Member States of the South-East Asia Region met in September 2013 to define which indicators they wished to include in their own case-based measles/rubella surveillance systems, as part of their initiative to meet the goal of measles and rubella/congenital rubella syndrome (CRS) elimination by 2020. They were asked to review a set of core variables and suggest changes, as appropriate. A set of core variables were agreed upon, so that when countries begin to submit case-based data to the Regional Office, the data are comparable.

Finally, the meeting concluded with the following recommendations:

- Countries yet to introduce rubella vaccine should put in place a plan for introduction at the earliest feasible time.
- Countries should hold national-level workshops/technical discussions on how to move from outbreak-based surveillance to case-based surveillance, including defining outbreak response.
- Countries should develop strategy documents on measles elimination and rubella/CRS control, with clear milestones and resource-needs estimates.
- Countries, particularly the large ones, should establish sentinel surveillance for CRS. Even if disease burden cannot be established for CRS, sentinel surveillance will allow assessment of vaccination impact in the future.
- In countries where capacity exists and resources are available, retrospective assessments for CRS burden should be considered.
- The WHO Regional Office for South-East Asia should organize a regional workshop on rubella/CRS in early 2014.
- Case-based reporting should be started from January 2014, with weekly reporting from subnational to national level, and from national level to the WHO Regional Office for South-East Asia.

Surveillance standards for measles and other priority vaccine-preventable diseases in South-East Asia

Report of a regional workshop
New Delhi, India, 23–27 September 2013
Surveillance standards for measles and other priority vaccine-preventable diseases in South-East Asia

Report of a regional workshop
New Delhi, India, 23–27 September 2013
# Contents

<table>
<thead>
<tr>
<th>Acronyms</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>v</td>
</tr>
<tr>
<td>Executive summary</td>
<td>vii</td>
</tr>
<tr>
<td>1. Background and objectives</td>
<td>1</td>
</tr>
<tr>
<td>2. Proceedings</td>
<td>2</td>
</tr>
<tr>
<td>2.1 Progress and challenges in meeting immunization goals</td>
<td>2</td>
</tr>
<tr>
<td>2.2 Progress on the implementation of “2012: Year of Intensification of Routine Immunization”</td>
<td>5</td>
</tr>
<tr>
<td>2.3 Regional overview of current measles and rubella/CRS surveillance</td>
<td>6</td>
</tr>
<tr>
<td>2.4 Global overview of status of measles, rubella/CRS, and related global surveillance experience</td>
<td>7</td>
</tr>
<tr>
<td>2.5 Best practices from measles surveillance in the Region of the Americas</td>
<td>8</td>
</tr>
<tr>
<td>2.6 Current status and future requirements in laboratory support for measles elimination and rubella/CRS control in the Region</td>
<td>9</td>
</tr>
<tr>
<td>2.7 Country presentations on VPD surveillance, with a focus on measles and rubella/CRS</td>
<td>11</td>
</tr>
<tr>
<td>2.8 Measles elimination and rubella/CRS control in the Region: goals, targets and indicators</td>
<td>15</td>
</tr>
<tr>
<td>2.9 Update on the other WHO regions</td>
<td>18</td>
</tr>
<tr>
<td>2.10 Overview of current global immunization coverage and VPD surveillance and reporting</td>
<td>21</td>
</tr>
<tr>
<td>2.11 Proposed indicators for measles/rubella/CRS surveillance for countries of the South-East Asia Region</td>
<td>22</td>
</tr>
<tr>
<td>2.12 CRS surveillance: opportunities and challenges for countries</td>
<td>28</td>
</tr>
<tr>
<td>2.13 Current practices in regional VPD surveillance data reporting</td>
<td>29</td>
</tr>
</tbody>
</table>
2.14 Discussion: given the challenges, what is needed to get case-based surveillance at the national level up and running? 31

3.15 Reporting of re-emerging VPDs (Japanese encephalitis, diphtheria, neonatal tetanus and pertussis) 32

2.16 Quality of surveillance data for “other” VPDs 34

2.17 Invasive bacterial vaccine-preventable diseases/rotavirus gastroenteritis surveillance update 35

2.18 Country team work: to elaborate a plan to make the transition to case-based surveillance for measles/rubella 36

3. Conclusion ......................................................................................................................... 37

4. Recommendations ........................................................................................................... 37

Annexes

1. Agenda and workshop objectives .................................................................................. 39

2. List of participants .......................................................................................................... 43

3. Proposed list of minimum indicators ............................................................................ 48

4. Basic minimum indicators and their definitions .......................................................... 49

5. Summary of country action plans ................................................................................ 53
# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERF</td>
<td>annual EPI reporting form</td>
</tr>
<tr>
<td>AFP</td>
<td>acute flaccid paralysis</td>
</tr>
<tr>
<td>CDC</td>
<td>United States Centers for Disease Control and Prevention</td>
</tr>
<tr>
<td>CHC</td>
<td>community health centre</td>
</tr>
<tr>
<td>CIF</td>
<td>case investigation forms</td>
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<tr>
<td>CRS</td>
<td>congenital rubella syndrome</td>
</tr>
<tr>
<td>DHS</td>
<td>Demographic and Health Surveys</td>
</tr>
<tr>
<td>EPI</td>
<td>Expanded Programme on Immunization</td>
</tr>
<tr>
<td>GAVI</td>
<td>GAVI Alliance (formerly the Global Alliance for Vaccines and Immunisation)</td>
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<tr>
<td>GIS</td>
<td>geographic information system</td>
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<td>GVAP</td>
<td>Global Vaccine Action Plan</td>
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<td>HP</td>
<td>health post</td>
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<td>HPV</td>
<td>Human papillomavirus</td>
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<tr>
<td>IgM</td>
<td>immunoglobulin M</td>
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<tr>
<td>IPV</td>
<td>inactivated polio vaccine</td>
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<tr>
<td>JRF</td>
<td>Joint Reporting Form</td>
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<tr>
<td>LIS</td>
<td>laboratory information system</td>
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<tr>
<td>MCV</td>
<td>measles containing vaccine</td>
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<tr>
<td>MLIS</td>
<td>measles laboratory information system</td>
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<tr>
<td>MMR</td>
<td>measles, mumps and rubella</td>
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<tr>
<td>MRCV</td>
<td>measles rubella containing vaccine</td>
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<tr>
<td>MTAGI</td>
<td>Maldives Technical Advisory Group on Immunization</td>
</tr>
<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>PCV</td>
<td>pneumococcal conjugate vaccine</td>
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<tr>
<td>RCV</td>
<td>rubella-containing vaccine</td>
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<tr>
<td>SAGE</td>
<td>Strategic Advisory Group of Experts</td>
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<td>SEAR</td>
<td>WHO South-East Asia Region</td>
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<tr>
<td>SIA</td>
<td>supplementary immunization activities</td>
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<td>SIDAS</td>
<td>South-East Asia Integrated Data Analysis System</td>
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<td>SoP</td>
<td>standard operating procedures</td>
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<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>VPD</td>
<td>vaccine-preventable disease</td>
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<td>WHO</td>
<td>World Health Organization</td>
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Executive summary

Member States of the South-East Asia Region met in September 2013 to define which indicators they wished to include in their own case-based measles/rubella surveillance systems, as part of their initiative to meet the goal of measles and rubella/congenital rubella syndrome (CRS) elimination by 2020. For purposes of jumpstarting that discussion, it was proposed to consider the following definition: case-based measles/rubella surveillance is enhanced measles/rubella surveillance, where: case-based reporting of every clinically-suspected measles case with the results of laboratory testing, and “zero” reporting, and not merely confirming a few cases by laboratory testing and then reporting of aggregate numbers as is currently done. This means tracing all cases, and obtaining personal and epidemiological details of each case in order to establish chains of transmission.

The countries participated in group discussions to review the minimum surveillance indicators, to assess if they were appropriate and sufficient, and to propose additions or deletions. They were asked to review a set of core variables and suggest changes, as appropriate. The outcome of the group work is summarized in the following agreed-upon definitions:

Definitions

For the purpose of case-based surveillance for measles and rubella in the South-East Asia Region, a suspected measles case definition will be used as the starting point. However, the testing algorithm will include testing first for measles, and all measles-negative samples will be automatically tested for rubella.

A suspected measles case

A suspected measles case is any person in whom a health worker suspects measles, or any person with fever and maculopapular rash (non-vesicular) with cough, coryza or conjunctivitis.
A suspected measles outbreak

A suspected measles outbreak is the occurrence of five or more suspected measles cases over a period of 1 month in a population size of at least 100 000. [However, countries that are already advanced in their measles elimination activities, lower than five suspected cases may be used].

A confirmed measles outbreak

A confirmed measles outbreak is the occurrence of three or more laboratory-confirmed measles cases over a period of 1 month in a population size of at least 100 000; and, even in situations where less than three laboratory cases are confirmed, if epidemiologically-linked, it would still be considered an outbreak.

[In a large outbreak, in order to manage the pressure on laboratories, 10 cases will be tested by serology. If an outbreak has fewer than 10 cases, all should be tested].

An adequately investigated measles outbreak

An outbreak is considered adequately investigated when the following activities are completed:

- initial visit to the cases within 48 hours;
- house-to-house search for cases within 1 week;
- information collected on all core epidemiological data variables;
- samples for serology from 10 suspect cases, or all suspected cases if less than 10 cases, collected;
- urine and nasopharyngeal samples are collected from at least five suspected cases.

Case classification

(1) **Laboratory-confirmed**: A case that meets the clinical case definition and is laboratory-confirmed.

(2) **Epidemiologically confirmed**: A case that meets the clinical case definition and is linked to a laboratory-confirmed case.
(3) **Clinically confirmed**: A case that meets the clinical case definition and for which no adequate blood specimen was taken.

(4) **Discarded non-measles non-rubella**: A suspected case that has been investigated and discarded as non-measles non-rubella using:

- laboratory testing in a proficient laboratory, or
- epidemiological linkage to a laboratory-confirmed outbreak of another communicable disease that is neither measles nor rubella.

A set of core variables were also discussed and agreed so that data from countries are comparable when countries begin to submit case-based data to the Regional Office. Finally, the meeting concluded with the following recommendations and next steps:

1. Countries yet to introduce rubella vaccine should put in place a plan for introduction at the earliest feasible time.

2. All countries should hold national-level workshops/technical discussions on how to move from outbreak-based surveillance to case-based surveillance, including defining outbreak response.

3. All countries should develop a measles elimination and rubella/CRS control strategy document, with clear milestones and resource-needs estimates.

4. Countries, particularly the large countries, should establish sentinel surveillance for CRS. Even if disease burden cannot be established for CRS, sentinel surveillance will allow assessment of vaccination impact in the future.

5. In countries where capacity exists and resources are available, retrospective assessments for CRS burden should be considered.

6. WHO Regional Office for South-East Asia should organize a regional workshop on rubella/CRS in early 2014.

7. Starting case-based reporting from January 2014 with weekly reporting from subnational to national level, and from national level to the WHO Regional Office for South-East Asia.
1. Background and objectives

Since 2003, Member States of the WHO South-East Asia Region have been pursuing measles mortality reduction goals. Tremendous progress has been made, with some countries having almost eliminated measles. With the Region on the verge of polio-free certification, and being the only WHO region that had not set a target measles elimination goal, Member States were in agreement that the time had come to set a regional measles elimination goal.

A regional consultation held in New Delhi, India in August 2009 established the technical, biological and programmatic feasibility of measles elimination by 2020 in South-East Asia. In 2010, the World Health Assembly committed to reduce measles mortality by 95% by 2015 compared to 2000, and encouraged all countries to strive to achieve 90% coverage of first dose measles-containing vaccine (MCV1) nationally and at least 80% coverage subnationally, also by 2015. One WHO region has already eliminated both measles and rubella, and all other regions have set time-bound goals to achieve the same.

In 2010, the Sixty-third Session of the Regional Committee for South-East Asia encouraged Member States to accelerate measles mortality reduction strategies to achieve the World Health Assembly-endorsed interim measles targets for 2015 and pursue measles elimination; however, the Sixty-third Regional Committee did not establish a target year for measles elimination. In 2012, the Regional Committee decided that it would consider a measles elimination and rubella control goal for the Region at its Sixty-sixth Session in September 2013. A regional consultation held in Kathmandu, Nepal in February 2013 reaffirmed the technical and programmatic feasibility of measles elimination and rubella/congenital rubella syndrome (CRS) control by 2020. The South-East Asia Regional Immunization Technical Advisory Group (SEAR ITAG) endorsed this target at its meeting in April 2013. The Regional Committee at its Sixty-sixth Session officially adopted a measles elimination goal for the South-East Asia Region, joining the other WHO regions in defining a specific timeline for measles elimination.
As the Region now moves toward the goal of measles elimination and rubella/CRS control by 2020, an agreement on the implementation of case-based surveillance as well as a consensus on definitions and core variables are required, with inputs from all countries. To this end, the general objectives of this workshop were:

- to review progress in immunization and vaccine-preventable disease (VPD) control in the Region;
- to review the progress of polio surveillance in relation to the Polio Eradication and Endgame Strategic Plan 2013–2018;
- to review the status of measles, rubella and CRS surveillance and agree on case definitions, targets, performance indicators, recording and reporting tools, core variables to be reported, reporting frequency and electronic data transfer system;
- to review the status of surveillance of other priority VPDs;
- to discuss mechanisms for aligning country reporting on key surveillance indicators with those in the Global Vaccine Action Plan’s (GVAP) Monitoring and Evaluation/Accountability Framework.

The workshop’s agenda and list of participants are available as Annexes 1 and 2, respectively.

2. **Proceedings**

2.1 **Progress and challenges in meeting immunization goals**

Countries were reminded of key global and regional immunization goals and targets, including:

- global polio eradication (by 2014) and certification (by 2018);
- regional polio-free certification (by 2014);
- measles and rubella elimination in at least five WHO regions by 2020;
- regional measles elimination and rubella/CRS control (by 2020) in SEAR;
 global neonatal tetanus elimination (by 2015);
 third dose of diphtheria–tetanus–pertussis (DTP3) coverage target – 90% nationally and 80% in every district (by 2015);
 all vaccines coverage target – 90% nationally and 80% in every district (by 2020).

The South-East Asia Region was commended for tremendous progress made on the polio eradication front, having been polio-free for 32 months. While the Region is clearly on track for polio-free certification at the end of February 2014, a number of countries (including Bangladesh, India and Nepal) conducted national polio immunization days in 2013, and have plans to continue in 2014.

On 13 September 2013, the Regional Committee for South-East Asia endorsed a measles elimination and rubella/CRS control goal by 2020. Although countries may not achieve World Health Assembly interim goals for 2015, the Region remains on the correct trajectory; countries have been working towards measles elimination (as demonstrated by various indicators) even in the absence of a regional target. Additionally, the Region has a strong measles laboratory network in place as well as an acute flaccid paralysis (AFP) surveillance network, which can be maximized towards the new elimination target. Countries are encouraged to accelerate their activities, with less than seven years left before the target timeline, to achieve at least 95% population immunity for measles. Several significant challenges to reaching this target timeline exist which include: (a) complex operational issues at the country level; (b) challenges presented by case-based surveillance and CRS surveillance; and (c) identifying the additional resources needed to support this surveillance network.

Despite issues and challenges in scaling up activities related to measles elimination, a number of milestones have already been achieved. Currently Bhutan, the Democratic People’s Republic of Korea and Maldives may have eliminated measles. Sri Lanka may have eliminated both measles and rubella. A measles–rubella (MR) campaign is planned in Bangladesh for February 2014, targeting 52 million children aged 9 months to 15 years. Myanmar is also planning an MR campaign in 2014 targeting 23 million children aged 9 months to 18 years, with further plans to introduce MR in the routine schedule in 2015. India has demonstrated accelerated efforts towards measles elimination by introducing a second dose of measles
vaccine (MCV2), targeting 139 million children in 14 states, through campaigns. In the remaining states that did not conduct measles immunization campaigns, MCV2 was introduced through the routine schedule. India has also recently launched outbreak-based measles surveillance in Uttar Pradesh, in addition to 11 other states where outbreak-based surveillance already exists. Overall, the estimated measles incidence rate in the South-East Asia Region reflected a downward turn between 2000 and 2012. Clearly the Region is already on the right trajectory to meet the elimination target of 2020.

In 2010, 58,000 newborns died from neonatal tetanus worldwide, a reduction of 93% since the late 1980s. However, a number of important global issues remain for neonatal tetanus elimination. For example, it is still not clear if this elimination goal is a priority, as reflected by the target shift (from 1995 to 2000, to 2005, to 2015). Globally, 40 countries were still to achieve elimination as of 2010, with India and Indonesia in the South-East Asia Region still to be validated as of 2013.

The DTP3 coverage target of 90% nationally and 80% in every district has not shown significant progress. Coverage across the countries has remained stagnant over the past 6 years, which represents approximately 9 million missed children each year. Opportunities to address this are multiple, including: the Year of Intensification of Routine Immunization (2012); the Decade of Vaccines and GVAP; GAVI Alliance funding for health system strengthening and new and underutilized vaccines; and, now, the regional measles elimination target.

The “all vaccine” coverage target of 90% nationally and 80% in every district was discussed. Regional achievements include: 10 out of 11 countries using Haemophilus influenza type B (Hib) pentavalent vaccine (India and Indonesia partially); all countries using Hepatitis B vaccine; 7 countries using MR vaccine; 4 countries using Japanese encephalitis vaccine; 1 country using human papillomavirus (HPV) vaccine; 2 countries having been approved for pneumococcal conjugate vaccine (PCV) in 2014; and 1 country undertaking a rotavirus vaccine pilot.

In summary, two critical areas remain for countries’ immediate attention. To achieve polio-free certification, it is important to maintain high population immunity, maintain high levels of AFP surveillance,
conduct regular risk assessments, and make decisions on the trivalent oral polio vaccine (tOPV) to bivalent oral polio vaccine (bOPV) switch and introduction of inactivated polio vaccine (IPV). To achieve the measles elimination goal, countries will need to agree on a number of important areas including definitions and indicators, core variables to be reported on, and reporting frequency.

2.2 Progress on the implementation of “2012: Year of Intensification of Routine Immunization”

Member States were reminded that the targets of the “2012: Year of Intensification of Routine Immunization” were that all countries in the South-East Asia Region strive to achieve at least 90% national immunization coverage and at least 80% district-level coverage (subnational level) for at least six basic antigens as measured by the coverage of DPT3/pentavalent vaccine. As of August 2013, the full impact of the Year of Intensification of Routine Immunization remained to be seen as data were not yet fully available. What is known is that countries with higher national coverage (more than 95%) will not see a visible increase at the national level, and high-priority countries (India, Indonesia and Timor-Leste) will probably see an increase in national coverage. The impact of intensification efforts on regional coverage will vary, with the effect most notably seen at the subnational level. Several countries were showcased, demonstrating various innovative approaches in intensification of routine immunization, namely India, Indonesia, Nepal and Timor-Leste.

A number of suggestions emerged on how to increase coverage through intensification of routine immunization, including:

- countries could concentrate more on areas where coverage is comparatively low, and specifically aim at dropouts and reaching unreached children through routine services;
- orienting staff, with special emphasis on those in poorly performing areas;
- mapping resources and making corrections to meet the needs in real time;
monitoring vaccination sessions and vaccine distribution through internal reviews, and evaluating immunization coverage at regular intervals;

- consolidating partner support to countries.

### 2.3 Regional overview of current measles and rubella/CRS surveillance

The regional overview of measles and rubella/CRS surveillance set the stage for participants to consider the issues to be addressed as countries move towards the 2020 measles elimination goal. These issues include reviewing current data collection requirements, reaching consensus on frequency of reports and outputs and, most importantly, initiating discussions on future VPD surveillance requirements. The countries will need to strengthen their surveillance systems, and develop and implement more comprehensive monitoring indicators, including increased reporting frequencies.

In addition to reviewing the various forms submitted to the Regional Office for South-East Asia, countries were reminded of the utility of the current types of data and the frequency of reporting, as summarized in the table below.

<table>
<thead>
<tr>
<th>VPD report</th>
<th>Data type</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polio</td>
<td>AFP cases</td>
<td>Weekly</td>
</tr>
<tr>
<td>Polio</td>
<td>Laboratory report</td>
<td>Weekly</td>
</tr>
<tr>
<td>Measles and rubella</td>
<td>Case-based report</td>
<td>Bangladesh, Nepal, Myanmar</td>
</tr>
<tr>
<td>Measles and rubella</td>
<td>Aggregate data</td>
<td>Monthly</td>
</tr>
<tr>
<td>Other VPDs</td>
<td>Aggregate</td>
<td>Monthly</td>
</tr>
<tr>
<td>Invasive bacteria diseases/rotavirus</td>
<td>Aggregate</td>
<td>Quarterly</td>
</tr>
<tr>
<td>WHO/UNICEF JRF and WHO-SEARO IVD AERF</td>
<td>Aggregate</td>
<td>Annual</td>
</tr>
<tr>
<td>Outbreaks</td>
<td>Aggregate</td>
<td>Monthly</td>
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</tbody>
</table>

JRF: joint reporting form; AERF: annual EPI reporting form
2.4 Global overview of status of measles, rubella/CRS, and related global surveillance experience

Globally, measles incidence is down by 77%, to 32.9 per million in 2012 compared to 142 per million in 2000. However, there have been set backs along the way. For example, the Region of the Americas had an increase in measles cases in 2010 and 2011, related to importations from Europe. The African and European regions also had resurgences in measles cases in 2010 and 2011, with many cases in older age groups. This resurgence seems to have resulted from variable quality/delays in implementing follow-up supplementary immunization activities (SIAs); gaps in immunization service delivery; insufficient resource mobilization; conflicting social and health sector priorities; and vaccine hesitancy/resistance. In contrast, the Western Pacific Region has seen a steady decrease in cases, as a result of successful SIAs in China and other countries.

WHO recommends that countries take the opportunity offered by accelerated measles control and elimination activities to introduce rubella-containing vaccine (RCV). The preferred approach is for countries to start with MR or measles, mumps and rubella (MMR) vaccine in a wide-age-range campaign, followed by the introduction of MR/MMR into the routine immunization programme. Countries introducing RCV should achieve and maintain immunization coverage of at least 80%, with RCV delivered through routine immunization services and/or regular SIAs. In November 2012, the Strategic Advisory Group of Experts (SAGE) on Immunization spoke of recent GAVI Alliance investments in measles and rubella control and welcomed the significant additional resources for increasing routine coverage, MR and measles SIAs, and timely outbreak response vaccination. SAGE went on to recommend that countries seize this unique opportunity and commit additional national resources to ensure that programme planning and implementation are of the highest quality. Furthermore, each campaign should follow established “best practices” and be independently evaluated to ensure homogeneous vaccination coverage of at least 95%.

In summary, remarkable progress has been made globally on the measles and rubella front, with an 86% drop in deaths and 94% drop in measles cases since the 1980s. However, there remain a number of opportunities to further accelerate progress.
2.5 Best practices from measles surveillance in the Region of the Americas

In the Region of the Americas, 30 000 reporting sites exist as part of the integrated measles/rubella surveillance network. Case-based community surveillance has also been developed with the capacity to have data flow directly to the Regional Office. The surveillance network is supported by 148 subnational, national and regional laboratories. In addition, the Pan American Health Organization has placed 14 field epidemiologists in priority countries.

The Pan American Health Organization’s definition of measles elimination is the interruption of endemic measles virus transmission in all the countries of the Americas for at least 12 months, in the presence of high-quality surveillance. Rubella elimination is defined as the interruption of endemic rubella virus transmission in all the countries of the Americas for at least 12 months without the occurrence of CRS cases associated with endemic transmission, in the presence of high-quality surveillance.

Laboratory challenges are an area requiring attention in the elimination era. Namely, a serum specimen and at least one specimen for viral isolation should be obtained from each suspect measles or rubella case at first contact with the patient. An adequate specimen for virus isolation allows for the genetic characterization of the virus, which is necessary to improve information in the sequencing database for measles and rubella viruses currently circulating in the Region. Part of the Pan American Health Organization’s strategy also includes the collection of serum and viral samples from “hot cases” in tourist and industrialized areas – those having a travel history, those in border areas with high traffic, and those suspected cases with a high likelihood of exposure.

In summary, the experience of the Region of the Americas yields a number of lessons learned that could also be applied in some South-East Asia Region contexts. One such lesson is that measles elimination is an excellent opportunity to also eliminate rubella, while protecting measles gains. Furthermore, integrated surveillance is a “win-win” – it unmasksthe hidden rubella/CRS problem and also helps to improve primary health care. Also critical are indicators for monitoring performance, feedback from the countries, and the ability to rapidly detect and control importations.
2.6 Current status and future requirements in laboratory support for measles elimination and rubella/CRS control in the Region

The measles and rubella laboratory network in the South-East Asia Region is a part of the WHO global network. It was initiated in 2003 with eight laboratories, and has expanded to include 36 laboratories. The network comprises one regional reference laboratory in Thailand, two national reference laboratories in India, at least one national laboratory in each Member State except India (with eight) and Indonesia (with four), and 13 subnational laboratories in Thailand. Out of these 36 laboratories, 21 are already WHO-accredited, 13 in Thailand are under the supervision of the WHO-accredited laboratory in Thailand, and two are planning an accreditation visit.

Each laboratory is responsible for establishing and maintaining “proficient laboratory” status. The laboratories support case confirmation by serology testing and identify genotypes of measles and rubella viruses circulating in the Region. The role of the laboratory network is very important in the verification process of measles elimination. Ultimately, the laboratory network will be responsible for documenting the interruption of endemic transmission and detecting imported and import-related cases.

Quality indicators on the current status of the laboratory network, as regards to measles and rubella/CRS control, indicate that the network has the competency to support high-quality surveillance in the Region. The number of specimens tested from 2009 to 2012 reflects great variation among the various laboratories, with some high volume laboratories testing more than a thousand specimens per year.

The Sixty-sixth Regional Committee for South-East Asia adopted Resolution SEA/RC66/R5 in September 2013, calling for Member States to strengthen surveillance systems, including laboratory capacity, to achieve the goal of measles elimination and rubella/CRS control by 2020. To help meet this elimination goal, the measles and rubella laboratory network will be required to develop a plan for increasing capacity. The quality indicators that will be used as markers of increased laboratory capacity are as follows.

- Timeliness of reporting laboratory results: measles immunoglobulin M (IgM) testing results reported by the
laboratory within four days of specimen receipt (target: equal to or more than 80%). Reduction in reporting time of measles IgM results to programme (from seven days to four days) will start by January 2014.

- The accuracy of measles and rubella IgM detection determined by the agreement in test results on sera submitted by the national laboratory and subnational laboratory to the regional reference laboratory or national reference laboratory, as appropriate (target: equal to or more than 90%).

- Proficiency testing results for measles and rubella IgM reported within 14 days of panel receipt and the score on the most recent WHO proficiency test is equal to or more than 90%.

- Virus detection and genotyping results completed within two months of receipt of specimen and data reported to the WHO Regional Office for South-East Asia (target: equal to or more than 80%).

- The score from the annual on-site review of laboratory operating procedures and practices is equal to or more than 80% for the national laboratory and equal to or more than 90% for the regional reference laboratory.

The genotype distribution of measles in the South-East Asia Region (excepting Bangladesh, Bhutan, Democratic People’s Republic of Korea and Timor-Leste) is D4, D5, D7, D8, D9, G2 and G3. The rubella genotypes are 2B and 1E (including Bangladesh, India, Nepal, Sri Lanka and Thailand only).

All Member States agree that there will have to be a surge in laboratory capacity in order to meet the demands of the case-based surveillance system required to reach the measles elimination goal by 2020. In order to enhance laboratory capacity, Member States are encouraged to conduct assessment exercises to better understand the implications of resource requirements (including human, material and financial) to support the increased numbers of tests as a result of launching case-based surveillance.
2.7 Country presentations on VPD surveillance, with a focus on measles and rubella/CRS

The table below reflects a summary of the goals, targets and key challenges as presented by the 10 countries (the Democratic People’s Republic of Korea was not present) on their current VPD surveillance networks, with a focus on measles and rubella/CRS.

<table>
<thead>
<tr>
<th>Country</th>
<th>Goals and targets</th>
<th>Key challenges</th>
</tr>
</thead>
</table>
| Bangladesh| Achieve national level 95% measles vaccination coverage and reach measles elimination status by 2016. Achieve national level 95% vaccination coverage and decrease rubella cases by 90% by 2016 compared to 2010. | a) The national non-measles suspected measles reporting rate is more than 2 per 100 000. However, there are around five under-reporting districts each year.  
b) Nationally, overall completeness and timeliness are above targets. However, completeness is less than 90% in eight districts and timeliness is less than 80% in 10 districts.  
c) Two databases are maintained, for cases reported from health facilities and cases from outbreaks. |
<p>| Bhutan    | Measles and rubella elimination by 2016.                                         | a) Inadequate case notification/reporting.                                                                 |
|           |                                                                                   | b) Transportation of suspected MR samples from health facilities to national MR laboratory for testing. |
|           |                                                                                   | c) Weak supervision and monitoring at district level.                                                    |
|           |                                                                                   | d) Limited national reference laboratory capacity for MR.                                              |
|           |                                                                                   | e) Limited financial support to train all health workers on revised MR guidelines.                     |
|           |                                                                                   | f) Inconsistent surveillance data.                                                                      |</p>
<table>
<thead>
<tr>
<th>Country</th>
<th>Goals and targets</th>
<th>Key challenges</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>Mortality reduction target of 95% by 2015.</td>
<td>a) Expansion of laboratory-supported surveillance to all states in the country.</td>
</tr>
<tr>
<td></td>
<td>Measles elimination target of 2020.</td>
<td>b) Integrating data from various surveillance systems.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Transitioning from outbreak to case-based surveillance with a revised surveillance guideline.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Defining surveillance indicators to monitor surveillance quality.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Securing adequate trained staff and funding to achieve and maintain high-quality surveillance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f) Apart from surveillance challenges, there are other immunizations challenges for elimination target.</td>
</tr>
<tr>
<td>Indonesia</td>
<td>National measles elimination goal by 2018. Establishment a rubella/CRS prevention goal in 2017.</td>
<td>a) Measles/rubella issues:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- private practitioners</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- electronic individual case report</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- expand measles/rubella laboratories</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- case definitions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- rubella outbreaks.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) CRS surveillance:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- sentinel surveillance at teaching hospitals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- retrospective survey (every year), one hospital in each province</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- routine immunization integrated with neonatal visit.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Laboratory:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- laboratory confirmation testing in only a small percentage</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- laboratory logistics are few.</td>
</tr>
<tr>
<td>Country</td>
<td>Goals and targets</td>
<td>Key challenges</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Maldives</td>
<td>Measles elimination by 2015.</td>
<td>a) Data collection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Monitoring surveillance data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Outbreak detection, investigation, reporting, management and response.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Laboratory confirmation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Availability of SoPs for different tasks.</td>
</tr>
<tr>
<td>Myanmar</td>
<td>To reach global and regional elimination targets for VPDs and to meet regional goal of measles elimination and rubella/CRS control by 2020.</td>
<td>a) Data collection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Monitoring surveillance data.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Outbreak detection, investigation, reporting, management and response.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Laboratory confirmation.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Availability of SoPs for different tasks.</td>
</tr>
<tr>
<td>Nepal</td>
<td>To initiate measles elimination and rubella control by 2016.</td>
<td>a) Expansion of case-based surveillance:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- only one accredited laboratory (National Public Health Laboratory);</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- expansion of case-base sites is challenging due to difficult terrain, lack of laboratory facilities in health posts/sub-health posts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- sample collection and transportation from remote districts.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Introduction of MCV2 into routine immunization schedule and type of vaccine still to be decided.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Mobilization of resources for expanding case-based surveillance.</td>
</tr>
<tr>
<td>Country</td>
<td>Goals and targets</td>
<td>Key challenges</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Measles and rubella/CRS elimination by 2018.</td>
<td>None listed.</td>
</tr>
<tr>
<td>Thailand</td>
<td>Measles elimination goal by 2020.</td>
<td>a) Disease surveillance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Routine surveillance versus Measles Elimination.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Develop reporting system to link Thai web-based system with the Measles Laboratory Information System.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Accredit proficiency testing scheme using by ISO/IEC 17043.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Subnational laboratory participation and develop external quality assessment by national laboratory.</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>Achieve and maintain 90% immunization coverage including measles by 2015. To maintain polio-free status. To reduce estimated measles mortality by 90% by 2015 and achieve regional elimination by 2020.</td>
<td>a) Inadequate staff and capacity for achieving high-quality case-based surveillance at all levels.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>b) Yet to establish a system to systematically monitor coverage, completeness and timeliness of the reporting system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>c) Laboratory confirmation of measles and rubella cases takes place at only national level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>d) Timely transportation of specimens, due to poor condition of the road network and transport system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>e) Fair percentage of population seeks native treatment for illness such as measles and rubella.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>f) Lack of adequate operational resources for regular supervision and reviews.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>g) Improving the system with overall system strengthening and capacity development.</td>
</tr>
</tbody>
</table>
Despite the challenges, Member States of the Region have been on the right trajectory to eliminate measles and control rubella/CRS, even before the endorsement of Resolution SEA/RC66/R5. Since 2005, countries have been conducting large-scale measles catch-up campaigns that have reached hundreds of millions of children, resulting in a significant decline in measles mortality and morbidity. Several countries have already embarked on measles elimination efforts, even without a stated goal and timeframe to do so. Member States have vast experience in mass campaigns and in VPD surveillance, and in some countries the existing polio infrastructure and resources are already being used to strengthen routine immunization and measles/rubella surveillance. The table shows key milestones reached, demonstrating ongoing efforts related to measles elimination and rubella control targets.

The countries share common challenges, including:

- lack of support/commitment from local leaders for global/regional goals;
- variable resources among provinces and districts, particularly in those countries where health services are largely decentralized;
- lack of human resources, coupled with high staff turnover;
- financial constraints, which have implications on: health-worker training, upgrading current guidelines and standards of practice, RCV introduction, and the transition from outbreak surveillance to case-based surveillance.

### 2.8 Measles elimination and rubella/CRS control in the Region: goals, targets and indicators

The Member States were reminded of the commitments made by their policy-makers at the Regional Committee meeting in September 2013, and that Resolution SEA/RC66/R5 represented a culmination of years of effort. In August 2009, a regional consultation held in New Delhi, India, established the technical, biological, and programmatic feasibility of eliminating measles in the Region by 2020. In February 2013, a regional consultation held in Kathmandu, Nepal, reaffirmed consensus on the feasibility of measles elimination and rubella control by 2020. This was further supported in April 2013 at the SEAR ITAG meeting when the 2020 goal was endorsed. Subsequently, in July 2013, the High-level Preparatory Meeting for the Regional Committee proposed a resolution on the 2020 goal for consideration of the Regional Committee at its Sixty-sixth Session to be held in September 2013.
<table>
<thead>
<tr>
<th></th>
<th>Bangladesh</th>
<th>Bhutan</th>
<th>Democratic People's Republic of Korea</th>
<th>India</th>
<th>Indonesia</th>
<th>Myanmar</th>
<th>Maldives</th>
<th>Nepal</th>
<th>Sri Lanka</th>
<th>Thailand</th>
<th>Timor-Leste</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rubella introduced</strong></td>
<td>2012</td>
<td>2006</td>
<td>No</td>
<td>No/Yes</td>
<td>No</td>
<td>2014</td>
<td>2007</td>
<td>Yes</td>
<td>1996</td>
<td>1986</td>
<td>No</td>
</tr>
<tr>
<td><strong>MCV/MR 1 (at age)</strong></td>
<td>9 mths</td>
<td>9 mths</td>
<td>9 mths</td>
<td>9–12 mths</td>
<td>9 mths</td>
<td>9 mths</td>
<td>9 mths</td>
<td>1 yr</td>
<td>9 mths</td>
<td>9 mths</td>
<td></td>
</tr>
<tr>
<td><strong>MCV/MR 2 (at age)</strong></td>
<td>15–18 mths</td>
<td>24 mths</td>
<td>15 mths</td>
<td>24 mths</td>
<td>18 mths</td>
<td>18 mths</td>
<td>No</td>
<td>3 yrs</td>
<td>2.5 yrs</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td><strong>National MCV coverage target</strong></td>
<td>95%</td>
<td>95%</td>
<td>95%</td>
<td>100%</td>
<td>90%</td>
<td>95%</td>
<td>100%</td>
<td>95%</td>
<td>95%</td>
<td>95%</td>
<td>90%</td>
</tr>
<tr>
<td><strong>Subnational MCV coverage target</strong></td>
<td>90%</td>
<td>95%</td>
<td>95%</td>
<td>100%</td>
<td>80%</td>
<td>80%</td>
<td>100%</td>
<td>80%</td>
<td>95%</td>
<td>95%</td>
<td></td>
</tr>
<tr>
<td><strong>Measles elimination strategy document</strong></td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>No. of laboratory (s)</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>11</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>14</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Case-based surveillance</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No/Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
The regional measles elimination goal for 2020 outlines clear strategies, as follows.

1. Achieve 90% coverage nationally and 80% subnationally with two doses of measles and rubella vaccination (while the SEAR countries acknowledge the global target of 95%, the conclusion was to set more practical targets in this region).

2. Establish case-based surveillance with adequate laboratory support.

3. Ensure plans for prevention of outbreaks.

4. Provide linkages with other child health interventions.

5. Increase public confidence and demand for immunization.

Member States were reminded that the focus of the workshop was on standards for case-based measles/CRS surveillance in the Region, to meet the elimination goal of 2020. The workshop was designed to start the dialogue with countries on goals, targets, and indicators; core variables and lower-level surveillance indicators; reporting requirements and frequency of reporting; planning for the next 2–3 years; identifying needs for support; and starting case-based surveillance in countries from January 2014.

The regional measles elimination and rubella/CRS control goal includes specific targets for the Member States in the areas of disease burden, immunization and surveillance, as outlined in the table below.

<table>
<thead>
<tr>
<th>Targets</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease burden</td>
<td>Reduce measles mortality by 95%, compared to 2000 estimates.</td>
<td>“Zero” endemic measles transmission in a defined geographical area (e.g. region or country) for at least 12 months in the presence of a well performing surveillance system.</td>
</tr>
<tr>
<td></td>
<td>Reduce measles incidence to &lt;5 cases per million population.</td>
<td>More than 95% reduction in rubella/CRS cases compared to 2008 estimates.</td>
</tr>
<tr>
<td></td>
<td>50% reduction in rubella/CRS cases compared to 2008 estimates.</td>
<td></td>
</tr>
</tbody>
</table>
In summary, it was reaffirmed that the rubella/CRS control targets are also achievable by 2020 due to a number of factors, including: integrated measles and rubella strategies; 95% efficacy of a single dose of rubella vaccine; and, the increasing trend towards the use of MR/MMR vaccine. Therefore, when measles is eliminated, and with the use of the MR vaccine, rubella/CRS will certainly be well-controlled if not eliminated.

2.9 Update on the other WHO regions

Although there have been evolving global norms and indicators, the global strategic plan shared by all WHO regions is to reduce global measles mortality by at least 95% by end-2015 compared with 2000 estimates, and
achieve regional measles and rubella/CRS elimination goals. Milestones to this end are:

- to reduce annual measles incidence to less than 5 cases per million, and maintain that level;
- 90% coverage with MCV1 (and MRCV as appropriate) nationally and more than 80% vaccination coverage in every district or equivalent administrative unit;
- 95% coverage with measles, MR or MMR during SIAs in every district;
- to establish a rubella control/CRS prevention goal in at least one additional WHO region;
- to establish a target date for the global eradication of measles.

Similarly, the global strategic plan shared by all WHO regions is to achieve measles and rubella elimination in at least five WHO regions by end 2020. Milestones to this end are:

- to sustain the achievements toward the 2015 goals;
- 95% coverage with the MCV1 and MCV2 (or MRCV in each district and nationally);
- to establish a target date for the global eradication of rubella and CRS.

The Weekly Epidemiological Record 2013 Framework for Verifying Elimination of Measles and Rubella outlines basic principles, standard set of definitions, case classification, essential criteria, surveillance indicators, and lines of evidence. This framework provides global standards for monitoring progress towards, and achievement of, elimination.

A number of challenges were noted as important for countries to factor into their respective plans for enhancing surveillance. Regarding outbreak investigations and case-based reporting, consideration will need to be given to issues such as how to merge/maintain both systems; what the outbreak threshold and the threshold for laboratory confirmation would be; what to do in low-incidence settings; how to define large outbreaks in “low-incidence” settings; how to define “large” outbreaks and, in such events, would all cases be tested, or could there be a representative sample
of testing? These questions and others will have to be addressed by
countries.

Each of the WHO regions demonstrates progress in meeting goals,
although certain challenges exist. The Region of the Americas is maintaining
elimination and its verification process is underway. Challenges include
maintaining high-quality surveillance, local gaps in population immunity,
the cost of outbreak response, and maintaining funding as incidence
decreases. The other WHO regions are at varying stages of elimination.
In the Western Pacific Region, the guidelines for verification were finalized
in March 2013 and the first annual progress reports were due on 1 October
2013. Five of the 16 national verification committees may soon be
requesting verification of elimination (Australia, Japan, Republic of Korea,
Macao Special Administrative Region and Mongolia). The European Region
is in the midst of responding to a resurgence in measles and rubella. A new
“package for accelerated action” is in place to address strengthening of
vaccination systems and surveillance, responding to outbreaks, developing a
communication and advocacy plan, and mobilizing resources. The first
round of status reports were sent to the regional verification committee in
July. The Eastern Mediterranean Region is also in the midst of responding to
outbreaks and humanitarian emergencies. Large outbreaks are currently
affecting Pakistan and Somalia, while humanitarian emergencies are
resulting in measles outbreaks in Iraq, Jordan, Lebanon and Syria. Similarly,
the African Region is addressing a measles and rubella resurgence with
plans for strengthening routine immunization, improving campaign funding
and quality, widening the target age-range based on epidemiology, and
post-campaign coverage surveys. In 2013, the GAVI Alliance will support
SIAs in Cape Verde, Democratic Republic of the Congo, Ethiopia, Ghana,
Nigeria, Rwanda and Senegal. The Measles & Rubella Initiative has also
supported campaigns in 11 other countries.

In conclusion, the surveillance priorities for elimination are to confirm
all cases and detect virus (chains of transmission) from all outbreaks. The
surveillance system attributes should be sensitive – identify all suspect cases;
timely – prompt notification, investigation and response; and complete –
complete investigations, laboratory confirmation and virus detection. The
measles verifying framework proposes definitions and indicators supporting
regional verification for attainment of measles and rubella elimination goals.
2.10 Overview of current global immunization coverage and VPD surveillance and reporting

Global monitoring of immunization coverage and VPD surveillance is conducted through the WHO and UNICEF Joint Reporting Form (JRF) on Immunization. This form/process reports cases of VPDs and includes immunization coverage, administrative data, targets, numbers vaccinated, percentage of coverage, survey results, and official country estimates.

The JRF mechanism started in 1998, and is an annual process that includes all 194 Member States of WHO. The data generated by the JRF provide information on reported cases of selected VPDs, which then contribute to a number of source documents. Six annual publications (WHO and UNICEF), a standard set of slides (over 250 slides), as well as various reports and articles rely on the data inputs of the JRF. The data also provide critical information to stakeholders and donors. This source of information allows for monitoring of programme indicators (WHO, UNICEF, other agencies) and progress of global goals (Millennium Development Goals, Decade of Vaccines and the GVAP) as well as providing WHO and UNICEF with immunization coverage estimates and input to disease burden estimates (as well as other uses, as the data are publicly available).

Another global information source is the WHO and UNICEF Estimates of National Immunization Coverage (wuenic). Introduced in 1999, this joint endeavour produces the WHO and UNICEF annual review of national immunization coverage. This coverage report is country-specific for 195 countries and territories, and constitutes an independent assessment. In other words, in many cases the report uses data officially reported but estimates are not necessarily approved by Member States.

A number of official publications report progress on immunization programmes, such as: UNICEF’s The State of the World's Children reports, WHO World Health Statistics/World Health Report, and the GAVI Alliance Annual Progress Report. Data generated are also used to monitor international goals, provide information for disease burden models, and drive decisions of funding agencies and donors. Estimates are based on multiple, consistent empirical data sources. However, while well-supported, they still carry a risk of being incorrect. Estimates are based on data that are
internally consistent and plausible. In some cases, data may be from a single source unsupported by an independent quantitative source. In all cases, estimates should be used with caution and should be assessed in light of the objectives for which they are being used.

In conclusion, a number of recommendations were made for countries to improve data quality, including:

- direct consultation with regional and national programmes;
- improving empirical data;
- Expanded Programme on Immunization (EPI) reviews/data-quality self-assessments;
- supportive supervision/staff training (at national and subnational levels);
- assessment and improvement of estimates of target populations (at national and subnational levels);
- undertaking periodic high-quality surveys.

2.11 Proposed indicators for measles/rubella/CRS surveillance for countries of the South-East Asia Region

Member States of the South-East Asia Region were requested to consider which indicators they wished to include in their own case-based measles/rubella surveillance systems. For purposes of discussion, it was proposed to consider the following definition: case-based measles/rubella surveillance is enhanced measles/rubella surveillance, where: case-based reporting of every clinically-suspected measles case with the results of laboratory testing, and “zero” reporting, and not merely confirming a few cases by laboratory testing and then reporting of aggregate numbers as is currently done. This means tracing all cases, and obtaining personal and epidemiological details of each case in order to establish chains of transmission.

Furthermore, countries were asked to consider the case definition as: a suspect measles case is any person in whom a clinician suspects measles infection, or any person with fever and maculopapular rash (i.e. non-vesicular) and cough, coryza (i.e. runny nose) or conjunctivitis (i.e. red
eyes). Moreover, to consider: a suspect rubella case is any person in whom a clinician suspects rubella infection, or any person who presents with fever, rash and cervical, post-auricular or suboccipital adenitis or arthralgia, arthritis.

In considering the proposed case definitions, Member States should factor in a number of important points. For example, if only the measles case definition is used, then there is a chance of potentially missing rubella. If only fever and rash are used, while it may capture potential rubella cases, in measles-endemic countries too many “cases” would be picked up – thereby overwhelming laboratories with test samples. Since the priority is measles elimination, laboratory testing is such that all measles-negative samples are automatically tested for rubella (potentially missing some mixed infections). A suggested starting point is to use the measles case definition at this stage, but in the future the case definition could be broadened. Countries were asked to give some thought to the proposed definitions of suspected cases, case classification, case definition in the verification stage, and the definition of a measles outbreak, and to consider a proposed list of minimum indicators (Annex 3).

A number of challenges will confront countries as they move forward with case-based surveillance. For example, respective countries will be required to ensure that the basic set of core indicators are reflected in any national information systems so that variations in data capture, reporting forms and formats can be aligned to regional and global goals for measles elimination and rubella/CRS control. Additional resources will have to be identified to ensure that every case of suspected measles is investigated and case-based information is collected, analysed and reported as per agreed protocol. Countries will also need to ensure that they are served by a WHO-accredited laboratory (or laboratories) and that the laboratory has the resources to ensure timely testing of suspected measles and rubella cases, and that reports are available of such tests.

Measles and rubella surveillance data are currently reported to the Regional Office for South-East Asia; however, there are limitations. The data are aggregated and due to non-availability of place of infection, vaccination status or ages of cases, it is difficult to describe the epidemiology of measles and rubella. It is also difficult to establish linkages between surveillance and laboratory data. Further limitations include the
chance of duplication of cases reported from routine and outbreak surveillance, and that the data generated are insufficient to calculate some of the minimum required indicators.

Countries will be required to design their respective case investigation forms (CIFs). The measles and rubella CIF could be developed using the existing platform of the AFP system. While designing or updating country CIFs, special effort should be made to ensure incorporation of the agreed-upon core variables from the workshop. Similarly, countries will also be required to design respective laboratory investigation/request forms and ensure that their laboratory form incorporates the agreed-upon core variables to be reported to the Regional Office.

The countries were divided into three groups to review the minimum surveillance indicators, to see if they were appropriate and sufficient, and to propose additions or deletions. They were asked to review a set of core variables and suggest changes, as appropriate. The outcome of the group work is summarized in the below agreed-upon definitions:

**Definitions**

For the purpose of case-based surveillance for measles and rubella in the South-East Asia Region, a suspected measles case definition will be used as the starting point. However, the testing algorithm will include testing first for measles, and all measles-negative samples will be automatically tested for rubella.

**A suspected measles case**

A suspected measles case is any person in whom a health worker suspects measles, or any person with fever and maculopapular rash (non-vesicular) with cough, coryza or conjunctivitis.

**A suspected measles outbreak**

A suspected measles outbreak is the occurrence of five or more suspected measles cases over a period of 1 month in a population size of at least 100,000. [However, countries that are already advanced in their measles elimination activities, lower than five suspected cases may be used].
**A confirmed measles outbreak**

A confirmed measles outbreak is the occurrence of three or more laboratory-confirmed measles cases over a period of 1 month in a population size of at least 100 000; and, even in situations where less than three laboratory cases are confirmed, if epidemiologically-linked, it would still be considered an outbreak.

In a large outbreak, in order to manage the pressure on laboratories, 10 cases will be tested by serology. If an outbreak has less than 10 cases, all should be tested.

**An adequately investigated measles outbreak**

An outbreak is considered adequately investigated when the following activities are completed:

- initial visit to the cases within 48 hours;
- house-to-house search for cases within 1 week;
- information collected on all core epidemiological data variables;
- samples for serology from 10 suspect cases, or all suspected cases if less than 10 cases, collected;
- urine and nasopharyngeal samples are collected from at least five suspected cases.

**Case classification**

1. **Laboratory-confirmed**: A case that meets the clinical case definition and is laboratory-confirmed.

2. **Epidemiologically confirmed**: A case that meets the clinical case definition and is linked to a laboratory-confirmed case.

3. **Clinically confirmed**: A case that meets the clinical case definition and for which no adequate blood specimen was taken.
(4) **Discarded non-measles non-rubella:** A suspected case that has been investigated and discarded as non-measles non-rubella using:

- laboratory testing in a proficient laboratory, or
- epidemiological linkage to a laboratory-confirmed outbreak of another communicable disease that is neither measles nor rubella.

The following are the minimum core variables for reporting which were discussed and agreed:

- Case EPID number/outbreak identifier ID
- Country, state, district, subdistrict, block
- Sex
- Date of birth/age
- Date of onset of fever
- Date of onset of rash
- Cough, coryza or conjunctivitis [Yes/No]
- Date of notification
- Date of investigation
- Vaccination:
  - number of MCV doses, date of last dose
  - number of RCV doses, date of last dose
- Travel history
- Serology:
  - specimen ID for serology
  - date and type of specimen collected
  - date of serology specimen sent to laboratory
  - date of serology specimen received at laboratory
  - adequate specimen sample
Virology:
- specimen ID for virology
- date and type of virology specimen collection
- date of virology specimen sent to laboratory
- date of virology specimen received at laboratory
- adequate specimen sample

Laboratory result:
- date result sent to national programme
- results (negative, equivocal, measles IgM-positive, rubella IgM-positive)
- measles virus detection: positive, negative
- genotype of measles
- date genotype result of measles sent to national programme
- rubella virus detection: positive, negative
- genotype of rubella
- date genotype result of rubella sent to national programme

Final classification
- measles laboratory-confirmed
- measles epidemiological link
- measles clinically compatible
- rubella laboratory-confirmed
- rubella epidemiological link
- discarded

In conclusion, the target of elimination and control by 2020 was reaffirmed. In the first 2–3 years, some of the countries will not be able to achieve the targets, but this is to be expected given the scope, scale and challenges involved. A proposal was made that the countries start case-based reporting to the Regional Office for South-East Asia from January 2014. In preparation for such, countries need to agree upon standard case
definitions, indicators and targets, and make adjustments to their national surveillance systems in order to collect, analyse and report on the recommended indicators and data on a weekly basis.

2.12 CRS surveillance: opportunities and challenges for countries

In 2010, an estimated 103,000 CRS cases were born globally, and each was associated with severe long-term disability. The identification of children with CRS can be challenging. CRS surveillance can be done in one of two ways, either through retrospective studies or prospective surveillance.

Retrospective studies represent a rapid method for identification of infants with CRS. This method consists of reviewing medical or clinical records with certain defects or signs consistent with CRS. The findings can help to serve as a baseline and complement prospective surveillance for monitoring impact. However, many of the cases will not be confirmed. Prospective surveillance establishes the baseline incidence of CRS, which allows for monitoring of the impact of rubella vaccination. In order to implement a CRS surveillance system, several important steps are required including: developing an algorithm or protocol (detecting cases – passive and active case detection, investigating cases, reporting cases – when and to whom); educating health-care providers on diagnosing, testing and reporting of infants; and, designating a rubella/CRS surveillance coordinator.

A number of challenges to CRS surveillance exist. For example, 50% of pregnant women with rubella infection may be asymptomatic. Other challenges include: suboptimal access to care, which may limit detection of rubella in pregnancy; the limitations associated with the ability to detect and investigate cases of CRS; cases with single defects (such as hearing loss) present after infancy when confirmation is not always possible; death before access to a health facility; and, vaccination in infancy, which may limit the ability to diagnose infection using serology.

In summary, the burden of CRS can be estimated prospectively and retrospectively. If prospectively, the data collected can be used to establish a baseline and then allow for continual monitoring of the impact of the programme. The issue with prospective surveillance is that it is a labour-intensive method and can take 1–2 years to get data. If the burden is
assessed retrospectively, this method allows for rapid identification of infants with CRS. It also allows countries without information to obtain baseline data. While retrospective surveillance may not pick up all cases, it is still sufficient to generate rough estimates of the burden and track trends following immunization. Countries also need to consider that infants with CRS are infectious, and infection control issues should be addressed. Technical support is available from WHO to address the issues, questions and concerns related to the challenges presented by CRS surveillance.

2.13 Current practices in regional VPD surveillance data reporting

The Regional Office for South-East Asia utilizes various data management tools, for which the countries provide the data inputs. These include:

- information for action (IFA) – Epi Info 6.4;
- polio laboratory information for action (PLIFA) – Microsoft Access;
- VPD-IFA – Microsoft Access;
- laboratory information system (LIS) for measles/rubella – Epi Info 3.2;
- Microsoft Excel templates for monthly VPD/laboratory reports, invasive bacterial diseases/rotavirus gastroenteritis, SIA coverage, JRF/AERF forms and population estimates.

In addition, countries were reminded of the current deadlines for data submissions:

- all countries submit AFP case/laboratory data (CAR files – text format) every week by Monday morning 10:00;
- all laboratories submit measles/rubella and Japanese encephalitis monthly reports (Microsoft Excel files) by the tenth of each month;
- all countries submit other VPD cases monthly reports (Excel files) by the fifteenth of each month.
The Immunization and Vaccine Development unit at the Regional Office for South-East Asia requests countries’ data for a variety of purposes, including:

- merging the country datasets and converting them into an Microsoft Access database format [AFP (weekly) and VPDs (monthly)];
- producing the VPD Surveillance Bulletin and analysis slides set for dissemination (weekly and monthly);
- submitting AFP case/laboratory data (CAR and Microsoft Access database files) weekly, and VPD data (TXT and Microsoft Access database files) monthly, to WHO headquarters, Geneva.

The Immunization and Vaccine Development unit also coordinates data/report collection on rotavirus gastroenteritis/invasive bacterial diseases (quarterly), SIA coverage, the WHO/UNICEF JFR (annually), and population estimates (annually).

Several challenges need to be addressed to improve overall data quality in the Region. For example, some countries do not regularly submit weekly and monthly reports (VPD/laboratory cases); measles/rubella case data are not linked to the laboratory results; discrepancies exist between the monthly VPD report and the monthly laboratory report; duplication or double counting of suspected measles cases (from routine and from outbreak surveillance); the monthly VPD cases reported sometimes do not match the annual VPD cases reported in the WHO/UNICEF JRF; in some cases, countries do not share subnational (e.g. district) EPI coverage and population data; variations in the population estimates used to calculate disease incidence and immunization coverage; and, aggregated data (monthly other VPDs report) limit the ability to conduct epidemiological analysis.

In addition to addressing the current challenges, the Regional Office also recommends a number of strategies which would lead to improved country and regional data quality. These include providing regular data feed-forward to the Regional Office (100%), use of single-sourced population denominators (latest estimates from national statistical offices), and, if administrative boundaries change, to share those geographic information system (GIS) shapefiles.
2.14 Discussion: given the challenges, what is needed to get case-based surveillance at the national level up and running?

The floor was opened up for countries to respond to the workshop discussions from Day 1 through Day 3. Specifically, to discuss the potential challenges with regards to initiating case-based surveillance by 1 January 2014.

Indonesia expressed concerns about meeting this target, given the challenges faced by the country. There are around 9000 reporting sites, and this vast number of sites would need to be reinforced which will take some time. The data team requested that software be developed to facilitate data management and analysis. The country is struggling with the accuracy of the current data system, and in order to move towards laboratory confirmation, could they consider only collecting laboratory-confirmed data. However, the risk is that they would miss some suspected cases. Clarification was made by WHO headquarters that work needs to be done to ensure that the case definitions are clear, and that the information collected is accurate. The net should be cast as wide as possible. The Centers for Disease Control and Prevention (CDC), Atlanta added that the current surveillance network in countries may not be easily transformed to support measles case-based surveillance; countries could re-look at their AFP surveillance network to see if these could be modified to include the suspected measles cases.

Bhutan noted that the increase in frequency from monthly to weekly reporting may create an extra burden and cost on the current health workers who have to collect the additional information. The new surveillance network would change the established system in place. Training and extra support for the processes will need to be considered. The Immunization and Vaccines Development unit reiterated that countries should decide what needs to be adapted to support their respective networks to meet the new requirements of case-based surveillance. For example, if there is a strong AFP reporting network that countries wish to adapt, then they should. If they have ideas about new systems that could work better, that would also be acceptable.

WHO headquarters concluded by reminding countries to keep these issues in mind during the group work session to follow; some of these challenges need to be explicitly raised, including what support would be required.
2.15 Reporting of re-emerging VPDs (Japanese encephalitis, diphtheria, neonatal tetanus and pertussis)

Among other VPDs reported monthly to the Regional Office for South-East Asia, diphtheria, neonatal tetanus, pertussis and Japanese encephalitis could be considered priority VPDs. There is a strong rationale for enhanced reporting of these re-emerging VPDs. Namely, that diphtheria is indicative of systemic weakness in a given national immunization programme; pertussis appears to be re-emerging even in countries with high coverage, and there are issues related to the acellular pertussis component of the DTP/pentavalent vaccine; the global maternal and neonatal tetanus elimination target is 2015; and, Japanese encephalitis is a specific regional issue.

The current annual regional data collection reported as part of the JRF (aggregated data) includes diphtheria, measles, neonatal tetanus, total tetanus (all tetanus including neonatal tetanus), pertussis, yellow fever, Japanese encephalitis, mumps, rubella and CRS. There are currently a few discrepancies between monthly and annual reporting of priority VPDs, as listed below.

1. Diphtheria
   - No data from countries in monthly report (Nepal, India)

2. Pertussis
   - No data from countries in monthly report (Nepal, India)
   - No data in both monthly and annual report (Indonesia)

3. Neonatal tetanus
   - No data from country in monthly report (India)
   - No matching between monthly and annual report (Nepal)

4. Japanese encephalitis
   - Monthly report not comparable with annual report
   - Monthly (encephalitis), annual (Japanese encephalitis)
Issues with the current reporting of re-emerging VPDs were highlighted as an area that the countries and the Region should address. These issues include:

- geographical information not available to locate outbreak;
- age and vaccination status not known to assess impact of programme;
- real-time information not available to take action.

As the countries move forward with strengthening their surveillance systems, the Regional Office proposed minimum variables to be reported for diphtheria, pertussis, neonatal tetanus and Japanese encephalitis, as follows.

<table>
<thead>
<tr>
<th>(1)</th>
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<tbody>
<tr>
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<td>District</td>
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<td>Specimen collected</td>
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<td>(11)</td>
<td>Laboratory result</td>
</tr>
<tr>
<td>(12)</td>
<td>Comments</td>
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</tbody>
</table>

In conclusion, Member States of the South-East Asia Region are requested to consider moving forward with: (i) case-based reporting, starting January 2014; (ii) reporting a minimum set of variables to the Regional Office; (iii) modifying national surveillance systems to collect, analyse and report on the minimum set of variables; (iv) and, reaching an agreement on the frequency of reporting to the Regional Office.
2.16 Quality of surveillance data for “other” VPDs

Currently, there are a number of global surveillance systems for VPDs including measles, yellow fever, rotavirus diarrhoea, vaccine-preventable invasive bacterial diseases, meningitis, encephalitis and AFP surveillance. These surveillance systems are feasible given standardization of case definitions, core variables, laboratory networks and performance indicators, which then in turn allow for assessment of data quality and use in understanding the epidemiology of disease. For other traditional VPDs, such as pertussis, diphtheria, and non-neonatal tetanus, modelling is used instead surveillance data due to issues of vaccine-effectiveness (such as waning immunity/disease breakthrough), limited use of WHO standards for surveillance, and limited global monitoring of disease burden.

A number of potential strategies to improve traditional VPD data quality at the global, regional and country levels were offered. At the global and regional levels, this includes giving consideration to:

- country case definitions and surveillance standards for VPDs;
- line-lists of cases with age and vaccination data;
- improving data quality in the JRF;
- standardization, to improve comparability between countries;
- consistent case definitions, laboratory networks;
- enhancing data fields to assess quality of data or increase usability;
- assessing quality – requesting countries’ case definitions, description of surveillance systems, laboratory capacity;
- increasing usability – age breakdown, vaccination history.

At the country level, potential strategies to improve traditional VPD data quality include giving consideration to:

- developing processes to assess surveillance data quality;
- “data quality audit” model – heavy focus on validation of data between levels in a country;
- “surveillance system evaluation” model – qualitative, description of the system;
- “hybrid” model – incorporating aspects from both approaches to provide an overall picture of surveillance data quality;
- targeted strategy to better understand epidemiology of disease;
- sentinel surveillance – incorporating standardized data collection, laboratory diagnostics to defined geographical area or target population;
- outbreak protocols – pre-developing strategies and tools to apply to outbreak settings.

Those traditional VPDs which are not currently included in the global surveillance systems represent an area that should be further addressed due to the high burden of disease, suboptimal vaccines, poor-quality surveillance data (including missing/insufficient data), and lack of standardization.

### 2.17 Invasive bacterial vaccine-preventable diseases/rotavirus gastroenteritis surveillance update

The overarching achievement of the global sentinel site surveillance network for rotavirus gastroenteritis and invasive bacterial vaccine-preventable diseases (IB-VPD) is that it has met the 2008 objectives for presence of disease and describing serotype/genotype prevalence in all countries for rotavirus gastroenteritis and in most countries for IB-VPD. Countries in the network have also benefited in a number of ways. Laboratory capacity has been established in many countries (including detecting other diseases, such as typhoid). In addition, data have been used for decision-making and advocacy, and countries are using the IB-VPD surveillance platform for special studies and IB-VPD data for vaccine introduction decision-making.

There have been a number of challenges associated with sentinel site surveillance. A sizeable proportion of sentinel sites/countries are not meeting performance criteria in terms of enrolment and reporting (consistency, accuracy and completeness). There are also low numbers of laboratory-confirmed cases, diverse and suboptimal data management
systems, and a lack of case-based data to analyse and interpret results at the regional offices (in some regions) and headquarters.

Member States of the South-East Asia Region are encouraged to participate in this network. Participation will require a commitment from countries to meet the minimum data-quality standards, such as case-based reporting, standardizing data across sites/regions, enhancing data management systems to promote real-time verification and analysis capacity, and initiating zero reporting. In addition, there are laboratory-specific activities required to support IB-VPD surveillance, such as further strengthening the laboratory network at sites, standardizing sample selection for serotyping/grouping and linking case-based data to serotype/group data.

In summary, Member States of the South-East Asia Region are encouraged to engage in and support IB-VPD surveillance. In order to move forward, countries could consider standardizing data collection and reporting across sites/regions, reporting case-based data at all levels, improving data management and quality, limiting analysis and inclusion of data in regional and global bulletins to subset of reporting sites, and networking across all regions for lessons learned.

2.18 Country team work: to elaborate a plan to make the transition to case-based surveillance for measles/rubella

Countries met individually to review their respective measles/rubella surveillance systems and begin to identify what would be required to be aligned with the proposed changes in surveillance and reporting. They were asked to assess what technical support would be required to implement the proposed changes, and review the implications in terms of resources that the proposed changes would have. Finally, countries were asked to outline a broad draft plan of action, depicting how they would move towards the implementation of enhanced case-based measles/rubella surveillance (Annex 5).
3. Conclusion

Member States of the South-East Asia Region are at different stages with regards to VPD surveillance, with some countries already well advanced in their surveillance for measles and rubella, as well as inching closer to the goal of measles elimination and rubella/CRS control by 2020.

There is a general consensus among Member States to initiate case-based weekly reporting from January 2014 while, at the same time, acknowledging that not all countries can do all that is required by this time. Countries have begun the dialogue to assess what their needs are with regards to launching the case-based network, which requires further review to ascertain the actual technical and financial needs. Many of the Member States, and certainly the larger countries, will require a phased plan. Nonetheless, despite the challenges, whether technical, financial, or scale of operations, the conclusion of the workshop is that goal of measles elimination and rubella/CRS control in the South-East Asia Region by 2020 is attainable.

The workshop produced a draft list of key monitoring indicators and critical core variables for investigation, laboratory work and reporting. The Regional Office for South-East Asia has consolidated this into a table (Annex 4), on which countries would be asked to provide further insights and suggestions by end November 2013.

In conclusion, WHO and partners stand ready to support countries as they explore various aspects of the proposed case-based surveillance network.

4. Recommendations

Recommendations and next steps were proposed, as follows:

(1) Countries yet to introduce rubella vaccine should put in place a plan for introduction at the earliest feasible time.

(2) All countries should hold national-level workshops/technical discussions on how to move from outbreak-based surveillance to case-based surveillance, including defining outbreak response.
(3) All countries should develop a measles elimination and rubella/CRS control strategy document, with clear milestones and resource-needs estimates.

(4) Countries, particularly the large countries, should establish sentinel surveillance for CRS. Even if disease burden cannot be established for CRS, sentinel surveillance will allow assessment of vaccination impact in the future.

(5) In countries where capacity exists and resources are available, retrospective assessments for CRS burden should be considered.

(6) The WHO Regional Office for South-East Asia should organize a regional workshop on rubella/CRS in early 2014.

(7) Case-based reporting should start from January 2014 with weekly reporting from subnational to national level, and from national level to the WHO Regional Office for South-East Asia.
Annex 1

Agenda and workshop objectives

Workshop objectives

(1) To review progress in immunization and EPI disease control in the Region.

(2) To review progress of polio surveillance in relation to the polio endgame strategy.

(3) To review status of measles, rubella and CRS surveillance and agree on case definitions, targets, performance indicators, recording and reporting tools, core variables to be reported, reporting frequency and electronic data transfer system.

(4) To review status of surveillance of other EPI diseases.

(5) To discuss mechanisms for aligning country reporting on key surveillance indicators with those in the GVAP Monitoring and Evaluation/Accountability Framework.

Agenda

- Progress and Challenges in meeting Immunization Goals – Arun Thapa (WHO Regional Office for South-East Asia)

- Progress on the Implementation of “2012 – Year of Intensification of Routine Immunization” – Nihal Abeysinghe (SEARO)

- Regional overview of current Measles and Rubella/CRS surveillance – Pem Namgyal (WHO Regional Office for South-East Asia)

- Global overview of status of Measles, Rubella/CRS, and related global surveillance experience – Robert Perry (WHO HEADQUARTERS)

- Best Practices from Measles Surveillance in the Americas - Robb Linkins (CDC)
Discussion

Current status and future requirement of laboratory support for Measles Elimination and Rubella/CRS control in the region – Mainul Hasan (WHO Regional Office for South-East Asia)

Country presentations on their VPD surveillance with focus on measles and rubella/CRS:
  – Bangladesh
  – Bhutan
  – India
  – Indonesia
  – Maldives
  – Myanmar
  – Nepal
  – Sri Lanka
  – Thailand
  – Timor-Leste

Summary and discussion on country presentations – Pem Namgyal (WHO Regional Office for South-East Asia)

Measles Elimination and Rubella/CRS Control in SEAR: Goals, Targets and Indicators – Arun Thapa (WHO Regional Office for South-East Asia)

Update on where the other Regions are – Robert Perry (WHO headquarters)

Discussion

Proposed indicators for measles/rubella/CRS surveillance for SEAR countries - Pem Namgyal (WHO Regional Office for South-East Asia)

Summary of discussions and key challenges – Pem Namgyal (WHO Regional Office for South-East Asia)
- Overview of the current global immunization and vaccine-preventable diseases surveillance and reporting - Tony Burton (WHO headquarters)
- CRS surveillance –opportunities and challenges for countries – Thomas Cherian (WHO headquarters)
- Current practices for regional VPD surveillance data reporting – Tika Ram Sedai (WHO Regional Office for South-East Asia)
- Discussion
- Introduction to the core variables and indicators for measles and rubella case investigation and reporting – Mainul Hasan (WHO Regional Office for South-East Asia)
- Introduction to group work on core variables and indicators for measles/rubella reporting
- Plenary: groups report back on core variables
- Discussion – Given the challenges, what is needed to get case-based surveillance at the national level, up and running? – Tika Ram Sedai (WHO Regional Office for South-East Asia) and Tony Burton (WHO headquarters)
- Reporting of re-emerging VPDs (JE, diphtheria, NNT, and pertussis) – Mainul Hasan (WHO Regional Office for South-East Asia)
- Quality of Surveillance Data for ‘Other’ VPDs – Adam Macneil (CDC)
- IBD/Rota Surveillance Update – Thomas Cherian (WHO headquarters)
- Discussion
- Introduction to country team work: to elaborate a plan to make the transition to case-based surveillance for measles/rubella
- Country team work

Report from countries on their plans
  - Bangladesh
  - Bhutan
– India
– Indonesia
– Maldives
– Myanmar
– Nepal
– Sri Lanka
– Thailand
– Timor-Leste

12:30 – 13:00 Discussion
14:00 – 15:00 Conclusions and Recommendations – way forward
15:00 Close and Adjourn
Annex 2

List of participants

Country participants

**Bangladesh**

Dr Tajul Islam Abdul Bari  
Programme Manager  
EPI headquarters, DGHS  
Ministry of Health and Family Welfare  
Dhaka

Dr Mohammad Quamrul Islam  
Field Service and National VPD Data  
DGHS  
Ministry of Health and Family Welfare  
Dhaka

**Bhutan**

Mr Sangay Phuntsho  
Assistant Programme Officer  
Department of Public Health  
Ministry of Health  
Thimphu

Mr Tenzin Dorji  
Senior Laboratory Technician  
Public Health Laboratory Service  
Ministry of Health  
Thimphu

Mr Dopo  
Data Manager  
Planning and Policy Division  
Ministry of Health  
Thimphu

**India**

Dr Rakesh Kumar  
Joint Secretary  
Ministry of Health  
Ministry of Health and Family Welfare  
New Delhi

Dr Ajay Khera  
Deputy Commissioner  
Child Health and Immunization  
Ministry of Health and Family Welfare  
New Delhi

Dr Pradeep Haldar  
Deputy Commissioner  
Ministry of Health  
Ministry of Health and Family Welfare  
New Delhi

Dr Arun Chaturvedi  
Joint Director (EPI)  
Directorate of Family Welfare  
Ministry of Health and Family Welfare  
Lucknow

Dr Ajit Kumar Prasad  
Deputy Director  
Health Department  
Ministry of Health and Family Welfare  
Ranchi

Dr Santosh Shukla  
Deputy Director (Immunization)  
Directorate of Health Service  
Ministry of Health and Family Welfare  
Bhopal

Dr Saroj Naithani  
State EPI Officer  
Directorate of Health and Family Welfare  
Ministry of Health and Family Welfare  
Dehradun

Dr Suresh Kumar Dalpat  
Deputy Director  
Directorate General Health Services  
Ministry of Health and Family Welfare  
Panchkula

Dr Subhash Pandey  
State EPI Officer  
Directorate of Health Services  
Ministry of Health and Family Welfare  
Chhattisgarh
Dr R P Jain  
Project Director (Immunization)  
Directorate of Medical Health Services  
Ministry of Health and Family Welfare  
Rajasthan

Dr Sunil Ranojirao Vaidya  
Group Leader (Measles)  
National Institute of Virology  
Ministry of Health and Family Welfare  
Pune

**Indonesia**

Dr Theresia Sandra Diah Ratih  
National EPI Programme Manager  
Directorate Gen.of Disease Cntrl & Env. Health  
Ministry of Health  
Jakarta

Dr Krisna Nur Andriana Pangesti  
Head of Human Biomedical Division  
Centre for Biomedical and Basic Technology of Health  
Ministry of Health  
Jakarta

Mr Indra Jaya  
National VPD Data Manager  
Directorate Surveillance, Immunization, Quarantine and  
Ministry of Health  
Jakarta

Mr Agus Priyana  
VPD Data Manager  
Central Java Province  
Ministry of Health  
Jakarta

Dr Irene Susilo  
CDC Manager  
West Sumatera Province  
Ministry of Health  
Jakarta

Dr Honggo Simin  
CDC Manager  
West Kalimantan Province  
Ministry of Health  
Jakarta

Dr I Made Suadnya  
CDC Manager  
West Nusa Tenggara Province  
Ministry of Health  
Jakarta

Dr Yuzar I B Ismoetoto  
CDC Manager  
West Java Health District Office  
Ministry of Health  
Jakarta

Mr Rusli  
VPD Data Manager  
West Java Province  
Ministry of Health  
Jakarta

Mr Subur Hadi Marhaento  
Chief of Section of Disease Control and Outbreak  
Central Java Province  
Ministry of Health  
Jakarta

**Maldives**

Ms Nashiya Abdul Ghafoor  
Public Health Programme Officer  
Health Protection Agency  
Ministry of Health  
Malé

Mr Ibrahim Nishan Ahmed  
Senior Public Health Programme  
Health Protection Agency  
Ministry of Health  
Malé

Mr Ahmed Mahir  
Community Health Officer  
Raa Ungoofaaru Regional Hospital  
Ministry of Health  
Malé

**Myanmar**

Dr Kyaw Kan Kaung  
Deputy Director  
Department of Health  
Ministry of Health  
Yangon
Dr Htoo Myint Swe  
Medical Officer (CEU)  
Department of Health  
Ministry of Health  
Yangon

Dr Aung Myint  
Medical Superintendent  
Department of Health  
Ministry of Health  
Yangon

**Nepal**

Mr Mukti Nath Khanal  
Deputy Director  
Department of Health Services  
Ministry of Health and Population  
Kathmandu

Mr Shiv Chandra Thakur  
Immunization Supervisor Officer  
District Health Office  
Ministry of Health and Population  
Kathmandu

Dr Shyam Raj Upreti  
Senior Public Health Administrator  
Child Health Division  
Department of Health Services  
Ministry of Health and Population  
Kathmandu

**Sri Lanka**

Dr Paba Palihawadana  
Chief Epidemiologist  
Epidemiology Unit  
Ministry of Health  
Colombo

Dr Thushanthi S Wijesinghe  
Medical Officer  
Epidemiological Unit  
Ministry of Health  
Colombo

**Thailand**

Dr Pornsak Yoocharoen  
Medical Officer  
Department of Disease Control  
Ministry of Public Health  
Nonthaburi

Dr Athiwat Primsirikunawut  
Medical Scientist  
Department of Medical Sciences  
Ministry of Public Health  
Nonthaburi

Ms Pornthip Chompook  
Public Health Technical Officer  
Department of Disease Control  
Ministry of Public Health  
Nonthaburi

Mr Somjate Tungcharoensilp  
Public Health Technical Officer  
Department of Disease Control  
Ministry of Public Health  
Nonthaburi

**Timor-Leste**

Mr Caetano Gusmao  
National EPI Programme Manager  
EPI  
Ministry of Health  
Dili

Ms Esperanca da Conceicao Soares  
Data Manager  
Surveillance Epidemiology  
Ministry of Health  
Dili

Mr Francisco Abel Viana  
National Surveillance Focal Point  
Surveillance  
Ministry of Health  
Dili
**Donors and partners**

**United States Centers for Disease Control and Prevention (CDC), Atlanta, United States**

- Dr Robert Linkins
  - Chief
  - Global Immunization Division

- Dr Abhijeet Anand
  - Epidemiologist
  - Global Immunization Division

- Dr Adam Macneil
  - Epidemiologist
  - Global Immunization Division

- Dr Umid Sharapov
  - Medical Epidemiologist
  - Global Immunization Division

**WHO country offices**

**Bangladesh**

- Dr Jayantha Liyanage
  - Medical Officer
  - EPI
  - WHO Bangladesh
  - Dhaka

**Bhutan**

- Mr Kinley Dorji
  - National Professional Officer
  - EPI
  - WHO Bhutan
  - Thimphu

**India**

- Dr Jeffrey Mcfarland
  - Medical Officer
  - Immunization
  - WHO India
  - New Delhi

- Dr Sunil Bahl
  - Deputy Project Manager (Technical)
  - National Polio Surveillance Project
  - WHO India
  - New Delhi

**Indonesia**

- Dr Michael Friedman
  - Medical Officer
  - Surveillance
  - WHO-Indonesia
  - Jakarta

- Ms Niprida Mardin
  - National Surveillance Officer
  - Surveillance
  - WHO-Indonesia
  - Jakarta

- Dr Sidik Utoro
  - National Surveillance Officer
  - Surveillance
  - WHO Indonesia
  - Jakarta

**Myanmar**

- Dr Vinod Kumar Bura
  - Medical Officer
  - EPI
  - WHO Myanmar
  - Yangon

**Nepal**

- Dr Rajendra Bohara
  - National Coordinator
  - Programme for Immunization Preventable Diseases
  - WHO Nepal
  - Kathmandu
Timor-Leste
Mr Herminio Lelan
National Programme Officer
Expanded Programme on Immunization
WHO Timor-Leste
Dili

WHO headquarters, Geneva, Switzerland
Dr Anthony Burton
EPI System Analyst Officer
Immunization, Vaccines and Biologicals
Dr Robert Perry
Medical Officer
Immunization, Vaccines and Biologicals
Dr Thomas Cherian
Coordinator, Programme and Impact Monitoring
Immunization, Vaccines and Biologicals

Secretariat, WHO Regional Office for South-East Asia, New Delhi, India
Dr Sangay Thinley
Director
Family Health and Research
Dr Arun Thapa
Coordinator
Immunization and Vaccine Development
Dr Nihal Abeysinghe
Regional Adviser – Vaccine-preventable Diseases
Immunization and Vaccine Development
Dr Pem Namgyal
Technical Officer – Vaccine-preventable Diseases
Immunization and Vaccine Development
Mr Homero Hernandez
Resource Mobilization Officer
Immunization and Vaccine Development
Ms Uttara Aggarwal
Technical Officer
Immunization and Vaccine Development
Ms Virginia Swezy
Technical Officer
Immunization and Vaccine Development
Dr Pushparanjan Wijesinghe
Technical Officer – Rotavirus and Invasive Bacterial Diseases
Immunization and Vaccine Development
Dr Mainul Hasan
TIP-Surveillance
Immunization and Vaccine Development
Mr Tika Ram Sedai
Data Management
Immunization and Vaccine Development
Ms Mohita Dawar
Secretary
Immunization and Vaccine Development
Ms Chitra Salil
Secretary
Immunization and Vaccine Development
Annex 3

Proposed list of minimum indicators

- annual incidence of confirmed measles cases;
- annual number of deaths reported due to measles;
- measles case–fatality ratio;
- annual incidence of confirmed rubella cases;
- percentage of suspected measles outbreaks fully investigated [target 100%];
- percentage of outbreaks tested for virus detection [target at least 80%];
- percentage of specimen with laboratory results within 4 days [target at least 80%];
- MCV coverage nationally and by subnational administrative units (states, province, districts) [target 95% nationally, 80% all districts];
- minimum indicators of quality of field and laboratory surveillance.
## Annex 4

**Basic minimum indicators and their definitions**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Target</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td><strong>1. Disease incidence</strong></td>
<td></td>
<td><strong>(i) Annual incidence of confirmed measles cases</strong></td>
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<td></td>
<td></td>
<td><strong>(ii) Annual incidence of confirmed rubella cases</strong></td>
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<tr>
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<td></td>
<td>Absence of indigenous measles transmission</td>
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<td></td>
<td></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 numerator is zero, the target incidence would be zero.</td>
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<tr>
<td><strong>2. Adequacy of investigation</strong></td>
<td></td>
<td><strong>(i) Proportion of all suspected measles and rubella cases that have had an adequate investigation initiated within 48 hours of notification</strong></td>
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<td></td>
<td>≥80%</td>
<td>The numerator is the number of suspected cases of measles or rubella for which an adequate investigation was initiated within 48 hours of notification and the denominator is the total number of suspected measles and rubella cases, multiplied by 100.</td>
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<tr>
<td><strong>3. Outbreak investigation</strong></td>
<td></td>
<td><strong>(i) Percentage of suspected measles outbreaks fully investigated</strong></td>
</tr>
<tr>
<td></td>
<td>≥80%</td>
<td><strong>(ii) Percentage of suspected outbreaks tested for virus detection</strong></td>
</tr>
<tr>
<td></td>
<td>≥80%</td>
<td>(i) The numerator is the number of confirmed outbreaks that meet the fully investigated outbreak criteria and the denominator is the</td>
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### Indicator

<table>
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<tr>
<th>Indicator</th>
<th>Target</th>
<th>Definition</th>
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<tr>
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<td>total number of suspected outbreaks multiplied by 100.</td>
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<tr>
<td></td>
<td></td>
<td>(ii) The numerator is the number of confirmed outbreaks tested for virus detection and the denominator is the total number of suspected outbreaks multiplied by 100.</td>
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<tr>
<td>4. Immunization coverage</td>
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<tr>
<td>(i)</td>
<td>MCV1 and MCV2 coverage nationally and by subnational administrative units</td>
<td>95% nationally, 90% subnationally</td>
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<tr>
<td>5. Timeliness of reporting</td>
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<tr>
<td>(i)</td>
<td>Proportion of surveillance units reporting to the national level on time</td>
<td>≥80%</td>
</tr>
<tr>
<td>(ii)</td>
<td>Proportion of countries reporting to their WHO regional level on time</td>
<td>100%</td>
</tr>
<tr>
<td>Indicator</td>
<td>Target</td>
<td>Definition</td>
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<tr>
<td>Regional Office and the denominator is the total number of countries multiplied by 100.</td>
<td></td>
<td>6. <strong>Reporting rate of discarded non-measles non-rubella cases</strong>&lt;br&gt;&lt;br&gt;(i) A national reported rate of discarded non-measles non-rubella cases per 100 000 population</td>
</tr>
<tr>
<td>7. <strong>Representativeness of reporting</strong>&lt;br&gt;&lt;br&gt;(i) Proportion of subnational administrative units reporting at least two discarded non-measles non-rubella cases per 100 000 population</td>
<td>≥80%</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.</td>
</tr>
<tr>
<td>8. <strong>Laboratory confirmation</strong>&lt;br&gt;&lt;br&gt;(i) Proportion of suspected cases with adequate specimens for detecting acute measles or rubella infection collected and tested in a proficient laboratory</td>
<td>≥80%</td>
<td>The numerator is the number of suspected cases from whom adequate specimens 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].</td>
</tr>
</tbody>
</table>
### Indicator

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<tbody>
<tr>
<td><strong>9. Timeliness of specimen transport</strong>&lt;br&gt; (i) Proportion of specimens received at the laboratory within 5 days of collection</td>
<td>≥80%</td>
<td>The <em>numerator</em> is the total number of specimens received in the laboratory within 5 days of collection and the <em>denominator</em> is the total number of specimens received by the laboratory multiplied by 100.</td>
</tr>
<tr>
<td><strong>10. Timeliness of reporting laboratory results</strong>&lt;br&gt; (i) Proportion of results reported by the laboratory within 4 days of receiving the specimen</td>
<td>≥80%</td>
<td>The <em>numerator</em> is the total number of specimens for which laboratory results were available within 4 days of receiving the specimen and the <em>denominator</em> is the total number of specimen received for testing multiplied by 100.</td>
</tr>
</tbody>
</table>
Annex 5

Summary of country action plans

<table>
<thead>
<tr>
<th>Country</th>
<th>Key activities planned</th>
<th>Support required</th>
</tr>
</thead>
</table>
| **Bangladesh** | Update the existing guidelines to accommodate recommendations of the regional workshop.  
National-level planning meeting.  
Refresher training on integrated VPD surveillance for district and subdistrict managers.  
Support district-level monitoring of surveillance performance.  
Support to the national measles and rubella laboratory.  
Surveillance desk reviews:  
- quarterly at divisional level;  
- yearly at national level.                                                                                                                                                                                                 | Not listed                                                                                                                                               |
| **Bhutan** | Core group national-level meeting/appraisal.  
Develop/revise measles and rubella elimination strategy document (SoPs).  
Review reporting/investigation forms.  
Review current laboratory capacity for testing/reporting.  
Training of health workers on revised elimination strategy/reporting and investigation forms.  
Monitoring to track the progress on status of elimination.                                                                                                                                                                                                 | Laboratory accreditation on periodic basis, laboratory networking and capacity strengthening.  
Support on development of elimination strategy.  
Validation of measles and rubella elimination.                                                                                                                                                                                                 |
<table>
<thead>
<tr>
<th>Country</th>
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<th>Support required</th>
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</thead>
</table>
| **India** | Phased state-wise switch to case-based surveillance.  
Switch based on indicators, such as: optimize the utilization of laboratory human resources, case load, and current surveillance indicators from outbreak surveillance (outbreak size/duration/cases, etc.).  
All states switch to case-based surveillance between January 2014 and December 2016. | Strengthening laboratory network:  
• training for laboratory personnel;  
• logistics support for the laboratory.  
Determining population susceptibility by age.  
Other countries’ experience:  
• exposure visits/exchange programme. |
| **Indonesia** | Initiate measles/rubella surveillance.  
Advocacy.  
Sensitization and training.  
Expand laboratories.  
Revise guidelines (including forms) and reporting system.  
Integrated surveillance and EPI in new comprehensive multi-year plan.  
Develop CRS guidelines.  
Conduct retrospective survey.  
Develop CRS surveillance system.  
Phase-wise manner of roll-out through 2018. | Assessment of laboratory capacity.  
Improving reporting system.  
Provision of laboratory reagents.  
Web-based/electronic data tool (software) from the Regional Office. |
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<tr>
<th>Country</th>
<th>Key activities planned</th>
<th>Support required</th>
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</thead>
<tbody>
<tr>
<td>Maldives</td>
<td>Review the national surveillance system to align with the Regional Office’s requirements.</td>
<td>Support to conduct epidemiological studies to understand population susceptibility (sero studies).</td>
</tr>
<tr>
<td></td>
<td>Present the review results to the Maldives Technical Advisory Group on Immunization (MTAGI).</td>
<td>Assistance to conduct trainings on the manual for surveillance officers.</td>
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<tr>
<td></td>
<td>MTAGI recommendations to the Minister of Health for approval.</td>
<td>Assistance for training of health workers on appropriate standards for sample collecting procedures at all levels.</td>
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<td></td>
<td>Update and distribute surveillance manual.</td>
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<td></td>
<td>Train surveillance officers and other health workers.</td>
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<td></td>
<td>Strengthen the capacity in reference laboratory to meet new standards.</td>
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<tr>
<td></td>
<td>Strengthen laboratory surveillance to capture CRS.</td>
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<td></td>
<td>Revise issues and update the Regional Office for South-East Asia Integrated Data Analysis System (SIDAS).</td>
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<td></td>
<td>Change definition of outbreak, from 3 cases to 1 case.</td>
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<td></td>
<td>Integrate EPI and CD in the new Health Protection Agency structure.</td>
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<td></td>
<td>Put in place a policy jointly developed by the health and tourism ministries to report cases (especially imported cases).</td>
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<tr>
<td>Country</td>
<td>Key activities planned</td>
<td>Support required</td>
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<tr>
<td>Myanmar</td>
<td>Strengthen the capacity of regional surveillance officers, special disease control team leaders and Township Medical Officers.</td>
<td>Sustained adequate financial support to support the roll-out plan.</td>
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<tr>
<td></td>
<td>Orient frontline health workers on measles/rubella case-based surveillance.</td>
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<td></td>
<td>Upgrade the existing data collection tools and facilities (formats, guidelines, etc.).</td>
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<td></td>
<td>Enhance awareness on notification of fever with rash cases to community and stakeholders.</td>
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<td></td>
<td>Conduct quarterly evaluation of VPD surveillance performance with an emphasis on measles/rubella surveillance.</td>
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<td></td>
<td>Involve private sector and other stakeholders in VPD surveillance.</td>
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<td></td>
<td>Expand laboratory capacity at subnational and national levels.</td>
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<td></td>
<td>Facilitate specimen collection and transportation.</td>
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<tr>
<td>Nepal</td>
<td>Conduct advocacy meeting with policy-level officials and paediatricians (National Plans of Actions) for more political commitment and resource mobilization.</td>
<td>Support to advocate to policy-makers and professional organizations</td>
</tr>
<tr>
<td></td>
<td>Revise forms and formats based on recommendations of regional workshop.</td>
<td>Resources required to expand and sustain increase in workload of health workers and laboratory network.</td>
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<tr>
<td></td>
<td>Phase-wise expansion of case-based sites.</td>
<td>Ongoing assistance to monitor/provide feedback on data quality.</td>
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<tr>
<td></td>
<td>Orient staff in new sites.</td>
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<tr>
<td>Country</td>
<td>Key activities planned</td>
<td>Support required</td>
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</tbody>
</table>
| Sri Lanka | Strengthen case-based surveillance:  
- case-based surveillance with laboratory confirmation  
- sentinel site surveillance: weekly zero reporting  
- outbreak detection, confirmation, investigation and control. | Technical assistance for strengthening laboratory surveillance.  
Provision of adequate reagents for serology.  
Support to establish facilities for genotyping at national laboratory.  
Support to conduct awareness programme on core variables and indicators for elimination of measles and rubella for virologists.  
Support to develop laboratory format including minimum core set of variables with virologists.  
Identifying resources to support adequate human and financial requirements. |
| Thailand | Review/update core variables.  
Raise awareness among health workers at all reporting sites (Measles Elimination).  
Accredit all subnational laboratories | Request that the Regional Office consider using case-based surveillance data directly (no need for aggregated data from MLIS) since time and resource |
<table>
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<tr>
<th>Country</th>
<th>Key activities planned</th>
<th>Support required</th>
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<tbody>
<tr>
<td></td>
<td>(ISO 15189) and proficiency testing scheme (ISO 17043).</td>
<td>consuming. Support for policy strengthening through national authority. Support for mobilizing necessary resources (e.g. measles/rubella test kits, training budgets).</td>
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<td></td>
<td>Modify the reporting form to include:</td>
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<td>• community health centre and health post identification in the EPID No.;</td>
<td></td>
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<td></td>
<td>• date of notification.</td>
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<td></td>
<td>Train staff focal points at HP, CHC, referral hospitals on case detection, improving coverage, filling forms, etc.</td>
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<td></td>
<td>Review and strengthen reporting network.</td>
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<tr>
<td></td>
<td>Strengthen monitoring and supervision.</td>
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<tr>
<td></td>
<td>Review and revise plans for outbreak investigation and management.</td>
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</tr>
<tr>
<td></td>
<td>Include midwives at HP in the network (weekly by telephone).</td>
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<td>Request focal points at CHC to inform DHS of cases weekly by telephone.</td>
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<td>Ensure that DHS has line listing of each case and follows up by email weekly.</td>
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<td>Training for staff at various levels.</td>
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<td>Support to ensure that all district health services have email capability.</td>
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<td></td>
<td>Support to improve laboratory surveillance including sample collection, transport and testing at national laboratory.</td>
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<td>Mobilizing/providing operational costs for at least 2 years.</td>
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<tr>
<td></td>
<td>Support to implement a monitoring and reviewing mechanism for case-based surveillance (for at least 2 years).</td>
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</tbody>
</table>
Member States of the South-East Asia Region met in September 2013 to define which indicators they wished to include in their own case-based measles/rubella surveillance systems, as part of their initiative to meet the goal of measles and rubella/congenital rubella syndrome (CRS) elimination by 2020. They were asked to review a set of core variables and suggest changes, as appropriate. A set of core variables were agreed upon, so that when countries begin to submit case-based data to the Regional Office, the data are comparable.

Finally, the meeting concluded with the following recommendations:

- Countries yet to introduce rubella vaccine should put in place a plan for introduction at the earliest feasible time.
- Countries should hold national-level workshops/technical discussions on how to move from outbreak-based surveillance to case-based surveillance, including defining outbreak response.
- Countries should develop strategy documents on measles elimination and rubella/CRS control, with clear milestones and resource-needs estimates.
- Countries, particularly the large ones, should establish sentinel surveillance for CRS. Even if disease burden cannot be established for CRS, sentinel surveillance will allow assessment of vaccination impact in the future.
- In countries where capacity exists and resources are available, retrospective assessments for CRS burden should be considered.
- The WHO Regional Office for South-East Asia should organize a regional workshop on rubella/CRS in early 2014.
- Case-based reporting should be started from January 2014, with weekly reporting from subnational to national level, and from national level to the WHO Regional Office for South-East Asia.