

Status Report on Progress Towards Measles and Rubella Elimination

SAGE Working Group on Measles and Rubella (22 October 2012)

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I. Introduction

This report provides an update on progress, challenges, and opportunities for the global control and eventual elimination of measles and rubella. It has been prepared as a background document for the November 2012 SAGE Meeting and includes eight sections (see Table of Contents). Following the introduction, the second section describes the current global and regional targets. The third section reports on progress towards the global measles immunization coverage, incidence and mortality reduction targets and concludes that progress has plateaued since 2008. The fourth section provides executive summaries of progress, challenges and lessons learnt from each of the 6 WHO Regions and concludes that The American Region has reached its measles and rubella elimination goals, The Western Pacific Region is making good progress towards measles elimination however, the remaining 4 Regions are facing significant challenges that, if not addressed, will result in them not achieving their targets on time. The fifth section provides a synopsis of the major challenges facing each region. The sixth section describes the new opportunities and steps being taken to implement the Global Measles and Rubella Strategic Plan, 2012-2020. The seventh section lists the questions to SAGE and the last section provides draft recommendations for discussion.

SAGE is being asked to review this report, provide guidance on whether the new plans and resources are sufficient to get back on track, and advise on what additional strategies or innovations are needed to reach the global and regional targets.

II. Current Global and Regional Targets

Global Targets

Millennium Development Goal 4 aims to reduce deaths among children overall by two thirds by 2015 compared with the level in 1990. Routine measles vaccination coverage was selected as an indicator of progress towards this goal because of the potential of measles vaccination to reduce mortality among children and consideration of measles vaccination coverage as a marker of access to children's health services.¹

In May 2010, Member States at the World Health Assembly (WHA) established the following measles control targets to be achieved by 2015 as milestones towards the future eradication of measles:

- exceed 90% coverage with the first dose of measles-containing vaccine nationally and exceed 80% vaccination coverage in every district or equivalent administrative unit
- reduce annual measles incidence to less than five cases per million and maintain that level
- reduce measles mortality by 95% or more in comparison with 2000 estimates.

Regional Targets

All six WHO regions have committed to measles elimination and five regions have set target dates. The WHO Region of the Americas achieved the goal in 2002; the Western Pacific Region aims to eliminate

¹ *The Millennium Development Goals report 2009*. New York, United Nations, 2009 (http://mdgs.un.org/unsd/mdg/Resources/Static/Products/Progress2009/MDG_Report_2009_En.pdf, accessed 18 November 2009)

measles by end of 2012; and the European and Eastern Mediterranean Regions are accelerating their measles control activities in order to eliminate measles by 2015. In 2011, countries in the African Region took on the goal to eliminate measles by 2020, and in 2010 the South-East Asia Region adopted a resolution urging countries to mobilize resources to support the elimination of measles, the target date for which is still to be decided.

Three of the six WHO regions have set control or elimination targets for rubella. The Americas has targeted rubella and CRS elimination by 2010 and the European Region, rubella elimination by 2015. The Western Pacific Region aims to have significantly accelerated rubella control and CRS prevention by 2015, and the Eastern Mediterranean Region is currently discussing the establishment of a target date for rubella and CRS elimination. The African and South-East Asia Regions have yet to establish rubella control or elimination goals.

Feasibility of Measles Eradication

The November 2010 meeting of SAGE reviewed results from the programme of work to assess the feasibility of global eradication of measles. The conclusions were that measles can and should be eradicated; that the eradication of measles represents unique disease control and developmental opportunities; and that eradication activities should be carried out in the context of strengthening routine immunization programmes. In addition, the programme efficiencies of using combined measles–rubella vaccine and integrated surveillance for fever and rash provide an opportunity for measles eradication activities to accelerate the control of rubella and the prevention of congenital rubella syndrome. SAGE recommended that demonstration of measurable progress towards existing global and regional targets be made the basis for establishing a target date for achieving measles eradication, and requested frequent updates on progress.

Global Vaccine Action Plan Targets for Measles and Rubella

In April 2012, the core partners of the Measles Initiative (American Red Cross, US Centers for Disease Control and Prevention, United Nations Foundation, UNICEF, and WHO) launched the Global Measles and Rubella Strategic Plan, 2012–2020. The common vision is *a world without measles, rubella and congenital rubella syndrome* with existing global control and regional elimination targets as milestones towards this vision. At the WHA in May 2012, the Global Vaccine Action Plan (GVAP) of the Decade of Vaccines was endorsed. One of the four high level goals in GVAP is meeting global and regional elimination targets and the target for measles and rubella is to achieve elimination in at least 5 Regions by 2020. As the targets, strategies and guiding principles in the Global Measles and Rubella Strategic Plan, 2012–2020 are closely aligned with the GVAP it acts as a supporting strategic document that provides more detail on measles and rubella in the wider immunization context provided by the global plan.

In summary, while there is a general consensus that no child should die from measles or be born with congenital rubella syndrome (i.e., eradication of measles, rubella and CRS is the ultimate goal), the target date by which this should be achieved has still to be established.

III. Progress Towards Global Targets

Immunization Activities

During 2000–2010, estimated global MCV1 coverage increased from 72% to 85% then decreased to 84% in 2011; by 2011, 3 of the 6 WHO regions had >90% estimated MCV1 coverage (Table 1). The proportion of all member states with >90% coverage increased from 42% in 2000 to 62% in 2010, then fell to 60% in 2011. Notable progress was seen during this period in the African, Southeast Asian, and Western Pacific Regions, while the American and European Regions sustained a high proportion (i.e., approximately 80%) of Member States meeting this objective. In 2011 the proportion of Member States exceeding 90% MCV1 coverage dropped in 3 of 6 regions, the African, American, and Eastern Mediterranean Regions. In 2011, 21,464 (61%) of 34,200 districts worldwide achieved ≥80% MCV1 coverage; 53 (34%) of the 156 Member States providing this data reached the target in every district. Globally the proportion of Member States meeting this target has not changed significantly since these data were first reported in 2003. Of the estimated 20.2 million children who never received MCV1 in 2011 (i.e., 16% of surviving infants worldwide), 11 million (55%) were in just 5 Member States: India (6.7 million), Nigeria (1.7 million), Ethiopia (1 million), Pakistan (0.9 million) and the Democratic Republic of the Congo (DRC) (0.8 million).

By 2011 all Member States were providing two doses of measles vaccine. The second dose of MCV (MCV2) was offered through routine services in 141 (73%), ranging from 8 (17%) of 46 countries in the African Region to 53 (100%) of the countries in the European Region. In 2011 coverage with MCV2 in target-aged children, based on administrative records, was reported to WHO and UNICEF by 116 (82%) of those Member States having introduced the vaccine with coverage of 45%, up from 13% in 2000. Of Member States reporting coverage, 67 (35%) exceeded 90% national coverage, ranging from 10 (29%) of 25 in the American Region to 28 (53%) of 43 in the European Region. During 2000–2011, over one billion children received a measles vaccination through SIAs. During 2011, based on reports by Member States to WHO, 28 measles SIAs reached >146 million children, including 23 reaching >117 million children among the 47 high-burden countries. Reported coverage was >95% for 11 (39%) of SIAs, including 9 (39%) in high-burden countries.

By 2011, 130 (67%) Member States were providing at least one dose of RCV, up from 99 (52%) in 2000. Though rubella coverage is almost identical to that of measles, as all Member States except Tunisia² provide rubella vaccine combined with measles or measles and mumps vaccines, regional and global coverage is much lower as not all Member States use the vaccine. The proportion of Member States having introduced rubella vaccine by 2011 ranged from 7% in the African Region to 100% of countries in the American and European Regions. During 2000–2011, estimated global coverage with one dose of RCV increased from 21% to 41%; by 2011, the American and European Regions of WHO had >90% estimated RCV coverage.

² Based on 2011 Joint Reporting Form information, Tunisia gives single antigen rubella vaccine to adolescent girls

Disease Surveillance

The number of Member States annually reporting measles surveillance data to WHO and UNICEF increased from 169 (88%) in 2000 to 188 (97%) in 2011 and for rubella from 102 (53%) in 2000 to 173 (89%) in 2011. Effective measles and rubella surveillance includes establishing case-based surveillance with laboratory testing of persons with suspected measles, rubella or the syndrome of acute rash and fever to confirm cases and outbreaks and to identify measles and rubella virus genotypes. By 2011, 183 (94%) Member States had implemented case-based surveillance, up from 120 (62%) in 2004. In addition, the number of Member States supported with standardized quality-controlled measles and rubella testing by the WHO Measles and Rubella Laboratory Network had increased to 184 (95%) from 71 (37%) in 2000. Though 121 (63%) of Member States reported cases of congenital rubella syndrome (CRS) in 2011, up from 75 Member States in 2000, few cases of CRS are reported, as described below.

During 2000–2011, global reported measles cases decreased 57% from 853,480 to 354,820 and measles incidence decreased 64% from 146 to 53 cases per million population, with all WHO regions reporting decreases in case numbers and incidence (Table 1). The greatest decrease in reported measles cases was during 2000–2008, from 853,480 to 277,968.

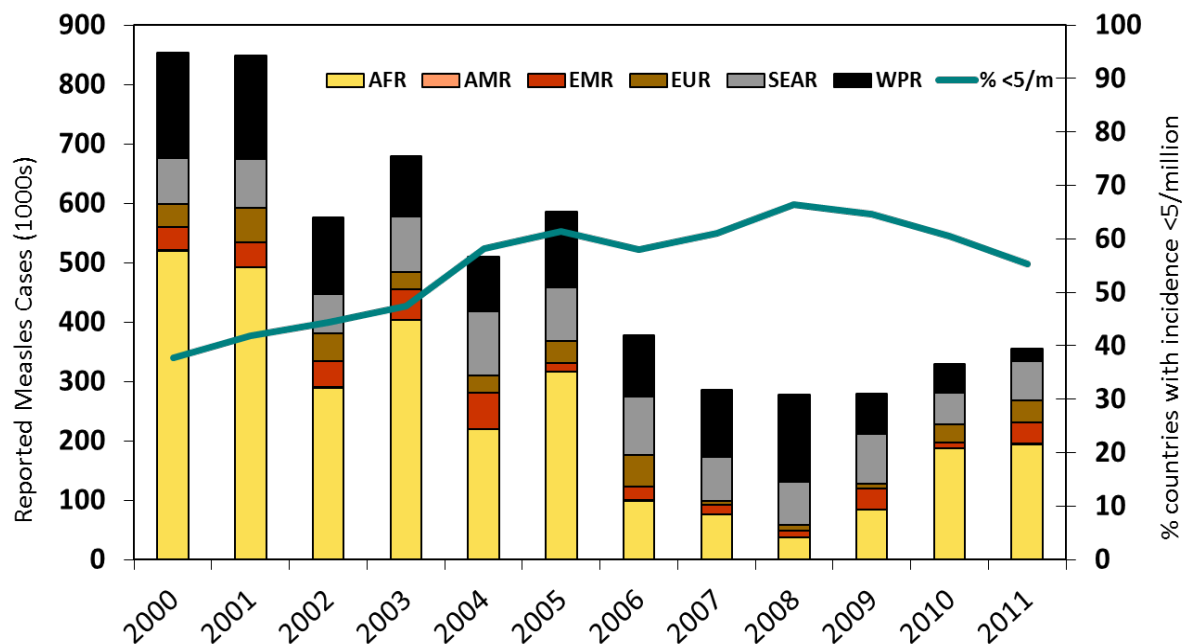
From 2008 to 2009, overall global reported measles cases remained stable, with increases in the African Region (AFR) from 37,012 to 83,479 and in the Eastern Mediterranean Region (EMR) from 12,120 to 36,605 balanced by a decrease in the Western Pacific Region (WPR) from 147,987 to 66,609.

From 2009 to 2010, global reported measles cases increased to 329,608. Decreases in WPR to 49,460, in EMR to 10,072, and in the South-East Asia Region (SEAR) from 84,356 to 52,529 were offset by increases in AFR to 186,675 and in the European Region (EUR) from 7,499 to 30,625.

From 2010 to 2011, global reported measles cases increased to 354,820. Further decreases in WPR to 21,050 were offset by increases in the other regions: EMR to 35,923, SEAR to 65,161, AFR to 194,364 and EUR to 37,073 (Figure 1).

Globally, the percentage of Member States with reported measles incidence <5 cases per million population increased from 63 (38%) of 167 reporting Member States in 2000 to 121 (67%) in 2008. That number decreased in 2011 to 104 (60%) of 188 reporting Member States (Table 1).

TABLE 1. Estimates of coverage with the first dose of measles-containing vaccine administered through routine immunization services among children aged 1 year, reported measles cases and incidence by World Health Organization region, 2000 and 2011													
WHO region	2000					2011					2010		
	% coverage with the first dose of measles-containing vaccine a	Number of reported measles cases b	Measles incidence (cases per million population) c d	% countries with incidence < 5 per million	Estimated Measles Deaths (95% CI) e	% coverage with the first dose of measles-containing vaccine a	Number of reported measles cases b	Measles incidence (cases per million population) c d	% decline from 2000	% countries with incidence < 5 per million	Estimated Measles Deaths (95% CI) e	% mortality reduction 2000 to 2010	
African	54	520 102	859	5.1	337 000 (216 600-653 000)	75	194 364	63	238	72	46	50 000 (8 900-258 100)	85%
Americas	92	1755	2.1	89	<100	92	1249	29	1.4	37	94	<100	-
Eastern Mediterranean	72	38 592	90	17	48 600 (29 400-82 300)	83	35 923	7	63	30	45	10 100 (3 500-39 000)	79%
European	91	37 421	50	45	400 (200-2 300)	94	37 073	1	44	13	44	100 (0-1 300)	87%
South-East Asia	61	78 558	52	0	48 200 (25 700-84 900)	79	65 161	17	37	29	27	10 500 (4 700-38 000)	78%
Western Pacific	85	177 052	107	30	13 100 (4 700-46 100)	96	21 050	88	12	89	62	3 100 (500-32 500)	76%
Total	72	853 480	148	38	535 300 (347 200-976 400)	84	354 820	58	53	64	55	139 300 (71 200-447 800)	74%
a Coverage data: WHO/UNICEF estimates of national immunization coverage. Geneva, World Health Organization, 2012 (October 2012 version). (Available at http://www.who.int/immunization_monitoring/routine/immunization_coverage/en/index4.html , accessed 6 October 2012)													
b Reported case data: Measles reported cases. Geneva, World Health Organization, 2011 (data as of xxx) (http://apps.who.int/immunization_monitoring/en/globalsummary/timeseries/tis/incidence/area.htm , accessed 6 October 2012)													
c Population data from Measles/rubella/congenital rubella syndrome surveillance data final classification, 2010. Immunization Newsletter 2011; 33(3):7													
d Any country not reporting data on measles cases for that year were removed from both the numerator and denominator													
e mortality estimates from Simons E, Ferrari M, Fricks J, Wannemuehler K, Anand A, Burton A, Strebel P. Assessment of the 2010 global measles mortality reduction goal: results from a model of surveillance data. Lancet 2012; 379(9832):2173-8.													



AFR = African Region, AMR = Region of the Americas, EMR = Eastern Mediterranean Region, EUR = European Region, SEAR = South-East Asia Region, WPR = Western Pacific Region.

Figure: Reported measles cases by WHO Region and global percentage of countries with estimated incidence <5 per million, 2000-2011

During 2009–2011, a number of Member States experienced large measles outbreaks including DRC (134,042 cases in 2011), Malawi (118,712 cases in 2010), Burkina Faso (54,118 cases in 2009), Iraq (30,328 cases in 2009), Bulgaria (22,004 cases in 2010), South Africa (18,356 cases in 2010), Zambia (15,754 cases in 2010 and 13,324 in 2011), France (14,949 in 2011), Somalia (17,298 cases in 2011), Zimbabwe (9,696 cases), Viet Nam (6,582 cases in 2009 and 2,809 in 2010), Chad (8,650 cases in 2011), Nigeria (8,491 cases in 2010 and 18,843 in 2011), Namibia (7,214 cases in 2009 and 2010), the Philippines (6,368 cases in 2009 and 6,538 in 2010), Italy (5,189 cases in 2011) and Ethiopia (4,235 cases in 2010 and 3,255 in 2011). The outbreaks were primarily due to low MCV1 coverage and, in Burkina Faso, DRC, Ethiopia, Nigeria, and the Philippines, to suboptimal or delayed SIAs. In Viet Nam the outbreak occurred in areas not covered by subnational SIAs in 2007 and 2008. In areas of high reported coverage, outbreak investigations found that susceptible individuals had accumulated over several years among adolescents and adults who had missed vaccination, thus high reported national routine or SIA coverage had masked subnational immunity gaps. In Bulgaria, Malawi, Zambia and Zimbabwe these gaps were often found in groups with limited access to health services or who were reluctant to vaccinate their children, often for philosophical or religious reasons.

During 2000–2011, global reported rubella cases decreased 83% from 670,894 to 114,449. The greatest decrease in reported rubella cases was a 98% decrease in the European Region, from 804,567 to 9,671, and a 99.9% decrease in the Americas, from 58,755 in 2000 to only 9 cases in 2011. In other regions the number of cases increased during this period in parallel with the increase in the number of Member

States reporting rubella cases. Compared to rubella fewer Member States report CRS cases, though the number increased from 75 (39%) in 2000 to 121 (63%) in 2011. Compared to model estimates the number of reported CRS case is very low, with 214 reported CRS cases in 2011 versus an estimated 111,888 CRS cases in 2008.

Disease Burden Estimates

Global measles mortality decreased 74% from 535,300 deaths in 2000 to 139,300 in 2010. Compared with estimated mortality assuming the complete absence of measles vaccination, 9.6 million deaths were averted by measles vaccination during 2000–10. Measles mortality was reduced by more than three-quarters in all regions except the South-East Asia Region. Most measles deaths (79%) were estimated to be in Africa and India during 2000–10. Estimated measles mortality decreased by 85% in Africa, from 337,000 to 50,000, during 2000–10 (Table 1). As a whole, the African Region accounted for 36% of global measles mortality in 2010, down from 63% in 2000. India's small decline in measles mortality (26%) led to an increase in the country's share of global measles mortality from 16% in 2000 to 47% in 2010. Estimated measles mortality decreased by 78% during 2000–10 in the remaining ten countries in the Southeast Asia Region. Planned SIAs in India targeting 134 million children in 11 States and the introduction of a routine second dose in 17 Indian States during 2011–13 should lead to substantially reduced measles mortality by 2015.

The Eastern Mediterranean and Western Pacific Regions accounted for 9–11% of estimated global measles mortality during 2000–10, and estimated measles mortality fell 79% in the Eastern Mediterranean and 76% in the Western Pacific region. Although the European Region continues to have large outbreaks of measles, because of very low case-fatality ratios (CFRs), the region accounted for less than 1% of global measles mortality.

Though surveillance for rubella has greatly improved over the past 11 years, a small proportion of CRS cases are reported. Disease modelling studies suggest that the burden of CRS has been stable from 1996 to 2008, dropping slightly from 120,342 estimated cases in 1996 to 111,888 in 2008.

IV. Progress Towards Regional Targets

African Region

The African Region of the WHO is comprised of 46 Member States with a total population estimated at 850 million in 2012. The African Region adopted the measles mortality reduction goal since 2001, and has been implementing the WHO UNICEF recommended strategies ever since. In September 2011, the 60th Regional Committee of the WHO adopted a goal of measles elimination for the African Region by the year 2020, which includes the following targets:

- Achieve 90% coverage with the first dose of measles vaccine nationally (WHO UNICEF estimates) AND exceed 80% vaccination coverage in every district or equivalent administrative unit in all countries.

- Achieve at least 95% coverage with measles vaccines during SIAs in at least 80% of districts.
- Achieve a measles incidence of less than one confirmed measles case reported per million population per year (excluding imported cases).
- Achieve the surveillance performance targets

In the meantime, the Region is working towards measles pre-elimination targets set for the end of 2012. These targets are seen as milestones in the progress towards measles elimination.

WHO AFRO does not yet have a goal for CRS/ rubella elimination. However, countries are being encouraged to determine the local burden of disease and to introduce rubella vaccine according to the recommendations provided in the most recent WHO rubella vaccine position paper.

Progress

Between the years 2001 and 2011, countries in the African Region have achieved an increase in MCV1 coverage from 56% to 75% (according to the WHO UNICEF estimates). In 2011, 6 of the 46 member states achieved measles vaccination coverage of 90% or more, while 8 countries³ had coverage of less than 60%.

As of September 2012, the second dose of measles vaccination (MCV2) is provided as part of the routine immunisation doses in 11 countries.⁴ Burundi, Sao Tome and Principe, and Zambia are expected to introduce MCV2 by the end of 2012.

Between 2001 and August 31, 2012, a total of 568.4 million children were vaccinated through Supplemental Immunization Activities (SIAs) in 43 Member States.⁵ An additional 24.2 million children will be reached by the end of 2012.

As of September 2012, 43 countries in the Region have established case-based surveillance for measles⁶, supported with a network of 44 national measles laboratories, of which three also serve as regional reference laboratories.

Success stories

The majority of countries in the Region continue to have low incidence of measles. In 2012, as of 10th August 2012, the Regional incidence of confirmed measles cases is 15 cases per million population; 26 of the 43 countries have incidence levels of less than 1 confirmed measles case per million.

For instance, Ghana, the Gambia, Eritrea and Rwanda have maintained low incidence of confirmed measles over the past few years, supported by high routine immunization coverage rates, and the

³ Chad, Cote d'Ivoire, Equatorial Guinea, Ethiopia, Gabon, Guinea, Liberia, Mali

⁴ Algeria, Botswana, Cap Vert, Eritrea, Gambia, Ghana, Lesotho, Mauritius, Seychelles, South Africa and Swaziland.

⁵ All countries in the African Region except Algeria, Mauritius and Seychelles.

⁶ These 42 countries include all Member States in the African Region except Comoros, Mauritius, Sao Tome & Principe and Seychelles.

conduct of timely, well organized and well-funded follow-up measles SIAs. This is illustrative of the strong national level leadership and commitment to measles elimination in these countries.

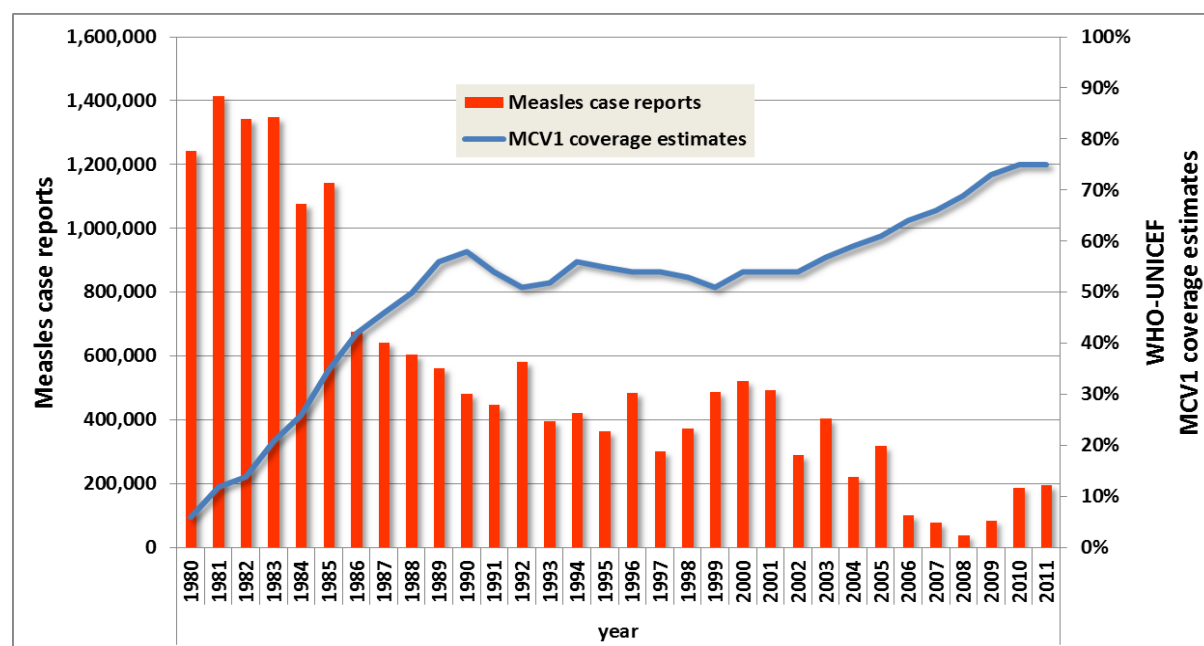


Figure 1. Routine first measles vaccination coverage (WHO-UNICEF estimates) and measles case reports. 1980 - 2011.

Challenges

In 2010, 28 countries experienced measles outbreaks, bringing the overall incidence level to 165 cases per million population at Regional level (as compared to incidence levels of 10 – 40 per million between 2007 – 2009). In 2011, Zambia and the Democratic Republic of the Congo experienced large outbreaks, and a number of districts in DR Congo continue to experience outbreaks as of September 2012.

In DR Congo, the gaps in national and subnational level routine immunisation coverage, as well as the delays in conducting follow-up measles SIAs in 2010, (linked to delays in mobilizing resources for scheduled follow-up measles SIAs) are the factors behind the large-scale and protracted measles outbreaks which have affected all provinces in the country. The situation is compounded by the increasing shift in epidemiological susceptibility involving older children, and thus requiring a widening of the target age group for follow-up and outbreak response immunization activities.

Summary

As of the end of 2011, seven countries (Botswana, Burkina Faso, Ghana, Malawi, Mauritius, Seychelles and Swaziland) are on track to meet the African Regional measles pre-elimination targets for 2012. On the other hand, 25 countries have missed some of the targets set by the pre-elimination goal, and are at risk of failing to reach the 2012 pre-elimination goal.

Strengthening country ownership and leadership of the measles elimination strategies, and ensuring the allocation of adequate resources for the implementation of measles elimination strategies will be of

paramount importance. Countries and partners need to invest in strengthening the immunisation system in order to attain and maintain measles elimination.

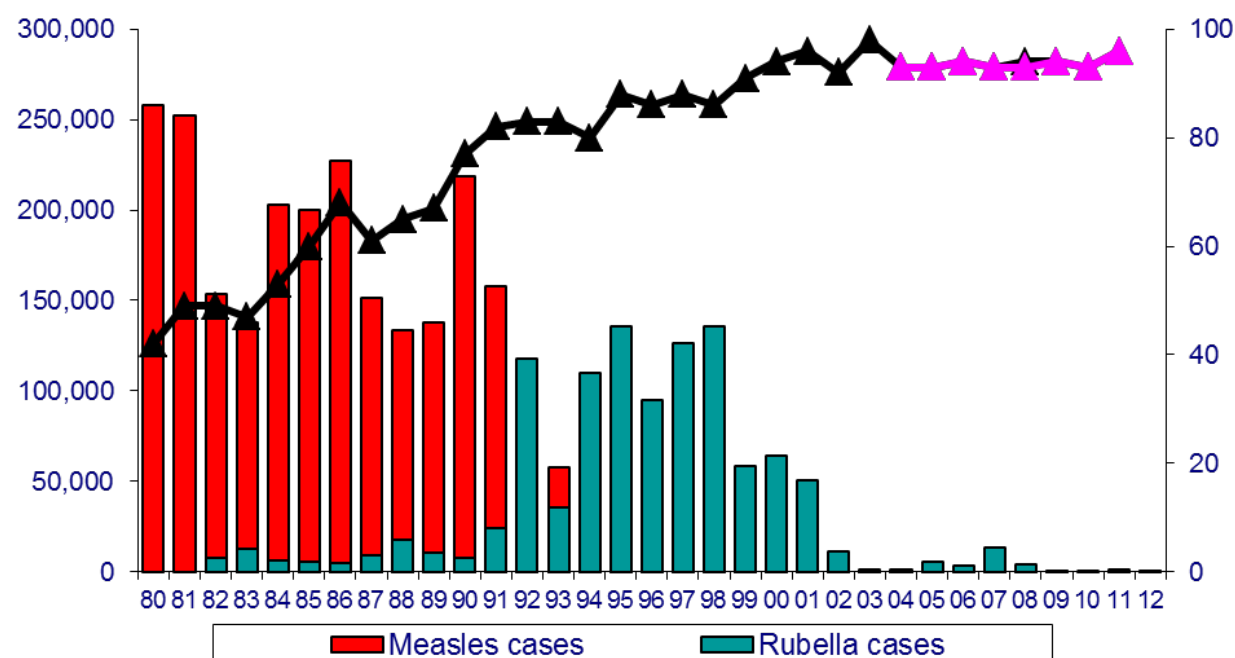
American Region

Regional measles and rubella elimination goals

In 1994, during the 24th Pan American Sanitary Conference, ministers of health adopted Resolution CSP24.R16, setting a **goal to eliminate measles** from the Region of the Americas by 2000. Approval of the resolution was based on the impressive and rapid reduction in measles demonstrated by countries that pioneered the use of immunization strategies for elimination. The Region of the Americas achieved the goal of measles elimination in November 2002.

The strengthening of measles surveillance also revealed that rubella and congenital rubella syndrome had emerged as significant public health problems in the Region. In 1999, the PAHO Technical Advisory Group on Vaccine-Preventable Diseases (TAG) recommended accelerated rubella control and congenital rubella syndrome (CRS) prevention with campaigns targeting a wide age range, including adults. In 2003 the 44th Directing Council adopted Resolution CD44.R1, calling on Member States to **eliminate rubella and congenital rubella syndrome** from their countries by 2010. In addition, the resolution called on the Director to “elaborate a regional plan of action and mobilize resources in support of a rubella/CRS elimination goal for 2010.” The last endemic rubella and CRS cases in the Region were reported in 2009.

Figure: Measles vaccination coverage among children <1 year of age and reported measles and rubella cases, the Americas 1970-2012⁷



⁷ Source: Country reports to FCH-IM/PAHO.

Progress in verifying elimination

In October 2007, the 27th Pan American Sanitary Conference approved Resolution CSP27.R2 urging Member States to establish National Commissions to document and verify measles, rubella, and CRS elimination in each country. It authorized the formation of an International Expert Committee (IEC) to document and verify the interruption of transmission of endemic measles and rubella viruses in the Region of the Americas. To ensure a standardized approach to documentation, PAHO developed a regional plan of action to guide countries and their National Commissions in compiling and analyzing evidence that endemic measles and rubella transmission has been interrupted.

In accord with Resolution CSP27.R2 of the Pan American Sanitary Conference, an International Expert Committee was formed and 23 National Commissions were established, including a Commission for the French Overseas Departments in the Americas. In addition, a Subregional Commission was established for the English-speaking and Dutch-speaking Caribbean countries and territories, including Suriname. As of September 2012, 20 commissions, including those for the French Departments and the English/Dutch-speaking Caribbean, have submitted their final elimination reports to PAHO for review and comment by the International Expert Committee. The remaining four countries (Colombia, Ecuador, Haiti, and Peru) will submit their reports by the end of November.

After careful analysis of these 20 reports submitted by the National Commissions and the Subregional Commission, it appears that the interruption of endemic measles and rubella virus transmission has been achieved. However, the Region of the Americas continues to be exposed to high risk of virus importations, given the continuing circulation of measles and rubella viruses in other regions of the world. Additionally, some of the countries have reported weaknesses and failures in their national surveillance systems and routine immunization programs, which make them particularly vulnerable to the risk of reintroduction of viruses that, can cause outbreaks. Moreover, some of the National Commissions concluded that the epidemiological surveillance is not sufficiently robust to ensure maintenance of the elimination of rubella and CRS. Nevertheless, the International Expert Committee states that documentation to verify the absence of the endemic diseases in the Region can be achieved if the weaknesses identified are corrected promptly. To that end, countries are urged to take prompt actions to correct challenges identified during the verification process to ensure that the achievements in eliminating endemic diseases will be maintained.

The 28th Pan-American Sanitary Conference (September 17-21, 2012) reviewed the progress made toward the documentation and verification of the elimination of measles, rubella, and congenital rubella syndrome in the Americas, and adopted the resolution (CSP28/R14) to secure regional achievements to eliminate the measles and rubella (i.e. the emergency plan of action to maintain the elimination of endemic measles, rubella and CRS in the Americas). This resolution urges Member States to strengthen active surveillance of these diseases and to maintain high population immunity through vaccination.

Enabling Factors

The countries in the Region have shown strong political commitment by adopting the resolutions to eliminate measles, rubella and CRS and adopting the resolution to document and verify the Regional elimination. In order to achieve the Regional elimination of the endemic diseases the countries have

been improving routine measles-rubella immunization, conducting periodic SIAs and promoting community acceptance of measles and rubella vaccines.

Strengthened capacity and utilization of measles/rubella laboratory testing in the region (there are 21 measles/rubella national laboratories in the network, which are supported by 2 regional referral laboratories, and the CDC global reference laboratory).

The Member Countries have included vaccination and surveillance activities into their national budgets, which increases sustainability of the vaccination programs.

Challenges

Recent Outbreaks

In 2011, there was an eightfold increase of measles cases over the previous annual average of 156 cases between 2003 and 2010. This increase coincided with several large outbreaks in Europe and Africa. Of the 45 countries and territories, 33 (73.3%) reported no measles cases, and 9 (20%) reported 14 confirmed measles cases. Three countries—Canada, Ecuador, and the United States (6.7%)—reported a total of 1,290 cases, 93% of the 1,379 confirmed cases in the Region (unconfirmed data for 2012, as of EW40/2012). The current outbreaks in the Region put measles elimination at risk. The largest outbreak, with duration of seven months (EW14/2011–EW40/2011), occurred in Canada and resulted from an importation of D4 measles virus from Europe. In Canada 803 cases of measles were reported in 2011, 61% of all reported cases in the Region in 2011. The second largest outbreak in Ecuador has caused 329 laboratory confirmed measles cases in 2011 and 2012. The last case has been reported from the week 28/2012. The most commonly identified genotypes in these three countries include D4, which is circulating on the European continent; B3, from Africa; and D8 and D9, from Southeast Asia and the Pacific, respectively.

The recent measles outbreaks (excluding the Canadian outbreak) have similar characteristics. The vast majority of cases have occurred in specific groups of unvaccinated persons (religious groups or other groups that reject vaccination) or in specific geographic areas, such as in indigenous communities, in large cities (especially on the peripheries), and in rural and border areas with limited access to health care. Almost all measles cases are import-associated.

Heterogeneous coverage

Low measles and rubella incidence can lead to a false sense of security. While documenting and verifying the elimination of the viruses in the Region, several PAHO Member States identified challenges in their immunization programs, such as weak surveillance and heterogeneous or low coverage that put at risk the elimination of measles and rubella. These pockets of susceptible populations can sustain future outbreaks.

Sustaining high quality surveillance

Maintaining measles/rubella/CRS surveillance under low incidence requires high specificity and sensitivity. Post-elimination phase requires adoption of high standards molecular biology techniques to facilitate identification of source of infections.

Summary assessment

Based on the final national elimination reports received up to date, the countries in the Region appear to have interrupted endemic transmission of measles and rubella virus. However, the Region of the Americas continues to be exposed to high risk of measles and rubella importations, given the continuing circulation of measles and rubella viruses in other regions of the world. Additionally, some of the countries have reported weaknesses and failures in their national surveillance systems and routine immunization programs, which make them particularly vulnerable to the risk of reintroduction of viruses that can cause outbreaks.

Countries should integrate the activities in the Emergency Plan of Action for maintaining measles, rubella, and CRS elimination in their annual plans of the national immunization programs. The main objective of the plan is to sustain achieved efforts by maintaining very high level of population immunity against measles and rubella and further enhance surveillance systems to detect sporadic imported cases before they spread and cause secondary cases.

The maintenance of the diseases elimination is expensive. Most of the outbreaks in the Region have been sparked by importations from outside the Americas. According to published research from the region and other countries and documented experiences from the region, containing small and medium size outbreaks due to importations costs local and state governments hundreds of thousands, up to millions, of dollars to contain. However, at this stage when the region is maintaining the measles, rubella and CRS elimination, available resources are not enough to keep the program on the track. Fundraising for the maintenance of Regional elimination is challenging.

As a result, strong advocacy combined with financial and technical support will be required by most of the countries in the Region to maintain the countries free of the endemic transmission of measles and rubella. Also advocacy with other WHO Regions and their development cooperation partners to step up their efforts to increase measles and rubella coverage, with a view to achieving elimination worldwide is essential.

Eastern Mediterranean Region

Introduction

In 1997, the 22 countries in the World Health Organization Eastern Mediterranean Region (EMR) had resolved to eliminate measles from their region by 2010 (EM/RC44/R.6). Despite the significant progress, in terms of morbidity and mortality reduction in all countries, the region did not achieve measles elimination by the target date of 2010. Accordingly, in 2011, the Regional Committee of the Eastern Mediterranean resolved to revise the target date of measles elimination to 2015 (EM/RC58/R.5)

Several countries of the EMR are suffering from complex emergency situation, internal conflict and financial constraints which constitute major challenges facing measles elimination. Endemicity of poliovirus in Afghanistan and Pakistan adds to these challenges.

Countries of the EMR are at different stages of measles endemicity and have variable capacity of measles elimination. EMR countries are categorized in 3 groups, based on incidence of measles in 2011:

Countries **at elimination** and ready for validating elimination (reporting 0 cases for ≥ 2 years or more in presence of with a nationwide measles case-based surveillance, high measles coverage for both MCV1 and MCV2): Bahrain, Jordan, Syria, Palestine

Countries **close to Elimination**: (incidence < 5 cases/1,000,000 with a nationwide measles case-based surveillance, high measles coverage for both MCV1 and MCV2): Egypt, Iran, Oman, Iraq, Tunisia, Lebanon

Countries with **high burden of disease**: Afghanistan, Djibouti, Kuwait, Libya, Morocco, Pakistan, Qatar, Saudi Arabia, Somalia, Sudan, South Sudan, United Arab Emirates and Yemen.

Measles and Rubella Epidemiology

Measles

The implementation of elimination strategies in Member States has led to a rapid decrease in measles and rubella incidence in the region. In 2011 nine countries (39%) have reported measles incidence of < 1 case per million persons in the presence of a sensitive and well-functioning nationwide surveillance system: Bahrain, Egypt, Iran, Iraq, Jordan, Oman, Palestine, Syria, and Tunisia. In spite of this progress, there has been a resurgence of measles cases in several countries from late 2009 which has continued to 2012. The total confirmed measles cases reported in 2011 and January-June 2012 are 9,315 and 7,827 cases respectively, of these 87% and 90% are reported from Afghanistan, Pakistan, Sudan and Yemen. Sudan alone accounts for 50% of cases in 2011 and 62% in 2012, despite implementing follow up SIAs in 2010-2011.

This resurgence has occurred in some countries that have been reporting high routine and SIAs vaccination coverage however, a substantial proportion of the measles cases reported during these outbreaks were unvaccinated, which raises the concern about the quality of the reported routine coverage data as well as the quality of implemented SIAs.

Rubella

Currently, 15 of the 23 countries in EMR are using rubella vaccine in their EPI program with high coverage $\geq 90\%$ coverage of RCV1 and 14 of them are using a 2 dose schedule. Thirteen countries have established a national target for rubella/CRS elimination. In addition, rubella case-based surveillance is integrated with measles surveillance in all countries in the Region. Ten countries now are implementing CRS surveillance as well. In addition, the new GAVI window for supporting MR catch up campaign is an excellent opportunity to intensify measles/rubella control and elimination activities. In January 2012, the EMRO organized a Regional consultation on Rubella and CRS to discuss the regional situation and the possibility of establishing regional rubella and CRS control or elimination target.

Progress Towards the Current Goal

Achieving high population immunity

Based WHO/UNICEF estimates, routine measles-containing vaccine (MCV1) coverage improved during the past decade from 72% in 2000 to 84% in 2010. However, estimates for 2011 indicate a decrease in MCV1 regional coverage to 83% due, mainly, to the drop in MCV1 coverage in Pakistan and the slight decrease in Morocco, Syria, and Yemen. In 2011, 12 countries out of those who reported to EMR have achieved 95% or more for MCV1. In addition, the coverage of routine immunization has impressively increased in priority countries. For example, MCV1 coverage estimate was 64% in South Sudan in 2011.

Despite the progress in the Region, countries including Afghanistan, Pakistan, Somalia, Sudan and Yemen have experienced several outbreaks in late 2010 through 2012. These outbreaks occurred due to delay in implementation of the follow-up SIAs, a deteriorating security situation, and/or inadequate funds.

As of 2012, nineteen member states are implementing a 2nd dose of measles vaccine through routine services. Eleven of these countries have reached the 95% coverage with 2 doses of routine measles vaccine at national level based on national reporting in 2011.

Follow-up measles campaigns are being conducted in countries that haven't reached the target 95% coverage with 2 doses of measles vaccine. To date in 2012, around 30 million children have been vaccinated through measles supplementary immunization activities (SIAs). These achievements are due to implementation of measles elimination strategies in most of the member states, thanks to sincere national efforts and support from partners.

Case-based and laboratory surveillance

All EMR countries have moved to measles case-base surveillance with laboratory confirmation, 21 (91%) of these countries are implementing nationwide, and two countries Somalia and S. Sudan are performing surveillance in identified sentinel sites. In 2009, 13,892 samples were tested in the EMR Lab Net for measles IgM; this increased to 18,516 serum samples tested in 2011. Countries report to EMRO monthly measles cases and surveillance indicators. There is a significant improvement in the performance of measles case-based surveillance in most of the countries in the region, and this reflected by status of measles surveillance performance indicators in region.

Also much progress has been made towards collecting genotype information from measles cases, 20 (87%) EMR countries have characterized circulating measles virus as a result of the increased capacity of the laboratory network. From 2000-2009 the major genotypes detected were D4 (47%) and B3 (38%), but since 2011 to date genotype B3 has increasingly being detected accounting 69% of the reported genotype in 2011, other genotypes detected were D5, D8, D9 and H1.

Enabling Factors

- Commitment of EMR countries towards measles elimination renewed, RC58/R.5
- Partners' support to low income countries (e.g., The Measles and Rubella Initiative)

- Accumulating experience from other disease elimination/eradication efforts and successful implementation of measles catch-up and follow up campaigns.
- Current activities and initiatives to strengthen health systems and routine immunization in priority countries which resulted in reported vaccination coverage improved and measles surveillance being expanded and strengthened.
- GAVI windows of support for MCV2 introduction, RCV and measles SIAs in priority countries.

Challenges

The Region is still facing challenges to reach the measles elimination goal. From 2010 to date the Region is going through many challenges: political changes, conflicts, floods, famine as well as shortage of funds from partners. Routine vaccination coverage in many countries in the Region didn't reach at least 95% coverage with both MCV1 and MCV2 in all districts, the level that supports reaching measles elimination. Therefore, maintaining very high levels of population immunity throughout the population is a significant challenge in this context.

Measles epidemiological and molecular surveillance is not up to the standard that supports validating measles elimination, even in most of the countries with established nationwide surveillance. Some countries of the region are experiencing measles outbreaks even among the age groups that have been vaccinated during SIAs with reported high coverage. Pockets of susceptible populations still exist in some countries in the form of hard to reach populations in low income countries and in countries with a big expatriate population. All this has had an adverse effect on measles elimination activities and increased risk of outbreaks, as seen in Afghanistan, Pakistan Somalia, Sudan and Yemen. Funding for follow up campaigns and competing priorities are continuing challenges for these countries.

Addressing the challenges

- Renewed commitment by member states (EM/RC58/R.5)
- Strengthening capacities at country level in regard to micro-planning and use of innovative approaches to reach unreached and hard to reach populations (e.g. RED/ CHD)
- Technical support to priority countries in surveillance and outbreak investigation
- Efficient use of available funding and encourage countries to maximize benefits from all GAVI windows of support especially new vaccine introduction, MR campaign, outbreak response and HSS
- Increasing the coordination/communication between Member States and EMRO with development partners in the region

Summary

Most countries in the EMR are likely to achieve the measles elimination goal by 2015. **However, regional measles elimination will largely depend on progress in countries with high burden of disease:** Afghanistan, Djibouti, Morocco, Pakistan, Somalia, Sudan, South Sudan and Yemen. Advocacy, financial and technical support will be required by most of the countries as well as smooth supply of vaccine.

European Region

Regional measles and rubella goals

The European Region of the World Health Organization (WHO) has adopted the goals to eliminate endemic measles and rubella, which will also lead to elimination of congenital rubella syndrome (CRS). In 2002, the WHO Regional Office for Europe developed and implemented a strategic plan for measles and congenital rubella syndrome in the WHO European Region, targeting the interruption of indigenous transmission of measles (measles elimination) and the prevention of congenital rubella syndrome (<1 case of CRS per 100.000 live births) by 2010. Rubella elimination by 2010 was adopted as a regional target at the WHO Regional Committee for Europe in 2005. As the elimination was not achieved by year 2010, the 60th WHO Regional Committee for Europe recommitted to the elimination goals and reset the target date for 2015.

Progress towards the current goals

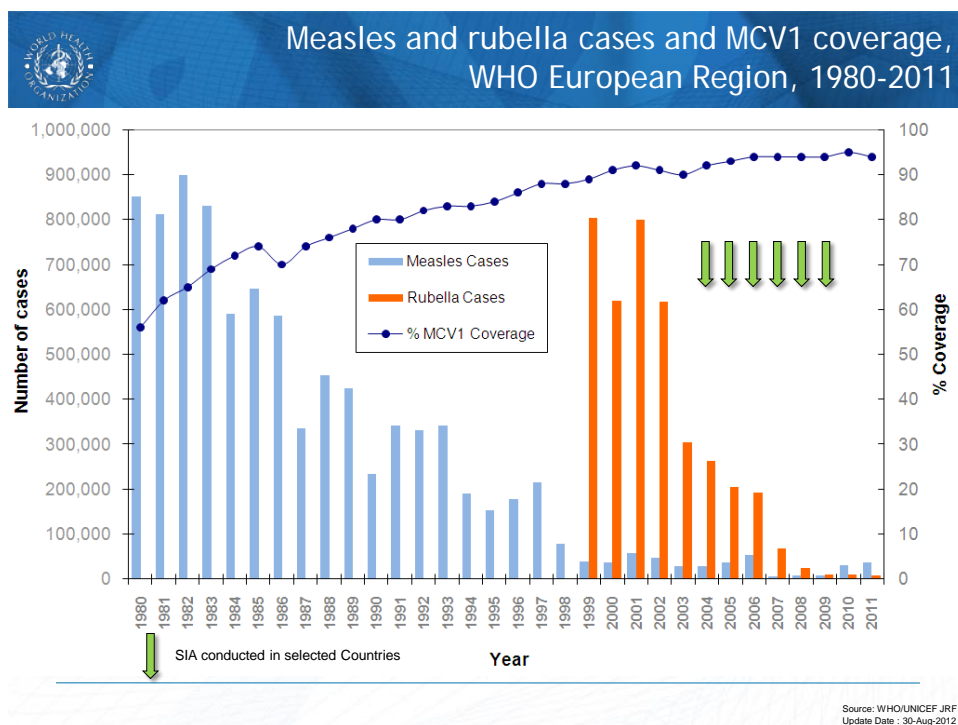
The strategic plan for elimination of measles and rubella and prevention of CRS 2012 – 2015 is under revision. The revised key strategies to achieve measles and rubella elimination in the European Region are to:

- Achieve and sustain very high coverage ($\geq 95\%$), with 2 doses of measles and at least one dose of rubella vaccine, through high-quality routine immunization services;
- Provide measles and rubella vaccination opportunity, including supplementary immunization activities, to all high risk groups and populations susceptible to measles and/or rubella;
- Strengthen surveillance systems by rigorous case investigation and laboratory confirmation of suspected sporadic cases and outbreaks;
- Improve the availability and use of high-quality evidence-based information for health professionals and the public, on the benefits and risks associated with immunization against measles and rubella.

All 53 Member States have routine immunization programmes with scheduled two doses of measles and rubella containing vaccines. Vaccines in use are measles-mumps-rubella (MMR), measles-rubella (MR) and measles-mumps-rubella-varicella (MMRV). In 51 Member States, immunization is performed with MMR for both doses; one country is using MMR for the first dose and MR for the second dose; one country is using MR for both doses. MMRV is used in four countries.

Supplemental immunization activities are organized to target unimmunized and not completely immunized populations.. During the period 2000-2010 about 57 million people were immunized against measles and about 30 million people were immunized against rubella. The Regional Office led activities in many Member States, mostly in countries located in the Central Asian part of the region.

As a result of a strong and sustainable immunization programme in all Member States of the Region, incidences of both diseases decreased (see Figure below). The total number of measles cases in the Region decreased from 597 455 cases in 1983, to 6 936 in 2007. The number of reported rubella cases decreased from 804 567 in 1999, to 9 672 cases in 2011.



The transmission of measles increased after 2007, and 95 027 measles cases were reported in the period 2009-July 2012. The annual reported number of measles cases was 7 419 in 2009, 30 850 in 2010, and 37 893 in 2011. A similar situation is expected for 2012, as 18 856 cases were reported in the first seven months of 2012.

Most of the cases are reported from France, Bulgaria and Ukraine, countries challenged with large outbreaks (Table 1). Outbreaks were also reported from other countries, in part related to susceptible sub populations (minorities, migrants, religious and philosophical groups). In some countries (e.g., United Kingdom, Switzerland and France, measles cases are occurring among the general population.

Table 1. Countries in the WHO European Region with the highest number of reported measles cases, 2009 – 2012

Country	2009	2010	2011	2012	Total
Bulgaria	2249	22006	157	0	24412
France	1541	5019	15214	745	22519
Ukraine	24	42	1313	11086	12465
Romania	8	187	4417	2447	7059
Italy	173	861	5179	530	6743
Spain	43	285	3507	401	4236
United Kingdom	1176	397	1083	1093	3749
Germany	572	805	1600	139	3116
Russian Federation	101	152	783	1771	2807
Switzerland	999	81	644	58	1782
Total	6886	29835	33897	18270	88888
% of all in WHO	92.82	96.71	89.45	96.85	93.54
WHO European Region	7419	30850	37893	18865	95027

The majority of cases are among unimmunized population, in infants younger than one year, adolescents and young adults. The distribution by age differs by countries. Taking into consideration that MCV has been in use for more than 30 years, these cases could have been prevented.

During the period 2009 – July 2012, Member States reported 36 433 cases of rubella, increasing from 900 in 2009, to 6 757 in 2010 and 8 577 in 2011. However, 20 199 rubella cases were reported in the first seven months of 2012, due to ongoing outbreaks in Romania and Poland (Table 2).

Rubella surveillance is still a challenge in the WHO European Region. Until 2012, four countries (Belgium, Denmark, France and Germany) did not have national surveillance for rubella. There is also a need for improving the laboratory capacity for rubella surveillance.

Table 2. Countries in the WHO European Region with the highest number of reported rubella cases, 2009 – 2012

MS	2009	2010	2011	2012	Total
Romania	0	354	3922	13708	17984
Poland	0	4197	4293	4382	12872
Bosnia and Herzegovina	225	1861	23	0	2109
Ukraine	0	0	0	942	942
Russian Federation	0	1	2	890	893
Kazakhstan	306	0	0	10	316
Georgia	67	60	64	52	243
Tajikistan	177	6	0	1	184
Turkey	87	64	0	0	151
Italy	2	41	84	0	127
WHO European Region	900	6757	8577	20199	36433

Different surveillance systems for congenital rubella syndrome, congenital rubella infection and/or rubella in pregnancy, exist in the Member States. The Regional office is receiving annual reports on the case count. The available information is not sufficient and adequate for a detailed analysis.

Underreporting is likely, as rubella is still present (endemic or epidemic) in many Member States and only 474 CRS cases were reported in the European Region during 1990 – 2011.

Activities on poliomyelitis eradication in the Region served as a model to initiate similar processes for measles and rubella elimination. Good health system infrastructure and adequate human resources in most of the Member States allowed for major achievements in the measles and rubella elimination. However, some Member States faced insufficient support and political commitment affecting immunization programmes delivery at different points in time.

High routine immunization coverage and supplemental immunization activities, the introduction of rubella vaccine into routine immunization programmes of all MS by 2009 and the improved surveillance for measles and rubella, are critical for elimination activities.

In addition, special approaches were used to increase coverage, like specific strategies to reaching vulnerable and hard-to-reach populations, or creating school entry immunization requirements in some of Member States.

Successes and Challenges

The differences of population immunity between Member States in the European Region, is best presented by the epidemiology of measles and rubella in recent years. Some countries do not face significant increase of incidence after the importation of measles or rubella viruses. While in others, the outbreaks expose weak segments on the national immunization programmes and indicate a need for further activities to increase overall population immunity and strengthening of the surveillance.

Characteristics of well performing countries

Well performing countries (e.g. Finland, Norway, Slovakia and Slovenia) have a fully operational health system, with a consistently high routine immunization coverage of all vaccines, including measles and rubella vaccines introduced in the national programme in the 1970's-80's and early introduction of second dose measles vaccine.

Detailed case-based investigation with laboratory testing is performed for all suspected cases, allowing confirmation that the cases are either imported or import-related, and excluding endemic measles and rubella transmission. Further, due to high population immunity, importations result in outbreaks of limited size and few transmission generations. Most of the outbreaks are among subpopulations (e.g. migrants) with limited spread to the general population. Immunization and vaccines are well accepted by the population, and the national health system and public health authorities are capable of managing anti-vaccination sentiment.

Major challenges in countries with recent outbreaks

Member States affected with outbreaks (e.g. Bulgaria, France, Romania and Ukraine) reported cases in populations with either none or suboptimal immunization coverage. In some of these countries the size susceptible population is significant. All these Member States are facing the following challenges:

- Insufficient political commitment and/or funding for immunization programmes (due to lack of prioritization or in result of an economic crisis)
- Health systems reform, with changed availability and/or accessibility of immunization services. Abolishment of old immunization system with delayed reassignment of the responsibilities for immunization and surveillance.
- Vaccine hesitancy or refusal due to:
 - Lack of confidence in health authorities, public health services, immunization programmes;
 - Vaccine product safety concerns;

- Measles and rubella considered mild diseases with associated misconception “very low risk” of severe or long term complications, while vaccines are considered to impose a “significant health risk” due to adverse events following immunization;
- Anti-vaccination sentiment growth in absence of public health system response;
- Religious or philosophic beliefs;
- Health care workers’ opinions opposing immunisation;
- Lack of understanding and access to reliable information about vaccines and diseases in all segments of the population.

Summary

Comprehensive analysis of the current measles and rubella elimination status in the Region and by Member States is not possible, as much of the critical information is still not routinely collected by countries and submitted to the WHO European Region. Region-wide assessment is planned as of 2013, when countries and their National Verification Committees will be requested to provide annual measles and rubella reports.

According to currently available information, the regional target to eliminate measles and rubella by 2015 is severely challenged. Critical for achieving the target is strong commitment by Member States through: a) improving immunization coverage; b) strengthening/establishing case based surveillance; c) developing new policies to address identified needs of susceptible or unimmunized populations; and d) evidence-based advocacy for immunization targeting decision makers, health care workforce and general population.

South-East Asia Region

Regional Targets

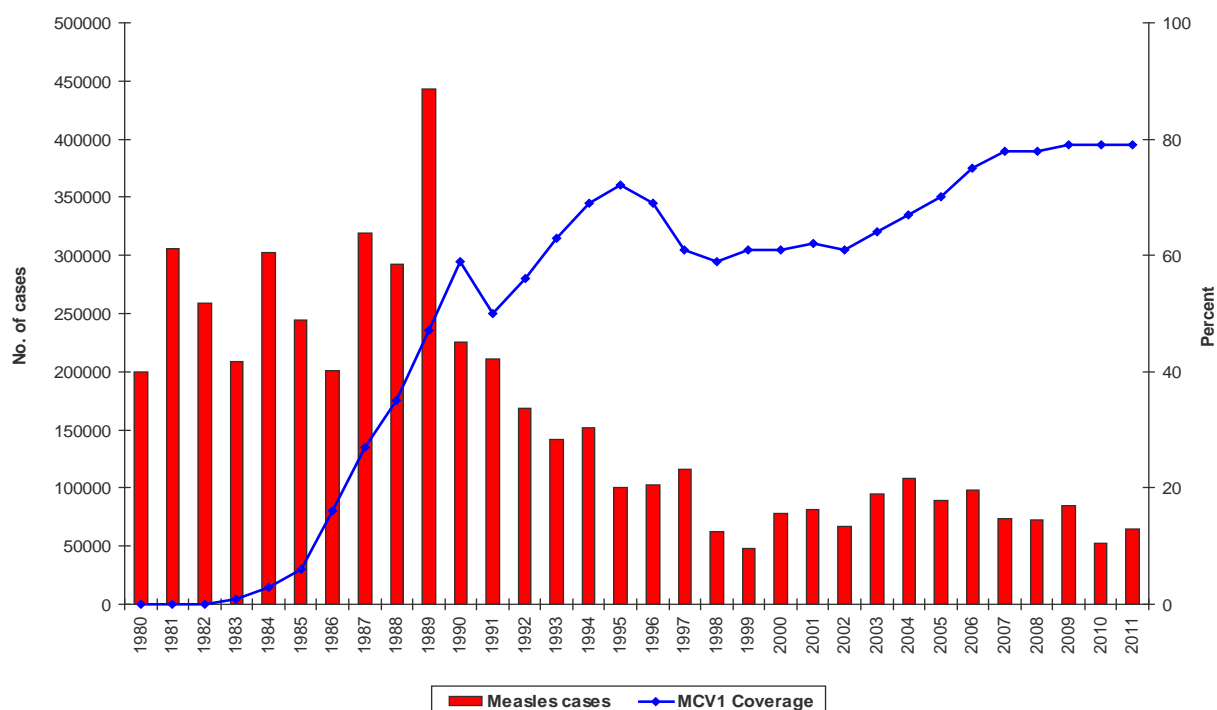
The South East Asian Region is the only WHO Region that has not established a target year for achieving measles elimination. In August 2009, at the regional consultation on measles, there was consensus among all Member States and partners that measles elimination was technically, biologically and programmatically feasible in SEAR by the year 2020 or shortly thereafter for some countries with large populations. In 2010, the High-Level Preparatory Meeting considered the proposal for establishing a measles elimination goal by 2020, but recommended that Member States should initially focus on achieving interim goals of measles mortality reduction by 2015 as approved by the 63rd WHA. The Regional Committee endorsed this recommendation. Hence, the 2015 Regional targets are: (i) at least 90% coverage with the first dose of measles vaccine nationally, and at least 80% coverage in every district or equivalent administrative unit; (ii) reduction in annual measles incidence to less than five cases per million and maintain that level; and (iii) reduction in measles mortality by 95% or more in comparison with 2000 estimates.

Progress

Improving and sustaining routine immunization coverage

Routine MCV1 coverage in the Region increased from 62% in 2000 to 79% in 2011, but it has stagnated at 79% for the last three years. According to WHO/UNICEF estimates (2012), in 2011, seven countries (Bangladesh, Bhutan, DPR Korea, Maldives, Myanmar, Sri Lanka and Thailand) reported national coverage at greater than 90%. Two countries, Indonesia and Nepal reported national coverage at almost 90% (89% and 88%, respectively) and 2 countries lagged behind; India reported national coverage of 74% and Timor-Leste of 62%. Significant progress for MCV1 coverage in India was made from 2000 to 2007 with an increase from 55% to 74%. However, coverage has stagnated over the last 5 years. Only, three countries, DPR Korea, Maldives and Sri Lanka have reported MCV1 coverage greater than 80% in all districts. District level data is not available from Thailand.

Figure: MCV1 coverage and reported measles cases, SE Asian Region, 1980-2011.



Providing MCV2 through SIAs and/or routine services

Between 2000 and 2011, all of the countries in the region except Thailand and Sri Lanka conducted national measles catch-up campaigns. As a whole, the Region achieved 95% coverage during measles SIAs reaching over 290 million children against a target of 305 million children.

Bangladesh, Indonesia, Myanmar, Nepal and Timor-Leste have conducted follow-up campaigns to target the accumulation of children susceptible to measles. In addition to conducting catch-up campaigns, Bhutan, DPR Korea, Maldives, Thailand and Sri Lanka provide a second dose of measles vaccine through routine services.

All Member States are providing MCV1 as measles, MR or MMR vaccine to the children between the age of 9 to 12 months of age. Bangladesh, Nepal and Timor-Leste have provided the second dose of measles vaccine through SIAs. Bhutan has provided measles second dose with measles-rubella vaccine at the age of 24 months. India has provided MCV2 at the age of 16-24 months through the routine immunization programme in 21 districts. India initiated measles SIAs in 14 states with MCV1 coverage <80% with a policy to incorporate MCV2 in the routine immunization programme after six months of completing the campaigns. Indonesia, DPR Korea, Maldives, Myanmar, Sri Lanka and Thailand have provided MCV2 through routine immunization.

Lesson learned from polio eradication show that high immunization coverage is crucial to preventing measles and rubella. Countries in the region have intensified their efforts to increase and sustain high immunization coverage at the national and district levels.

Measles incidence and rubella situation

In the South East Asia Region the number of measles cases declined from 106,419 in 2000 to 65,161 in 2011. The range of reported cases varied from 108,089 in 2004 to 69,301 in 2007 and 52,529 in 2010. The annualized measles incidence of the region was 43.5/million for the year 2007 and 36.01/million in 2011. No case of measles was reported from DPR Korea and Maldives during 2010 and 2011. Sri Lanka had an incidence of 2.91 cases per million populations in 2011. Between 2000 and 2010, the region had achieved a 78% reduction in measles mortality (44% if India is included).

Improving measles surveillance

After completion of measles catch-up campaigns, Bangladesh, Bhutan, DPR Korea, Maldives, Myanmar, Nepal and Sri Lanka have started case-based measles surveillance. Indonesia is doing a phased implementation. India and Thailand continued aggregate reporting. All the countries have WHO accredited measles laboratory except Timor-Leste. Samples from Timor-Leste are sent to Indonesia for confirmation.

The rate of laboratory testing has improved over the past few years from 16% in 2009 to 34% in 2011 (see Table-8). Bhutan and DPR Korea have tested 100% of suspected measles cases. Bangladesh and Myanmar have tested >90% of the suspected measles cases. Thailand and Indonesia have tested only small fraction of suspected measles cases.

Challenges

There are five major challenges the region is facing:

- Transitioning from measles mortality reduction to measles elimination and rubella control.
- Achieving and sustaining homogeneous high coverage through routine services and /or SIAs in the two largest countries, India and Indonesia
- Funding: Political commitment and funding both by governments and partners is critical for increasing population immunity.
- Vaccine availability: Possibility of vaccine shortage due to lack of supply plans.
- Case-based surveillance particularly in large countries with autonomous or federalised structures.

Enabling factors

- A regional consultation on setting a target year for measles elimination in SEAR is scheduled for February 2013 and establishing a regional target date is on the Regional Committee agenda in September 2013.
- 2012 is the year of Intensification of Routine Immunization (IRI). Member countries have put efforts to increase the routine immunization coverage targeting high-risk groups and hard to reach areas. This effort is expected to increase measles immunization coverage in member states contributing to achieving the interim goals.
- Ongoing and planned SIAs will further increase population immunity:
 - The measles catch-up campaign in India is targeting 134 million children (9 months to 10 years) in 14 states of 35 States with MCV1 <80%. As of September 2012, the first two phases of the catch-up campaign were completed reaching 53 million children. The 3rd and last phase is scheduled for completion by April 2013. The remaining 21 states with MCV1 coverage \geq 80% are providing the second dose of measles vaccine through routine EPI services.
 - Indonesia completed the third phase measles follow-up SIA in 2011.
 - Myanmar completed nation-wide measles campaign in March 2012.
 - Nepal is conducting the second and third phase MR campaign in 2012-2013.
 - Bangladesh is planning to conduct MR campaign in late 2013.
- Large countries like India and Indonesia are largely self-financing. However, some other countries in the region need further government commitment and funding support from partners in order to achieve interim targets and move towards measles elimination, .
- India is the largest producer of M and MR vaccine. Indonesia produces its own M vaccine and is developing MR production capacity. In addition, at the EPI Managers meeting in Bangkok during 9-12 October 2012, vaccine needs for countries, procurement planning and forecasting was discussed. The EPI managers of all member states agreed to make this a high priority.
- Member states in the region are strengthening measles surveillance. Rubella surveillance is also being integrated with measles control programme. A sensitive measles surveillance in place will help programme monitoring.

Conclusion

Five countries in SEAR (Bhutan, DPR Korea, Maldives, Thailand and Sri Lanka) have surpassed > 90% coverage with measles vaccine and reduced measles mortality by > 90% compared to 2000 estimates. Five countries (Bangladesh, Indonesia, Myanmar, Nepal, and Timor-Leste) have successfully implemented strategies for measles mortality reduction and have achieved or are close to achieving the 90% measles mortality reduction goal. India has already accelerated measles mortality reduction activities by conducting nation-wide measles catch-up campaigns targeting 135 million 9 months to 10 years children of 14 states having MCV1 coverage <80%. By mid-2013, all 35 States in India will be providing a second dose of measles containing vaccine through a combination of routine services and SIAs.

Therefore, the feasibility of achieving measles elimination by all member countries by 2020 is possible. For this, there is a need of country commitment, ownership and support from partners.

Western Pacific Region

In 2003, the Regional Committee for the Western Pacific Region (RC) adopted resolution WPR/RC54.R3, establishing the regional goal of measles elimination. It was followed in 2005 by adoption of resolution WPR/RC56.R8, establishing 2012 as the target for measles elimination. In 2010, the RC adopted resolution WPR/RC61.R7, reaffirming the 2012 measles eliminating goal. Further in September 2012, the RC endorsed a new resolution WPR/RC63.R5, calling for countries and areas to intensify their efforts to interrupt residual transmission as rapidly as possible and sustain the achievements in eliminating measles.

These RC resolutions emphasize accelerating rubella control and CRS prevention by combining them with measles elimination activities. In 2009, the Technical Advisory Group on Immunization and Vaccine Preventable Diseases in the Western Pacific Region recommended that countries and areas should plan to decrease rubella incidence to < 10 cases per million population and congenital rubella syndrome (CRS) to < 10 cases per million live births, by 2015.

Recent progress

In August 2012, based on in-depth review of the regional progress towards measles elimination, the Technical Advisory Group concluded that:

'All countries and areas in the Region have made tremendous efforts to achieve and sustain measles elimination. As a result, the Region is making rapid and remarkable progress and now is on the verge of eliminating measles. Thirty-two countries and areas may have already interrupted endemic measles transmission. The number of measles cases declined by 86% from 145,935 in 2008 down to 21,054 in 2011, and the annual measles incidence reduced from 81.6 per million in 2008 to 11.6 per million population in 2011. In 2012, the number of measles cases has continued to decrease in the Region, with a reduction of 69% from 5,150 measles cases in January-June 2012 compared to 16 431 cases in the same period in 2011. And the number of measles cases is now at historic low in most countries in the Region.'

Rubella incidence varies among countries in the Region, with rubella incidence higher than 10 rubella cases per million population in seven countries and areas. Current reported rubella incidence in WPR countries is impacted by history of rubella vaccination as well as stage of rubella surveillance in individual countries. CRS surveillance presents a challenge because of lack of diagnostic capacity and extensive underreporting in most developing countries. In terms of vaccination, as of July 2012, 31 countries and areas are using MR or MMR in their national routine immunization programmes; and by 2015 rubella containing vaccine will be universally used in the entire region.

Successful practice

Countries and areas have been implementing the key measles elimination strategies recommended by WHO and have tailored them to the country situation.

Cambodia has been innovatively implementing a high-risk community strategy and has taken systematic steps to make it sustainable. The country conducted a focused EPI review in October 2010 to identify

where and why children missed their vaccinations and decided to explore an effective strategy to improve immunization services provided to the underserved populations. High-risk communities were identified and refined during the measles SIAs in 2011 by checking immunization records village by village. These communities were prioritized for actions, including micro-planning, expansion of outreach services, monitoring and supervision.

The last confirmed measles case occurred in November 2011. Success in interrupting endemic transmission in Cambodia has demonstrated that measles elimination is achievable even in the most challenging areas once an effective strategy can be identified and well implemented.

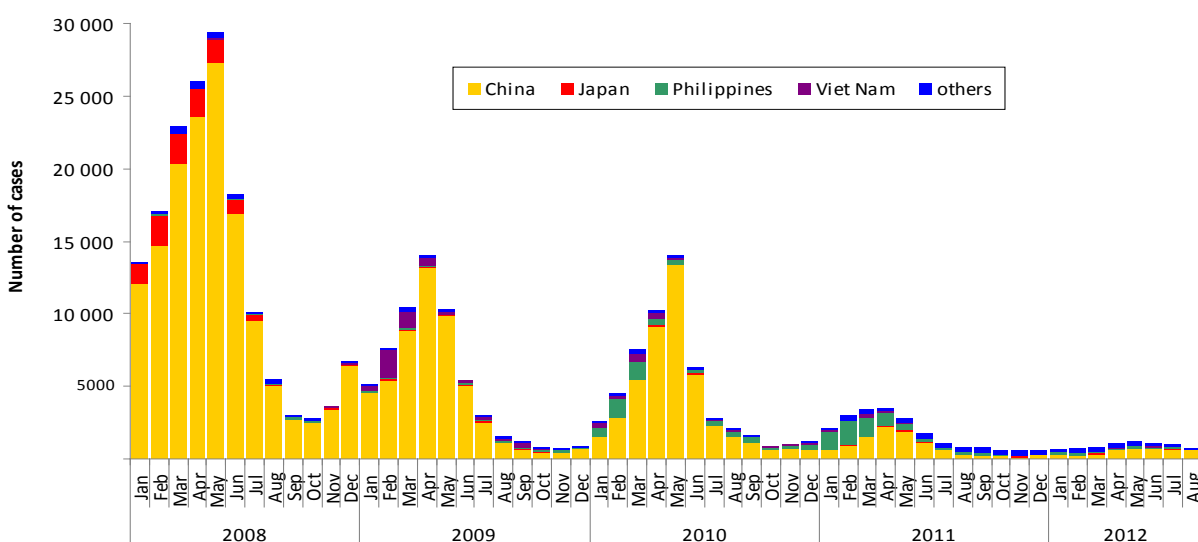


Figure 1 Measles cases by month of onset in Western Pacific Region, 2008–2012* (January–August)
(Source: National measles and rubella monthly reports)

Critical Lesson

Some critical challenges remain in the region to interrupt endemic transmission eventually in all countries and areas, requiring greater political commitment and resources and intensified efforts.

In early 2011, measles emerged in Malaysia and mainly affected children under 7 years old. Measles transmission has been prolonged and continues till now, resulting in an incidence of 54 per million population in 2011 and 89 per million population (annualized rate) in 2012 as of 31 September.

Reported national MCV1 coverage is high (95%) in Malaysia while coverage is not universally high within the country, with coverage < 90% in about 36% districts in 2011. Susceptible children built-up rapidly among the pre-school children particularly given MCV2 administered at 7 years old (school entry); while no preventive action was taken to tackle this risk. WHO recommended a national SIA in response to the

recent and widespread measles outbreaks. Subnational SIA targeting high risk areas only has been eventually chosen due to various operational challenges in conducting a nationwide SIA.

The prolonged measles transmission in Malaysia has indicated that, unlike polio, measles is now not only affecting the least developed countries, but also the high-income countries in the region. The region's experiences has also revealed that, not only the constraints in resources and technical capacity (e.g. in most developing countries), but also the public perceptions on measles becoming a mild disease and resistance to vaccination (e.g. in some developed countries), can hamper the measles elimination programme.

Future directions

As highlighted earlier, the Western Pacific Region is on verge of eliminating measles, and all countries and areas remain strongly committed. Countries still with endemic transmission are planning to intensify their strategies and efforts to close the remaining programmatic gaps as soon as possible.

Sustaining the achievement of measles elimination is also challenging while it provides a great opportunity for countries to reach every community with adequate vaccination services and promote for equity in immunization. It is imperative for every country and area to implement proper strategies and activities to close immunity and surveillance gaps using practical means, and rapidly identify risks (areas and population groups), adequately prevent, prepare for and respond to outbreaks caused by either endemic or imported measles virus. Cambodia's high-risk community strategy offers an innovative strategic approach for the region to move on. The Region and countries will continue prioritizing measles elimination and use measles elimination as a means to advocate for synergy with rubella control activities and equity of immunization and other health care services.

V. Synopsis of the major challenges

African Region:

- Large outbreaks in countries with weak underlying immunization systems
- In countries with a stronger programme, a shift in the age distribution of measles cases to older ages requiring SIAs to target a wider age range
- Lack of human and financial resources

American Region:

- Has achieved and maintained measles elimination (since 2002) and rubella/CRS elimination (since 2009)
- Importations are an ongoing threat that result in costly outbreak response activities

Eastern Mediterranean Region:

- Rapid political change in a number of countries is resulting in declines in immunization coverage
- Increased risk of outbreaks in Afghanistan, Pakistan, Somalia, Sudan and Yemen
- Measles epidemiological and molecular surveillance is not up to the standard that supports validating measles elimination

European Region:

- Insufficient political commitment (e.g., in Western Europe) and health system reform (e.g., in Eastern Europe)
- Politicization of immunization and failure of vaccine procurement in Ukraine
- Vaccine hesitancy is a dominant issue in many countries

South East Asian Region:

- Stagnant routine immunization coverage over the past 5 years and the only WHO Region that has not established a target year for achieving measles elimination
- India and Indonesia are particularly challenging because of their large and diverse populations
- Recent eradication of polio from the Region, a renewed focus on the intensifying routine immunization and India embarking on accelerated measles control is providing new momentum

Western Pacific Region:

- All countries in the Region have made tremendous efforts to achieve and sustain measles elimination and the Region is now on the verge of eliminating measles
- Recent measles outbreaks have involved a high proportion of adult cases and the question remains as to whether these age cohorts will need to be vaccinated to achieve and sustain elimination.
- CRS surveillance presents a challenge because of lack of diagnostic capacity and extensive underreporting in most developing countries.

VI. Opportunities for accelerating Measles and Rubella Elimination

New Policies

The revised position paper on measles vaccine (July 2009) made receipt of 2 doses of measles vaccine the standard for all national immunization programmes. It clarified the criteria for introduction and optimal age of administration of the routine second dose as well as the need to continue SIAs until coverage with both routine doses reaches 90-95% . The revised rubella vaccine position paper (August 2011) encourages countries not yet using rubella vaccine in their national immunization programme to use their delivery system for measles vaccine to introduce rubella vaccine through use of combined measles-rubella (MR) or measles-mumps-rubella vaccines (MMR). These policy breakthroughs were the basis for developing a new strategic plan that fully integrates rubella and CRS prevention with measles control and elimination activities.

New Strategic Plan

In April 2012 realizing the potential of combining rubella with measles, the core partners of the Measles and Rubella Initiative (formerly the Measles Initiative) launched the **Global Measles and Rubella Strategic Plan, 2012-2020**. The development of the plan took over 15 months with extensive consultation with stakeholders and reflects renewed commitment by the core partners. The *Foreword* of the plan is signed by the Heads of Agency of the American Red Cross, US Centers for Disease Control and Prevention, the United Nations Foundation, UNICEF and WHO with the following statement:

“With strong partnerships, resources and political will, we can, and must work together to achieve and maintain the elimination of measles, rubella and CRS globally.”

The Plan includes a five-pronged strategy to reach the measles, rubella and CRS national, regional and global targets and goals:

- Achieve and maintain high levels of population immunity by providing high vaccination coverage with two doses of measles- and rubella-containing vaccines.
- Monitor disease using effective surveillance, and evaluate programmatic efforts to ensure progress.
- Develop and maintain outbreak preparedness, respond rapidly to outbreaks and manage cases.
- Communicate and engage to build public confidence and demand for immunization.
- Perform the research and development needed to support cost-effective operations and improve vaccination and diagnostic tools.

The Plan builds on 30 years of experience in implementing immunization programmes and reflects the lessons learned to date by the MR Initiative and other globally coordinated disease-management efforts, including the Global Polio Eradication Initiative. It particularly seeks to extend the experience gained by the WHO Region of the Americas in eliminating measles, rubella and CRS, to all other regions. In addition to these strategies, the Plan outlines the guiding principles of country ownership, strengthening immunization systems, equity and linkages with other programmes that provide the context in which all measles and rubella control activities should be conducted.

Implementing the Strategies

Achieving and maintaining high population immunity

Increasing coverage with the 1st dose is the focus of renewed efforts by countries, regions and partners to strengthen immunization systems and sustainably increase immunization coverage. To address stagnant routine immunization coverage, the SE Asian Region is implementing an initiative in all Member States to make 2012 the year of intensification of routine immunization. In addition in June 2012, the GAVI Board expanded its performance-based awards to include incentives for improving coverage with MCV1 as a means to reduce the DPT3-MCV1 dropout rate and emphasize the value of a fully vaccinated infant by their 1st birthday. The details of this support are still being worked out and funds should be available to GAVI-eligible countries in 2013.

An increasing number of countries are introducing a routine MCV2 dose in their national childhood immunization schedule. In 2011, Bolivia, Botswana, Djibouti, India, Suriname introduced MCV2. Bangladesh, Burundi, Cambodia, Eritrea, Gambia, Ghana, Sao Tome, are introducing routine MCV2 this year and Burkina Faso and Kenya have applied to GAVI to support their introductions in 2013. By end 2012, 149 of 194 WHO Member States will have a routine 2 dose measles schedule in their national childhood immunization schedule. However, coverage with this dose in the 2nd year of life remains low in many countries that have recently introduced MCV2 and increased efforts are needed to realize the full potential of this well child visit in the 2nd year of life.

The most significant boost to population immunity, both against rubella as well as measles, will come from the new GAVI support for introduction of rubella vaccine. Fifty-one of the remaining 60 countries not yet using rubella vaccine in their routine programme are GAVI-eligible. The recommended approach to introduce rubella vaccine through a wide-age range campaign for all children ages 9 months to 14 years 11 months using combined MR vaccine offers the opportunity to rapidly raise population immunity in these age cohorts that typically contribute most to virus transmission. To ensure sufficient MR vaccine supply for the campaigns and allow countries adequate time to prepare for the switch to MR vaccine as part of the routine program, the roll-out is planned over a six-year period (2013-2018). Full implementation of the roll-out will result in nearly 1 billion children receiving MR vaccine in the campaigns and an additional 200 million infants receiving MR vaccine as a routine first dose. High quality campaigns are critical, and best practices campaign guidelines are being updated that include conducting a post-campaign coverage or seroprevalence survey.

Laboratory supported case-based surveillance

Case-based measles surveillance has been established in 183 countries (94%) with 11 countries⁸ still to implement it nationwide. The WHO Global Measles and Rubella Laboratory Network includes 690 laboratories organized in a tiered structure that provides diagnostic and virus characterization capacity. The critical role of the laboratory network is under recognized and increasing efforts are being made to showcase its value for money. The laboratory network needs to be scaled up in some large countries

⁸ Algeria, Comoros, Guinea-Bissau, Mauritius, Seychelles, Sao Tome and Principe, Somalia, South Sudan, San Marino, India, Thailand

(e.g., India and Indonesia) and expanded to include the remaining countries. There is a shortfall of \$1 million in 2013 for enhancing rubella molecular surveillance which is required for monitoring progress towards elimination.

Performance indicators repeatedly show that the field investigation component of measles and rubella surveillance is lagging behind and some countries with elimination goals (e.g., in the European Region) are not reporting measles and rubella case-based data to the WHO Regional Office. Guidelines are being developed for establishing sentinel CRS surveillance and the capacity for technical assistance is being expanded through training both regional and country focal points as well as a pool of consultants in a standard approach for conducting assessments of national surveillance systems. Combining measles/rubella surveillance reviews with AFP surveillance and new vaccine surveillance assessments will allow more frequent focus on this critical component of the programme. There is a need for updated guidance and standard procedures for conducting integrated VPD surveillance reviews. In addition, there is the opportunity and expectation that measles/rubella surveillance will take over some of the costs to maintain the AFP surveillance network (e.g., salaries for surveillance officers who currently do surveillance for measles and other VPDs as well as polio).

Documenting and verifying elimination

Over the past 2 years, PAHO has implemented a process to verify elimination of measles and rubella at country and regional level. The recommendation from the Independent Expert Committee on verification led to adoption of an emergency plan to sustain elimination to be implemented throughout the Region over the next 3 years. Three other Regions with elimination goals (Europe, Eastern Mediterranean, and Western Pacific) are in the process of finalizing their guidelines and establishing both national and regional verification commissions. Because these Regions have not yet achieved elimination, their commissions have the function to monitor and report on progress towards elimination and highlight the need to improve the quality of immunization coverage and surveillance information. At the September meeting of the SAGE working group on measles and rubella, a global framework for monitoring and verification of measles and rubella elimination was reviewed and is near to completion.

Risk assessment, outbreak preparedness and response

Building on the experience from polio eradication, the Regions have developed, or are in the process of developing, a risk assessment tool to identify underperforming districts at risk of measles outbreaks. These tools need to be promoted at EPI Manager Meetings and their usefulness evaluated as a means of outbreak prevention.

Outbreak preparedness and response has been added as a key strategy in the new Plan. Large measles outbreaks affecting predominantly Africa, Europe, and Asia over the past 2 years highlighted long delays in mounting a response, the lack of country preparedness and response plans, and that the 2009 WHO guidelines for outbreak response were difficult to operationalize. In June 2012, the GAVI Board approved \$55 million over 6 years (2012-2017) to enable a rapid response to measles outbreaks associated with high mortality. These funds will be administered by the MR Initiative and arrangements for making these funds available to countries are close to being finalized. A workshop is being planned by UNICEF and CDC to develop clear operational guidelines for measles outbreak response. This aspect of the programme

will need to be evaluated and adjusted as more experience is gained in both responding to outbreaks and addressing the underlying causes.

Evidence-based communication strategies

Vaccinating over 95% of the target population against measles and rubella requires well-conceived, professionally implemented communication strategies linked directly to programme goals. A new emphasis is being given to effective communication and public engagement with parents, health professionals, community leaders and the media, to gain their trust, and overcome fears and rumors associated with vaccination. Vaccine hesitancy is an emerging challenge in all Regions and in the European Region it is posing a major challenge to achieving measles and rubella elimination goals. Initiatives in the Region to get ahead of this problem are providing reliable information for parents and providers as well as expanding country capacity to respond to reports of adverse events following immunization. The MR Initiative (www.measlesrubellainitiative.org) has recently benefited from a communications specialist who has developed an e- newsletter, social media sites, and developed its first comprehensive communications plan (StopMeaslesRubella.org; [Twitter@MeaslesRubella](https://twitter.com/MeaslesRubella)). There are additional opportunities for immunization programmes to build on the communications experience and expertise established by the polio eradication programme (e.g., in India).

Innovation and strategic oversight

The Global LabNet has maintained an active research agenda developing alternative approaches to specimen collection (e.g., oral fluid and dried blood spots) and more recently a point of care diagnostic test for measles and rubella. However, no ear-marked funding has been made available from the measles and rubella programme budget to fund research and development and foster innovation in the field.

The SAGE working group on measles and rubella was formed to provide strategic oversight to the programme and its' terms of reference include *"identify gaps in essential evidence and programme barriers to achieving measles and rubella/CRS elimination targets and present SAGE with proposed areas for operational or basic science research."* The working group has formed 3 sub-groups to look at immunization strategies, monitoring/surveillance, and the research agenda.

The **immunization strategies subgroup** is tackling questions on determining the upper age range for M and MR campaigns, how to define the age groups and geographic extent of outbreak response immunization, and developing recommendations for revaccination of children on anti-retroviral therapy.

The **monitoring and surveillance subgroup** with input from the Regions is revising the definitions and framework for monitoring progress towards and achievement of measles and rubella elimination (see document in the Yellow Book entitled "Framework for verifying elimination of measles and rubella").

The **research subgroup** has taken a long list of ideas for applied and operational research and is conducting a prioritization exercise with the aim of identifying a short list of the highest priority areas for immediate investment. Additional products from each of these subgroups as well as results from an economic analysis of the costs and benefits of measles and rubella eradication will be presented to SAGE in 2013.

Applying the Guiding Principles

Country ownership

Country ownership and political commitment at all levels are required for successful control and elimination of measles and rubella. Accelerated measles and rubella control activities are based on a country-driven, bottom-up approach with plans of action submitted through WHO and UNICEF Regional offices to the MR Initiative and GAVI for funding support. Since August 2012, advocacy visits have been conducted to Rwanda, Niger, Cape Verde, and Nigeria aimed at ensuring increased commitment of national-level resources for planned measles or measles/rubella SIAs. The MR Initiative is currently investigating whether it should increase their support for operational costs from \$0.32 per child to match the recent GAVI Board decision to provide \$0.65 per child. Close coordination between GAVI and the MR Initiative will be needed to avoid duplication of efforts and efficient use of partner resources.

Strengthening routine immunization systems

Measles and rubella elimination activities provide a unique opportunity to strengthen routine immunization systems. Because measles is one of the most transmissible human pathogens, manifests as outbreaks of febrile rash illness, and requires immunization coverage >95% to stop transmission, it can be used to identify underserved communities and highlight gaps in the immunization programme. A recent example of this comes from Cambodia, where during their measles follow-up campaign in 2011, high risk communities were identified by thorough checking of children's immunization cards. This list of missed children was used to plan additional outreach sessions for the high risk communities, use of mobile phones for communication between village volunteers and the health service, and using the newly introduced measles 2nd dose to assess the child's immunization status at 18 months (as well as the mother's TT status) and catch-up missing doses. In 2013, if funds permit, the MR Initiative will provide additional resources for countries to plan and implement specific strategies to be conducted during and after the campaign that will strengthen routine service delivery. A practical example of this is the opportunity SIAs provide for re-training of all vaccinators in safe injection practices. During the measles SIAs in India, health workers were shown to have significantly better knowledge of standard immunization practices after the measles SIA than before.

Equity

Measles and rubella SIAs promote equity by reaching children missed by routine services and continue to be used to deliver additional child health interventions such as vitamin A, deworming medications, OPV and/or insecticide treated nets for malaria prevention. In 2011, of 28 nation-wide SIAs, 21 provided vaccinations against polio (77 million doses) or rubella (23 million doses) or other interventions such as vitamin A (24 million doses), deworming medication (21 million treatments), or long-lasting insecticide-treated nets (LLINs, 8,725 given out).

Linkages with other programmes

Measles and rubella control and elimination activities provide additional opportunities for synergy with other child health programmes. Closer linkages with polio eradication has benefits both for measles and rubella elimination (polio field staff plan and supervise measles/rubella SIAs and do measles and rubella outbreak investigations) and for polio eradication (delivery of additional doses of OPV during measles

SIAs, maintaining AFP surveillance in countries and regions where polio has been eradicated). However, the opportunity for other elimination programmes such as measles and rubella to take over key elements of the polio infrastructure and human resources is at risk of being lost because of lack of transition planning and insufficient funds for measles/rubella surveillance and programme monitoring. As the end-game strategy for polio eradication evolves, new opportunities for linkages between polio and measles may emerge — these may be related to the routine delivery of an inactivated polio vaccine (IPV) dose at nine months, and needle-free injection technologies (patch/jet injectors), among others.

The routine MCV2 contact establishes a “well child visit” in the second year of life that combines vaccination with deworming, growth monitoring and semi-annual vitamin A supplementation. Through participation of the Lions Club in the MR Initiative, the synergy between two proven interventions to reduce blindness, measles vaccination and vitamin A supplementation, will be further expanded, including the mobilization of national Lions Club volunteers.

With respect to the Global Measles and Rubella Laboratory Network, the equipment, training and quality assurance that support the confirmation of measles, rubella, and CRS through an enzyme-linked immunosorbent assay (ELISA) provide an effective platform for confirmation of other vaccine-preventable diseases, such as yellow fever and Japanese encephalitis.

New Partners and Resources

Since the last discussion of measles at SAGE new partners are providing additional financial and human resources in the fight against measles and rubella. GAVI has pledged over \$700 million dollars of new support by opening windows to support MR vaccine introduction (\$550 million), measles follow-up SIAs in 6 large and challenging countries (\$107 million), emergency measles outbreaks response (\$55 million) and the yet to be implemented performance based support for MCV1. Lions Club International through a challenge grant from the BMGF have brought both money and Lions volunteers to support measles SIAs in Ethiopia, Nepal, Uganda, and Kenya. Another exciting development is the recent announcement by the International Pediatric Association of their initiative to eradicate measles and rubella and join forces with the MR Initiative.

Developing a measles and rubella eradication investment case

It has been estimated that measles eradication would cost between 6-8 billion USD. Similar costing has not been done for rubella eradication or the incremental costs and benefits of combining rubella eradication with measles eradication. WHO has a contract with Kid Risk Inc. to conduct a comprehensive eradication investment case that compares different options for coordination global control and/or eradication of measles and rubella either together or separately. Results from this work are expected in the first quarter of 2013. This information together with demonstration of further progress towards global and regional targets will be needed before SAGE can advise on establishing a target date for achieving global eradication of measles and/or rubella.

VII. Questions to SAGE

SAGE is being asked to make a realistic assessment of progress towards global and regional targets, identify key challenges, lessons learnt, and new opportunities. The Expanded Programme on Immunization is seeking SAGE guidance and recommendations on the following questions:

- Is the programme on track to achieve global and regional targets?
- Are the new strategies, programme plans, and resources well enough defined, effective and sufficient?
- Have the challenges and areas of uncertainty requiring further investigation been adequately defined?
- What additional strategies, tactics, and innovations are needed?
- Does the workplan and anticipated products from the MR working group adequately address the terms of reference?

VIII. Draft Recommendations

SAGE commends the countries and partners for the tremendous progress made in reducing measles mortality and incidence, contributing significantly to MDG 4, and to the progress made in all regions which would not have been possible without the commitment of the countries and the support of the many partners. In addition, there has been a steady increase in the number of countries using rubella vaccine in their routine childhood immunization programme. However, despite the tremendous progress, a careful assessment of the comprehensive reports presented indicates that based on current trends and programme performance, the 2015 global targets as well as regional elimination targets in the European (2015), E. Mediterranean (2015) and African (2020) Regions will not be achieved on time.

Regaining momentum towards elimination

SAGE noted this lack of progress with concern and the high cost of responding to importations in countries that have achieved elimination and urges country governments, international partner agencies and civil society partners to increase their advocacy, investment and commitment to achieving the existing measles and rubella control and elimination targets as part of the GVAP of the Decade of Vaccines.

Establishing an elimination goal in the SE Asian Region

The eradication of polio from the SE Asian Region and new country-led activities conducted as part of the Regional resolution on Intensification of Routine Immunization has provided new momentum to immunization programmes. SAGE noted the plans for a Regional consultation on measles elimination in February 2013 and encourages Member States in the Region to establish a target date for achieving measles elimination as means to maintain the high political and funding support to immunization and as critical step towards establishing a target date for global eradication of measles.

Equity

Because measles is one of the most transmissible human pathogens, it readily finds susceptible populations and can be used to identify underserved communities and highlight gaps in the immunization programme. Recognizing the potential for measles elimination to promote equity, SAGE encourages immunization and health services to use the occurrence of measles cases as an indicator of inequities in access to preventive health services and use this intelligence for planning more equitable health service delivery.

Strengthening routine immunization systems

Measles and rubella elimination activities provide a unique opportunity to strengthen routine immunization systems. SAGE noted the innovative work done in Cambodia and India where measles SIAs were used to measurably improve routine immunization service delivery. SAGE recommends that countries and partners provide additional resources to plan and implement specific strategies to be conducted before, during and after SIAs the campaign that will strengthen routine service delivery.

Operational planning and financing

The goals of the Measles and Rubella Global Strategic Plan, 2012-2020 are closely aligned with the Global Vaccine Action Plan and the strategies and guiding principles, if fully implemented, should

achieve the regional and global targets. However, the costs of implementing the plan are not yet available. SAGE recommends that a detailed operational plan be developed and its components fully costed so that a realistic assessment can be made of the human and financial resources needed to reach the current regional and global targets.

New partners and resources

Over the past 18 months, new civil society partners (e.g., Lions Clubs International Foundation, The International Pediatric Association, The American Academy of Pediatrics, Sabin Vaccine Institute) have joined the MR Initiative. With the new commitments by GAVI to support measles control and rubella vaccine introduction, low and low-middle income countries have the option to obtain support from both MR Initiative and/or GAVI. SAGE recommends GAVI and the MR Initiative establish effective communication channels at each level of their organizations both with each other and countries to avoid confusion and potential duplication of efforts.

Rubella vaccine introduction

The introduction of rubella vaccine starting with a wide age-range MR SIA with substantial funding support for GAVI-eligible countries is a unique and unprecedented opportunity to rapidly increase population immunity against both rubella and measles and move countries closer to elimination. SAGE recommends that every country introducing rubella vaccine ensure that their planning and implementation is of the highest quality and includes all the strategies recommended by SAGE (Wkly Epid Rec, 28 August 2009, No. 35, 2009, 84, 349–360). Each MR campaign should follow established “best practices” and be independently evaluated to ensure homogeneous vaccination coverage of >95%.

Linkages with other programmes

Closer linkages between measles and rubella programme activities and the Global Polio Eradication Initiative has well recognized benefits both for both programmes. SAGE recommends countries and global immunization partners assess the potential synergies and take active steps, where appropriate, to transition the polio infrastructure and lessons learnt to support achievement of measles and rubella elimination targets.

Laboratory-supported case-based surveillance

While the WHO Global LabNet is providing a high quality diagnostic and virus tracking capacity to nearly all countries, field surveillance is lagging behind in many countries due to lack of human and financial resources. SAGE noted challenges in the integration of rubella with measles surveillance, inadequate quality of case and outbreak investigations, and lack of timely reporting by countries to WHO Regional Offices even in Regions with established elimination goals. SAGE recommends immediate attention to funding shortfalls for both field and laboratory surveillance and stronger advocacy with governments to ensure on-time reporting of measles and rubella surveillance data to WHO Regional Offices. In addition, SAGE requests the MR working group to look in more detail at surveillance and present draft recommendations for strengthening this critical aspect of the programme to SAGE in 2013.

Documenting and verifying elimination

The establishment of Regional and national commissions to document and verify elimination provides much needed attention to improving the quality of vaccination coverage, disease and virus surveillance

information. SAGE stressed the importance of a standardized approach that draws on the experience from countries and Regions involved in verification activities. SAGE reviewed and endorsed the draft Framework for Verification of Measles and Rubella Elimination and encourages Regions and countries, as they approach elimination, to adopt this approach.

Risk assessment, outbreak preparedness and response

SAGE welcomed the new GAVI funds to support more effective response to measles outbreaks. The experience from elimination of measles and rubella in the Americas is that, in addition to timely outbreak response, attention should be given to outbreak prevention. SAGE recommended that Regional and country experience be used as the basis for developing and evaluating a risk assessment tool to identify and intervene in underperforming districts as a means to prevent outbreaks.

Overcoming vaccine hesitancy

SAGE noted the increasing challenge being faced in all Regions, but particularly in the European Region, with regard to vaccine hesitancy and recommended that the measles and rubella working group liaise closely with the new SAGE working group on vaccine hesitancy in this regard.

Innovation and strategic oversight

SAGE reviewed and agreed that the planned products from the MR working group adequately address the terms of reference of the working group. With respect to the research agenda, SAGE noted the short time line to achieve the GVAP goals and requested that the working group present the results of their work on prioritization of research needs at the next SAGE meeting.

Strengthen global coordination

The inclusion of regional measles and rubella elimination in the GVAP goals for 2020 and the addition of new partners and funding to support implementation will require stronger coordination among partners, across regions and with countries. SAGE encourages all partners in the Measles and Rubella Initiative to review their management structure with a view to strengthening their ability to support efficient programme implementation. In addition, WHO as the lead technical agency, should assess its capacity to effectively coordinate programme activities in this expanding area of work.