

Measles elimination and rubella/congenital rubella syndrome control

*Report of a regional consultation
Kathmandu, Nepal, 19–22 February 2013*



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Acronyms

AEFI	adverse events following immunization
AFP	acute flaccid paralysis
CRS	congenital rubella syndrome
EPI	Expanded Programme of Immunization
EWARS	early warning and reporting systems
GAVI Alliance	Global Alliance for Vaccines and Immunisation [formerly]
GIVS	Global Immunization Vision and Strategy
GVAP	Global Vaccine Action Plan
HLP	High-Level Preparatory meeting
IHR	International Health Regulations
IMCI	Integrated Management of Childhood Illness
IPA	International Pediatrics Association
ITAG	Immunization Technical Advisory Group
KAP	Knowledge, Attitude & Practice
MCV	measles-containing vaccine
MR	measles and rubella vaccine
MYIP	multi-year immunization plan
NML	national measles laboratory
ORI	outbreak response immunization
RC	Regional Committee
RED	Reaching Every District
RI	routine immunization
RRL	regional reference laboratories
SAGE	WHO Strategic Advisory Group of Experts

SEAR	South-East Asia Region
SIA	supplementary immunization activity
SVI	Sabin Vaccine Institute
TCG	Technical Consultative Group
UNICEF	United Nations Children's Fund
VPD	vaccine preventable disease
WHO	World Health Organization

1. Introduction

Five of the six WHO Regions have measles elimination goals with established target dates endorsed by their respective Regional Committees. The Western Pacific Region has a 2012 goal, the European and Eastern Mediterranean regions have 2015 goals and the African Region has a 2020 goal. The Region of the Americas has achieved both measles and rubella elimination.

In August 2009, a regional consultation on measles involving representatives from the 11 Member States of the South-East Asia Region (SEAR) agreed that measles elimination is technically feasible, and an elimination goal for 2020 or sooner should be set for the South-East Asia Region, but a specific date was not set. In late 2009, the WHO Regional Committee for South-East Asia adopted Resolution SEA/RC62/R3 that called for the elimination of measles from the Region, but a target year for elimination was not included in the Resolution.

Measles elimination activities present the opportunity to eliminate or accelerate the control of rubella and congenital rubella syndrome (CRS). All regions except the South-East Asia Region and African regions have called for the elimination or accelerated control of rubella.

2. Objectives of the regional consultation on measles elimination and rubella/congenital rubella syndrome (CRS) control

The regional consultation was held from 19 to 22 February 2013 in Kathmandu, Nepal, with the overall objective to come to a consensus on a timeline for measles elimination and rubella/CRS control in the Region.

The general objective was to accelerate measles elimination and rubella/CRS control in the South-East Asia Region.

The specific objectives were as follows:

- to review progress in the Region towards the interim World Health Assembly measles targets;
- to review the burden of rubella in the Region and the progress made in rubella control;
- to review the current evidence on the feasibility of and agree on measles elimination and rubella control in the Region, including the issues surrounding vaccine supply, injection safety (adverse events following immunization – AEFI), waste management, cold chain and funding requirements;
- to agree on a regional strategic framework and target year for achieving the goal of measles elimination and rubella control.

Representatives from all Member States were present. Also in attendance were representatives from the United States Centers for Disease Control and Prevention (CDC), the Sabin Vaccine Institute, the United Nations Foundation, the United Nations Children’s Fund (UNICEF), United States Agency for International Development (USAID), nearly 50 members of the International Pediatrics Association (IPA), and two from the Immunization Technical Advisory Group (ITAG). The list of participants is available in Annex 1 and the agenda in Annex 2. Dr Lin Aung, WHO Representative Nepal, on behalf of the Regional Director, inaugurated the consultation. The Regional Director’s opening remarks are provided in Annex 3. Dr Min Than Nyunt served as Chair and Dr Pradeep Haldar as Co-Chair of the meeting. Dr Karma Lhazeen served as the Rapporteur.

The outcome of this consultation will be presented to the Regional Committee for South-East Asia at its session in September 2013.

3. Review of global and regional progress towards achievement of interim WHA measles targets and rubella control

The objectives of this session were to review the global and regional progress in achieving the 2015 milestones set by the Sixty-third World

Health Assembly (2010) towards measles elimination and to review the global and regional status of rubella control. The three 2015 measles milestones include:

- (1) increasing routine coverage with the first dose of measles-containing vaccine (MCV1) for children of 1 year of age to $\geq 90\%$ nationally;
- (2) reducing and maintaining annual measles incidence to < 5 cases per million;
- (3) reducing measles mortality by $> 95\%$ from the 2000 estimate.

Globally, from 2000 to 2011, estimated MCV1 coverage increased from 72% to 84%. Three WHO regions had achieved the $\geq 90\%$ MCV1 coverage target (Americas, European and Western Pacific) by 2011. The other three Regions ranged from 75% to 83% MCV1 coverage. By 2011, 34% of Member States reported $\geq 80\%$ MCV1 coverage in all districts.

Between 2000 and 2011, Member States providing a second dose of measles vaccine (MCV2) in their routine immunization schedules increased from 97 (50%) to 141 (73%). Annual reported measles incidence decreased by 62% to 55 cases per million compared to 146 per million, and estimated measles mortality decreased by 71% from 542 000 to 158 000 during this period. Thus far, only the Americas have reached the 2015 95% mortality reduction goal.

In 2011, 130 countries (41% of birth cohort) included the rubella vaccine in their routine immunization programme. Eighty-six per cent of Member States reported 112 531 rubella cases and an incidence of 16 cases per million population. The most recent report of CRS burden (2008) estimated 111 888 cases.

In the South-East Asia Region, from 2000 to 2011, MCV1 coverage increased from 61% to 79%. Four of the 11 countries in the Region have surpassed the $\geq 95\%$ WHA MCV1 coverage target, and nine countries have introduced MCV2. Annual measles incidence decreased by 29% to 36 cases per million compared with 51 per million, and estimated measles mortality decreased by 48% from 137 000 to 71 000 during this period. Routine immunization schedules for measles and rubella and measles vaccination coverage, incidence and mortality data in the South-East Asia Region are presented in Table 1 by country.

In 2011, four countries in the South-East Asia Region included rubella vaccine in their routine immunization programme. Ten of the 11 countries in the Region reported 9 904 rubella cases and an incidence of 5.4 per million population. A total of 52 000 cases of CRS were estimated to be present in South-East Asia Region in 2008.

Table 1 SEAR routine immunization schedules (RI, 2011), country-level measles vaccination coverage, incidence and mortality

SEAR	Country	MCV1% ^b		MCV2 % ^c	Measles incidence per million population ^c			Measles mortality ^b	% Mortality reduction
		2000	2011	2011	2000	2011	2000	2010	
	RI ^a								
Bangladesh	M (38 weeks)	72	96	NA	39	37	13 640	875	94
Bhutan	MR (9 months, 24 months)	78	95	95	620	14	30	5	83
Democratic People's Republic of Korea	M (9 months, 15 months)	78	99	99	0	0	1	0	100
India	M (9–12 months, 16–24 months)	55	74	30	22	24	74 406	50 033	33
Indonesia	M (9 months, 1st grade)	74	89	85	227	91	20 595	6 844	67
Maldives	M (9 months), MMR (18 months)	99	96	96	74	0	1	0	100
Myanmar	M (9 months, 18 months)	84	99	80	18	34	1536	464	70
Nepal	M (9 months)	71	88	NA	410	84	1327	16	99
Sri Lanka	MMR (1 year, 3 years)	99	99	99	873	3	325	2	99
Thailand	MMR (9 months, 1st grade)	94	98	91	65	48	51	38	25
Timor-Leste	M (9 months)	56 ^d	62	NA	0	664	0	2	-
Total		61	79		51	36	137 000	71 000	48

^a From WHO/SEAR EPI Fact Sheet (29 August 2012). Since publication, Bangladesh has replaced the measles vaccine with MR in their routine immunization programme for 9-month-old infants

^b Data from WHO/UNICEF final estimates (2012)

^c Data from Joint Reporting Form (JRF 2012)

^d Data first available in 2002

(NA) Data not available

The discussion includes:

- The current status in the South-East Asia Region strongly supports the 2009 consensus on the technical and programmatic feasibility of eliminating measles in the Region by 2020.
- Recent developments on the measles and rubella immunization front:
 - a new position paper on measles (2009) stated that two doses of vaccine are standard for all immunization programmes;
 - a new position paper on rubella (2011) stated that countries should take the opportunity of measles elimination to introduce rubella vaccine;
 - in 2012, a new Global Measles & Rubella Strategic Plan was released with the vision of a world without measles, rubella and CRS that was followed by the release of a Global Vaccine Action Plan (GVAP) to eliminate measles and rubella in five WHO Regions by 2020;
 - The WHO Strategic Advisory Group of Experts (SAGE) urged the South-East Asia Region to: (1) establish a measles elimination goal and work towards establishing a rubella elimination goal, (2) raise the visibility of measles and rubella elimination activities and ensure that they receive adequate priority and resources as a central component of the GVAP and (3) establish closer linkages between measles and rubella programmes using the polio infrastructure.
- The potential benefit of partnership with civil society and professional health organizations such as the IPA.
- The importance of advocating to high-level authorities with the measles and rubella elimination message; organizations such as the IPA should advocate for elimination.
- The importance of addressing cross-border measles and rubella situation, vaccination coverage and the need for collaboration; one country with higher disease prevalence in border areas poses high risk for transmission across the border to neighbouring countries.

- Recognizing that there are hard-to-reach populations in every country, and ways must be found to reach these populations and vaccinate them to achieve target coverage levels.
- How routine immunization must be the foundation for measles elimination and rubella/CRS control programmes.

4. Feasibility of measles elimination and rubella/CRS control

4.1 Definition of measles elimination

In 2008, a consensus document on “Indicators for monitoring progress towards elimination and targets suggestive of having achieved elimination” was developed. It defined measles elimination as the “absence of endemic measles cases for a period of 12 months or more, in the presence of adequate surveillance.”

4.2 Biological feasibility

Measles elimination and rubella/CRS control are biologically feasible. Measles and rubella viruses infect only humans with no animal or environmental reservoir. Measles infection presents in virtually all infected persons as fever and rash with cough and/or coryza and/or conjunctivitis. Unapparent or subclinical measles infections are rare. Measles and rubella infections are easily confirmed or discarded through accurate, inexpensive serological tests. Although several genotypes of measles and rubella virus exist, both viruses are genetically stable and rarely mutate. Two doses of measles vaccine confer 99% immunity, and a single dose of rubella vaccine confers >95% immunity against all genotypes. Both natural infection and vaccine-induced immunity are likely lifelong.

4.3 Technical feasibility

The measles basic reproductive number (R_0) ranges from 13 to 18 translating to a herd immunity threshold of 92–94%. Rubella has an R_0 of 6–7 translating to a herd immunity threshold of 83–85%. Thus, it is

technically feasible to interrupt transmission of measles and rubella viruses provided sufficient levels of population immunity are obtained. The lower level of population immunity needed to interrupt rubella compared with measles virus transmission suggests that the use of a combined measles and rubella vaccine can eliminate rubella while achieving measles elimination.

WHO-recommended and proven strategies to eliminate measles and rubella/CRS include: (1) achieving high immunization coverage through routine and, when needed, supplementary immunization activities; (2) sensitive and timely case-based measles and rubella and CRS surveillance to identify and respond to residual areas of virus transmission, and (3) an accredited laboratory network capable of providing evidence for confirming or discarding suspected measles and rubella cases and identifying and characterizing measles and rubella viruses. Over a decade of experience and success using these strategies has demonstrated that it is technically feasible to achieve and maintain measles and rubella elimination. Using these strategies, the Region of the Americas has remained measles-free since 2002, and 4 of the 11 Member States of the Region (Bhutan, Democratic People's Republic of Korea, Maldives and Sri Lanka) may have eliminated measles already as suggested by immunization coverage and surveillance data.

4.4 Programmatic feasibility

During the past decade, the South-East Asia Region has made significant improvements in immunization coverage, case-based measles and rubella surveillance, in establishing a regional laboratory network and in outbreak preparedness. The success in implementing these strategies serves as strong evidence for the operational feasibility of measles elimination and rubella control in the Region.

Measles vaccine coverage

In the past decade, MCV1 coverage improved from 61% to 79% in the South-East Asia Region. Excluding India, MCV1 coverage improved from 77% to 93% during this period. Seven of the 11 (64%) countries in the Region currently have an MCV1 coverage greater than 95%, surpassing the World Health Assembly 2015 milestone, while two additional countries are at nearly 90% coverage (Table 1). Nine of the 11 (82%) countries in the Region have introduced MCV2 into their routine immunization

programmes, and of these five countries currently have greater than 90% MCV2 coverage.

The two countries with the lowest MCV1 coverage, India (74%) and Timor-Leste (62%), are working hard to overcome their challenges and have made strides towards meeting immunization coverage targets. India continues to introduce MCV2 through measles supplementary immunization activities (SIAs) to a target population of 139 million children aged 9 months to 10 years in 14 states that have less than 80% MCV1 coverage. These SIAs have been conducted in three phases beginning in 2010 and concluding in 2013 and will be followed by MCV2 routine immunization. Measles outbreak surveillance with collection of case-based data began in three southern states in 2006 and has expanded to include a total of 12 states in 2012. A measles laboratory network within India has grown to include 10 laboratories in different states and union territories, including two reference laboratories in Chennai and Pune. In 2011, Timor-Leste reported 92% coverage after a nationwide catch-up measles SIA that was conducted in response to an outbreak affecting 763 children. The high coverage rate from this SIA appears to have interrupted transmission. Timor-Leste's low routine MCV1 coverage requires biannual SIAs to prevent the rapid accumulation of susceptible children, and therefore a follow-up SIA should be conducted in 2013.

Rubella vaccine introduction and coverage

Rubella vaccine, typically given as a combination of measles and rubella vaccines (MR) or measles, mumps and rubella vaccines (MMR), is part of the routine immunization schedule in five countries of the Region: Bangladesh (MR), Bhutan (MR), Maldives (MMR), Sri Lanka (MMR) and Thailand (MMR). Bangladesh is the most recent country in the Region to include rubella vaccine (2012) and plans to complete a catch-up campaign in 2013. In addition, Nepal introduced rubella vaccine (MR) in a campaign in 2012 for ages 9 months–15 years and plans to add it to the routine immunization schedule in April 2013. Two of the five countries in the Region not using rubella vaccine have plans to introduce it: Myanmar in 2014 and Indonesia in 2016. Four of these five countries not yet using the rubella vaccine are GAVI Alliance-eligible (Democratic People's Republic of Korea, India, Myanmar and Timor-Leste) and may apply for introduction using a national, wide age-range rubella vaccine SIA. The rubella vaccination coverage of 2011 for Bhutan was 95%, 96% for Maldives and 99% for Sri Lanka; data for Democratic People's Republic of Korea were not available.

Surveillance

Surveillance capabilities and performance have improved considerably in SEAR over the past decade. All countries in the Region except India currently conduct case-based surveillance for measles and rubella in health facilities. All, including India, conduct case-based surveillance in the setting of outbreaks. Among countries conducting case-based surveillance in health facilities, the discarded measles rate was 3.3 per 100 000 population in 2011 (target $\geq 2/100\ 000$).

Country-level surveillance performance indicators reported at this Regional Consultation are presented in Table 2. In summary, 8 of the 11 (73%) countries reported surveillance performance data. Among the 8 Member States that reported data, 4 (50%) reported that they met the national discarded rate target, one at the district-level. Four (50%) met the target for specimen adequacy, 3 (38%) for full investigation of outbreaks, and 2 (25%) for annualized incidence of confirmed measles cases. Five (63%) met the target for timeliness of reporting and 6 (75%) for completeness.

Surveillance for CRS is routinely conducted only in Sri Lanka thus far. However, Nepal plans to begin CRS surveillance with 11 sentinel sites beginning March 2013 and Bangladesh plans to establish 146 sentinel sites by the end of 2013. Additionally, many countries in the Region have conducted seroprevalence studies to identify susceptibility in women of childbearing age.

Laboratory network

The Region's Measles and Rubella Laboratory Network is part of the greater Global Network technically managed by WHO headquarters. The South-East Asia Regional network has grown to include a total of 23 laboratories (20 WHO accredited) with at least one national measles laboratory (NML) in each of the Member States and three regional reference laboratories (RRLs). Fifteen of the 23 laboratories are capable of virus isolation and genetic sequencing. Thailand also established a network of 14 subnational measles laboratories guided by the RRL in Bangkok.

Outbreak preparedness

More than 1000 suspected measles or rubella outbreaks were reported and investigated in eight Member States during 2011, demonstrating robust outbreak preparedness and response capacity. Among 551 confirmed outbreaks, 15 628 cases were identified.

Vaccine supply

Overall, the supply of MCVs meets the forecasted demand, but careful planning will be required as the GAVI-supported rubella vaccine introduction scales up. There are several measles and MR market constraints that must be taken into consideration by the countries of the Region. Two of the three measles vaccine manufacturers have limited capacity, and thus there is expected to be a major reliance on a single manufacturer for the majority of measles activities. There still continues to be only one supplier of MR vaccine, and this is the same manufacturer that the majority of measles monovalent vaccine. Measles and MR vaccines share the same production facilities and are therefore interdependent, for instance changes in demand of one vaccine or the other, or large orders of both vaccines for the same time period will be difficult to meet without sufficient lead time.

No new suppliers are expected to enter the measles vaccine market until at least 2015, but more likely not until 2016. There does appear to be an interest in the MR vaccine market from some manufacturers in the emerging economies; however, additional WHO prequalified MR products are not likely to be on the market prior to 2015 or 2016. Therefore, careful coordination between programmes, partners and countries, and accurate forecasting will be the key to ensuring adequate supply.

Injection safety and waste management

Programmatic issues related to injection safety, AEFI and waste management need to be appropriately addressed when immunization strategies, especially supplementary immunization activities, are conducted. Adequate preparations must also be made for the occurrence of rare yet serious AEFI, such as anaphylaxis. Public concerns for such adverse events are heightened when disease incidence is low. The importance of environmental safety requires the safe disposal of hazardous immunization waste.

Table 2 Performance indicators for the South-East Asian Region, 2013

Country	National discard rate (>=2)	% Districts with >=2 cases discarded (>=80%)	% Specimen adequacy (>=80)	% Outbreaks fully investigated (100%)	Annualized incidence of confirmed measles cases per million (<1)	Annualized incidence of confirmed rubella cases per 100 000	% Timeliness of reporting (>=80%)	% Completeness of reporting (>=90)
Bangladesh	1.66	23	88.4	100	11	1.9	86	92
Bhutan	11.0	55	100	No outbreaks	1.4	0.4	75	96
Democratic People's Republic of Korea	1.70	81	78	95	0.0	0.0	84	92
India	0.20	4.4	98	93	0.3	0.1	95	97
Indonesia	4.67	NA	NA	85	8.9	28	69	59
Maldives	NA	NA	NA	NA	NA	NA	NA	NA
Myanmar	NA	NA	NA	NA	NA	NA	NA	NA
Nepal	4.00	77	86	98	27	2.5	92	97
Sri Lanka	0.39	NA	59	100	1.4	0.2	55	99
Thailand	6.40	66	47	100	15	NA	88	45
Timor-Leste	NA	NA	NA	NA	NA	NA	NA	NA

Source: Regional Consultation Meeting, Kathmandu, February 2013

Funding requirements

Estimated costs from 2013 to 2020 for proposed SIAs, outbreak response immunization (ORI) and measles and rubella surveillance, including laboratory support by country, are given in Table 2. These costs do not include current costs for the SIAs in India that are being completed in 2013. Total estimated costs to eliminate measles and control rubella/CRS in the Region are summarized in Table 3. All estimated costs assume that India and Indonesia will use MR vaccine in future SIAs and ORI.

Table 3 Estimated costs for SIAs, ORI and MR surveillance by country, SEAR, 2013–2020

(US Dollars)

Country	SIA	ORI	MR surveillance	Total
Bangladesh	102 814 211	4 141 806	14 323 926	121 279 943
Bhutan	0	25 620	552 858	578 479
Democratic People's Republic of Korea	0	636 223	836 528	1 472 751
India	290 899 737	9 005 080	149 261 957	449 166 774
Indonesia	121 342 575	7 397 251	10 130 164	138 869 990
Maldives	0	9 588	179 308	188 897
Myanmar	15 664 547	1 390 490	7 447 232	24 502 269
Nepal	9 522 430	1 294 807	11 435 892	22 253 129
Sri Lanka	0	615 509	444 160	1 059 669
Thailand	31 287 679	1 413 239	4 622 367	37 323 285
Timor-Leste	1 247 148	84 917	276 386	1 608 451
Total	572 778 327	26 014 530	199 510 780	798 303 636

Total costs for all SIAs, ORI and MR surveillance are estimated to be US\$ 798.3 million, of which US\$ 572.8 million (72%) is for SIAs, US\$ 26.0 million (3%) is for ORI and US\$ 199.5 million (25%) is for MR surveillance, including laboratory support. Costs for other budget components are estimated to be US\$ 4.8 million. These estimates do not include direct support to strengthen routine immunization services. Detailed budget breakdowns and methodologies are provided in the strategic plan.

Table 4 Summary of estimated costs to eliminate measles and prevent rubella and CRS, SEAR 2013–2020

(US Dollars)

2012–2015	2013	2014	2015	Total
SIA	89 007 733	121 463 489	20 368 978	230 840 200
Outbreak Response	0	0	0	0
MR Surveillance	12 637 940	12 684 606	19 579 004	44 901 551
CRS Surveillance	110 000	132 000	158 400	400 400
Communication	50 000	50 000	50 000	150 000
Research	50 000	50 000	50 000	150 000
Technical support	50,000	50 000	150 000	250 000
Verification	0	200 000	100 000	\$300 000
Total	101 905 673	134 630 095	40 456 382	276 992 150

(US Dollars)

2016-2020	2016	2017	2018	2019	2020	Total
SIA	20 507 243	0	29 093 119	5 015 741	16 803 159	71 419 261
Outbreak response	2 214 402	10 689 868	10 635 909	10 576 789	10 516 026	44 632 994
MR Surveillance	17 190 875	24 176 487	30 931 682	31 191 154	30 977 184	134 467 382
CRS Surveillance	190 080	228 096	273 715	328 458	394 150	1 414 499
Communication	50 000	50 000	50 000	50 000	50 000	250 000
Research	50 000	50 000	50 000	50 000	50 000	250 000
Technical Support	50 000	0	100 000	100 000	100 000	350 000
Verification	50 000	50 000	50 000	100 000	200 000	450 000
Total	40 302 599	35 244 450	71 184 425	47 412 142	59 090 519	253 234 136

(US Dollars)

SUMMARY	2013–2015	2016–2020	2013–2020
SIA	230 840 200	71 419 261	302 259 461
Outbreak response	0	44 632 994	44 632 994
MR surveillance	44 901 551	134 467 382	179 368 932
CRS surveillance	400 400	1 414 499	1 814 899
Communication	150 000	250 000	400 000
Research	150 000	250 000	400 000
Technical Support	250 000	350 000	600 000
Verification	300 000	450 000	750 000
Total	276 992 150	253 234 136	530 226 287

Financing

Eliminating measles from the Region will have substantial health and economic benefits for all countries. Country ownership is essential to ensure that activities required to achieve the goals are supported by adequate human, material and financial resources. Existing external financial support structures may be useful, especially with regard to fulfilling the common objectives of strengthening health and immunization services and improving the surveillance infrastructure. GAVI is expected to finance approximately US\$ 79.1 million for catch-up SIAs in Bangladesh (2013), Myanmar (2015) and Timor-Leste (2015). This accounts for approximately 14% of the total SIA cost of US\$ 572.8 million. Additional funding for priority countries and areas with relatively limited economic resources, such as Bangladesh, Myanmar, Nepal, and Timor-Leste, will be needed to help finance special interventions for measles elimination and prevention of rubella and CRS such as follow-up SIAs and surveillance. The Measles and Rubella Initiative (MRI) and its core partners – the American Red Cross, United Nations Foundation, UNICEF, CDC and WHO – will also continue to contribute both financial and technical supports. Efforts are needed to expand the donor-partner landscape to complement government contributions. In addition to immunization activities, additional resources will be required to improve case-based measles surveillance and the measles laboratory network.

While efforts are made to increase partner support, Member States must also be prepared to assume many of the costs required to eliminate measles and prevent rubella/CRS by 2020. Trends in national economic indicators suggest that countries are increasingly able to finance proposed measles elimination and rubella/CRS prevention activities. Gross national income per capita has increased annually in all countries, and the percentage of health financing derived from external sources is decreasing.

4.5 Challenges of achieving measles elimination and rubella/CRS control

The path to measles elimination and rubella control will not be easy and will require countries to overcome many challenges. The highly infectious nature of measles, requiring >93–95% population immunity to stop transmission, poses a biological challenge in the Region as do factors

facilitating virus transmission, such as population growth, population density, migration within countries and international travel. The HIV epidemic may pose additional challenges because of the associated atypical disease presentation, prolonged virus excretion and reduced protective effects of vaccine among HIV-infected persons. Technical challenges relate to the properties of the measles vaccine, including the need for two doses, an intact cold chain, a sterile subcutaneous injection and that the vaccine is not effective in early infancy. Rubella/CRS control requires the political will to finance the additional costs of MR vaccine and CRS surveillance introduction. Programmatic challenges to measles elimination and rubella control include vaccinating the traditionally hard-to-reach populations (e.g. urban slum dwellers, ethnic minorities and migrants) and children in hard-to-reach areas (e.g. remote villages, conflict areas and border regions). Such challenges are not new and have been successfully addressed by many countries in eliminating polio, measles and rubella.

4.6 Lessons learnt from the Americas and Western Pacific regions and from polio eradication

Keys to successful, high-quality vaccination campaigns and high levels of coverage include the importance of:

- political commitment and partnerships at the highest levels;
- political advocacy, sensitization and resource mobilization;
- closing immunity gaps by conducting regular risk assessments, developing microplans according to local realities to ensure every community is reached and prioritization of high-risk communities for action;
- having a practical and timely information system;
- social mobilization and communication;
- a vaccination safety plan;
- ensuring high-quality training and supervision;
- rapid monitoring and verification of the vaccines;
- recognition of the country for achieving high coverage;
- intercountry and interregional collaborations.

Keys to enhancing and maintaining high-quality surveillance systems include the importance of:

- rapid assessments of surveillance systems to increase their quality;
- conducting active case searches and reviewing the sensitivity of surveillance systems in epidemiologically silent areas;
- involvement of the private sector in surveillance;
- health alerts to communicate information within and outside of the Region;
- coordination with private laboratories in the laboratory network;
- collaboration between epidemiological and laboratory teams;
- improving molecular genotyping during outbreaks.

Key lessons learnt from polio eradication include the following points:

- strong government ownership and accountability of the programme at all levels are critical for success with the highest level political engagement;
- meticulous planning and implementation of vaccination campaigns lead to high coverage, even in areas with weak health systems;
- accurate, real-time data monitoring on campaigns drives immediate corrective actions;
- a robust communication strategy is vital for programme effectiveness;
- conscious and persistent efforts to search for and vaccinate missed children are crucial to achieve eradication;
- research-based innovations help to overcome technical and operational barriers;
- synergistic and non-overlapping support by partners enhances programme effectiveness;
- data-driven decision-making identifies and focuses on high-risk areas and populations.

Discussion includes the following steps:

- the importance of providing a MCV2 and doing so preferably in the second year of life (rubella vaccine position paper);
- the importance of integrating the immunization service with other health services;
- the importance of partnering with paediatricians and other professional societies in particular, the need for them to serve as spokespersons for successful vaccination campaigns;
- the importance of optimizing cross-border communications and cooperation (e.g. contact tracing); cross-border communication and cooperation exist in the South-East Asia Region, but there is a need to formalize these interactions; the importance of not only getting information to WHO offices but also to ministries of health and practitioners.

5. Outline of the regional strategic plan for the elimination of measles and rubella/CRS control in the Region

The strategic plan is a guiding document that incorporates regional experience and principles contained in global guidance documents such as GVAP, the Global Framework for Immunization Monitoring and Surveillance (GFIMS), WHO position papers on measles and rubella vaccines, WHO guidelines on monitoring progress towards measles and rubella elimination and others.

The goal of the regional strategic plan is the elimination of measles by 2020 and control of rubella/CRS in SEAR. To achieve those ends, four key strategies were discussed:

- (1) **Achieve and maintain 95% population immunity against measles (with two doses) and rubella within each district of each country in the Region through routine and supplementary immunization.** This strategy requires adding an MCV2 to routine immunization schedules where it has not yet been added; optimizing immunization schedules with MCV1

and MCV2 to maximize protection; adopting school entry requirements expanding vaccination beyond traditional age groups and taking a Reaching Every District (RED) approach.

- (2) **Develop and sustain a sensitive and timely case-based measles and rubella/CRS surveillance system.** This strategy requires ensuring sensitive, timely and complete case-based reporting and investigation of measles and rubella; establishing and/or expanding CRS surveillance; providing (1) training in case identification, investigation, contact tracing, data analysis and management; (2) operational resources to ensure high-quality surveillance, and (3) regular feedback of surveillance data and performance.
- (3) **Develop and maintain an accredited measles and rubella laboratory network.** This strategy requires annual accreditation of regional and national measles/rubella laboratories; monthly case-based laboratory reporting from each national measles/rubella laboratory to the Regional Office; providing adequate operational support for laboratory supplies, equipment and specimen transport, and providing training and technical support to RRLs and NMLs.
- (4) **Strengthen support and linkages.** This strategy requires advocacy, social mobilization and communication; outbreak and emergency/disaster preparedness and response; research including operational, communications, Knowledge, Attitude & Practice (KAP) and innovative technologies, and integrated interventions (maternal and child health and integrated management of childhood illness, routine immunization and polio eradication).

The current regional strategic plan for measles elimination and rubella/CRS control is a draft that requires further input from countries and partners. Development and update of national action plans will be required to ensure that they are in line with the regional plan and global guidelines. A regional verification commission and national verification committees will need to be established for eventual verification of measles elimination.

6. Conclusions and Recommendations

Conclusions

- Based on the 2009 regional consensus and this consultation, *all* Member States of the South-East Asia Region reaffirm the feasibility of measles elimination in the Region by 2020.
- The world is moving towards rubella/CRS elimination, which when linked with measles elimination is feasible in the Region by 2020.
- The use of single antigen measles vaccine is a missed opportunity for rubella/CRS prevention.
- Rubella/CRS prevention, country scorecard:
 - 5 of the 11 countries have not yet introduced rubella-containing vaccine in their immunization programmes (Democratic People’s Republic of Korea, India, Indonesia, Myanmar, Nepal and Timor-Leste);
 - 10 of the 11 countries support the rubella/CRS prevention goal in the Region by 2020 (excluding India):
 - 6 of these 10 countries support rubella/CRS elimination by 2020 (Bangladesh, Bhutan, Democratic People’s Republic of Korea, Maldives, Sri Lanka and Thailand);
 - the remaining 4 of the 10 countries support rubella/CRS control by 2020 (Indonesia, Myanmar, Nepal and Timor-Leste).

Table 5 Country commitment for the measles and rubella elimination goal of 2020

Country	Regional measles elimination goal by 2020	National target year	Regional rubella/CRS 2020 goal		National target
			Elimination	Control	
Bangladesh	Yes	2016	Yes	–	2020
Bhutan	Yes	2016	Yes	–	2016
Democratic People’s Republic of Korea	Yes	2015	Yes	–	2020
India	Yes	Not yet	–	–	–
Indonesia	Yes	2018	–	Yes	2020
Maldives	Yes	2015	Yes	–	2020
Myanmar	Yes	2018	–	Yes	2020
Nepal	Yes	2016	–	Yes	2020
Sri Lanka	Yes	2018	Yes	–	2018
Thailand	Yes	2020	–	Yes	2020
Timor-Leste	Yes	2015	Yes	–	2020

Recommendations

- The definition of measles or rubella elimination is the absence of endemic virus transmission in a defined geographic area for ≥ 12 months in the presence of a well-performing surveillance system.
- The following globally agreed to surveillance indicators should be used to mark progress towards elimination and important areas of the *verification* progress:
 - annualized incidence rate of discarded non-measles, non-rubella cases = “ ≥ 2 per 100 000 population”;

- proportion of subnational administrative units reporting at least two discarded non-measles, non-rubella cases per 100 000 population per year = “> 80%”;
 - proportion of laboratory-confirmed chains of transmission with samples adequate for detecting measles or rubella virus collected and tested in an accredited laboratory = “≥80%”;
 - percentage of suspected measles cases tested for serology = “≥80%”;
 - percentage of suspected cases with adequate investigation within 48 h = “≥80%”;
 - annualized incidence rate of confirmed endemic measles cases = “0”.
- Verification of measles elimination can take place 36 months after the interruption of endemic virus transmission.
 - No single line of evidence should be considered alone but rather should be evaluated together to establish the case for elimination:
 - a detailed description of the epidemiology of measles and rubella since the introduction of measles and rubella vaccine in the national immunization programme;
 - population immunity presented as a birth cohort analysis with the addition of evidence related to any marginalized and migrant groups;
 - quality of epidemiological and laboratory surveillance system for measles and rubella.
 - The IPA is committed to support and advocate for measles and rubella elimination at the country level in collaboration with the ministries of health and relevant professional bodies.

Next steps

- The regional strategic plan will be finalized and disseminated. Countries should develop their own measles elimination and rubella/CRS prevention plans. These plans should also be

reflected in their multi-year immunization plans (MYIP) and national health plans.

- The WHO Regional Office for South-East Asia will conduct a regional case-based measles/rubella/CRS monitoring, surveillance and data workshop in the second half of 2013.
- The WHO Regional Office for South-East Asia will assist Member States in conducting national-level workshops to work towards achieving measles/rubella/CRS objectives.
- The conclusions and recommendations of this consultation will be submitted to the Regional Committee for consideration in September 2013.

Annex 1

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Annex 2

Agenda

A. Global and regional measles and rubella overview

- Feasibility of measles elimination and rubella/CRS control in South-East Asia Region
- Global status of measles and rubella/CRS elimination
- Global measles and rubella initiative: progress and challenges
- Measles elimination; experience from Western Pacific Region
- Measles and rubella elimination; experience from Americas
- Sustainable immunization financing and its relevance to measles elimination and rubella/CRS control in the South-East Asia Region
- Progress in polio eradication in India and key lessons learnt

B. Programmatic feasibility of measles elimination and rubella/CRS control

- Rubella and CRS surveillance: global experience and issues
- Regional overview of measles and rubella surveillance
- Current status and future requirement of laboratory support for measles elimination and rubella/CRS control in the Region

C. Country presentations

1. Countries using measles vaccine
 - Democratic People's Republic of Korea
 - Myanmar
 - India
 - Indonesia
 - Timor-Leste

2. Countries using MR vaccine

- Bangladesh
- Bhutan
- Nepal

3. Countries using MMR vaccine

- Maldives
- Thailand
- Sri Lanka

D. Advocacy, vaccine safety and sustainability

Advocacy and social mobilization for measles elimination and rubella/CRS control

Vaccine supply and pricing forecast (M, MR, MMR)

Role of professional organizations in measles elimination and rubella/CRS control

Vaccine safety specific to measles/rubella elimination

Outline of regional strategic plan for measles elimination and rubella/CRS control

Estimated cost of measles elimination and rubella/CRS control

Setting a target year for regional measles elimination and rubella/CRS control

Review of regional strategic plan for measles elimination and rubella/CRS control

Annex 3

Opening Remarks by Dr Samlee Plianbangchang Regional Director, WHO South-East Asia Region

Honourable Secretary of Health, WHO Representative to Nepal, Deputy Regional Director South-East Asia, President of the International Pediatric Association, representatives of the Member States of the WHO South-East Asia Region, representatives of the Sabin Vaccine Institute (SVI), members of the International Pediatrics Association (IPA) and regional pediatric societies, representatives of partner organizations, including the United States Centers for Disease Control and Prevention (CDC), the United Nations Foundation (UNF), the GAVI Alliance, experts from the Region and outside, distinguished guests, participants, ladies and gentlemen, allow me to add my words of welcome to you.

I would like to begin by reminding us that measles immunization coverage is one of the indicators being used to track child survival and that elimination of measles directly contributes to helping achieve the Millennium Development Goal 4. Five of the six WHO Regions have endorsed measles elimination targets and one region, the Americas, has already been certified as having eliminated measles and rubella.

In August 2009, during a regional measles consultation in New Delhi, all Member States agreed that it was technically feasible to target 2020 as the measles elimination goal for the Region. However, the South-East Asia Region has not yet set a target year for measles elimination. Nonetheless, the progress in reduction of measles morbidity and mortality in the Region is very encouraging.

Measles immunization coverage in the Region increased from 62% in 2000 to 79% in 2011. As a result, the number of measles cases reported decreased by 39% from 106 419 in 2000 to 65 161 in 2011. In 2005, Member States endorsed a 90% measles mortality reduction goal by 2010, compared with levels in 2000. The Region achieved a 44% reduction by 2010. The reduction has been low because of slow progress in some countries.

With regard to rubella and congenital rubella syndrome, WHO estimates that the South-East Asia Region contributes to 48% of the global congenital rubella syndrome, which highlights the burden of disease in our Region. In recognition of the burden, new funding opportunities from the GAVI Alliance for the introduction of rubella-containing vaccines are now available to support and accelerate the control of rubella and congenital rubella syndrome. Five of the 11 Member States in the Region have already introduced rubella-containing vaccine in their routine immunization programme.

Distinguished participants, ladies and gentlemen now allow me to share with you some other important developments in the Region:

All Member States of this Region endorsed a Regional Committee Resolution in September 2011 that declared 2012 as the “Year of Intensification for Routine Immunization in SEAR”. All 11 Member States started the implementation of their intensification plan in 2012.

The Region has also been polio-free for more than 2 years and is on track to achieve polio-free certification in February 2014. This is a significant achievement for the Region. Lessons learnt from polio eradication are being put into practice to improve other areas of immunization and the infrastructure, particularly the high-performing surveillance and laboratory networks, which should be adapted to support regional measles elimination and rubella control goals.

Many countries have been carrying out measles catch-up/follow-up campaigns in the Region, and some are already implementing elimination strategies.

There has been increased attention on rejuvenating primary health care in all its aspects, and on universal health care. Immunization is a key pillar of primary health care and is one primary health-care service that provides and has mostly achieved universal coverage in most Member States. Immunization and, in this regard, polio eradication, measles elimination and control of rubella and congenital rubella syndrome directly touch upon the major priority issues of equity in this Region and the right of all children to have access to the same immunization and health services no matter where they are in the country.

This Region has increased its attention to health systems strengthening for sustainable immunization; several Member States are benefiting from donor funds that are now available to eligible countries.

This consultation is therefore timely. I mention these developments to underscore the need for Member States to adopt an integrated approach to the delivery of immunization services through a strong primary health-care system so that uniformly and consistently high immunization coverage is achieved and sustained.

A strong primary health-care delivery system and sustained universal high immunization coverage are essential for maintaining polio-free status and for achieving measles elimination, rubella and congenital rubella syndrome control.

Through this consultation, my hope is that after a thorough review of the programmatic feasibility, we can agree on establishing a timeline and on planning activities for a regional elimination goal for measles and for rubella and congenital rubella syndrome as well. While doing so, you may consider defining the goals and targets very closely.

Distinguished participants, ladies and gentlemen, I wish you a successful consultation and a pleasant stay in Kathmandu.

Thank you

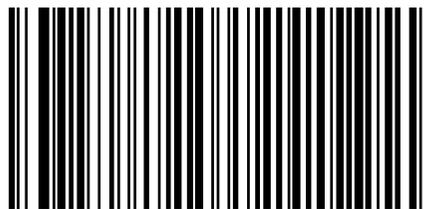
The Regional Consultation on Measles was held on 19–22 February 2013 with the overall objective to accelerate measles elimination and rubella/CRS control in the South-East Asia Region. The report presents global and regional progress towards achievement of interim World Health Assembly measles targets and rubella control and summarizes the biological, technical and programmatic feasibility of measles elimination and rubella control in the Region. An outline of the strategic plan to achieve measles elimination and rubella control goals was presented and discussed.



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