

# Tuberculosis Control

In the WHO Western Pacific Region

2002 Report



**World Health Organization**  
**Office for the Western Pacific Region**

Part I

# COMMENTARY





## COMMENTARY

This report follows the *Tuberculosis Control in the WHO Western Pacific Region 2000* report and is based on case notification and treatment outcome data supplied by national control programmes to WHO, using a standard data collection form.<sup>1</sup>

The aim of this report is to present progress in tuberculosis control in the Western Pacific Region, and in particular, in implementing the WHO directly observed treatment, short-course (DOTS) strategy.<sup>2</sup> Last year's report<sup>3</sup> noted that tuberculosis was still a public health problem in the Region with 49 notified cases per 100 000 population (823 421 new cases, among whom 393 801 were smear-positive).

The ratio of detected to estimated cases in the Region was 44%, far below the WHO target of 70%. The reported total regional population coverage of DOTS (proportion of the population with access to DOTS) was 67%, unchanged compared with the previous year. However, the proportion of newly detected patients enrolled in DOTS in the Region increased, from 69% of all new cases in 1999 to 74% in 2000, and from 78% of new smear-positive cases in 1999 to 85% in 2000. DOTS enrollment rates remained unchanged between 1999 and 2000 in the People's Republic of China (henceforth, China), but increased sharply in the Philippines, from 22% in 1999 to 75% in 2000 (all cases) and from 28% in 1999 to 75% in 2000 (smear-positive cases). The regional cure and success rates in DOTS areas were 93% and 95%, respectively, well above the WHO 85% cure rate target.

### 1 Review of tuberculosis case notification

Only three Pacific island countries (PICs) with a total population size of 43 000 did not report tuberculosis case notification for 2000 to WHO. In total, 804 579 cases (all types) and 384 755 smear-positive cases were notified for 2000. Regional case notification rates per 100 000 population were 49 (all types) and 23 (smear-positive) and did not show any significant difference from the previous year's rates (Table 1). China contributes 58% of the total number of notified cases in the Region.

<sup>1</sup> World Health Organization. *WHO Report 2001, Global Tuberculosis Control*. WHO Geneva 2001.

<sup>2</sup> World Health Organization. *WHO Tuberculosis Programme: Framework for Effective Tuberculosis Control*. WHO Geneva 1994: WHO/TB/94.179.

<sup>3</sup> World Health Organization. *Tuberculosis Control in the WHO Western Pacific Region 2000*. WHO/WPRO 2001.

Regional case notification rates per 100 000 population were 49 (all types) and 23 (smear-positive) and did not show any significant departure from the previous year's rates.

The notification rate per 100 000 (all types) varied from 250 in Kiribati to 0 in Tokelau, with eight countries reporting a rate greater than 100, and nine countries reporting a rate lower than 25 (mostly Pacific island countries). In most large countries with a high burden of tuberculosis, the notification of new smear-positive cases was close to that of the previous year.

Case notification (all cases) increased until 1999 in China (356 364 cases in 1995, 471 359 in 1999 and 463 373 in 2000), Viet Nam until 2000 (55 739 cases in 1995 to 89 792 cases in 2000), Malaysia (11 778 cases in 1995 to 15 057 in 2000), Papua New Guinea (8041 cases in 1999 and 12 121 cases in 2000), while it decreased in the Philippines and the Republic of Korea. In other countries, case notification has fluctuated over the past six years, as was the case with Hong Kong, China (which showed a sharp decrease from 7512 cases in 1999 to 5141 in 2000), and Mongolia (Table 1).

The proportion of smear-positive cases among all notified cases varied from 100% in some Pacific island countries (with great variations due to small overall figures), to a low 14% in Singapore, 16% in the Federated States of Micronesia, 19% in Papua New Guinea, and 24% in Australia and Hong Kong, China. Such low proportions in the latter countries may be attributed to differences in case definitions (for instance, some countries, such as New Caledonia, notify latent tuberculosis), low utilization of microscopy services or imperfections in the tuberculosis information system.

The regional proportion of smear-positive cases among cases enrolled in DOTS (55%) was higher than the proportion among cases not enrolled in DOTS (28%). This may reflect tuberculosis control programme improvements since sputum smear examinations are considered the standard diagnosis of pulmonary tuberculosis under DOTS.

Extrapulmonary tuberculosis was not reported in China nor in the Republic of Korea, while it represented more than 40% of notified cases in Australia, Kiribati and New Zealand (Table 3).

In total, 51% of new smear-positive cases occurred in the most economically productive 15-45 year old age group (Figure 5). About 33% of the regional notified smear-positive cases were female (sex ratio M/F = 2). The regional sex ratio (M/F) was 0.8 in the 0-14 year old age group, 1.3 in the 15-24 year old age group, and increased in the older age groups.

HIV and tuberculosis data were reported by 12 countries and areas. HIV seroprevalence in newly detected tuberculosis cases was 7.9% in Cambodia; 4.9% in Malaysia; 3.0% in Fiji; 1.2% in New Zealand; 1.0% in Papua New Guinea and the Commonwealth of the Northern Mariana Islands; 0.5% in Hong Kong, China and Macao, China; 0.3% in Singapore; and 0% in Brunei Darussalam, French Polynesia and Mongolia.

## 2 Estimates of TB case detection rates

WHO Western Pacific Regional Office, in collaboration with the WHO Global Tuberculosis Programme, Geneva, 2, conducted a workshop on tuberculosis estimates in

1977.<sup>4</sup> The goal of the workshop was to evaluate the availability and reliability of tuberculosis data in participating countries and derive country specific estimates of morbidity and mortality for the disease. Based on data arising out of the workshop, a report, *Global Burden of Tuberculosis*, was published in 1999. The estimates presented here are for the year 2000, updated from that article. Methods used to update the estimates are presented in the *Global Tuberculosis Report 2001*.

It was estimated that the incidence of tuberculosis in the Region was 1 975 899 in 2000 (compared to 1 880 849 in 1999), of whom 858 494 were smear-positive (841 564 in 1999). Case detection rates were thus 41% (all cases) and 45% (smear-positive), compared to 44% and 47%, respectively, in 1999 (Table 2). The smaller estimates along with a decrease in case notification led to a substantial reduction of the case detection rate of smear-positive cases in several countries, including Cambodia (from 57% in 1999 to 44% in 2000), Japan (79% in 1999 to 57% in 2000), and the Philippines (71% in 1999 to 60% in 2000). Estimates should be treated cautiously since a lot of uncertainty is attached to them.

### 3 Review of DOTS implementation

DOTS has proven to be an effective control strategy for tuberculosis since the early 1990s. Certain factors that can aggravate the epidemiological situation of tuberculosis, such as population growth, urbanization and the HIV epidemic, are emerging simultaneously. Therefore, there is an urgent need to expand DOTS, especially in countries with a high prevalence of tuberculosis.

In 1999, the number of countries implementing a strategy consistent with DOTS continued to increase, reaching 128 (61%) in 1999. By the end of that year, 83% of the world's population was living in countries that had adopted DOTS and about 45% of the global population had access to DOTS. The documented treatment success rates under DOTS varied from 71% in Africa to more than 95% in the Western Pacific Region.

Out of the 34 countries and areas in the Region that submitted data for the year 2000, the number stating that a non null percentage of the population was living in geographic areas served by DOTS units was 28, compared to 22 the previous year and 18 in 1998. Despite this significant increase in the number of countries implementing the DOTS strategy, the reported total regional population coverage of DOTS (proportion of the population with access to DOTS) was 67%, unchanged from the previous year (Table 10), reflecting slow scaling up of DOTS expansion in several large countries (DOTS coverage in China increased from 64% in 1999 to only 68% in 2000).

However, the proportion of newly detected patients enrolled in DOTS in the Region increased, from 69% of all new cases in 1999 to 74% in 2000, and from 78% of new smear-positive cases in 1999 to 85% in 2000 (Table 10). DOTS enrollment rates remained unchanged between 1999 and 2000 in China, but increased sharply in the

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<sup>4</sup> Dye C., Scheele S., Dalin P., et al. *Global Burden of Tuberculosis. Estimated Incidence, Prevalence, and Mortality by Country*. JAMA 1999; 282: 677-686.

Philippines, from 22% in 1999 to 75% in 2000 (all cases) and from 28% in 1999 to 75% in 2000 (smear-positive cases). It should be noted that these comparisons between 1999 and 2000 are limited by changes over time in the number of reporting countries, and in the definitions applied regarding DOTS coverage and enrollment rates.

To evaluate the outcome of treatment, the cure rate and success rate of smear-positive cases is used (see definitions of treatment outcomes, Annex 1). Reporting of treatment outcome is often the most inaccurate section of the annual tuberculosis report sent by countries and areas. Totals are often inconsistent with the sum of all categories (which should be mutually exclusive), the number of registered patients is often very different from the number of notified patients as taken from the previous year's report, or from the updated section of the previous year's report that is supplied at the end of the standardized notification forms.

In 1999, 393 801 new smear-positive cases were notified to WHO (updated figures for 1999 were reported by several countries in the 2000 report, and the regional updated figure for 1999 totaled 411 219). But in 2000, it was also reported that only 312 049 were registered during the year 1999 for treatment evaluation, i.e. 76% of the updated number of newly detected smear-positive cases for 1999 (Table 11). One of the seven high burden countries did not report completed treatment figures but rather regrouped completed and cured into the cured category.

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*The regional cure rate and success rate in DOTS areas were 91% and 96%, respectively, well above the WHO target cure rate of 85%. The regional death rate was only 2% in DOTS areas.*

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The regional cure rate and success rate in DOTS areas were 91% and 96%, respectively, well above the WHO target cure rate of 85% (Table 11). The regional death rate was only 2% in DOTS areas. Country success rates in DOTS areas were mostly similar to those reported the previous year. Treatment outcome for non-DOTS areas concerned only a small number of notified smear-positive cases (29 690 cases were reported in 2000) as registered in 1999 for treatment evaluation, of whom 19 878 were in China, whereas the notified number from the previous year's report was 86 898 [23 901 in China]) (Table 12). In the Philippines, 52 896 smear-positive cases were notified in non-DOTS areas in 1999, but none of them were notified in 2000 as registered for treatment outcome analysis. Furthermore, only 34% of cases notified in non-DOTS areas in 1999 were smear-positive, as compared to 54% in DOTS areas, a difference probably related to an inadequate or insufficient use of laboratory services in non-DOTS areas in many countries, those services being crucial to the determination of treatment outcomes. Therefore, any analysis of treatment outcomes involving non-DOTS areas or using non-DOTS areas as a comparison group is probably afflicted by major biases.

#### 4 Anti-tuberculosis drug resistance

In the Region, 12 out of 37 countries and areas joined WHO and the International Union Against Tuberculosis and Lung Disease (IUATLD) global project on anti-tuberculosis drug resistance surveillance (DRS) and 10 countries completed at least the first survey on drug resistance between 1995 and 2001. Drug resistance to any drug was found among newly diagnosed tuberculosis cases in all countries surveyed in the Western Pacific Region, with a population adjusted mean of 19.4% ranging from 4.8% to 32.9%, indicating rigorous transmission of drug resistant *Mycobacterium tuberculosis* occurs in the Region (Table 13).

Adjusted mean prevalence of MDR-TB was 2.6% among new cases, ranging from 0.1% to 5.3% and it was found to be a serious level — 6.3% to 9.1% — in some provinces of China when MDR-TB of retreatment cases are included (Table 15). Significantly higher resistance was found against isoniazid (INH) in five countries when compared with the others in the Region, while streptomycin (SM) resistance outnumbered or equaled INH resistance in six countries or provinces. Mono-resistance to INH and SM was common among new cases but much less among retreatment cases. The third most common resistance was found against rifampicin (RMP) and most of these cases were associated with INH resistance. Ethambutol (EMB) resistance was low.





## Part II

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**Table 1: Latest notification of tuberculosis by country, 1999-2000**

Countries	Pop. (x 1000)	Case Notification, 1995-1999					Case Notification, 2000			
		All Cases Number*					Number		Rate/100 000	
	2000	1995	1996	1997	1998	1999	All Types**	New Smr +	All Types**	New Smr +
		a	d	e	f	g	h	i	j	k
American Samoa	57	5	0	6	4	3	3	2	5	4
Australia	19 157	1073	1073	1145	899	1073	1043	251	5	1
Brunei Darussalam	338		140	149	198	267	307	84	91	25
Cambodia	12 014	14 603	14 857	15 629	16 946	19 266	18 891	14 822	157	123
China	1 236 722	356 364	414 480	448 053	464 559	471 359	463 373	213 766	37	17
Cook Islands	17		0	0	1	3	1	1	6	6
Fiji	840	203	200	171	166	192	144	62	17	7
French Polynesia	230	83	86	91	105	93	59	29	26	13
Guam	154	114	114	95	89	69	54	42	35	27
Hong Kong, China	6796	6212	6501	7072	7673	7512	5141	1240	76	18
Japan	126 920	43 078	42 122	42 190	44 016	40 800	39 384	11 853	31	9
Kiribati	84		253	32	276	253	210	54	250	64
Republic of Korea	47 733	42 117	39 315	33 215	34 661	32 075	21 782	8216	46	17
Lao PDR	5287	830	1440	1923	2153	2434	2234	1526	42	29
Macao, China	438	402	570	575	465	422	449	133	103	30
Malaysia	22 203	11 778	12 691	13 539	14 115	14 908	15 057	8156	68	37
N. Mariana Islands	69	48	51	93	97	66	75	27	109	39
Marshall Islands	61	51	59	103	51	41	34	11	56	18
Micronesia FS	115	172	126	107	123	100	91	15	79	13
Mongolia	2380	2780	3457	2987	2915	3348	3109	1389	131	58
Nauru	12	2	0	9	6	2	4	4	33	33
New Caledonia	211	111	127	100	104	83	86	38	41	18
New Zealand	3843	391	352	321	365	447	344	74	9	2
Niue	2	0	0	0	0	0	0	0	0	0
Palau	19	19	5	15	15	32				
Papua New Guinea	5131	8041	5087	7977	11 291	12 189	12 121	2267	236	44
Philippines	76 348	119 186	165 453	195 767	162 360	145 807	128 495	67 056	168	88
Pitcairn Islands (***)	0									
Samoa	170	45	31	32	22	31	43	13	25	8
Singapore	3263	1889	1951	1977	2120	1805	1728	248	53	8
Solomon Islands	410	352	306	316	281	289	303	109	74	27
Tokelau	2	0	0	0	0	0	0	0	0	0
Tonga	100	22	22	21	30	22	24	15	24	15
Tuvalu	10	36			18				0	0
Vanuatu	200	79	126	184	178	120	152	63	76	32
Viet Nam	76 900	55 739	74 711	77 938	87 468	88 879	89 792	53 169	117	69
Wallis and Futuna	14	4	4	14	14				0	0
<b>WPR TOTAL</b>	<b>1 648 250</b>	<b>751 951</b>	<b>942 831</b>	<b>834 722</b>	<b>839 121</b>	<b>843 990</b>	<b>804 579</b>	<b>384 755</b>	<b>49</b>	<b>23</b>

\* Data updated in the 2000 country report. \*\* All types includes new smear-positive, relapse, smear-negative and extrapulmonary tuberculosis cases.

\*\*\* No data on tuberculosis are available.

Out of 37 countries and areas, 34 reported to WHO in 2000, compared to 30 in 1999. There was a 4.7% decrease in the regional total number of notified cases (all types) between 1999 and 2000 and a 2.3% decrease in the regional total number of notified smear-positive cases between 1999 and 2000. In 2000, 58% of notified newly detected tuberculosis cases were in China. Population data came from the country tuberculosis reports for 2000.

**Table 2:** Case detection rates of tuberculosis by country

Countries	Notified Cases		Estimated Cases		Case Detection Rates (%)	
	All types	Smear +	All types	Smear +	All types	Smear +
American Samoa	3	2	23	11	13	18
Australia	1043	251	1525	685	68	37
Brunei Darussalam	307	84	199	89	154	94
Cambodia	18 891	14 822	74 921	33 490	25	44
China	463 373	213 766	1 364 851	583 936	34	37
Cook Islands	1	1	7	3	14	33
Fiji	144	62	281	126	51	49
French Polynesia	59	29	81	36	73	81
Guam	54	42	135	61	40	69
Hong Kong, China	5141	1240	6250	2809	82	44
Japan	39 384	11 853	45 927	20 665	86	57
Kiribati	210	54	72	32	292	169
Republic of Korea	21 782	8216	28 887	12 970	75	63
Lao PDR	2234	1526	8457	3806	26	40
Macao, China	449	133	972	437	46	30
Malaysia	15 057	8156	24 719	11 074	61	74
N. Mariana Islands	75	27	63	28	119	96
Marshall Islands	34	11	44	20	77	55
Micronesia FS	91	15	106	48	86	31
Mongolia	3109	1389	5463	2458	57	57
Nauru	4	4	4	2	100	200
New Caledonia	86	38	187	84	46	45
New Zealand	344	74	403	181	85	41
Niue	0	0	1	0	0	
Palau			17	7		
Papua New Guinea	12 121	2267	12 597	5656	96	40
Philippines	128 495	67 056	249 404	112 146	52	60
Pitcairn Islands (***)						
Samoa	43	13	55	25	78	52
Singapore	1728	248	1920	862	90	29
Solomon Islands	303	109	388	175	78	62
Tokelau	0	0	1	0	0	
Tonga	24	15	34	15	71	100
Tuvalu			4	2	0	0
Vanuatu	152	63	171	77	89	82
Viet Nam	89 792	53 169	147 725	66 476	61	80
Wallis and Futuna			5	2	0	0
<b>WPR TOTAL</b>	<b>804 533</b>	<b>384 755</b>	<b>1 975 899</b>	<b>858 494</b>	<b>41</b>	<b>45</b>

The revision of estimates along with a decrease in case notification led to a substantial decrease of the case detection rate of smear-positive cases in several countries (see commentary). Estimates are to be taken cautiously since a lot of uncertainty is attached to them.

**Table 3:** Tuberculosis cases notified by type in 2000

	Pop (x1000)	Pulmonary							Extra- pulmonary % out of total	Total all types	
		Sputum positive				Sputum negative					
		New	Relapse	% of all SS+ out of all pulm.	% out of new pulm.	% out of total	% out of total	% out of total			
American Samoa	63	2	66.7	100.0	0	100.0	0	0.0	1	33.3	3
Australia	19 157	251	27.3	45.6	17	48.6	283	30.8	369	40.1	920
Brunei Darussalam	338	84		31.7	15	37.4	166	54.1	42		307
Cambodia	12 014	14 822	78.5	88.5	814	93.4	1108	5.9	2147	11.4	18 891
China	1 236 722	213 766	50.0	50.0	19 664	54.6	194 488	45.4	0		427 918
Cook Islands	17	0	0.0	0.0	0	0.0	1	100.0	0	0.0	1
Fiji	840	62	43.1	59.6	0	59.6	42	29.2	40	27.8	144
French Polynesia	230	29	49.2	59.2	1	61.2	19	32.2	10	16.9	59
Guam	154	42	77.8	87.5	1	89.6	5	9.3	6	11.1	54
Hong Kong, China	6797	1240	34.0	39.4	120	43.2	1787	48.9	504	13.8	3651
Japan	126 920	11 853	31.6	39.0	1367	43.5	17 195	45.9	7046	18.8	37 461
Kiribati	84	54	28.0	62.1	3	65.5	30	15.5	106	54.9	193
Republic of Korea	47 733	8216	37.7	37.7	2262	48.1	11 304	51.9	0	0.0	21 782
Lao PDR	5287	1526	68.3	74.3	91	78.7	437	19.6	180	8.1	2234
Macao, China	438	133	40.8	48.2	12	52.5	131	40.2	50	15.3	326
Malaysia	22 203	8156	54.2	59.7	0	59.7	5517	36.6	1384	9.2	15 057
N. Mariana Islands	69	27	36.0	42.2	0	42.2	37	49.3	11	14.7	75
Marshall Islands	61	11	29.7	39.3	0	39.3	17	45.9	9	24.3	37
Micronesia FS	115	15	29.4	31.9	3	38.3	29	56.9	4	7.8	51
Mongolia	2380	1389	44.7	61.8	126	67.4	732	23.5	862	27.7	3109
Nauru	12	4	100.0	100.0	0	100.0	0	0.0	0	0.0	4
New Caledonia	211	38	44.7	67.9	4	75.0	14	16.5	29	34.1	85
New Zealand	3843	74	24.3	42.3	7	46.3	94	30.8	130	42.6	305
Niue	2	0			0		0		0		0
Palau	18										
Papua New Guinea	5130	2267	23.6	38.9	915	54.6	2647	27.6	3768	39.3	9597
Philippines	76 348	67 056	52.2	52.2	8578	58.9	52 858	41.1	0	0.0	128 492
Pitcairn Islands	0.046										
Samoa	170	13	33.3	48.1	0	48.1	14	35.9	12	30.8	39
Singapore	3263	248	19.6	22.6	55	27.6	795	62.9	165	13.1	1263
Solomon Islands	410	109	36.0	45.8	1	46.2	128	42.2	65	21.5	303
Tokelau	2	0			0		0		0		0
Tonga	100	15	62.5	71.4	1	76.2	5	20.8	3	12.5	24
Tuvalu	11										
Vanuatu	200	63	41.4	50.8	5	54.8	56	36.8	28	18.4	152
Viet Nam	76 900	53 169	59.2	69.4	5493	76.5	17 993	20.0	13 137	14.6	89 792
Wallis and Futuna	15										
<b>Total</b>	<b>1 648 257</b>	<b>384 734</b>	<b>50.5</b>	<b>52.5</b>	<b>39 555</b>	<b>57.9</b>	<b>307 932</b>	<b>40.4</b>	<b>30 108</b>	<b>3.9</b>	<b>762 329</b>

**Table 4: Trend of notified tuberculosis cases (all types)**

	American Samoa	Australia	Brunei Darussalam	Cambodia	China	Cook Islands	Fiji	French Polynesia	Guam	Hong Kong, China	Japan	Kiribati	Republic of Korea	Lao PDR	Macao, China	Malaysia	N. Mariana Islands	Marshall Islands	Micronesia FS	Mongolia	Nauru	New Caledonia	New Zealand	Niue	Palau	Papua New Guinea	Philippines	Pitcairn Islands	Samoa	Singapore	Solomon Islands	Tokelau	Tonga	Tuvalu	Vanuatu	Viet Nam	Wallis and Futuna	Total	
1977	7	1251				257	95	67	7191	89 245	97					10 264	8	1075				608	7	2212	107 108	36	2760	355	62			150					222 855		
1978	8	1292	230			183	78	64	6623	80 629	40					10 441	6	1107				595	14	2446	118 587	59	2964	411	89			131	68 650				294 647		
1979	2	1542	216			30	205	81	71	7903	76 455	94	81 910		442	11 094	4	1123				542	9	2232	108 813	58	2800	452	71	7	184	11 821				308 161			
1980	2	1457	196			37	210	73	55	8065	70 916	146	89 803		1101	11 168	6	1160				108 474	17	2525	112 307	59	2710	266	64	33	178	43 062				346 198			
1981	6	1386	285			10	180	58	41	7729	65 867	187	98 532		585	10 970	26	7	1094				128 448	10	2418	116 821	49	2425	313	49	18	92	43 506				353 240		
1982	6	1270	245	8158	98 654	19	163	48	49	7527	63 940	193				11 894	75	12 67	1325				107 437	17	2742	104 715	43	2179	324	0	45	12	173	51 206				355 645	
1983	8	1219	276	7572	117 557	29	185	66	48	7301	62 021	127	91 572		455	11 634	74	15 73	1514				161 415	14	2954	106 300	41	2065	302	50	23	171	43 185				457 427		
1984	12	1299	256	10 241	151 564	20	165	73	54	7843	61 521	111	85 669		671	10 577	58	12 75	1652				144 402	20	3505	151 863	37	2143	337	0	54	9	188	43 875				534 450	
1985	5	1088	238	10 145	226 899	36	230	75	37	7545	58 567	103	87 169		571	10 569	64	15 66	2994				104 359	26	3678	151 028		1952	377	2	49	32	124	46 941				611 088	
1986	8	906	212	10 325	265 095	17	199	79	49	7432	56 690	129	88 789		420	10 735	16	37 60	2819				98 320	13	2877	153129		1760	292	35	27	131	47 557				650 256		
1987	9	907	189	9106	313 604	16	173	63	34	7269	56 496	110	87 419		389	11 068	49	32 97	2433				74 296	38	3235	163 740	29	1616	334	9	24	22	90	55 505				714 475	
1988	13	954	126	10 691	362 114	15	162	64	41	7021	54 357	208	74 460		320	10 944	27	11 77	2538				111 295	17	4261	183 113	29	1666	372	1	14	24	118	52 463				766 627	
1989	5	952	128	7906	367 799	1	218	58	75	6704	53 112	121	70 012		274	10 686	28	7 68	2233				110 303	3	3396	217 272	37	1617	488	35	25	144	52 270				796 087		
1990	15	1016	143	6501	375 481	1	252	59	40	6510	51 821	68	63 904		343	10 873			1659				130 348		2497	317 008	44	1591	382	1	23	23	140	47 536				888 409	
1991	2	950		10 903	376 246		210	49		6283	50 612		57 864	1951	329	11 059			1611				140 335	6	3401	207 371			309	19	16	234	54 509				784 409		
1992		1011		16 148		12	240	83		6534	48 956	100	48 070	994	294	11 420	67	52 111	1516				140 317	2	2540	236 172	26	1512	364	1	23	30	147	56 594	4			433 480	
1993	4	991	160	13 270	344 218	6	82	70	70	6537	47 437		46 999	1905	318	12 075		61 151	1418				149 274	1	25	5516	174 189	49	1722	367	32	28	114	52 994				711 162	
1994				15 112	363 804	4	225	89	94	6319	44 590	253	38 155	1135	349	11 708	46		171 1730	4			132 352	2	41	5335	180 044	45	1677	332	0	23	19	152	51 763	11			723 716
1995	5	1073	0	14 603	356 364	0	203	83	114	6212	43 078	0	42 117	830	402	11 778	48	51 172	2780	2			111 391	0	19	276	119 186	45	1889	306	0	22	36	79	55 739	4			658 018
1996	0	1073	140	14 857	414 480	0	200	86	114	6501	42 122	327	39 315	1440	570	12 691	51	59 126	3457	0			127 352	0	5	222	165 453	31	1951	316	0	22		126	74 711				780 925
1997	6	1145	149	15 629	448 053	0	171	91	95	7072	42 190	32	33 215	1923	575	13 539	93	103 107	2987	9			100 321	0	15	235	195 767	32	1977	281	0	21		184	77 938	14			842 924
1998	4	899	198	16 946	464 559	1	166	105	89	7673	44 016	276	34 661	2153	465	14 115	97	51 123	2915	6			104 365	0	15	215	162 360	22	2120	289	0	30	18	178	87 468	14			841 788
1999	3	1073	267	19 266	471 359	3	192	93	69	7512	40 800	253	32 075	2434	422	14 908	66	41 100	3348	2			83 447	1	32	255	145 807	31	1805	281	0	22		120	88 879				830 976
2000	3	1043	307	18 891	463 373	1	144	59	54	5141	39 384	210	21 782	2234	449	15 057	75	34 91	3109	4			86 344	0	0	12 121	128 495	43	1728	303	0	24		152	89 792				804 506

**Table 5: Trend of notified tuberculosis cases (new smear positive cases)**

	American Samoa	Australia	Brunei Darussalam	Cambodia	China	Cook Islands	Fiji	French Polynesia	Guam	Hong Kong, China	Japan	Kiribati	Republic of Korea	Lao PDR	Macao, China	Malaysia	N. Mariana Islands	Marshall Islands	Micronesia FS	Mongolia	New Caledonia	New Zealand	Niue	Palau	Papua New Guinea	Philippines	Pitcairn Islands	Samoa	Singapore	Solomon Islands	Tokelau	Tonga	Tuvalu	Vanuatu	Viet Nam	Wallis and Futuna	Total
1977		881					145	41			13 373	22				6050										852			1285	182		29		57			22 917
1978		741					101	32			13 198	4				6313										903			1375	174		41		52			22 934
1979		807					114	41			12 806	21	34	633		6622										883			1197	184		28		52			57 388
1980	0	765					111	52			12 291	10	38	211		6819		5							10	967	17 275		1266	153		32	23	59			78 049
1981	6	723					97	39			12 214	34	43	868		6766	0	4							5	867	19 006	32	1062	174		18	10	34	33	243	118 202
1982	3	690		5801	19 236		98	32			12 649	17	46	735		7320	11	6	11			34			2	942	20 676	30	998	176		25	3	49	33	014	148 558
1983	6	596		5316	25 628		79	48			13 010	14	45	688		7251	3	6	32			60			6	870	18 657	25	860	130		23	7	55	32	612	150 982
1984	9	634		5507	38 367		82	52			13 277		42	561		6660	28	7	18							1061	21 291	20	992	155		25	3	55	30	426	161 230
1985	2	583		5235	53 078		99	48		4142	13 808		48	515		6682	4	8	14	363			69		4	870	39 571		949	155		23	3	51	34	217	208 493
1986	5			8715	60 949		86	49		4110	13 745		49	083		6653	5	4	10	320			66		0	606	50 624		839	101		18	5	36	30	381	226 410
1987	3			7173			75	45		4042	14 405		45	066		6924	22		18	271			55		4	839	72 150		740	115		12	7	26	34	530	186 522
1988				8246			65	44		3918	14 592		39	040		6718				276			62			1273	63 655		794	137		7	7	46	39	486	178 366
1989				5842			76	43		3768	14 710		33	968		133 6711				234		40				951	97 070		823	149			2	39	35	095	199 654
1990				5132			83			3670	15 498		30	700		124 6774				185		37				611			840	117		16	7		30	728	94 522
1991				8507			63	34		3564	15 285		28	790	526	140 6752				128		33				489				88		17	5		35	865	100 286
1992		536		12 910	90 184	4	75	40			15 540		17	736	459	158 6754	21	14	19	92		32						2	841	130	0	17	5	84	38	659	184 312
1993	1	557	68	9560	84 898	4		39	53	2429	15 210	99	16	630	765	108 6954		12	8	87	35	91	0	8		812	92 279	21		155		16	2	41	36	534	267 476
1994				11 058	104 729	1	60	38	40		14 777	184	18	375	752	171 6861	22		15	200	2	42	61	0	11	573	87 401	18	861	114	0	17	1	62	35	613	282 061
1995	5			11 101	153 276	0	73	37	65	1677	14 367	52	11	754	478	141 6688	14	10	9	455	2	33	78	0	9	652	95 768	15	455	109	0	9	0	30	37	550	334 912
1996	0			88 12 065	194 365	0	71	37	59	1774	12 867	144	11	420	886	258 7271	26	12	14	769	0	35	90	0	4	652	86 695	9	519	103	0	14		50	48	911	379 208
1997	6	171	83	12 686	224 546	0	66	41	54	1943	13 571	50	99	57	1234	325 7496	21	25	9	1171	14	37	83	0	7	1195	80 163	14	436	113	0	11		66	50	016	405 611
1998	4	203	81	13 865	232 406	1	74	34	64	2091	11 935	52	10	359	1494	276 7802	26	11	14	1356	6	31	106	0		2107	69 476	7	482	121	0	16	0	38	54	889	409 427
1999	3	285	100	15 744	230 626	0	65	40	47	2020	12 909	59	95	59	1719	244 8207	15	17	20	1513	2	30	94	1	20	1914	73 373	17	465	352	0	10		43	53	805	413 318
2000	2	251	84	14 822	213 766	1	62	29	42	1240	11 853	54	82	16	1526	133 8156	27	11	15	1389	4	38	74	0		2267	67 056	13	248	109	0	15		63	53	169	384 736







**Table 8:** Age and sex distribution of new sputum smear-positive tuberculosis cases in DOTS and non-DOTS areas combined, 2000, by country

	New SS+ males							Total	New SS+ females							Total	New SS+ males and females							Total
	0-14	15-24	25-34	35-44	45-54	55-64	>=65		0-14	15-24	25-34	35-44	45-54	55-64	>=65		0-14	15-24	25-34	35-44	45-54	55-64	>=65	
American Samoa	6	0	0	0	1	1	0	2	0	0	0	0	1	0	0	1	0	0	0	0	2	1	0	3
Australia	3	16	35	25	24	19	49	171	0	15	19	12	15	5	14	80	3	31	54	37	39	24	63	251
Brunei Darussalam	0	6	4	15	5	7	15	52	0	4	6	9	6	3	4	32	0	10	10	24	11	10	19	84
Cambodia	26	519	1323	1618	1456	1373	1058	7373	38	457	1157	1649	1798	1459	892	7450	64	976	2480	3267	3254	2832	1950	14 823
China	1131	19 111	29 399	25 206	25 593	21 429	21 771	143 640	1420	14 536	18 496	12 377	9899	7102	6296	70 126	2551	33 647	47 895	37 583	35 492	28 531	28 067	213 766
Cook Islands	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	1	0	0	1
Fiji	0	8	6	13	5	4	2	38	0	7	5	7	1	4	0	24	0	15	11	20	6	8	2	62
French Polynesia	1	3	3	4	4	4	3	22	1	4	1	0	1	0	0	7	2	7	4	4	5	4	3	29
Guam	2	1	6	6	9	6	9	39	0	3	1	2	5	2	2	15	2	4	7	8	14	8	11	54
Hong Kong, China	3	47	71	114	151	147	363	896	4	37	73	60	24	28	118	344	7	84	144	174	175	175	481	1240
Japan	2	246	572	676	1494	1509	3816	8315	5	222	464	213	292	384	1958	3538	7	468	1036	889	1786	1893	5774	11 853
Kiribati	2	9	3	3	3	8	2	30	2	5	6	3	4	1	3	24	4	14	9	6	7	9	5	54
Republic of Korea	19	821	1085	988	853	731	901	5398	25	546	544	393	220	295	795	2818	44	1367	1629	1381	1073	1026	1696	8216
Lao PDR	7	92	128	166	201	177	176	947	10	59	95	131	122	91	71	579	17	151	223	297	323	268	247	1526
Macao, China	0	10	8	25	22	9	17	91	0	10	4	6	6	3	13	42	0	20	12	31	28	12	30	133
Malaysia	32	694	1138	1177	908	814	891	5654	41	464	564	424	367	356	286	2502	73	1158	1702	1601	1275	1170	1177	8156
N. Mariana Islands	1	4	8	9	9	3	2	36	0	10	17	7	3	1	1	39	1	14	25	16	12	4	3	75
Marshall Islands	3	5	4	1	3	5	3	24	7	7	3	0	2	2	0	21	10	12	7	1	5	7	3	45
Micronesia FS	0	2	0	1	0	0	1	4	4	3	1	1	0	1	1	11	4	5	1	2	0	1	2	15
Mongolia	6	181	260	171	68	38	23	747	32	200	213	113	41	26	17	642	38	381	473	284	109	64	40	1389
Nauru	1	0	0	0	1	0	0	2	0	0	0	0	1	1	0	2	1	0	0	0	2	1	0	4
New Caledonia	1	1	3	4	2	3	4	18	1	8	1	1	3	2	4	20	2	9	4	5	5	5	8	38
New Zealand	0	6	5	6	8	10	7	42	1	6	6	5	0	4	10	32	1	12	11	11	8	14	17	74
Niue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Palau																								
Papua New Guinea	8	87	70	30	21	12	5	233	6	77	45	21	15	5	1	170	14	164	115	51	36	17	6	403
Philippines	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pitcairn Islands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Samoa	0	3	1	1	1	2	1	9	0	2	1	1	0	0	0	4	0	5	2	2	1	2	1	13
Singapore	1	8	9	34	51	26	64	193	1	9	8	7	9	5	16	55	2	17	17	41	60	31	80	248
Solomon Islands	3	13	4	8	8	10	6	52	8	15	13	7	7	5	2	57	11	28	17	15	15	15	8	109
Tokelau	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonga	0	2	1	1	0	1	5	10	0	1	1	1	0	1	1	5	0	3	2	2	0	2	6	15
Tuvalu																								
Vanuatu	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Viet Nam	51	2367	6147	8209	6713	5150	7712	36 349	64	1334	2320	2754	2594	2847	4907	16 820	115	3701	8467	10 963	9307	7997	12 619	53 169
Wallis and Futuna																								
<b>WPR</b>	<b>1303</b>	<b>24 262</b>	<b>40 293</b>	<b>38 511</b>	<b>37 614</b>	<b>31 498</b>	<b>36 906</b>	<b>210 387</b>	<b>1670</b>	<b>18 041</b>	<b>24 064</b>	<b>18 204</b>	<b>15 437</b>	<b>12 633</b>	<b>15 412</b>	<b>105 461</b>	<b>2973</b>	<b>42 303</b>	<b>64 357</b>	<b>56 715</b>	<b>53 051</b>	<b>44 131</b>	<b>52 318</b>	<b>315 848</b>
<b>% **</b>	<b>1</b>	<b>12</b>	<b>19</b>	<b>18</b>	<b>18</b>	<b>15</b>	<b>18</b>	<b>100</b>	<b>2</b>	<b>17</b>	<b>23</b>	<b>17</b>	<b>15</b>	<b>12</b>	<b>15</b>	<b>100</b>	<b>1</b>	<b>13</b>	<b>20</b>	<b>18</b>	<b>17</b>	<b>14</b>	<b>17</b>	<b>100</b>

\*Only data from DOTS areas were reported.

\*\* Indicates proportion of patients in specific age group out of total for each category (male, female, combined).

In total, 33% of the regional notified smear-positive cases were female (sex ratio M/F = 2). The regional sex ratio (M/F) was 0.8 in the 0-14 year old age group, 1.3 in the 15-24 group, and then increased in the older age groups.

**Table 9:** Age and sex distribution of new sputum smear-positive tuberculosis rates in DOTS and non-DOTS areas combined in the Western Pacific Region, 2000

Western Pacific Region		Totals	Rates
<b>Males</b>	0-14	1303	0.6
	15-24	24 262	17.5
	25-34	40 293	25.2
	35-44	38 511	32.5
	45-54	37 614	41.8
	55-64	31 498	53.3
	>=65	36 906	71.4
	<b>Total</b>	<b>210 387</b>	<b>25.0</b>
<b>Females</b>	0-14	1670	0.8
	15-24	18 041	13.8
	25-34	24 064	15.9
	35-44	18 204	16.1
	45-54	15 437	18.0
	55-64	12 633	22.1
	>=65	15 412	24.4
	<b>Total</b>	<b>105 461</b>	<b>13.1</b>
<b>Males and Females</b>	0-14	2973	0.7
	15-24	42 303	15.7
	25-34	64 357	20.6
	35-44	56 715	24.5
	45-54	53 051	30.2
	55-64	44 131	37.9
	>=65	52 318	45.5
	<b>Total</b>	<b>315 848</b>	<b>19.1</b>

Population figures used to calculate rates in this table were the 1998 estimates from *Demographic Data for Health Situation Assessment and Projections – 1998*, WHO Geneva, 1998.



**Table 10: DOTS coverage reported by country, 2000**

Countries	Pop.	Pop.		Notified		DOTS	Notified		DOTS	Estimated	DOTS Case
	Total	Accessible		All types*		Enrollment	New S+		Enrollment	Incident	Detection
	(x 1000)	(x 1000)	(%)	DOTS	non-DOTS	Rate	DOTS	non-DOTS	Rate	New S+	Rate
	(2000)					All Cases			New S+		New S+ (%)
	a	b	b/a	c	d	c/(c+d)	e	f	e/(e+f)	g	e/g
American Samoa	57	57	100	3	0	100	2	0	100	21	9
Australia	19 157	10 345	54	490	553	47	122	129	49	766	16
Brunei Darussalam	338	338	100	307	0	100	84	0	100	88	96
Cambodia	12 014	11 894	99	18 891	0	100	14 822	0	100	30 155	49
China	1 236 722	840 971	68	348 436	114 937	75	191 280	22 486	89	568 892	34
Cook Islands	17	17	100	1	0	100	0	0		6	0
Fiji	840	840	100	144	0	100	62	0	100	311	20
French Polynesia	230	230	100	59	0	100	29	0	100	85	34
Guam	154	154	100	54	0		42	0			
Hong Kong, China	6796	6796	100	3685	1456	72	915	325	74	2786	33
Japan	126 920	45 691	36	15 397	23 987	39	4415	7438	37	16 500	27
Kiribati	84	84	100	210	0	100	54	0	100	31	174
Republic of Korea	47 733	0	0	0	21 782	0	0	8216	0	15 752	0
Lao PDR	5287	3701	70	1617	617	72	1526	0	100	3965	38
Macao, China	438	438	100	449	0		133	0			
Malaysia	22 203	22 203	100	15 057	0	100	8156	0	100	11 102	73
N. Mariana Islands	69	69	100	75	0	100	27	0	100	28	98
Marshall Islands	61	61	100	34	0	100	11	0	100	24	45
Micronesia FS	115	115	100	91	0	100	15	0	100	43	35
Mongolia	2380	2380	100	3109	0	100	1389	0	100	2190	63
Nauru	12	12	100	4	0		4	0			
New Caledonia	211	0	0	0	86		0	38			
New Zealand	3843	3843	100	344	0	100	74	0	100	115	64
Niue	2	0	0	0	0		0	0		1	0
Palau	19	2	8							7	0
Papua New Guinea	5131	410	8	2534	9587	21	403	1864	18	5747	7
Philippines	76 348	68 713	90	96 371	32 124	75	49 991	17 065	75	107 651	46
Pitcairn Islands (**)	0.046	0									
Samoa	170	170	100	43	0	100	13	0	100	68	19
Singapore	3263	3263	100	590	1138	34	105	143	42	718	15
Solomon Islands	410	410	100	303	0	100	109	0	100	152	72
Tokelau	2	0	0	0	0		0	0			
Tonga	100	98	98	24	0	100	15	0	100	37	41
Tuvalu	10	0									
Vanuatu	200	100	50	105	47	69	26	37	41	80	33
Viet Nam	76 900	76 746	100	89 792	0	100	53 169	0	100	65 365	81
Wallis and Futuna	14	0									
<b>WPR TOTAL(**)</b>	<b>1 648 250</b>	<b>1 100 151</b>	<b>67</b>	<b>598 219</b>	<b>206 314</b>	<b>74</b>	<b>326 993</b>	<b>57 741</b>	<b>85</b>	<b>832 685</b>	<b>39</b>

\* All types includes new smear-positive, relapse, smear-negative and extrapulmonary tuberculosis cases.

\*\* In WPR Total, cases reported for years other than 2000 are not included in calculation.

DOTS case detection rate is the fraction of estimated cases notified under DOTS. A revision of the estimates of new tuberculosis cases in the Region in 2000 and a decrease of case notification in some endemic countries resulted in a decrease of case detection rates (ratio of notified cases to estimated cases) between 1999 and 2000, although case notifications remained stable.

**Table 11:** Treatment outcome of new smear-positive cases registered in 1999 in DOTS areas

Country	Registered*	Evaluated**	Outcomes of Treatment						
			Cured	Completed Treatment	Defaulted	Failed	Died	Transferred Treatment Out	Treatment Success
	(%)	(%)	(%)	(%)	(%)	(%)	(%)	(%)	
American Samoa	0		100	0	0	0	0	100	
Australia	161	98	16	70	1	0	9	4	85
Brunei Darussalam	100	100	56	20	6	1	2	15	76
Cambodia	15 744	100	91	3	3	0	3	1	93
China	188 112	99	97	0	1	1	1	0	97
Cook Islands	0	100	40	40	0	0	0	20	80
Fiji	65	100	83	9	3	0	5	0	92
French Polynesia	40	100	85	0	3	0	13	0	85
Guam	69	100	67	28	0	0	4	1	94
Hong Kong, China	1536	100	71	7	5	7	5	4	78
Japan	4218	96	48	32	3	7	11	0	79
Kiribati	52	100	88	0	2	4	6	0	88
Republic of Korea									
Lao PDR	1603	100	80	4	7	7	0	1	84
Macao, China	266	100	78	0	6	5	7	3	78
Malaysia	7602	100			11	0	8	0	84
N. Mariana Islands	15	100	80	0	0	0	7	13	80
Marshall Islands	17	100	82	0	18	0	0	0	82
Micronesia FS	19	74	100	29	0	0	7	0	129
Mongolia	1513	100	81	5	3	4	4	3	86
Nauru	2	100	50	0	0	50	0	0	50
New Caledonia									
New Zealand									
Niue	1	100	100	0	0	0	0	0	100
Palau	0								
Papua New Guinea	480	95	44	26	26	0	2	4	69
Philippines			70	17	6	2	3	3	87
Pitcairn Islands									
Samoa	13	131	82	12	0	0	6	0	94
Singapore	130	100	95	0	2	0	2	2	95
Solomon Islands	107	94	79	8	4	0	5	4	87
Tokelau									
Tonga	10	100	50	30	0	0	20	0	80
Tuvalu									
Vanuatu	24	100	71	17	4	0	8	0	88
Viet Nam	53 227	100	90	2	2	1	3	2	92
Wallis and Futuna									
<b>Total</b>	<b>312 049</b>	<b>100</b>	<b>91</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>96</b>

\* Registered for cohort analysis

\*\* Percentage of evaluated cases among registered cases.

The WHO target is an 85% cure rate. The target has been reached at the regional level.

**Table 12:** *Treatment outcome of new smear-positive cases registered in 1999 in non-DOTS areas*

Country	Registered*	Evaluated**	Outcomes of Treatment						
			Cured	Completed Treatment	Defaulted	Failed	Died	Transferred Out	Treatment Success
			(%)	(%)	(%)	(%)	(%)	(%)	(%)
American Samoa	0								
Australia	131	93	20	62	5	0	11	2	83
Brunei Darussalam	0								
Cambodia	0								
China	19 878	99	85	0	4	8	1	2	85
Cook Islands	0								
Fiji	0								
French Polynesia	0								
Guam	0								
Hong Kong, China	484	20	9	29	6	1	44	11	38
Japan	7196	20	43	44	1	9	3	0	87
Kiribati	0								
Republic of Korea	1804	100							
Lao PDR	77	100	0	69	23	5	1	1	69
Macao, China	0								
Malaysia	0								
N. Mariana Islands	0								
Marshall Islands	0								
Micronesia FS	0								
Mongolia	0								
Nauru	0								
New Caledonia	30		100						
New Zealand	0								
Niue	0								
Palau	0								
Papua New Guinea	0								
Philippines	0								
Pitcairn Islands	0								
Samoa	0								
Singapore	25	100	80	0	4	0	4	12	80
Solomon Islands	0								
Tokelau	0								
Tonga	0								
Tuvalu	0								
Vanuatu	19	0							
Viet Nam	46	100	8	9	2	0	4	0	93
Wallis and Futuna	0								
<b>Total</b>	<b>29 690</b>	<b>79</b>	<b>81</b>	<b>16</b>	<b>7</b>	<b>11</b>	<b>3</b>	<b>5</b>	<b>97</b>

Treatment outcomes reported in non-DOTS areas concern only 34% of cases that should have been analyzed.





**Table 13:** *Anti-tuberculosis drug resistance (%) in new cases\**

Country / province	Guangdong, China	Shandong, China	Zhejiang, China	Hong Kong, China	Japan	Republic of Korea	Malaysia	New Zealand	Singapore	Viet Nam	Cambodia	
No. of cases studied	1,479	1,009	806	4424	1374	2370	1001	179	980	641	630	
Any drug resistance	17.9	17.6	14.8	12.2	10.3	10.6	4.8	11.2	4.8	32.9	10.2	
1 drug resistance	9.7	9.8	8.2	8.5	7.6	6.8	4.2	8.4	4	19.5		
2 drugs resistance (without MDR)	2.7	4.9	2	2.3	1.7	1.4	0.5	1.7	0.4	11.2		
3 drugs resistance (without MDR)	0.1	0.1	0.2	0.1	0.1	0.2	0	0	0.1	0		
MDR-TB	5.3	2.9	4.3	1.4	0.9	2.2	0.1	1.1	0.3	2.2	0	
INH resistance	Any DR	11.4	11.3	8.9	6.1	4.4	8.6	1.6	9.5	3.4	20.6	6.6
	Mono	4.1	3.8	2.7	2.6	2	4.9	1	6.7	2.6	7.3	4.8
RMP resistance	Any DR	7.1	3.8	6.3	1.6	1.4	3	0.5	1.1	0.4	3.3	0.6
	Mono	1	0.6	1.6	0.05	0.2	0.7	0.4	0	0.1	0.9	0.5
SM resistance	Any DR	9.1	12.2	8.8	8.2	7.5	3.1	3	2.8	1.9	23.9	4.8
	Mono	4.1	5.4	3.7	5.3	5.2	1.2	2.4	1.1	1.3	11.1	3
EMB resistance	Any DR	3.5	1.7	1.9	1.6	0.4	1.1	0.5	0.6	0.3	1.1	0.2
	Mono	0.6	0.1	0.2	0.5	0.1	0.04	0.4	0.6	0	0.2	0

\* Available data from 10 countries surveyed.

The level of anti-tuberculosis drug resistance closely relates to the extent of use of the corresponding drugs in the treatment of tuberculosis and with treatment efficiency (cure rate) in tuberculosis control programmes. Drug resistance increases when poor tuberculosis treatment programmes select out drug resistant mutants and these are left to further transmit the resistant bacilli in the community. Anti-tuberculosis drug resistance surveys conducted in 10 countries and areas showed that drug resistant tuberculosis was highly prevalent in the Western Pacific Region. Drug resistance was found among newly diagnosed tuberculosis cases in all countries surveyed with a population adjusted mean of 19.4%, ranging from 4.8% to 32.9%. Multidrug resistant tuberculosis (MDR-TB: resistance to at least INH and RMP) was 5.3% in Guangdong, China, and ranged from 0.3% to 1.7% in other countries and areas.

**Table 14:** *Anti-tuberculosis drug resistance (%) in retreatment cases\**

Country / province	Guangdong, China	Shandong, China	Zhejiang, China	Hong Kong, China	Japan	Republic of Korea	Singapore	Cambodia
No. of cases studied	163	220	148	783	264	283	151	96
Any drug resistance	34.4	50	58.8	26.9	42.4	21.9	13.2	17.7
1 drug resistance	14.1	15.9	18.2	12.5	15.2	9.9	6	
2 drugs resistance (without MDR)	3.7	13.6	4	4.8	5.3	4.5	2.6	
3 drugs resistance (without MDR)	0.6	0.9	1.4	0.3	2.3	0.4	0.7	
MDR-TB	16	19.5	35.1	9.6	19.7	7.1	4	3.1
INH resistance								
Any DR	22.7	40.5	44.6	17.4	33	17.3	11.9	16.7
Mono	3.7	9.5	7.4	3.8	6.8	6.7	5.3	9.4
RMP resistance								
Any DR	20.2	23.2	43.9	11.6	21.6	10.2	5.3	3.1
Mono	3.1	0.5	5.4	1.3	0.8	1.8	0.7	0
SM resistance								
Any DR	17.8	34.5	27.7	16.3	24.2	6.7	0	7.3
Mono	7.4	5.9	4.7	6.8	7.6	1.4	0	1
EMB resistance								
Any DR	8	10.5	16.9	6	15.2	3.5	0	0
Mono	0	0	0.7	0.6	0	0	0	0

\* Available data from 10 countries surveyed.

**Table 15:** *Anti-tuberculosis drug resistance (%) in new and retreatment cases\**

Country / province	Australia	Guangdong, China	Shandong, China	Zhejiang, China	Hong Kong, China	Japan	Republic of Korea	Malaysia	New Zealand	Singapore	Cambodia
No. of cases studied	750	1642	1271	954	4632	1535	42 428	1017	200	1131	726
Any drug resistance	10.5	19.5	24.3	21.6	12.9	13.6	10.9	5	12	5.9	11.2
1 drug resistance	8	10.2	11.1	9.8	8.7	8.3	6.9	4.4	8	4.2	
2 drugs resistance (without MDR)	0.5	2.8	6.6	2.3	2.3	2.1	1.5	0.5	2.5	0.8	
3 drugs resistance (without MDR)	0	0.2	0.3	0.4	0.1	0.3	0.2	0	0.5	0.1	
MDR-TB	2	6.4	6.3	9.1	1.8	2.9	2.3	0.1	1	0.8	0.4
INH resistance											
Any DR	9.7	12.5	17.3	14.5	6.6	7.4	8.8	1.7	9.5	4.5	7.9
Mono	7.2	4	5	3.5	2.6	2.5	4.9	1.1	6.5	2.9	5.4
RMP resistance											
Any DR	2.1	8.4	7.8	12.2	2	3.5	3.1	0.5	2	1.1	1
Mono	0.1	1.2	0.6	2.2	0.1	0.3	0.7	0.4	0	0.2	0.4
SM resistance											
Any DR	1.9	9.9	16.8	11.7	8.6	9.3	3.2	3.1	3.5	1.7	5.1
Mono	0.5	4.4	5.5	3.8	5.4	5.5	1.2	2.6	1	1.1	2.8
EMB resistance											
Any DR	0.3	4	3.5	4.2	1.8	2	1.2	0.5	1.5	0.3	0.1
Mono	0.1	0.5	0.1	0.3	0.5	0.1	0.04	0.4	0.5	0	0

\* Available data from 10 countries surveyed.

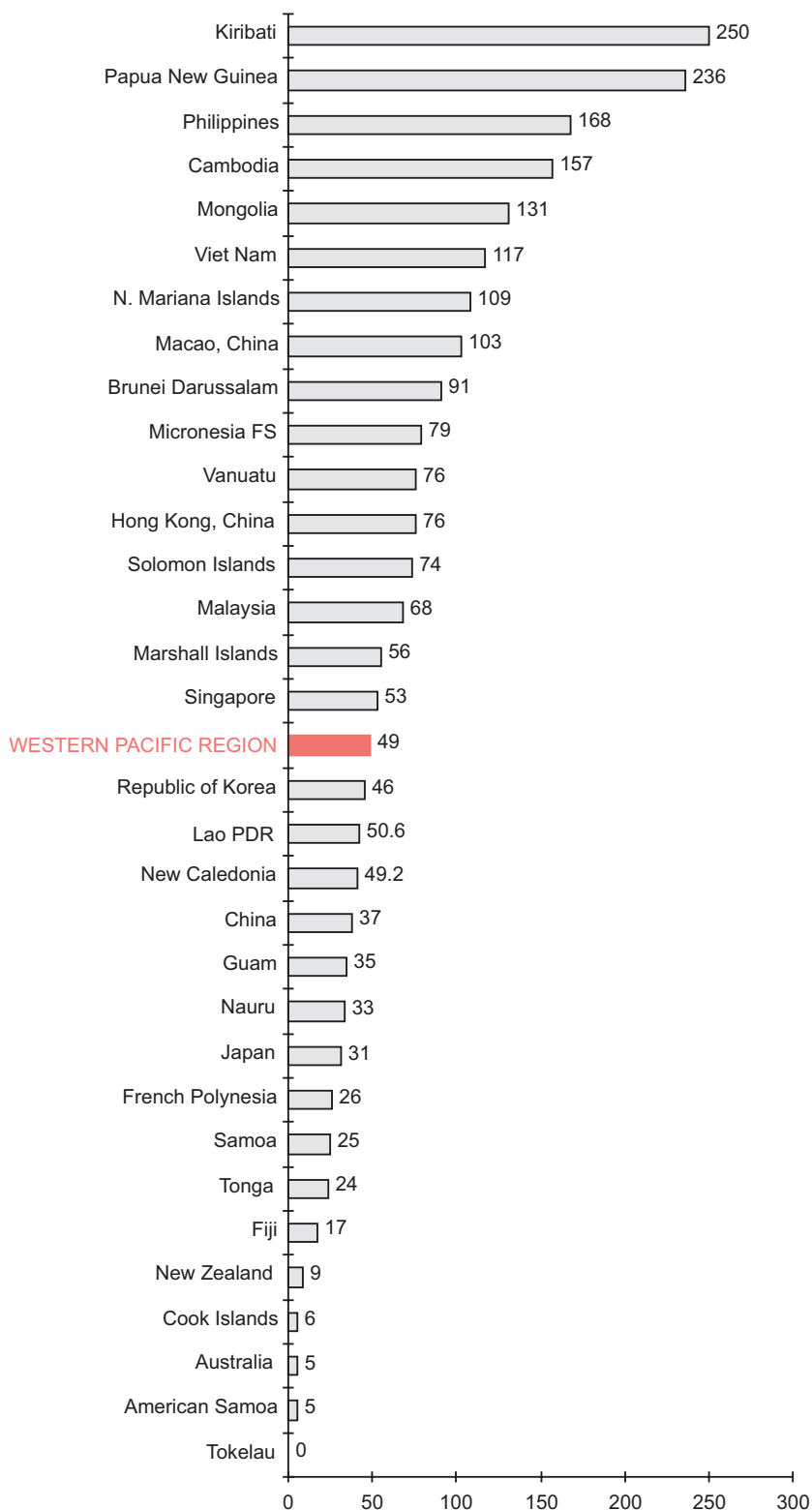
## Part III

# FIGURES

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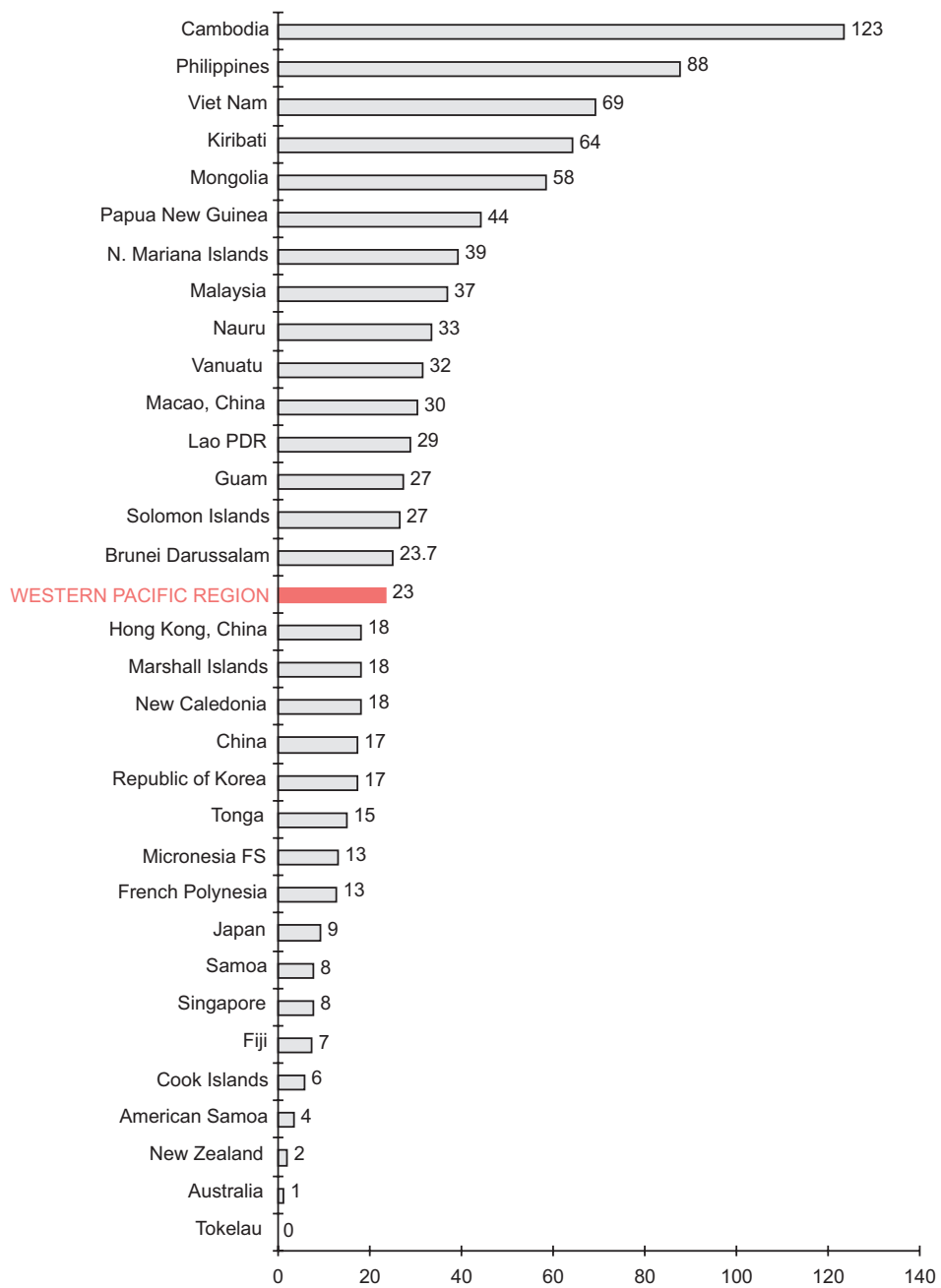


**Figure 1:**  
*Latest notification rate, all types, per 100 000 population, by country*



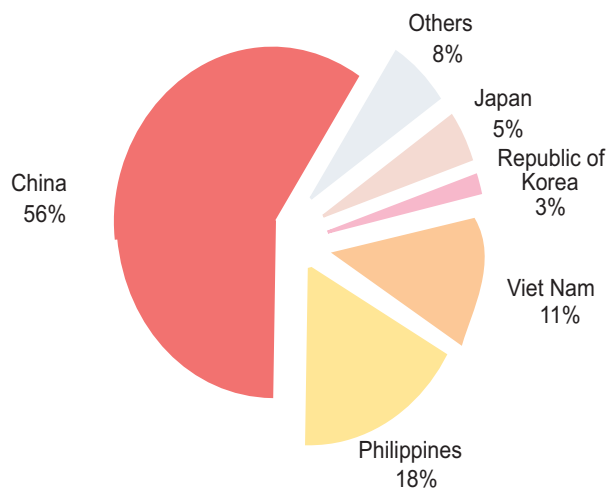
The notification rate for the Region was 49 per 100 000 in 2000, varying in individual countries and areas from 0 (Tokelau) to 250 (Kiribati). The notification rate was higher than 100 in eight countries/areas and lower than 25 in nine countries/areas. In Pacific island countries with a small population, the annual numbers and rates of cases showed great fluctuation. The ranking of countries for 2000 was very close to that of the previous year (with the notable difference that Palau, which ranked fourth in 1999, but did not report to WHO in 2000).

**Figure 2:**  
*Latest notification rate of new smear-positive cases per 100 000 population, by country*



The notification rate for the Region was 23 per 100 000, varying in individual countries and areas from 0 (Tokelau) to 123 (Cambodia). The rates and ranking of countries are similar to those of the previous year.

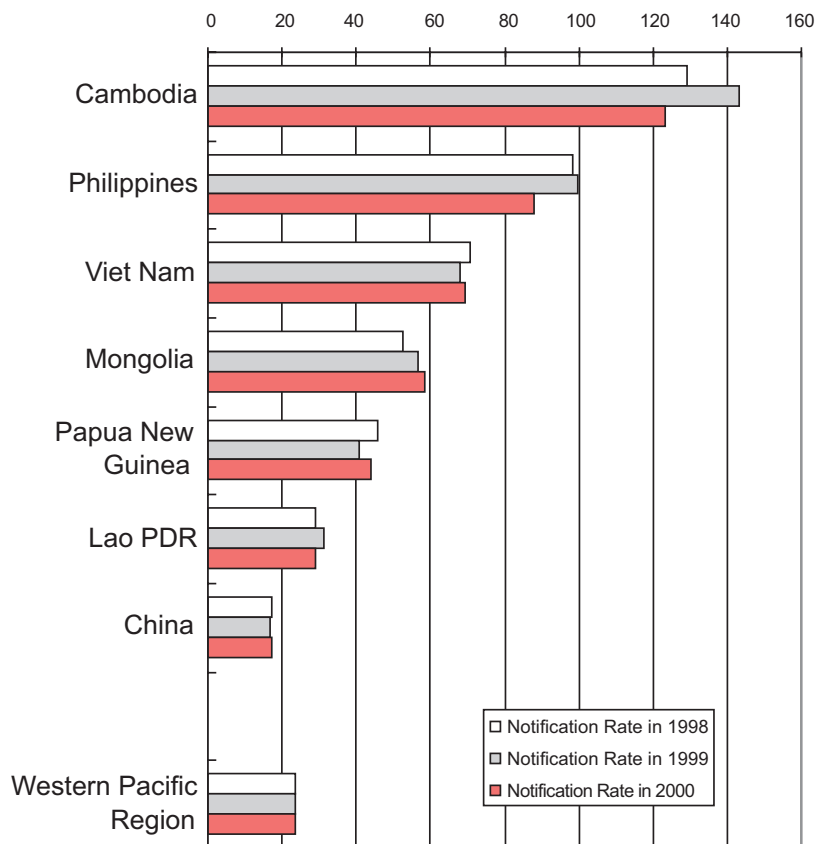
**Figure 3:**  
Distribution of notified cases by major countries in the Western Pacific Region, 2000



Total Notified Cases = 804 552

Five countries account for 92% of all notified cases, with China contributing 56%. These countries also contain 95% of the regional population.

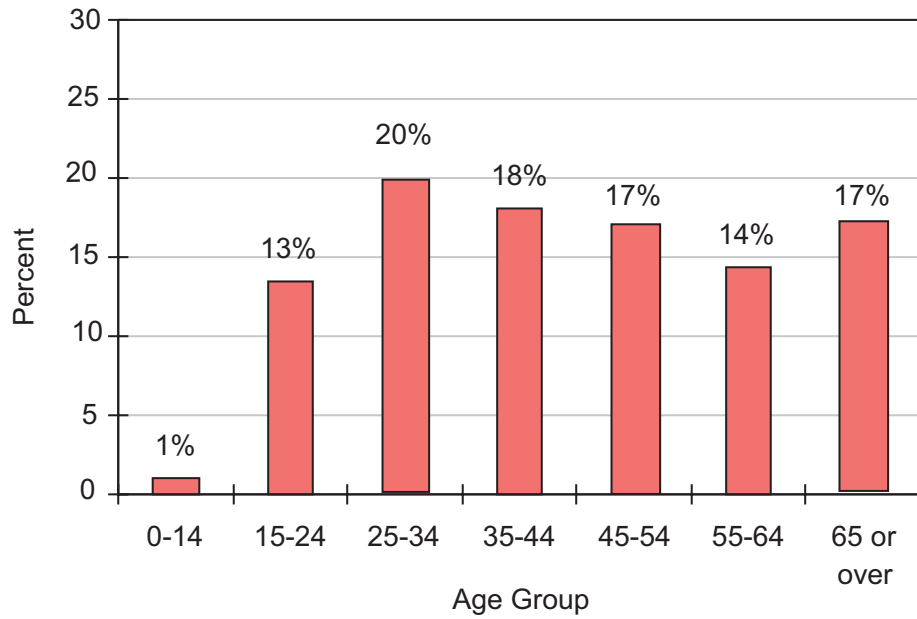
**Figure 4:**  
Comparison of notification rates of new smear-positive cases in high burden countries in 1998, 1999 and 2000



The notification rate remained stable in the Region between 1998 and 2000.

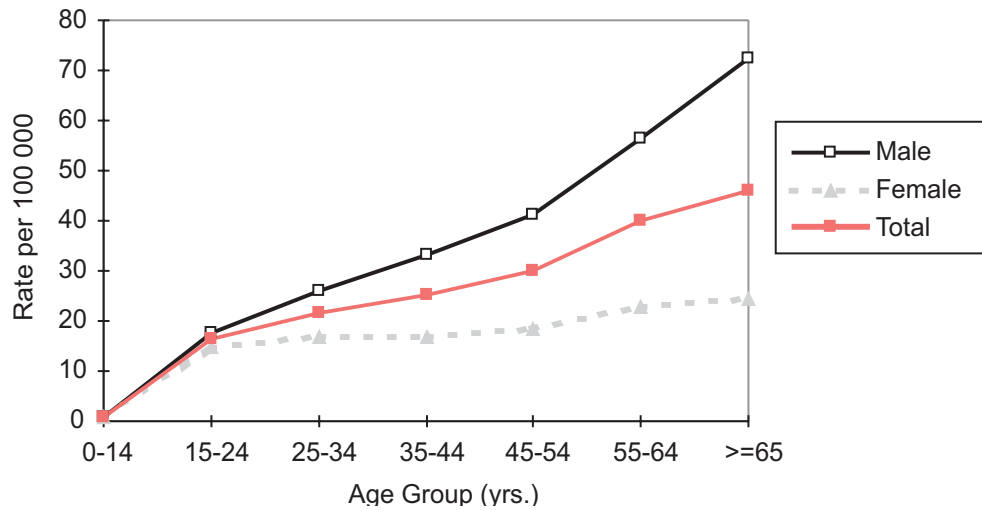


**Figure 5:**  
*New smear-positive pulmonary cases by age group, Western Pacific Region, 2000*



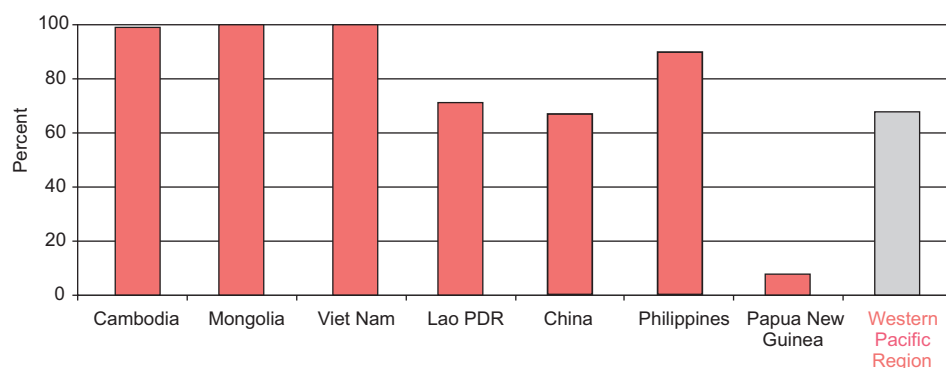
A majority of the new tuberculosis smear-positive cases were in the most economically productive age group (15 to 45 years old).

**Figure 6:**  
*New smear-positive pulmonary rates by age group, Western Pacific Region, 2000*



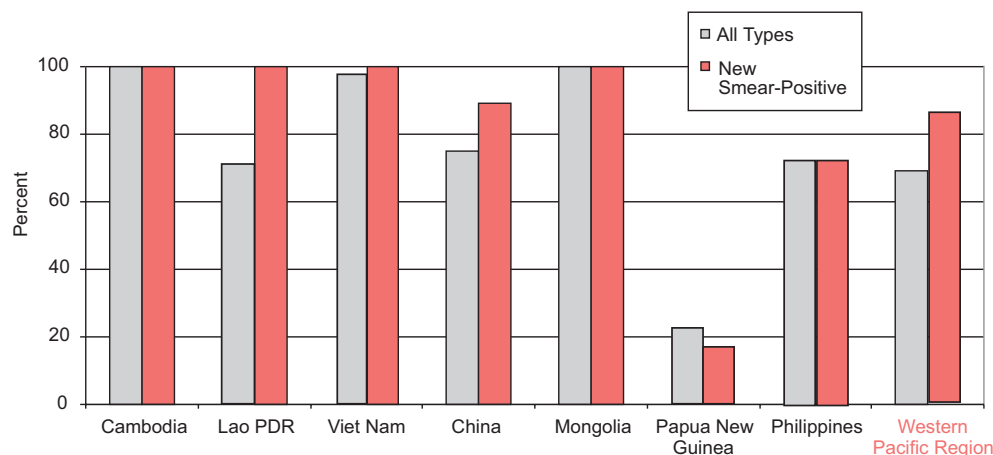
There were twice as many male tuberculosis patients reported as females. The number of patients was almost equal in females and males up to the age of 24, but after this age, male cases predominated, with the gap between the two sexes widening as the age increased. In contrast to the case distribution by age group (Figure 5), the notification rate of new smear-positive cases increased with age. This tendency is more significant in males, with the rate for those aged 65 and over being almost four times than that for the 15-24 age group.

**Figure 7:**  
*Population with access to DOTS in high burden countries, 2000*



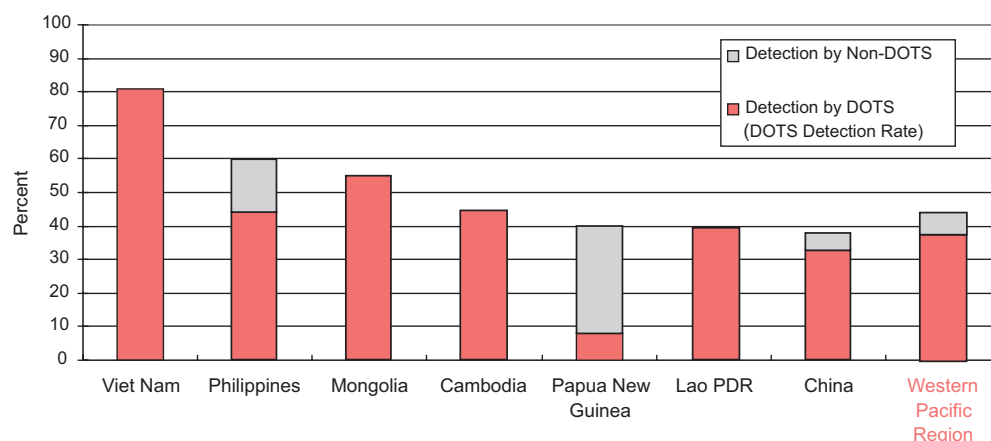
The population with access to DOTS reached high levels in most high burden countries in 2000, although it remained at a low level in Papua New Guinea.

**Figure 8:**  
*DOTS enrolment rate of patients in high burden countries, 2000*



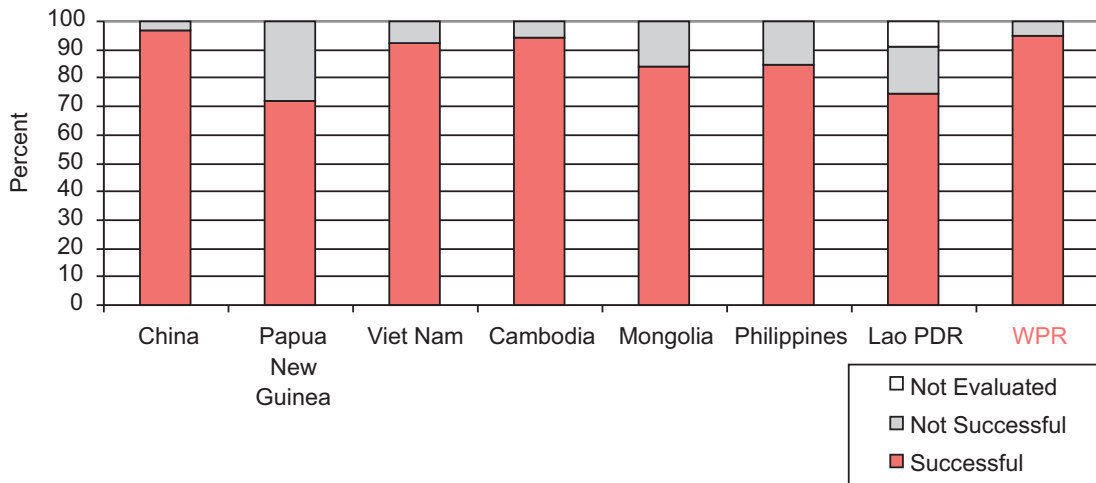
DOTS enrolment rate was 100% in 17 countries/areas among the 34 that reported to WHO.

**Figure 9:**  
*Case detection by DOTS and non-DOTS in high burden countries, 2000*



The DOTS detection rate is the fraction of estimated cases notified under DOTS. A revision of the estimates of new tuberculosis cases in the Region in 2000 and a decrease of case notification in some endemic countries resulted in a decrease of case detection rates (ratio of notified cases to estimated cases) between 1999 and 2000, although case notifications remained stable. Viet Nam reached the 70% WHO target for case detection whereas most endemic countries showed an overall case detection rate lower than 50%.

**Figure 10:**  
Treatment  
outcome under  
DOTS in high  
burden countries,  
2000



Ten countries/areas reported a cure rate equal or greater than the 85% WHO target, and 16 countries/areas reported a success rate of 85% or more. Treatment outcome reports were inconsistent in several endemic countries, particularly in non-DOTS areas.

**Figure 11:**  
Trends of DOTS  
implementation,  
1995-2000

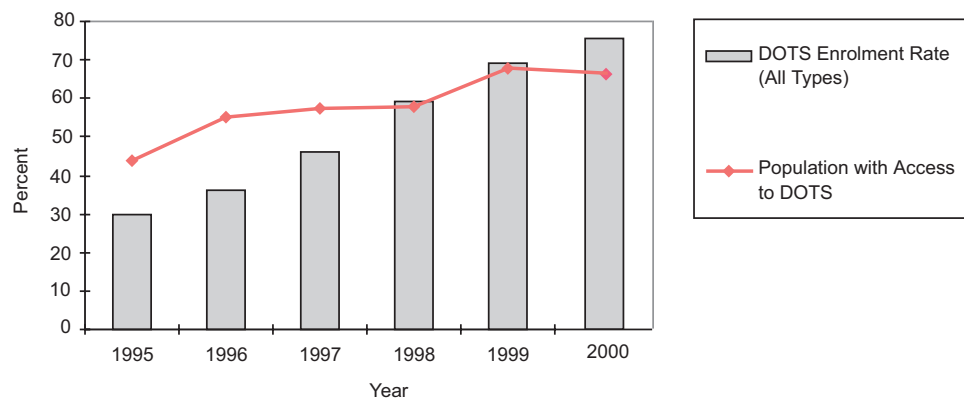
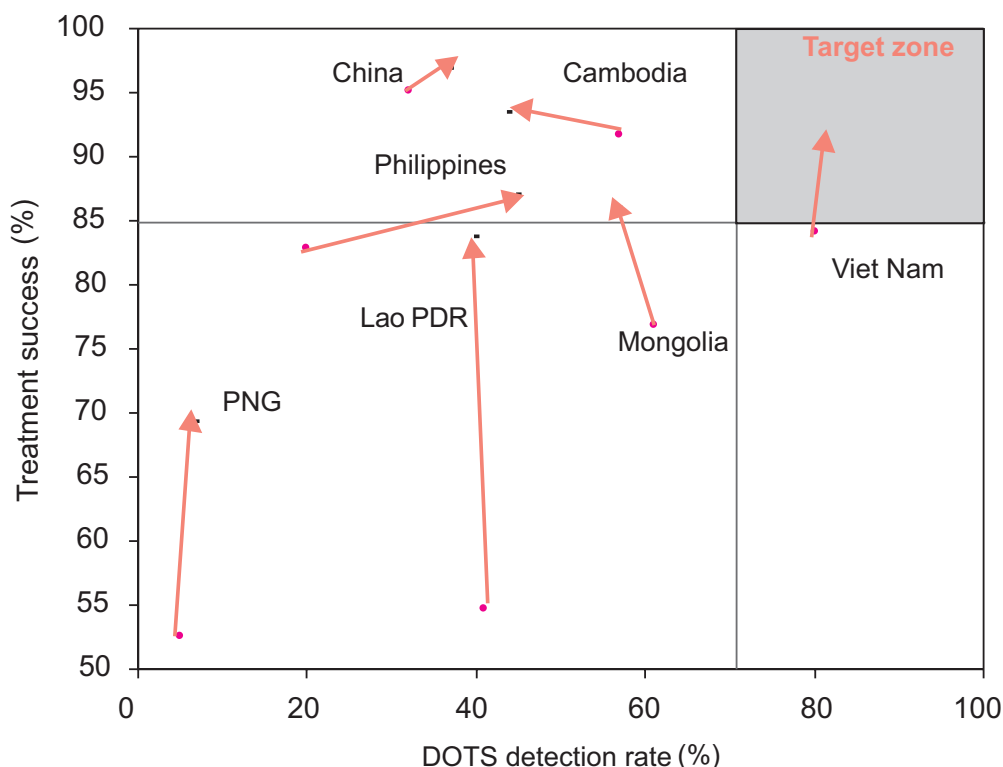


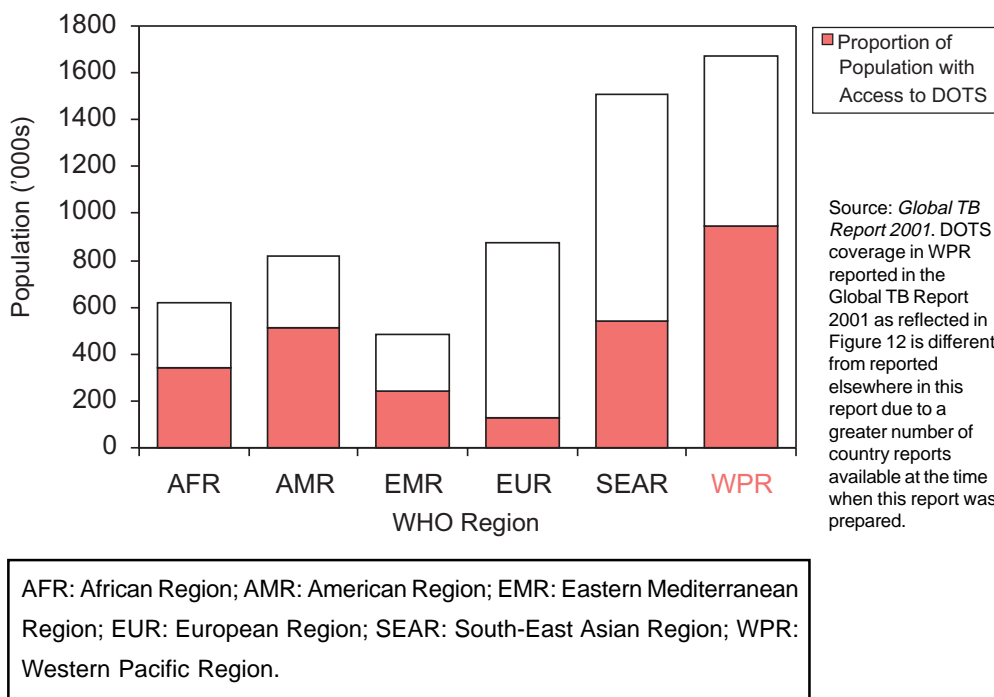
Figure 11 shows the expansion of the regional DOTS implementation from 1995 to 1999. In terms of population, DOTS coverage has improved since the strategy began in 1991. Coverage was 67% in 2000, compared to 58% in 1998. The DOTS enrolment rate has also increased significantly to 74% for all types. However, the DOTS case detection rate of new smear-positive cases was only 39%, still short of the global target of 70%. It is necessary to expand DOTS rapidly and to increase its population coverage and enrolment rate, especially in high prevalence countries.

**Figure 12:**  
DOTS progress in high burden countries in the Western Pacific Region



Treatment success refers to cohorts of patients registered in 1998 and 1999, and evaluated, respectively, by the end of 1999 and 2000. DOTS detection rate is the fraction of estimated cases notified under DOTS. Arrows mark progress in high burden countries of the Region that have supplied notification for the last two years. Countries should enter the graph at top left, and proceed rightwards to the target zone.

**Figure 13:**  
DOTS coverage by WHO Region, 2000



Each bar shows the population of the region, and the shaded portion of the bar shows the population covered by DOTS. The number above each bar is the percent of the population covered.



# ANNEXES

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2	Data collection and major sources of information	43





## ANNEX 1

## DEFINITIONS OF TUBERCULOSIS CASES

**A case of tuberculosis:** A patient in whom tuberculosis has been bacteriologically confirmed, or has been diagnosed by a clinician. Any person given treatment for tuberculosis should be recorded.

**All types:** The sum of new smear-positive pulmonary, relapse, new smear-negative pulmonary and extrapulmonary cases.

**New smear-positive pulmonary:** A patient who has never received treatment for tuberculosis or has taken anti-tuberculosis drugs for less than four weeks and who has one of the following:

- Two or more initial sputum smear examinations positive for acid fast bacilli (AFB), or
- one sputum examination positive for AFB plus radiographic abnormalities consistent with active pulmonary tuberculosis as determined by a treating medical officer; or
- one sputum specimen positive for AFB and at least one sputum that is culture positive for AFB.

**New smear-negative pulmonary:** A case of pulmonary tuberculosis that does not meet the above definition for smear-positive tuberculosis:

**Extrapulmonary tuberculosis:** Tuberculosis of organs other than the lungs: e.g., pleura, lymph nodes, abdomen, genito-urinary tract, skin, joints and bones, meninges, etc. Diagnosis should be based on one culture-positive specimen, or histological or strong clinical evidence consistent with active extrapulmonary tuberculosis, followed by a decision by a clinician to treat with a full course of anti-tuberculosis chemotherapy. (A patient diagnosed with both pulmonary *and* extrapulmonary tuberculosis should be classified as a case of pulmonary tuberculosis.)

**Retreatment cases:** Relapses, failures and defaulters.

**Relapse:** A patient previously treated for tuberculosis and declared cured or treatment completed, and is diagnosed with bacteriologically positive (smear of culture) tuberculosis.

<sup>1</sup> WHO, IUATLD, KNCV. *Revised International Definitions in Tuberculosis Control*. Int J Tuberc Lung Dis 2001; 5: 213-215.



## Definitions of treatment outcome

**Cured:** A patient who is sputum smear-negative in the last month of treatment and on at least one previous occasion.

**Completed treatment:** A patient who has completed treatment but who does not meet the criteria to be classified as a cure or a failure.

**Treatment success:** The sum of patients who are cured and those who have completed treatment.

**Died:** A patient who dies for any reason during the course of treatment.

**Failure:** A patient who, while on treatment, is sputum smear-positive at five months or later during the course of treatment.

**Defaulted:** A patient who has interrupted treatment for two consecutive months or more.

**Transferred out:** A patient who has been transferred to another recording and reporting unit and for whom the treatment outcome is not known.

**Not evaluated:** Patients who did not have treatment outcome evaluated.

**Note:** In countries where culture is current practice, patients can be classified as cured or failure on the basis of culture results.

## Indicators to assess treatment outcome

**Cure rate:** Proportion of cured cases out of all cases registered in a certain period (registered in 1999 and evaluated in 2000 in this report).

**Treatment success rates:** The sum of the proportion of patients who were cured and patients who completed treatment out of all cases registered in a certain period (1999 in this report). The global target is an 85% cure rate and a greater treatment success rate.

Cure rate and treatment success rate are expressed as a percentage of all registered cases. To assess the quality of treatment programmes for new infectious cases, the number of new cases registered for treatment in 1999 (reported in 2001) is compared to the number of cases notified as smear-positive in 1999 (reported in 2000). These numbers should be the same. Differences may arise because National Tuberculosis Programmes do not compile data at the end of each calendar year, because diagnoses are incorrect, because patients are lost between diagnosis and the start of treatment, or because records are lost. Second, the fraction of registered cases was evaluated for outcome. All registered cases should be evaluated. Third, data on the six standard, mutually exclusive outcomes of treatment are compiled. These figures are reported as percentages of all registered cases, so that the possible outcomes plus the fraction of

cases not evaluated sum to 100%. When a country states the number of patients registered for treatment, but gives no outcomes, no result is reported rather than zero treatment success. Although treatment outcomes are expressed as percentages, they are referred to as rates. The six possible outcomes plus the fraction of cases not evaluated sum to 100%. Sometimes, countries state a number of registered cases that is less than the sum of the six outcomes (i.e. the number evaluated), or is missing. In such instances we take the denominator for treatment success to be the number evaluated or the number of smear-positive cases notified in the previous year, whichever is greater. Data describing the outcome of retreatment were collected only from DOTS areas.

## Case detection rate and DOTS detection rate

**DOTS.** The recommended strategy for tuberculosis control, comprising:

- government commitment to ensuring sustained, comprehensive tuberculosis control activities;
- case detection by sputum smear microscopy among symptomatic patients self-reporting to health services;
- standardized short-course chemotherapy using regimens of six to eight months, for at least all confirmed smear-positive cases. Good case management includes directly observed treatment (DOT) during the intensive phase for all new sputum smear-positive cases, the continuation phase of rifampicin-containing regimens and the whole retreatment regimen;
- a regular, uninterrupted drug supply of all essential anti-tuberculosis drugs; and
- a standardized recording and reporting system that allows assessment of case-finding and treatment results for each patient and of the tuberculosis control programme's performance overall.

**Targets for tuberculosis control**, established by the World Health Assembly:

- To cure 85% of the sputum smear-positive tuberculosis cases detected; and
- To detect 70% of the estimated new sputum smear-positive tuberculosis cases.

Case notifications represent only a fraction of the true number of cases arising in a country because of incomplete coverage by effective NTP.

The estimated case detection rate is defined as:

$$\text{Case detection rate (\%)} = \frac{\text{Annual new smear-positive notifications (country)}}{\text{Estimated annual new smear-positive incidence (country)}}$$

DOTS detection rate refers to case detection under DOTS:

$$\text{DOTS detection rate (\%)} = \frac{\text{Annual new smear-positive notifications under DOTS}}{\text{Estimated annual new smear-positive incidence (country)}}$$

The case detection rate and DOTS detection rate are identical when a country has a 100% DOTS enrolment rate.

The denominators are derived from “Global Burden of Tuberculosis: Estimated Incidence, Prevalence and Mortality by Country in 1997” published by *Journal of the American Medical Association (JAMA)* in 1999 (Dye, C., S. Scheele, P. Doblin, V. Pathania and M.C. Raviglione).

***Population with access to DOTS:*** The country’s population that has access to units implementing DOTS.

***DOTS Enrolment Rate (%)***: This indicates the proportion of cases enrolled in DOTS out of notified cases.

***DOTS enrolment rate (all types) (%)*** = 
$$\frac{\text{Annual notifications of all types under DOTS}}{\text{Total of annual notifications of all types}}$$

***DOTS enrolment rate (New S+) (%)*** = 
$$\frac{\text{Annual notification of new smear-positive cases under DOTS}}{\text{Total of annual notifications of new smear-positive cases}}$$

## ANNEX 2 DATA COLLECTION AND MAJOR SOURCES OF INFORMATION

The WHO Western Pacific Region comprises 37 countries and areas with a 2000 population of about 1.645 billion. The Region contains very large countries such as China and Japan representing, respectively, 75% and 8% of the total regional population, while the 32 smallest countries account for 5% of the total population. Seven countries have a population of more than 10 million and six have a population of between one million and 10 million. Of the remaining 24 countries and areas with fewer than one million inhabitants, 17 have a population of less than 200 000 and eight of 20 000 or less. Countries and areas are scattered in the north, west, central and south Pacific.

The main information source for estimates of tuberculosis infection, disease and deaths is the article “Global Burden of Tuberculosis: Estimated Incidence, Prevalence and Mortality by Country in 1997,” published in *JAMA* by WHO in 1999, using data from WHO workshops in 1997 and updated in 2001. The source for the update was the *Global Tuberculosis Control 2001*.

The data collection forms were designed by the WHO Global Tuberculosis Programme, Geneva, and were completed and submitted to WHO Western Pacific Regional Office by respondent countries in 2000. These were the main source of information on tuberculosis case notification and DOTS status. The Regional Office for the Western Pacific was responsible for verification of data submitted by each country. The 1995, 1997 and 1998 editions of the *Epidemiological Review of Tuberculosis in the Western Pacific Region*, the 1999 and 2000 editions of *Tuberculosis in WHO Western Pacific Region*, published by WHO Regional Office for the Western Pacific, as well as the WHO *Global Tuberculosis Control* reports of 1997, 1998, 1999, 2000 and 2001 were also used as sources.

The population figures for 1995-1999 were from the 1998 revision of *Demographic Data for Health Situation Assessment and Projections – 1998* (WHO, Geneva, 1998) and may differ from those of other sources. The population figures for 2000 were provided by the countries as part of their report on tuberculosis.





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