

MEASLES-RUBELLA

News in Brief

Progress towards measles elimination: Member States of the Western Pacific Region kept up the attack against endemic measles virus during 2011 through supplementary immunization activities (SIAs) and strengthened routine immunization services. Integrated, multi-antigen SIAs in Cambodia, the Lao People's Democratic Republic, the Federated States of Micronesia, the Philippines and Papua New Guinea reached 20.5 million people with measles containing vaccine and provided other essential child health interventions (for example, oral polio vaccine, vitamin A and deworming medicines). Measles incidence was 11.6 per million of population in 2011 compared with 27 per million in 2010. However, a dramatic reduction in cases occurred in the second half of the year that should continue in 2012 as a result of the SIAs mentioned above.

Regional Consultation on Measles Elimination and Hepatitis B Control: The WHO Regional Office for the Western Pacific is bringing together the members of the Regional Verification Commission (RVC) on Measles Elimination and ministry of health officials from Member States and partners for a consultation on measles elimination 17–20 April. The RVC will meet alone on 17 April for an organizational meeting to be followed by the consultation with Member States and partners 18–20 April. The consultation will also address a proposed target year for achieving the Hepatitis B control goal of <1% seroprevalence of hepatitis B surface antigen prevalence among five-year-old children and the Decade of Vaccines Collaboration Global Vaccine Action Plan.

GAVI supports rubella vaccine introduction: In response to increased demand from countries and World Health Organization (WHO) recommendations, in November 2011, the Global Alliance for Vaccines and Immunization (GAVI) Board approved to open a funding window for rubella vaccines, with a target of reaching 588 million children by 2015. GAVI will invite applications from eligible countries in 2012 for support of catch-up SIAs targeting children ages nine months to 14 years with measles-rubella vaccine and a one time vaccine introduction grant for each country to cover operational costs for routine introduction. Application guidelines will be available on 1 April, and applications are due by 31 August 2012. The decision on funding rubella vaccines supports the United Nations Secretary-General's *Global Strategy for Women and Children's Health* by increasing access to life-saving vaccines for women and children in the world's poorest countries.

Data Reporting

Timeliness and completeness of monthly data reporting

National reports (Table 1A)

During 2011, completeness and timeliness of monthly reporting of measles and rubella cases to the WHO Regional Office for the Western Pacific was 95% and 89%, respectively. Completeness of reporting for the Region ranged from 82% to 100% by month; and varied from 75% to 100% by country and area. Completeness of monthly reporting was particularly low for the Pacific island countries and areas, Papua New Guinea and Viet Nam (75% each) because of low reporting during the first half of the year. Timeliness of monthly reporting for the Region ranged from 76% to 100% by month and from 42% to 100% by country and area. Timeliness

was particularly low for Papua New Guinea (42%) and Viet Nam (50%), primarily because of late or no reports during the first half of the year.

National measles laboratory reports (Table 1B)

During 2011, completeness and timeliness of data submitted by national measles laboratories (NMLs) to the Regional Office was 93% and 88%, respectively. Laboratories from China do not report laboratory data directly to the WHO Regional Office for the Western Pacific. All other NMLs achieved at least 80% completeness. Timeliness of monthly reporting was particularly low for NMLs in Fiji (58%), Papua New Guinea (67%) and Viet Nam (northern) (75%), but timeliness improved in the second half of the year.

Table 1A. Completeness and timeliness of national reporting, Western Pacific Region, 2009 - 2011

Country	2009		2010		2011 ¹												Completeness ²	Timeliness ³	
	Completeness	Timeliness	Completeness	Timeliness	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
					10 Feb	10 Mar	10 Apr	10 May	10 Jun	10 Jul	10 Aug	10 Sep	10 Oct	10 Nov	10 Dec	10 Jan			
Australia	100%	100%	100%	100%	08 Feb	10 Mar	08 Apr	06 May	09 Jun	07 Jul	09 Aug	07 Sep	07 Oct	09 Nov	09 Dec	09 Jan	100%	100%	
Brunei Darussalam	100%	100%	100%	100%	08 Feb	09 Mar	07 Apr	09 May	07 Jun	09 Jul	09 Aug	07 Sep	08 Oct	08 Nov	08 Dec	09 Jan	100%	100%	
Cambodia	100%	83%	75%	42%	10 Feb	10 Mar	10 Apr	10 May	08 Jun	10 Jul	31 Aug	10 Sep	10 Oct	10 Nov	10 Dec	10 Jan	100%	92%	
China	92%	0%	100%	58%	14 Feb	10 Mar	12 Apr	11 May	13 Jun	10 Jul	10 Aug	13 Sep	12 Oct	15 Nov	15 Dec	15 Jan	100%	100%	
Hong Kong (China)	100%	100%	100%	100%	09 Feb	09 Mar	07 Apr	06 May	09 Jun	08 Jul	09 Aug	09 Sep	07 Oct	09 Nov	08 Dec	06 Jan	100%	100%	
Japan	100%	92%	100%	100%	04 Feb	07 Mar	05 Apr	06 May	10 Jun	08 Jul	10 Aug	10 Sep	10 Oct	09 Nov	07 Dec	10 Jan	100%	100%	
Lao PDR	58%	42%	83%	75%	09 Feb	10 Mar	08 Apr	10 May	10 Jun	10 Jul	06 Aug	05 Sep	07 Oct		09 Dec	10 Jan	92%	92%	
Macao (China)	100%	83%	100%	100%	07 Feb	04 Mar	06 Apr	05 May	07 Jun	01 Jul	05 Aug	02 Sep	07 Oct	02 Nov	05 Dec	05 Jan	100%	100%	
Malaysia	58%	42%	92%	83%	09 Feb	07 Mar	08 Apr	06 May	09 Jun	15 Jul	10 Aug	10 Sep	05 Oct	09 Nov	15 Dec	10 Jan	100%	92%	
Mongolia	100%	75%	100%	92%	09 Feb	07 Mar	09 Apr	05 May	07 Jun	10 Jul	05 Aug	09 Sep	07 Oct	10 Nov	10 Dec	09 Jan	100%	100%	
New Zealand	100%	92%	100%	92%	07 Feb	07 Mar	05 Apr	12 May	08 Jun	05 Jul	24 Aug	08 Sep	06 Oct	04 Nov	08 Dec	10 Jan	100%	83%	
Papua New Guinea	67%	17%	67%	33%	16 Feb	29 Mar					14 Jul	04 Aug	06 Sep	07 Oct	04 Nov	07 Dec	17 Jan	75%	42%
Philippines	75%	58%	100%	92%	06 Feb	14 Mar	10 Apr	03 May	03 Jun	07 Jul	03 Aug	06 Sep	10 Oct	09 Nov	03 Dec	03 Jan	100%	92%	
Republic of Korea	50%	17%	92%	92%	10 Feb	08 Mar	07 Apr	09 May	10 Jun	10 Jul	08 Aug	14 Sep	07 Oct	04 Nov	06 Dec	04 Jan	100%	92%	
Singapore	100%	67%	100%	100%	02 Feb	01 Mar	06 Apr	05 May	06 Jun	04 Jul	03 Aug	06 Sep	04 Oct	04 Nov	06 Dec	09 Jan	100%	92%	
Viet Nam	83%	25%	92%	25%	10 Feb		10 Apr		02 Jun	10 Jul	11 Aug	02 Oct	07 Oct	02 Nov		11 Jan	75%	50%	
Pacific island countries*	67%	42%	92%	58%	10 Feb	10 Mar					22 Jul	10 Aug	15 Sep	11 Oct	03 Nov	09 Dec	10 Jan	75%	67%
Completeness	85.3%		93.6%		100%	94%	88%	82%	88%	100%	100%	100%	100%	94%	94%	100%	95.1%		
Timeliness		60.8%		78.9%	94%	88%	88%	76%	88%	88%	82%	88%	100%	94%	88%	88%			88.7%

¹ Monthly reports received through March 2012

Legend: black = timely report; red = untimely report

² Completeness is defined as the number of reports received by the end of the reporting month divided by the number of expected reports for the year

³ Countries and areas should submit reports by the 10th (or the next working day) of the following month; Pacific island countries and China may report to the Regional Office by the 15th (or the next working day) of the following month

Table 1B. Completeness and timeliness of laboratory reporting, Western Pacific Region, 2009 - 2011

Country	2009		2010		2011 ¹												Completeness ²	Timeliness ³	
	Completeness	Timeliness	Completeness	Timeliness	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec			
					10 Feb	10 Mar	10 Apr	10 May	10 Jun	10 Jul	10 Aug	10 Sep	10 Oct	10 Nov	10 Dec	10 Jan			
Australia	100%	83%	100%	100%	08 Feb	03 Mar	05 Apr	04 May	03 Jun	01 Jul	08 Aug	06 Sep	03 Oct	07 Nov	02 Dec	03 Jan	100%	100%	
Cambodia	50%	17%	42%	25%	07 Feb	07 Mar	07 Apr	09 May	09 Jun	09 Jul	05 Aug	07 Sep	08 Oct	08 Nov	09 Dec	05 Jan	100%	100%	
China	0%	0%	0%	0%													0%	0%	
Hong Kong (China)	100%	100%	100%	100%	09 Feb	09 Mar	09 Apr	09 May	09 Jun	09 Jul	10 Aug	09 Sep	08 Oct	10 Nov	10 Dec	09 Jan	100%	100%	
Japan	0%	0%	0%	0%	04 Feb	07 Mar	05 Apr	06 May	10 Jun	08 Jul	10 Aug	10 Sep	10 Oct	09 Nov	07 Dec	10 Jan	100%	100%	
Lao PDR	8%	0%	58%	58%	10 Feb	10 Mar	08 Apr	10 May	10 Jun	10 Jul	10 Aug	03 Sep	10 Oct	10 Nov	10 Dec	10 Jan	100%	100%	
Macao (China)	100%	92%	100%	100%	07 Feb	04 Mar	07 Apr	05 May	08 Jun	07 Jul	05 Aug	05 Sep	08 Oct	08 Nov	05 Dec	08 Jan	100%	100%	
Malaysia	75%	8%	92%	58%	09 Feb	07 Mar	08 Apr	10 May	09 Jun	10 Jul	09 Aug	09 Sep	10 Oct	08 Nov	07 Dec	10 Jan	100%	100%	
Mongolia	92%	92%	100%	100%	08 Feb	04 Mar	06 Apr	04 May	07 Jun	09 Jul	05 Aug	07 Sep	07 Oct	04 Nov	09 Dec	09 Jan	100%	100%	
New Zealand	83%	8%	100%	33%	09 Feb	11 Mar	08 Apr	10 May	10 Jun	07-Jul	10 Aug	08 Sep	10 Oct	10 Nov	09 Dec	10 Jan	100%	92%	
Papua New Guinea	0%	0%	75%	33%	10 Feb	08 Mar	12 Apr	09 May		01 Jul	09 Aug	09 Sep	02 Oct		02 Dec	24 Jan	83%	67%	
Philippines	100%	33%	100%	83%	08 Feb	10 Mar	08 Apr	10 May	25 May	10 Jul	09 Aug	09 Sep	10 Oct	10 Nov	08 Dec	05 Jan	100%	100%	
Republic of Korea	75%	50%	100%	100%	10 Feb	09 Mar	08 Apr	10 May	08 Jun	10 Jul	09 Aug	09 Sep	10 Oct	10 Nov	09 Dec	10 Jan	100%	100%	
Singapore	100%	100%	100%	100%	07 Feb	07 Mar	08 Apr	06 May	07 Jun	08 Jul	05 Aug	09 Sep	07 Oct	08 Nov	06 Dec	06 Jan	100%	100%	
Viet Nam (northern)	92%	58%	100%	58%	08 Feb	21 Mar	09 Apr	10 May	16 Jun	12 Jul	09 Aug	09 Sep	05 Oct	07 Nov	08 Dec	09 Jan	100%	75%	
Viet Nam (southern)	92%	75%	83%	50%	09 Feb	10 Mar	08 Apr	10 May	08 Jun	08 Jul	09 Aug	08 Sep	10 Oct	10 Nov	09 Dec	09 Jan	100%	100%	
Fiji	67%	58%	67%	50%	09 Feb	10 Mar	11 Apr	04 May		22 Jul	10 Aug	15 Sep	11 Oct	03 Nov	09 Dec	10 Jan	92%	58%	
Completeness	66.7%		77.5%		94%	94%	94%	82%	82%	94%	94%	94%	88%	94%	94%	94%	92.6%		
Timeliness		45.6%		61.8%	94%	82%	82%	94%	76%	82%	94%	88%	88%	88%	94%	94%			88.2%

¹ Monthly reports received through March 2012

² Completeness is defined as the number of reports received by the end of the reporting month divided by the number of expected reports for the year

³ National measles and rubella laboratories should submit monthly reports by the 10th (or the next working day) of the following month

Incidence and Deaths (Table 2A)

A total of 21 048 confirmed measles cases were reported in the Region during 2011, corresponding to a measles incidence of 11.6 per million of population, a 57% decrease compared to the 27.0 per million incidence in 2010. The countries with the highest incidence were New Zealand (135.7), the Philippines (69.1), Malaysia (54.4), Cambodia (50.4), and Singapore (27.6). Classification is pending for 45 cases.

Clinically confirmed cases accounted for 5447 (26.3%) of all confirmed cases in the Region with classification data (Australia and Singapore do not report clinically confirmed cases). Countries and areas with a large percentage of clinically confirmed cases included

Viet Nam (86.2%), the Lao People's Democratic Republic (74.3%), Cambodia (55.8%), the Philippines (48.0%), and Hong Kong (China) (46.2%). Clinically confirmed cases are considered failures of surveillance because either specimens were not collected or contact tracing was inadequate to establish epidemiologic linkage to other confirmed cases.

Forty-seven measles related deaths were reported during 2011 (case fatality rate [CFR]=0.2%): 28 were reported from the Philippines (CFR=0.4%), 10 from China (CFR=0.1%), four from Viet Nam (CFR=0.5%) and four from Malaysia (CFR=0.2%) and one from Cambodia (CFR=0.1%)

Surveillance Performance Indicators (Table 2B)

Case reporting rate

The annualized discarded measles rate during 2011 was 2.8 per 100 000 population for the Region, an increase from 1.7 in 2010 and exceeding the target of 2 per 100 000. Countries and areas achieving or

exceeding the target included Fiji (59.3), Cambodia (20.2), Viet Nam (16.0), Malaysia (11.6), Mongolia (6.5), the Lao Peoples Democratic Republic (5.2), Hong Kong (China) and the Philippines (3.1), and Macao (China) (2.7). Countries with discarded measles rates well below the target included

Table 2A. Measles case classification and incidence, by country and area, Western Pacific Region, 2010–2011¹

Country	2010										2011 ¹									
	Population (in millions) ²	Suspected measles cases ³	Confirmed measles cases				Discarded cases	Pending classification	Deaths due to measles	Measles incidence per 1 million pop.	Population (in millions) ²	Suspected measles cases ³	Confirmed measles cases				Discarded cases	Pending classification	Deaths due to measles	Measles incidence per 1 million pop.
			Lab	Epi-linked	Clinical	Total							Lab	Epi-linked	Clinical	Total				
Australia	22.27	No data	65	5	0	70	0	0	0	3.1	22.61	No data	164	24	0	188	0	0	0	8.3
Brunei Darussalam	0.40	7	0	0	0	0	7	0	0	0.0	0.41	10	4	0	0	4	6	0	0	9.9
Cambodia	14.14	3572	451	0	705	1 156	2416	0	6	81.8	14.31	3613	319	0	402	721	2885	7	1	50.4
China	1341.34	56 766	26 297	116	11 768	38 181	18 529	56	39	28.5	1347.57	34 642	8951	13	979	9 943	24 692	7	10	7.4
Hong Kong (China)	7.05	24	4	0	7	11	13	0	0	1.6	7.12	232	6	1	6	13	222	0	0	1.8
Japan	126.54	461	306	3	121	430	31	0	0	3.4	126.50	809	322	9	79	410	399	0	0	3.2
Lao PDR	6.20	332	6	0	147	153	179	0	0	24.7	6.29	439	12	17	84	113	326	0	0	18.0
Macao (China)	0.54	28	0	0	0	0	28	0	0	0.0	0.56	16	1	0	0	1	15	0	0	1.8
Malaysia	28.40	1102	68	2	4	74	1028	0	0	2.6	28.86	4910	1445	82	42	1569	3341	0	4	54.4
Mongolia	2.76	160	0	0	7	7	153	0	0	2.5	2.80	183	0	0	0	0	183	0	0	0.0
New Zealand	4.37	No data	15	21	12	48	0	0	0	11.0	4.41	No data	428	105	66	599	0	4	0	135.7
Papua New Guinea	6.86	26	0	0	0	0	26	0	0	0.0	7.01	50	0	0	0	0	44	6	0	0.0
Philippines	93.26	10 376	2883	137	3368	6388	3988	0	34	68.5	94.85	9506	3239	171	3144	6554	2952	0	28	69.1
Republic of Korea	48.18	246	95	16	3	114	132	0	0	2.4	48.39	174	40	0	3	43	131	0	0	0.9
Singapore	5.09	No data	54	0	0	54	0	0	0	10.6	5.19	No data	143	0	0	143	0	0	0	27.6
Viet Nam	87.85	6428	757	90	979	1826	2919	1683	1	20.8	88.79	14 954	22	81	642	745	1 4208	0	4	8.4
Pacific island countries and areas																				
American Samoa	0.07	0	0	0	0	0	0	0	0	0.0	0.07	0	0	0	0	0	0	0	0	0.0
Cook Islands	0.02	0	0	0	0	0	0	0	0	0.0	0.02	0	0	0	0	0	0	0	0	0.0
Fiji ⁴	0.86	75	1	0	0	1	46	28	0	1.2	0.87	538	2	0	0	2	515	21	0	2.3
French Polynesia	0.27	0	0	0	0	0	0	0	0	0.0	0.27	0	0	0	0	0	0	0	0	0.0
Guam	0.18	0	0	0	0	0	0	0	0	0.0	0.18	0	0	0	0	0	0	0	0	0.0
Kiribati	0.10	0	0	0	0	0	0	0	0	0.0	0.10	0	0	0	0	0	0	0	0	0.0
Marshall Islands	0.05	0	0	0	0	0	0	0	0	0.0	0.05	0	0	0	0	0	0	0	0	0.0
Micronesia, Federated States of	0.11	0	0	0	0	0	0	0	0	0.0	0.11	0	0	0	0	0	0	0	0	0.0
Nauru	0.01	0	0	0	0	0	0	0	0	0.0	0.01	0	0	0	0	0	0	0	0	0.0
New Caledonia	0.25	0	0	0	0	0	0	0	0	0.0	0.25	0	0	0	0	0	0	0	0	0.0
Niue	0.00	0	0	0	0	0	0	0	0	0.0	0.00	0	0	0	0	0	0	0	0	0.0
Northern Mariana Islands	0.06	0	0	0	0	0	0	0	0	0.0	0.06	0	0	0	0	0	0	0	0	0.0
Palau	0.02	0	0	0	0	0	0	0	0	0.0	0.02	0	0	0	0	0	0	0	0	0.0
Samoa	0.18	0	0	0	0	0	0	0	0	0.0	0.18	0	0	0	0	0	0	0	0	0.0
Solomon Islands	0.54	0	0	0	0	0	0	0	0	0.0	0.55	0	0	0	0	0	0	0	0	0.0
Tokelau	0.00	0	0	0	0	0	0	0	0	0.0	0.00	0	0	0	0	0	0	0	0	0.0
Tonga	0.10	0	0	0	0	0	0	0	0	0.0	0.10	0	0	0	0	0	0	0	0	0.0
Tuvalu	0.01	0	0	0	0	0	0	0	0	0.0	0.01	0	0	0	0	0	0	0	0	0.0
Vanuatu	0.24	0	0	0	0	0	0	0	0	0.0	0.25	0	0	0	0	0	0	0	0	0.0
Wallis and Futuna	0.01	0	0	0	0	0	0	0	0	0.0	0.01	0	0	0	0	0	0	0	0	0.0
Western Pacific Region	1798.34	79 603	31 002	390	17 121	48 513	29 495	1767	80	27.0	1808.80	70 076	15 098	503	5447	21 048	49 919	45	47	11.6

¹ Monthly reports with data through March 2012

² Population figures from United Nations World Population Prospects: The 2010 Revision

³ Australia, New Zealand and Singapore report only confirmed cases

⁴ Classification is provisional based on laboratory data only

Green <1 confirmed measles case / 1 000 000 population
 Yellow 1-9.9 confirmed measles case / 1 000 000 population
 Red >= 10 confirmed cases / 1 000 000 population

Table 2B. Measles surveillance performance indicators, by country and area, Western Pacific Region, 2010–2011 ¹

Country	2010					2011 ¹				
	Discarded measles rate per 100 000 pop	Second level units with ≥ 1 discarded cases per 100 000 pop	Suspected cases with adequate investigation	Suspected cases with adequate blood specimens ²	Percent clinically confirmed cases ³	Discarded measles rate per 100 000 pop	Second level units with ≥ 1 discarded cases per 100 000 pop (annualized)	Suspected cases with adequate investigation	Suspected cases with adequate blood specimens ²	Percent clinically confirmed cases ³
	≥ 2	≥ 80%	≥ 80%	≥ 80%	≤ 10%	≥ 2	≥ 80%	≥ 80%	≥ 80%	≤ 10%
Australia ⁴	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Brunei Darussalam	1.8	100.0%	85.7%	100.0%	Not applicable	1.5	100.0%	70.0%	90.0%	0.0%
Cambodia	17.1	75.0%	60.1%	79.3%	61.0%	20.2	75.0%	41.8%	84.9%	55.8%
China	1.4	51.6%	91.1%	72.6%	30.8%	1.8	71.0%	94.4%	88.0%	9.8%
Hong Kong (China)	0.2	0.0%	45.8%	66.7%	63.6%	3.1	100.0%	76.7%	97.8%	46.2%
Japan	0.0	0.0%	Insufficient data	Insufficient data	28.1%	0.3	4.3%	Insufficient data	Insufficient data	19.3%
Lao PDR	2.9	35.3%	19.3%	23.8%	96.1%	5.2	70.6%	40.5%	43.1%	74.3%
Macao (China)	5.2	100.0%	100.0%	100.0%	Not applicable	2.7	100.0%	100.0%	100.0%	0.0%
Malaysia	3.6	87.5%	71.7%	81.7%	5.4%	11.6	93.8%	71.9%	83.8%	2.7%
Mongolia	5.6	31.8%	65.0%	92.5%	100.0%	6.5	36.4%	60.7%	100.0%	Not applicable
New Zealand ⁴	Insufficient data	Insufficient data	Insufficient data	Insufficient data	25.0%	Insufficient data	Insufficient data	Insufficient data	Insufficient data	11.0%
Papua New Guinea	0.4	5.0%	46.2%	100.0%	Not applicable	0.6	20.0%	42.0%	82.0%	Not applicable
Philippines	4.3	94.1%	14.5%	67.8%	52.7%	3.1	88.2%	51.3%	76.3%	48.0%
Republic of Korea	0.3	6.3%	61.8%	73.9%	2.6%	0.3	0.0%	73.0%	85.6%	7.0%
Singapore ⁴	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data	Insufficient data
Viet Nam	3.3	53.1%	58.9%	59.8%	53.6%	16.0	84.4%	22.3%	31.7%	86.2%
Pacific island countries and areas										
American Samoa	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Cook Islands	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Fiji	5.3	75.0%	0.0%	Not applicable	Not applicable	59.3	100.0%	0.0%	Insufficient data	Insufficient data
French Polynesia	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Guam	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Kiribati	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Marshall Islands	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Micronesia, Federated States of	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Nauru	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
New Caledonia	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Niue	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Northern Mariana Islands	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Palau	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Samoa	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Solomon Islands	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Tokelau	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Tonga	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Tuvalu	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Vanuatu	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Wallis and Futuna	0.0	0.0%	Not applicable	Not applicable	Not applicable	0.0	0.0%	Not applicable	Not applicable	Not applicable
Western Pacific Region	1.7	39.3%	76.2%	71.3%	35.4%	2.8	52.3%	67.3%	73.5%	26.3%

¹ Monthly reports received through March 2012

² Excludes epi-linked cases

³ Among all confirmed cases

⁴ Reports only confirmed cases

Green	Reached or surpassed target
Yellow	Nearly reached target: 1.00-1.99 for non-measles suspected case rate; 10.1-25% for percent clinically confirmed cases; 60-79% for other indicators
Red	Substantially below target

Table 3. Measles and rubella laboratory performance, Western Pacific Region, 2011¹

Country	Measles and rubella		Measles													Rubella				
			Serology									Virus detection				Serum and blood (includes DBS)				
	Total number of cases tested	Total number of samples received	Serum					Blood		Results ≤ 7 days	Measles Virus isolation/ detection (swab, urine, PBMC)		Measles RT - PCR		Total number of lab confirmed cases	Samples tested for rubella IgM	Rubella IgM (+)	Rubella IgM equiv	Rubella IgM pending	
			Samples tested for measles IgM	Measles IgM (+)	Measles IgM equiv	Measles IgM (-)	Measles IgM pending	DBS samples	No. of samples tested		No. of isolates	No. of samples tested	No. of (+)	No.						No.
Australia	159	254	77	25	6	46	59.7%	0	0	-	100%	0	0	167	134	111	40	5	1	0
Cambodia	3201	3208	3038	288	2	2748	90.5%	0	170	8	55.6%	0	0	0	0	296	3038	1048	60	0
China																				
Hong Kong (China)	379	434	342	6	5	331	96.8%	0	0	-	98.2%	19	2	29	6	7	352	41	2	4
Japan																				
Lao PDR	181	181	181	12	0	169	93.4%	0	0	-	82.1%	0	0	0	0	12	181	37	21	0
Macao (China)	47	47	47	1	0	46	97.9%	0	0	-	97.9%	0	0	0	0	1	47	1	1	0
Malaysia	4923	5009	4975	1582	109	3284	66.0%	0	0	-	100%	4145	118	481	114	1582	3360	383	193	1
Mongolia	182	182	182	0	0	182	100%	0	0	-	100%	0	0	0	0	0	182	14	5	1
New Zealand	1175	1424	693	161	11	520	75.0%	1	2	0	99.0%	17	2	701	389	467	95	4	1	12
Papua New Guinea	144	144	60	0	0	60	100.0%	0	84	0	30.7%	0	0	0	0	0	144	8	9	2
Philippines	7620	7620	7620	3829	424	3367	44.2%	0	0	-	72.6%	179	30	0	0	3829	3831	1115	322	0
Republic of Korea	243	288	227	41	21	165	72.7%	0	0	-	98.2%	17	1	79	13	42	227	19	32	0
Singapore	581	831	239	56	2	181	75.7%	0	0	-	97.6%	273	42	65	4	95	376	9	18	0
Viet Nam (northern)	2466	2466	1460	8	4	1447	99.1%	1	0	-	62.4%	55	0	0	0	8	2465	1413	134	0
Viet Nam (southern)	1729	1739	1475	6	9	1460	99.0%	0	0	-	92.9%	10	0	10	0	6	1721	1084	110	0
Fiji	527	528	518	2	1	515	99.4%	0	10	0	47.2%	0	0	0	0	2	527	151	57	0
Total	23 557	24 355	21 134	6017	594	14 521	68.7%	2	266	8	78.6%	4715	195	1532	660	6458	16 586	5332	966	20

¹ Monthly reports received through March 2012

Table 4A. Measles genotype distribution, Western Pacific Region, 2010–2011¹

Country	2010												2011 ¹											
	Total confirmed cases ²	Total Lab confirmed ²	GENOTYPES ³								Pending	Total	Total confirmed cases ²	Total Lab confirmed ²	GENOTYPES ³								Pending	Total
			B3	D4	D8	D9	D11	G3	H1	A					B3	D4	D8	D9	D11	G3	H1	A		
Australia	70	65	7	3	4	21	-	-	2	1	9	47	188	164	-	31	25	38	-	-	1	5	3	103
Brunei Darussalam	0	0	-	-	-	-	-	-	-	-	-	0	4	4	-	-	-	-	-	-	-	-	-	0
Cambodia	1156	451	-	-	-	11	-	-	-	-	-	11	722	320	-	-	-	2	-	-	3	-	-	5
China	38 181	26 297	-	-	-	2	2	-	277	2	-	283	9943	8951	-	-	-	-	1	-	175	2	-	178
Hong Kong (China)	11	4	1	-	1	1	-	-	2	-	-	5	13	6	-	-	1	3	-	-	1	-	-	5
Japan	430	306	-	-	1	4	-	-	1	-	-	6	410	322	-	51	7	35	-	1	-	4	-	98
Lao PDR	153	6	-	-	-	-	-	-	5	-	-	5	113	12	-	-	-	-	-	-	6	-	-	6
Macao (China)	0	0	-	-	-	-	-	-	-	-	-	0	1	1	-	-	1	-	-	-	-	-	-	1
Malaysia	75	69	1	-	-	1	-	3	-	2	-	7	1,470	1,277	-	-	9	33	-	1	-	1	-	44
Mongolia	7	0	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	0
New Zealand	48	15	-	-	3	-	-	-	-	2	-	5	597	427	-	22	3	12	-	-	-	-	-	37
Papua New Guinea	0	0	-	-	-	-	-	-	-	-	-	0	0	0	-	-	-	-	-	-	-	-	-	0
Philippines	6384	2881	-	-	-	11	-	-	-	-	-	11	6552	3238	-	-	-	24	-	-	-	-	-	24
Republic of Korea	114	95	-	-	-	-	-	-	38	1	-	39	43	40	-	-	-	12	-	-	-	1	-	13
Singapore	54	54	-	-	-	13	-	2	1	-	-	16	143	143	-	1	9	33	-	1	-	-	2	46
Viet Nam	1823	757	-	-	-	-	-	-	23	-	-	23	1,075	16	-	-	-	-	-	-	2	-	-	2
Pacific island countries	0	0	-	-	-	-	-	-	-	-	-	0	2	2	-	-	-	-	-	-	-	-	-	0
Total	48 506	31 000	9	3	9	64	2	5	349	8	9	458	21 276	14 923	-	105	55	192	1	3	188	13	5	562

¹ Monthly reports received through March 2012

² Source: National measles surveillance reports (Table 2A)

³ Sources: National and regional reference laboratory reports to WHO and to the Measles Nucleotide Sequence online database (MeaNS), whichever has the greater number

Table 4B. Rubella genotype distribution, Western Pacific Region, 2010–2011¹

Country	2010						2011 ¹						
	Samples tested for rubella IgM ²	Rubella IgM positive ²	Genotypes ³			Total	Samples tested for rubella IgM ²	Rubella IgM positive ²	Genotypes ³			Pending	Total
			1E	1j	2B				1E	1j	2B		
Australia	56	12	-	-	-	0	40	5	-	-	-	-	0
Brunei Darussalam	-	-	-	-	-	0			-	-	-	-	0
Cambodia	2580	71	-	-	4	4	3038	1,048	-	-	-	-	0
China	-	-	52	2	-	54			154	-	18	-	172
Hong Kong (China)	120	11	6	2	-	8	351	40	7	-	8	-	15
Japan	-	-	1	-	-	1			2	1	2		5
Lao PDR	84	26	5	-	-	5	181	37	1	-	-	-	1
Macao (China)	57	2	-	-	-	0	47	1	-	-	-	-	0
Malaysia	844	110	-	-	-	0	3360	383	-	-	4	-	4
Mongolia	156	7	2	-	-	2	182	14	-	-	-	-	0
New Zealand	62	1	-	-	-	0	95	4	-	-	5	-	5
Papua New Guinea	34	5	-	-	-	0	144	8	-	-	2	-	2
Philippines	4327	1440	-	3	1	4	3831	1115	-	-	-	-	0
Republic of Korea	202	15	-	-	-	0	227	19	-	-	-	-	0
Singapore	770	47	-	-	1	1	376	9	-	-	-	-	0
Viet Nam	5018	2302	-	-	1	1	4187	2471	-	-	15	-	15
Pacific island countries	48	1	-	-	-	0	527	151	-	-	2	-	2
Total	14 358	4050	66	7	7	80	16 586	5305	164	1	56	0	221

¹ Monthly reports received through March 2012

² Source: National laboratory reports to WHO (Table 3)

³ Sources: National and regional reference laboratory reports to WHO and to the Measles Nucleotide Sequence online database (MeaNS), whichever has the greater number

Papua New Guinea (0.6), Japan (0.3), and the Republic of Korea (0.3). China and Brunei Darussalam almost achieved the target with discarded rates of 1.8 and 1.5, respectively. None of the Pacific island countries and areas other than Fiji reported any discarded (or suspected) measles cases. Australia, New Zealand and Singapore do not report discarded measles cases.

Representativeness of surveillance sensitivity at the subnational level improved in 2011 versus 2010, with 52% versus 39% of second-level administrative reporting units reporting ≥ 1 discarded measles cases per 100 000 population, respectively (target $\geq 80\%$). Seven countries and areas achieved or exceeded the target: Brunei Darussalam, Hong Kong (China), Macao (China), and Fiji (100% each); Malaysia (93.8%), the Philippines (88.2%), and in Viet Nam (84.4%). Cambodia (75.0%), China (71.0%) and the Lao People's Democratic Republic (70.6%) nearly achieved the target. Japan, Mongolia, Papua New Guinea and the Republic of Korea were well below the target.

Adequate case investigation

A case is considered adequately investigated if it is investigated within 48 hours of report and 10 core data variables are completed in the case investigation form. During 2011, 67.3% of suspected cases were adequately investigated. Macao (China) (100%) and

China (94.4%) exceeded the 80% target. Five countries and areas nearly achieved the target including Hong Kong (China) (76.7%), Republic of Korea (73.0%), Malaysia (71.9%), Brunei Darussalam (70.0%) and Mongolia (60.7%). Australia, Japan, New Zealand and Singapore do not report data in the standard format.

Adequate specimens

Adequate specimens were collected from 73.5% of suspected cases during 2011. Nine countries and areas achieved or exceeded the 80% target: Macao (China) (100%), Mongolia (100%), Hong Kong (China) (97.8%), Brunei Darussalam (90.0%), China (88.0%), the Republic of Korea (85.6%), Cambodia (84.9%), Malaysia (83.8%) and Papua New Guinea (82.0%). The Philippines collected adequate specimens from 76.2% of suspected cases, whereas Viet Nam and the Lao People's Democratic Republic reported 31.7% and 43.1%, respectively. Fiji, which reported 538 suspected measles cases, did not report date of rash onset for any of them and, although 518 specimens were tested for measles IgM, adequacy of specimen (that is, at least 0.5 ml of serum and collection within 28 days of rash onset) was unknown. Australia, Japan, New Zealand and Singapore do not report proportion of suspected cases with collection of adequate specimens.

Performance of national measles laboratory and genotype results (Tables 3 & 4A)

Laboratory results within seven days

During 2011, among 21 134 serum or blood and 266 dried blood spot (DBS) specimens received for testing of anti-measles IgM antibody, 78.6% had results within seven days after receipt of specimens by laboratory (target $\geq 80\%$). National laboratories with less than 80% timeliness of laboratory results included Papua New Guinea (30.7%), Fiji (47.2%), Cambodia (55.6%), Viet Nam (northern) (62.4%) and the Philippines (72.6%).

Virus detection

Among 4715 samples evaluated for virus isolation or detection in regional reference laboratories (RRLs) in Australia and Hong Kong (China) and in NMLs in Malaysia, New Zealand, the Philippines, the Republic of Korea, Singapore, and Viet Nam in 2011, 195 (4.1%) measles virus isolates were obtained. Measles virus was isolated among samples from Malaysia (118), Singapore (42), the Philippines (30), Hong Kong (China) (2), New Zealand (2) and the Republic of Korea (1).

Genotypes may be determined from genetic sequence data collected by reverse transcriptase polymerase chain reaction (RT-PCR) following virus isolation or

directly from specimens without virus isolation. Among 1532 specimens tested by RT-PCR, 660 were positive from laboratories in New Zealand (389), Australia (134), Malaysia (114), the Republic of Korea (13), Hong Kong (China) (6) and Singapore (4).

Genotyping

Measles genotypes are reported directly to the WHO Regional Office for the Western Pacific or to the Measles Nucleotide Sequence (MeaNS) online database. In all, 557 samples from 12 countries and areas were positive for D9 (192), H1 (188), D4 (105), D8 (55), G3 (3), D11 (1) and A (13). D9 was identified from cases in nine countries and areas including Australia (38), Japan (35), Malaysia (33), Singapore (33), the Philippines (24), New Zealand (12), the Republic of Korea (12), Hong Kong (China) (3), Cambodia (2). H1 was identified from cases in China (175), the Lao People's Democratic Republic (6), Cambodia (3), Viet Nam (2), Australia (1) and Hong Kong (China) (1). D4 was identified from cases in Japan (51), Australia (31), New Zealand (22), and Singapore (1). D8 was identified from cases in Australia (25), Malaysia (9), Singapore (9), Japan (7), New Zealand (3), Hong Kong (China) (1) and Macao (China) (1).

Rubella (Tables 3 & 4B)

During 2011, among 16 586 specimens received for rubella testing, 5332 (32.2%) samples were positive and 966 (5.8%) were equivocal for anti-rubella IgM antibody; 20 were pending. Countries with the largest number of IgM-positive rubella specimens included Viet Nam (2497: 1413 from the north and 1084 from the south), the Philippines (1115), Cambodia (1048), Malaysia (383) and Fiji (151). In all, 221 specimens

from seven countries and areas were positive for 1E (164), 2B (56) and 1j (1). Genotype 1E was identified from cases in China (154), Hong Kong (China) (7), Japan (2) and the Lao People's Democratic Republic (1). Genotype 2B was identified from cases in China (18), Viet Nam (15), Hong Kong (China) (8), New Zealand (5), Malaysia (4), Fiji (2) and Papua New Guinea (2). Genotype 1j was identified from a case in Japan.

Special topic - Measles elimination and importations in the Western Pacific Region

Measles elimination is defined as "the absence of endemic measles transmission in a defined geographical area (e.g. region) for ≥ 12 months in the presence of a well performing surveillance system."¹ Endemic measles transmission is defined as "the existence of continuous transmission of indigenous or imported measles virus that persists for ≥ 12 months in any defined geographical area." Even after elimination of endemic transmission is achieved, importations of measles virus may occur and result in limited transmission. Re-establishment of endemic transmission occurs when "epidemiological and laboratory evidence indicates the presence of a chain of transmission of a virus strain² that continues

uninterrupted for ≥ 12 months in a defined geographical area where measles had previously been eliminated." In the Western Pacific Region, measles cases and outbreaks continue to occur in several countries that have low levels of measles virus transmission as a result of measles virus importations.

We reviewed measles surveillance data on cases with rash onset in 2011 reported by Australia, Japan, and Singapore to better understand measles virus importations. A total of 741 confirmed measles cases were reported from these three countries: 119 (16.1%) were reported as imported cases, and another 48 (6.5%) were reported as import-related (Table 5).

Table 5: Reported measles importations in Western Pacific region, by Source region and country, 2011

Source Region	Source Country	No. imported	Percent of Total	Genotypes						No. import-related	Grand Total	Percent of Grand Total
				D4	D8	D9	H1	G3	UNK			
AFR	Kenya or Tanzania	1				1				2	3	
AFR		1	1%	0	0	1	0	0	0	2	3	2%
AMR		0	0%							0	0	0%
EMR		0	0%							0	0	0%
EUR	France	11	65%	6	0	0		0	5	0	11	61%
	United Kingdom	2	12%	2	0	0		0	0	0	2	11%
	Italy	1	6%	1						1	2	11%
	Georgia	1	6%			1				0	1	6%
	Germany	1	6%						1	0	1	6%
	Spain	1	6%	1						0	1	6%
EUR		17	15%	10	0	1	0	0	6	1	18	12%
SEAR	Indonesia	24	46%	0	2	9		1	12	0	24	32%
	India	14	27%	2	7	0		0	5	13	27	36%
	Thailand	9	17%	1	4	0		0	4	7	16	22%
	Bangladesh	4	8%	0	2	0		0	2	2	6	8%
	Myanmar	1	2%						1	0	1	1%
SEAR		52	47%	3	15	9	0	1	24	22	74	47%
WPR	Philippines	18	44%	0	0	8		0	10	10	28	46%
	New Zealand	8	20%	7	0	0		0	1	5	13	21%
	Singapore	5	12%	0	0	3		0	2	2	7	11%
	Malaysia	4	10%	2	0	1		0	1	0	4	7%
	Cambodia	2	5%	0	1	1		0	0	0	2	3%
	Viet Nam	2	5%						2	0	2	3%
	Australia	1	2%	0	1	0		0	0	3	4	7%
	China	1	2%						1	0	1	2%
WPR		41	37%	9	2	13	0	0	17	20	61	39%
	France, Portugal or Malaysia	1				1				0	1	
	Sri Lanka or Singapore	1				1				0	1	
Uncertain		2		0	0	2	0	0	0	0	2	
	Unknown	6		1	1	0		0	4	3	9	
TOTAL		119		23	18	26	0	1	51	48	167	
Percent of total imported genotypes				34%	26%	38%	0%	1%				

Source of importation

Among 111 cases with reported source country of origin, 52 (47%) were imported from the WHO South-East Asia Region, 41 (37%) from the WHO Western Pacific Region, 17 (15%) from the WHO European Region and 1 (1%) from the WHO African Region.

Among the 52 importations from the WHO South-East Asia Region, 24 (46%) originated from Indonesia, 14 (27%) from India, 9 (17%) from Thailand, 4 (8%) from Bangladesh and 1 (2%) from Myanmar. Among the 41 importations from within the WHO Western Pacific Region, 18 (44%) originated from the Philippines, 8 (20%)

from New Zealand, 5 (12%) from Singapore, 4 (10%) from Malaysia, 2 (5%) each from Cambodia and Viet Nam, and 1 (2%) each from Australia and China. Among 17 importations from the WHO European Region, 11 (65%) came from France, 2 (12%) from the United Kingdom of Great Britain and Northern Ireland, and 1 (6%) each from Georgia, Germany, Italy and Spain. One importation from the WHO African Region came from either Kenya or the United Republic of Tanzania. Thus, the most common source countries of reported importations of measles virus in 2011 were Indonesia (24), the Philippines (18), India (14), France (11), Thailand (9) and New Zealand (8).

¹ World Health Organization. Monitoring progress towards measles elimination. Wkly Epidemiol Rec 2010; 85:490-4.

² A virus strain comprises viruses with N gene (450) sequences that are at least 99.7% identical (1 nucleotide change).

The three countries varied in proportion of imported cases from particular WHO regions (Table 6). Countries in the WHO South-East Asia Region were the source of most of importations into Singapore (82%). Countries in the WHO Western Pacific Region were the source of

most imported cases into Japan (59%). WHO South-East Asia Region and WHO Western Pacific Region countries accounted for a similar percentage of imported cases (43% and 37%, respectively) into Australia.

Table 6: Region of origin of imported measles virus, by affected country, Western Pacific Region 2011

WPR country	Number of cases imported	Number with known source country	Imported from AFR	Imported from EUR	Imported from SEAR	Imported from WPR
Australia	58	54	2%	19%	43%	37%
Japan	32	29		21%	21%	59%
Singapore	29	28		4%	82%	14%
Total	119	111	1%	15%	47%	37%

Importation genotypes

Among 111 imported cases with known source country, genotype data were available from 68 (57%) (Table 5). The most commonly imported genotype identified was D9, accounting for 26 (38%) importations and originated primarily from Indonesia and the Philippines (38% and 33% of imported D9, respectively). Genotype D4 was the next most common imported virus genotype, accounting for 23 (34%) importations, most of which originated from New Zealand and France (32% and 27% of imported D4 virus, respectively). Genotype D8 accounted for 18 (26%) importations and originated primarily from India and Thailand (41% and 24% of all D8 importations, respectively). One G3 importation came from Indonesia.

Programmatic implications

As countries and areas in the WHO Western Pacific Region continue to move closer towards measles elimination, sensitive and timely surveillance is increasingly important not only to identify residual chains of transmission of endemic virus, but also to identify the source of virus as imported, import-related or endemic. Distinguishing imported and import-related cases from endemic cases also is critical for verification of measles elimination. This requires high-quality epidemiological investigations that include contact tracing as well as specimens collected for virus detection. That 12 (80%) of 15 countries and areas with laboratory-confirmed measles cases were also able to identify virus genotypes (Table 4a) is a laudable achievement. However, specimens to detect and sequence measles virus are needed from more cases to assess the possible source of every chain of transmission.

Eliminating measles virus transmission in the WHO Western Pacific Region will reduce a substantial number of imported and import-related cases and outbreaks within the Region. The large-scale SIAs in several countries in the Region in 2011 have dealt a critical blow to endemic measles transmission in these countries and the risk of importations from these to other countries. Countries with ongoing measles virus transmission in 2012 - including China, Malaysia, New Zealand and Singapore - likely will need to supplement routine immunization with special activities to interrupt measles virus transmission in 2012.

Measles virus importations from other regions will continue after the Western Pacific Region achieves elimination. However, such importations need not result in re-established transmission, as repeated experience has demonstrated in the Americas. The Americas have sustained measles elimination since 2003. Moreover, the frequency of importations should decrease and eventually disappear as the African, Eastern Mediterranean and European regions progress toward achieving their measles elimination goals. In addition, although the South-East Asia Region does not yet have an elimination goal, 10 of its 11 Member States do have elimination goals. Moreover, two countries that represent major sources of importations into the Western Pacific Region - India and Indonesia - have been implementing strategies to reduce transmission substantially. India will complete catch-up SIAs targeting children nine months to 14 years old in 14 high-burden measles states as well as introduction of MCV2 in to the routine schedule nationwide in 2012. Indonesia completed the final phase of its three-phase follow-up SIA in 2011, achieving 97% coverage among 70% of the population nine to 59 months old. The Western Pacific Region is on the verge of achieving another important public health victory.

**Expanded Programme on Immunization
Regional Office for the Western Pacific
World Health Organization**

P.O. Box 2932, 1000 Manila, Philippines
Tel. No. (63 2) 5288001
Fax No. (63 2) 5211036, 5260279