



TUBERCULOSIS CONTROL

in
WHO
WESTERN PACIFIC REGION
2000 Report

(Cases Notified in 1999)

WORLD HEALTH ORGANIZATION
Western Pacific Regional Office





.....

**TUBERCULOSIS CONTROL
IN WHO WESTERN PACIFIC REGION**

.....

(Cases Notified in 1999)

2000 Report

World Health Organization
Office for the Western Pacific Region

Prepared by

Stop TB Programme in the WHO Regional Office for the Western Pacific Region
(Dr Dongil Ahn, Dr Takeshi Kasai, Dr Marcus Hodge and Dr Pieter Van Maaren),
in collaboration with Dr Philippe Glaziou.

Acknowledgements

We would like to thank all tuberculosis managers, and statisticians from all the countries and areas of the Western Pacific Region for providing appropriate data for this publication.

The World Health Organization welcomes requests for permission to reproduce or translate its publications, in part or in full. Applications and inquiries should be addressed to the Office of Publications, World Health Organization, Geneva, Switzerland, or to the Regional Office for the Western Pacific, Manila, Philippines, which will be glad to provide the latest information on any changes made to the text, plans for new editions, and reprints and translations already available.

© World Health Organization 2001

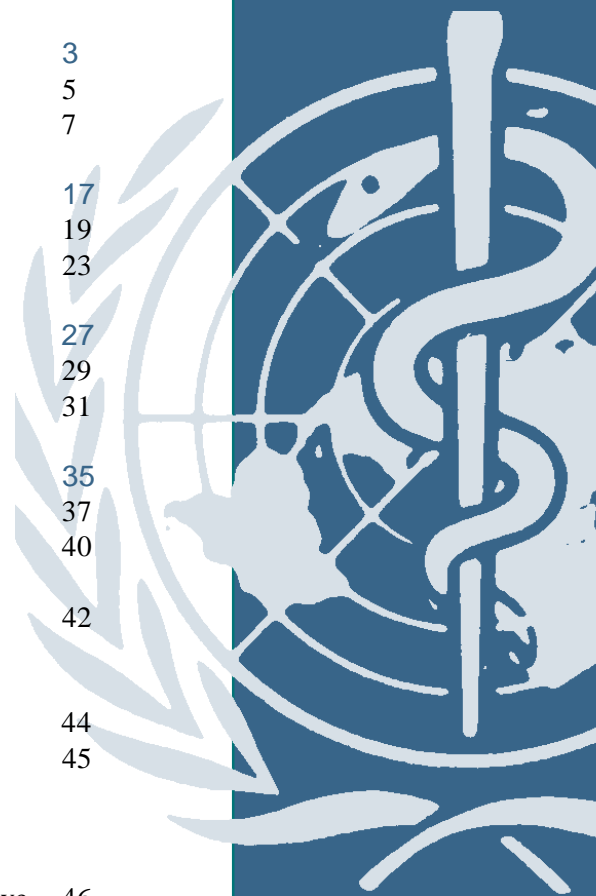
Publications of the World Health Organization enjoy copyright protection in accordance with the provisions of Protocol 2 of the Universal Copyright Convention. All rights reserved.

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the Secretariat of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Design: Graham Dwyer

CONTENTS

ABBREVIATIONS	iv
SUMMARY	v
INTRODUCTION	1
PART I REVIEW OF TUBERCULOSIS EPIDEMIOLOGY	3
1 Estimation of the Tuberculosis Burden	5
2 Tuberculosis Case Notification	7
PART II REVIEW OF DOTS IMPLEMENTATION	17
3 DOTS Coverage	19
4 Treatment Outcome by DOTS and Non-DOTS	23
PART III COUNTRY PROFILES	27
5 Grouping of Countries in the Region	29
6 Progress in TB Control in High Burden Countries	31
ANNEXES	35
1 Definitions	37
2 Trend in Notified Cases (All Types and New Smear-Positive Cases), 1977-1999	40
3 Trend in Notification Rate (All Types and New Smear-Positive Cases) per 100 000, 1976-1999	42
4 Tuberculosis Cases Notified in 1999	44
5 Age and Sex Distribution of New Smear-Positive (SS+) Tuberculosis Cases, DOTS and Non-DOTS Areas Combined, 1999	45
6 Age and Sex Notification Rate of New Smear-Positive (SS+) Tuberculosis Cases, DOTS and Non-DOTS Areas Combined, 1999	46



ABBREVIATIONS

AFR	-	African Region (of WHO)
AIDS	-	acquired immunodeficiency syndrome
AMR	-	American Region (of WHO)
DOT	-	directly observed treatment
DOTS	-	directly observed treatment short-course
EMR	-	Eastern Mediterranean Region (of WHO)
EUR	-	European Region (of WHO)
HIV	-	human immunodeficiency virus
IEDCP	-	Infectious and Endemic Disease Control Project (World Bank)
IUATLD	-	International Union Against Tuberculosis and Lung Diseases
JICA	-	Japan International Cooperation Agency
PIC	-	Pacific island country
SEAR	-	South-East Asia Region (of WHO)
TB	-	tuberculosis
WHO	-	World Health Organization
WPR	-	Western Pacific Region (of WHO)

SUMMARY

For the year 1999, 30 out of the 37 countries and areas of the Region sent tuberculosis data to the WHO Regional Office for the Western Pacific. The remaining countries represent only a small portion of the Regional population (0.05%). Data collection was based on a standard collection form, definitions and variables.

Tuberculosis is still a major public health problem in the Region with 49 notified cases per 100 000 population (51 in 1998). There are nine countries/areas in which the notification rate exceeds 100 per 100 000. The ratio of detected to estimated cases in the Region was only 44% in 1999 (42% in 1998). The People's Republic of China (referred to in this text as China) and Viet Nam account for most of the increase in the number of new pulmonary smear-positive cases in the Region until 1998.

There were about 2 million estimated cases of all types of tuberculosis in the Region in 1999, of which some 850 000 cases were infectious (sputum smear-positive cases). In 1999, there were reported 823 421 all types and 393 801 new smear-positive cases. This makes a corresponding case detection rate of all types of tuberculosis of only 44% (42% in 1998) and of all infectious cases of 47% (44% in 1998) in the Region. The disease affects twice as many males as females, with 68% of the smear-positive cases occurring in the 15-54 age group, the most productive segment of the population.

Although human immunodeficiency virus (HIV)/tuberculosis co-infection is still low on average in the Region, some countries have reported an increase. The prevalence rate of HIV in new tuberculosis cases was 5.2% in Cambodia in 1998, 6% in Malaysia and 1% in Viet Nam (0.6% in 1994). These percentages are expected to rise over the next few years.

To tackle the tuberculosis problem, WHO and other agencies have backed the promotion of directly observed treatment short-course (DOTS) in the Region. In 1999, the Regional population with access to DOTS was 68%, while 69% of all notified tuberculosis cases and 78% of notified new smear-positive cases were enrolled in DOTS. The Philippines expanded DOTS coverage and reported in 1999 twice as many smear-positive cases under DOTS as compared to 1998. The DOTS treatment outcome is very good, achieving a success rate of 95%, as compared to 69% in non-DOTS evaluated patients.

To achieve WHO targets of an 85% cure rate and 70% case detection rate in the Region, expansion of DOTS is crucial, especially in high burden countries.

Tuberculosis is still a major public health problem in the Region with 49 notified cases per 100 000 population (51 in 1998). There are nine countries/areas in which the notification rate exceeds 100 per 100 000.

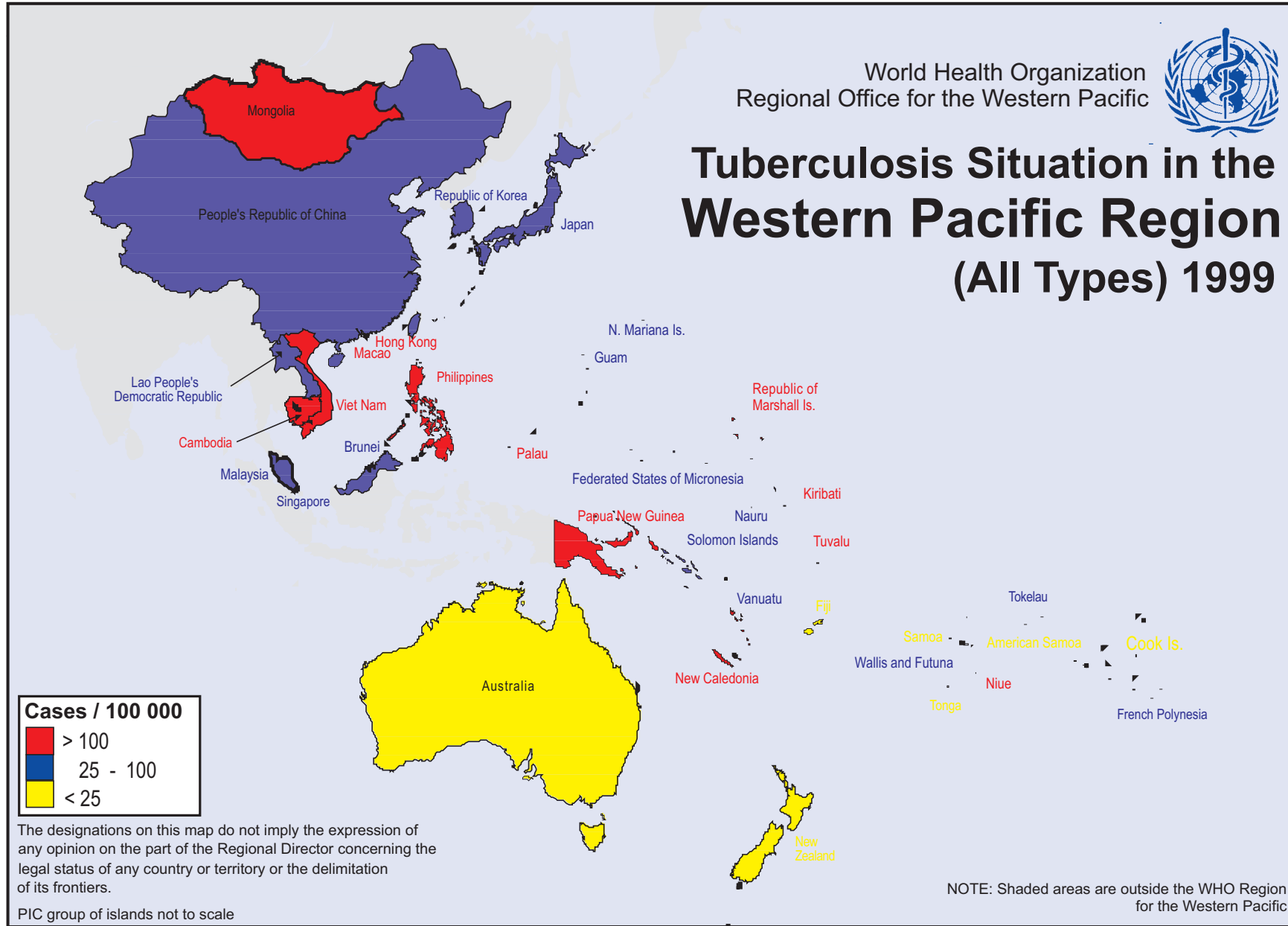


FIGURE 1:

INTRODUCTION

This report is presented in three parts. Part I covers the estimated tuberculosis burden, tuberculosis case notification and trends. Part II describes DOTS implementation and data on high burden countries, and Part III provides profiles on tuberculosis in specific countries.

Demographic characteristics of the Western Pacific Region

The WHO Western Pacific Region comprises 37 countries and areas with a 1999 population of about 1.673 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, while six have a population of between 1 million and 10 million. Of the remaining 24 countries and areas with a population smaller than 1 million, 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 data collection forms were designed by the WHO Global Tuberculosis Programme, Geneva, and completed and submitted to WHO Regional Office for the Western Pacific by respondent countries in 1999.

Data collection and major sources of information

The main information source for estimates of tuberculosis infection, disease and deaths is the article “Global Burden of Tuberculosis” published in the *Journal of the American Medical Association (JAMA)* by WHO in 1999, using data from WHO workshops in 1997. These estimates were updated in 2001. The source for the update on global data was *Global Tuberculosis Control 2001*.

The data collection forms were designed by the WHO Global Tuberculosis Programme, Geneva, and completed and submitted to WHO Regional Office for the Western Pacific by respondent countries in 1999. These were the main source of information on tuberculosis case notification and directly observed treatment short-course (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 *Epidemiological Review of Tuberculosis in the Western Pacific Region*, the 1999 edition of *Tuberculosis Control 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. Some data from the *Global Tuberculosis Control 2001* differ from those in this report because two country reports (Brunei Darussalam and the Lao People’s Democratic Republic) were not available when the *Global Tuberculosis Control 2001* was prepared.

Information on human immunodeficiency virus (HIV) and tuberculosis comes from *STI/HIV Status and trends of STI, HIV and AIDS at the End of the Millennium*, WHO Regional Office for the Western Pacific 1999. Other publications provided detailed information on the epidemiological situation and programmes. These sources are listed as references in this publication's individual sections.

The population figures for 1999 were from the 1998 revision of *UN World Population Prospects* and may differ from those of other sources.

Part I

REVIEW OF TUBERCULOSIS EPIDEMIOLOGY



1 ESTIMATION OF THE TUBERCULOSIS BURDEN

There were 8.4 million new tuberculosis cases worldwide, up from 8 million in 1997.

WHO Regional Office for the Western Pacific, in collaboration with the WHO Global Tuberculosis Programme, Geneva, conducted a workshop in 1997 on tuberculosis estimates.¹ 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, *Global Burden of Tuberculosis* was published in 1999. Presented here are updated estimates for the year 1999 from that article. Methods used to update the estimates for 1999 are presented in the *Global Tuberculosis Report 2001*.

Global estimates

Table 1 shows the global burden of tuberculosis in the world and in the Western Pacific Region in 1999. There were 8.4 million new tuberculosis cases worldwide, up from 8 million in 1997. This rise is due largely to a 20% increase in incidence in African countries most affected by the HIV/acquired immunodeficiency syndrome (AIDS) epidemic. Of these 8.4 million cases, 45% were sputum smear-positive cases.

Table 1: *Estimates of the tuberculosis burden worldwide and in the Western Pacific Region, 1999*

	World (million)	WPR (million)
Notified new cases (all types)	3.69	0.82 (22%)
Notified smear-positive cases	1.48	0.39 (26%)
Estimated number of cases (all types)	8.42	1.99 (24%)
Estimated number of smear-positive cases	3.67	0.9 (25%)

¹ C. Dye, S. Scheele, P. Dalin, et al. "Global Burden of Tuberculosis: Estimated Incidence, Prevalence and Mortality by Country." *JAMA* 1999; 282: 677-686.

Table 2 shows the estimated incidence of tuberculosis by WHO Region. In 1999, the Western Pacific Region ranked second globally after the South-East Asia Region in the number of estimated and notified smear-positive cases.

Table 2: *Estimated and notified tuberculosis cases by WHO Region*

Region	Estimated		Notified		Case Detection	
	All Cases	Smear-positive	All Cases	Smear-positive	All Cases (%)	Smear-positive (%)
AFR	2 037 338	806 360	644 972	321 260	32	40
AMR	402 838	178 822	233 823	133 363	58	75
EMR	616 786	277 397	156 637	67 135	25	24
EUR	475 242	213 017	362 541	86 271	76	40
SEAR	3 009 717	1 348 194	1 469 672	485 790	49	36
WPR	1 874 971	842 955	822 177	391 964	44	46
World	8 416 892	3 666 745	3 689 822	1 485 783	44	41

2 TUBERCULOSIS CASE NOTIFICATION

Background

Definition of terms

All types, new case and relapse:

“All types” refers to the sum of new pulmonary smear-positive, relapses, new pulmonary smear-negative and extrapulmonary tuberculosis cases. A “new case” is defined as a patient who has either never had previous treatment for tuberculosis or who has previously taken anti-tuberculosis drugs for less than four weeks. A “relapse” means a patient previously treated and declared cured by a medical officer but who reports back for treatment and is then determined as sputum smear-positive.

Information on notification of cases has been collected over the past 24 years (1976-1999).

These surveillance statistics provide some indication of the changing burden of tuberculosis in the Region and each country/area.

Rates per 100 000 population:

Notification rates are always expressed per 100 000 population. The rates for 1999 were calculated using the absolute number of cases reported from each country and the 1999 mid-year population. The data source of population in 1998 was *UN World Population Prospects* (1998 revision). Therefore, the rates used in this report may differ from those of other sources if different population numbers were used.

Data collection

Notification of tuberculosis cases from 1995 to 1999, by each country, are summarized in Table 3. 30 out of the 37 countries/areas of the WHO Western Pacific Region sent data for 1999. The 7 countries/areas not sending data were Guam; Macao, China; Nauru; New Caledonia; the Pitcairn Islands; Tuvalu; and Wallis and Futuna, representing a total population of 849 000 and accounting for 0.05% of the Regional population. All these countries (with the exception of the Pitcairn Islands) reported in 1998. For this report, these seven countries have been excluded from some tables and figures. When they were included, they were assigned the most recent available data. China, the Republic of Korea and Solomon Islands did not notify extrapulmonary cases. Malaysia did not report relapses. The Philippines included failure cases in its report. Singapore reported only on residents. In the tables, “0” means that zero cases were reported; a blank space means that data were not available, not reported or not applicable.

General considerations on tuberculosis trends

Information on notification of cases has been collected over the past 24 years (1976-1999). These surveillance statistics provide some indication of the changing burden of tuberculosis in the Region and each country/area. However, because of the differing reporting systems and tuberculosis control policy between countries, changing

Countries	Pop. (x 1000)	Case Notification, 1995 - 1998				Case Notification, 1999				Estimated Incidence		Case Detection Rate (%)	
		All Cases Number				Number		Rate/100 000		Number, 1999		All Types* h/b	New Smear + i/c
		1995	1996	1997	1998	All Types*	New Smear +	All Types*	New Smear +	All Types*	New Smear +		
		a	d	e	f	g	h	i	j	k	b	c	
American Samoa ('98)	63	6		6	6	4	3	6.3	4.8	52	23	8	13
Australia	18 641	1073	1073	1145	899	1073	285	5.8	1.5	1491	746	72	38
Brunei Darussalam	320				160	272	102	85.0	31.9	186	83	147	123
Cambodia	10 981	14 599	14 857	15 629	16 946	19 266	15 744	175.4	143.4	61 494	27 562	31	57
China	1 265 979	335 059	469 358	418 903	457 349	460 169	212 426	36.3	16.8	1 303 958	582 350	35	36
Cook Islands	20		1	0	2	3	0	15.0	0.0	16	7	18	0
Fiji	834	203	200	171	166	192	65	23.0	7.8	684	309	28	21
French Polynesia ('98)	227		86	91	105	93	33	41.0	14.5	186	84	50	39
Guam ('94)	147				94			0.0	0.0	131	59	0	0
Hong Kong, China ('98)	6660	6212	6501	6983	7673	7087	1566	106.4	23.5	6061	2731	117	57
Japan	126 187	43 078	42 122	42 190	44 016	40 800	12 909	32.3	10.2	36 594	16 404	111	79
Kiribati	85		253	32	276	253	59	297.6	69.4	70	31	363	188
Republic of Korea	46 505	33 196	31 134	26 202	30 008	23 936	9559	51.5	20.6	33 949	15 347	71	62
Lao PDR	5525	1307	1440	1923	2165	2437	1719	44.1	31.1	9227	4144	26	41
Macao, China ('98)	459	354	455	589	463					1014	454	0	0
Malaysia	21 877	11 778	12 902	13 539	14 115	14 908	7960	68.1	36.4	24 502	10 939	61	73
Mariana Is. ('98)	70	40	40	93	97	66	15	94.4	21.4	62	28	106	54
Marshall Is.	63		56		49	42	17	66.7	27.0	56	25	75	67
Micronesia FS	137		94	108	138	102	16	74.5	11.7	112	51	91	32
Mongolia	2680	3010	3010	2987	2915	3348	1513	124.9	56.5	5494	2466	61	61
Nauru ('94)	11				4					9	4	0	0
New Caledonia ('98)	206		205		102					169	76	0	0
New Zealand	3719	307	323	328	367	348	69	9.4	1.9	223	112	156	62
Niue	2	1	2	0	1	2	1	102.9	51.4	2	1	116	129
Palau	18	19	5	15	15	32	20	177.8	111.1	15	7	217	300
Papua New Guinea	4706	8041	5087	7977	11 291	12 189	1914	259.0	40.7	11 765	5271	104	36
Philippines	73 601	235 496	276 295	208 301	159 866	145 807	73 373	198.1	99.7	231 107	103 777	63	71
Pitcairn Is. (**)	0.046									0	0		
Samoa	172	51	37	32	22	31	17	18.0	9.9	153	69	20	25
Singapore	3541	1889	1889	1977	2120	1654	465	46.7	13.1	1700	779	97	60
Solomon Islands	430	352	289	318	295	289	93	67.2	21.6	353	159	82	58
Tokelau	2	1	1		1	0	0	0.0	0.0	2	1	0	0
Tonga	100	20	22	21	30	22	10	22.0	10.0	82	37	27	27
Tuvalu ('98)	11	36			18					10	4	0	0
Vanuatu	187	79	79	184	178	117	43	62.6	23.0	166	75	70	57
Viet Nam	79 228	55 739	74 711	84 964	87 449	88 879	53 805	112.2	67.9	149 741	67 344	59	80
Wallis & Futuna ('97)	15	4	4	14	14			0.0	0.0	13	6	0	0
WPR TOTAL (***)	1 673 409	751 951	942 831	834 722	839 121	823 421	393 801	49.2	23.5	1 880 849	841 564	44	47

Table 3: Latest notification of tuberculosis cases by country

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

** No data on tuberculosis is available.

*** In Western Pacific Region Total, cases reported for other years than 1998 are not included in calculation.

definitions of a notifiable case and possible under- or over-reporting, these figures should be interpreted with caution.

Case notification in the world in 1999

By 22 January 2001, 171 countries reported cases notifications for 1999 and or treatment outcomes for 1998 to WHO (81% of 211 countries) (Figure 2 shows the distribution of notified cases by WHO Region, while Figure 3 shows the notification rate by WHO Region). Of them, 128 satisfied the technical criteria for DOTS implementation at the end of 1999 (as compared to 119 in 1998). By the end of 1999, 83% of the world's population was living in countries that had adopted DOTS.

By the end of 1999, 83% of the world's population was living in countries that had adopted DOTS.

Figure 2: Distribution of notified cases by Region

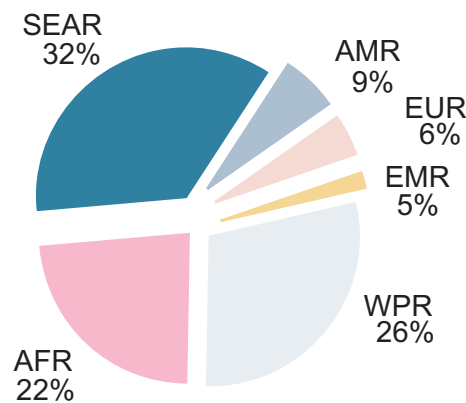
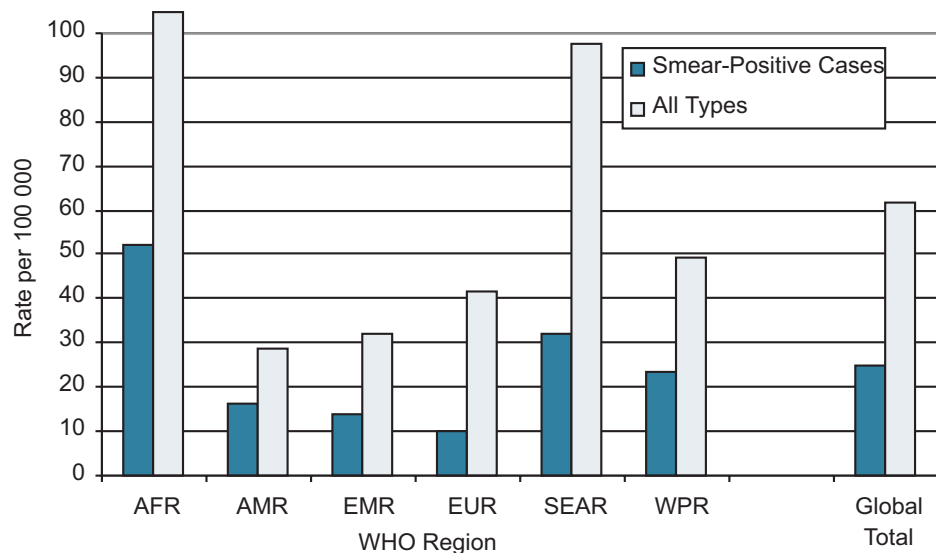
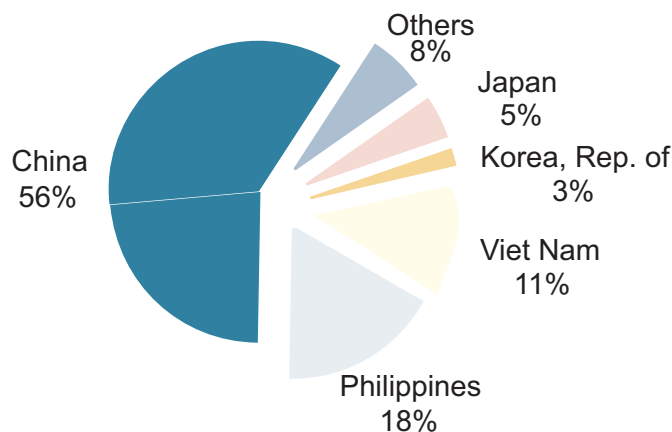


Figure 3: Notification rate by WHO Region



Five countries account for 92% of all notified cases, with China contributing 56%, the Philippines 18% and Viet Nam 11% (see Figure 4). These five countries also contain 95% of the Regional population.

Figure 4: *Distribution of notified cases by major countries*



Notification rate of all types of tuberculosis cases per 100 000 population

The notification rate for the Region was 49 per 100 000 population, varying in individual countries/areas from 0 (Tokelau) to 298 (Kiribati) (see Figure 5). In Pacific island countries (PICs) with a small population, such as Kiribati and Tokelau, the annual numbers and rates of cases showed great fluctuation. The notification rate was lower than 25 per 100 000 in eight countries, between 25 and 100 in 13 countries, and more than 100 in the remaining nine countries.

The notification rate for the Region was 23.5 per 100 000 population, varying from 0 in Tokelau and Cook Islands to 143.4 per 100 000 in Cambodia.

Latest notification of new pulmonary sputum smear-positive cases

Notified new pulmonary sputum smear-positive cases

There were 393 801 new sputum smear-positive cases notified in 1999 (see Table 3). China (54%), the Philippines (19%) and Viet Nam (14%) represented 87% of the Region’s notified new pulmonary smear-positive cases.

Notification rate of new pulmonary sputum smear-positive cases per 100 000 population

The notification rate for the Region was 23.5 per 100 000 population, varying from 0 in Tokelau and Cook Islands to 143.4 per 100 000 in Cambodia (see Figure 6). The notification rate was lower than 25 per 100 000 in 18 countries, including Australia, China, Japan and the Republic of Korea. The rate was between 25 and 100 per 100 000 in 10 countries, including Malaysia, Papua New Guinea, the Philippines and Viet Nam. Cambodia and Palau were the only countries to register a figure higher than 100 per 100 000.

Proportion of new smear-positive cases out of all new pulmonary cases

The median proportion of new smear-positive cases out of all new pulmonary cases was 50%, ranging between 0% in Cook Islands and 96% in Cambodia.

The proportion of smear-positive cases among pulmonary cases enrolled in DOTS (54%) was higher than the proportion among pulmonary cases not enrolled in DOTS (34%). This may reflect tuberculosis control programme improvements since sputum smear examinations are considered the standard diagnosis of pulmonary tuberculosis.

Figure 5: Latest rate of notified cases by country

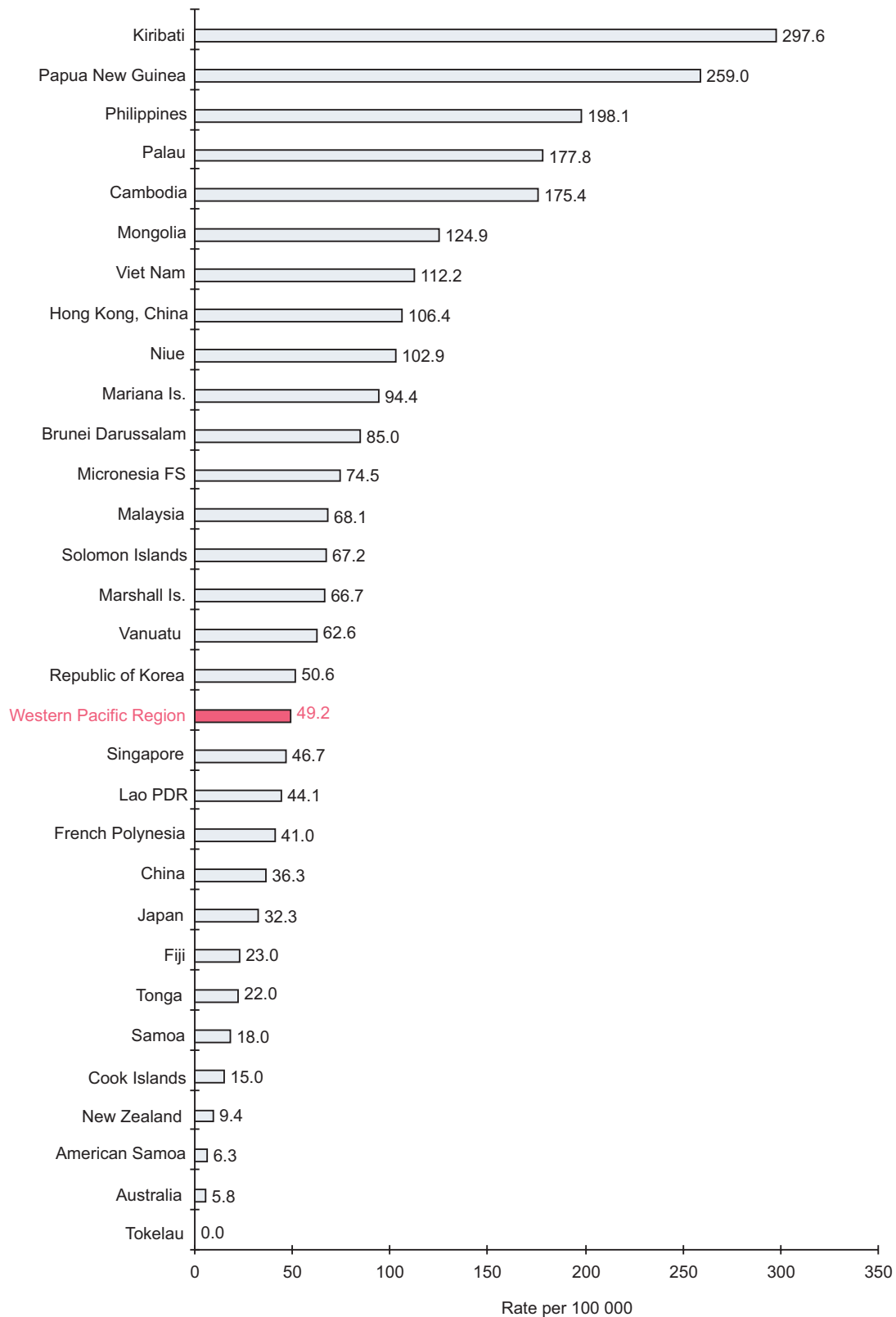
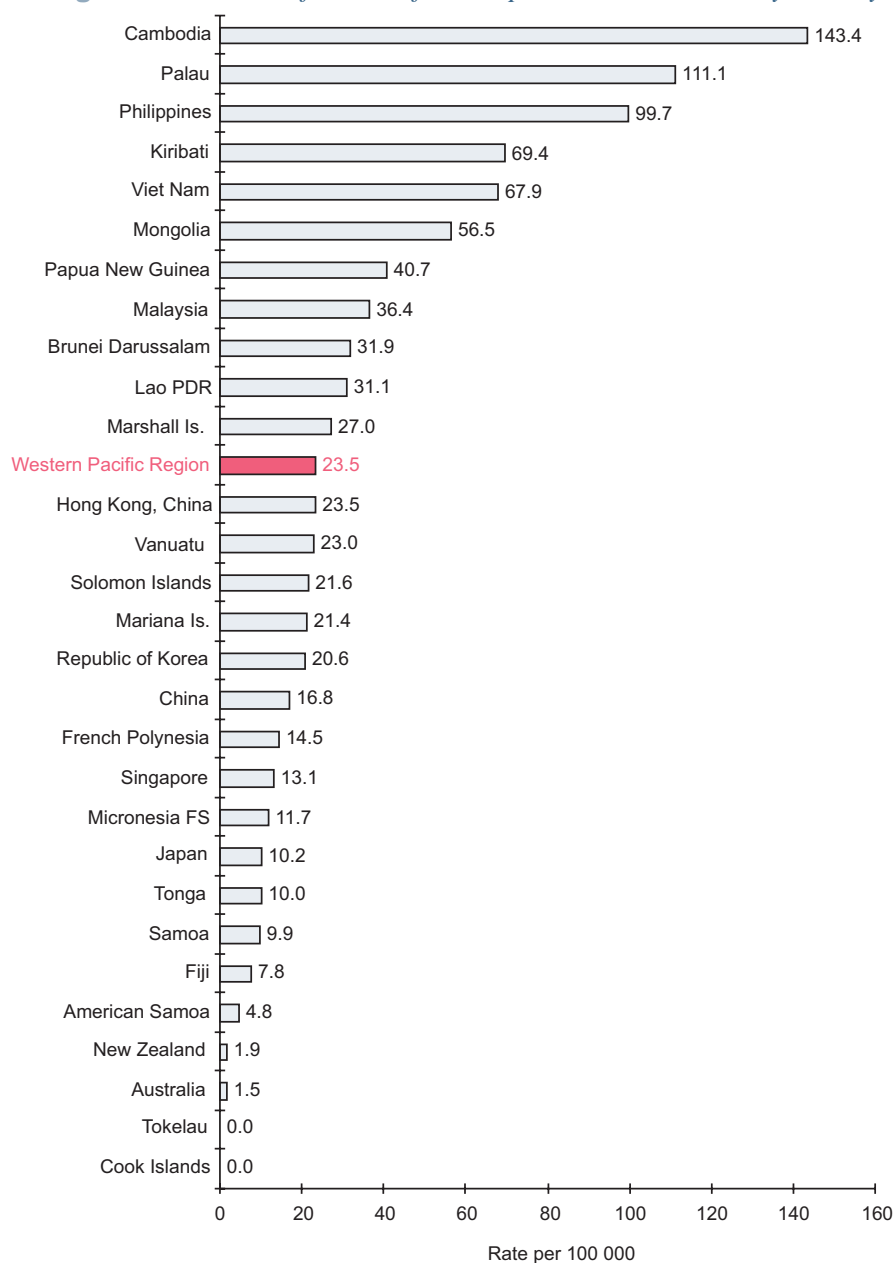


Figure 6: Latest notification of smear positive tuberculosis by country



Trends in notification of all types and new smear-positive cases in the Region

The number of notified all types of tuberculosis has fluctuated over the last seven years. This is attributable mainly to a similar fluctuation in the number of cases from China and, to a lesser extent, the Philippines. The notification rate for all types of tuberculosis varied from 45.7 in 1993 to 49.2 per 100 000 population in 1999, peaking at 58 in 1996 (see Figure 7).

In contrast, the notification rate for new sputum smear-positive cases has increased steadily and continuously from 1993 to 1998. This rise is due largely to more frequent detection of sputum smear-positive cases in China. The rise in the number of new sputum smear-positive cases in China for the period 1993-1998 was mainly due to improved case finding in DOTS areas.

Figure 7: All types and new smear-positive rates, 1993-1999

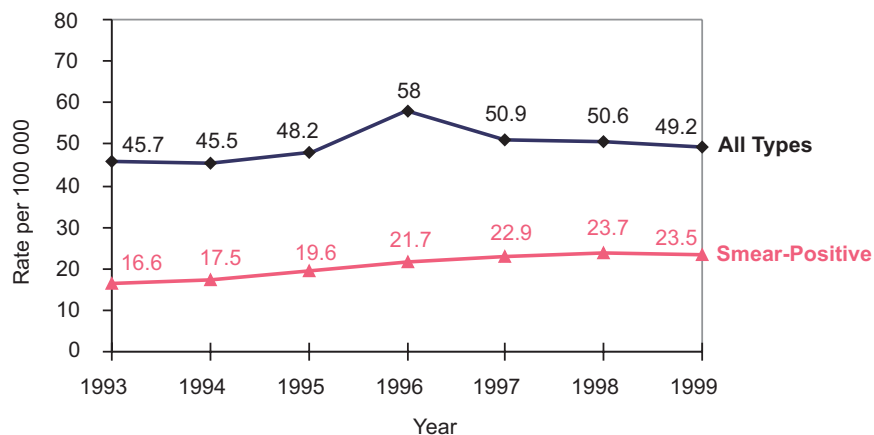
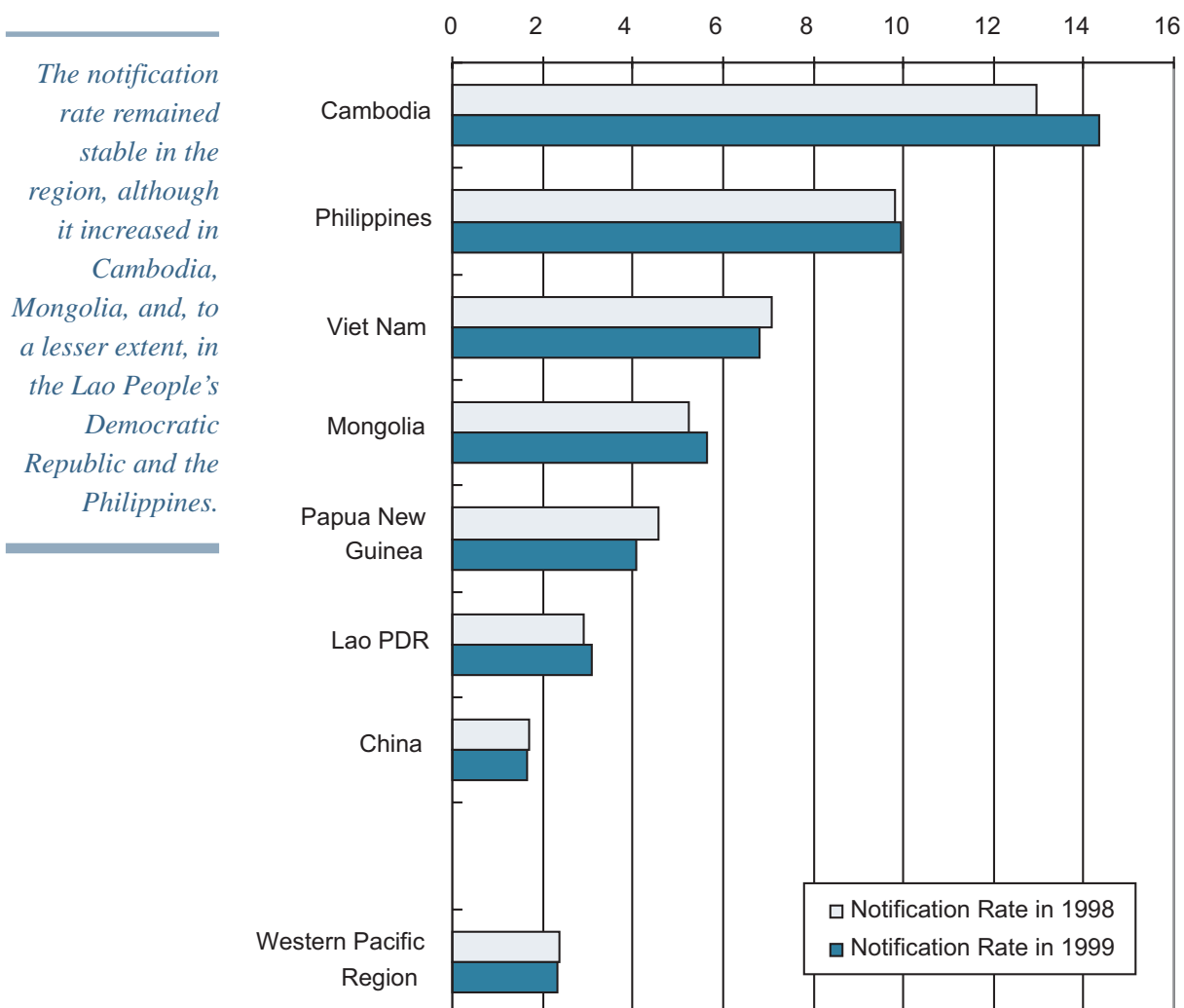


Figure 8 shows the notification rate for smear-positive cases in 1998 and 1999. The notification rate remained stable in the Region, although it increased in Cambodia, Mongolia and, to a lesser extent, in the Lao People’s Democratic Republic and the Philippines. The notification rate decreased in Papua New Guinea; and Viet Nam.

Figure 8: Comparison of notification rates in 1998 and 1999



Distribution of the different types of notified cases in the Region

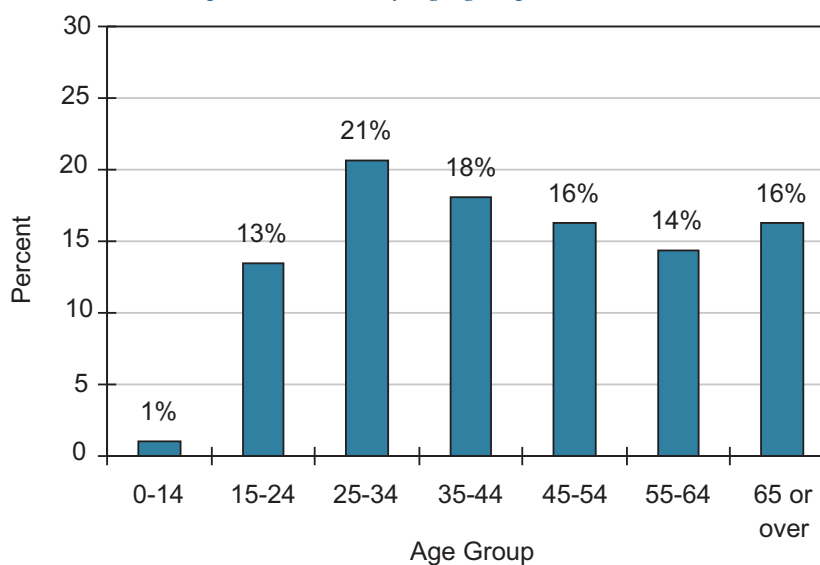
Among the 823 421 notified cases, 393 801 (48%) were new pulmonary sputum smear-positive cases, 22 109 (3%) were relapses, 318 618 (39%) were new pulmonary sputum smear-negative cases and 30 899 (4%) were extrapulmonary new cases. The low number and percentage of extrapulmonary cases is accounted for by the fact that China and the Republic of Korea did not report such cases, and the Philippines reported 0.1% of extrapulmonary cases only. The proportion of new pulmonary smear-positive cases to all new pulmonary cases was 55% (see Annex 4).

Patients younger than 15 years of age accounted for 1% of new pulmonary smear-positive cases. The distribution reached a peak of 21% for the 25-34 age group and declined until the age of 65 or more, where it slightly increased.

Sex and age distribution of new pulmonary smear-positive cases in the Region

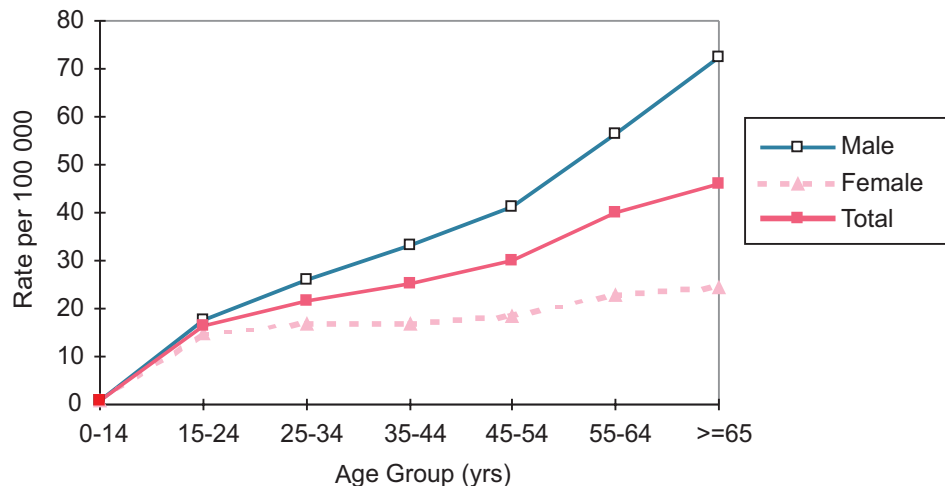
Information on sex and age was collected for new pulmonary smear-positive cases. Data from DOTS and non-DOTS areas were combined and analysed. Such information was reported by 21 countries, accounting for 310 163 patients (see Annex 5) and representing 79% of all new pulmonary sputum smear-positive cases reported in the Region. Patients younger than 15 years of age accounted for 1% of new pulmonary smear-positive cases. The distribution reached a peak of 21% for the 25-34 age group and declined until the age of 65 or more, where it slightly increased. The 15-54 age group accounted for 68% of the cases (see Figure 9).

Figure 9: *New smear-positive cases by age group*



Among the 21 countries that sent information, 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 (see Figure 10). In contrast to the case distribution by age group, 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 (73 per 100 000) being four times higher than that for the 15-24 age group (18 per 100 000). The rate was almost similar in females and males until the age of 24, after which males showed a higher rate. The gap in rate between the two sexes widened as the age increased.

Figure 10: Notification rate by sex and age group, new smear-positive cases, Western Pacific Region, 1999



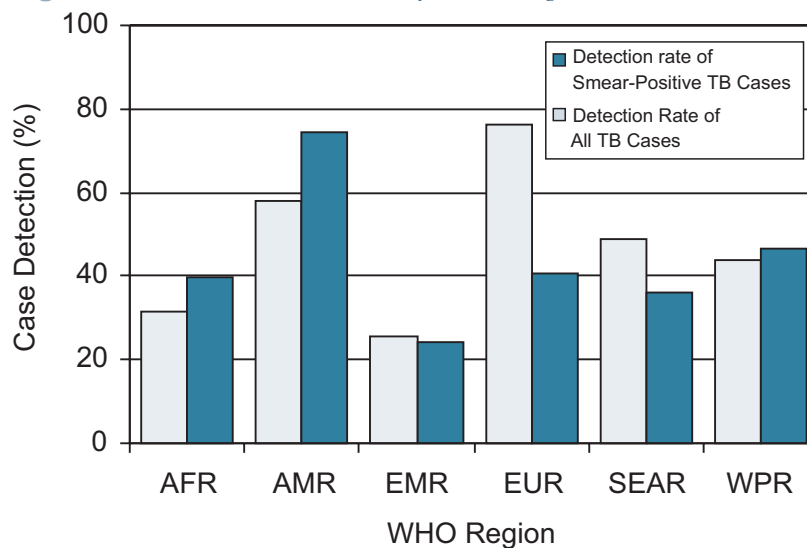
Case detection in the world and in the Region

It is estimated that there were 8.42 million new cases in the world in 1999 of whom 44% were detected.

The world in 1999

A global target of WHO is the detection of 70% of existing new sputum smear-positive cases. The case detection rate is defined as the ratio (%) of annual new smear-positive notifications to estimated annual new smear-positive cases. It is estimated that there were 8.42 million new cases in the world in 1999 of whom 44% were detected. The case detection rate of smear-positive cases was 41%. Figure 11 shows the case detection rates by WHO region in 1999. Case detection rates in 1999 were lowest in the Eastern Mediterranean Region and highest in Europe, the Americas and the Western Pacific.

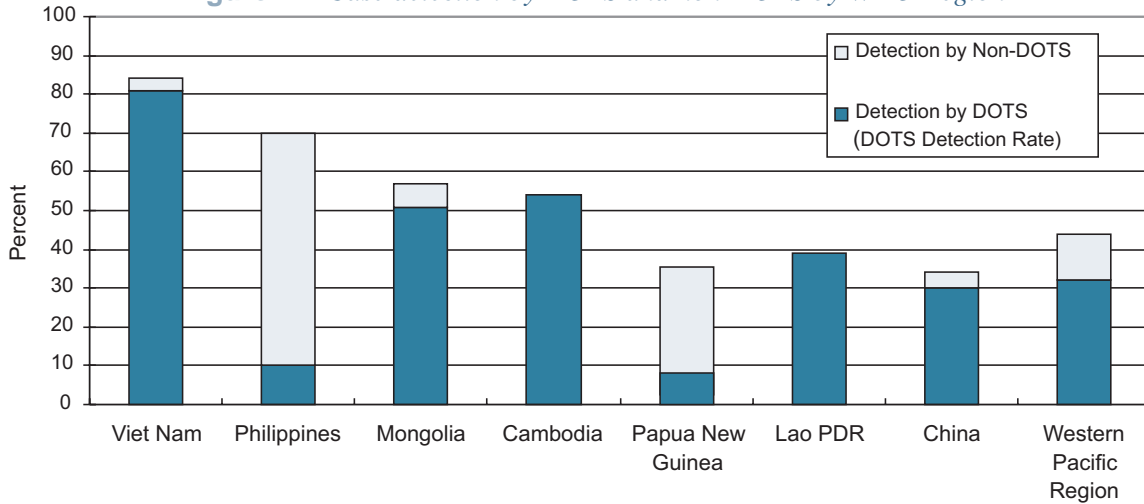
Figure 11: Case detection rates by WHO Region



The Region in 1999

In 1999, the case detection rate in the Western Pacific Region (new smear-positive cases) was 47%, an increase from 44% in 1998. Within the Region, the case detection rate varied by country. Figure 12 shows the case detection rate by DOTS and non-DOTS among the high burden countries of the Region. The Philippines and Viet Nam have a high case detection rate of new sputum positives of 71% and 80%, respectively, contrasting with a lower rate in China (36%) and Papua New Guinea (36%).

Figure 12: Case detection by DOTS and non-DOTS by WHO Region



Although HIV/tuberculosis co-infection is still low on average in the Region, some countries have reported an increase. The prevalence rate of HIV in new tuberculosis cases was 5.2% in Cambodia in 1998, 6% in Malaysia and 1% in Viet Nam (0.6% in 1994). These percentages are expected to rise over the next few years.

Part II

REVIEW OF DOTS IMPLEMENTATION



Table 4: DOTS coverage reported by country, 1999

Countries	Pop. Total	Pop. accessible		Notified All types*		DOTS Enrolment	Notified New S+		DOTS Enrolment	Estimated Incident	DOTS Case
	(x 1000)	to DOTS(*2)		DOTS	non-DOTS	Rate	DOTS	non-DOTS	Rate	New S+	Detection
	(1999)	(x 1000)	(%)	c	d	All Cases (%)	e	f	New S+ (%)	g	New S+ (%)
	a	b	b/a	c	d	c/(c+d)	e	f	e/(e+f)	g	e/g
American Samoa	63	63	100	4		100	3		100	23	13
Australia	18 641	6897	37	511	562	48	152	133	53	746	20
Brunei Darussalam	320	320	100	272		100	102		100	83	123
Cambodia	10 981	10 981	100	19 266		100	15 744		100	27 562	57
China	1 265 979	810 227	64	346 200	113 969	75	188 525	23 901	89	582 350	32
Cook Islands	20	20	100	3		100	0			7	0
Fiji	834	834	100	192		100	65		100	309	21
French Polynesia	227	227	100	93	0	100	33	0	100	84	39
Guam	147	0									
Hong Kong, China	6660	5661	85	5831	1256	82	1566		100	2731	57
Japan	126 187	126 187	100	40 800		100	12 909		100	16 404	79
Kiribati	85	79	93	253		100	59		100	31	188
Republic of Korea	46 505	46 505	100	23 936		100	9559		100	15 347	62
Lao PDR	5525	3923	71	2437		100	1719		100	4144	41
Macao, China	459	0									
Malaysia	21 877	0	0	0	14 908	0	0	7960	0	10 939	0
N. Mariana Is.	70	0	0	0	66	0	0	15	0	28	0
Marshall Is.	63	50	79	42		100	17		100	25	67
Micronesia FS	137	82	60	102		100	16		100	51	32
Mongolia	2680	2680	100	3348		100	1513		100	2466	61
Nauru	11	0									
New Caledonia	206	0									
New Zealand	3719	3719	100	0	348	0		69	0	112	0
Niue	2	0	0	0	2	0	0	1	0	1	0
Palau	18	1	8	32		100	20		100	7	300
Papua New Guinea	4706	376	8	1214	10 975	10	254	1660	13	5271	5
Philippines	73 601	31 648	43	31 825	113 982	22	20 477	52 896	28	103 777	20
Pitcairn Is. (**)	0.046	0									
Samoa	172	172	100	31		100	17		100	69	25
Singapore	3541	3541	100	1654		100	465		100	779	60
Solomon Islands	430	430	100	289		100	93		100	159	58
Tokelau	2	0		0	0		0	0			
Tonga	100	98	98	22		100	10		100	37	27
Tuvalu	11	0									
Vanuatu	187	84	45	86	31	74	24	19	56	75	32
Viet Nam	79 228	78 436	99	88 426	453	99	53 561	244	100	67 344	80
Wallis & Futuna	15	0									
WPR TOTAL (**)	1 673 409	1 133 242	68	566 869	256 552	69	306 903	86 898	78	840 959	36

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

** In WPR Total, cases reported for other years than 1999 are not included in calculation.

3 DOTS COVERAGE

DOTS has been 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 high tuberculosis prevalence countries.

In this chapter, progress of DOTS is reviewed and assessed, using the following indicators:

Certain factors that can aggravate the epidemiological situation of tuberculosis, such as population growth, urbanization and the HIV epidemic, are emerging simultaneously.

Proportion of population with access to DOTS (%):

This is defined as the proportion of population with access to DOTS programmes out of the total population.

DOTS enrolment rate:

This is defined as the proportion of cases enrolled in DOTS out of all notified cases.

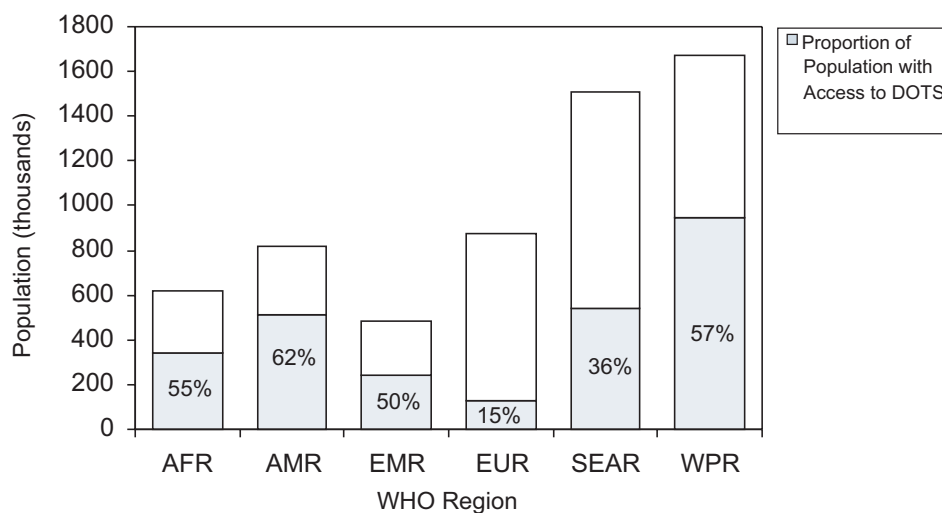
Case detection rate of new smear-positive cases:

This is the ratio of annual new smear-positive tuberculosis case notification to estimated annual incidence. The global target is a 70% case detection rate.

Global coverage in 1999

The number of countries implementing a strategy consistent with DOTS has continued to increase, reaching 128 (61%) in 1999, nine more than in 1998. By the end of 1999, 83% of the world's population was living in countries that had adopted DOTS. Figure 13 shows the proportion of population with access to DOTS by WHO Region in 1999. Around 45% percent of the global population had access to DOTS.

Figure 13: DOTS coverage by WHO Region



Coverage in the Region in 1999

DOTS coverage in the Region

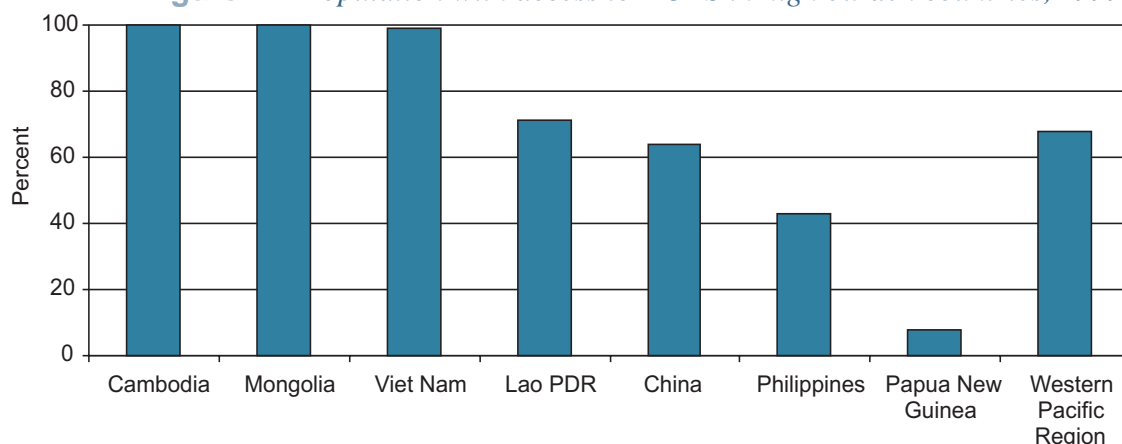
Out of the 30 countries/areas in the Region that submitted data in 2000, the number implementing a strategy consistent with DOTS in 1999 was 22, compared with 18 in 1998. Population coverage of DOTS (proportion of population with access to DOTS) was 68% in 1999, a significant increase from the 58% in 1998. The enrolment rate of all types and new smear-positive cases in 1999 were 69% (59% in 1998) and 78% (72% in 1998), respectively. This is mainly accounted for by increased enrolment rates in Hong Kong, China; Mongolia; the Philippines; Singapore; and Viet Nam. DOTS case detection rates of all cases and new smear-positive cases were 30% and 36%, respectively, attributable to the increased enrolment rate. In both enrolment rate and DOTS case detection rate, the figure for new smear-positive cases was higher than that of all types.

DOTS coverage in the high burden countries of the Region

Figure 14 shows population coverage (proportion of population with access to DOTS) in each of the high burden countries in the Region in 1999. The figure ranged from 100% in Cambodia to 8% in Papua New Guinea.

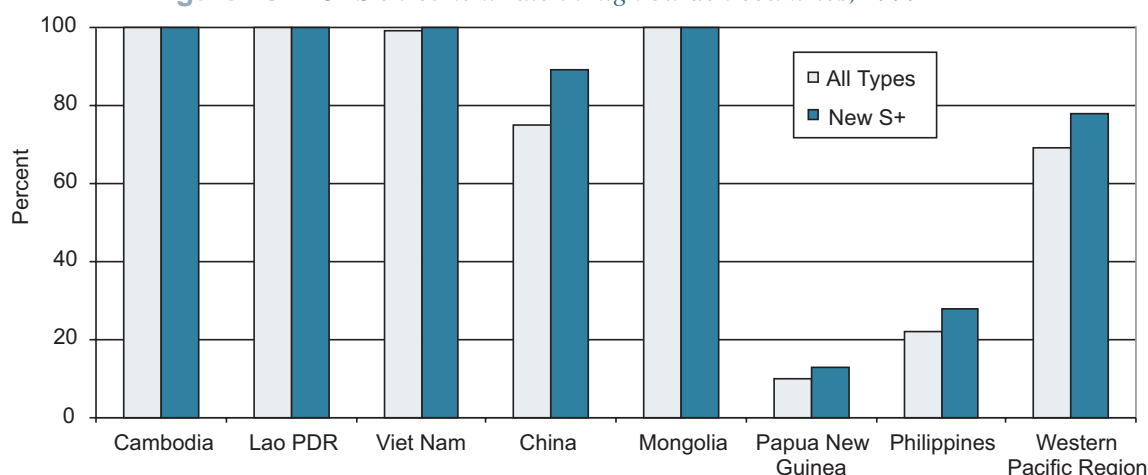
Population coverage of DOTS (proportion of population with access to DOTS) was 68% in 1999, a significant increase from the 58% in 1998.

Figure 14: Population with access to DOTS in high burden countries, 1999



DOTS enrolment rate of all types of tuberculosis ranged from 100% in Cambodia to 22% in the Philippines, and 10% in Papua New Guinea (Figure 15).

Figure 15: DOTS enrolment rate in high burden countries, 1999



The DOTS case detection rate was 36% for the cases reported in the Region in 1999. Although 68% of the Region's population has access to DOTS, the DOTS case detection rate of new smear-positive cases is still low on average in the Region as a whole. Among the high burden countries, the DOTS case detection rate (new smear-positive) ranged from 80% in Viet Nam to 5% in Papua New Guinea (See Table 4). Viet Nam is the only country that has achieved a 70% DOTS case detection rate with both high DOTS enrolment rate and high case detection rate. Other countries have not reached a 70% DOTS case detection rate due to low case detection and/or a low DOTS enrolment rate. Cambodia, China, the Lao People's Democratic Republic and Mongolia had a high DOTS enrolment rate but the case detection rate remained low. In Papua New Guinea, both the enrolment rate and case detection rate remained very low (13% and 5%, respectively).

The DOTS case detection rate was 36% for the cases reported in the Region in 1999.

Table 5: Treatment outcome of new smear-positive cases registered in 1998

Country	Control Strategy	Registered*	Evaluated**	Outcomes of Treatment					Transferred Out	Treatment Success
				Cured	Completed Treatment	Defaulted	Failed	Died		
				(%)	(%)	(%)	(%)	(%)		
American Samoa	DOTS	4	100	50	0.0	0.0	0.0	0.0	50	50
	non-DOTS	0								
Australia	DOTS	146	92	13.0	62.3	0.7	0.7	10.3	4.8	75.3
	non-DOTS	91	95	24.2	42.9	2.2	0.0	8.8	16.5	67.1
Brunei Darussalam	DOTS	81	100	56.8	28.4	4.9	1.2	2.5	6.2	85.2
	non-DOTS									0
Cambodia	DOTS	13 290	100	91.5	3.0	2.2	0.4	2.3	0.5	94.5
	non-DOTS	0								0
China***	DOTS	190 016	100	96.6	0.0	0.6	0.8	1.2	0.3	96.6
	non-DOTS	20 080	99	84.6	0.0	4.5	6.5	1.8	1.7	84.6
Cook Islands****	DOTS									0
	non-DOTS	1	100	0.0	0.0	0.0	0.0	0.0	100.0	0
Fiji	DOTS	79	100	82.2	7.6	8.9	0.0	1.3	0.0	89.8
	non-DOTS	0								0
French Polynesia	DOTS	27	100	74.1	0.0	11.1	3.7	11.1	0.0	74.1
	non-DOTS	0								0
Hong Kong, China****	DOTS	1566	100	78.1	7.1	4.2	1.5	4.1	5.0	85.2
	non-DOTS									0
Japan****	DOTS	4003	100	49.6	30.5	3.2	7.4	9.3	0.0	80.1
	non-DOTS	0								0
Kiribati	DOTS	52	100	82.7	0.0	5.8	5.8	5.8	0.0	82.7
	non-DOTS	0								0
Lao PDR	DOTS	1494	91	67.0	7.6	7.9	0.3	6.8	1.7	74.6
	non-DOTS									0
Malaysia	DOTS	0								0
	non-DOTS	7721	100	0.0	78.4	12.7	0.5	6.4	2.0	78.4
N. Mariana Is.	DOTS	0								0
	non-DOTS	110	100	79.1	0.0	0.0	0.0	0.9	20.0	79.1
Marshall Is. ****	DOTS	12	100	83.3	0.0	0.0	0.0	8.3	8.3	83.3
	non-DOTS	0								0
Micronesia FS****	DOTS	16	100	0.0	75.0	6.3	0.0	12.5	6.3	75
	non-DOTS	0								0
Mongolia	DOTS	1356	100	78.6	5.3	3.8	5.0	3.7	3.4	83.9
	non-DOTS									0
Palau	DOTS	30	100	40.0	33.3	0.0	0.0	0.0	26.7	73.3
	non-DOTS	0								0
Papua New Guinea	DOTS	258	100	27.5	44.6	16.3	0.8	1.9	8.9	72.1
	non-DOTS	4550								
Philippines	DOTS	8976	100	77.8	6.6	6.9	2.6	2.9	3.2	84.4
	non-DOTS(*)	11 707	68	37.6	22.7	3.4	0.8	1.3	1.9	60.3
Samoa	DOTS	7	100	0.0	85.7	0.0	14.3	0.0	0.0	85.7
	non-DOTS	0								0
Singapore****	DOTS	201	97	84.1	0.0	5.0	0.0	5.0	3.0	84.1
	non-DOTS	0								0
Solomon Islands	DOTS	138	100	83.3	8.7	0.7	0.0	4.4	2.9	92
	non-DOTS									0
Tonga	DOTS	16	100	93.8	0.0	0.0	0.0	6.3	0.0	93.8
	non-DOTS	0								0
Viet Nam	DOTS	52 799	100	89.9	2.7	1.9	1.2	2.8	1.5	92.6
	non-DOTS	1752	100	75.1	10.2	6.4	2.3	3.9	2.2	85.3
TOTAL	DOTS	274 567	100	93.3	1.5	1.3	1.0	1.8	0.7	94.8
	non-DOTS	46 012	82	49.6	19.4	5.2	3.2	2.4	1.7	69

The table includes the countries/areas that submitted treatment outcome results in the 1999 report.

*: Registered for cohort analysis.

** : Percentage of evaluated cases among registered.

***: Cured rates in China includes completed treatment rates.

****: Evaluated patients in Hong Kong, China were classified as DOTS for evaluation purposes and non DOTS in 1998.

4 TREATMENT OUTCOME BY DOTS AND NON-DOTS

To evaluate the outcome of treatment in DOTS areas, the cure rate and success rate of smear-positive cases is used (see definitions of treatment outcomes, Annex 1).

The cure rate is the proportion of patients who have completed treatment and had smear-negative results confirmed twice, once at the end of treatment.

The treatment success rate is the sum of the cure rate and completion rate defined as a proportion of patients who completed treatment and did not register smear-positive results after five months of treatment or later. The global target is an 85% cure rate and a greater treatment success rate.

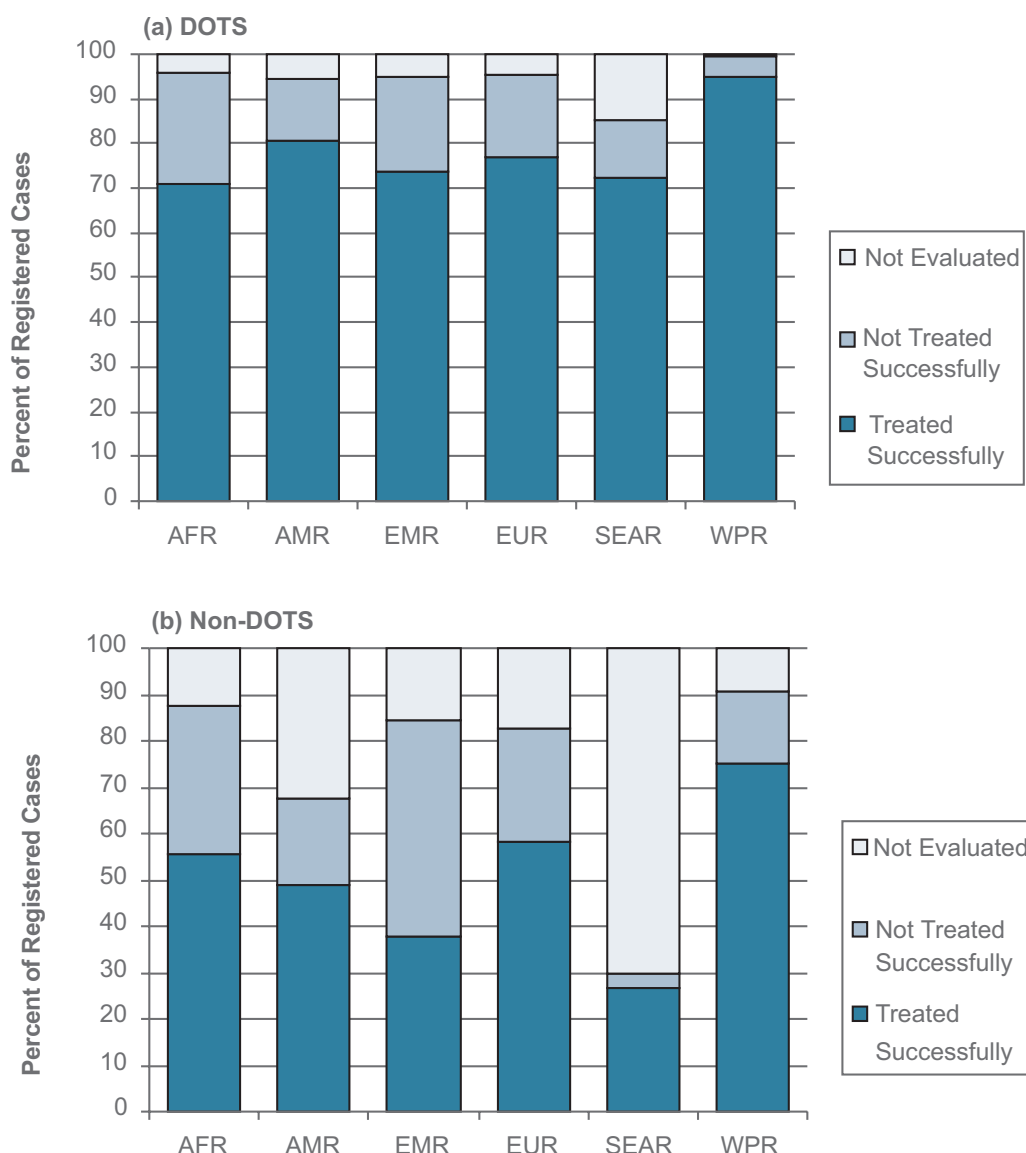
To assess the quality of treatment programmes for new infectious cases, the number of new cases registered for treatment in 1998 (reported in 2000) is compared to the number of cases notified as smear-positive in 1998 (reported in 1999). These numbers should be the same.

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 smear-positive cases registered for treatment in 1998 (reported in 2000) is compared to the number of cases notified as smear-positive in 1998 (reported in 1999). 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. Data describing the outcome of retreatment were collected only from DOTS areas.

Global treatment outcome in 1999

The documented treatment success rates under DOTS varied from 71% in Africa to more than 95% in the Western Pacific Region (see Figure 16). Fatal outcomes were most common in Africa (6%) and Europe (6%), where cases are more frequent among HIV-infected individuals and the elderly, respectively. Over the period 1995-1998, the overall success rates have remained approximately stable at 77-81% under DOTS, and 54-64% worldwide.

Figure 16: Treatment success in (a) DOTS and (b) non-DOTS areas, by WHO Region, 1998 cohort.

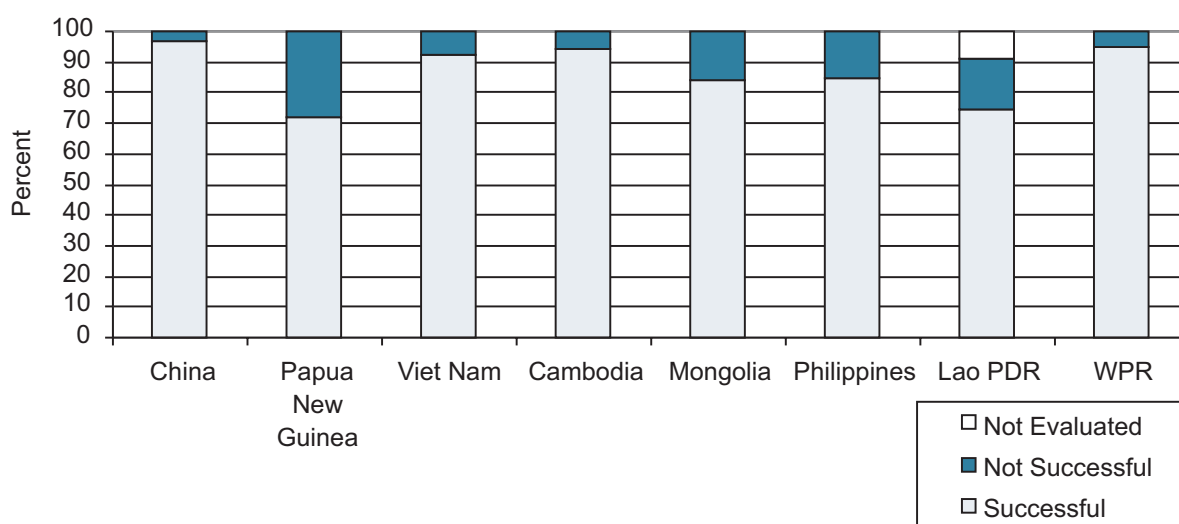


Treatment outcomes in the Region in 1999

The treatment outcome of cases registered in 1998 was reported by 25 of the Region’s countries/areas. In DOTS areas, 274 567 new smear-positive cases were registered for cohort analysis. The number of cases notified in 1998 was different from the number of registered cases as reported in 2000 in most countries. More cases were registered for treatment outcome than reported the previous year (272 238). The cure rate and treatment success rate of new smear-positive cases under DOTS were 93.3% and 94.8%, respectively, in the Region (see Table 5). For China, data strongly influence the Regional figures, particularly the high regional treatment success rate (96.6% success rate in DOTS areas in China).

High burden countries (with the exception of the Lao People’s Democratic Republic and Papua New Guinea) had a DOTS success rate of 80% or greater. Cambodia, China and Viet Nam achieved an 85% success rate (see Figure 17).

Figure 17: Treatment outcome under DOTS in high burden countries



In terms of population, DOTS coverage has improved since the strategy began in 1991. Coverage was 68% in 1999, as compared to 58% the previous year.

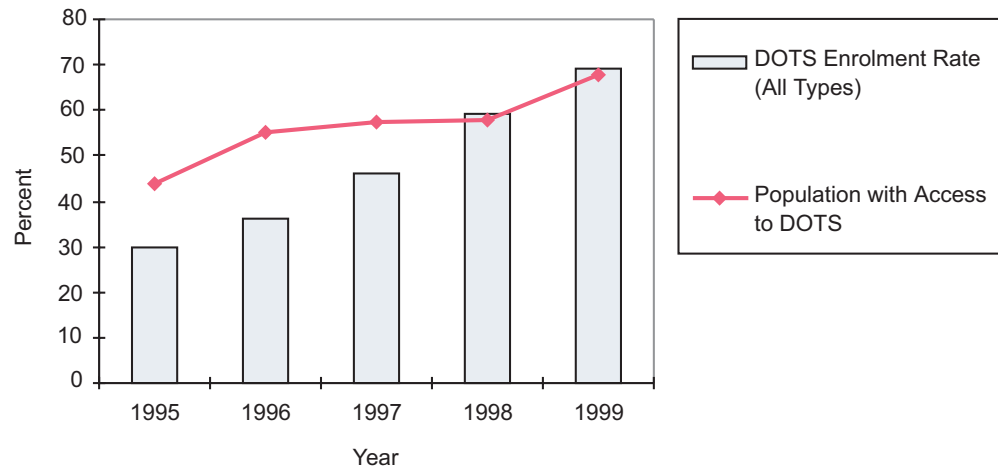
For non-DOTS areas, six countries reported treatment outcomes. The success rate under non-DOTS was 69%. However, it is difficult to assess the treatment outcome of non-DOTS cases properly because the evaluated cases represent only a small fraction (39%) of cases reported for 1998. Retreatment outcomes were reported by 15 countries for DOTS areas, and are shown in Table 6. Death rates are typically high in developed countries (Australia 10%, French Polynesia 11%, Japan 9.3%, Malaysia 6.4%, Singapore 5%), where the proportion of new cases belonging to the elderly (Japan, 40% of the cases are older than 70 years) is also high. Overall, the success rate was 91%, but was only 53% in Papua New Guinea and 55% in the Lao People's Democratic Republic.

Table 6: Retreatment outcomes in the Western Pacific

Country	Registered	Cure Rate (%)	Success Rate (%)
Australia	21	9.5	81.0
Brunei Darussalam	14	21.4	92.9
Cambodia	689	89.0	91.7
China	12 568	93.4	95.2
French Polynesia	15	80.0	80.0
Hong Kong, China	241	66.4	80.1
Lao PDR	53	54.7	54.7
Marshall Islands	2	0.0	100.0
Micronesia FS	25	0.0	80.0
Mongolia	117	60.7	76.9
Papua New Guinea	19	31.6	52.6
Philippines	29	75.9	82.8
Singapore	159	81.8	81.8
Solomon Islands	6	83.3	83.3
Viet Nam	5612	79.4	84.1
Total	19 570	88.1	91.3

Figure 18 shows the expansion of regional DOTS implementation from 1995 to 1999. In terms of population, DOTS coverage has improved since the strategy began in 1991. Coverage was 68% in 1999, as compared to 58% the previous year. The DOTS enrolment rate has also increased significantly to 69% for all types. However, the DOTS case detection rate of new smear-positive cases was only 36%, still far 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 18: Trends of DOTS implementation in the Western Pacific, 1995-1999



Part III

COUNTRY PROFILES



5 GROUPING OF COUNTRIES IN THE REGION

The Region's countries can be grouped according to the burden of tuberculosis and DOTS coverage. Such a grouping facilitates strategies to further expand DOTS or address specific issues facing a group. The grouping of countries/areas in the Western Pacific Region is as follows:

Group 1: Countries with high tuberculosis burden:

Cambodia, China, the Lao People's Democratic Republic, Mongolia, Papua New Guinea, the Philippines, Viet Nam.

This group represents the highest tuberculosis burden in the Region. Cambodia, China, the Philippines and Viet Nam belong to the top 23 countries in the world for the disease. The success of tuberculosis control programmes depends on achieving high DOTS cases detection rates and maintenance of high success rates. All countries in this group have adopted the DOTS strategy and have proved that it can cure tuberculosis in urban and rural areas, even when they are remote. But they have unequal political, financial and technical commitments to increasing the availability of DOTS.

Cambodia, China, the Philippines and Viet Nam belong to the top 23 countries in the world for the disease.

Group 2: Countries with intermediate tuberculosis burden and good health infrastructure:

Brunei Darussalam; Hong Kong, China; Japan; the Republic of Korea; Macao, China; Malaysia; Singapore.

These countries are able to allocate more human, technical and financial resources to health care than developing countries and are equipped with good health infrastructures. However, tuberculosis incidence is still high and the tuberculosis burden has not decreased during recent years, except in the Republic of Korea. In this group of countries, the majority of tuberculosis cases occur among the elderly or in specific risk groups such as homeless, foreign-born persons from high-prevalence countries or HIV-infected patients.

Group 3: PICs with populations of less than 1 million and initial stage of DOTS implementation:

All small PICs: American Samoa, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, the Commonwealth of the Northern Mariana Islands, the Marshall Islands, the Federated States of Micronesia, Nauru, New Caledonia, Niue, Palau, the Pitcairn Islands, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu, Wallis and Futuna.

DOTS implementation in the PICs is lower than in the Region as a whole and little is known about their epidemiological situation, although many islands have achieved high notification rates. Health staff in small countries and remote islands tend to be

scarce, while people live in scattered communities and isolated households and, therefore, are often difficult to reach. Communications are limited and health services are usually concentrated in the capital of the main island with often limited or no primary health care services in outer islands.

Group 4: *Industrialized countries with low tuberculosis burden and low incidence: Australia, New Zealand.*

The two industrialized countries in this group have lower incidences than those in group 3. However, the DOTS strategy should also be applied to these two countries, but adapted to their needs, and to those of high risk groups such as HIV-infected patients, foreign-born persons from high prevalence countries and immigrants.

6 PROGRESS IN TB CONTROL IN HIGH BURDEN COUNTRIES (Group 1)

1. Cambodia

For the last 10 years, Cambodia has been trying to rebuild a health system that was dismantled by war. The overall strategy of the rebuilding is to improve equity and accessibility to essential health services, including tuberculosis care. When directly observed treatment (DOT) was adopted in 1993, the public health infrastructure was too weak to offer ambulatory DOT through health centers. The positive impact of the health reforms and rebuilding is demonstrated in the fact that in 2000, core primary health care services were available through 67 operational districts and about 500 health centers. The strengthening of the health network will allow tuberculosis services to become progressively decentralized to peripheral health centers, improving access for all. Meanwhile, the private health sector is also expanding in Cambodia, offering opportunities for the further expansion of DOTS that need to be explored. It is planned that within four years, tuberculosis services will be available in 795 of the 929 health facilities (one facility per 10 000 population) being developed through the country.

The strengthening of the health network will allow tuberculosis services to become progressively decentralized to peripheral health centers, improving access for all.

Reported DOTS population coverage rose from 88% in 1997 to 100% in 1998 and 1999. Some 57% of all estimated smear-positive cases were notified under DOTS, a small increase on 1998. The measured treatment success was very high (95%). The prevalence of HIV infection is the highest in the Region (3.7% among the 15-49 age group population, or 180 000 cases in 1999), and 5% of tuberculosis patients were found to be HIV positive in 1998. With some extra effort devoted to case finding (and perhaps to refining the present estimate of incidence), Cambodia should be able to reach the WHO target of 70% case detection by 2005.

2. China

The existing DOTS programme includes both the Infectious and Endemic Disease Control (IEDC) and Ministry of Health Projects, covering 50% and 14% of the population, respectively. More than one in three infectious tuberculosis cases are currently treated under DOTS and the reported treatment success rate has remained in excess of 90% (though China does not separate patients known to be cured from those that merely completed treatment). The impact of this programme can be judged, in part, from the results of a national disease prevalence survey carried out during 2000. Preliminary analysis of the survey data suggests that the prevalence of smear-positive cases was 122/100 000 population, a decrease of 21% since 1990. More critically, prevalence was only 90/100 000 in the 13 provinces participating in the IEDC project. The reduction in these provinces between 1990 and 2000 was 37%, as compared with 3.2% elsewhere in China. The national death rate from tuberculosis was 9.8/100 000,

a reduction of 53% since 1989. Applied to IEDC provinces, this result suggests that about 56 000 deaths were averted in the year 2000, towards the upper end of the range proposed on the basis of treatment-retreatment (capture-recapture) modeling.¹ Set against this good news is the fact that DOTS coverage has not improved since 1997; consequently, the number of cases enrolled in 1999 was about the same as in 1998. The major challenge now is to secure political commitment and financial resources to maintain and expand the DOTS programme. In this regard, there are two significant developments. First, the State Council of China held a high-level advocacy meeting with national and provincial leaders in December 2000 to push for increased commitment from all levels of government. Second, a group of international partners, including the World Bank and the Department for International Development (UK), is working to provide new funds for tuberculosis control in China.

3. The Lao People's Democratic Republic

Until the end of 1994, National Tuberculosis Control Programme implementation was limited to the National Tuberculosis Centre (NTC) and a few provinces. At the end of 1994, a revised National Tuberculosis Control Policy was adopted based on the DOTS strategy, which has been expanded since it was introduced in Savannakhet Province in late 1994. In 1999, DOTS was being implemented in 13 out of 18 provinces in collaboration with the Damien Foundation Belgium and the International Union Against Tuberculosis and Lung Diseases (IUATLD). This gave 71% of the total population access to DOTS. Progress in case finding has been remarkable. As the programme has expanded to new provinces since 1995, the number of detected cases has increased, from 830 cases in 1995 to 2437 cases in 1999. In 1999, 100% of all registered new smear-positive cases were enrolled in DOTS. The DOTS treatment success rate for cases registered increased from 62.4% in 1997 to 74.6% in 1998.

Treatment outcomes using DOTS in Mongolia were close to the WHO target with a 83.9% success rate for new smear-positive cases registered in 1998.

4. Mongolia

In 1994, the Mongolian Government approved a new National Tuberculosis Control Programme based on WHO and IUATLD recommendations. Before 1994, case finding was carried out mainly through chest X-rays. The proportion of smear-positive cases in all notified cases was low, at around 10%. The figure increased to 45% in 1999. DOTS was started in 1994. At the end of 1999, 100% of the population had access to DOTS. Treatment outcomes using DOTS were close to the WHO target with a 83.9% success rate for new smear-positive cases registered in 1998.

5. Papua New Guinea

The country has engaged in tuberculosis control since the 1950s when a vertical programme was established. Short-course chemotherapy was introduced in 1987 and extended to cover all the country in 1989. DOTS started in April 1997. The number of notified cases of tuberculosis has fluctuated throughout the years. The majority of pulmonary cases are not offered sputum examinations and diagnosis is often based on

¹ C. Dye, F. Zhao, S. Scheele and B.G. Williams. "Evaluating the Impact of Tuberculosis Control: Number of Deaths Prevented by Short-course Chemotherapy in China." *Int J Epidemiol* 2000; 29: 558-564.

symptoms and a chest X-ray. As a result, the proportion of sputum-positive cases out of pulmonary cases was 16% in the whole country, and 21% in DOTS areas in 1999. A score chart is often used for the diagnosis of tuberculosis in children. They represent about one third of notified pulmonary cases. Therefore, there is a possibility of over-diagnosis for sputum negative cases and under-diagnosis of sputum positives. It is difficult to assess the outcomes of treatment because retrospective cohort analyses and monitoring treatment with follow-up sputum examinations are not used routinely. Another problem is that the proportion of defaulters is high in some areas, even in DOTS areas such as the National Capital District, where the figure reached 33% in 1998. A success rate of only 72.1% was reported from DOTS areas. There are plans in 2000 to expand DOTS in five more districts in Morobe Province and, as a pilot stage, in six other provinces.

6. The Philippines

The Philippines has been actively reforming many of its social programmes since 1992. In the health sector, the reforms have clearly delineated the role of the central, regional and provincial governments to draw on the comparative advantage of each in delivering quality health care. The central level of the tuberculosis control programme is responsible for overall programme management including the formulation of technical norms, providing technical support and drug procurement. The regional level is responsible for coordination with and technical support to provincial governments. Provinces are beginning to take ownership for tuberculosis as a priority public health issue and have demonstrated political commitment to expanding DOTS throughout the country.

DOTS has expanded rapidly in the Philippines, reaching 43% population coverage in 1999 compared with 17% in 1998.

DOTS has expanded rapidly in the Philippines, reaching 43% population coverage in 1999 compared with 17% in 1998. By the end of 1999, the WHO strategy was operational in 28 provinces. Twenty percent of all estimated smear-positive cases were notified to the DOTS programme in 1999, double the proportion in 1998. The extra 10 000 smear-positive cases reported under DOTS in 1999 were added at the expense of more than 8000 fewer cases reported from non-DOTS areas. Thus, the net gain in smear-positive cases reported in 1999 was about 2000 cases. Treatment success in the 1998 cohort was close to the WHO target of 85%; defaulting (7%) was the main obstacle to better cure. Outside the DOTS cohort, treatment success was only 60% because a large fraction of cases was not evaluated. The burden of tuberculosis in the Philippines was accurately measured by a prevalence survey carried out in 1997; the high estimate of case detection overall (70%) is probably accurate and, with impressive outcomes of treatment, suggests that rapid progress could be made towards WHO targets. The primary constraints to the continued expansion of DOTS are the downsizing of the central level and weak programme monitoring.

7. Viet Nam

Viet Nam is one of the few high tuberculosis burden countries reaching the WHO target on case finding and treatment success within the context of low gross national product per capita. High political commitment is translated into high priority on tuberculosis, with subsequent allocation of government resources for tuberculosis,

including a World Bank loan, insuring the drug supply. The programme uses both ambulatory DOTS as well as hospitalization during the intensive phase of treatment. Major constraints to sustain effective tuberculosis control include the increasingly active but under-regulated private health sector, the growing threat from HIV/AIDS and the spectre of multidrug resistant tuberculosis.

Beginning in 1995, Viet Nam rapidly expanded the availability of DOTS and has maintained coverage since 1996. More than 98% of the population had access to DOTS in 1999. Treatment success rates have consistently been in excess of 85%, and reached 93% in the 1998 cohort. The estimated proportion of all incident smear-positive cases successfully treated was outstandingly high at 75%.

ANNEXES

1: Definitions	37
2: Trend in Notified Cases (All Types and New Smear-Positive Cases), 1977-1999	40
3: Trend in Notification Rate (All Types and New Smear-Positive Cases) per 100 000, 1976-1999	42
4: Tuberculosis Cases Notified in 1999	44
5: Age and Sex Distribution of New Smear-Positive (SS+) Tuberculosis Cases, DOTS and Non-DOTS Areas Combined, 1999	45
6: Age and Sex Notification Rate of New Smear-Positive (SS+) Tuberculosis Cases, DOTS and Non-DOTS Areas Combined, 1999	46



ANNEX 1 DEFINITIONS

Definitions of tuberculosis cases

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:

- at least two initial sputum smear examinations (direct smear microscopy) positive for acid fast bacilli (AFB);
- one sputum examination positive for AFB and 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 patient with symptoms suggestive of tuberculosis and having one of the following:

- two sets (taken two weeks apart) of at least two sputum specimens negative for AFB; radiographic abnormalities consistent with pulmonary tuberculosis and a lack of clinical response despite one week of a broad-spectrum antibiotic; a decision by a physician to treat with a full curative course of anti-tuberculosis chemotherapy; or
- severely ill; at least two sputum specimens negative for AFB; radiographic abnormalities consistent with extensive pulmonary tuberculosis (interstitial or miliary); a decision by a physician to treat with a full curative course of anti-tuberculosis chemotherapy; or
- a patient whose initial sputum smears were negative, who had sputum sent for culture initially, and whose subsequent sputum culture result is positive.

New pulmonary case, smear not done: A patient diagnosed with pulmonary tuberculosis but for whom no sputum smear examination was carried out. In this report, it is included in new smear-negative pulmonary cases.

Extrapulmonary: A patient with tuberculosis of organs other than the lungs: tuberculosis of the pleura (tuberculosis pleurisy), of peripheral lymph nodes, abdomen, genito-urinary tract, skin, joints and bones, tubercular meningitis, etc.

Any 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 by a medical officer after completion of treatment but who reports back to the health service with a positive sputum smear examination.

Definitions of treatment outcome

Cured: Patients who were initially sputum smear-positive, who completed treatment and had at least two negative sputum smear results during the continuation phase, one of which was at the completion of treatment.

Completed treatment: Patients who were initially sputum smear-positive, completed treatment, with negative smears at the end of the initial phase, but with no or only one negative sputum examination in the continuation phase and none at the end of treatment.

Died: Patients who died during treatment, regardless of cause.

Failure: Smear-positive cases who remained or became again smear-positive five months or later after starting treatment.

Defaulted: Patients who have interrupted treatment for two months or more.

Transferred out: Patients who were transferred to another treatment unit and whose treatment results are not known.

Not evaluated: Patients who did not have their treatment outcome evaluated and it remains unknown.

Indicators to assess treatment outcome

Cure rate: Proportion of cured cases out of all cases registered in a certain period (1998 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 (1998 in this report).

Case detection rate and DOTS detection rate

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 *JAMA* in 1999 (P. Doblin, C. Dye, V. Pathania, M.C. Raviglione and S. Scheele).

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.

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

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

Country/Area		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Am. Samoa	all	7	8	2	2	6	6	8	12	5	8	9	13	5	15	2		4		6		6		4
	new S+				0	6	3	6	9	2	5	3						1		3		6		3
Australia	all	1251	1292	1542	1457	1386	1270	1219	1299	1088	906	907	954	952	1016	950	1011	991		1073	1073	1145	899	1073
	new S+	881	741	807	765	723	690	596	634	583							536	557				171	203	285
Brunei	all		230	216	196	285	245	276	256	238	212	189	126	128	143			160						272
Darussalam	new S+																	68						102
Cambodia	all						8158	7572	10 241	10 145	10 325	9106	10 691	7906	6501	10 903	16 148	13 270	15 112	14 599	14 857	15 629	16 946	19 266
	new S+						5801	5316	5507	5235	8715	7173	8246	5842	5132	8507	12 910	9560	11 058	11 101	12 065	12 686	13 865	15 744
China	all					98 654	117 557	151 564	226 899	265 095	313 604	362 114	367 799	375 481	376 246			344 218	363 804	357 829	469 358	418 903	457 349	460 169
	new S+					19 236	25 628	38 367	53 078	60 949							90 184	84 898	104 729	134 488	168 270	188 529	214 462	212 426
Cook Is.	all			30	37	10	19	29	20	36	17	16	15	1	1		12	6	4	1		0	2	3
	new S+																4	4	1	0		0	1	0
Fiji	all	257	183	205	210	180	163	185	165	230	199	173	162	218	252	210	240		225	203	200	171	166	192
	new S+	145	101	114	111	97	98	79	82	99	86	75	65	76	83	63	75		60	68	69	66	74	65
Fr. Polynesia	all	95	78	81	73	58	48	66	73	75	79	63	64	58	59	49	83	82	89		86	91	105	93
	new S+	41	32	41	52	39	32	48	52	48	49	45	44	43		34	40	39	38		37	41	34	33
Guam	all	67	64	71	55	41	49	48	54	37	49	34	41	75	40			70	94					
	new S+																	53	40					
Hong Kong, China	all	7191	6623	7903	8065	7729	7527	7301	7843	7545	7432	7269	7021	6704	6510	6283	6534	6537	6319	6212	6501	6983	7673	7087
	new B+								4142	4110	4042	3918	3768	3670	3564		2429			2116	1536	1869	1566	
Japan	all	89 245	80 629	76 455	70 916	65 867	63 940	62 021	61 521	58 567	56 690	56 496	54 357	53 112	51 821	50 612	48 956	47 437	44 590	43 078	42 122	42 190	44 016	40 800
	new S+	13 373	13 198	12 806	12 291	12 214	12 649	13 010	13 277	13 808	13 745	14 405	14 592	14 710	15 498	15 285	15 540	15 210	14 777	14 367	12 867	13 571	11 935	12 909
Kiribati	all	97	40	94	146	187	193	127	111	103	129	110	208	121	68		100		253		327	32	276	253
	new S+	22	4	21	10	34	17	14										99	184		144	11	50	59
Rep. of Korea	all			81 910	89 803	98 532		91 572	85 669	87 169	88 789	87 419	74 460	70 012	63 904	57 864	48 070	46 999	38 155	33 196	31 134	26 202	30 008	23 936
	new B+			34 633	38 211	43 868	46 735	45 688	42 561	48 515	49 083	45 066	39 040	33 968	30 700	28 790	17 736	16 630	18 375	11 754	11 420	9957	10 359	9559
Lao PDR	all															1951	994	1905	1135	1307	1440	1923	2165	2437
	new S+															526	459	765	752	726	886	1234	1508	1719
Macao, China	all			442	1101	585		455	671	571	420	389	320	274	343	329	294	318	349	354	455	589	463	
	new B+													133	124	140	158	108	171	141	204	304	226	
Malaysia	all	10 264	10 441	11 094	11 168	10 970	11 894	11 634	10 577	10 569	10 735	11 068	10 944	10 686	10 873	11 059	11 420	12 075	11 708	11 778	12 902	13 539	14 115	14 908
	new B+	6050	6313	6622	6819	6766	7320	7251	6660	6682	6653	6924	6718	6711	6774	6752	6754	6954	6861	6688	7271	7596	7802	7960
N. Mariana Is.	all					26	75	74	58	64	16	49	27	28			67		46	40		93	97	66
	new S+					0	11	3	28	4	5	22					21		22	14		14	26	15
Marshall Is.	all	8	6	4	6	7	12	15	12	15	37	32	11	7			52	61			56		49	42
	new S+				5	4	6	6	7	8	4						14	12			17		11	17
Micronesia FS	all					67	73	75	66	60	97	77	68				111	151	171		94	108	138	102
	new S+					11	32	18	14	10	18						19	8	15		10	11	28	16

Country/Area		1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Mongolia	all	1075	1107	1123	1160	1094	1325	1514	1652	2994	2819	2433	2538	2233	1659	1611	1516	1418	1730	3010	3010	2987	2915	3348
	new S+									363	320	271	276	234	185	128	92	87	200	622	622	1171	1356	1513
Nauru	all																		4					
	new S+																		2					
New Caledonia	all				108	128	107	161	144	104	98	74	111	110	130	140	140	149	132		205		102	
	new S+						34	60						40	37	33	32	35	42		26		30	
New Zealand	all	608	595	542	474	448	437	415	402	359	320	296	295	303	348	335	317	274	352	307	323	328	367	348
	new S+									69	66	55	62					91	61	47	76	57	81	69
Niue	all																2	1	2	1	2	0	1	2
	new S+																	0	0	1	1	0		1
Palau	all	7	14	9	17	10	17	14	20	26	13	38	17	3		6		25	41	19	5	15		32
	new S+				10	5	2	6		4	0	4						8	11	9	4	7		20
Papua New Guinea	all	2212	2446	2232	2525	2418	2742	2954	3505	3678	2877	3235	4261	3396	2497	3401	2540	5516	5335	8041	5087	7977	11 291	12 189
	new S+	852	903	883	967	867	942	870	1061	870	606	839	1273	951	611	489		812	573	1652	652	1195	2107	1914
Philippines	all	107 108	118 587	108 813	112 307	116 821	104 715	106 300	151 863	151 028	153 129	163 740	183 113	217 272	317 008	207 371	236 172	174 189	180 044	235 496	276 295	208 301	159 866	145 807
	new S+				17 275	19 006	20 676	18 657	21 291	39 571	50 624	72 150	63 655	97 070				92 279	87 401	94 768	86 695	83 353	71 663	73 373
Pitcairn Is.	all																							
	new S+																							
Samoa	all	36	59	58	59	49	43	41	37			29	29	37	44		26	49	45	51	37	32	22	31
	new S+					32	30	25	20								2	21	18	15	10	14	7	17
Singapore	all	2760	2964	2800	2710	2425	2179	2065	2143	1952	1760	1616	1666	1617	1591		1512	1722	1677	1889	1889	1977	2120	1654
	new B+	1285	1375	1197	1266	1062	998	860	992	949	839	740	794	823	840		841		861	455	455	432	480	465
Solomon Is	all	355	411	452	266	313	324	302	337	377	292	334	372	488	382	309	364	367	332	352	289	318	295	289
	new S+	182	174	184	153	174	176	130	155	155	101	115	137	149	117	88	130	155	114	109	90	113	140	93
Tokelau	all						0		0	2		9	1		1		1		0	1	1			0
	new S+																0		0	1	1			0
Tonga	all	62	89	71	64	49	45	50	54	49	35	24	14	35	23	19	23	32	23	20	22	21	30	22
	new S+	29	41	28	32	18	25	23	25	23	18	12	7		16	17	17	16	17	9	16	12	16	10
Tuvalu	all			7	33	18	12	23	9	32	27	22	24	25	23	16	30	28	19	36			18	
	new S+				23	10	3	7	3	3	5	7	7	2	7	5	5	2	1	6			0	
Vanuatu	all	150	131	184	178	92	173	171	188	124	131	90	118	144	140	234	147	114	152	79		184	178	117
	new S+	57	52	52	59	34	49	55	55	51	36	26	46	39			84	41	62	30		66	38	43
Viet Nam	all		68 650	11 821	43 062	43 506	51 206	43 185	43 875	46 941	47 557	55 505	52 463	52 270	47 536	54 509	56 594	52 994	51 763	55 739	74 711	84 964	87 449	88 879
	new S+					33 243	33 014	32 612	30 426	34 217	30 381	34 530	39 486	35 095	30 728	35 865	38 659	36 534	35 613	37 550	48 911	53 647	54 873	53 805
Wallis & Futuna	all																4		11 4			14		
	new S+																		2 0			1		
Total	all	222 855	294 647	308 161	346 198	353 240	355 645	457 427	534 450	611 088	650 256	714 475	766 627	796 087	888 409	784 409	433 480	711 162	723 716	774 721	942 481	834 722	839 121	823 421
	new S+	22 917	22 934	57 388	78 049	118 202	148 558	150 982	161 230	208 493	226 410	186 522	178 366	199 654	9 4 522	100 286	184 312	267 476	282 061	314 624	352 935	375 801	393 244	393 801

Trend in Notified Cases (All Types and New Smeared-Positive Cases), 1977-1999 (Continued)

Country/Area		1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Am. Samoa	all	40.0	22.6	25.8	6.3	6.3	18.2	17.1	23.5	34.3	13.9	22.2	24.3	35.1	13.5	31.9	4.2		7.8		11.1		10.3		6.4
	new S+					0.0	18.2	8.6	17.7	25.7	5.6	13.9	8.1						2.0		5.6		10.3		4.8
Australia	all	9.9	8.8	9.0	10.6	9.9	9.3	8.4	7.9	8.4	6.8	5.7	5.6	5.8	5.7	6.0	5.6	5.8	5.6		5.9	5.9	6.3	4.9	5.8
	new S+	7.2	6.2	5.2	5.6	5.2	4.9	4.5	3.9	4.1	3.7							3.1	3.2				0.9	1.1	1.5
Brunei Darussalam	all	207.4		133.0	120.7	106.0	147.7	122.5	110.4	95.2	106.3	93.8	80.4	52.3		55.9			56.3						85.0
	new S+																		23.9						31.9
Cambodia	all							118.2	106.7	142.2	137.1	135.9	116.7	135.3	98.8	79.3	129.8	187.8	142.7	151.6	142.4	141.1	148.6	158.1	175.4
	new S+							84.1	74.9	76.5	70.7	114.7	92.0	104.4	73.0	62.6	101.3	150.1	102.8	110.9	108.3	114.6	120.6	129.4	143.4
China	all							9.6	11.5	14.4	21.4	25.2	29.6	33.0	33.1	33.1	32.7		28.8	30.1	29.3	38.0	33.7	36.4	36.3
	new S+							1.9	2.5	3.7	5.0	5.8							7.7	7.1	8.7	11.0	13.6	15.2	17.1
Cook Is.	all				166.7	205.6	58.8	105.6	161.1	105.3	180.0	85.0	94.1	88.2	5.0	5.9			70.6	31.6	21.1	5.3		0.0	10.4
	new S+																		23.5	21.1	5.3	0.0	0.0	5.2	0.0
Fiji	all	44.3	43.1	30.1	33.0	33.1	27.8	24.8	27.6	23.6	32.4	27.5	23.1	22.3	29.5	34.1	28.1	31.8		28.7	25.9	25.1	21.1	20.9	23.0
	new S+	20.9	24.3	16.6	18.4	17.5	15.0	14.9	11.8	11.7	13.9	11.9	10.0	8.9	10.3	11.2	8.4	9.9		7.8	8.7	8.7	8.2	9.3	7.8
Fr. Polynesia	all	80.9	68.4	55.3	55.5	49.0	38.7	31.2	39.5	45.6	46.9	44.1	37.1	33.9	32.2	33.3	27.1	44.9	39.4	41.4		38.4	40.1	46.2	40.1
	new S+	30.9	29.5	22.7	28.1	34.9	26.0	20.8	28.7	32.5	30.0	27.4	26.5	23.3	23.9		18.8	21.6	18.8	17.7		16.5	18.1	15.0	14.5
Guam	all	58.2	81.7	76.2	68.3	51.4	37.3	48.5	42.5	45.4	30.8	40.2	27.2	33.1	59.5	31.8			48.6	64.0					
	new S+																		36.8	27.2					
Hong Kong, China	all	176.2	156.3	140.9	161.3	158.1	148.6	144.8	137.8	145.2	137.2	135.1	129.8	123.2	115.6	112.2	106.5	110.8	112.7	109.0	103.4	110.4	111.7	115.2	106.4
	new S+										75.3	74.7	72.2	68.7	65.0	63.3	60.4		41.9			35.9	24.6	28.1	23.5
Japan	all	86.8	78.4	70.2	66.0	60.6	56.0	54.0	52.0	51.5	48.5	46.6	46.5	44.6	43.2	41.9	40.8	39.3	38.1	35.7	34.4	33.6	33.6	34.9	32.3
	new S+	11.9	11.7	11.5	11.1	10.5	10.4	10.7	10.9	11.1	11.4	11.3	11.9	12.0	12.0	12.5	12.3	12.5	12.2	11.8	11.5	10.3	10.8	9.5	10.2
Kiribati	all	505.5	173.2	71.4	162.1	243.3	306.6	321.7	208.2	179.0	163.5	201.6	169.2	315.2	177.9	100.0		140.9		328.6		408.8	39.5	340.6	297.6
	new S+	41.8	39.3	7.1	36.2	16.7	55.7	28.3	23.0										128.6	239.0		36.3	13.6	61.7	69.4
Rep. of Korea	all				217.8	235.6	254.5		229.2	211.1	211.5	212.1	207.7	177.4	165.2	149.3	134.0	110.3	106.7	105.5	73.8	68.5	57.3	65.1	51.5
	new S+				92.1	100.2	113.3	118.8	114.4	104.9	117.7	117.2	107.1	93.0	80.2	71.8	66.7	40.7	37.7	41.2	26.1	25.1	21.8	22.5	50.6
Lao PDR	all																45.4	22.6	41.4	24.0	26.8	28.7	37.0	41.9	44.1
	new S+																12.2	10.4	16.6	15.9	14.9	17.6	23.8	29.2	31.1
Macao, China	all				410.8	196.3		149.7	217.2	145.7	100.7	94.0	72.1	59.6	75.9	69.6	77.2	82.8	87.7	83.5	107.8	130.6	100.9		
	new S+													28.9	27.4	29.6	41.5	28.1	43.0	33.3	48.3	67.4	49.2		
Malaysia	all	88.8	80.2	79.7	82.8	81.2	77.8	82.0	78.3	69.6	66.6	66.6	66.1	64.5	61.6	60.8	60.3	60.8	62.7	59.4	58.5	62.7	64.4	65.9	68.1
	new S+	52.9	47.3	48.2	49.4	49.6	48.0	50.5	48.8	43.8	42.1	41.3	41.3	39.6	38.7	37.9	36.9	36.1	36.6	34.8	33.2	35.3	36.1	36.4	36.4
N. Mariana Is.	all						152.9	441.2	435.3	305.3	320.0	80.0	136.1	71.1	73.7			145.7		97.9	85.1		189.9	138.7	94.3
	new S+						0.0	64.7	17.7	147.4	20.0	25.0	61.1					45.7		46.8	29.8		29.8	37.2	21.4
Marshall Is.	all	65.4	29.6	21.4	14.3	19.4	21.9	37.5	45.5	34.3	53.6	127.6	106.7	25.6	17.5			106.1	119.6			101.8		81.3	66.7
	new S+					16.1	12.5	18.8	18.2	20.0	28.6	13.8						28.6	23.5			30.9		18.2	27.0
Micronesia FS	all							93.1	100.0	85.2	72.5	63.8	103.2	79.4	71.6			102.8	151.0	171.0		73.4	83.1	121.0	74.5
	new S+							15.3	43.8	20.5	15.4	10.6	19.2					17.6	8.0	15.0		7.8	8.5	24.5	11.7

Country/Area		1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Mongolia	all	76.3	71.2	71.4	70.2	70.7	65.1	77.0	85.5	91.3	161.8	148.4	124.8	126.9	109.5	79.0	74.9	69.2	63.9	76.9	124.9	124.9	116.3	113.0	124.9
	new S+										19.6	16.8	13.9	13.8	11.5	8.8	6.2	4.2	3.9	8.9	25.8	25.8	45.6	52.6	56.5
Nauru	all																			36.4					
	new S+																			18.2					
New Caledonia	all					77.7	89.5	72.3	111.0	94.7	69.3	66.2	48.1	69.4	68.8	79.3	83.8	81.9	85.1	74.2		111.4		49.4	
	new S+							23.0	41.4						25.0	22.6	19.8	18.7	20.0	23.6		14.1		14.5	
New Zealand	all	19.7	19.6	19.2	17.5	15.3	14.5	13.7	13.0	12.2	11.2	9.7	9.0	8.9	8.9	10.2	9.9	9.1	7.8	10.1	8.6	8.9	9.0	9.7	9.4
	new S+										2.2	2.0	1.7	1.9					2.6	1.7	1.3	2.1	1.6	2.1	1.9
Niue	all																	66.7	50.0	100.0	50.0	100.0	0.0	51.4	100.0
	new S+																		0.0	0.0	50.0	50.0	0.0	0.0	50.0
Palau	all	38.5	50.0	100.0	64.3	113.3	66.7	141.7	100.0	153.9	216.7	92.9	271.4	121.4	25.0		50.0		156.3	256.3	111.8	29.4	88.2		177.8
	new S+					66.7	33.3	16.7	42.9		33.3	0.0	28.6						50.0	68.8	52.9	23.5	41.2		111.1
Papua New Guinea	all	64.8	79.0	84.3	77.0	84.2	78.0	83.1	84.4	106.2	108.2	84.6	89.9	118.4	87.1	67.5	89.5	65.1	134.5	130.1	186.9	115.6	177.3	245.5	259.0
	new S+		30.4	31.1	30.5	32.2	28.0	28.6	24.9	32.2	25.6	17.8	23.3	35.4	24.4	16.5	12.9		19.8	14.0	38.4	14.8	26.6	45.8	40.7
Philippines	all	338.4	238.0	260.5	233.6	233.5	235.9	204.2	204.2	284.4	276.3	273.5	278.9	308.0	361.5	515.6	329.7	377.5	268.8	272.0	348.5	400.6	294.5	219.2	198.1
	new S+					35.9	38.4	40.3	35.8	39.9	72.4	90.4	122.9	107.1	161.5				142.4	132.0	140.2	125.7	117.9	98.2	99.7
Pitcairn Is.	all																								
	new S+																								
Samoa	all	52.0	23.4	37.8	36.7	36.7	31.4	27.4	25.5	22.7			18.0	18.0	21.8	27.2		16.2	29.3	26.6	29.8	21.3	19.0	12.6	18.0
	new S+						20.5	19.1	15.5	12.3								1.2	12.6	10.7	8.8	5.7	8.3	4.0	9.9
Singapore	all	122.7	118.7	125.9	117.5	112.3	99.3	88.2	82.5	84.4	76.3	68.0	61.8	62.9	60.2	58.9		53.7	61.7	59.5	66.3	66.3	57.5	61.0	46.7
	new S+	59.4	55.3	58.4	50.2	52.4	43.5	40.4	34.4	39.1	37.1	32.4	28.3	30.0	30.7	31.1		29.8		30.5	16.0	16.0	12.6	13.8	13.1
Solomon Is.	all	153.5	171.5	192.1	204.5	117.7	134.3	129.6	116.6	125.3	139.6	102.1	115.6	121.6	152.5	120.1	93.9	109.0	103.7	90.7	93.1	73.9	78.8	70.7	67.2
	new S+	93.5	87.9	81.3	83.3	67.7	74.7	70.4	50.2	57.6	57.4	35.3	39.8	44.8	46.6	36.8	26.8	38.9	43.8	31.2	28.8	23.0	28.0	33.6	21.6
Tokelau	all							0.0		0.0	100.0		450.0	50.0		50.0		50.0		0.0	50.0	50.0			0.0
	new S+																	0.0		0.0	50.0	50.0			0.0
Tonga	all	74.4	68.1	94.7	74.7	68.8	52.1	45.5	48.1	56.3	49.5	36.1	25.3	14.6	29.2	23.2	19.0	23.0	32.7	23.5	20.2	22.2	21.2	30.6	22.0
	new S+	24.4	31.9	43.6	29.5	34.4	19.2	25.3	22.1	26.0	23.2	18.6	12.6	7.3		16.2	17.0	17.0	16.3	17.4	9.1	16.2	12.1	16.3	10.0
Tuvalu	all				100.0	471.4	225.0	150.0	287.5	112.5	400.0	337.5	275.0	300.0	312.5	287.5	200.0	375.0	311.1	211.1	276.9			161.9	
	new S+					328.6	125.0	37.5	87.5	37.5	37.5	62.5	87.5	87.5	25.0	87.5	62.5	62.5	22.2	11.1	46.2			0.0	
Vanuatu	all	220.6	151.5	128.4	162.8	154.8	76.7	139.5	133.6	144.6	94.7	97.0	62.1	78.7	90.0	95.9	156.0	96.1	73.1	92.1	46.7		103.4	98.1	62.6
	new S+	69.1	57.6	51.0	46.0	51.3	28.3	39.5	43.0	42.3	38.9	26.7	17.9	30.7	24.4			54.9	26.3	37.6	17.8		37.1	20.9	23.0
Viet Nam	all	115.3		133.8	22.5	80.2	79.3	91.4	75.6	75.3	77.9	77.0	85.5	81.7	80.9	72.0	80.5	81.9	74.3	71.0	74.8	98.1	111.0	112.7	112.2
	new S+						60.6	59.0	57.1	52.2	56.7	49.2	53.2	61.5	54.3	46.6	53.0	56.0	51.2	48.9	50.4	64.2	70.1	70.7	67.9
Wallis & Futuna	all																	28.6		78.6	28.6		93.3		
	new S+																			14.3	0.0		6.7		
Total	all																		45.7	45.5	48.2	58.0	50.9	50.6	49.2
	new S+																			16.6	17.5	19.6	21.7	22.9	23.7

Countries	Population (x 1000)	Pulmonary						Extrapulmonary		Total All Types	
		Sputum Positive			Sputum Negative				% out of Total		
		New	% out of Total	% out of of new Pulmonary	Relapse		% out of Total				
						% of all SS+ out of all Pulmonary					
American Samoa	63	3			0		0	1		4	
Australia	18 641	285	26.6	50.2	19	51.8	283	26.4	389	36.3	1073
Brunei Darussalam	320	102			5		111		54		272
Cambodia	10 981	15 744	81.7	95.6	792	95.8	725	3.8	2005	10.4	19 266
China*	1 265 979	212 426	46.2	51.9	18 200	53.9	196 873	42.8		0.0	460 169
Cook Islands	20	-	0.0	0.0	1	50.0	1	33.3	1	33.3	3
Fiji	834	65	33.9	43.0	-	43.0	86	44.8	41	21.4	192
French Polynesia	227	33	35.5	51.6	5	55.1	31	33.3	24	25.8	93
Hong Kong, China	6660	1566	22.1	34.3	229	37.4	3003	42.4	734	10.4	7087
Japan	126 187	12 909	31.6	42.7	1573	45.5	17 358	42.5	7095	17.4	40 800
Kiribati	85	59	23.3	60.8	10	64.5	38	15.0	110	43.5	253
Republic of Korea	46 505	9559	39.9	44.6	2501	50.4	11 876	49.6		0.0	23 936
Lao PDR	5 525	1719	70.5	77.5	55	78.0	499	20.5	164	6.7	2437
Malaysia	21 877	7960	53.4	61.6	0	61.6	4966	33.3	1982	13.3	14 908
N. Mariana Is.	70	15	22.7	26.3	0	26.3	42	63.6	5	7.6	66
Marshall Is.	63	17	40.5	47.2	0	47.2	19	45.2	6	14.3	42
Micronesia FS	137	16	15.7	27.6	-	27.6	42	41.2	19	18.6	102
Mongolia	2680	1513	45.2	66.4	127	68.1	767	22.9	941	28.1	3348
New Zealand	3719	69	19.8	41.3	11	44.9	98	28.2	111	31.9	348
Niue	2	1	50.0	50.0	-	50.0	1	50.0	-	0.0	2
Palau	18	20	62.5	64.5	-	64.5	11	34.4	1	3.1	32
Papua New Guinea	4706	1914	15.7	41.5	38	42.0	2695	22.1	4979	40.8	12 189
Philippines	73 601	73 373	50.3	54.9	12 059	58.6	60 260	41.3	115	0.1	145 807
Samoa	172	17	54.8	70.8	-	70.8	7	22.6	7	22.6	31
Singapore	3541	465	28.1	33.4	99	37.8	929	56.2	138	8.3	1654
Solomon Islands	430	93	32.2	44.5		44.5	116	40.1		0.0	289
Tokelau	2	-			-		-		-		
Tonga	100	10	45.5	58.8	1	61.1	7	31.8	4	18.2	22
Vanuatu	187	43	36.8	48.9	1	49.4	45	38.5	28	23.9	117
Viet Nam	79 228	53 805	60.5	75.2	5400	77.0	17 729	19.9	11 945	13.4	88 879
Total	1 672 560	393 801	47.8	55.3	22 109	56.6	318 618	38.7	30 899	3.8	823 421

*China did not report extrapulmonary cases; **Malaysia did not report relapses.

Countries	New SS+ Males								New SS+ Females								New SS+ Males and Females							
	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Total	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Total	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Total
Australia	1	26	29	17	19	17	51	160	4	20	27	19	10	8	37	125	5	46	56	36	29	25	88	285
Cambodia	41	525	1389	1734	1645	1578	1089	8001	51	445	1229	1861	1857	1448	852	7743	92	970	2618	3595	3502	3026	1941	15 744
China	1247	18 961	29 328	25 095	24 239	21 564	21 367	14 1801	1431	15 178	18 846	12 370	9838	7131	5663	70 457	2678	34 139	48 174	37 465	34 077	28 695	27 030	212 258
Fiji	1	13	7	5	8	3	3	40	0	5	7	5	2	5	1	25	1	18	14	10	10	8	4	65
French Polynesia	0	2	2	2	1	2	4	13	4	2	2	4	2	3	3	20	4	4	4	6	3	5	7	33
Hong Kong, China*	3	76	104	139	149	200	371	1042	7	73	94	62	43	37	162	478	10	149	198	201	192	237	533	1520
Japan*	6	290	623	706	1605	1768	4117	9115	7	236	459	253	292	419	2128	3794	13	526	1082	959	1297	2187	6245	12 309
Kiribati	2	6	4	2	4	4	3	25	1	9	9	6	2	3	4	34	3	15	13	8	6	7	7	59
Republic of Korea	27	884	1205	1180	871	962	1136	6265	40	704	653	402	256	306	933	3294	67	1588	1858	1582	1127	1268	2069	9559
Lao PDR*	5	88	174	187	215	197	193	1059	8	65	114	143	140	96	93	659	13	153	289	330	355	293	286	1719
Mongolia	12	213	314	178	63	34	26	840	25	205	252	113	43	18	17	673	37	418	566	291	106	52	43	1513
New Zealand	1	10	8	4	3	8	15	49	1	6	7	2	3	0	1	20	2	16	15	6	6	8	16	69
Niue	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
Palau	0	2	2	5	1	2	1	13	0	1	3	1	0	2	0	7	0	3	5	6	1	4	1	20
Papua New Guinea*	1	33	25	9	8	3	0	79	0	32	20	13	6	0	1	72	1	65	45	22	14	3	0	150
Samoa	0	1	2	0	1	1	4	9	0	3	2	1	0	0	2	8	0	4	4	1	1	1	6	17
Singapore	0	18	23	41	72	55	124	333	0	12	21	18	23	17	29	120	0	30	44	59	95	72	153	453
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	1	0	0	1	3	2	7	0	1	0	0	0	2	0	3	0	2	0	0	1	5	2	10
Vanuatu	0	0	4	1	2	0	0	7	0	2	10	4	1	0	0	17	0	2	14	5	3	0	0	24
Viet Nam	58	2254	6355	8392	6465	5530	7321	36 375	68	1361	2511	3029	2549	3034	4828	17 380	126	3615	8866	11 421	9014	8564	12 199	53 805
TOTAL	1405	23 404	39 598	37 697	35 372	31 931	35 827	205 234	1647	18 360	24 266	18 306	15 067	12 529	14 754	104 929	3052	41 764	63 864	56 003	50 439	44 460	50 581	310 163
Percent	0.68	11.40	19.29	18.37	17.23	15.56	17.46	100.00	1.57	17.50	23.13	17.45	14.36	11.94	14.06	100.00	0.98	13.47	20.59	18.06	16.26	14.33	16.31	100.00

*Only data from DOTS areas were reported.

Countries	New SS+ Males								New SS+ Females								New SS+ Males and Females							
	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Total	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Total	0-14	15-24	25-34	35-44	45-54	55-64	>=65	Total
Australia	0.0	0.8	1.5	1.3	1.1	1.9	3.3	1.2	0.1	1.5	1.7	1.1	0.7	0.3	1.9	1.0	0.1	1.1	1.6	1.2	0.9	1.1	2.5	1.101
Cambodia	1.6	53.1	156.1	259.8	439.0	769.0	802.5	135.6	1.3	44.1	132.0	231.5	376.1	503.3	339.1	123.4	1.4	48.6	143.8	244.6	403.7	605.3	506.4	129.3
China	0.9	18.2	23.5	27.1	35.5	48.7	55.5	21.6	1.0	15.5	16.8	14.6	15.3	17.2	13.4	11.8	0.9	16.9	20.2	21.1	25.8	33.5	32.9	16.831
Cook Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	115.8	0.0	0.0	0.0	10.5	0.0	0.0	0.0	57.0	0.0	0.0	0.0	5.193
Fiji	0.0	8.2	18.3	13.7	23.2	17.7	12.7	9.6	1.6	12.4	17.2	8.0	11.6	13.3	12.0	8.9	0.8	10.2	17.8	10.9	17.4	15.5	12.3	9.295
French Polynesia	0.0	19.0	20.0	20.0	10.0	71.4	99.9	17.9	7.9	4.8	11.1	35.7	11.1	0.0	20.0	11.8	3.9	11.9	15.8	27.6	10.5	38.4	55.5	14.969
Hong Kong, China	1.2	12.5	18.3	25.0	40.2	91.4	169.2	38.2	1.0	15.8	18.9	11.3	12.2	18.9	56.2	17.2	1.1	14.0	18.6	18.4	27.2	58.2	108.1	28.062
Japan	0.0	3.4	6.9	9.3	17.3	24.7	52.5	15.3	0.1	2.9	5.0	3.0	3.6	5.9	19.2	6.1	0.0	3.1	6.0	6.2	10.5	15.0	33.1	10.615
Kiribati	5.7	68.3	170.7	51.2	153.6	102.4	102.4	61.0	11.4	89.6	85.3	76.8	256.0	51.2	102.4	60.0	8.5	78.3	128.0	64.0	204.8	76.8	102.4	60.465
Republic of Korea	0.3	23.0	30.1	34.1	41.1	61.4	108.7	29.5	0.8	19.2	16.8	12.0	10.0	20.7	52.7	15.3	0.5	21.2	23.6	23.2	25.7	40.2	73.6	22.466
Lao PDR	0.3	16.6	45.2	62.7	107.9	206.0	226.3	36.5	0.6	12.6	35.8	48.1	62.8	78.7	77.2	22.1	0.5	14.6	40.5	55.3	84.8	139.2	143.1	29.207
Macao	0.0	37.3	73.0	87.8	80.7	229.3	458.5	82.7	1.8	31.6	27.2	45.0	25.6	26.8	114.6	32.0	0.9	34.5	46.7	66.2	55.9	132.4	252.2	56.86
Malaysia	0.8	33.7	63.9	82.5	102.8	80.9	336.5	50.2	1.2	27.4	31.6	29.8	39.3	29.1	86.3	22.4	1.0	30.6	47.9	55.5	71.2	54.7	198.2	36.442
N. Mariana Is.	0.0	0.0	107.2	107.2	178.7	143.0	143.0	51.5	0.0	42.9	95.3	35.7	0.0	0.0	0.0	22.9	0.0	21.4	102.1	71.5	119.2	71.5	71.5	37.178
Marshall Is.	0.0	33.2	0.0	33.2	49.8	99.5	0.0	16.6	0.0	16.6	74.6	33.2	0.0	99.5	0.0	19.9	0.0	24.9	37.3	33.2	24.9	99.5	0.0	18.243
Micronesia FS	17.3	43.2	30.8	60.8	24.5	0.0	275.6	37.3	9.1	9.0	0.0	16.3	58.8	0.0	0.0	10.9	13.3	26.5	16.3	39.4	40.1	0.0	137.8	24.545
Mongolia	3.4	78.8	117.3	110.8	89.9	60.1	52.2	58.6	6.7	61.1	103.3	79.5	44.3	38.7	27.2	46.5	5.0	70.1	110.3	95.0	67.1	49.3	38.0	52.577
New Caledonia	0.0	35.3	24.2	15.1	18.1	30.2	90.6	21.0	0.0	20.1	12.1	7.6	30.2	0.0	36.3	11.8	0.0	27.7	18.1	11.3	23.9	15.1	63.5	16.481
New Zealand	0.2	2.8	3.4	2.9	3.1	4.5	2.1	2.4	0.0	4.0	2.0	2.8	0.9	2.5	2.0	1.9	0.1	3.4	2.7	2.9	2.0	3.5	2.1	2.133
Papua New Guinea	1.0	14.5	14.8	12.1	14.8	13.8	6.1	8.8	1.3	21.1	15.0	12.2	12.4	3.0	1.4	9.3	1.1	17.7	14.9	12.1	13.6	8.4	3.7	9.044
Philippines	0.0	2.1	5.2	8.4	9.6	12.7	7.0	3.7	0.0	1.1	2.0	2.8	4.0	4.0	4.1	1.5	0.0	1.6	3.6	5.6	6.8	8.3	5.4	2.589
Samoa	3.0	4.6	6.9	0.0	19.3	24.1	0.0	5.5	0.0	5.3	8.8	0.0	0.0	0.0	0.0	2.4	1.6	4.9	7.7	0.0	9.6	12.0	0.0	4.012
Singapore	0.2	3.8	11.1	20.4	28.9	69.1	99.9	20.8	0.5	2.7	5.5	3.2	9.4	21.1	26.9	6.7	0.4	3.3	8.3	11.9	19.2	45.0	59.9	13.81
Solomon Islands	4.3	33.8	30.1	76.5	145.3	84.7	193.7	37.3	2.3	33.9	57.4	53.8	88.8	84.7	16.1	30.1	3.3	33.8	43.2	65.4	117.0	84.7	104.9	33.803
Tonga	0.0	18.7	44.2	20.6	68.7	51.5	206.1	22.2	4.7	10.3	0.0	0.0	0.0	51.5	206.1	10.3	2.3	14.7	22.1	10.3	34.4	51.5	206.1	16.327
Vanuatu	5.0	23.1	40.9	10.9	0.0	65.4	65.4	17.4	5.3	30.6	67.9	39.2	16.3	0.0	32.7	24.5	5.2	26.7	54.9	25.8	8.2	32.7	49.0	20.935
Viet Nam	0.4	29.8	96.9	205.1	288.8	348.8	459.2	94.2	0.4	17.1	41.2	61.3	101.4	159.7	188.7	43.6	0.4	23.6	69.4	127.4	187.0	244.8	295.1	68.522
WPR Total	0.7	17.5	26.1	33.1	40.6	55.3	70.9	24.8	0.9	14.4	17.4	16.7	18.0	22.5	23.7	13.4	0.8	16.0	21.9	25.1	29.6	39.2	44.9	19.194

*Only data from DOTS areas were reported.



WORLD HEALTH ORGANIZATION

Regional Office for the Western Pacific

Stop TB

United Nations Avenue

1000 Manila, Philippines

Fax No.: (63-2) 521-1036

Tel. No.: (63-2) 528-8001

E-mail: stoptb@wpro.who.int

Website: <http://www.who.org.ph>