The regional workshop on surveillance standards for measles and other priority vaccine-preventable diseases (VPD) in South-East Asia was conducted from 19 to 23 September 2016 in Kathmandu, Nepal. The workshop was attended by the EPI programme managers, EPI programme officers, Surveillance Officer and Data managers from 10 Member States.

The workshop provided opportunities to the National EPI programme managers, surveillance managers and data managers from Member States to participate and provide inputs prior to the finalization of the regional standards for measles, rubella and other VPD surveillance. The workshop also provided a platform for experience sharing across Member States on surveillance performance, tools and technologies used and issues and challenges related to strengthening VPD surveillance. The workshop brought data managers, EPI programme managers and surveillance officers together to discuss on data quality issues and ways to streamline and integrate different data sources for measles, rubella and other VPD surveillance. The workshop also helped to build skills of the participants on the use of various related tools and data dictionaries through hands-on training.

This publication reports on the suggestion made on the MR and VPD surveillance standards made by the participants to finalize the document as well as on the conclusions, way forward and country action plans for 2017 developed by the representatives of Member States during the meeting to accelerate progress towards measles elimination and rubella and CRS control in WHO South East Asia Region.
Regional workshop on surveillance standards for measles, rubella and priority vaccine-preventable diseases

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<td>acute flaccid paralysis</td>
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<td>BHS</td>
<td>basic health services</td>
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<tr>
<td>CIF</td>
<td>case investigation form</td>
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<tr>
<td>CRS</td>
<td>congenital rubella syndrome</td>
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<tr>
<td>EPI</td>
<td>Expanded Programme of Immunization</td>
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<tr>
<td>EURO</td>
<td>Regional Office for Europe</td>
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<td>IEAG</td>
<td>Indian Expert Advisory Group</td>
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<td>GAVI</td>
<td>Gavi The Vaccine Alliance</td>
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<td>GVAP</td>
<td>Global Vaccine Action Plan</td>
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<tr>
<td>HF</td>
<td>health facility</td>
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<td>HMIS</td>
<td>health management information system</td>
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<td>HSS</td>
<td>Health System Strengthening</td>
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<td>IDS</td>
<td>integrated disease surveillance</td>
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<td>IDSP</td>
<td>Integrated Disease Surveillance Programme</td>
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<td>IVD</td>
<td>Immunization and Vaccines Development</td>
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<td>ITAG</td>
<td>Immunization Technical Advisory Group</td>
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<td>JRF</td>
<td>joint reporting form</td>
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<td>MCV</td>
<td>measles containing vaccine</td>
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<td>MR</td>
<td>measles rubella</td>
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<td>NEHR</td>
<td>national electronic health record</td>
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<td>NITAG</td>
<td>National Immunization Technical Advisory Group</td>
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<td>NVC</td>
<td>National Verification Committee</td>
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<td>POCT</td>
<td>point of care testing</td>
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<td>QMS</td>
<td>quality management system</td>
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<td>RVC</td>
<td>Regional Verification Commission</td>
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<td>SEAR</td>
<td>South-East Asia Region</td>
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<td>Acronym</td>
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<td>SEARO</td>
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<td>South-East Asia Regional Vaccine Action Plan</td>
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<td>SEA-RVC</td>
<td>South-East Asia Regional Verification Commission</td>
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<tr>
<td>SIA</td>
<td>Supplementary Immunization Activities</td>
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<tr>
<td>SOP</td>
<td>standard operating procedure</td>
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<tr>
<td>TORCH</td>
<td>toxoplasma Gondi, rubella, cytomegalovirus and herpes virus</td>
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<td>US CDC</td>
<td>United States Center for Disease Control</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<td>VPD</td>
<td>vaccine-preventable diseases</td>
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<td>WPRO</td>
<td>Regional Office for the Western Pacific</td>
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<td>WHA</td>
<td>World Health Assembly</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Executive summary

A regional workshop on surveillance standards for measles and other priority vaccine-preventable diseases (VPDs) in the South-East Asia Region (SEAR) of WHO was organized during 19–23 September 2016, at Kathmandu, Nepal. The workshop was attended by EPI programme managers, surveillance officers and data managers from 10 Member States, with regrets from the Democratic People's Republic of Korea. The objectives of the workshop included building consensus on the revised regional surveillance standards among Member States, and identifying challenges in the implementation of these standards in the context of the in-country settings and situations. The workshop assumed greater importance in the context of the adoption of the goal of measles elimination and rubella/congenital rubella syndrome control in SEAR by 2020. The workshop was conducted as a follow-up to an earlier meeting on surveillance standards for measles and other priority VPDs in SEAR in September 2013 and in response to the SEAR immunization technical advisory group recommendation in 2015 that the surveillance guidelines for VPDs should be updated.

The first 3 days of the workshop were exclusively for EPI programme managers and surveillance officers. Discussions focused on programmatic issues pertaining to surveillance for measles, rubella and other VPDs and the proposed revisions required in surveillance practices to achieve measles elimination and rubella control. Country experiences on surveillance processes and performance were shared by representatives of all Member States, highlighting the potential issues and challenges. Inputs were provided towards the standardization of surveillance guidelines and performance indicators to be used in all SEAR countries. The final revised surveillance standards are expected to be adapted by countries in the Region to meet regional needs in accordance with each country’s specific disease control/elimination priorities.

Data managers from Member States joined the meeting during the last 2 days of the workshop. The focus of discussions shifted to data quality assurance by helping EPI managers, surveillance programme managers and data managers to streamline and integrate different data sources for measles, rubella and other VPD surveillance. The workshop enabled participants to
gain hands-on experience on the use of data dictionaries and related tools for data analysis.

This workshop identified a strong need to customize the support extended to Member States and guide national strategies for inclusion of definitive timelines and milestones for activities pertaining to measles elimination and rubella control. The need to establish high-quality surveillance systems and meticulous analysis of data generated was highlighted once again. It was recognized that to sustain the progress made and to move ahead towards the achievement of measles elimination and rubella control goals in SEAR, it is critical to focus on areas of immunization, surveillance and strengthening collaboration among development partners and stakeholders.
1. **Background**

Overwhelming evidence demonstrates the benefits of immunization as one of the most successful and cost-effective health interventions ever known. Over the past several decades, immunization has achieved many milestones, including the eradication of smallpox, an accomplishment that has been called one of humanity’s greatest triumphs. Vaccines have saved countless lives, lowered the global incidence of polio by 99% and reduced illness, disability and death from diphtheria, tetanus, whooping cough, measles, haemophilus influenza type b disease and epidemic meningococcal A meningitis. The WHO South-East Asia Region has been free of polio for the last 5 years and eliminated maternal and neonatal tetanus in 2015.

We have vaccines against more than 25 diseases in the present day world, and this has increased the need for better surveillance against these diseases to control or eliminate them. High vaccination coverage may not necessarily indicate the case load or disease burden in a population. There is a need to look into the surveillance performance as the key indicators towards progress towards disease control and/or elimination. A functional vaccine-preventable disease surveillance system is a key part of public health decision-making in all countries. Thus, there is an urgent need to build on the current efforts to strengthen vaccine-preventable disease surveillance with latest state-of-the-art technologies at subnational and national levels.

To address this issue, WHO-SEARO conducted a workshop on surveillance standards for measles and other priority vaccine-preventable diseases (VPD) in South-East Asia from 19 to 23 September 2016, which was a follow-up to the previous meeting conducted in 23–27 September 2013. The SEAR-ITAG 2015 also made recommendations to update surveillance guidelines for various VPDs. Following the 2013 workshop and in line with the SEAR-ITAG 2015, to address the emerging needs in VPD surveillance in the Region, the IVD unit worked with various experts in the Region to update the VPD surveillance standards in line with the global
standards. The updated VPD surveillance standard was expected to be reviewed in a workshop by representatives from Member States and the final revised document adapted by countries in the Region to meet regional and national needs in accordance with each country’s disease control/elimination priorities, objectives and strategies.

The regional workshop on surveillance standards for measles and other priority vaccine-preventable diseases (VPD) in South-East Asia was thus conducted from 19 to 23 September 2016. The workshop provided opportunities to the National EPI programme managers, surveillance managers and data managers from Member States to participate and provide inputs prior to the finalization of the regional standards for VPD surveillance. The workshop also provided a platform for experience sharing across Member States on surveillance performance, tools and technologies used and issues and challenges related to strengthening VPD surveillance.

The workshop also provided a forum for discussion on various issues with data quality by helping all stakeholders (EPI managers, surveillance programme managers and data managers) to understand the issues and root causes of inadequate data quality and thought provoking discussion on streamlining and integrating different data sources for measles, rubella and other VPD surveillance. The workshop also provided opportunities for hands-on skills to participants on the use of various related tools (Measles Rubella risk assessment tool, using Measles Strategic Planning tool to generate Immunity Profile) and data dictionaries.

2. Objectives of the meeting

The objectives of the meeting were as follows.

(1) Build consensus on the updated regional surveillance standards among Member States.

(2) Orient participants on the updated regional surveillance standards and seek inputs, if any, based on different in-country settings and situations.

(3) Understand the challenges/barriers in the implementation of the revised surveillance guidelines, including laboratory and data-
related challenges, in the context of different in-country settings and situations.

(4) Data managers and surveillance officers are able to understand the data-dictionary for VPD surveillance and can align different data sources to generate the key surveillance indicators and develop a transition plan for strengthening case-based surveillance.

(5) Hands-on practice on the use of a subnational risk assessment tool, generating population immunity profile for measles and generating indicator tables from the new data dictionary.

3. Organization of the meeting

The first 3 days of the meeting were exclusively for EPI programme managers and surveillance officers with the agenda focused on programmatic issues pertaining to surveillance for measles, rubella and other VPDs and the proposed revisions to meet current elimination/control targets. The opening remarks of Dr Poonam Khetrapal Singh, Regional Director, WHO South-East Asia Region, were delivered by Dr Arun Thapa, Director Programme Management. The meeting was chaired by Dr Sunil Bahl, Regional Adviser, Accelerated Disease Control and attended by EPI managers and surveillance officers from 10 of the 11 Member States. Democratic People's Republic of Korea had sent regrets.

The fourth and fifth days were joint meetings with data managers from the participating Member States.

The entire meeting was also attended by representatives from UNICEF Regional Office for South Asia and the US Center for Disease Control, Atlanta. The agenda for the meeting is provided in Annex 1 and the list of participants in Annex 2.

Secretariat support was provided by WHO-SEARO and WHO Nepal Country Office jointly. The proceedings of the meeting were recorded by the rapporteurs, Dr Sharmila Shrestha and Ms Mona Lacoul.
All the sessions of the meeting were web-casted live through WebEx, the links for which were shared with all concerned partners and counterparts.

4. **Inaugural session**

1. Inauguration of the workshop by lighting the lamp was done by Dr Rajendra Prasad Pant, Director, Child Health Division, Ministry of Health, Nepal, on behalf of the Health Secretary of the Ministry of Health, Government of Nepal.

2. The welcome address on behalf of the WHO Regional Director was delivered by Dr Arun Thapa, Director, Programme Management. The Regional Director’s address emphasized that high vaccination coverage may not necessarily indicate the case load or disease burden in a population and thus there is a need to look into the surveillance performance as key indicators towards progress in disease control and/or elimination. She also reminded us that we have vaccines against more than 25 diseases in the present-day world, and this has increased the need for better surveillance against these diseases to control or eliminate them. The Regional Director had identified measles elimination and rubella control as a flagship programme in the Region and hoped that the meeting would pay more attention on the surveillance for measles and rubella. She emphasized that measles moves fast and we need to move faster with accelerated efforts to build strong alliance and coordination among partners; effectively mobilize additional resources; and strengthen surveillance in tandem with strengthening routine immunization. The Regional Director also highlighted the gains made to make the Region polio-free as well as validation of the Region as maternal and neonatal tetanus-free in 2016, which was possible due to strong commitment from national governments matched by appropriate technical support by partners. She also mentioned that every family, no matter where it was residing, had the right to all immunization and health services provided by the respective governments, in the spirit of universal health coverage contributing towards Sustainable Development Goals, especially Goal 3 on health.
(3) Dr Rajendra Prasad Pant, Director, Child Health Division, Ministry of Health, Nepal, welcomed all the participants to the beautiful country of Nepal and expressed gratitude to WHO for selecting Nepal for the regional workshop. He also expressed that this eminent group would deliberate extensively on the many important and pressing issues on this agenda and that the rich experience brought by all participants on this subject would allow a fruitful exchange of experiences, views and recommendations that will further accelerate progress towards strengthening vaccine-preventable disease surveillance in our Region.

(4) Mr Philippe Cori, Deputy Regional Director, UNICEF Regional Office for South Asia, welcomed participants and emphasized the importance of this meeting echoing the remarks made by the Regional Director, WHO-SEARO. He emphasized the need for joint collaboration and working in partnership with all stakeholders at the country level. He also expressed that UNICEF was committed to support countries to strengthen vaccine-preventable disease (VPDs) surveillance and to ensure that no child is left from the benefits of immunization.

(5) Dr Sunil Bahl, Regional Adviser, Accelerated Disease Control, reviewed the objectives of the workshop and the expected outcomes.

The objectives of the workshop were as follows:

(1) Build consensus on the updated regional surveillance standards among Member States.

(2) Orient participants on the updated regional surveillance standards and seek inputs, if any, based on different in-country settings and situations.

(3) Understand the challenges/barriers in the implementation of the revised surveillance guidelines, including laboratory and data-related challenges, in the context of different in-country settings and situations.

(4) Data managers and surveillance officers are able to understand the data-dictionary for VPD surveillance and can align different
data sources to generate the key surveillance indicators and develop a transition plan for strengthening case-based surveillance.

(5) Hands-on practice on the use of subnational risk assessment tool, generating population immunity profile for measles and generating indicator tables from the new data dictionary.

The expected outcomes were as follows:

(1) Provide inputs to support finalization of the revised regional standards and guidelines for surveillance of measles, rubella and other VPDs.

(2) Share experiences on existing surveillance performance as well as existing tools and technologies.

(3) Support identification of potential challenges to revised standards keeping the country context and situation in mind.

(4) Contribute to identification of actions and timelines for activities that must be completed prior to the operationalization of the revised standards by January 2017 in all countries.

(5) Support streamlining and integration of various data sources for measles, rubella and other VPD surveillance systems in countries.

(6) Orient oneself on the key tools required for case-based surveillance for measles and rubella.

A round of introduction of the participants was done and Dr Arun Thapa, Director, Programme Management, WHO-SEARO, requested Dr Sunil Bahl, Regional Adviser, Accelerated Disease Control, to take over the proceedings of the workshop.

5. Proceedings of the Workshop

The workshop had a number of PowerPoint presentations, group works and hands-on exercise. All the presentations made during the workshop are available in the link provided in Annex 3. The proceedings from 5.1 to 5.9 (the first 3 days of the workshop) were exclusively attended by the National
EPI managers, National Surveillance managers and WHO EPI focal points of respective Member States. The remaining proceedings were also attended by the National data managers of Member States. The entire proceedings of the workshop were chaired by Dr Sunil Bahl, Regional Adviser, Accelerated Disease Control, WHO-SEARO.

5.1 South-East Asia Regional Vaccine Action Plan 2016–2020 (SEAR-VAP)

The SEAR-VAP was introduced by Dr Sunil Bahl, Regional Adviser, on Accelerated Disease Control. He emphasized that the SEAR-VAP is a framework to accelerate progress towards regional immunization goals that helps to shape national vaccine action plans, harmonize efforts to address inequities in access to immunization services, improve access to human and financial resources needed to achieve the immunization goals and establish mutual accountability between governments and their local and international partners. The SEAR-VAP is aligned to the Global Vaccine Action Plan (GVAP) 2011–2020, which was endorsed by Member States during the World Health Assembly (WHA) in 2012, and has eight goals:

1. Polio-free status is maintained.
2. Elimination of maternal and neonatal tetanus is sustained.
3. Measles is eliminated and Rubella/CRS is controlled.
4. Control of Japanese Encephalitis is accelerated.
5. Control of Hepatitis B is accelerated.
6. Routine immunization systems and services are strengthened.
7. Introduction of new vaccine and related technologies is accelerated.
8. Adequate production and availability of safe and efficacious vaccines is ensured.

Progress against each of these goals in South-East Asia was presented and discussed. There were comments from participants on lack of rubella-specific surveillance, which may deter the rubella control goal. Participants also had queries on the importance given to JE control acceleration but less
focus on the traditional VPDs such as diphtheria and pertussis. The presenter reminded that the focus from traditional VPDs has never been removed but new focus on JE has been added based on the disease burden and its gaining public health importance.

5.2 VPD Surveillance: Global and Regional Perspective

Dr Minal Patel from WHO HQ presented the global perspective of VPD surveillance and provided a global report-card as of 2015 on some of the priority vaccine-preventable diseases. She emphasized that there is no global monitoring of surveillance for other pathogens outside of those in the JRF and thus a large gap in other VPD surveillance. She also informed that in 2017, WHO HQ plans to revise the 2003 Global VPD Surveillance Guidelines, and SEAR revised guidelines will be used as a reference for the global guidelines.

Dr Sudhir Khanal from WHO-SEARO presented the regional status of VPD surveillance with focus on measles and rubella surveillance. He summarized that for SEAR:

- Surveillance is critical to monitor progress and ultimately reduce mortality and morbidity. Thus, the current VPD surveillance needs to be strengthened in SEAR to meet the global and regional standards.
- Target of measles elimination and rubella/CRS control by 2020 may not be met unless immediate actions are taken to strengthen surveillance. We have less than 900 working days to achieve this regional goal.
- National surveillance plans and activities must be identified and implemented to strengthen measles and rubella surveillance.
- Countries are expected to adopt the revised elimination standard surveillance system move to single case-based surveillance data for measles and rubella by 2017.
- Countries with polio-funded human resources that support measles-rubella surveillance must develop transition plans to ensure that measles-rubella surveillance does not get affected as the polio funding ramps down.
Participants from India, Indonesia and Sri Lanka had specific concerns on the adoption of the new surveillance guide and broadening of surveillance definition for surveillance of measles and rubella to fever and rash as that may have huge implication to the immunization systems with increased case load and need to do a large number of laboratory tests. It was clarified that India and Indonesia are expected to move to the new definition of fever and rash for surveillance of measles and rubella only after they have conducted a nationwide wide-age-range measles and rubella vaccination campaign in the country. It is expected that after these countries conduct a high-quality MR campaign, the number of cases of measles and rubella will drastically go down causing less burden to the system.

5.3 Laboratory support to VPD surveillance in SEAR

Ms Sirima Pattamadilok, MR Laboratory Coordinator, WHO-SEARO, presented the status and challenges of laboratory support to vaccine-preventable diseases in SEAR with focus on MR laboratory support.

She highlighted the tiered structure of WHO VPD laboratory network in the South-East Asia Region and how global specialized laboratories, regional reference laboratories, national reference laboratories and national laboratories are interlinked. She emphasized that laboratories in the countries close to measles elimination should consider changing the algorithm of serology testing and considers implementing more sensitive method such as Real-time PCR for case confirmation. Ms Pattamadilok also encouraged countries to share genotype data through the MeaNS and RubNS system to support the global surveillance of measles and rubella and understand the transmission patterns. She also highlighted some of the challenges faced by laboratories to support VPD surveillance, which included the following.

- Need for Quality Assurance of the huge number of the SEAR MR laboratory network that will require a new strategic approach.
- Capacity to conduct molecular epidemiology.
- Need to look for alternate sampling techniques in hard-to-reach areas (Bangladesh, Bhutan, Nepal, Myanmar and Maldives) for which QMS needs to be developed.
Sample collection for viral detection needs to be done regularly and that sustainability for elimination phase will require more funding and staffing.

Ms Pattamadilok also shared her experience on how the quality assurance mechanism for measles and rubella laboratory network are conducted in large countries such as China and Thailand. She highlighted that in China, one national reference laboratory conducted quality assurance and accreditation for 32 provincial laboratories, which in turn provided quality assurance and accreditation oversight for 339 prefecture laboratories, county laboratories and other laboratories from children hospitals. This could be a model to follow in large countries such as India and Indonesia.

5.4 Country presentations on VPD surveillance

All 10 Member States that participated in the workshop presented the VPD surveillance, issues and challenges with focus on MR surveillance for the respective countries. The presentation was done in reverse-alphabetical order. Each country highlighted the various existing surveillance systems, reporting mechanisms and issues and challenges within each surveillance system in the country. All country presentations are available in the link provided in Annex 3.

5.5 Data requirement for VPD surveillance in SEAR

The presentation on the data requirement for VPD surveillance was done by Mr Tika Ram Sedai, Technical Officer. Discussions focused around the existing Measles-Rubella (MR) data reporting system and related issues and on case-based data requirements and proposed changes. The presentation highlighted some of the key issues that SEAR is facing in terms of VPD surveillance data reporting, as follows:

- Multiple reporting of MR Case and Laboratory data.
- Variation in reporting template and timeline: aggregated monthly lab data reporting; lab line list (results); aggregated monthly Case data reporting; case-based data (measles-rubella); Case line list (other VPDs).
Discrepancy between Epi/surveillance and laboratory reporting highlighting poor linkage between Epi and lab data.

Late reporting, incomplete or irregular, including missing of various key information/dates in measles-rubella case-based dataset submitted to SEARO.

Case-based data reporting for other VPDs such as neonatal tetanus, diphtheria, pertussis, Japanese encephalitis are yet to be organized.

The presentation also highlighted on the need for additional variable to be reported for MR surveillance, which also included providing a laboratory unique identifier code to each laboratory.

After an elaborated discussion on data requirement, the workshop proposed the following actions to each Member State.

- Review existing Measles-Rubella and other VPDs surveillance system to assess requirements. Changes may be required in Case and Laboratory investigation forms.
- Develop plan for implementation of revised case-based surveillance system.
- Update surveillance guide, manuals, SOP, training materials, line list, zero reporting form, bulletin, indicators, etc. to ensure that the changes are incorporated.
- Modify existing database (national and subnational) or create new if required.
- Data integration with other surveillance systems (EWARS, IDS, VPD, HMIS).
- Training to national and subnational surveillance teams.
- Change in MR case-based data reporting format to be sent to SEARO (create or modify interface for data exchange).

It was also highlighted that countries are expected to switch to MR data reporting format (from aggregate to case-based) effective 1 January 2017 and that SEARO database system will accept only case-based dataset for Measles-Rubella effective 1 January 2017.
5.6 Review of the proposed draft VPD surveillance guide

The proposed draft VPD surveillance guide was reviewed by participants of the workshop in depth. The participants were divided into four groups and each group reviewed the guidelines in depth with focus on MR surveillance section. Guidelines to follow in the group work were provided and each group had a facilitator to support the group. The following key suggestions were made on the Measles-Rubella section of the Surveillance Guide.

- Fever and rash case definition to be adopted – countries categorized based on MCV coverage, case-load, surveillance performance into three categories; first category will start early 2017; second category late 2017; and third category in 2018.
- More explicit explanation of outbreak procedures and response to include in the Guide.
- No standardization of unique case identifier as these are country specific and to follow the AFP surveillance pattern. The national Epi/surveillance programme should assign a unique case identifier (Case ID) to every suspect case and specimen sent from the field and establishes a link with relevant measles laboratory.
- To develop uniform guidance for calculation of indicators and uniformity in analysis in the sections.
- Section on sample collection to align with global laboratory guidelines.
- Contact tracing and active case search for all confirmed cases to be included in the guidelines.
- To add vaccine-related rash as a separate classification:

There were also a number of suggestions made on the formatting and typos in the document, which have been noted and will go through a rigorous editing process considering these inputs. A number of additional discussions were focused on the implementation of the guideline, which included the following:

- Ensuring that surveillance system is representative and reaches all subnational areas beyond AFP reporting sites.
Streamlining multiple parallel reporting mechanisms (e.g. EWARS, IDS, etc.).

Conducting regular EPI and VPD surveillance reviews (can be internal/more frequent) and ensure that recommendations from such reviews are implemented to enhance programmed performance.

Securing regular funding sources to sustain MR and other priority VPD surveillance even if the polio global funding decreases or stops with better transition plan; GAVI HSS, Lions Clubs as opportunities.

Respective governments have high commitment – now time to translate that into national budgeted plans.

Database in EPI/surveillance and laboratory should be linked using modern database/information and communication technologies. Regular interaction among these teams should be conducted to harmonize case-based dataset submitted to SEARO.

5.7 Molecular epidemiology for measles and rubella

Dr Miguel Mulders, Global Measles and Rubella Laboratory Network Coordinator, presented the molecular epidemiology for measles and rubella. The session was dedicated to discussion on how genetic data can be used to track transmission patterns and identify sources of infection. The session also highlighted that molecular epidemiology is key component to verify measles elimination. The presentation also shared the lessons learnt from more than 20 years of molecular epidemiology of measles, which has helped to:

- Understand global distribution of strains. E.g. Genotype B3, once restricted to African countries now has a global distribution; Genotype D8, endemic in India now has a global distribution; Genotype H1, still endemic only in China.
- Determine transmission pathways of the virus.
- Determine origin of importation events.
- Monitor effectiveness of disease control programmes.
- Document elimination of endemic virus transmission.
- Differentiate vaccine strains from wild.

5.8 New technologies for measles/rubella surveillance

Ms Sirima Pattamadilok presented the use of alternate techniques for sample collection with focus on the use of dried blood spot (DBS) to collect samples for measles and rubella IgM testing. The presentation also discussed the advantages and disadvantages of serum collection and DBS. A discussion on the possibility of availability of Point-Of-Care-testing device (POCT) and its principal was discussed. Participants were enthusiastic on the use of DBS as a simpler technique for collection of samples but were cautioned that the gold standard is still the whole blood serum sample.

5.9 GAVI’s measles rubella strategy and support for VPD surveillance in SEARO

Dr Pushpa Ranjan Wijesinghe, Medical Officer, presented on the GAVI measles and rubella strategy. The discussion highlighted that GAVI’s MR strategy is a comprehensive, single, planned, coherent, long-term approach to measles and rubella elimination, which primarily focuses on uniformly increasing routine MCV coverage (equitable coverage) and support appropriately complementing routine immunization with supplementary immunization activities (SIAs). The strategy is a strategic opportunity for strengthening routine immunization and also invites leveraging GAVI HSS and PEF (Partnership Engagement Framework) support for strengthening surveillance/monitoring and evaluation. The presentation also highlighted that countries in SEAR are at various phases of funding support from GAVI – Democratic People's Republic of Korea and Nepal in the Initial Self-funding phase; Bangladesh, India and Myanmar at preparatory transition phase; Bhutan, Indonesia, Sri Lanka and Timor-Leste at accelerated transition phase while Thailand and Maldives in the Region are not GAVI eligible.
The presentation also detailed on the paradigm shift in measles support as per the GAVI MR strategy.

<table>
<thead>
<tr>
<th>Past support</th>
<th>New approved support</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Wide age initial MR catch-up supplementary immunization activities (SIA)</td>
<td>• Continue wide age initial MR catch-up SIA</td>
</tr>
<tr>
<td>• Measles follow-up SIA for six countries</td>
<td>• MCV follow-up SIA to all Gavi eligible countries, countries bearing some cost</td>
</tr>
<tr>
<td>• Routine measles second dose for 5 years</td>
<td>• Routine measles second dose* and MR (first &amp; second) with co-financing</td>
</tr>
<tr>
<td>• Outbreak response fund</td>
<td>• Continue outbreak response fund</td>
</tr>
</tbody>
</table>

5.10 **Core variables and key surveillance performance indicators for measles, rubella and priority VPDs**

The proceedings were also attended by the National Data managers of 10 Member States. The key surveillance performance indicators for measles, rubella and other priority VPDs were shared and discussed and agreed upon with focus on the measles and rubella key surveillance performance indicators.

The session also had group work, where participants reviewed the core variables for measles and rubella that are expected to be reported by the respective Member State to SEARO against the respective country case investigation form (CIF). The group work was done country-wise and each country reviewed the respective CIF using a standard case-study provided to the country team and ensured that the core variables were reflected in the CIF. Countries that did not have the entire core variables reflected in the CIF-developed plans to incorporate as appropriate after in-country consultation. One of the key area of discussions on the variables was on 30-day follow-up, and participants had queries whether this is required or feasible and the experts from SEARO and WHO HQ confirmed that these
would help to give measles-related mortality information as most mortality due to measles occur after 2 weeks of the infection.

Participants also involved themselves in a second group work on calculating the key surveillance performance indicators for measles and rubella using a dummy raw case-based data and acquainted themselves on the numerators and denominators of the key surveillance performance indicators.

The core variables and key surveillance performance indicators for measles and rubella are attached as Annexes 4 and 5.

5.11 Immunization and VPD data quality assessment

The session had a number of presentations from a group of experts from WHO HQ and SEARO who provided global and regional perspective on data quality issues, challenges and way forward. The session also oriented participants on the key global guidelines that are available for Immunization and VPD data quality assessment. A number of real-life examples on data quality issues were shared with participants and their inputs sought on the reasons for such issues at both global and regional levels.

Participants were also informed on the data validation process that happens at WHO HQ and SEARO level on the data submitted by countries on both immunization and surveillance data. Specific analysis on the issues with JRF data and various interventions conducted by SEARO to enhance the quality of JRF data was presented and discussed with participants. The presentations highlighted that the data are of high quality if they fit their intended uses in operations, decision-making and planning; that the data quality problems can occur at many points/information flow chains in the data collection and reporting process and so to improve data quality, we must control it at many different points/flow chain to prevent data from becoming inaccurate and hinder the usefulness of the entire data system. The presentations also emphasized that we may only be able to fix a part of what we find and thus teamwork is the key to achieve high-quality data.

Following intense discussions in the session, some key areas on immunization and surveillance data quality were identified to be considered by the countries.
Data quality improvement plans and activities for immunization and VPD surveillance should be developed as a stand-alone plan or as part of annual EPI plan of action (or cMYP) or other health plan.

Need to conduct annual reviews to assess data quality, both at national and subnational levels.

Need to conduct periodic coverage evaluation/household surveys to validate administrative coverage of immunization.

Data quality review to be included as part of the future joint national and international EPI and VPD surveillance review, and post-introduction evaluation (PIE) of new vaccines.

Countries to ensure timeliness, completeness and accuracy of annual reporting of national immunization performance indicators through joint reporting form (JRF).

Documentation of data management system and practices, manual/SOP, error logs, corrective action taken as good practice.

Database/entry form for VPD surveillance should have a number of validation checks especially on the dates, unique ID, geographical locations and age.

Regular data analysis with feedback and feedforward mechanism should be instituted.

Databases in EPI programme, surveillance programme and laboratory should be linked using modern database/technology.

SEARO database system will accept case-based dataset only (and not aggregate data) for Measles-Rubella surveillance effective 1 January 2017.

Timeline for weekly case-based dataset submission to SEARO remains 10:00 am every Monday (New Delhi time).

5.12 EPI Coverage evaluation survey – new methodology

Dr Minal Pater from WHO HQ oriented participants on the new EPI coverage evaluation survey methodology released by WHO in 2015. She
highlighted on the key areas where enhancements were done from the previous methodology, which included the following:

- Defining the scope of the survey
- Sampling
- New methods on vaccination ascertainment
- Guidance on digital data collection
- Steps to minimize bias and bolster data quality
- Innovative graphs for presenting results
- Reporting to be comprehensive and persuasive about data quality.

The presentation also highlighted some of the key challenges related to implementation of the new survey methodology and informed the group that support is available from WHO if requested by countries to help implement the new survey methodology. The final guidelines of the new coverage survey methodology are publicly available on the WHO website.

5.13 Orientation on newer tools to support acceleration of measles elimination and rubella control programme activities

The workshop also took the opportunity to orient participants on some of the essential tools that could be used in countries to support acceleration of measles elimination and rubella control activities.

SIA readiness tool for SIAs using injectable vaccines

Participants were oriented on the use of the SIA readiness tool and its dashboard. Considering that Injectable SIAs are significant opportunities to close the population immunity gap for measles and rubella, its use has been highly recommended by WHO in countries that are conducting MR SIA in the days to come to ensure the quality of the SIAs. Various examples on how the tool was used in other settings and how it helped to take immediate corrective actions were described.
**Measles Rubella subnational risk assessment tools**

Participants were also oriented on the measles rubella subnational risk assessment tool. The tool uses four key programmatic components (immunity profile, surveillance performance and programme delivery status and treat assessment) to identify districts that are at very high, high, medium or low risk of measles and rubella virus transmission. Hands-on practice on the use of excel-version of the tool were conducted. Country teams were provided with respective country data and the tool and were asked to work on the tool and identify very-high, high, medium and low-risk areas in the country. Country teams are expected to replicate these lessons learnt to conduct subnational risk assessment in the respective countries and develop risk mitigation plans.

**Using Measles Strategic Planning tool to generate population immunity profile**

Participants were also oriented on the concepts of the Measles Strategic Planning Tool version 2 developed by WHO and partners. The tool has been modified by SEARO and all related data up to 2015 required to generate immunity profile has been entered, including subnational data for India and Indonesia. Participants in the respective country group work reviewed the tool and generated population immunity profile for various birth cohorts. They also worked to generate various scenarios and identify what intervention would best help to reduce the immunity gap in different age groups in countries.

6 **Country action plans**

Following extensive deliberation for 5 days, each country team developed work-plans focused on accelerating progress towards measles elimination and rubella control. The key highlights from the country work-plans were as follows:
Bangladesh

- Country is committed to further strengthen the surveillance system towards elimination of measles and control of rubella as targeted by the Region.

- Plans:
  - Web-based surveillance system will be the new milestone towards sound surveillance system and plans to incorporate all surveillance variables by end 2016.
  - Update existing CIF to accommodate the recommended variables by last quarter of 2016.
  - Update Measles Rubella/CRS surveillance guideline by the second quarter of 2017 and implement new guidelines by the third quarter of 2017.

- Challenges would be to develop the new guideline in time, capacity-building of the relevant personnel and strengthen the lab capacity with increased work load on stipulated time. Intensive monitoring and supervision to implement the web-based surveillance data management system can also be a challenge.

- Support is expected for development of Guideline, forms and IEC materials, capacity-building of the relevant personnel and to strengthen lab capacity.

Bhutan

- Country plans to be verified as having status of measles elimination by 2017 and thus have identified key areas that need accelerated implementation.

- Between October 2016 and February 2017, Bhutan plans to conduct the following activities.
  - Conduct sensitization and training of clinicians and health workers on revised MR surveillance guideline and CIF.
  - Discuss with the Ministry to place surveillance officers in subnational level (hospitals).
- Explore alternative shipment mechanism.
- Use DBS as alternative samples collection method.
- Streamline reporting system and develop web-based data management system for case-based surveillance.
- Reinforce CRS surveillance system in three regional referral hospitals.

**India**

The country is yet to introduce rubella-containing vaccine in the Routine Immunization Programme. India has a huge challenge of high-case burden of both measles and rubella and still has no case-based surveillance system for measles and rubella. However, to accelerate progress towards achieving the regional goal of measles elimination, the country has planned for the following activities:

- MR campaign planned in phased manner from January 2017 to December 2018.
- Case-based surveillance for MR will be transitioned over the period of MR campaign and immediately after the MR campaign.
- Guidelines and Case investigation formats will be modified before launch of MR campaign.
- Integration with IDSP and expansion of lab network by December 2017.
- Trainings of health workers will be conducted state-wise as per the transition plan starting from January 2017.
- Quarterly VPD reviews at national and subnational levels.
- Provision of alternate source of funding for surveillance activity – GAVI HSS -2(January 2017 to December 2019).

However, challenges remain to conduct these activities en-mass and with high quality, and thus India expects support from WHO and UNICEF to implement these activities with quality.
Indonesia

The country is yet to introduce rubella-containing vaccine in the Routine Immunization Programme. The country has a huge challenge of high-case burden of both measles and rubella and is still with no case-based surveillance for measles and rubella. However, to accelerate progress towards achieving the regional goal of measles elimination, the country has planned for the following activities:

- MR campaign planned in phased manner from August 2017 to December 2018.
- Guidelines and Case investigation formats will be modified by March 2017.
- Expand Enhanced Case-Based Measles Surveillance Piloted in six Districts to improve reporting system, including case reporting from all potential reporting units.
- Trainings of health workers will be conducted state-wise as per the transition plan starting from January 2017.
- Central Government supports the specimen transport for all provinces.
- Evaluating and supporting three new subnational measles laboratories.
- Advocacy meeting to local government, IPS (Indonesian Paediatric Society), CRS sentinel hospital.

Maldives

Maldives plans to be verified as having status of measles elimination by 2017 and thus has identified key areas that need accelerated implementation. Between October 2016 and February 2017, Maldives plans to conduct the following activities.

- Revise surveillance guideline to align with SEARO guideline.
- Adapt to fever and rash case definition.
- Revise CIF and database to include new variables.
➢ Conduct nationwide training to sensitize health professionals to new case definition and surveillance guide:
  - Dissemination of guideline and IEC material for health professionals.

➢ Discussion with National Measles Laboratory:
  - New sample methods (e.g. DBS)
  - Strengthening coordination with EPI programme
  - Training on sample collection and transportation.

➢ Conduct subnational risk assessment and plan accordingly to mitigate the risk with support from SEARO.

➢ External assessment of measles surveillance activities.

**Myanmar**

Although case-based surveillance has been initiated in Myanmar since 2010, the private sector is still not a part of it and the reporting rate of non-measles and non-rubella is still quite low even at the national level.

Myanmar plans to conduct the following activities by end 2017.

➢ Sensitization to the private sector through advocacy meetings to clinicians and GP (general practitioners).

➢ Refresher trainings for BHS (basic health services ) Unit and the clinicians on MR case-based surveillance.

➢ Community awareness raising through IEC and other mass media.

➢ Plan to use DBS especially in hard-to-reach areas.

➢ Supportive supervision especially to silent areas and areas with low non-measles/non-rubella rates.

➢ Revision of MR surveillance guidelines as per the regional guidelines.
**Nepal**

The MR surveillance in Nepal is dependent on the AFP surveillance network and thus the reporting sites are limited. There is also a need to enhance coordination between Laboratory, Surveillance Unit and Epidemiology Unit and ensure that recordings are consistence. Nepal plans to conduct the following activities to overcome these challenges.

- Expansion of MR reporting sites in all HFs (4111) by first quarter of 2017.
- Orientation to all health workers all over the country (fever with rash definition) on new surveillance standard for measles and rubella by end 2017.
- Conduct MR SIA in 2018.
- Develop outbreak response plan by early 2017.
- Expand WHO accredited MR laboratory in all seven states and strengthen the national laboratory.

**Sri Lanka**

Following a large outbreak in 2013 up to 2016, Sri Lanka has strengthened surveillance and laboratory capacity as well as a response plan to cases of fever and rash. Sri Lanka continues to strive to attend the elimination standards and plans to have the following strategic activities conducted in 2017 to accelerate progress towards measles elimination and rubella control.

- Maintain the required discarded rate for measles and rubella plan to adapt case definition to “fever and maculo-papular rash” after discussion in the next NITAG meeting.
- Encourage health-care staff to collect serum samples as much as possible at first contact of the patient.
- Identify the requirement of alternative specimen collection and testing methods, e.g.: dried blood spot, oral fluid and urine.
- Assess measles and rubella population level immunity.
Regional workshop on surveillance standards for measles, rubella and priority vaccine-preventable diseases

- Maintain high laboratory confirmation rates for suspected cases of measles and rubella.

**Thailand**

Thailand has strong collaboration among stakeholders, i.e. surveillance, EPI, lab through a weekly tripartite meeting. A single online database for MR elimination links clinical, epidemiological, laboratory data and is accessible to all. Thailand also has strong regional reference labs with timely reporting of results and good rate of viral detection. Thailand has already implemented new case definition of fever with rash for MR surveillance and the data required for measles elimination are in place. VPD surveillance is not a priority in the National Policy but to accelerate progress towards measles elimination, Thailand plans to conduct the following activities.

- Develop regular report from the electronic database, including feedback to the subnational level.
- Develop data cleansing protocol.
- Revise the MR elimination guideline as per regional guidelines.
- Integrate EPI and surveillance training workshop for subnational staff.
- Establish Congenital Rubella Surveillance using NEHR (national electronic health record) and TORCH lab surveillance.

**Timor-Leste**

Being a relatively new country in the Region, Timor-Leste has a number of challenges, including inadequate staff/resources at central level and district level for achieving high-quality surveillance control, limitation of coordination between the surveillance unit of the MOH and national hospital/referral hospitals, limited capacity of the staff at the health facility level on surveillance system at the district and subdistrict levels for sample collection, storage and transportation to national laboratory for testing. Timor-Leste plans to address these challenges to the extent possible by the following activities.
- Capacity-building (training) for health workers on specific to VPD surveillance system.
- Strengthening collaboration and coordination between the surveillance department at the national level and hospitals.
- Establishment of other VPD surveillance, monitoring and supervision.
- Additional surveillance staff to district health facilities.
- Regular supportive supervision to improve data qualities.

7. **Conclusions and Way Forward**

The workshop during the course of deliberation concluded that while VPD surveillance is key to immunization programmes, measles elimination and rubella/CRS control is a priority for the South-East Asia Region (SEAR). Significant progress has been made in reducing measles mortality in SEAR during the past few years. However, SEAR countries will have to take some strong and urgent actions if the measles elimination and rubella/CRS control goal has to be achieved by 2020. The workshop thus identified the following key areas of work as a way forward:

**On Immunization**

- Efforts are required to increase MCV1 and MCV2 coverage to more than 95% to achieve elimination goal.
- Introduce RCV in the remaining three countries (Democratic People's Republic of Korea, India, Indonesia) as soon as possible.
- Generate immunity profile by age cohort annually and actions taken to reduce immunity gaps.
- Countries conducting MR SIAs to ensure high quality of campaigns
  - should use SIA readiness tool;
  - external monitoring to evaluate the quality.
On Surveillance

- Sensitive, high-quality surveillance is critical to achieving measles elimination and rubella/CRS control.
- SEAR VPD surveillance standards to guide national strategies for measles-rubella surveillance strengthening.
- Countries where MR surveillance is dependent on AFP surveillance network need to expand MR surveillance sites beyond the current AFP surveillance sites.
- Broadening case definition for reporting suspected cases: ‘fever and rash’ (3 Cs dropped) is required, and countries are expected to adopt according to the following timelines:
  - Q1 2017: Bhutan, Maldives, Sri Lanka, Thailand, Timor-Leste
  - Q3 2017: Bangladesh, Myanmar, Nepal
  - 2018: Democratic People’s Republic of Korea, India, Indonesia.
- On Case reporting and investigation:
  - Strengthen reporting network, including private sector involvement.
  - Encourage immediate reporting of all suspected cases.
  - Revise policy and tools for investigation, as appropriate.
  - Ensure availability of trained human resource for case investigation at subnational level.
- Revision of MR case investigation forms and other related tools to ensure that core variables are captured.
- Unique I/D for each case investigated:
  - Standardized policy in each country on how and when to allocate unique I/D and by whom.
  - Structure of unique I/D country discretion.
  - Same I/D on case and specimen going to lab to allow linking of epi and lab data.
Specimen collection and transportation:
- Increased specimen collection for virological testing.
- Consider alternate specimen collection techniques, as appropriate (in consultation with SEARO).

**On Data**
- Frequent interaction between EPI, surveillance and laboratory to harmonize case-based dataset, including review of case classification.
- Case-based dataset submitted in standard format to SEARO on weekly basis.
- Data management: Switch from aggregate reporting to case-based reporting from January 2017.
- Epi data and lab data to be linked using modern database/information and communication technologies.
- Regular data quality checks, analysis, indicator calculation and feedback provided.
- Periodic data quality assessments – stand alone or part of other assessments.
- Risk assessment – subnational risk assessment to be conducted annually followed by appropriate actions to mitigate risks.

**On Linkages**
- Countries to make use of GAVI opportunities on HSS and PEF for measles and rubella activities, especially surveillance strengthening.
- Need for transition plans for polio assets to support measles-rubella activities in five countries with substantial polio funded networks.
Other actions

- Countries to develop/revise national action plans with milestones, activities, timelines, resources to reach the 2020 goal.
  - In-country consultation with all stakeholders.
  - Surveillance strengthening should be an integral part of the national action plan.
  - Share the national action plan with SEARO by 31 December 2016.

- Progress against national action plans to be presented during SEAR-ITAG in 2017.

- Finalization of annual reports by NVC by February 2017 for submission to the Regional Verification Commission for Measles Elimination and Rubella/CRS control.

- Bhutan and Maldives to develop national action plan for October 2016 to March 2017 and a report on implementation of this plan targeting verification by the Verification Commission in April 2017.

8 Closing

The closing session was chaired by Dr Arun Thapa, Director Programme Management, WHO-SEARO. He emphasized on the need to rapidly uptake the findings from this workshop and accelerate efforts towards measles elimination and rubella control in SEAR. He also emphasized that Bhutan and Maldives, which have made great progress, should prepare themselves to undergo verification process in the upcoming meeting of the SEAR-RVC and ensured that SEARO is willing to provide technical support for the preparation.

Dr Thapa congratulated all the participants on the successful completion of the workshop and requested Member States and the representative participants for concerted action to accelerate progress towards measles elimination, rubella control and control of other VPDs in SEARO specifically targeting Maldives and Bhutan to plan for the verification of elimination of measles.
9 Workshop evaluation by participants

The workshop was evaluated using the standard WHO evaluation form which was filled out by 34 participants. The average score of the participants’ rating on the following attributes on a scale of 1 (Poor) to 10 (Perfect) shows high satisfaction levels.

<table>
<thead>
<tr>
<th>Pre-Conference Arrangements (Scale of 1–10)</th>
<th>Average</th>
</tr>
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<tbody>
<tr>
<td>Timely receipt and clarify of administrative information</td>
<td>8.9</td>
</tr>
<tr>
<td>Travel Authorization /arrangements for WHO-sponsored attendees</td>
<td>8.3</td>
</tr>
<tr>
<td>Response time for pre-conference clarifications</td>
<td>8.8</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Conference Arrangements (Scale of 1–10)</th>
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</thead>
<tbody>
<tr>
<td>Airport pick-up</td>
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<tr>
<td>Reception and check-in efficiency of the hotel</td>
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<tr>
<td>Registration process</td>
<td>9.3</td>
</tr>
<tr>
<td>Quality of conference kit</td>
<td>7.7</td>
</tr>
<tr>
<td>Hotel rooms and service</td>
<td>8.3</td>
</tr>
<tr>
<td>Workshop room(s) set-up and ambience</td>
<td>9.2</td>
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<tr>
<td>Group work facilities/allocation</td>
<td>9.3</td>
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<tr>
<td>Quality of audio-visual systems</td>
<td>9.1</td>
</tr>
<tr>
<td>Food and Beverage – Quality and Service</td>
<td>9.3</td>
</tr>
<tr>
<td>Facilities, at and efficiency of Workshop Secretariat</td>
<td>8.9</td>
</tr>
<tr>
<td><strong>OVERALL RATING</strong></td>
<td>8.8</td>
</tr>
</tbody>
</table>

**Technical quality of the workshop**

| To what extent the objectives of the workshop were accomplished?                  | 8.8     |
| Whether the agenda of the workshop were relevant to achieve objectives.          | 9.2     |
| Were the outcomes of the workshop relevant to the needs of your country?         | 9.6     |
| Were working papers presented substantive to the needs of the workshop?          | 9       |
| Are you in a position to integrate the outcome of this workshop to the national workplan? | 9       |
Most participants appreciated the group works and expected that more experience sharing will be included in future workshops on the implementation of outcomes of this workshop.

10 Acknowledgement

This report benefited from the dedication, support and expertise of all the participants of the regional workshop on surveillance standards for measles, rubella and priority vaccine-preventable diseases as well as a number of WHO staff and external collaborators.

Dr Sudhir Khanal, WHO-SEARO staff, coordinated the workshop and produced the report in collaboration with a team of rapporteurs comprising of Tika Sedai, Sharmila Shrestha and Mona Lacoul. Strategic guidance was provided by the Regional Director, Dr Poonam Khetrapal Singh; Director, Programme Management, Dr Arun Thapa and Dr Pem Namgyal, Director FGL. The report-writing process was overseen by Dr Nihal Abeysinghe and Dr Sunil Bahl.

The report-writing team wishes to also thank the following contributors whose expert review made this report possible:

WHO HQ staff: Minal Patel and Antoni Sebastien reviewed the draft surveillance standard document and provided technical inputs.

WHO-SEARO: Sigrun Roesel, Sirima Pattamadilok, Pushpa Ranjan Wijesinghe, Uttara Aggarwal and Aarti Garg reviewed the draft and provided necessary inputs.

US CDC: Jim Goodson, Heather Scobi and Susan Wang provided inputs to the various sections of the meeting proceedings and final draft of the surveillance standard document.

The report-writing team would like to acknowledge the support provided by the entire IVD team, especially Ms Malu Adlakha for the administrative support, the R-DOC team, the building management, ICT services, travel unit and all related staff who played a crucial role in the smooth conduct of the meeting and in the preparation of this report.
Annex 1

Agenda

Day-1
- Inauguration Session
- SEAR-Vaccine Action Plan 2016–2020 – An overview
- VPD surveillance :Global perspective
- Vaccine Preventable Diseases (VPDs) surveillance in SEAR : Current status and challenges
- Laboratory support for VPD surveillance in SEAR: An overview
- Country presentations on VPD surveillance, issues and challenges with focus on MR surveillance-Timor-Leste, Thailand, Sri Lanka

Day-2
- Country presentations on VPD surveillance, issues and challenges with focus on MR surveillance-Nepal, Myanmar, Maldives, Indonesia, India, Bhutan, Bangladesh.
- Data requirements for VPD surveillance
- Group work - Review of surveillance standard on Measles and rubella by each group

Day-3
- Plenary discussion on Review of surveillance standard on Measles and rubella by each group
- Molecular epidemiology for Measles and Rubella- Interpreting the nucleotide surveillance data and phylogenetic tree
- Using Dried blood spot and other new technologies for measles/rubella surveillance & role of surveillance team
- GAVI’s measles rubella strategy and support for VPD surveillance in SEARO : A perspective
- Next steps - Way forward and Wrap-up Day 3
Day-4

- Welcome to data managers and self-introduction
- Key surveillance performance indicators for measles and rubella and other priority VPDs
- GROUP WORK –
  - Discussion on data variables for measles and rubella
  - Review of data dictionaries and current case investigation forms of the countries
  - Exercise on generating indicators using the data dictionary and raw country data
- Immunization and VPD data quality assessment
  - Global perspective on immunization data quality
  - Regional review of data quality issues on immunization and measles rubella surveillance
- EPI Coverage evaluation survey- new methodology
- SIA readiness tool for SIAs using injectable vaccines

Day-5

- Introduction and hands-on exercise on the use of subnational risk assessment tools (measles/rubella) and Measles Strategic Planning Tool to generate immunity profile
- Status of selected vaccine-preventable diseases in SEAR
- Group Work – way forward and country action plans
  - Developing country action plan for VPD surveillance
  - Country presentations on way forward
- Wrap-up discussions and Closing Session
Annex 2

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Dr Rusipah  
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Accelerated Disease Control and VPD Surveillance Branch  
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Surveillance Officer  
Expanded Programme on Immunization

Mr Sebastien Antoni  
Data Manager  
Immunization Strategic Information  
IVB, FWC
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<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr Arun B. Thapa</td>
<td>Director Programme Management WHO-SEARO, New Delhi</td>
</tr>
<tr>
<td>Dr Sunil Kumar Bahl</td>
<td>Regional Adviser-Accelerated Disease Control Immunization and Vaccine Development</td>
</tr>
<tr>
<td>Ms Sirima Pattamadilok</td>
<td>Scientist (Virologist) Immunization and Vaccine Development</td>
</tr>
<tr>
<td>Dr Pushpa Ranjan Wijesinghe</td>
<td>Technical Officer, Emerging VPD Immunization and Vaccine Development</td>
</tr>
<tr>
<td>Dr Sudhir Khanal</td>
<td>Medical Officer, Measles Immunization and Vaccine Development</td>
</tr>
<tr>
<td>Mr Tika Ram Sedai</td>
<td>Technical Officer, Data Management Immunization and Vaccine Development</td>
</tr>
<tr>
<td>Ms Malu Adlakha</td>
<td>Supply Assistant Immunization and Vaccine Development</td>
</tr>
</tbody>
</table>

### Observers from WHO Nepal

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ms Mona Lacoul</td>
<td>GIS and Research Officer WHO-IPD</td>
</tr>
<tr>
<td>Dr Jagat Narain Giri</td>
<td>Immunization Coordinator, WHO-IPD</td>
</tr>
<tr>
<td>Dr Sagar Ratna Shakya</td>
<td>Measles and Rubella Coordinator WHO-IPD</td>
</tr>
<tr>
<td>Dr Sharmila Shrestha</td>
<td>Surveillance Medical Officer Kathmandu (North) Field Office WHO-IPD</td>
</tr>
</tbody>
</table>

### WHO- Nepal

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr Sanjeeb Tamrakar</td>
<td>Administration and Programme Assistant WHO-IPD</td>
</tr>
<tr>
<td>Mr Radip Awale</td>
<td>IT Assistant WHO-IPD</td>
</tr>
</tbody>
</table>
Annex 3

Presentations made in the surveillance standard workshop

All presentations made in the workshop are available in the following link in the order of presentations made as per the agenda.

http://www.searo.who.int/entity/immunization/meetings/survstand2016/en/

The link to meeting documents in the webpage will require user name and password. Please find the username and password to access

<table>
<thead>
<tr>
<th>Username: mrvpd</th>
</tr>
</thead>
<tbody>
<tr>
<td>Password: mrvpd@2016</td>
</tr>
</tbody>
</table>
### Annex 4

**Key surveillance performance indicators for measles and rubella**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease incidence</td>
<td>The numerator is the confirmed number of measles or rubella cases for the year and the denominator is the population in which the cases occurred multiplied by 1 million. When the numerator is zero, the target incidence would be zero.</td>
</tr>
<tr>
<td>(i) Annual incidence of confirmed measles cases</td>
<td></td>
</tr>
<tr>
<td>(ii) Annual incidence of confirmed rubella cases</td>
<td></td>
</tr>
</tbody>
</table>

#### Indicators for high quality of epidemiologic surveillance of measles and rubella

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of surveillance units reporting measles and rubella data to the national level and on time (target: ≥ 80%)</td>
<td>The numerator is the number of surveillance units reporting on time and the denominator is the total number of surveillance units in the country multiplied by 100. [Remember that each reporting unit will report 52 times a year].</td>
</tr>
<tr>
<td>Reporting rate of non-measles non-rubella cases at the national level (target: ≥ 2 per 100 000 population)</td>
<td>The numerator is the number of discarded non-measles non-rubella cases and the denominator is the total population of the country multiplied by 100 000.</td>
</tr>
<tr>
<td>Proportion of second administrative level units reporting at least two non-measles non-rubella case per 100 000 (target: ≥ 80% of second-level administrative units)</td>
<td>The numerator is the number of subnational units reporting at least two discarded non-measles non-rubella cases per 100 000 and the denominator is the total number of subnational units multiplied by 100. Note: If the administrative unit has a population &lt; 100 000, the rate should be calculated by combining data over more than 1 year for a given administrative unit to achieve ≥ 100 000 person–years of observation.</td>
</tr>
<tr>
<td>Proportion of suspected cases with adequate</td>
<td>The numerator is the number of suspected cases of measles or rubella for which an adequate 1</td>
</tr>
<tr>
<td>Indicator</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| investigation\(^1\)  
(target: ≥ 80% of suspected cases) | investigation was initiated within 48 hours of notification and the denominator is the total number of suspected measles and rubella cases, multiplied by 100. |
| proportion of suspected cases with adequate specimen collection\(^2\)  
(target: ≥ 80% of suspected cases, excluding epidemiologically linked cases) | The numerator is the number of suspected cases from whom adequate specimens\(^2\) for detecting measles or rubella were collected and tested and the denominator is the total number of suspected measles or rubella cases multiplied by 100. [Epidemiologically linked cases should be removed from the denominator]. |
| proportion of specimens received at the laboratory within 5 days of collection  
(target: ≥ 80%) | The numerator is the total number of specimens received in the laboratory within 5 days of collection and the denominator is the total number of specimens received by the laboratory multiplied by 100. |
| proportion of laboratory-confirmed chains of transmission (defined as two or more confirmed measles cases) with specimens adequate for detecting measles virus collected and tested in an accredited laboratory  
(target: ≥ 80%) | The numerator is the number of chains of transmission for which adequate samples have been submitted for viral detection and the denominator is the number of chains of transmission identified. Note: Where possible, samples should be collected from at least 5–10 cases early in a chain of transmission and every 2–3 months thereafter if transmission continues. For virus isolation, adequate throat or urine samples are those collected within 5 days after rash onset. For virus detection using molecular techniques, adequate throat samples are those collected up to 14 days after onset of rash, and adequate oral fluid samples are those collected up to 21 days after onset of rash. |

\(^1\) An adequate investigation includes at a minimum collection of all of the following data from each suspected case of measles: name or identifiers, place of residence, place of infection (at least to district level), age (or date of birth), sex, date of rash onset, date of specimen collection, vaccination status, date of last vaccination, date of notification and date of investigation (excluding cases that are either confirmed as measles by epidemiological linkage or discarded as non-measles by being epidemiologically linked to another laboratory-confirmed case of communicable disease or by epidemiological linkage to a case negative for measles IgM) and travel history.

\(^2\) Adequate specimens for serology are those collected within 28 days after rash onset that consist of ≥ 0.5 ml serum or ≥ 3 fully filled circles of dried blood on a filter paper, or oral fluid. For oral fluid samples, the sponge-collection device should be rubbed for about 1 minute along the gum until the device is thoroughly wet; epidemiologically linked cases should be excluded from the denominator.
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators and suggested targets for epidemiologic surveillance quality for congenital rubella syndrome (CRS)</td>
<td>Reporting rate of suspected CRS cases at the national level (target: ≥ 1 per 10,000 live births) The numerator is the number of suspected CRS cases for the year and the denominator is the live birth cohort of the population in which the cases occurred multiplied by 10,000. When numerator is zero, the target incidence would be zero.</td>
</tr>
<tr>
<td>Proportion of suspected CRS cases with adequate investigation (target: ≥ 80% of suspected cases)</td>
<td>The numerator is the number of suspected CRS cases for which an adequate investigation was initiated after 3 months of age of the child and the denominator is the total number of suspected CRS cases, multiplied by 100. Adequate investigation defined as the collection of the following data points: name and/or identifier; place of residence; sex; date of birth; date of reporting; date of investigation; date of specimen collection; history of rash illness of mother; travel history of mother; vaccination history of mother; age of mother; clinical examinations for hearing impairment, cataract and congenital cardiac/heart defects and clinical outcome of the CRS case (alive or dead).</td>
</tr>
<tr>
<td>Proportion of suspected cases with adequate specimen collection (target: ≥ 80% of suspected cases)</td>
<td>The numerator is the number of suspected cases from whom adequate specimens for detecting CRS (IgM/IgG) were collected and tested and the denominator is the total number of suspected CRS cases multiplied by 100 [epidemiologically linked cases].</td>
</tr>
<tr>
<td>Proportion of confirmed cases with adequate specimen analysed for virus detection (target: ≥</td>
<td>The numerator is the number of lab-confirmed CRS cases for the year for which adequate specimen was analysed for viral detection and the denominator is the total number of lab-confirmed CRS cases.</td>
</tr>
</tbody>
</table>

3 Adequate specimens for serology are those collected within 12 months of age of the child that consist of ≥ 0.5 ml serum
### Indicators and suggested targets for laboratory performance

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% of confirmed cases)</td>
<td>multiplied by 100.</td>
</tr>
<tr>
<td>proportion of lab-confirmed cases with at least two negative tests for virus detection after 3 months of age, with at least a 1-month interval between tests (target: ≥ 80% of confirmed cases)</td>
<td>The numerator is the number of lab-confirmed CRS cases with at least two negative tests for virus detection after 3 months of age, with at least a 1-month interval between tests for the year and the denominator is the total number of lab-confirmed CRS cases, multiplied by 100.</td>
</tr>
<tr>
<td>Proportion of confirmed CRS cases detected within 3 months of birth.</td>
<td>The numerator is the number of confirmed CRS cases (clinical compatible and laboratory confirmed) detected within 3 months of birth and the denominator is the total number of lab-confirmed CRS cases, multiplied by 100.</td>
</tr>
<tr>
<td>Indicators and suggested targets for laboratory performance</td>
<td></td>
</tr>
<tr>
<td>Proportion of measles and rubella network laboratories that are WHO-accredited for serologic and, if relevant, for virologic testing (target: 100% of laboratories)</td>
<td>The numerator is the total number that is WHO-accredited for virologic and serologic testing and the denominator is the total number of labs (private and public) testing for MR in the geographic region.</td>
</tr>
<tr>
<td>Completeness and timeliness of monthly reporting (including zero reporting) to the WHO Regional Office for specimens received for serologic and virologic testing (target: ≥ 80% of specimens received in the</td>
<td></td>
</tr>
</tbody>
</table>

---

4 WHO measles laboratory accreditation criteria include (1) annual proficiency test results ≥ 90%; (2) at least 90% concordance of NML with RRL confirmatory testing; and (3) passing on-site inspection.
<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of specimens with serologic results reported by the laboratory within 4 days of receiving the specimen (target: ≥ 80% of specimens received)</td>
<td>The numerator is the total number of specimens for which laboratory results were available within 4 days of receiving the specimen and the denominator is the total number of specimen received for testing multiplied by 100, in the given year.</td>
</tr>
<tr>
<td>Proportion of laboratories (government and private) that conduct measles and rubella diagnostic testing that have adequate quality assurance mechanisms in place (target: 100% of laboratories)</td>
<td>The numerator is the total number of laboratories (government and private) that conduct measles diagnostic testing that have adequate quality assurance mechanisms in place and the denominator is the total number laboratories (government and private) that conduct measles diagnostic testing multiplied by 100, in the given year.</td>
</tr>
<tr>
<td>Proportion of virus detection and genotyping results (where appropriate) that are completed within 2 months of receipt of specimen (target: ≥ 80% of specimens received)</td>
<td>The numerator is the total number of virus detection and genotyping results (where appropriate) that are completed within 2 months of receipt of specimen and the denominator is the total number of specimen received for testing multiplied by 100, in the given year.</td>
</tr>
</tbody>
</table>
Annex 5

Core reporting variables for measles and rubella surveillance in SEAR

<table>
<thead>
<tr>
<th>Variable Name</th>
<th>Description</th>
<th>Field Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country</td>
<td>Country of Report</td>
<td>Text (ISO3 code)</td>
</tr>
<tr>
<td>CaseID</td>
<td>Case identification number</td>
<td>Defined by country</td>
</tr>
<tr>
<td>OutbreakID</td>
<td>Outbreak ID number</td>
<td>Defined by country</td>
</tr>
<tr>
<td>Province</td>
<td>Province</td>
<td>Defined by country</td>
</tr>
<tr>
<td>District</td>
<td>District</td>
<td>Defined by country</td>
</tr>
<tr>
<td>Block</td>
<td>Block</td>
<td>Defined by country</td>
</tr>
<tr>
<td>Sex</td>
<td>Sex</td>
<td>Text (option: F; M; U)</td>
</tr>
<tr>
<td>DOB</td>
<td>Date of birth</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>AgeYear</td>
<td>Age in Year (completed)</td>
<td>Number (format: ##)</td>
</tr>
<tr>
<td>DNOT</td>
<td>Date of notification to public health system</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DOI</td>
<td>Date of investigation</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DosesMCV</td>
<td>Number of doses measles containing vaccine</td>
<td>Number (format: ##)</td>
</tr>
<tr>
<td>DateLastMCV</td>
<td>Date of last dose of measles containing vaccine</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DosesRCV</td>
<td>Number of doses rubella containing vaccine</td>
<td>Number (format: ##)</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Description</td>
<td>Field Type</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>DateLastRCV</td>
<td>Date of last dose of rubella containing vaccine</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DOntsetF</td>
<td>Date of onset of fever</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DOntsetR</td>
<td>Date of onset of rash</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>CCC</td>
<td>Cough or coryza or conjunctivitis</td>
<td>Text (option: 1-Yes; 2-No; 9-Unknown)</td>
</tr>
<tr>
<td>LabCode</td>
<td>MR network laboratory code (given by SEARO)</td>
<td>Number (format: ##)</td>
</tr>
<tr>
<td>TypeSeroSpec</td>
<td>Type of serology specimen</td>
<td>1-Serum; 2-DBS; 3-Oral Fluid; 4-Other</td>
</tr>
<tr>
<td>DateSpecSero</td>
<td>Date of specimen collected for serology</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DateSeroSent</td>
<td>Date serology specimen sent to lab</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DateSeroRec</td>
<td>Date serology specimen received at lab</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>SpecIDSero</td>
<td>Unique ID of Serology specimen</td>
<td>Defined by Laboratory</td>
</tr>
<tr>
<td>MeaslesIgM</td>
<td>Measles IgM result</td>
<td>Text (option: 1-Positive; 2-Negative; 3-Equivocal; 4-Pending; 5-Not tested)</td>
</tr>
<tr>
<td>DateMeaIgMResult</td>
<td>Date serology result reported to the national programme</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>RubellalgM</td>
<td>Rubella IgM result</td>
<td>Text (option: 1-Positive; 2-Negative; 3-Equivocal; 4-Pending; 5-Not tested)</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Description</td>
<td>Field Type</td>
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<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>DateRubIgMResult</td>
<td>Date serology result reported to the national programme</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>TypeViroSpec</td>
<td>Type of virology specimen</td>
<td>1-Urine; 2-Throat Swab; 3-Oral Fluid; 4-Other</td>
</tr>
<tr>
<td>DateViroSpecColl</td>
<td>Date specimen collected for virology</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DateViroSent</td>
<td>Date virology specimen sent to lab</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>DateViroRec</td>
<td>Date virology specimen received at lab</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>SpecIDViro</td>
<td>Unique ID of virology specimen</td>
<td>Defined by Laboratory</td>
</tr>
<tr>
<td>MeaVirDetect</td>
<td>Measles virus detection</td>
<td>Text (option: 1-Positive; 2-Negative; 3-Pending; 4-Not tested)</td>
</tr>
<tr>
<td>GenotypeMea</td>
<td>Genotype of measles virus</td>
<td>Text</td>
</tr>
<tr>
<td>DateMeaGenoResult</td>
<td>Date measles genotyping result reported to national programme</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>RubVirDetect</td>
<td>Rubella virus detection</td>
<td>Text (option: 1-Positive; 2-Negative; 3-Pending; 4-Not tested)</td>
</tr>
<tr>
<td>GenotypeRub</td>
<td>Genotype of rubella virus</td>
<td>Text</td>
</tr>
<tr>
<td>DateRubGenoResult</td>
<td>Date rubella genotyping result reported to national programme</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>Variable Name</td>
<td>Description</td>
<td>Field Type</td>
</tr>
<tr>
<td>---------------</td>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>Class</td>
<td>Final classification for suspected measles</td>
<td>Text (option: 1-Clinically Confirmed Measles; 2-Laboratory Confirmed Measles; 3-Epidemiologically Confirmed Measles; 4-Laboratory Confirmed Rubella; 5-Epidemiologically Confirmed Rubella; 6-Discarded; 7-Pending)</td>
</tr>
<tr>
<td>SourceInfect</td>
<td>Classification based on source of infection</td>
<td>Text (option: 1-Endemic; 2-Imported; 3-Import related; 9-Unknown source)</td>
</tr>
<tr>
<td>TravelHistory</td>
<td>History of Travel</td>
<td>Text</td>
</tr>
<tr>
<td>Date30dFup</td>
<td>Date of 30 days follow-up</td>
<td>Date (format: DD-MM-YYYY)</td>
</tr>
<tr>
<td>Outcome</td>
<td>Outcome of patient</td>
<td>Text (option: 1-Alive; 2-Died; 3-Lost to Follow-up; 9-Unknown)</td>
</tr>
<tr>
<td>Comment</td>
<td>Any comments</td>
<td>Text</td>
</tr>
</tbody>
</table>
The regional workshop on surveillance standards for measles and other priority vaccine-preventable diseases (VPD) in South-East Asia was conducted from 19 to 23 September 2016 in Kathmandu, Nepal. The workshop was attended by the EPI programme managers, EPI programme officers, Surveillance Officers and Data managers from 10 Member States.

The workshop provided opportunities to the National EPI programme managers, surveillance managers and data managers from Member States to participate and provide inputs prior to the finalization of the regional standards for measles, rubella and other VPD surveillance. The workshop also provided a platform for experience sharing across Member States on surveillance performance, tools and technologies used and issues and challenges related to strengthening VPD surveillance. The workshop brought data managers, EPI programme managers and surveillance officers together to discuss on data quality issues and ways to streamline and integrate different data sources for measles, rubella and other VPD surveillance. The workshop also helped to build skills of the participants on the use of various related tools and data dictionaries through hands-on training.

This publication reports on the suggestion made on the MR and VPD surveillance standards made by the participants to finalize the document as well as on the conclusions, way forward and country action plans for 2017 developed by the representatives of Member States during the meeting to accelerate progress towards measles elimination and rubella and CRS control in WHO South East Asia Region.