaccination campaign to enhance the national JE vaccine programme.

Although some progress has been made, weaknesses in surveillance systems continue to limit efforts to estimate disease burden, define target populations for vaccination, and measure the impact of vaccination in some countries. Strengthening of surveillance in countries that have not yet achieved a high degree of JE control is critical for providing disease burden data and evidence of vaccine impact.

3.1.4. Measles and rubella elimination

1. The TAG notes that endemic measles transmission is ongoing in several countries, particularly countries with large populations, but the regional incidence of measles has decreased in the last 18 months since 2014. In March 2014, the Regional Verification Commission for Measles Elimination in the Western Pacific verified measles elimination to have been achieved and sustained in Australia, Macao SAR (China), Mongolia, and the Republic of Korea, and in March 2015, in Brunei Darussalam, Cambodia and Japan. Some of these countries are repeatedly exposed to imported measles virus from countries with endemic virus transmission. From 2015 to 2016, measles virus transmission was re-established in Mongolia following the largest measles outbreak in the country for the last 30 years.
2. Due to active implementation by Member States of strategies and activities proposed by the *Western Pacific Regional Plan of Action for Measles Elimination* from 2003 to 2012, the Region experienced dramatic declines in measles incidence. However, the recent resurgence of measles in endemic countries or large-scale measles outbreaks following importation has revealed that the susceptible population is largely comprised of adolescents/adults and young infants not regularly reached by current immunization strategies. The TAG recalls that the fifty-fourth session of the WHO Regional Committee for the Western Pacific urged Member States to offer all children two doses of measles vaccine to achieve 95% population immunity in each birth cohort in every district in 2003.
3. The TAG notes that many countries in the Region have been utilizing the measles elimination platform and strategies to initiate or accelerate activities for rubella elimination. Several countries in the Region have made significant progress towards rubella elimination and aim to eliminate rubella by 2020.
4. The TAG acknowledges that WHO has prepared a draft Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action in consultation with national immunization programmes of Member States and partners.
5. The TAG notes the substantial progress towards rubella elimination in the Region. In particular, China has steadily reduced rubella incidence since 2008 to record low levels of 0.6 cases per 100 000 population in 2015 and documented a decrease in endemic genotypes from at least four to two genotypes in 2015, reflecting increasing pressure on rubella virus to maintain its reservoir.

3.1.5. Maternal and neonatal tetanus elimination

1. The TAG congratulates Cambodia on the 2015 achievement of validation of maternal and neonatal tetanus elimination (MNTE).
2. The TAG also commends the Philippines on the 2015 achievement of validation in 16 of 17 regions and progress towards national validation.
3. The TAG notes the low proportion of the regional population that routinely receives booster vaccination against diphtheria after age 6.

3.1.6. Strengthening routine immunization systems-equity and sustainability

1. The TAG acknowledges the efforts Member States are making in reducing immunization disparities and filling gaps in vaccinations and immunization services, particularly among underserved populations.

2. The TAG notes the uneven progress in vaccination coverage at subnational levels that may be related to uneven immunization service provision, mobile populations, vaccine hesitancy, and other factors in low- and middle-income countries. These coverage disparities can negatively impact efforts to achieve elimination and control of vaccine-preventable diseases and pose a risk of resurgence of diseases.
3. The TAG acknowledges WHO and partners' efforts to address vaccine security through strengthening effective vaccine management and financial sustainability in low- and middle-income countries.
4. The TAG takes note that vaccine stock-outs at both national and subnational levels were reported in countries and caused some interruption of immunization services. Some of these stock-outs were due to internal planning and distribution issues, while others were due to vaccine shortages in the international market.
5. The TAG acknowledges the efforts being made by the WHO Regional Office and Member States to sustain achievements already made in immunization.
6. The TAG takes note of the potential risk of vaccine hesitancy and therefore the benefits of active stakeholders' and community participation in reducing vaccine hesitancy.
7. The TAG notes the important role and responsibilities of private providers in achieving the goals of the Global Vaccine Action Plan (GVAP) and the *Regional Framework for Implementation of the Global Vaccine Action Plan in the Western Pacific* and recognized synergy between public and private partnership in order to strengthen immunization services.

3.1.7. Strengthening evidence-based immunization decision-making

1. The TAG acknowledges the continuing need for strengthening of national evidence-informed immunization decision-making processes due to the introduction of many new vaccines, increasing programme costs, competing public health priorities and an increasing demand for transparency from communities.
2. The TAG acknowledges the efforts made by Member States, the WHO Regional Office and partners towards improving immunization policy-making processes throughout the Region.
3. The TAG notes that sound and credible evidence-based decision-making methods and processes are needed. This may occur through a national immunization technical advisory group (NITAG) or equivalent body. The TAG acknowledges that the term NITAG may not be the ideal description for every context; in absence of an appropriate alternative, the term "NITAG or equivalent" is proposed to be used for the time being.
4. The TAG notes that the Region still has much progress to make to achieve the target of having a functional NITAG or equivalent in every country by 2020, with some countries yet to form a NITAG or equivalent, and existing NITAGs having varying levels of functionality.
5. The TAG notes that an evaluation tool for NITAGs or their equivalents has been developed and is available on the NITAG Resource Centre. This tool may aid Member States with improving their immunization decision-making processes.
6. The TAG notes the particular challenges of ensuring sound evidence-informed decision-making in Pacific island countries and areas and in the feasibility of establishing NITAGs in all countries due to limited human and financial resources and expertise.
7. The TAG notes that many of the challenges faced by NITAGs are common throughout the Region and may be addressed through cross-collaboration among NITAGs.

3.1.8. Strengthening routine immunization – data quality

1. The TAG acknowledges that the quality of regional-level data to monitor progress towards GVAP and Regional Framework goals is affected by incomplete and delayed submission of the WHO-UNICEF Joint Reporting Form (JRF), and poor response rate to queries addressing inaccurate or missing information in the JRF. Completeness of information is critically low for financing indicators, and very few countries are sharing information on vaccine pricing and procurement mechanisms.
2. The TAG acknowledges that national immunization coverage monitoring is inconsistent across different sources, and data quality issues are affecting both numerators and denominators, in some countries to a degree that profoundly affects the usability of routine administrative data. High-quality coverage surveys could be useful in validating national routine coverage monitoring and quantitatively supporting key factors for EPI programme management.
3. The TAG notes that there are newer tools and approaches that could be used to assess the quality of national data and to support development of a specific data improvement plan.
4. The TAG notes that digitization of aggregated or individual case-based information within EPI represents an opportunity to strengthen data management and quality on coverage monitoring, however, this requires close coordination between EPI and other government stakeholders.

3.1.9. Strengthening vaccine safety surveillance and regulatory capacity

1. The TAG reiterates that ensuring vaccine/immunization safety and effectively responding to immunization safety incidents are critical to build and maintain public trust in national EPI programmes.
2. The TAG notes that Member States have worked strenuously on analysing the capacity gap, developing regional and national guidelines on causality assessment and communications, and providing national and subnational trainings in Cambodia, the Lao People's Democratic Republic and Viet Nam.
3. The TAG notes that strengthening the surveillance system of adverse events following immunization (AEFI) is necessary, particularly in middle-income countries. Reporting rates of AEFI are significantly improved, and as of 2015, 17 countries are maintaining higher reporting rates, compared with the WHO-standard AEFI reporting rate of 10 AEFI cases per 100 000 surviving infants.
4. The TAG notes that the WHO Regional Office and Member States have made an effort to continue periodic effective vaccine management assessments and implement activities in the improvement plan in Cambodia, Kiribati, Mongolia and Viet Nam.
5. The TAG notes that the National Regulatory Authority (NRA) system for vaccines and medicines was assessed in Cambodia, the Lao People's Democratic Republic and Mongolia in 2015–2016.
6. The TAG notes that the WHO Regional Office and Member States made progress in strategic planning and risk communication at its fourth workshop.
7. The TAG notes the ongoing important collaboration between WHO/EPI and WHO/Essential Medicines and Technology on effective vaccine management activities.

3.1.10. Evidence-based introduction of new vaccines

The TAG notes that low- and middle-income countries in the Western Pacific Region have made significant progress in introducing new and underutilized vaccines, yet still lag behind high-income countries in including new vaccines in their national immunization programmes. In addition, upper-middle-income countries lag behind low- and lower-middle-income countries in including some new vaccines in their national immunization programmes, in part because they do not have access to support from donor organizations for introductions that low- and lower-middle-income countries have. Achievement of the Decade of Vaccines goal for introduction of new and improved vaccines requires that countries evaluate evidence on disease burden, including surveillance, cost, the role of other disease prevention and control measures, vaccine characteristics, vaccine supply, and immunization programme and health system strength. An increasing number of Member States are collecting and evaluating such evidence to develop and sustain vaccine introduction policies, and some Member States have consolidated the evidence in national plans. WHO plays an important role in providing technical support and capacity-building for the collection of such evidence. Surveillance with laboratory confirmation is a key source of evidence, and the quality of surveillance requires consistent attention.

3.1.11. Dengue

1. The TAG notes with interest the publication of a WHO position paper on dengue vaccine on 29 July 2016, after registration of a vaccine in several countries. The TAG also notes the participation of investigators from several Western Pacific Region countries in clinical trials conducted by manufacturers of this vaccine. The TAG notes that there are also three candidate dengue vaccines under development which may be available in the next few years. The TAG notes that the registered vaccine is undergoing active consideration by the Strategic Advisory Group of Experts (SAGE) and that further updates will be available in the near future.
2. The TAG commends the Philippines on the licensing and introduction of dengue vaccine to selected cohorts of children in three regions of the Philippines as a school-based programme targeting students in Grade 4 who are at least 9 years of age.
3. The TAG notes that efficacy estimates of the currently available vaccine are serotype-specific, differ by underlying dengue serostatus (lower efficacy among those who are seronegative), and range from ~50% to ~85%, with an overall efficacy of ~65%. This is lower than most other vaccines used in the EPI and is expected under field conditions to reduce dengue disease by 20–30% in the long-term in moderate-to-high transmission settings. Further, efficacy is lower in children under age 9, possibly because they are more likely to be seronegative for dengue than persons 9 years and older. The TAG also notes that there was an increase in hospitalization for dengue disease in the third year following vaccination among children aged 2–5 years. The TAG considers that the safety signal in young children may suggest there is an increased risk of severe dengue cases among persons 9 years and older, which could impact public confidence in the vaccine and the immunization programme as a whole.

3.2. Recommendations for Member States

3.2.1. Sustaining polio-free status and implementation of polio endgame strategies

1. The TAG recommends that all countries analyse and fill population immunity gaps by strengthening routine vaccination with polio vaccines and conducting polio supplementary immunization activities.
2. The TAG recommends that all countries improve surveillance for acute flaccid paralysis cases and conduct active surveillance, especially in underperforming areas as outlined by

the 21st Meeting of the Regional Commission for the Certification of Poliomyelitis Eradication in the Western Pacific. In addition, all countries and areas should notify in a comprehensive and timely manner all type 2 polioviruses detected from all sources, including environmental surveillance, as prompt detection/reporting of type 2 is critically important in the post-switch phase.

3. The TAG recommends that all countries ensure the completion of a national policy for the timely and comprehensive response to polio events/outbreaks in line with the Global Polio Eradication Initiative guiding documents.
4. The TAG recommends that all countries develop strategies to address gaps in population immunity against type 2 poliovirus due to delayed introduction or stock-out of IPV, including prioritization of IPV allocation to high-risk areas, and exploration of the programmatic feasibility of using IPV as a fractional dose via intradermal administration.
5. The TAG recommends that all countries authorize the importation and use of mOPV type 2 based on WHO prequalification and/or by providing an emergency waiver that permits importation and use of the vaccine for emergency response, in order to respond within 14 days of a confirmed outbreak, and in accordance with the poliovirus type 2 outbreak response protocol.
6. The TAG recommends that all countries comply with the requirements of GAPIII Phase 1 (second part) and identify, appropriately handle and store materials that are infectious or potentially infectious with OPV type 2 and OPV type 2-like, Sabin type 2 and Sabin type 2-like viruses by the end of December 2016.

3.2.2. Hepatitis B accelerated control

1. The TAG urges all countries and areas to implement national policies for hepatitis B vaccination for health-care workers as part of a comprehensive health-care worker vaccination programme. Delaying the implementation of these policies in this high-risk group creates a grave risk to patient care and disease transmission.
2. The Global Health Sector Strategy on Viral Hepatitis 2016–2021 calls for a 90% reduction in incidence. Given that the Region has reached less than 1% regional prevalence among children 5 years of age, the TAG recommends that every country and area reach this 1% goal as soon as possible. Additionally, the hepatitis B ERP should consider the feasibility of reducing the regional goal to 0.5% prevalence, understanding that additional guidance, including planning for and conducting serosurveys, will be necessary for adopting this potential post-2017 goal.
3. The TAG encourages countries that have been identified as requiring programme improvement during the Workshop on Improving and Monitoring Hepatitis B Birth Dose Vaccination, namely Cambodia, Kiribati, the Lao People's Democratic Republic, Papua New Guinea, the Philippines, Solomon Islands, and Viet Nam, to develop short- and long-term plans to programmatically improve birth dose and hepatitis B 3rd dose (HepB3) coverage.
4. The TAG endorses the 2016 ERP vaccine-related recommendations, including: ministries of health should encourage the delivery of babies in health facilities; help strengthen coordination between EPI and MCH for timely administration of hepatitis B birth dose; and ensure effective monitoring and reporting of birth-dose coverage.

3.2.3. Japanese encephalitis (JE) accelerated control

1. The TAG recommends that JE incidence of less than 0.5 cases per 100 000 population in the targeted population (typically children under 15 years old) in affected areas (national and subnational) be the primary target for JE vaccination programmes to achieve accelerated control of JE in the Region. Incidence is a direct measure of disease occurrence and an incidence target will allow monitoring of JE vaccination programmes. Implementing an incidence target will require that Member States have high-quality JE surveillance so that incidence can be measured accurately.
2. The TAG recommends that for Member States that do not have high-quality JE surveillance, coverage of $\geq 95\%$ with primary JE vaccine series among the targeted population (typically children under 15 years old) in affected areas (national and subnational) be an intermediate target to achieve accelerated control of JE in the Region.
3. The TAG recommends that the primary strategy to achieve accelerated control of JE in the Region be the introduction of JE vaccine into the routine immunization programme, using a phased approach, depending on resources and capacities of countries.

3.2.4. Measles and rubella elimination

1. The TAG encourages Member States to continue to make efforts to increase coverage achieved with routine and supplemental administration of measles–rubella (MR) vaccine.
2. The TAG reaffirms its 2015 recommendation to establish a regional rubella elimination target date of 2020.
3. The TAG encourages countries to update or develop national strategies and plans of action for measles and rubella elimination. The draft Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action may serve as a valuable resource to Member States.
4. The TAG encourages countries to establish and maintain a platform to provide immunizations in the second year of life as an opportunity to reach all children, including those who are hard to reach, with MR and other scheduled vaccines and for catch-up immunizations for under-immunized children, as needed. To prevent measles virus transmission among preschool-aged children who are at highest risk of dying from measles, the second routine dose should be given in the second year of life.
5. The TAG encourages countries and areas to monitor and track coverage for the second dose of MR, to document the drop-out rate between the first and second doses of MR, and to work to reduce the drop-out rate. The WHO Regional Office for the Western Pacific should inventory which countries and areas have programme policy restrictions that limit vaccinations offered after 12 months of age and should work with countries and areas to remove these barriers to vaccination.
6. The TAG reiterates its 2014 recommendation that for countries experiencing measles outbreaks, supplementary vaccine doses should be considered for unvaccinated children aged 6 months and older who are not yet age eligible for the first dose of measles-containing vaccine (MCV1) in the national immunization programme and who are at high risk of exposure to the measles virus, such as in outbreak settings or expected travel to measles-affected areas. Children who receive supplementary measles vaccine doses prior to the country's recommended age for MCV1 should continue to receive the two doses of MR according to the national immunization schedule. School entry should be used as an opportunity to ensure that all children have two documented doses of MR prior to school entry.
7. TAG encourages all countries to implement school-based programmes to check immunization records to maximize immunization coverage through catch-up immunization as needed. China and the Republic of Korea have successfully implemented the strategy. The recently published experience of China in the use of

school-based checks of immunization records should be distributed to all countries by the Regional Office for the Western Pacific as an example of what can be achieved.

8. Appropriate infection control measures and health-care facility practices should be implemented to prevent transmission of measles and rubella in health-care settings, especially in hospitals. These plans should include strategies to ensure that all health workers are immune to measles and rubella.

3.2.5. Maternal and neonatal tetanus elimination

1. The TAG recommends that the two remaining countries implement required actions to achieve the validation of MNTE as soon as possible:
 - a. the Philippines should implement the recommended tetanus toxoid supplemental immunization activities by the end 2016 in order to achieve national validation of MNTE; and
 - b. Papua New Guinea should move forward with the pre-validation assessment and validation survey as soon as possible.
2. All countries and areas should maintain elimination status by regularly reviewing the WHO/UNICEF district data of core and surrogate indicators for maternal and neonatal tetanus and by taking appropriate corrective actions in coordination with maternal, neonatal and child health programmes.
3. Every case of maternal and neonatal tetanus represents a sentinel event and should be thoroughly investigated, including an assessment of the tetanus vaccination status among women of reproductive age residing in the same community, to determine underlying risk factors and to assess the possibility of implementing corrective actions.
4. All remaining countries that have not yet done so are encouraged to use vaccine combinations containing diphtheria toxoid and tetanus toxoid, rather than tetanus toxoid alone, when immunization against tetanus is indicated.
5. The TAG recommends that school-based immunization of tetanus–diphtheria vaccinations for both boys and girls should be considered as part of a national schedule to provide protection against tetanus and diphtheria.

3.2.6. Strengthening routine immunization systems-equity and sustainability

1. The TAG recommends that all Member States develop strategies to address gaps in vaccination and immunization services, particularly at subnational level, focusing on high-risk populations, including underserved populations, the urban poor, minority ethnic groups, and hard-to-reach and mobile populations. Further, the TAG encourages identifying and reducing missed opportunities for vaccination and a life-course approach to close the gaps in immunization services.
2. The TAG reiterates the recommendation of the 24th TAG:
 - a. establishing an immunization visit platform in the second year of life to deliver scheduled vaccines such as DTP4 and MCV2, as well as providing catch-up vaccination for those vaccine doses missed during the first year of life; and
 - b. establishing routine school immunization record checks and follow-up vaccinations with missed doses of measles, rubella and other vaccines to ensure all children enter school fully protected from vaccine-preventable diseases.

3. The TAG recommends Member States to work together with WHO and partners to ensure vaccine security and avoid stock-outs through regular vaccine forecasting, timely procurement and adequate resource allocation. It encourages countries to ensure best use of middle-income country strategies and the V3P platform to overcome potential risks to vaccine security.

3.2.7. Strengthening evidence-based immunization decision-making

1. The TAG encourages Member States without NITAGs or equivalent immunization decision-making bodies to consider establishing such mechanisms.
2. The TAG recommends that Member States with NITAGs or equivalents consider evaluating their processes and effectiveness and identifying ways to strengthen them.
3. The TAG recommends that Member States, WHO and partners enhance linkages among NITAGs and consider creating a regional network to address common technical issues and develop NITAG capacity.

3.2.8. Strengthening routine immunization – data quality

1. The TAG reiterates that Member States are urged to sustain and improve the timeliness, consistency and completeness of annual reporting of indicators listed in the WHO-UNICEF Joint Reporting Form, including financing indicators and vaccine price and procurement information through the V3P platform.
2. The TAG recommends that Member States conduct data quality reviews, through regular desk reviews of national and subnational immunization coverage data, including assessment of denominators, and periodic health facility and district-level data quality assessment as routine programme activity and/or through external support as stand-alone data quality assessment or combined with EPI reviews.
3. The TAG recommends that Member States develop data improvement plans based on the findings of the desk reviews, including coverage surveys, if appropriate.
4. The TAG encourages Member States to strengthen coordination with government stakeholders in charge of the health information system and target population registration in order to more accurately report vaccination coverage.
5. The TAG encourages Member States to explore the possibility of setting up an electronic immunization registry based on a complete population database, through coordination with government stakeholders involved in the registration of target population, within and outside the health sector.

3.2.9. Strengthening vaccine safety surveillance and regulatory capacity

1. The TAG urges Member States to share best practices and lessons learnt in strengthening the vaccine/immunization safety surveillance systems, including AEFI surveillance and NRA's adverse drug reactions surveillance through the NRA Alliance, considering the importance of immunization safety practices to maintain high-quality immunization services.
2. The TAG urges Member States to make continuous efforts to strengthen AEFI surveillance through strengthening vaccine vigilance institutional mechanisms as appropriate, analysing the capacity gap by adopting root-cause analysis, self-assessment, developing and updating guidelines on vaccine safety surveillance, providing national and

subnational trainings, establishing/institutionalizing national vaccine/immunization safety causality committees and enhancing analytical capacity.

3. The TAG urges Member States to continue timely and effective responses to vaccine/immunization safety incidents and to share the information through regional and global vaccine safety surveillance networks.
4. The TAG urges Member States to continue improving cold-chain capacity and logistics through periodic effective vaccine management assessment and update of the national improvement plan.
5. The TAG urges Member States to strengthen vaccine regulatory systems, make continuous improvement and implement resolution WHA67.20 on regulatory system strengthening for vaccines, as appropriate.
6. The TAG urges Member States to engage in and strengthen the regional alliance of national regulatory authorities, recognizing the importance of collaboration to pool regulatory capacities to promote greater access to quality, safe, efficacious and affordable vaccines.
7. The TAG urges Member States to support establishing effective vaccine and immunization safety communication systems in low- and middle-income countries in the Region.
8. The TAG urges Member States to address vaccine access issues by facilitating research and development, technology transfer, and legislating clinical trial oversight where the regulatory function is deficient.

3.2.10. Evidence-based introduction of new vaccines

1. The TAG advises each Member State to develop a national plan for evidence-based introduction of new vaccines. NITAGs or equivalent should play a central role in making recommendations to government about the introduction of new vaccines. This plan could be part of the comprehensive multi-year plan for immunization or other health plans.
2. The TAG again urges Member States in which surveillance includes laboratory confirmation for diseases targeted by new vaccines to monitor and improve the quality of surveillance implementation.
3. Noting that in the context of the introduction of new vaccines, the perception that multiple injections during one visit is a problem, and noting the April 2015 SAGE recommendations on the issue of multiple injections, the TAG recommends that countries should neither modify recommended immunization schedules nor add additional visits for vaccine delivery solely for the purpose of preventing multiple injections during the same visit when such modifications are not evidence-based.

3.2.11. Dengue

1. The TAG recommends that, at present, countries and the Region should take a cautious approach to consideration of the use of dengue vaccine. The TAG recommends that any consideration should closely follow the advice in the current position paper, new information on safety and efficacy of these vaccines, and additional evaluations and policy recommendations of the SAGE.
2. The TAG recommends that the Philippines provide regular updates on the effectiveness, safety and implementation of the dengue vaccine using a school-based platform.

3.3. Recommendations for WHO Secretariat

3.3.1. Sustaining polio-free status and implementation of polio endgame strategies

1. The TAG recommends WHO to urge additional manufacturers to prequalify IPV as soon as possible to decrease the risk of global shortages and maintain long-term vaccine security.

3.3.2. Hepatitis B accelerated control

1. The TAG encourages the WHO Regional Office for the Western Pacific to widely publicize the success of hepatitis B vaccination programmes across the Region in averting 7 million deaths and 37 million chronic infections that would have otherwise occurred between 1990 and 2014. Having accomplished this among many Member States ahead of the 2017 target is highly commendable and should be shared as part of this impressive vaccine success story.
2. The TAG reiterates its support for the use of hepatitis B vaccine outside the cold chain (OCC) for health facilities without functional cold chain, assuring proper monitoring conditions are in place.
3. The TAG reiterates that manufacturers should be encouraged to relabel vaccine to allow its use in a controlled temperature chain (CTC). Relabelling vaccine for CTC use would particularly assist countries with weak NRAs in safely storing and transporting hepatitis B vaccine outside of the traditional 2-8 ° C.
4. The TAG endorses the ERP's role in monitoring the ongoing performance of verified countries and their 2016 vaccine-related recommendation: that WHO to urge procurement agencies to require vaccine manufacturers to include on their labels the suitability of CTC use of monovalent hepatitis B vaccines.

3.3.3. Japanese encephalitis (JE) accelerated control

1. The TAG recommends the WHO Regional Office for the Western Pacific consult with experts on JE control and prevention and also with staff from the WHO Regional Office for South-East Asia involved in JE control and prevention to set a timeline for achieving the regional accelerated control target.
2. The TAG reiterates the recommendations of the 22nd, 23rd and 24th TAGs that JE surveillance with laboratory confirmation should be further strengthened in endemic areas of the Western Pacific Region, and sentinel surveillance should be systematized to facilitate reporting at the regional level. Additional resource mobilization will be needed to implement this recommendation.
3. The TAG recommends the WHO Regional Office for the Western Pacific conduct an assessment of resources needed to expand use of the JE surveillance structured tool for assessment of implementation in countries that have not yet achieved a high degree of JE control.

3.3.4. Measles and rubella elimination

1. By the end 2016, WHO should finalize the draft Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action through further consultation with TAG, national immunization programmes of Member States and partners.
2. WHO should submit the final Measles and Rubella Elimination in the Western Pacific – Regional Strategy and Plan of Action to the sixty-eighth session of WHO Regional Committee for the Western Pacific in 2017 for review and endorsement.
3. TAG requests WHO to consult with Member States for setting the target year for regional rubella elimination.
4. WHO should complete revisions of the *Guidelines on Verification of Measles Elimination in the Western Pacific Region* (2013) through further consultation with the Regional Verification Commission for Measles Elimination in the Western Pacific (RVC), Subregional Committee for the Verification of Measles Elimination in Pacific island countries and areas (SRVC) and national verification committees (NVCs) to include monitoring progress of rubella elimination, along with measles elimination in each country and area.

3.3.5. Strengthening routine immunization systems – equity and sustainability

1. The TAG recommends the development of a comprehensive global and regional guideline to support countries to overcome vaccine hesitancy. It encourages Member States to proactively work on identifying and addressing country-specific vaccine hesitancy issues.
2. The TAG reiterates its support to ensure sustainability of achievements and continuing efforts to achieve the goals of the GVAP and the Regional Framework for GVAP Implementation in the Western Pacific. TAG endorses the usefulness of Global Routine Immunization Strategies and Practices (GRISP) in strengthening country routine immunization programmes towards achieving GVAP targets.

3.3.6. Strengthening evidence-based immunization decision-making

1. The TAG recommends that WHO and partners give particular attention and support to Pacific island countries and areas and develop innovative means through which to improve their immunization policy-making, such as assessing feasibility of a subregional TAG or developing other suitable mechanisms.

3.3.7. Strengthening vaccine safety surveillance and regulatory capacity

1. The TAG recommends exploration of the optimization of regional expertise resources to support the performance of vaccine/immunization safety surveillance systems of middle-income countries in the Region.
2. The TAG recommends exploration of a means to support Pacific island countries and areas for AEFI causality assessment committees to include outreach and training of medical personnel to appropriately and accurately report adverse events associated with the administration of a vaccine.
3. The TAG recommends continuation of vaccine pharmacovigilance system assessments using a common vaccine–medicine assessment tool and to support capacity-building for low- and middle-income countries.

4. The TAG supports continued improvement of effective vaccine management in public health medicines supply system and vaccine regulatory systems through implementation of EVM improvement plan and NRA institutional development plan.

3.3.8. Evidence-based introduction of new vaccines

1. The TAG requests WHO to provide technical support and capacity-building for the development of national plans for evidence-based introduction of new vaccines and to assess and improve the quality of surveillance implementation.

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BUREAU REGIONAL DU PACIFIQUE OCCIDENTAL

25TH MEETING OF THE TECHNICAL
ADVISORY GROUP ON IMMUNIZATION
AND VACCINE-PREVENTABLE DISEASES
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ANNEX 2

25TH MEETING OF THE TECHNICAL ADVISORY GROUP ON IMMUNIZATION
AND VACCINE-PREVENTABLE DISEASES IN THE WESTERN PACIFIC REGION
Manila, Philippines, 26–29 July 2016

English only

TIMETABLE

Time	Tuesday, 26 July 2016	Time	Wednesday, 27 July 2016	Time	Thursday, 28 July 2016	Time	Friday, 29 July 2016
0800–0830	REGISTRATION		6. Measles and rubella elimination		8. Strengthening immunization systems (including strengthening routine immunization programme)		10. Implementation of Western Pacific Regional Framework for Global Vaccine Action Plan
0830–0900	1. Opening <ul style="list-style-type: none"> Opening speech Self-introduction Election of officers: Chairperson, Vice-Chairperson and Rapporteur Administrative announcements 	0830–0845	6.1 Global update	0830–0845	8.1 Global perspective on strengthening routine immunization programme: Global Routine Immunization Strategies Practices (GRISP)	0830–0900	10.1 Regional update
		0845–0900	6.2 Regional overview and draft Regional Strategy	0845–0900	8.2 Closing gaps: addressing inequity in the regional context	0900–0915	11. Partners' Meeting
		0900–0915	6.3 Country presentations - immunization <ul style="list-style-type: none"> Republic of Korea Japan Cambodia 	0845–0900	8.3 Achieving high and equitable coverage in urban settings	0915–0930	11.1 Securing commitments at all levels - lessons from the field and resource allocation
		0915–0930		0900–0915	8.4 Life course approach; school-based immunization – New Zealand	0930–0945	Discussion
		0930–0945		0915–0930	8.5 Vaccine security; Implementation plan for Effective Vaccine Management (EVM) in Papua New Guinea	0945–1000	11.2 Sustainable transition on Western Pacific strategy
		0945–1000	6.4 Proposed strategy for immunization	0930–0945	Discussion	1000–1015	11.3 Progress in middle income countries strategy
		1000–1015	Discussion	0945–1000		1015–1030	11.4 Update on V3P and application opportunity
							Discussion
0900–0930	GROUP PHOTO AND COFFEE BREAK	1015–1045	COFFEE BREAK	1000–1020	COFFEE BREAK	1030–1100	COFFEE BREAK
	2. Overview/Introduction		6.5 Country presentation – epidemiologic surveillance <ul style="list-style-type: none"> Hong Kong 	1020–1040	8.6 Strengthening evidence-based decision making	1100–1115	11.5 John Snow Institute
0930–0945	2.1 Objectives of the meeting	1045–1100		1040–1055	8.7 Lessons learnt (functional National Immunization Technical Advisory Groups [NITAG])	1115–1130	11.6 PATH
0945–1000	2.2 Update on implementation of Global Vaccine Action Plan	1100–1115	6.6 Proposed strategy for epidemiologic surveillance	1055–1110	Discussion	1130–1145	11.7 United States Centers for Disease Control and Prevention
1000–1015	2.3 Update from Strategic Advisory Group of Experts	1115–1130	Discussion	1110–1130	8.8 Data quality in Western Pacific Region countries: overview, challenges, opportunities	1145–1200	11.8 National Institute of Infectious Diseases
	3. Sustaining polio-free status and implementation of polio endgame strategies	1130–1145	6.7 Country presentation – laboratory support <ul style="list-style-type: none"> China 	1130–1145	8.9 Data quality assessment and data improvement plan	1200–1215	Discussion
1015–1030	3.1 Global update	1145–1200	6.8 Proposed strategy for laboratory support	1145–1200	8.10 Lessons to learn from implementing Electronic Immunization Registry		
1030–1045	3.2 Regional update	1200–1215	Discussion	1200–1220	Discussion		
1045–1100	3.3 Polio laboratory network and environmental surveillance update						
1100–1115	3.4 Global Polio Eradication Initiative outbreak response						
1115–1130	3.5 Country presentation – outbreak of circulating vaccine-derived poliovirus						
1130–1145	Discussion						
1145–1315	LUNCH BREAK	1215–1345	LUNCH BREAK	1220–1350	LUNCH BREAK	1215–1515	LUNCH BREAK

1315–1355	3.6 Trivalent oral polio vaccine-bivalent oral polio vaccine switch and inactivated polio vaccine supply		6.9 Country presentation – outbreak preparedness and response	1350–1410	8.11 Regional vaccine regulatory update	1515–1615	12. Technical Advisory Group conclusions and recommendations
1355–1405	3.7 Country Presentations	1345–1400	<ul style="list-style-type: none"> • Viet Nam 	1410–1425	8.12 Global and regional vaccine safety update	1615–1630	13. Closing Session
1405–1415	<ul style="list-style-type: none"> • China • Philippines • Viet Nam 	1400–1415	<ul style="list-style-type: none"> • Mongolia 	1425–1440	Discussion		
1415–1430		1415–1430	<ul style="list-style-type: none"> • Australia 		9. Introduction of New and Underutilized Vaccine (NUVI)		
1430–1445	Discussion	1430–1445	<ul style="list-style-type: none"> • China 	1440–1510	9.1 Global/Regional NUVI update		
1445–1515	3.8 Laboratory containment	1445–1500	<ul style="list-style-type: none"> • Philippines 				
1515–1530	Discussion	1500–1515	6.10 Proposed strategy for outbreak preparedness and response				
		1515–1530	Discussion				
		1530–1545	6.11 Regional Verification Commission				
		1545–1600	6.12 National Verification Committee				
		1600–1615	Discussion				
1530–1600	COFFEE BREAK	1615–1645	COFFEE BREAK	1510–1540	COFFEE BREAK		
1600–1620	4. Hepatitis B accelerated control	1645–1700	6.13 Proposed strategy for other strategic areas	1540–1555	9.2 Surveillance networks		
1620–1630	4.1 Global/Regional update	1700–1715	Discussion	1555–1605	9.3 Western Pacific Regional rotavirus and invasive bacterial diseases laboratory networks		
	Discussion		7. Maternal and neonatal tetanus elimination		9.4 Country presentation – pneumococcal conjugate (PCV) introduction		
1630–1650	5. Japanese encephalitis (JE) accelerated control	1715–1730	7.1 Regional update	1605–1620	<ul style="list-style-type: none"> • Cambodia • Fiji 		
1650–1700	5.1 Global/Regional update			1620–1635			
1700–1710	5.2 Western Pacific Region JE laboratory network			1635–1650	9.5 Dengue vaccine update		
1710–1730	5.3 JE outbreak in the Philippines			1650–1700	9.6 Safety surveillance in dengue vaccine introduction: Philippine's experience		
1730–1755	5.4 Expert Resource Consultation update (targets, strategies, timeliness)			1700–1730	Discussion		
	Discussion						

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