

## News in Brief

The substantially revised International Health Regulations, known as IHR (2005), came into force on 15 June 2007. While reporting of measles is not directly specified as a reportable disease under IHR (2005), in some situations an event involving measles may become a potential public health emergency of international concern and therefore may be notified to WHO under IHR (2005). In addition, a country is required to inform WHO within 24 hours when it receives evidence of a public health risk identified outside its territory that may cause international disease spread, such as imported or exported measles cases. Some countries have used the IHR (2005) mechanism to report measles cases when spread from or to other countries appears likely. A recent example involves a 12-month-old measles case that was likely infected in Indonesia and traveled by boat to Singapore. From Singapore, the child traveled by plane to New Zealand, transiting in Australia. Shortly after arrival to New Zealand, the child developed rash, fever and cough and was laboratory confirmed as a measles case. New Zealand authorities promptly reported the case through the IHR (2005) mechanism. Authorities in all involved Member States were informed of the potential threat of measles virus importation; authorities in the WHO South-East Asia Regional Office and in Indonesia were informed of the case that originated within its borders so that it might investigate further. IHR (2005) will become an increasingly important mechanism for reporting potential measles virus importations, sharing information and conducting coordinated follow-up actions as the Region progresses towards elimination.

## Reporting (Table 1)

Completeness of measles surveillance reporting to Western Pacific Regional Office continued to improve in the second half of 2008, with over 80% completeness every month from July to October (Table 1). Timeliness, while much better than in 2007, did not change substantially by month in 2008 and remains at <50%. Countries having technical or operational difficulties in

producing or submitting their monthly reports are encouraged to work closely with WHO country offices and the Western Pacific Regional Office to help resolve them. We congratulate all countries contributing to better monitoring of progress towards the regional measles elimination goal by 2012.

Table 1: Completeness and timeliness of reporting - Western Pacific Region, 2007 and 2008\*

Country	2007		2008												Completeness†	Timeliness†
	Completeness	Timeliness	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov			
			07 Feb	07 Mar	07 Apr	07 May	07 Jun	07 Jul	07 Aug	07 Sep	07 Oct	07 Nov	07 Dec			
Australia	50%	8%	20 Feb	07 Mar	08 Apr	07 May	06 Jun	11 Jul	07 Aug	08 Sep	03 Oct	03 Nov	02 Dec	100%	64%	
Brunei Darussalam	0%	0%				14 May	16 Jun	07 Jul	05 Aug	06 Sep	06 Oct	04 Nov	02 Dec	73%	55%	
Cambodia	33%	8%		12 Mar	31 Mar	02 May			20 Aug	08 Sep	29 Oct	18 Nov	12 Dec	73%	18%	
China	75%	0%	14 Feb	13 Mar		15 May	16 Jun	08 Jul	12 Aug	10 Sep	13 Oct	11 Nov		82%	0%	
Hong Kong (China)	75%	25%	05 Feb	07 Mar	07 Apr	07 May	06 Jun	04 Jul	07 Aug	04 Sep	06 Oct	07 Nov	04 Dec	100%	100%	
Japan	0%	0%					06 Jun	11 Jul	07 Aug	07 Sep	06 Oct	07 Nov	07 Dec	64%	55%	
Lao People's Democratic Republic	8%	0%				15 May			20 Aug		27 Oct	17 Nov	04 Dec	45%	9%	
Macao (China)	92%	17%	06 Feb	05 Mar	02 Apr	05 May	09 Jun	03 Jul	08 Aug	09 Sep	09 Oct	10 Nov	12 Dec	100%	45%	
Malaysia	25%	0%	22 Feb	24 Mar	25 Apr	28 May			07 Aug		29 Oct			55%	9%	
Mongolia	67%	25%	22 Feb	05 Mar	04 Apr	03 May	19 Jun	07 Jul	07 Aug	05 Sep	08 Oct	07 Nov	09 Dec	100%	64%	
New Zealand	83%	58%	04 Feb	03 Mar	07 Apr	07 May	05 Jun	02 Jul	04 Aug	05 Sep	02 Oct	04 Nov	04 Dec	100%	100%	
Papua New Guinea	25%	8%	08 Feb	03 Mar	01 Apr	02 May	01 Jun	05 Jul		12 Sep	31 Oct			73%	45%	
Philippines	75%	42%	07 Feb			29 Apr	23 May	09 Jul	22 Aug	03 Sep	07 Oct	03 Nov		73%	55%	
Republic of Korea	33%	8%	26 Feb							01 Sep				18%	9%	
Singapore	83%	25%	06 Feb	05 Mar	04 Apr	05 May	03 Jun	04 Jul	06 Aug	12 Sep	07 Oct	07 Nov	11 Dec	100%	82%	
Viet Nam	42%	17%	07 Feb	22 Mar	07 Apr	08 May	08 Jun	09 Jul	12 Aug	12 Sep	06 Nov	06 Nov	10 Dec	100%	27%	
Pacific Island Countries	100%	75%	18 Feb	15 Mar			09 Jun	16 Jul		15 Sep	29 Oct	24 Nov	15 Dec	73%	36%	
<b>Monthly completeness</b>	<b>51.0%</b>		76%	71%	59%	82%	76%	76%	82%	88%	94%	82%	71%	<b>78.1%</b>		
<b>Monthly timeliness</b>		<b>18.6%</b>	35%	47%	47%	53%	47%	41%	47%	47%	41%	53%	41%		<b>45.5%</b>	

† Surveillance data reported as of Dec 17, 2008

\* Deadline for submission is on the 7th of the following month of reporting, except for the PICs, which is on the 15th.

Legend: black=timely report; red=untimely report

## Incidence (Table 2)

Annualized measles incidence in the Region through November is 8.4 per million population (Table 2). This does not include confirmed cases from China, for which data have not been submitted. Removing China's population from the denominator results in an annualized measles incidence of 33.4 per million. Annualized

incidence is <1 per million in 22 countries and areas. The majority of countries show a decreasing trend in measles incidence. Five countries and areas have increased annualized measles incidence in 2008 compared to 2007, including Australia, Cambodia, Macao (China), Singapore and Viet Nam.

**Table 2: Measles case classification and incidence, by country and area, Western Pacific Region, 2007-2008\***

Country/Area	2007										2008*									
	Population (in millions) †	Suspected measles cases	Confirmed measles cases				Discarded cases	Pending classification	Deaths due to measles	Measles incidence per 1 million pop.	Population (in millions) †	Suspected measles cases	Confirmed measles cases				Discarded cases	Pending classification	Deaths due to measles	Annualised measles incidence per 1 million pop.
			Lab	Epi-linked	Clinical	Total							Lab	Epi-linked	Clinical	Total				
Australia †	20.74	11	11	0	0	11	0	0	0	0.5	20.95	65	65	0	0	65	0	0	0	3.4
Brunei Darussalam	0.39	No data	No data	No data	No data	No data	No data	No data	No data	No data	0.40	17	2	0	1	3	14	0	0	8.2
Cambodia	14.44	1 294	8	0	386	394	900	0	0	27.3	14.70	3 494	5	0	1 705	1 710	1 715	69	0	126.9
China	1 328.63	118 031	No data	No data	No data	No data	No data	No data	64	No data	1 336.31	134 328	No data	No data	No data	No data	No data	No data	92	No data
Hong Kong (China)	7.21	106	70	0	18	88	18	0	0	12.2	7.28	85	50	1	16	67	18	0	0	10.0
Japan	127.97	No data	No data	No data	No data	No data	No data	No data	No data	No data	127.94	10 875	4 185	1 785	4 901	10 871	4	0	0	92.7
Lao People's Democratic Republic	5.86	1 670	122	0	1 548	1 670	0	No data	12	285.0	5.96	212	2	0	115	117	95	0	0	21.4
Macao (China)	0.48	1	0	0	0	0	1	0	0	0.0	0.48	21	4	0	1	5	15	1	0	11.3
Malaysia	26.57	1 544	37	0	703	740	793	11	0	27.8	27.03	1 635	59	0	481	540	246	849	1	21.8
Mongolia	2.63	110	10	0	100	110	0	0	0	41.8	2.65	358	28	0	0	28	330	0	0	11.5
New Zealand	4.18	25	4	3	18	25	0	1	0	6.0	4.21	14	7	0	7	14	0	0	0	3.6
Papua New Guinea	6.33	4	0	0	0	0	4	0	0	0.0	6.46	28	0	0	0	0	28	0	0	0.0
Philippines	87.96	888	174	12	314	500	387	1	3	5.7	89.65	1 275	203	0	61	264	481	530	6	3.2
Republic of Korea	48.22	451	181	0	37	218	233	0	0	4.5	48.39	70	5	0	1	6	62	2	0	0.1
Singapore †	4.44	15	15	0	0	15	0	0	0	3.4	4.49	17	17	0	0	17	0	0	0	4.1
Viet Nam	87.38	5 286	4	0	13	17	5 209	0	0	0.2	88.54	1 534	73	70	1	144	1 162	228	0	1.8
<b>Pacific island countries and areas</b>																				
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	0.84	9	0	0	0	0	9	0	0	0.0	0.84	10	0	0	0	7	3	0	0	0.0
French Polynesia	0.26	0	0	0	0	0	0	0	0	0.0	0.27	0	0	0	0	0	0	0	0	0.0
Guam	0.17	0	0	0	0	0	0	0	0	0.0	0.18	0	0	0	0	0	0	0	0	0.0
Kiribati	0.09	0	0	0	0	0	0	0	0	0.0	0.09	1	0	0	0	0	1	0	0	0.0
Marshall Islands	0.06	3	0	0	0	0	0	3	0	0.0	0.06	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	1	0	0	0	0	1	0	0	0.0	0.01	0	0	0	0	0	0	0	0	0.0
New Caledonia	0.24	3	0	0	0	0	2	1	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	5	0	0	0	0	5	0	0	0.0
Northern Mariana Islands	0.08	0	0	0	0	0	0	0	0	0.0	0.08	0	0	0	0	0	0	0	0	0.0
Palau	0.02	14	0	0	0	0	4	10	0	0.0	0.02	0	0	0	0	0	0	0	0	0.0
Samoa	0.19	2	0	0	0	0	0	2	0	0.0	0.19	0	0	0	0	0	0	0	0	0.0
Solomon Islands	0.50	0	0	0	0	0	0	0	0	0.0	0.51	4	0	0	0	0	3	1	0	0.0
Tokelau	0.00	1	0	0	0	0	0	1	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	1	0	0	0	0	1	0	0	0.0
Vanuatu	0.23	0	0	0	0	0	0	0	0	0.0	0.23	0	0	0	0	0	0	0	0	0.0
Wallis and Futuna	0.02	0	0	0	0	0	0	0	0	0.0	0.02	0	0	0	0	0	0	0	0	0.0
<b>Western Pacific Region</b>	<b>1 776.44</b>	<b>129 469</b>	<b>636</b>	<b>15</b>	<b>3 137</b>	<b>3 788</b>	<b>7 561</b>	<b>30</b>	<b>79</b>	<b>2.1</b>	<b>1 788.49</b>	<b>154 049</b>	<b>4 705</b>	<b>1 856</b>	<b>7 290</b>	<b>13 851</b>	<b>4 157</b>	<b>1 713</b>	<b>99</b>	<b>8.4</b>

## Surveillance Performance Indicators (Table 3)

For the Region, the annualized discarded measles rate was 0.3 per 100 000 population, well below the target of  $\geq 2$  per 100 000. However, as Australia and China do not report discarded cases, removing their populations from the denominator would result in an annualized discarded measles rate of 1.1 per 100 000 population for the Region. Brunei Darussalam, Cambodia, Macao (China), Mongolia and Niue are the only countries or areas with discarded measles rates above the target.

For the Region, only 2.6% of reported suspected cases had adequate specimens collected and 1.9% had adequate investigations conducted. However, while data on the number of reported suspected cases are available from Australia, China, Japan, Malaysia and New Zealand, the number with adequate specimens and adequate investigations in these countries has not been reported. Excluding the number of suspected cases in these countries from the denominator, 76.0% of reported suspected cases had adequate specimens and 40.7% had adequate investigations in the Region. Only Macao (China)

and Mongolia achieved specimen collection rates of  $\geq 80\%$ ; only Macao (China) achieved an adequate investigation rate of  $\geq 80\%$ . Surveillance definitions used by the Western Pacific Regional Office to calculate "adequate investigation" and "adequate specimen" indicators are as follows:

**Adequate investigation:** collection of essential data elements including date of rash onset, date of specimen collection, vaccination status, date of last vaccination, date of birth or age, sex, and district. In addition, every investigation should include a search for additional epidemiologically linked cases, but as this data is not available to the Western Pacific Regional Office, it is not considered in the calculation.

**Adequate specimen:** sufficient volume of blood (0.5 ml sera, filled dried blood spot [DBS] card) or oral fluid 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)

\* Monthly reports for Jan-Nov 2008

† Population figures from World Population Prospects: the 2006 Revision, New York, United Nations, 2007.

‡ Only laboratory confirmed cases are reported from Australia and Singapore.

Green <1 confirmed measles case / 1 000 000 population  
Yellow 1-9 confirmed measles case / 1 000 000 population  
Red > 2 confirmed cases / 1 000 000 population

Timeliness of laboratory investigation remains high in the Region. Laboratory results were available within seven days of specimen receipt by the laboratory for 80.8% of specimens. Many countries and areas

reached the target of  $\geq 80\%$ , including Australia, Hong Kong (China), Malaysia, Mongolia, New Zealand, the Republic of Korea, Singapore and Viet Nam.

**Table 3: Measles surveillance performance indicators, by country and area, Western Pacific Region, 2007-2008\***

Country/Area	2007					2008*				
	Discarded measles rate per 100 000 pop	Districts with $\geq 1$ non-measles case per 100 000	Suspected cases with adequate investigation	Suspected cases with adequate blood specimens $\Delta$	Laboratory results $\leq 7$ days $\dagger$	Annualized discarded measles rate per 100 000 pop	Districts with $\geq 1$ non-measles case per 100 000	Suspected cases with adequate investigation	Suspected cases with adequate blood specimens $\Delta$	Laboratory results $\leq 7$ days $\dagger$
	$\geq 2$	$\geq 80\%$	$\geq 80\%$	$\geq 80\%$	$\geq 80\%$	$\geq 2$	$\geq 80\%$	$\geq 80\%$	$\geq 80\%$	$\geq 80\%$
Australia	No data	No data	No data	No data	No data	No data	No data	No data	N/A	100.0%
Brunei Darussalam	No data	No data	No data	No data	No data	3.8	100.0%	23.5%	70.6%	No data
Cambodia	6.2	40.0%	42.5%	67.5%	59.2%	12.7	40.0%	43.7%	52.9%	51.9%
China	No data	No data	No data	No data	No data	No data	No data	No data	No data	No data
Hong Kong (China)	0.2	0.0%	60.4%	74.5%	No data	0.3	0.0%	50.6%	79.8%	97.3%
Japan	No data	No data	No data	No data	No data	0.0	No data	No data	No data	No data
Lao People's Democratic Republic	0.0	No data	No data	No data	No data	1.7	No data	8.0%	30.2%	28.2%
Macao (China)	0.2	No data	No data	No data	No data	3.4	100.0%	85.7%	90.5%	No data
Malaysia	3.0	No data	No data	No data	95.5%	1.0	No data	No data	No data	98.3%
Mongolia	0.0	No data	0.0%	7.3%	100.0%	13.6	No data	20.7%	80.2%	100.0%
New Zealand	0.0	No data	No data	No data	No data	0.0	No data	No data	No data	96.9%
Papua New Guinea	0.1	No data	0.0%	100.0%	No data	0.0	No data	50.0%	53.6%	No data
Philippines	0.4	5.4%	8.6%	48.3%	73.0%	0.6	7.0%	24.0%	38.4%	46.4%
Republic of Korea	0.5	No data	29.3%	84.7%	100.0%	0.1	No data	57.1%	70.0%	99.0%
Singapore	0.0	No data	No data	No data	88.5%	0.0	0.0%	35.3%	N/A	98.2%
Viet Nam	6.0	28.7%	26.0%	66.6%	67.5%	1.4	13.1%	55.7%	77.5%	95.9%
<b>Pacific island countries and areas</b>										
American Samoa	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Cook Islands	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Fiji	1.1	100.0%	0.0%	0.0%	No data	0.9	0.0%	10.0%	80.0%	No data
French Polynesia	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Guam	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Kiribati	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	0.0%	0.0%	No data
Marshall Islands	0.0	0.0%	33.3%	33.3%	No data	0.0	0.0%	Not applicable	Not applicable	No data
Micronesia, Federated States of	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Nauru	9.9	100.0%	0.0%	0.0%	No data	0.0	0.0%	Not applicable	Not applicable	No data
New Caledonia	0.8	0.0%	0.0%	66.7%	No data	0.0	0.0%	Not applicable	Not applicable	No data
Niue	0.0	0.0%	Not applicable	Not applicable	No data	334.6	100.0%	0.0%	0.0%	No data
Northern Mariana Islands	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Palau	20.0	100.0%	0.0%	7.1%	No data	0.0	0.0%	Not applicable	Not applicable	No data
Samoa	0.0	0.0%	0.0%	0.0%	No data	0.0	0.0%	Not applicable	Not applicable	No data
Solomon Islands	0.0	0.0%	Not applicable	Not applicable	No data	0.6	0.0%	0.0%	0.0%	No data
Tokelau	0.0	0.0%	0.0%	0.0%	No data	0.0	0.0%	Not applicable	Not applicable	No data
Tonga	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Tuvalu	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	0.0%	0.0%	No data
Vanuatu	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
Wallis and Futuna	0.0	0.0%	Not applicable	Not applicable	No data	0.0	0.0%	Not applicable	Not applicable	No data
<b>Western Pacific Region</b>	<b>0.4</b>	<b>5.4%</b>	<b>1.7%</b>	<b>4.1%</b>	<b>79.8%</b>	<b>0.3</b>	<b>3.4%</b>	<b>1.9%</b>	<b>2.6%</b>	<b>80.8%</b>

\* Monthly reports for Jan-Nov 2008

$\Delta$  Population figures from World Population Prospects: The 2006 Revision, New York, United Nations, 2007.

$\dagger$  Excludes epi-linked cases; not applicable for countries reporting only laboratory confirmed cases.

$\Delta$  This indicator has been computed using data from laboratory reports.

**Green** Reached or surpassed target  
**Yellow** Nearly reached target: 1.00-1.99 for non-measles suspected case rate; 60-79% for other indicators  
**Red** Substantially below target

## Special Topic: Interpreting Incidence

Measles incidence is calculated using reported confirmed cases per one million population. Cases may be confirmed by laboratory result, epidemiologic linkage to laboratory or other epidemiologically linked confirmed cases, or, in the absence of these, by clinical criteria. Any reported suspected measles case (i.e. a case that satisfies the measles clinical case definition) that does not have a specimen for laboratory evaluation and is not confirmed as having another disease (e.g. dengue), would be classified as a clinically confirmed case of measles.

As measles incidence decreases, the predictive value positive of the measles clinical case definition also decreases, resulting in misclassification bias. In other words, as countries approach elimination, an increasing number of clinically confirmed measles cases will be due to causes other than measles. Including clinically confirmed cases in the measles incidence numerator overestimates actual measles incidence, particularly when very large numbers of suspected measles cases are reported, as may happen when a case definition of fever

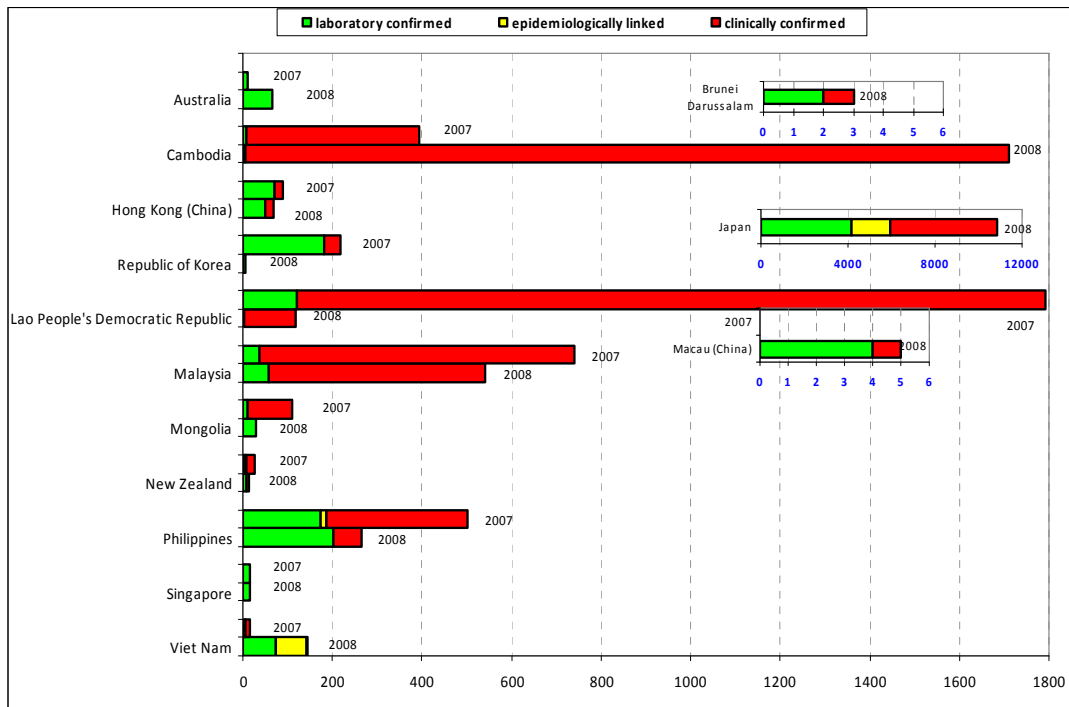
and rash is used instead of fever, rash and cough or coryza or conjunctivitis. A suspected measles case classified as clinically confirmed should be considered as a failure of surveillance because the actual status is unknown. The surveillance performance target of  $\geq 80\%$  specimen collection rate from reported suspected measles cases should be considered a *minimum* target. As countries approach elimination, an adequate specimen should be collected from every reported suspected case unless epidemiologic linkage to another laboratory or epidemiologically linked case can be demonstrated.

Figure 1 compares methods of measles case confirmation for 2007 and 2008 (through November), by country. What is particularly notable is the very large proportion of clinically confirmed cases among all confirmed cases in Cambodia and the Lao People's Democratic Republic. In Cambodia, 3494 suspected measles cases were reported in 2008 through November; 52.9% had adequate specimens and the annualized discarded measles rate was 12.7 per 100 000 population.

In spite of an apparently successful supplementary immunization activity in the first quarter of 2007 and 79% routine MCV1 coverage that year, 1710 of the 3494 reported suspected cases in 2008 were

confirmed, resulting in a very high incidence of 126.9 per million population. Among the 1710 confirmed cases, 1705 (99.7%) were clinically confirmed; only five were laboratory confirmed.

**Figure 1: Confirmed measles cases, by method of confirmation, Western Pacific Region, 2007-2008**



Similarly, the Lao People's Democratic Republic conducted a hugely successful supplementary immunization activity (SIA) with very high coverage in the last quarter of 2007. Improved case reporting in 2008 resulted in 212 suspected measles cases reported through October, with adequate specimens collected from 30.2% and an annualized discarded measles rate of 1.7 per 100 000 population. The relatively low specimen collection rate led to a large number of clinically confirmed cases; among a total of 117 confirmed cases, 115 (98.3%) were clinically confirmed, and annualized measles incidence was relatively high at 21.4 per million populations.

Both Cambodia and the Lao People's Democratic Republic illustrate how large numbers of clinically

confirmed cases can result in misleadingly high measles incidence rates. The best way to ensure credible and useful monitoring of measles incidence is: (1) to collect specimens on all suspected measles cases that can not be epidemiologically linked to known laboratory or other epidemiologically confirmed cases; and (2) to ensure adherence to the measles clinical case definition (i.e. fever, rash and cough or coryza or conjunctivitis) when classifying clinically confirmed measles cases. Fever rash illness (or acute fever and rash) is a sensitive screening criterion for investigating cases of suspected measles and rubella; however, the more specific WHO-recommended clinical case definition for measles should be used when classifying suspected measles cases as clinically confirmed.