

## Quality Assurance of Surveillance Data

In the September issue of the Measles Bulletin, we outlined measles classification criteria, described standard indicators for monitoring surveillance performance and progress towards measles elimination, and reviewed country-level data on measles incidence and surveillance performance. We also requested all member countries and areas to submit measles case-based data to the WHO Western Pacific Regional Office by the seventh of every month so that we in turn can help monitor regional progress towards measles elimination and provide monthly feedback to all countries and areas. In this issue, we will review the quality of the data submitted to the Regional Office in 2007, focusing on data completeness and accuracy.

### COMPLETENESS OF DATA

By completeness of data we mean: first, reporting of all core variable data elements from each case; and second, reporting all suspected cases that were investigated and meet the case definition for measles. This is different than completeness of reporting, which reflects the percentage of reporting units that report any data.

### Reporting all core variable data

Table 1 summarizes data for nine of the core variables from suspected cases in countries or areas submitting case-based reports to the Regional

Office through August or September 2007. Data for these nine core variables are needed for calculating 7 of the 10 core indicators used for monitoring progress towards measles elimination for the Western Pacific Region as described in the September issue of the Measles Bulletin. For case investigation variables (variables no. 1–4 in Table 1), we reviewed data reported through September; for laboratory-dependent variables (variables no. 5–10), we reviewed data reported through August to allow sufficient time for epidemiology and/or programme units to update their databases with laboratory results and classification status before submission to the Regional Office. Among 4338 cases with blood specimens reported through August, only 290 (6.7%) had data available for each of the nine core variables. The most common omissions were the date of laboratory result and the date that specimens were received in the laboratory, suggesting a need for better communication between laboratories and epidemiology and programme units for monitoring surveillance performance indicators. Method of confirmation (laboratory, epidemiologic linkage or clinical) was also commonly omitted, suggesting possible lack of familiarity with measles case classification criteria (described in the September issue) in some countries or areas. The date of case notification to the investigating team was missing in over 50% of cases, and the date of case investigation was missing in over 40%, making it difficult to monitor timeliness of case investigation. Finally, as the date

of blood specimen collection was absent in 172 (3.8%) of 4531 cases with blood specimen results, failure to report or enter this data resulted in as much as a 3.8% absolute decrease in adequate specimen collection rate for the Region (target  $\geq 80\%$ ) because of an inability to determine whether the specimen was collected within 28 days of rash onset.

### Reporting all investigated suspected cases

In addition to epidemiologic surveillance data that are submitted monthly, the Regional Office also supports a laboratory network consisting of national measles laboratories (NMLs) throughout the Region. Quality assurance monitoring requires NMLs to submit laboratory-based measles surveillance data to the Regional Office on a monthly basis. In comparing data submitted from January to August 2007 by epidemiology and/or programme units with data submitted by the NMLs during the same period, substantial discrepancies often were evident in regard to the number of cases with blood specimens (Table 2). Overall, the number of cases with blood specimens as reported by epidemiology and/or programme units was 58.6% of that reported by the NMLs. However, countries varied in the magnitude and direction of the discrepancies. In some countries (Mongolia, New Zealand, Singapore and Viet Nam), epidemiology and/or programme units reported substantially fewer cases with blood specimens than did the NMLs. Possible reasons for this could include a lower sensitivity to detect and report cases from epidemiologic surveillance versus the laboratory, or that epidemiology and/or programme units did not report to the Regional Office all suspected cases (including those that were discarded as non-measles). In other countries (Cambodia and the Philippines), epidemiology and programme units reported more cases with blood specimens than did the laboratories, suggesting epidemiologic surveillance data recording or entry errors, poor specimen quality, or incomplete reporting by laboratories.

**Table 1. Presence of data for selected core variables from epidemiologic surveillance, Western Pacific Region, 2007**

	Variable name	Cases with data	Cases without data	Total cases	% of cases without data
1	Date of rash onset *	5381	202	5583	3.6
2	Date of case notification *	2740	2843	5583	50.9
3	Date of case investigation *	3323	2260	5583	40.5
4	Date of collection of blood sample †	4359	172	4531	3.8
5	Date blood samples received at the lab † ‡	1439	2899	4338	66.8
6	Date lab results reported to programme † ‡	692	3646	4338	84.0
7	Measles IgM result † ‡ §	4223	115	4338	2.7
8	Final case classification † ‡	4337	1	4338	0.0
9	Method of confirmation † ‡	476	3862	4338	89.0
10	All variables † ‡	290	4048	4338	93.3

\* Countries reporting case-base information to the Regional Office through September

† Includes cases with specimen collected and excludes epidemiologically linked confirmed cases

‡ Includes cases with date of rash onset through August only

§ "Lab confirmed" cases are assumed to be IgM positive (e.g., Australia)

Epidemiology and/or programme units in some countries also reported different numbers of laboratory confirmed cases of measles and rubella than NMLs (Table 2). In Cambodia and the Republic of Korea, the epidemiology and/or programme units reported substantially more laboratory confirmed measles cases than did the corresponding NMLs, whereas in the Philippines and Viet Nam, the reverse was true. With regard to rubella, epidemiology and/or programme units from most countries underreported or did not report cases, with the exception of Cambodia and the Philippines which reported more laboratory confirmed rubella cases than did the corresponding NMLs.

**Table 2. Data discrepancies between epidemiologic surveillance reports and national measles laboratory results, Western Pacific Region, January-August 2007**

Country	Total suspect cases	Suspected cases with blood specimens			Measles IgM (+)			Rubella IgM (+)		
		Epi*	Lab †	% difference	Epi*	Lab †	% difference	Epi*	Lab †	% difference
Cambodia	1053	730	630	115.9	7	4	175.0	163	150	108.7
Hong Kong (China)	65	61	187	32.6	45	47	95.7			
Malaysia ‡	1063	510	515	99.0	31	32	96.9			
Mongolia	109	109	1988	5.5	10	10	100.0	99	962	10.3
New Zealand §	14	5	169	3.0	2	3	66.7		1	0.0
Philippines	478	321	309	103.9	68	73	93.2	107	93	115.1
Republic of Korea	400	375	396	94.7	162	140	115.7	2	22	9.1
Singapore	9	9	226	4.0	8	7	114.3		7	0.0
Viet Nam	3189	2709	3820	70.9	4	17	23.5		2476	0.0
<b>TOTAL</b>	<b>6380</b>	<b>4829</b>	<b>8240</b>	<b>58.6</b>	<b>337</b>	<b>333</b>	<b>101.2</b>	<b>371</b>	<b>3711</b>	<b>10.0</b>

\* Epi = data reported by the epidemiologic surveillance

† Reports through June only

‡ Lab = data reported by the national measles laboratory

§ Laboratory reports from February and August were not submitted

and programme units and the laboratory to review their respective data on all suspected cases. A national surveillance coordinator may be identified who is responsible for facilitating communication between these and other stakeholders and unifying different sources of data into a national surveillance database. Assigning a unique case identification (ID) code for each suspected measles case that is reported also will help avoid duplicate reporting of cases. Ideally, such case ID codes should be assigned on the date of notification (i.e., when the case is reported to the investigation team); as measles elimination is monitored by the Regional

## ACCURACY

Data recording or data entry errors affect the accuracy of the reported data. Common data recording or data entry errors that we have found from countries that have submitted case based data include duplicate entries, inconsistent dates and incorrect case classification.

### Duplicate entries

Among 5583 reported suspected measles cases occurring from January to September 2007, 61 (1.1%) were suspected duplicate entries based on similarities of names, addresses, date of onset, date of birth or age, and/or sex. After consulting those countries from which suspected duplicate case data were submitted, the respective countries and the Regional Office discarded these duplicate entries from our databases.

### Date inconsistencies

Date inconsistencies are evident when two date fields do not follow a logical order and indicate a data recording or data entry error that requires correction. The usual sequence of dates begins with date of birth followed by date of last measles vaccination (if vaccinated), date of rash onset, date of notification, date of investigation, date of specimen collection, date the laboratory receives the specimen, and date that the laboratory reports the results to the programme. Dates that do not follow this order suggest that a data recording or data entry error may have occurred, and the relevant data should be validated before analysis (Figure 1).

## Case Classification

Core data variables submitted by countries and areas in the Region also include the outcomes of each case investigation: the final case classification (CLASS: 1=Confirmed; 2=Discarded; 3=Pending; 9=Unknown), and, for confirmed cases, the method used to confirm the case (CONFMETH: 1=Laboratory, 2=Epidemiologic linkage, 3=Clinical). Among the 340 cases reported to the Regional Office from January to September 2007 that were positive for antimeasles IgM, 91 (26.8%) were classified by countries as *discarded* (CLASS=2) and 39 (11.5%) were classified as *clinically confirmed* (CLASS=1 and CONFMETH=3). In addition, 133 of 372 (35.8%) cases that were negative for antimeasles IgM and positive for antirubella IgM were classified as *clinically confirmed* measles. As explained in the September issue of the Measles Bulletin, suspected measles cases that are confirmed as having other diseases should be discarded as non-measles.

## QUALITY ASSURANCE NEEDS

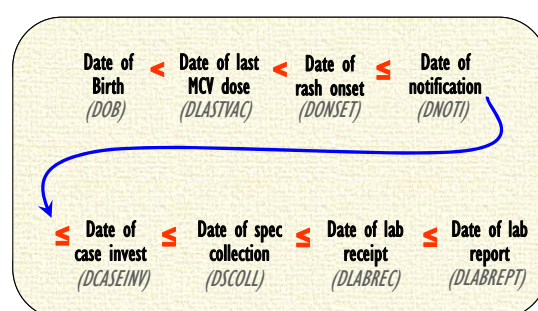
Completeness and accuracy of surveillance data are critical for its proper analysis and interpretation. Analysis of incomplete and/or inaccurate data may result in inappropriate policy, strategic or tactical decisions that can result in misguided human, material and financial resource use and adversely affect progress towards measles elimination.

Quality assurance requires development of better systems to prevent errors. For surveillance data, such systems should start with facilitating routine, periodic communication between epidemiology

Office, case ID codes should start with a three-letter country code, followed by a three-letter province and three-letter district code, year, and sequential serial number of the suspected case from that district during that year. Case investigation forms (CIFs) should be revised to include, at a minimum, all core variable data, clinical data to verify the case as meeting the clinical case definition of suspected measles (or rubella), travel history data to determine if the case (and virus) may be imported, and whether additional case finding was conducted to identify epidemiologic-linked cases. To facilitate data cleaning and analysis, all countries should enter data from CIFs into a computerized database. Duplicate entry of surveillance data is a common method used to identify and correct data entry errors. Also, simple programmes should be developed and run routinely to identify and correct logical errors such as date inconsistencies and case misclassification.

The Regional Office will continue to screen data for completeness and accuracy and provide feedback to countries and areas. However, countries and areas in the Region would be better served if such quality assurance systems are developed nationally and, where possible, subnationally to ensure optimal data interpretation and use at the local level.

**Figure 1. Logical sequence of date variables in case-based measles surveillance**



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**Table 3: Completeness and timeliness of country reporting to the WHO Regional Office for the Western Pacific, 2007**

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Completeness*	Timeliness*
Date Due →	07 Jan	07 Mar	07 Apr	07 May	07 Jun	07 Jul	07 Aug	07 Sep	07 Oct	07 Nov	(%)	(%)
Australia						09 Jul	09 Aug	10 Sep	19 Oct	07 Nov	56	22
Cambodia		04 Mar						10 Sep		17 Nov	33	11
Hong Kong (China)			07 May	06 Jun	06 Jul	14 Aug	07 Sep	09 Oct		07 Nov	78	11
Republic of Korea	07 Mar			15 May					11 Oct		22	0
Macao (China)		09 Mar			06 Jul	25 Jul			02 Oct	05 Nov	56	22
Mongolia	24 Jan		06 Apr	10 May		03 Jul	21 Aug		15 Oct		56	22
New Zealand		07 Mar	18 Apr	07 May	14 Jun		06 Aug	06 Sep	05 Oct		78	56
Philippines		02 Mar	02 Apr		26 Jun	04 Jul	10 Aug	06 Sep	06 Oct		78	56
Singapore		06 Mar	04 Apr		06 Jun	10 Jul	08 Aug	12 Sep	09 Oct	14 Nov	89	33
Viet Nam							15 Aug		29 Oct	16 Nov	33	0
PICs**	15 Feb	15 Mar	16 Apr	15 May	15 Jun	16 Jul	15 Aug	14 Sep	15 Oct	15 Nov	100	89
Completeness (%)	27	55	55	45	55	64	73	64	82	64	62	
Timeliness (%)	18	45	27	18	18	18	18	27	36	36	27	

\* For reports received following WPRO request in February, i.e. from March to November.

\*\* Deadline for submission of Pacific island country and areas data is on the 15th of every month

**Table 4a: Measles case classification and incidence, by country, Western Pacific Region, 2006-2007\***

Country	Population <sup>o</sup> (in millions)	2006									2007								
		Total suspected measles cases	No. confirmed measles				No. discarded measles	No. pending classification	No. of deaths due to measles	Confirmed measles cases (/1 000 000)	Total suspected measles cases	No. confirmed measles				No. discarded measles	No. pending classification	No. of deaths due to measles	Confirmed measles cases (/1 000 000)
			Lab	Epi	Clinical	Total						Lab	Epi	Clinical	Total				
Australia <sup>†</sup>	20.74	124	124	0	0	124	0	0	0	6.0	12	12	0	0	12	0	0	0	0.6
Brunei Darussalam	0.39	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Cambodia	14.44	508	2	0	186	188	287	33	0	13.2	1 177	7	0	347	354	821	2	0	24.5
China	1 328.63	107 538	No data	No data	No data	107 538	No data	No data	31	81.4	105 166	No data	No data	No data	105 166	No data	No data	47	79.2
Hong Kong (China)	7.21	139	68	0	38	106	33	0	0	14.9	90	58	0	13	71	15	4	0	9.9
Japan <sup>o</sup>	127.97	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Lao People's Democratic Republic	5.86	22	0	0	18	18	0	4	0	3.1	No data	No data	No data	No data	No data	No data	No data	No data	No data
Macao (China)	0.48	3	2	0	0	2	1	0	0	4.2	0	0	0	0	0	0	0	0	0.0
Malaysia	26.57	1 731	18	0	965	983	748	No data	No data	37.6	1 544	37	0	703	740	793	11	0	27.8
Mongolia	2.63	26	26	0	0	26	0	0	0	10.0	110	10	0	100	110	0	0	0	41.8
New Zealand	4.18	20	1	1	18	20	0	0	0	4.8	16	2	2	12	16	0	0	0	3.8
Papua New Guinea	6.33	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Philippines <sup>o</sup>	87.96	312	6	0	210	216	96	0	3	2.5	593	1	7	229	237	356	0	2	2.7
Republic of Korea	48.22	112	22	3	0	25	84	3	1	0.5	400	162	0	35	197	202	1	0	4.1
Singapore	4.44	28	28	0	0	28	0	0	0	6.4	12	12	0	0	12	0	0	0	2.7
Viet Nam	87.38	6 461	203	1 412	357	1 972	4 198	291	3	22.9	3 663	3	0	9	12	2 460	1 191	0	0.1
<b>Pacific island countries and areas:</b>																			
American Samoa	0.07	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Cook Islands	0.02	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Fiji	0.84	132	22	0	110	132	0	0	No data	158.5	9	0	0	0	9	0	0	0	0.0
French Polynesia	0.26	No data	No data	No data	No data	No data	No data	No data	No data	No data	0	0	0	0	0	0	0	0	0.0
Guam	0.17	1	0	0	0	0	1	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Kiribati	0.09	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Marshall Islands	0.06	6	0	0	0	0	0	6	No data	0.0	1	0	0	0	0	0	1	0	0.0
Micronesia, Federated States of	0.11	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Nauru	0.01	2	0	0	0	0	2	0	No data	0.0	1	0	0	0	0	1	0	0	0.0
New Caledonia	0.24	2	0	0	0	0	1	1	No data	0.0	3	0	0	0	0	2	1	0	0.0
Niue	0.00	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Northern Mariana Islands	0.08	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Palau	0.02	1	0	0	0	0	0	1	No data	0.0	13	0	0	0	0	4	9	0	0.0
Pitcairn Islands	0.00	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Samoa	0.19	10	0	0	0	0	2	8	No data	0.0	0	0	0	0	0	0	0	0	0.0
Solomon Islands	0.50	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Tokelau	0.00	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Tonga	0.10	2	0	0	0	0	2	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Tuvalu	0.01	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Vanuatu	0.23	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
Wallis and Futuna	0.02	0	0	0	0	0	0	0	No data	0.0	0	0	0	0	0	0	0	0	0.0
<b>Western Pacific Region</b>	<b>1 776.45</b>	<b>117 180</b>	<b>522</b>	<b>1 416</b>	<b>1 902</b>	<b>111 378</b>	<b>5 455</b>	<b>347</b>	<b>38</b>	<b>63.1</b>	<b>112 810</b>	<b>304</b>	<b>9</b>	<b>1 448</b>	<b>106 927</b>	<b>4 663</b>	<b>1 220</b>	<b>49</b>	<b>60.2</b>

\* Cases reported through 15 November 2007

<sup>o</sup> Population figures from World Population Prospects: The 2006 Revision, New York, United Nations, 2007.

<sup>†</sup> Reported cases for Australia are either laboratory confirmed or epidemiologically linked to a laboratory-confirmed case

<sup>o</sup> Sentinel surveillance system

Green	Reached target of <1 confirmed measles case / 1 000 000 population
Yellow	1-1.9 confirmed measles case / 1 000 000 population
Red	≥ 2 confirmed cases / 1 000 000 population

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**Table 4b: Measles surveillance performance indicators, by country, Western Pacific Region, 2006-2007\***

Country	Population <sup>a</sup> (in millions)	No. of districts <sup>†</sup>	2006				2007								
			Total suspected measles cases	Confirmed cases	Discarded Cases	Non- measles suspected case rate (/100 000)	Total suspected measles cases	Confirmed cases	Discarded Cases	Non- measles suspected case rate (/100 000)	Districts with ≥ 1 non-measles suspected case (/100 000)	Suspected cases with adequate investigation	Suspected cases with adequate blood specimens	Lab results ≤ 7 days	
Target						≥ 2				≥ 2	≥ 80%	≥ 80%	≥ 80%	≥ 80%	
Australia	20.74	No data	124 <sup>‡</sup>	124	0	0.0	12 <sup>‡</sup>	12	0	0.0	No data	No data	No data	No data	
Brunei Darussalam	0.39	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	
Cambodia	14.44	180	508	188	287	2.0	1,177	354	821	5.7	69 (38.3%)	501 (42.6%)	803 (68.2%)	No data	
China	1 328.63	3 132	107 538 <sup>‡</sup>	107 538	No data	No data	105 166 <sup>‡</sup>	105 166	No data	No data	No data	No data	No data	No data	
Hong Kong (China)	7.21	1	139	106	33	0.5	90	71	15	0.2	0 (0.0%)	62 (68.9%)	62 (68.9%)	57 (75.0%)	
Japan <sup>‡</sup>	127.97	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	
Lao People's Democratic Republic	5.86	140	22	18	0	0.0	No data	No data	No data	No data	No data	No data	No data	No data	
Macao (China)	0.48	1	3	2	1	0.2	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Malaysia	26.57	132	1 731	983	748	2.9	1 544	740	793	3.0	No data	No data	No data	No data	
Mongolia	2.63	342	26 <sup>‡</sup>	26	0	0.0	110 <sup>‡</sup>	110	0	0.0	No data	0 (0.0%)	8 (7.3%)	10 (9.1%)	
New Zealand	4.18	No data	20 <sup>‡</sup>	20	0	0.0	16 <sup>‡</sup>	16	0	0.0	No data	No data	No data	No data	
Papua New Guinea	6.33	89	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	
Philippines <sup>‡</sup>	87.96	186	312	216	96	0.1	593	237	356	0.4	8 (4.3%)	177 (29.8%)	326 (55.0%)	308 (77.0%)	
Republic of Korea	48.22	251	112	25	84	0.2	400	197	202	0.4	No data	233 (58.3%)	343 (85.8%)	370 (93.4%)	
Singapore	4.44	1	28 <sup>‡</sup>	28	0	0.0	12 <sup>‡</sup>	12	0	0.0	0 (0.0%)	No data	No data	No data	
Viet Nam	87.38	673	6 461	1 972	4 198	4.9	3 663	12	2 460	2.8	107 (15.9%)	576 (15.7%)	2 866 (78.2%)	No data	
<b>Pacific island countries and areas:</b>															
American Samoa	0.07	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Cook Islands	0.02	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Fiji	0.84	1	132	132	0	0.0	9	0	9	1.1	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
French Polynesia	0.26	1	No data	No data	No data	No data	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Guam	0.17	1	1	0	1	0.6	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Kiribati	0.09	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Marshall Islands	0.06	1	6	0	0	0.0	1	0	0	0.0	0 (0.0%)	1 (100.0%)	1 (100.0%)	0 (0.0%)	
Micronesia, Federated States of	0.11	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Nauru	0.01	1	2	0	2	14.5	1	0	1	7.2	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
New Caledonia	0.24	1	2	0	1	0.4	3	0	2	0.8	0 (0.0%)	0 (0.0%)	2 (66.7%)	0 (0.0%)	
Niue	0.00	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Northern Mariana Islands	0.08	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Palau	0.02	1	1	0	0	0.0	13	0	4	20.1	1 (100.0%)	1 (7.7%)	1 (7.7%)	0 (0.0%)	
Pitcairn Islands	0.00	1	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data	
Samoa	0.19	1	10	0	2	1.1	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Solomon Islands	0.50	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Tokelau	0.00	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Tonga	0.10	1	2	0	2	2.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Tuvalu	0.01	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Vanuatu	0.23	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
Wallis and Futuna	0.02	1	0	0	0	0.0	0	0	0	0.0	0 (0.0%)	Not applicable	Not applicable	Not applicable	
<b>Western Pacific Region</b>	<b>1 776.45</b>	<b>5 149</b>	<b>117 180</b>	<b>111 378</b>	<b>5 455</b>	<b>0.3</b>	<b>112 810</b>	<b>106 927</b>	<b>4 663</b>	<b>0.3</b>	<b>187 (3.6%)</b>	<b>1 551 (1.4%)</b>	<b>4 412 (3.9%)</b>	<b>745 (0.7%)</b>	

\* Cases reported through 15 November 2007

<sup>a</sup> Population figures from World Population Prospects: The 2006 Revision, New York, United Nations, 2007.

<sup>†</sup> District data from WHO/UNICEF Joint Reporting Forms 2006

<sup>‡</sup> Only confirmed cases were reported; in Australia, Mongolia, and Singapore, only lab-confirmed cases were reported.

<sup>§</sup> Sentinel surveillance system

Green	Reached or surpassed target
Yellow	Nearly reached target (1-1.99 for non-measles suspected case rate; 60-79% for other indicators)
Red	Substantially below target

Expanded Programme on Immunization  
 WORLD HEALTH ORGANIZATION  
 Regional Office for the Western Pacific, United Nations Avenue, P.O. Box 2932, 1000 Manila, Philippines  
 Fax no. (632) 5211036, 5260279, 5260362 Tel. No. (632) 5288001

Comments may be sent to WHO/WPRO Measles Bulletin [measles\\_bulletin@wpro.who.int](mailto:measles_bulletin@wpro.who.int).

Please send monthly data to Mr Benjamin Bayutas at [bayutasb@wpro.who.int](mailto:bayutasb@wpro.who.int)