

Monitoring Measles Surveillance and Progress Towards Measles Elimination

In 2003, the WHO Western Pacific Region Member States resolved to eliminate measles (WPR/RC54.R3) and in 2005 committed the Region to achieve measles elimination by 2012 (WPR/RC56.R8). Countries in the Region are rapidly progressing towards this goal, often because of large scale supplementary immunization activities (SIAs) that interrupt measles virus transmission. Sensitive and timely case-based measles surveillance that reaches to the local health facility level is critical to monitor measles virus circulation and quickly identify residual or new areas of transmission. Measles surveillance quality, and progress towards measles elimination, can be monitored using standard indicators.

At the 16th meeting of the Technical Advisory Group (TAG) on Immunization and Vaccine Preventable Diseases in the Western Pacific Region in June 2006, the TAG reminded countries to establish or strengthen case-based measles surveillance with weekly reporting and analysis and feedback at every level. The TAG went further, calling on countries to monitor surveillance performance indicators and to submit necessary data to the Regional Office for the Western Pacific for the same purpose on a monthly basis. In its 2005 resolution, the Regional Committee requested the Regional Director "to report regularly to the Regional Committee on progress towards measles elimination and hepatitis B control" (WPR/RC56.R8). To fulfill its reporting obligations to the Regional Committee and to WHO Headquarters (HQ), the Western Pacific Regional Office depends upon countries to submit case-based measles data every month. More importantly, these data are needed for the Western Pacific Regional Office to monitor measles surveillance quality and progress towards measles elimination, to provide monthly feedback to

Member States, and to identify countries in need of additional support.

In this issue of the Measles Bulletin, we will review measles classification criteria, standard indicators for monitoring surveillance performance and progress towards measles elimination, and reported measles incidence and surveillance performance status, by country and area. We also would like to take this opportunity to request all Member States and areas to submit case-based measles surveillance data to the Western Pacific Regional Office by the 7th of every month so that the Western Pacific Regional Office may monitor regional progress towards measles elimination and provide monthly feedback to all Member States. The 21 Pacific island countries and areas should report case-based data to the WHO Office for the South Pacific in Suva, Fiji, which will then forward

these data to the Western Pacific Regional Office monthly.

Classification of Suspected Measles Cases

To calculate the indicators, it is necessary to understand how measles cases are classified. Currently, the Western Pacific Regional Office defines a suspected case of measles as any person satisfying the clinical case definition of fever and rash and one or more of the following symptoms: cough or coryza or conjunctivitis. As countries begin to target rubella for elimination, the suspected case definition may be changed to fever and rash illness to capture both measles and rubella. Ultimately, all suspected measles cases are classified as either confirmed or discarded. Cases may be confirmed by the laboratory, epidemiologic linkage, or clinically.

Figure 1. Classification of Measles Cases

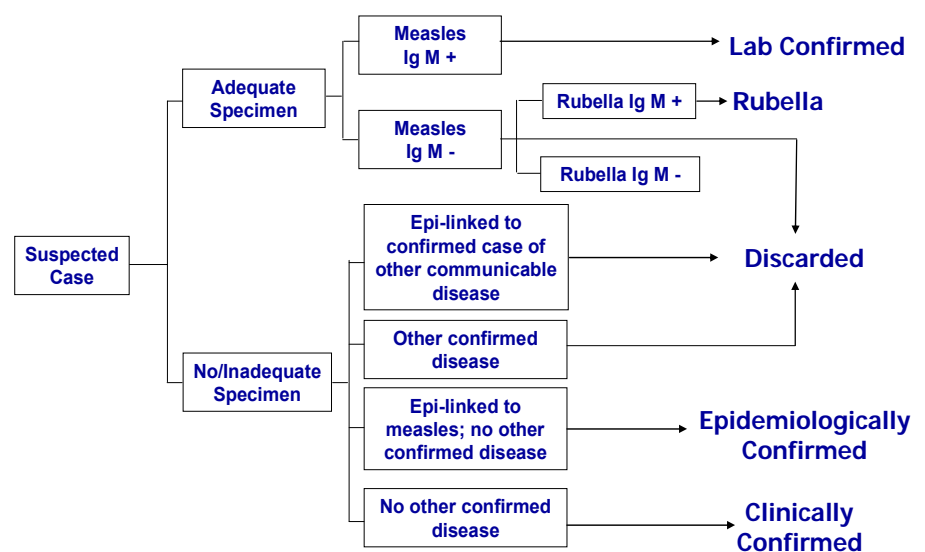


Figure 1 is a modification of a flow chart from the Western Pacific Region Field Guidelines for Measles Elimination (p. 17) illustrating the process by which suspected cases of measles are classified. Classification of suspected measles depends on blood specimen collection and/or other diagnostic tests as well as epidemiologic investigation. Suspected cases are confirmed as measles if they are IgM positive, or if they are epidemiologically linked to a laboratory or epidemiologically confirmed case. Epidemiologic linkage to measles occurs when there is contact with a lab confirmed or epidemiologically confirmed case 7-21 days before onset of rash in the suspected case. Suspected cases may be discarded as non-measles if adequate specimens are negative for IgM, and, for cases without adequate specimens, if they satisfy criteria for confirmation as a case of a different disease or are epidemiologically linked to a confirmed case of another

communicable disease. Any suspected case that cannot be confirmed by the laboratory or by epidemiologic linkage and cannot be discarded is classified as a clinically confirmed case. As such, cases that are clinically confirmed represent a failure of the surveillance system to adequately investigate and classify cases of disease.

Indicators for Monitoring Progress Towards Measles Elimination

Extensive consultation among WHO Headquarters, WHO Regional Offices, and representatives of the global measles partnership including UNICEF and the U.S. Centers for Disease Control and Prevention has resulted in a consensus set of basic indicators for monitoring progress towards measles elimination. These indicators modify slightly those published in the Western Pacific Regional Office's Field Guidelines for Measles Elimination in 2004. Indicators of very low incidence,

high quality surveillance, and high population immunity (Table 1) will be used by the Western Pacific Regional Office to monitor Regional progress towards measles elimination and will be evaluated periodically for their practicality and usefulness. Modifications will be made as needed in consultation with the global working group and the Western Pacific Regional Office TAG.

Data Required for Indicators

To monitor measles surveillance performance and progress towards measles elimination, the Western Pacific Regional Office is now requesting all Member States to submit measles surveillance core variable data by feed forwarding case-based data or completing EXCEL spreadsheets using the formats indicated in Table 2 by the 7th of every month.

Table 1: Indicators to Monitor Progress Towards Measles Elimination, Western Pacific Region

Indicator	Target
• Very Low Incidence	
1. Confirmed measles cases (confirmed by lab, epidemiologic linkage or clinically)*	< 1/1 000 000
• High Quality Surveillance	
2. National reporting of non-measles suspected cases †	≥ 2/100 000
3. Percentage of districts reporting ≥ 1/100 000 non-measles suspected cases †	≥ 80%
4. Percentage of suspected cases with adequate investigation within 48 hours of notification ‡	≥ 80%
5. Percentage of suspected cases with adequate blood specimens §	≥ 80%
6. Percentage of specimens with lab results ≤ 7 days after arrival to lab	≥ 80%
7. Transmission chains (outbreaks) with sufficient samples for virus isolation #	≥ 80%
• High Population Immunity	
8. National MCV1 and MCV2 coverage ¶	≥ 95%
9. Percentage of outbreaks or transmission foci with <10 cases	≥ 80%
10. Absence of endemic measles virus	No virus

* Excludes imported cases, but includes import-related cases

† Non-measles suspected case: excludes cases confirmed by lab, epidemiologic linkage, or clinically

‡ Adequate investigation: collection of essential data elements (date of rash onset, date of specimen collection, vaccination status, date of last vaccination, date of birth or age, sex, district) and search for epidemiologically-linked cases

§ Adequate blood specimen: sufficient volume (0.5 ml) collected within 28 days after rash onset

Excludes from the denominator cases that are epidemiologically linked to confirmed measles or to other confirmed communicable diseases (e.g. rubella)

Transmission chain (outbreak): 2 or more cases in which rash onset in one is 7-21 days after the other

Sufficient samples: oral fluid, naso-pharyngeal swabs, urine, or whole blood collected from at least two suspected cases for outbreaks with ≤ 5 cases and at least five suspected cases for outbreaks with >5 cases, early in any outbreak and every 2-3 months if transmission continues

¶ MCV1 and MCV2 coverage ≥ 95% also is required in every district to prevent pockets of measles virus transmission

Table 2: Case-Based Measles Surveillance Core Variables

Field name	Description	Choices/Format
EPID	Unique epidemiologic case identification number/code	
PROVINCE	1st Admin Level (Province/Region/State) of residence (or where infected)	
DISTRICT	2nd Admin Level (District or city) of residence (or where infected)	
VILLAGE	3rd Admin Level (Town/Neighborhood/Village) of residence (or where infected)	
SEX	Gender	M or F
DOB	Date of birth of case (if unknown, give age and specify months or years)	dd/mm/yyyy
DONSET	Date of rash onset	dd/mm/yyyy
DNOTI	Date of initial notification/reporting to health facility	dd/mm/yyyy
DCASEINV	Date of investigation	dd/mm/yyyy
NUMDOSE	Number of measles vaccine doses received prior to DONSET	
DLASTVAC	Date of last measles vaccination prior to DONSET	dd/mm/yyyy
DSCOLL	Date blood specimen collected	dd/mm/yyyy
DLABREC	Date lab received blood specimen	dd/mm/yyyy
SPECCOND	Condition of blood specimen upon arrival at lab, i.e., sufficient volume	1 - Sufficient volume, 2 - Insufficient volume
MlgM	Measles IgM result	1 - Positive, 2 - Negative, 3 - Equivocal, 4 - Pending, 8 - Not done, 9 - Unknown
RlgM	Rubella IgM result	1 - Positive, 2 - Negative, 3 - Equivocal, 4 - Pending, 8 - Not done, 9 - Unknown
DLABREPT	Date serological results reported by lab	dd/mm/yyyy
CLASS	Final classification	1 - Confirmed, 2 - Discarded, 3 - Pending, 9 - Unknown
CONF METH	Method of confirmation	1 - Lab Confirmed, 2 - Epi-linked, 3 - Clinically Confirmed
OUTCOME	Outcome (Alive, Dead)	1 - Alive, 2 - Dead, 9 - Unknown
VRESULT	Virological test result	1 - Positive, 2 - Negative, 3 - Pending, 8 - Not Done, 9 - Unknown
GENOTYPE	Measles virus genotype of isolate	
OTHERDIS	Other confirmed disease	Write in the name of the confirmed disease; indicate method of confirmation under the COMMENT column.

Current Measles Data Reporting to WHO-Western Pacific Regional Office, 2007

Among the 37 countries and areas of the Western Pacific Region, only 10 conducted case-based measles surveillance and shared this data with the Western Pacific Regional Office as of July 2007. In August, case-based systems for reporting were established for 20 of the 21 Pacific island countries and areas (PICs), increasing to 30 (81%) the number of countries/areas potentially reporting such data to the Western Pacific Regional Office. Japan, Brunei Darussalam, and Papua New Guinea do not report any data, and China, the Lao People's Democratic Republic, and Malaysia submit aggregate data only. In February 2007, the Western Pacific Regional Office requested the 10 countries submitting case-based data at that time to submit data on core variables on a monthly basis for the purpose of monitoring surveillance quality and progress towards measles elimination.

Table 3 lists the dates that the Western Pacific Regional Office received reports from the 10 countries reporting case-based measles surveillance data. Timely reports are indicated in black; late reports are indicated in red. New Zealand and the Philippines had the highest completeness and timeliness of reporting, 86% and 57%, respectively. However, completeness and timeliness for the Region have not exceeded 70% and 40%, respectively, in any month. The Western Pacific Regional Office

now is requesting that each country in the Region report all case-based core variable data to the Western Pacific Regional Office monthly. At the present time, the 21 Pacific island countries and areas should continue to report case-based core variable data on suspected measles cases to the WHO Office for the South Pacific in Suva, Fiji, which in turn will forward these data to the Western Pacific Regional Office monthly.

Table 3: Completeness and Timeliness of Country Reporting to the Western Pacific Regional Office, 2007

Country	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Completeness*	Timeliness*
Date Due	→	07-Mar	09-Apr	07-May	07-Jun	09-Jul	07-Aug	07-Sep		
Australia						09-Jul	09-Aug	10-Sep	43%	14%
Cambodia		04-Mar						10-Sep	29%	14%
Hong Kong			07-May	06-Jun	06-Jul	14-Aug	07-Sep		71%	0%
Republic of Korea	07-Mar			15-May					14%	0%
Macao		09-Mar			06-Jul	25-Jul			43%	0%
Mongolia	24-Jan		06-Apr	10-May		03-Jul	21-Aug		57%	29%
New Zealand		07-Mar	18-Apr	07-May	14-Jun		06-Aug	06-Sep	86%	57%
Philippines		02-Mar	02-Apr		26-Jun	04-Jul	10-Aug	06-Sep	86%	57%
Singapore		06-Mar	04-Apr		06-Jun	10-Jul	08-Aug	12-Sep	86%	43%
Viet Nam							15-Aug		14%	0%
Completeness	20%	50%	50%	40%	50%	60%	70%	50%		
Timeliness		40%	30%	10%	10%	30%	10%	20%		

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

Table 4: Core Variable Reporting, by Country, Western Pacific Region 2007

Field name	Australia	Brunei	Cambodia	China	Hong Kong	Japan	Lao PDR	Macao	Malaysia	Mongolia	New Zealand	Papua New Guinea	Philippines	Republic of Korea	Singapore	Viet Nam	Pacific Island Countries *		
EPID	✓		✓	Aggregate: only monthly number of cases reported with no classification.	✓			✓	Aggregate: Number of suspect cases, lab confirmed, clinical, epi link, pending, discarded, number with immunization, number deaths	✗	✓		✓	✓	✓	✓	✓		
PROVINCE	✓		✓								✓	✓		✓	✓	✓	✓	✓	✓
DISTRICT	Postal code		✓			HOK as 1 district				MAC as 1 district		✗	✗		✓	✓	SIN as 1 district	✓	✓
VILLAGE	✗		✓									✗	✗		✓	✓		✓	✗
SEX	✓		✓			✗				✓		✓	✗		✓	✗	✗	✓	✓
DOB	✓		✓			✓				Age instead of DOB		Age instead of DOB	Age instead of DOB		✓	✓	Age instead of DOB	✓	✓
DONSET	✓		✓			✓				✓		✗	✓		✓	✓	✓	✓	✓
DNOTI	✗		✓			✓				✓		✓	✓		✓	✓	✗	✓	✓
DCASEINV	✗		✓			✓				✓		✓	✗		✓	✓	✗	✓	✓
NUMDOSE	Yes/No only		✓			✓				✓		Yes/No only	Yes/No only		✓	✓	✗	✓	✓
DLASTVAC	✗		✓			✓				✓		✗	✓		✓	✓	✗	✓	✓
DSCOLL	✗		✓			✓				✓		✓	✗		✓	✓	✗	✓	✓
DLABREC	✗		✓			✓				✓		✗	✗		✗	✓	✗	✗	✓
SPECCOND	✗		✓			✗				✗		✗	✗		✗	✗	✗	✗	✗
MigM	✗		✓			✓				✓		✓	✗		✓	✓	✗	✓	✓
RigM	✗		✓			✓				✓		✓	✗		✓	✓	✗	✗	✓
DLABREPT	✗		✗			✓				✓		✗	✗		✓	✓	✗	✗	✗
CLASS	✓		✓			✓				✓					✗	✓	✓	✓	✓
CONF METH	All cases are either lab-confirmed or epi-linked		✓			✓				Included in "note"		Yes/no fields: "measles lab confirmed"; "clin confirmed"; "discarded"; "pending"	Two fields: "Fit clinical description" and "lab confirmation"		✓	✗	✓	✓	✓
OUTCOME	✓		✓			✓				✓		✓	✓		✓	✓	✓	✓	✓
VRESULT	✗		✗		✓			✓		✗	✗		✓	✓	✗	✗	✓		
GENOTYPE	✗		✗		✓			✓		✗	✗		✓	✓	✗	✗	✓		
Suspect cases reported	No		Yes		Yes			Yes		No	No		Yes	Yes	No	Yes	Yes		
Format submitted	Excel		Access		Word		Word	Excel	Word	Excel	Excel		Epi 6	Excel	Excel	Access	Excel		

* WHO/Fiji submits checked core variables for all PICs monthly; however, individual islands/areas may not submit all needed core variable data to WHO/Fiji

Table 4 lists the core variables that were reported to the Western Pacific Regional Office, by country, as of August 2007. Among the 30 countries that submitted case-based data to the Western Pacific Regional Office, most omitted several core variables and several do not provide data on suspected cases, making it impossible to calculate several indicators. In light of the accelerated activities to interrupt measles virus transmission throughout the Region, the Western Pacific Regional Office now is encouraging each country to investigate all suspected measles cases and, in addition to the national uses of case-based data, report data on each of the core variables to the Western Pacific Regional Office monthly.

Table 5a summarizes measles case classification and incidence data for 2006 and 2007. For the Region, measles incidence was 63.1 per million in 2006 and 45.0 per million for cases reported through September 2007, well above the annual target of <1 confirmed case per million population. As the population of China accounts for 75% of the Region's population, it is not surprising that it reports the vast majority of confirmed measles cases.

However, China reports a disproportionate number of confirmed measles cases compared to the rest of the Region: 98.6% of the 80 016 confirmed measles cases reported through September 2007 were reported from China. This finding may reflect under-reporting of measles cases from other countries, especially countries that have not reported any data to the Western Pacific Regional Office in 2007 including Brunei Darussalam, Japan, the Lao People's Democratic Republic and Papua New Guinea.

Table 5b summarizes measles surveillance performance indicators for 2006 and 2007. Non-measles suspected cases (i.e. suspected measles cases that were discarded) were reported at a rate of 0.31 per 100,000 in 2006 and 0.21 per 100 000 through September 2007, well below the annual target of ≥ 2 per 100 000 population. However, several countries including Australia, China, Mongolia, New Zealand, and Singapore report only confirmed cases; several more including Brunei Darussalam, Japan, the Lao People's Democratic Republic, and Papua New Guinea have not reported any data to the Western Pacific Regional Office. Excluding these countries from analysis,

the non-measles suspected case rate for the Region would be 1.98 in 2006 and 1.36 thus far in 2007. Countries and areas that have or will likely achieve the target reporting rate of ≥ 2 non-measles suspected cases per 100 000 population in 2007 include Palau (20.1), Nauru (7.2), Cambodia (5.2), Viet Nam (2.5), Malaysia (1.8), and Fiji (1.1).

A total of 84 948 suspected cases have been reported to the Western Pacific Regional Office in 2007 as of September. Adequate investigations were conducted for 1 048 (1.2%), and adequate blood specimens were collected from 3 719 (4.4%, excluding epidemiologically linked cases from the denominator). However, only Cambodia, Hong Kong (China), Macao (China), the Philippines, the Republic of Korea, Viet Nam, and 20 of the Pacific island countries/areas submit to the Western Pacific Regional Office the data needed to determine these indicators. From these countries, 4 937 suspected cases were reported to the Western Pacific Regional Office in 2007, among which 1 048 (21.2%) had an adequate investigation and 3 719 (75.3%) had adequate blood specimens collected. The Marshall Islands

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conducted an adequate investigation on its suspected case (100%). Hong Kong (China), at 70.5%, nearly reached the 80% target. Countries collecting adequate blood specimens from at least 80% of suspected cases include New Caledonia (100%), the Marshall Islands (100%), the Republic of Korea (85.7%) and Viet Nam (80.9%).

In summary, no country in the Region satisfies all criteria for elimination-standard measles surveillance, and no country submits all of the data elements required to monitor surveillance performance at the national and sub-national level. Consequently, it is not currently possible to monitor progress towards measles elimination throughout the

Region. Nevertheless, the success of a number of countries and areas in achieving several performance indicator targets is encouraging in that the remaining countries of the Region may do likewise.

The Western Pacific Region in 2007 and 2008 is accelerating its push to eliminate measles. Cambodia, China, the Lao People's Democratic Republic, Mongolia, Papua New Guinea, the Philippines and Viet Nam have or are conducting large scale, wide age-range SIAs against measles. It is imperative that all countries of the Region similarly strengthen measles surveillance in accordance with TAG recommendations so that all suspected cases are identified and investigated at

the health facility level, and that reporting, analysis, interpretation, feedback and responses derived from surveillance data are timely and complete at every level within the country. Submitting core variable data to the Western Pacific Regional Office by the 7th of every month will enable the Regional Office to provide monthly feedback to all countries, identify those in need of additional support, and motivating others to monitor their own progress towards eliminating measles by 2012. The Western Pacific Regional Office will provide regular feedback to countries by publishing surveillance and indicator data monthly in the Measles Bulletin.

Table 5a: Measles Case Classification and Incidence, by Country, Western Pacific Region, 2006-2007*

Country	Population ^a (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 [†]	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	1,056	7	0	302	309	747	0	0	21.4
China	1,328.63	107,538	No data	No data	No data	107,538	No data	No data	31	81.4	78,902	No data	No data	No data	78,902	No data	No data	39	59.4
Hong Kong (China)	7.21	139	68	0	38	106	33	0	0	14.9	61	37	0	7	45	11	5	0	6.2
Japan [‡]	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	1,063	31	0	559	590	473	No data	No data	22.2
Mongolia	2.63	26	26	0	0	26	0	0	0	10.0	10	10	0	0	10	0	0	0	3.8
New Zealand	4.18	20	1	1	18	20	0	0	0	4.8	15	2	3	9	14	0	1	0	3.4
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 [‡]	87.96	312	6	0	210	216	96	0	3	2.5	424	0	0	113	113	311	0	1	1.3
Republic of Korea	48.22	112	22	3	0	25	84	3	1	0.5	42	9	0	0	9	17	16	0	0.2
Singapore	4.44	28	28	0	0	28	0	0	0	6.4	9	9	0	0	9	0	0	0	2.0
Viet Nam	87.38	6,461	203	1,412	357	1,972	4,198	291	3	22.9	3,330	2	0	1	3	2,162	1,165	0	0.0
Pacific island countries:																			
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	0	158.5	9	0	0	0	0	9	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	2	0	0	0	0	2	0	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	11	0	0	0	0	4	7	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
Western Pacific Region	1,776.45	117,180	522	1,416	1,902	111,378	5,455	347	38	63.1	84,948	119	3	991	80,016	3,737	1,195	40	45.0

* Cases reported through 10 September 2007

^a Population figures from World Population Prospects: The 2006 Revision, New York, United Nations, 2007.

[†] Reported cases for Australia are either laboratory confirmed or epidemiologically linked to a laboratory-confirmed case

[‡] 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 measles cases / 1 000 000 population

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Table 5b: Measles Surveillance Performance Indicators, by Country, Western Pacific Region, 2006-2007*

Country	Population ^a (in millions)	No. of districts [†]	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 [‡]	124	0	0.0	12 [‡]	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	1,056	309	747	5.2	40 (22.2%)	444 (42.0%)	729 (69.0%)	No data
China	1,328.63	3,132	107,538 [‡]	107,538	No data	No data	78,902 [‡]	78,902	No data	No data	No data	No data	No data	No data
Hong Kong (China)	7.21	1	139	106	33	0.5	61	45	11	0.2	0 (0.0%)	43 (70.5%)	43 (70.5%)	21 (43.8%)
Japan [‡]	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	1,063	590	473	1.8	No data	No data	No data	No data
Mongolia	2.63	342	26 [‡]	26	0	0.0	10 [‡]	10	0	0.0	No data	No data	No data	No data
New Zealand	4.18	No data	20 [‡]	20	0	0.0	15 [‡]	14	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 [‡]	87.96	186	312	216	96	0.1	424	113	311	0.4	7 (3.8%)	100 (23.6%)	213 (50.2%)	178 (66.7%)
Republic of Korea	48.22	251	112	25	84	0.2	42	9	17	0.0	No data	15 (35.7%)	36 (85.7%)	12 (30.0%)
Singapore	4.44	1	28 [‡]	28	0	0.0	9 [‡]	9	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	3,330	3	2,162	2.5	147 (21.8%)	444 (13.3%)	2,694 (80.9%)	No data
Pacific island countries:														
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	2	0	2	0.8	0 (0.0%)	0 (0.0%)	2 (100.0%)	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	11	0	4	20.1	1 (100.0%)	1 (9.1%)	1 (9.1%)	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
Western Pacific Region	1,776.45	5,149	117,180	111,378	5,455	0.3	84,948	80,016	3,737	0.2	197 (3.8%)	1,048 (1.2%)	3,719 (4.4%)	211 (0.2%)

* Cases reported through 10 September 2007

^a Population figures from World Population Prospects: The 2006 Revision, New York, United Nations, 2007.

[†] District data from WHO/UNICEF Joint Reporting Forms 2006

[‡] Only confirmed cases were reported; in Australia, Mongolia, and Singapore, only lab-confirmed cases were reported.

[§] 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
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