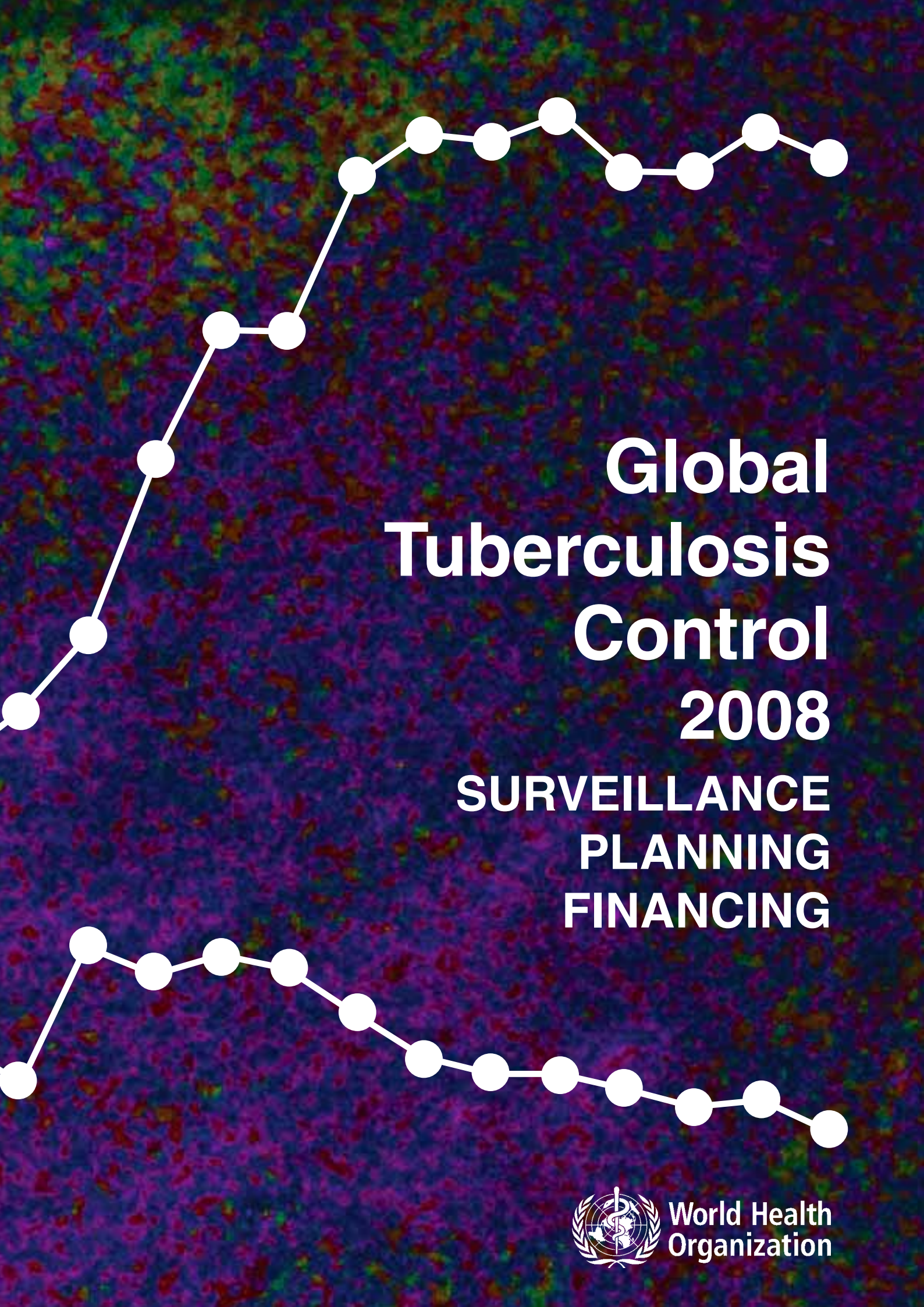

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Cover design by Chris Dye. The disintegration of the Union of Soviet Socialist Republics in 1991 had dire consequences for the control of tuberculosis. From 1992, the number of cases reported to WHO continued to decline in western and central European countries (lower series) but increased steeply in the newly independent states (upper series). This resurgence was probably due to failures in tuberculosis control, but also to other biological, social and economic factors influencing transmission of infection and susceptibility to disease (see Section 1.8.2). The cover image shows the bifurcation in European case notifications layered on a colour-saturated image of stains used in sputum-smear microscopy, including carbol fuchsin and methylene blue.

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Contents

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Abbreviations

ACSM	advocacy, communication and social mobilization
AFB	acid-fast bacilli
AFR	WHO African Region
AFRO	WHO Regional Office for Africa
AIDS	acquired immunodeficiency syndrome
AMR	WHO Region of the Americas
AMRO	WHO Regional Office for the Americas
ART	antiretroviral therapy
BMU	basic management unit
BPHS	basic package of health-care services
BRAC	Bangladesh Rural Advancement Committee
CAREC	Caribbean Epidemiology Centre
CDC	Centers for Disease Control and Prevention
CHW	community health worker
CPT	co-trimoxazole preventive therapy
CTBC	community-based TB care
DoH	Department of Health
DOT	directly observed treatment
DOTS	the internationally recommended strategy for TB control
DRS	drug resistance surveillance or survey
DST	drug susceptibility testing
EMR	WHO Eastern Mediterranean Region
EMRO	WHO Regional Office for the Eastern Mediterranean
EQA	external quality assurance
EUR	WHO European Region
EURO	WHO Regional Office for Europe
FDC	fixed-dose combination (or FDC anti-TB drug)
FIDELIS	Fund for Innovative DOTS Expansion, managed by IUATLD
GDF	Global TB Drug Facility
GDP	gross domestic product
GHW	General health worker
GLC	Green Light Committee
Global Plan	*The Global Plan to Stop TB, 2006–2015*
GNI	gross national income
HBC	high-burden country of which there are 22 that account for approximately 80% of all new TB cases arising each year
HIV	human immunodeficiency virus
HRD	human resource development
IEC	information, education, communication
IHC	Integrated HIV Care (a programme of the Union)
IPT	isoniazid preventive therapy
ISAC	Intensified support and action in countries, an emergency initiative to reach targets for DOTS implementation by 2005
ISTC	International standards for tuberculosis care
JICA	Japan International Cooperation Agency
KAP	knowledge, attitudes and practice
LACEN	Brazilian public health laboratories
LGA	local government area
LHW	lady health workers
LQAS	Laboratory quality assurance services
MDG	Millennium Development Goal
MDR	multidrug resistance (resistance to, at least, isoniazid and rifampicin)
MDR-TB	multidrug-resistant tuberculosis
MoH	Ministry of Health
NAP	national AIDS control programme or equivalent
NGO	nongovernmental organization
NRHM	National Rural Health Mission
NRL	national reference laboratory
NTP	national tuberculosis control programme or equivalent
PAHO	Pan-American Health Organization
PAL	Practical Approach to Lung Health
PATH	Program for Appropriate Technology in Health
PHC	primary health care
PhilTIPS	Philippine Tuberculosis Initiatives for the Private Sector
PPM	public–private or public–public mix
SEAR	WHO South-East Asia Region
SEARO	WHO Regional Office for South-East Asia
SINAN	Brazilian national disease information system
SOP	standard operating procedures
SRLN	supranational reference laboratory network
SUS	Unified Health System for Brazil
SWAp	sector-wide approach
TB	tuberculosis
TB CAP	Tuberculosis Control Assistance Program
UNAIDS	Joint United Nations Programme on HIV/AIDS

UNDP	United Nations Development Programme
UNHCR	United Nations High Commission for Refugees
UNITAID	international facility for the purchase of drugs to treat HIV/AIDS, malaria and TB
the Union	International Union Against Tuberculosis and Lung Disease
USAID	United States Agency for International Development
VCT	voluntary counselling and testing for HIV infection
WHO	World Health Organization
WPR	WHO Western Pacific Region
WPRO	WHO Regional Office for the Western Pacific
XDR-TB	TB due to MDR strains that are also resistant to a fluoroquinolone and at least one second-line injectable agent (amikacin, kanamycin and/or capreomycin)

Summary

Tuberculosis (TB) is a major cause of illness and death worldwide, especially in Asia and Africa. Globally, 9.2 million new cases and 1.7 million deaths from TB occurred in 2006, of which 0.7 million cases and 0.2 million deaths were in HIV-positive people. Population growth has boosted these numbers compared with those reported by the World Health Organization (WHO) for previous years. More positively, and reinforcing a finding first reported in 2007, the number of new cases per capita appears to have been falling globally since 2003, and in all six WHO regions except the European Region where rates are approximately stable. If this trend is sustained, Millennium Development Goal 6, to have halted and begun to reverse the incidence of TB, will be achieved well before the target date of 2015. Four regions are also on track to halve prevalence and death rates by 2015 compared with 1990 levels, in line with targets set by the Stop TB Partnership. Africa and Europe are not on track to reach these targets, following large increases in the incidence of TB during the 1990s. At current rates of progress these regions will prevent the targets being achieved globally.

The Stop TB Strategy is WHO's recommended approach to reducing the burden of TB in line with global targets. The Global Plan of the Stop TB Partnership details the scale at which the six components of the strategy should be implemented if the global targets are to be achieved. To date, progress has been mixed. The first component of the strategy – the detection and treatment of new cases in DOTS programmes – fares best. Globally, the rate of case detection for new smear-positive cases reached 61% in 2006 (compared with the target of at least 70%) and the treatment success rate improved to 84.7% in 2005, just below the target of 85%. Progress in the implementation and planning of other parts of the strategy ranges from major – with provision of TB/HIV interventions for TB patients in the African Region – to minor – with a need for improved guidance on advocacy, communication and social mobilization (ACSM) activities, and more ambitious planning for treatment of patients with multidrug-resistant TB (MDR-TB), in the European, South-East Asia and Western Pacific regions.

Available funding for TB control in 2008 peaked at US$ 3.3 billion across 90 countries (with 91% of global cases) that reported data, up from less than US$ 1 billion in 2002. Nonetheless, these same countries reported funding gaps totalling US$ 385 million in 2008; only five of the 22 high-burden countries reported no funding gap. The gap between the funding reported to be available by countries and the funding requirements estimated to be needed for the same countries in the Global Plan is larger still: US$ 1 billion. This is mainly due to the higher funding requirements for collaborative TB/HIV activities, management of MDR-TB and ACSM in the Global Plan, compared with country reports.

Progress in case detection slowed globally in 2006 and began to stall in China and India. The detection rate in the African Region remains low in absolute terms. Budgets stagnated between 2007 and 2008 in all but five of the 22 high-burden countries. Incidence rates are falling slowly compared with the 5–10% decline annually that is theoretically feasible. Renewed effort to accelerate progress in global TB control in line with the expectations of the Global Plan, supported by intensified resource mobilization from domestic and donor sources, is needed.

Key points

The global burden of TB

1. There were an estimated 9.2 million new cases of TB in 2006 (139 per 100 000 population), including 4.1 million new smear-positive cases (44% of the total) and 0.7 million HIV-positive cases (8% of the total). This is an increase from 9.1 million cases in 2005, due to population growth. India, China, Indonesia, South Africa and Nigeria rank first to fifth respectively in terms of absolute numbers of cases. The African Region has the highest incidence rate per capita (363 per 100 000 population).

2. There were an estimated 14.4 million prevalent cases of TB in 2006.

3. There were an estimated 0.5 million cases of multidrug-resistant TB (MDR-TB) in 2006.

4. In 2006 there were an estimated 1.5 million deaths from TB in HIV-negative people and 0.2 million among people infected with HIV.

5. In 2007, a total of 202 (out of 212) countries and territories reported TB notification data for 2006 to WHO. A total of 5.1 million new cases (out of the estimated 9.2 million new cases) were notified for 2006 among these 202 countries and territories, of which 2.5 million (50%) were new smear-positive cases. The African, South-East Asia and Western Pacific regions accounted for 83% of total case notifications.

Targets and strategies for TB control

6. Targets for global TB control have been set within the framework of the Millennium Developments Goals (MDGs). MDG 6 Target 6.C is to halt and reverse incidence by 2015. The Stop TB Partnership has set two additional impact targets, which are to halve prevalence and death rates by 2015 compared with their level in 1990. The outcome targets first set by the World Health Assembly in 1991 are to detect at least 70% of new smear-positive cases in DOTS programmes and to successfully treat at least 85% of detected cases. All five targets have been adopted by the Stop TB Partnership and, in 2007, were recognized in a World Health Assembly resolution (WHA 60.19).

7. The Stop TB Strategy launched by WHO in 2006 is designed to achieve the 2015 impact targets as well as the targets for case detection and treatment success. The Global Plan, launched in January 2006, details the scale at which the six components of the Stop TB Strategy should be implemented to achieve these targets, and the funding required, for each year 2006–2015.

8. The Stop TB Strategy has six major components: (i) DOTS expansion and enhancement; (ii) addressing TB/HIV, MDR-TB and other challenges; (iii) contributing to health system strengthening; (iv) engaging all care providers; (v) empowering patients, and communities; and (vi) enabling and promoting research.

Implementing the Stop TB Strategy

DOTS expansion and enhancement

9. DOTS was being implemented in 184 countries that accounted for 99% of all estimated TB cases and 93% of the world's population in 2006. A total of 4.9 million new cases of TB were notified by DOTS programmes in 2006 (98% of the total of 5.1 million new cases notified globally), including 2.5 million new smear-positive cases (99% of the total notified globally). Between 1995 (when reliable records began) and 2006, a total of 31.8 million new and relapse cases, and 15.5 million new smear-positive cases were notified by DOTS programmes.

Addressing TB/HIV, MDR-TB and other challenges

10. There has been considerable progress in HIV testing among TB patients, and in provision of co-trimoxozole preventive therapy (CPT) and antiretroviral therapy (ART) to HIV-positive TB patients.

11. Almost 700 000 TB patients were tested for HIV in 2006 among all reporting countries, up from 470 000 in 2005 and 22 000 in 2002. The numbers tested in 2006 are equivalent to 12% of TB case notifications globally, and 22% of notified cases in the African Region. Among 11 African countries with over 50% of the world's HIV-positive TB cases that reported data for all years 2002–2006, the percentage of notified cases that were tested quadrupled, from 8% to 35%. Rwanda (76%), Malawi (64%) and Kenya (60%) achieved the highest testing rates, which are also ahead of the 51% target set for the African Region in the Global Plan.

12. The number of HIV-positive TB patients treated with CPT reached 147 000 in 2006, equivalent to 78% of the HIV-positive TB patients that were identified

through testing and 2.5 times higher than the 58 000 patients treated with CPT in 2005. The number started on CPT is less than the 0.5 million specified in the Global Plan for 2006; numbers could be increased if more countries emulated the high testing rates of countries such as Rwanda, Malawi and Kenya.

13. The number of HIV-positive TB patients enrolled on ART was 67 000 in 2006, more than double the 29 000 reported for 2005 and seven times the 9 800 reported in 2004, but less than the 220 000 target for 2006 in the Global Plan. The proportion of diagnosed HIV-positive TB patients enrolled on ART was 41% compared with the 44% target for 2006 in the Global Plan; as with CPT, one reason why numbers fall short of the Global Plan is that HIV testing rates are not yet high enough.

14. Implementation of interventions to reduce the burden of TB in HIV-positive people was far below the targets set in the Global Plan in 2006. The Global Plan target for 2006 was to screen 11 million HIV-positive people for TB disease; the actual figure reported was 314 211. Only 27 000 HIV-positive people without active TB were started on IPT (0.1% of the 33 million people estimated to be infected with HIV), almost all of whom were in Botswana.

15. A total of 23 353 cases of MDR-TB were notified in 2006, of which just over half were in the European Region. Among these notified cases, only the 2 032 cases reported from projects and programmes approved by the Green Light Committee (GLC) are known to have been enrolled on treatment that meets the standards established in WHO guidelines.

16. The total number of MDR-TB cases that countries forecast will be enrolled on treatment in 2007 and 2008 is about 50 000 in both years. Projections for 2008 are much less than the target of 98 000 that was set in the Global MDR-TB/XDR-TB Response Plan. Most of the shortfall is in the European, South-East Asia and Western Pacific regions, and within these regions in China and India in particular. Major expansion of services that meet the standards established in WHO guidelines is needed.

Health system strengthening; engaging all care providers

17. Implementation of components 3–6 of the Stop TB Strategy is currently less well understood than for components 1 and 2, because the available data are more limited.

18. In the area of health system strengthening (component 3), diagnosis and treatment of TB is fully integrated into general health services in most countries. Links with general health sector or development planning frameworks are variable, but alignment with sector-wide approaches was comparatively good among reporting countries. The Practical Approach to Lung Health is being piloted or expanded nationwide in 15 countries, and is included in the plans of 73 countries. Many countries lack comprehensive plans for human resource development or a recent assessment of staffing needs.

19. Among the 22 high-burden countries (HBCs) that collectively account for 80% of TB cases globally, 14 are scaling up public–private and public–public mix approaches to involve the full range of care providers in TB control, and seven have used the International Standards for Tuberculosis Care to facilitate this process. However, the contribution of different providers to detection, referral and treatment of cases will remain unclear until recording and reporting forms recommended by WHO are more widely introduced.

Empowering patients, and communities; enabling and promoting research

20. Surveys of Knowledge, Attitudes and Practice (KAP) have been conducted in 13 of the 22 HBCs to help with the design of advocacy, communication and social mobilization (ACSM) activities. However, ACSM is still a new area for many countries, and much more guidance and technical support are necessary. Involvement of communities in TB care was reported by 20 of the 22 HBCs. Operational research (part of component 6) was reported by 49 countries.

Financing TB control

21. The total budgets of national TB control programmes (NTPs) in HBCs amount to US$ 1.8 billion in 2008, up from US$ 0.5 billion in 2002 but almost the same as budgets for 2007; NTP budgets for the 90 countries with 91% of global TB cases that reported complete data total US$ 2.3 billion in 2008. Budgets are typically equivalent to about US$ 100–300 per patient treated.

22. DOTS accounts for the largest single share of NTP budgets in almost all countries. Budgets for the diagnosis and treatment of MDR-TB have become strikingly large in the Russian Federation (US$ 267 million) and South Africa (US$ 239 million) and, when combined, these two countries account for 93% of the budgets for MDR-TB reported by HBCs.

23. With a few exceptions, NTP budgets do not include the costs associated with using general health system resources, such as staff and infrastructure for TB control. When these costs are added to NTP budgets, we estimate that the total cost of TB control in HBCs will reach US$ 2.3 billion in 2008 (up from US$ 0.6 billion in 2002), and US$ 3.1 billion across 90 reporting countries. Costs per patient treated are generally US$ 100–400.

24. For the 22 HBCs, NTP budgets and our estimates of the total costs of TB control activities planned for 2008 are very similar to those in 2007 for all but five countries (Brazil, Ethiopia, Mozambique, Nigeria and the United Republic of Tanzania). This stagnation is worrying, because it suggests that the deceleration in case detection that occurred between 2005 and 2006 could persist into 2008.

25. Funding for TB control has grown to US$ 2.0 billion in HBCs and US$ 2.7 billion across the 90 reporting countries in 2008. Increased funding is mainly from domestic sources in Brazil, China, the Russian Federation and South Africa and from Global Fund grants in other countries. Across HBCs in 2008, governments will cover 73% of the total costs of TB control and grants will cover 13% (including US$ 200 million from the Global Fund). Reported funding gaps for 2008 total US$ 328 million among HBCs (14% of total costs) and US$ 385 million across 90 reporting countries (13% of total costs). Only five HBCs reported no funding gap for 2008 (Bangladesh, Ethiopia, India, Indonesia, and South Africa)

26. Funding gaps reported by countries would be larger if country plans and assessments of funding requirements were fully aligned with the Global Plan. In 2008, the gap between the total available funding reported by countries and the total funding requirements laid out in the Global Plan is US$ 0.8 billion in HBCs and US$ 0.9 billion across all 90 reporting countries. The discrepancy is mostly due to higher budgets for MDR-TB (South-East Asia and Western Pacific regions), collaborative TB/HIV activities (African and South-East Asia regions) and ACSM (all regions) in the Global Plan.

27. Several countries have plans and budgets that are well aligned with the Global Plan. Many countries in Africa have embarked upon, and in some cases completed, the development of medium-term plans and budgets using a WHO tool designed to support planning and budgeting in line with targets set out in the Global Plan. Completion of this work, and its expansion to other countries, are now crucial and should form the basis for intensified efforts to mobilize the necessary resources from domestic and donor sources.

Progress towards outcome targets

28. The case detection rate for new smear-positive cases in DOTS programmes is estimated at 61% globally in 2006 (i.e. the 2.5 million notified cases divided by the 4.1 million estimated cases), a small increase from 2005 but still short of the 70% target. The Western Pacific Region (77%) and 77 countries achieved the 70% target; the Region of the Americas (69%) and the South-East Asia Region were close (67%). The Eastern Mediterranean Region (52%), the European Region (52%) and the African Region (46%) were much further from the target. The European Region could reach the target by increasing both DOTS population coverage and the use of smear microscopy.

29. The estimated case detection rate in the African Region in 2006 may be an underestimate, given the difficulty of disentangling the effect of improved programme performance from the effect of the HIV epidemic on notifications. Analytical work of the type recently done in Kenya, and new surveys of the prevalence of disease planned in several African countries, will help to improve the current estimates.

30. The treatment success rate in DOTS programmes was 84.7% in 2005, just short of the 85% target. This is the highest rate since reliable monitoring began, despite an increase in the size of the cohort evaluated to 2.4 million patients in 2005. Treatment success rates were lowest in the European Region (71%), the African Region (76%) and the Region of the Americas (78%). The South-East Asia and Western Pacific regions and 58 countries achieved the 85% target; the Eastern Mediterranean Region (83%) was close.

31. Based on current data and estimates, the Western Pacific Region achieved both the 70% case detection target (in 2006) and the 85% treatment success target (in 2005), as did 32 individual countries including five HBCs: China, Indonesia, Myanmar, the Philippines and Viet Nam.

32. Progress in case detection decelerated globally between 2005 and 2006, stalled in China and India, and fell short of the Global Plan milestone of 65% for 2006. The African Region, China and India collectively account for 69% of undetected cases.

Progress towards impact targets

33. Globally, the TB incidence rate per 100 000 population is falling slowly (–0.6% between 2005 and 2006), having peaked around 2003. By 2006, TB incidence per capita was approximately stable in the European Region and in slow decline in all other WHO regions (from 0.5% between 2005 and 2006 in the South-East Asia Region to 3.2% between 2005 and 2006 in the Region of the Americas). MDG 6 Target 6.C, to halt and reverse the incidence of TB, will be achieved well before the target date of 2015 if the global trend is sustained.

34. Prevalence and death rates per capita are falling, and faster than TB incidence. Globally, prevalence rates fell by 2.8% between 2005 and 2006, to 219 per 100 000 population (compared with the 2015 target of 147 per 100 000 population). Death rates fell by 2.6% between 2005 and 2006, to 25 per 100 000 population (compared with the 2015 target of 14 per 100 000

population). These estimates and targets include cases and deaths in HIV-positive people.

35. If trends in prevalence and death rates for the past five years are sustained, the Stop TB Partnership targets of halving prevalence and death rates by 2015 compared with 1990 levels could be achieved in the South-East Asia, Western Pacific and Eastern Mediterranean regions, and in the Region of the Americas. Targets are unlikely to be achieved globally, however, because the African and European regions are far from the targets. For example, deaths are estimated at 83 per 100 000 population in 2006 in the African Region, compared with a target for the region of 21.

36. While DOTS programmes are reducing death and prevalence rates, a new ecological analysis suggests that they have not yet had a major impact on TB transmission and trends in TB incidence around the world. If this is correct, then the challenge is to show that the diagnosis of active TB can be made early enough, and that treatment success rates can be high enough, to have a substantial impact on incidence on a large geographical scale. The greater the impact of TB control on incidence, the more likely it is that prevalence and death rates will be halved by the MDG deadline of 2015.

Principales constatations

La charge mondiale de tuberculose

1. On a estimé à 9,2 millions le nombre de nouveaux cas de tuberculose en 2006 (139 pour 100 000) dont 4,1 millions de nouveaux cas à frottis positif (44 % du total) et 0,7 million de VIH-positifs (8 % du total). L'augmentation par rapport aux 9,1 millions de cas en 2005 résulte de la croissance démographique. Les cinq pays qui ont enregistré le plus grand nombre de cas étaient, dans l'ordre, l'Inde, la Chine, l'Indonésie, l'Afrique du Sud et le Nigéria. C'est dans la Région africaine que le taux d'incidence pour 100 000 est le plus élevé (363).
2. La prévalence de la tuberculose en 2006 a été estimée à 14,4 millions de cas.
3. Le nombre de cas de tuberculose à bacilles multirésistants (tuberculose MR) en 2006 a été estimé à 0,5 million.
4. Le nombre de décès par tuberculose en 2006 a été estimé à 1,7 millions dont 0,2 millions VIH-positifs.
5. En 2007, 202 pays et territoires (sur 212) ont notifié à l'OMS des données concernant la tuberculose pour 2006. Au total, 5,1 millions de nouveaux cas (sur les 9,2 millions de nouveaux cas estimés) ont été notifiés pour 2006 par ces 202 pays et territoires, dont 2,5 millions (50 %) étaient des nouveaux cas à frottis positif. Trois Régions de l'OMS, l'Afrique, l'Asie du Sud-Est et le Pacifique occidental, totalisaient 83% des cas notifiés.

Cibles et stratégies de lutte antituberculeuse

6. Les cibles de la lutte mondiale ont été fixées dans le cadre des objectifs du Millénaire pour le développement (OMD). La cible 6.C de l'OMD 6 consiste à maîtriser la tuberculose et commencer à inverser la tendance d'ici 2015. Le Partenariat Halte à la tuberculose a fixé deux cibles supplémentaires concernant l'impact, qui consistent à réduire de moitié les taux de prévalence et de mortalité d'ici 2015 comparativement au niveau de 1990. Les cibles initialement fixées par l'Assemblée mondiale de la Santé en 1991 consistent à détecter au moins 70 % des nouveaux cas à frottis positif dans le cadre des programmes DOTS et à traiter avec succès au moins 85 % des cas détectés. Les cinq cibles ont été adoptées par le Partenariat Halte à la tuberculose et reconnues en 2007 dans une résolution de l'Assemblée mondiale de la Santé (WHA60.19).
7. La Stratégie Halte à la tuberculose lancée par l'OMS en 2006 vise à atteindre les cibles pour 2015 concernant l'impact ainsi que les cibles concernant la détection des cas et le taux de succès thérapeutiques. Le plan mondial, lancé en janvier 2006, précise à quelle échelle les six éléments de la Stratégie Halte à la tuberculose doivent être appliqués pour atteindre ces cibles et indique le financement nécessaire pour chaque année de 2006 à 2015.
8. La Stratégie Halte à la tuberculose comprend six éléments essentiels : i) poursuivre l'extension d'une stratégie DOTS de qualité et son amélioration ; ii) lutter contre la co-infection tuberculose-VIH, contre la tuberculose MR et s'attaquer à d'autres défis ; iii) contribuer au renforcement des systèmes de santé ; iv) impliquer tous les soignants ; v) donner aux personnes atteintes de tuberculose et aux communautés la capacité d'agir et vi) favoriser et promouvoir la recherche.

Mise en œuvre de la Stratégie Halte à la tuberculose

Poursuivre l'extension d'une stratégie DOTS de qualité et son amélioration

9. La stratégie DOTS a été appliquée dans 184 pays regroupant 99 % des cas de tuberculose et 93 % de la population mondiale en 2006. Au total, 4.9 millions de nouveaux cas de tuberculose estimés ont été notifiés par des programmes DOTS en 2006 (98 % du total mondial de 5,1 millions de nouveaux cas notifiés), dont 2,5 millions de nouveaux cas à frottis positif (99 % du total mondial des cas notifiés). Entre 1995 (quand on a commencé à disposer de données fiables) et 2006, les programmes DOTS ont notifié en tout 31,8 millions de nouveaux cas et de rechutes et 15,5 millions de nouveaux cas à frottis positif.

Lutter contre la co-infection tuberculose-VIH, contre la tuberculose MR et s'attaquer à d'autres défis

10. Des progrès considérables ont été enregistrés concernant le test de dépistage du VIH chez les malades de la tuberculose, et l'administration d'un traitement préventif au cotrimoxazole (TPC) et d'un traitement antirétroviral (ART) aux cas de tuberculose VIH-positifs.

11. Près de 700 000 malades de la tuberculose ont subi un test de dépistage du VIH en 2006 dans l'ensemble des pays fournissant des données, contre 470 000 en 2005 et 22 000 en 2002. Le nombre de malades ayant subi un test en 2006 représentait 12 % du total mondial de cas de tuberculose notifiés et 22 % des cas notifiés dans la Région africaine. Parmi les 11 pays africains enregistrant plus de 50 % du nombre total de cas de tuberculose chez des VIH-positifs qui ont signalé des données pour l'ensemble des années 2002–2006, le pourcentage des cas notifiés ayant subi un test a quadruplé, passant de 8 % à 35 %. Le Rwanda (76 %), le Malawi (64 %) et le Kenya (60 %) ont présenté les taux de tests de dépistage les plus élevés – des pourcentages supérieurs à la cible de 51 % fixée pour la Région africaine dans le plan mondial.

12. Le nombre de malades de la tuberculose VIH-positifs sous CPT a atteint 147 000 en 2006, ce qui correspond à 78 % des cas de tuberculose VIH-positifs recensés par un test de dépistage et à 2,5 fois plus que les 58 000 cas sous CPT en 2005. Le nombre de TPC commencé est inférieur au demi-million prévu par le plan mondial pour 2006 ; il pourrait augmenter si davantage de pays enregistraient des taux de dépistage plus élevés comparables à ceux du Rwanda, du Malawi et du Kenya.

13. Le nombre de malades de la tuberculose VIH-positifs commençant un ART a été de 67 000 en 2006, c'est-à-dire plus du double des 29 000 signalés en 2005 et sept fois plus que les 9800 signalés en 2004, mais il reste inférieur à la cible de 220 000 pour 2006, prévue dans le plan mondial. La proportion des cas de tuberculose diagnostiqués comme VIH-positifs commençant un ART était de 41 % contre une cible de 44 % pour 2006 prévue par le plan mondial ; comme pour le TPC, les résultats ont été inférieurs à ceux prévus par le plan mondial en partie en raison de taux de dépistage du VIH pas assez élevés.

14. Les interventions visant à réduire la charge de morbidité tuberculeuse chez les VIH-positifs sont bien en deçà des cibles fixées dans le plan mondial en 2006. La cible du plan mondial pour 2006 prévoyait le dépistage de 11 millions de VIH-positifs pour la tuberculose alors que le nombre effectivement signalé était de 314 211. Seuls 27 000 VIH-positifs sans tuberculose évolutive ont commencé un traitement préventif à l'isoniazide (0,1 % des 33 millions de sujets qu'on estime infectés par le VIH), presque tous au Botswana.

15. Au total, 23 353 cas de tuberculose MR ont été notifiés en 2006 dont un peu plus de la moitié dans la Région européenne. Parmi ces cas notifiés, on sait qu'un traitement répondant aux normes fixées par les directives de l'OMS a commencé uniquement pour les 2 032 cas signalés par des projets et des programmes approuvés par le Comité Feu Vert.

16. Le nombre total de cas de tuberculose MR pour lesquels les pays prévoient de commencer un traitement en 2007 et 2008 est d'environ 50 000 pour chacune des deux années. Les projections pour 2008 sont bien inférieures à la cible de 98 000 fixée dans le plan d'intervention mondial contre la tuberculose MR et ultrarésistante. C'est surtout en Europe, en Asie du Sud-Est et dans le Pacifique occidental, et dans ces deux dernières Régions en Chine et en Inde en particulier, que le déficit est le plus important. Une forte extension des services s'impose pour atteindre les normes fixées dans les directives de l'OMS.

Renforcer les systèmes de santé ; impliquer tous les soignants

17. La mise en œuvre des éléments 3 à 6 de la Stratégie Halte à la tuberculose est actuellement moins bien comprise que celle des éléments 1 et 2, les données disponibles étant plus limitées.

18. Dans le domaine du renforcement des systèmes de santé (élément 3), le diagnostic et le traitement de la tuberculose sont entièrement intégrés aux services de santé généraux dans la plupart des pays. Les liens avec les cadres de planification du secteur de la santé en général ou du développement varient, mais l'alignement sur des approches sectorielles est assez satisfaisant dans les pays notifiant des données. L'approche pratique de la santé respiratoire est appliquée au stade pilote ou élargie à l'échelle nationale par 15 pays et figure dans les plans de 73 pays. De nombreux pays ne disposent pas encore de plans complets de développement des ressources humaines ni d'une évaluation récente des besoins en personnels.

19. Parmi les 22 pays à forte charge de morbidité tuberculeuse qui regroupent 80 % des cas dans le monde, 14 sont en train de renforcer leurs approches public-privé et public-public pour associer tout l'éventail des dispensateurs de soins à la lutte antituberculeuse, et sept ont utilisé les normes internationales de soins pour la tuberculose afin de faciliter le processus. La contribution des différents dispensateurs à la détection, à la référence et au traitement des cas restera incertaine tant que les formulaires dont l'OMS a recommandé l'utilisation pour l'enregistrement et la notification n'auront pas été plus largement introduits.

Donner aux personnes atteintes de tuberculose et aux communautés la capacité d'agir ; encourager et promouvoir la recherche

20. Des enquêtes sur les connaissances, les attitudes et les pratiques ont été effectuées dans 13 des 22 pays à forte morbidité pour contribuer à la mise au point d'activités de sensibilisation, de communication

et de mobilisation sociale. Il s'agit là toutefois d'un domaine encore nouveau pour de nombreux pays qui ont besoin de recommandations et d'un appui technique bien plus importants. Vingt des 22 pays à forte morbidité ont fait état d'une participation des communautés aux soins. La recherche opérationnelle (qui fait partie de l'élément 6) a été mentionnée par 49 pays.

Financer la lutte antituberculeuse

21. Les budgets des programmes nationaux de lutte antituberculeuse dans les pays à forte morbidité s'établissent au total à US $1,8 milliard en 2008, contre US $0,5 milliard en 2002, le montant total pour 2008 étant pratiquement le même qu'en 2007 ; les budgets de ces programmes pour les 90 pays regroupant 91 % des cas mondiaux de tuberculose et qui ont signalé des données complètes s'établissent au total à US $2,3 milliards en 2008. Ces budgets correspondent à des dépenses de l'ordre de US $100 à 300 par malade soigné.

22. La stratégie DOTS absorbe la part la plus importante des budgets de la tuberculose dans la plupart des pays. Les budgets consacrés au diagnostic et au traitement de la tuberculose MR sont devenus particulièrement importants en Fédération de Russie (US $267 millions) et en Afrique du Sud (US $239 millions) et ils représentent ensemble 93 % des budgets de pays à forte morbidité consacrés à la tuberculose MR.

23. A quelques exceptions près, les budgets nationaux de la tuberculose n'englobent pas les coûts associés à l'utilisation des ressources des systèmes de santé généraux, par exemple les personnels et l'infrastructure de la lutte antituberculeuse. En ajoutant ces coûts aux budgets nationaux de la tuberculose, on estime que le coût total de la lutte antituberculeuse dans les pays à forte morbidité atteindra US $2,3 milliards en 2008 (contre 0,6 milliard en 2002), et US $3,1 milliards pour les 90 pays notifiant des données. Les coûts par malade traité sont généralement de l'ordre de US $100 à 400.

24. Dans les 22 pays à forte morbidité, les budgets nationaux et les estimations du coût total des activités de lutte antituberculeuse prévus en 2008 sont très semblables à 2007, sauf dans cinq cas (Brésil, Ethiopie, Mozambique, Nigéria et République-Unie de Tanzanie). Cette stagnation est préoccupante car elle semble indiquer que la décélération en matière de détection des cas observée en 2005 et 2006 pourrait se maintenir en 2008.

25. Le financement de la lutte antituberculeuse est passé en 2008 à US $2,0 milliards dans les pays à forte morbidité et à US $2,7 milliards dans les 90 pays notifiant des données. L'augmentation provient principalement de ressources intérieures en Afrique du Sud, au Brésil, en Chine et en Fédération de Russie et de subventions du Fonds mondial dans les autres pays. Dans l'ensemble des pays à forte morbidité en 2008, les autorités nationales couvriront 73 % de l'ensemble des coûts de la lutte antituberculeuse et les subventions 13 % (dont US $200 millions du Fonds mondial). Les déficits de financement signalés pour 2008 atteignent au total US $328 millions dans les pays à forte morbidité (14 % de l'ensemble des coûts) et US $385 millions dans les 90 pays notifiant des données (13 % de l'ensemble des coûts). Seuls cinq des pays à forte morbidité n'ont pas signalé de déficit de financement pour 2008 (Afrique du Sud, Bangladesh, Ethiopie, Inde et Indonésie).

26. Les déficits de financement signalés par les pays seraient plus importants si l'on alignait les plans des pays et les évaluations des besoins de fonds sur le plan mondial. Pour 2008, l'écart entre le montant total des fonds disponibles indiqué par les pays et le montant total des besoins de financement prévu dans le plan mondial est de US $0,8 milliard dans les pays à forte morbidité et de US $0,9 milliard dans l'ensemble des pays notifiant des données. La différence est due en grande partie aux budgets plus élevés consacrés à la tuberculose MR (Régions de l'Asie du Sud-Est et du Pacifique occidental), aux activités de collaboration tuberculose/VIH (Régions de l'Afrique et de l'Asie du Sud-Est) et aux activités de sensibilisation, de communication et de mobilisation sociale (ensemble des Régions) dans le plan mondial.

27. Plusieurs pays ont des plans et des budgets qui sont bien alignés sur le plan mondial. De nombreux pays d'Afrique ont commencé, et dans certains cas mené à bien, la mise au point de plans et de budgets à moyen terme utilisant un outil de l'OMS qui vise à appuyer la planification et la budgétisation conformément aux cibles fixées dans le plan mondial. Il est maintenant crucial de mener à bien ce travail et de l'étendre à d'autres pays pour servir de base aux efforts intensifiés visant à mobiliser les ressources nécessaires sur le plan interne et auprès des donateurs.

Progrès réalisés en vue d'atteindre les cibles en matière de résultats

28. Le taux mondial de détection des cas pour les nouveaux cas à frottis positif dans les programmes DOTS est estimé à 61 % en 2006 (ce qui correspond aux 2,5 millions de cas notifiés divisés par les 4,1 millions de cas estimés), en légère augmentation par rapport à 2005, mais encore loin de la cible de 70 %. La Région du Pacifique occidental (77 %) ainsi que 77 pays ont atteint la cible de 70 % ; alors que la Région des Amériques (69 %) et celle de l'Asie du Sud-Est (67 %) sont un peu au-dessous. En revanche, les autres Régions sont beaucoup plus éloignées

de la cible, à savoir la Méditerranée orientale (52 %), l'Europe (52 %) et l'Afrique (46 %). La Région européenne pourrait atteindre la cible en améliorant la couverture de la population par la stratégie DOTS ainsi qu'en recourant à l'examen microscopique des frottis.

29. Le taux estimé de détection des cas dans la Région africaine en 2006 est peut-être en deçà de la réalité, car il est difficile de distinguer l'effet de l'amélioration des programmes de l'effet de l'épidémie de VIH sur les notifications. Les travaux analytiques du genre de ceux qui ont récemment été entrepris au Kenya, et les nouvelles enquêtes sur la prévalence de la maladie prévues dans plusieurs pays africains, contribueront à améliorer les estimations.

30. Le taux des succès thérapeutiques dans le cadre des programmes DOTS était de 84,7 % en 2005, juste au-dessous de la cible de 85 %. C'est là le taux le plus élevé obtenu depuis l'introduction d'un suivi fiable, malgré l'augmentation de la taille de la cohorte évaluée à 2,4 millions de patients en 2005. Les taux de succès thérapeutiques les plus faibles ont été enregistrés dans la Région européenne (71 %), la Région africaine (76 %) et la Région des Amériques (78 %). La Région de l'Asie du Sud-Est et celle du Pacifique occidental ainsi que 58 pays ont atteint la cible de 85 % et la Région de la Méditerranée orientale, avec 83 %, n'en était pas loin.

31. Sur la base des données et des estimations actuelles, la Région du Pacifique occidental a atteint la cible de détection des cas de 70 % (en 2006) et la cible des succès thérapeutiques de 85 % (en 2005), de même que 32 pays dont cinq parmi ceux à forte morbidité, à savoir la Chine, l'Indonésie, le Myanmar, les Philippines et le Viet Nam.

32. On a observé un ralentissement des progrès dans le domaine de la détection des cas au niveau mondial entre 2005 et 2006, et un coup d'arrêt en Chine et en Inde, la cible de 65 % pour 2006 fixée dans le plan mondial n'ayant pas été atteinte. Ensemble, la Région africaine, la Chine et l'Inde regroupent 69 % des cas non détectés.

Progrès réalisés en vue d'atteindre les cibles concernant l'impact

33. Au niveau mondial, le taux d'incidence de la tuberculose pour 100 000 a légèrement diminué (-0,6 % entre 2005 et 2006), après avoir atteint un pic vers 2003. En 2006, le taux d'incidence pour 100 000 était relativement stable dans la Région européenne et légèrement en baisse dans toutes les autres Régions de l'OMS (la diminution entre 2005 et 2006 s'établissant entre 0,5 % dans la Région de l'Asie du Sud-Est et 3,2 % dans la Région des Amériques). La cible 6.C de l'OMD 6, qui vise à maîtriser la tuberculose et à commencer à inverser la tendance, sera atteinte bien avant la date butoir de 2015 si la tendance mondiale est maintenue.

34. Les taux de prévalence et de mortalité pour 100 000 diminuent plus rapidement que l'incidence. Au niveau mondial, les taux de prévalence ont diminué de 2,8 % entre 2005 et 2006, étant ramenés à 219 pour 100 000 (alors que la cible pour 2015 était de 147 pour 100 000). Les taux de mortalité ont eux diminué de 2,6 % entre 2005 et 2006, pour atteindre 25 pour 100 000 (alors que la cible pour 2015 était de 14 pour 100 000).

35. Si les tendances de la prévalence et de la mortalité des cinq dernières années sont maintenues, les cibles du Partenariat Halte à la tuberculose qui consistent à réduire de moitié les taux de prévalence et de mortalité d'ici 2015 comparativement aux niveaux de 1990 pourraient être atteintes dans les Régions de l'Asie du Sud-Est, du Pacifique occidental et de la Méditerranée orientale, ainsi que dans celle des Amériques. Mais il est peu probable que l'on réussira à atteindre les cibles au niveau mondial, car les Régions africaine et européenne sont loin du niveau fixé. C'est ainsi qu'on estime à 83 pour 100 000 les décès en 2006 dans la Région africaine, alors que la cible pour la Région est de 21.

36. Alors que les programmes DOTS parviennent à réduire les taux de mortalité et de prévalence, une nouvelle analyse écologique laisse penser qu'ils n'ont pas encore eu un impact majeur sur la transmission et les tendances de l'incidence tuberculeuse dans le monde entier. Si tel est le cas, le défi consiste à montrer que le diagnostic de tuberculose évolutive peut être réalisé suffisamment tôt, et que les taux de succès thérapeutique peuvent être suffisamment élevés pour avoir un impact substantiel sur l'incidence sur une grande échelle géographique. Plus l'impact de la lutte antituberculeuse sur l'incidence est important, plus on a de chances de réduire de moitié les taux de prévalence et de mortalité d'ici la date butoir de 2015 pour les OMD.

Resultados fundamentales

La carga mundial de la tuberculosis

1. El número estimado de nuevos casos de tuberculosis en 2006 fue de 9,2 millones (139 por 100 000 habitantes), entre ellos 4,1 millones de nuevos casos bacilíferos (44% del total) y 0,7 millones de casos VIH-positivos (8% del total). El incremento respecto de los 9,1 millones de casos de 2005 se debe al crecimiento de la población. La India, China, Indonesia, Sudáfrica y Nigeria ocupan, por este orden, los cinco primeros puestos en cifras absolutas de casos. La Región de África es la de mayor tasa de incidencia (363 por 100 000 habitantes).
2. En 2006 se estima que hubo 14,4 millones de casos prevalentes de tuberculosis.
3. La cifra estimada de casos de tuberculosis multirresistente en 2006 fue de 0,5 millones de casos.
4. La cifra estimada de defunciones por tuberculosis en 2006 fue de 1,7 millones, incluidos 0,2 millones de personas infectadas por el VIH.
5. En 2007, 202 de 212 países y territorios comunicaron a la OMS datos de notificación de la tuberculosis correspondientes a 2006. Para ese año, se notificó un total de 5,1 millones de casos nuevos (de una cifra estimada de 9,2 millones de casos nuevos) en esos 202 países y territorios, de los cuales 2,5 millones (50%) eran nuevos casos bacilíferos. El 83% del total de casos correspondió a las Regiones de África, Asia Sudoriental y el Pacífico Occidental.

Metas y estrategias para el control de la tuberculosis

6. Las metas para el control mundial de la tuberculosis se han fijado en el marco de los Objetivos de Desarrollo del Milenio (ODM). La meta 6.C, incluida en el ODM 6, consiste en haber detenido y comenzado a reducir la incidencia para el año 2015. La Alianza Alto a la Tuberculosis ha fijado otras dos metas de impacto, que son reducir a la mitad respecto de los niveles de 1990 las tasas de prevalencia y de mortalidad antes de 2015. Las metas de resultados fijadas en primer lugar por la Asamblea Mundial de la Salud en 1991 son detectar al menos el 70% de los nuevos casos bacilíferos en los programas DOTS y tratar satisfactoriamente a al menos el 85% de los casos detectados. Las cinco metas han sido adoptadas por la Alianza Alto a la Tuberculosis y, en 2007, fueron reconocidas en una resolución de la Asamblea Mundial de la Salud (WHA60.19).
7. La estrategia Alto a la Tuberculosis, lanzada por la OMS, en 2006, está diseñada para alcanzar las metas de impacto de 2015 así como las metas en materia de detección de casos y éxito terapéutico. El Plan Mundial, lanzado en enero de 2006, detalla la escala en la que deben aplicarse los seis componentes de la estrategia Alto a la Tuberculosis para alcanzar esas metas, así como los fondos necesarios, para cada año entre 2006 y 2015.
8. La estrategia Alto a la Tuberculosis consta de seis grandes componentes: i) expandir y mejorar el DOTS; ii) hacer frente a la tuberculosis acompañada del VIH, la tuberculosis multirresistente y otros problemas; iii) contribuir al fortalecimiento de los sistemas de salud; iv) involucrar a todo el personal de salud; v) dar mayor capacidad de acción a los pacientes y a las comunidades, y vi) favorecer y promover las investigaciones.

Ejecución de la estrategia Alto a la Tuberculosis

Expansión y mejora del DOTS

9. En 2006, el DOTS se estaba ejecutando en 184 países que albergaban el 99% de los casos de tuberculosis y el 93% de la población mundial. En ese año, los programas de DOTS notificaron un total de 4,9 millones de nuevos casos de tuberculosis (un 98% del total de 5,1 millones de casos nuevos notificados en todo el mundo), entre ellos 2,5 millones de nuevos casos bacilíferos (un 99% del total de nuevos casos bacilíferos notificados en todo el mundo). Entre 1995, cuando comenzaron los registros fiables, y 2006 los programas de DOTS notificaron un total de 31,8 millones de casos nuevos y recaídas y 15,5 millones de nuevos casos bacilíferos.

Hacer frente a la tuberculosis acompañada de VIH, la tuberculosis multirresistente y otros problemas

10. Se ha avanzado considerablemente en la realización de pruebas de detección del VIH entre pacientes de tuberculosis, así como en la administración de tratamiento preventivo con cotrimoxazol y tratamiento antirretroviral (TAR) a los pacientes de tuberculosis VIH-positivos.
11. En 2006 casi 700 000 pacientes se sometieron a las pruebas de detección del VIH en todos los países

notificantes, frente a los 470 000 de 2005 y los 22 000 de 2002. La cifra de 2006 equivale al 12% de los casos de tuberculosis notificados en todo el mundo, y al 22% de los casos notificados en la Región de África. En los 11 países africanos con más del 50% de los casos de tuberculosis VIH-positivos del mundo y que notificaron datos todos los años comprendidos entre 2002 y 2006, el porcentaje de casos notificados que fueron sometidos a pruebas de detección se cuadruplicó, del 8% al 35%. Rwanda (76%), Malawi (64%) y Kenya (60%) alcanzaron las tasas más altas de realización de pruebas de detección y con ello se situaron por delante de la meta del 51% fijada en el Plan Mundial para la Región de África.

12. El número de pacientes de tuberculosis VIH-positivos a los que se administró profilaxis tratados con cotrimoxazol se elevó a 147 000 en 2006, lo que equivale al 78% de los pacientes tuberculosos con VIH que se detectaron gracias a las pruebas, y es 2,5 veces mayor que los 58 000 pacientes tratados con cotrimoxazol en 2005. La cifra de los que empezaron la profilaxis con cotrimoxazol no llega a los 0,5 millones indicados en el Plan Mundial para 2006; podría aumentar si más países emularan las elevadas tasas de realización de pruebas de detección de países como Rwanda, Malawi y Kenya.

13. El número de pacientes de tuberculosis VIH-positivos participantes en el TAR fue de 67 000 en 2006, más del doble de los 29 000 notificados en 2005 y siete veces los 9800 notificados en 2004, aunque no se llegó a la meta de 220 000 indicada en el Plan Mundial para 2006. La proporción de pacientes de tuberculosis con diagnóstico positivo de VIH inscritos en el TAR fue del 41% frente a la meta del 44% del Plan Mundial para 2006. Como con la profilaxis con cotrimoxazol, una de las razones de que las cifras no alcancen las previstas en el Plan Mundial es que las tasas de realización de pruebas de detección del VIH aún no son lo bastante altas.

14. La ejecución de intervenciones para reducir la carga de la tuberculosis entre las personas VIH-positivas estuvo muy por debajo de lo previsto en el Plan Mundial para 2006. La meta del Plan Mundial para 2006 consistía en someter a 11 millones de personas VIH-positivas a pruebas de detección de la tuberculosis; la cifra real comunicada fue de 314 211. Sólo 27 000 VIH-positivos sin tuberculosis activa comenzaron a recibir tratamiento preventivo intermitente (el 0,1% de los 33 millones de personas que se estima están infectadas por el VIH), casi todos ellos en Botswana.

15. En 2006 se notificó un total de 23 353 casos de tuberculosis multirresistente, de los cuales algo más de la mitad se encontraban en la Región de Europa. De esos casos notificados, sólo se sabe con seguridad que han comenzado un tratamiento que cumple las directrices de la OMS los 2032 casos notificados por proyectos y programas aprobados por el Comité Luz Verde.

16. La cifra total de casos de tuberculosis multirresistente que los países prevén que comenzarán el tratamiento en 2007 y 2008 es de unos 50 000 en ambos años. Las proyecciones para 2008 son muy inferiores a la meta de 98 000 fijada en el Plan Mundial de Respuesta ante la Tuberculosis Multirresistente y Extremadamente Resistente. El mayor retraso se observa en las Regiones de Europa, Asia Sudoriental y Pacífico Occidental, y dentro de esas regiones en China y la India. Se necesita proceder a una importante expansión de servicios que cumplan las normas establecidas en las directrices de la OMS.

Fortalecimiento de los sistemas de salud: involucrar a todo el personal de salud

17. Actualmente, la ejecución de los componentes 3 a 6 de la estrategia Alto a la Tuberculosis no se comprende tan bien como la de los componentes 1 y 2, pues los datos disponibles son más limitados.

18. En la esfera del fortalecimiento de los sistemas de salud (componente 3), el diagnóstico y el tratamiento de la tuberculosis están plenamente integrados en los servicios de salud generales en la mayoría de los países. La relación con el sector sanitario en general o con los marcos de planificación del desarrollo es variable, pero el alineamiento con los enfoques sectoriales fue comparativamente bueno entre los países informantes. El enfoque práctico de la salud pulmonar se está ensayando o ampliando a escala nacional en 15 países y figura en los planes de 72 países. Muchos países carecen de planes integrales de desarrollo de recursos humanos o de una evaluación reciente de las necesidades de dotación de personal.

19. Entre los 22 países con alta carga de morbilidad, que colectivamente albergan el 80% de los casos de tuberculosis en el mundo, 14 están expandiendo los enfoques de asociación publicoprivada o entre entidades públicas para hacer participar a todo el abanico de proveedores de atención de salud en la lucha contra la tuberculosis, y siete han utilizado las normas internacionales de tratamiento de la tuberculosis para facilitar ese proceso. Sin embargo, la contribución de distintos proveedores a la detección, el envío y el tratamiento de casos seguirá estando poco clara hasta que se difundan más ampliamente los formularios de notificación y registro recomendados por la OMS.

Dar más capacidad de acción a los pacientes y las comunidades; permitir y promover las investigaciones

20. Se han realizado encuestas sobre conocimientos, actitudes y prácticas en 13 de los 22 países con alta

carga de morbilidad para ayudar con el diseño de las actividades de promoción, comunicación y movilización social. Esas actividades, no obstante, aún resultan bastante nuevas en algunos países, que necesitan mucha más orientación y apoyo técnico. Veinte de los 22 países con alta carga de morbilidad han informado de la participación de las comunidades en la atención de la tuberculosis. Cuarenta y nueve países informaron de investigaciones operacionales (parte del componente 6).

Financiación de la lucha contra la tuberculosis

21. Los presupuestos totales de los programas nacionales de lucha contra la tuberculosis en los países con alta carga de morbilidad se elevan a US$ 1800 millones en 2008, frente a US$ 500 millones en 2002, aunque permanecen casi al mismo nivel que los presupuestos de 2007; los presupuestos de los programas nacionales de los 90 países con el 91% de los casos mundiales de tuberculosis que comunicaron datos completos suman US$ 2300 millones en 2008. Los presupuestos son típicamente equivalentes a unos US$ 100–US$ 300 por paciente tratado.

22. El DOTS representa la parte más importante de los presupuestos de los programas antituberculosos nacionales en casi todos los países. Los presupuestos para el diagnóstico y el tratamiento de la tuberculosis multirresistente han crecido de manera muy llamativa en la Federación de Rusia (US$ 267 millones) y Sudáfrica (US$ 239 millones); tomados conjuntamente, los presupuestos de esos dos países representan el 93% de los presupuestos para combatir la tuberculosis multirresistente comunicados por los países con alta carga de morbilidad.

23. Salvo raras excepciones, los presupuestos de los programas nacionales de lucha contra la tuberculosis no incluyen los costos asociados al uso de recursos del sistema de salud general, como personal e infraestructura para combatir la enfermedad. Cuando esos costos se suman a los presupuestos de los programas, se estima que el costo total de la lucha contra la tuberculosis en los países con alta carga de morbilidad alcanzará los US$ 2300 millones en 2008 (desde US$ 600 millones en 2002), y US$ 3100 millones en los 90 países que presentan informes. Los costos por paciente tratado suelen ser de US$ 100–US$ 400.

24. En cuanto a los 22 países con alta carga de morbilidad, los presupuestos de los programas nacionales de lucha y nuestras estimaciones de los costos totales de las actividades de control de la tuberculosis previstas para 2008 son muy parecidos a los de 2007 en todos los países salvo cinco (Brasil, Etiopía, Mozambique, Nigeria y República Unida de Tanzanía). Este estancamiento resulta preocupante, pues sugiere que la desaceleración en la detección de casos que tuvo lugar entre 2005 y 2006 podría prolongarse en 2008.

25. En 2008, los fondos destinados a la lucha contra la tuberculosis han crecido hasta US$ 2000 millones en los países con alta carga de morbilidad y US$ 2700 millones en los 90 países informantes. El aumento de fondos procede principalmente de fuentes nacionales en el Brasil, China, la Federación de Rusia y Sudáfrica, y de donaciones del Fondo Mundial en otros países. En todos los países con alta carga de morbilidad, los gobiernos sufragarán en 2008 el 73% de los costos totales de la lucha antituberculosa y las donaciones cubrirán el 13% (incluidos US$ 200 millones del Fondo Mundial). Los déficits de financiación comunicados para 2008 alcanzan un total de US$ 328 millones entre los países con alta carga de morbilidad (14% de los costos totales) y US$ 385 millones en los 90 países informantes (13% de los costos totales). Sólo cinco países con alta carga de morbilidad informaron de que no tenían déficit de financiación en 2008 (Bangladesh, Etiopía, India, Indonesia y Sudáfrica).

26. Los déficits de financiación comunicados por los países serían mayores si los planes y las evaluaciones de las necesidades de fondos en los países concordaran plenamente con el Plan Mundial. En 2008, la diferencia entre el total de fondos disponibles comunicado por los países y las necesidades totales de financiación expuestas en el Plan Mundial es de US$ 800 millones en los países con alta carga de morbilidad y US$ 900 millones en los 90 países informantes. La discrepancia se debe sobre todo a los presupuestos más elevados para la tuberculosis multirresistente (Asia Sudoriental y Pacífico Occidental), actividades colaborativas contra la tuberculosis y el VIH (África y Asia Sudoriental) y actividades de promoción, comunicación y movilización social (todas las regiones) en el Plan Mundial.

27. Varios países tienen planes y presupuestos bien alineados con el Plan Mundial. Muchos países de África han emprendido, y en algunos casos terminado, la elaboración de planes y presupuestos a plazo medio utilizando un instrumento de la OMS diseñado para apoyar la formulación de planes y presupuestos de acuerdo con las metas establecidas en el Plan Mundial. La terminación de estos trabajos y su expansión a otros países son ahora cruciales y deben constituir la base de esfuerzos mayores para movilizar los recursos necesarios tanto de procedencia interna como de donantes.

Progresos realizados hacia las metas en materia de resultados

28. La tasa de detección de nuevos casos bacilíferos en los programas de DOTS se estima en un 61% a escala mundial en 2006 (es decir, los 2,5 millones de casos

notificados divididos por los 4,1 millones de casos estimados), lo que representa un ligero aumento con respecto a 2005 pero no llega a la meta del 70%. La Región del Pacífico Occidental (77%) y 77 países alcanzaron la meta del 70%; la Región de las Américas (69%) y la Región de Asia Sudoriental (67%) se acercaron a ella. Las Regiones del Mediterráneo Oriental (52%), Europa (52%) y África (46%) estuvieron mucho más lejos de la meta. La Región de Europa podría alcanzar la meta aumentando tanto la cobertura de la población con DOTS como el uso de microscopia de frotis.

29. Es posible que la tasa estimada de detección de casos en la Región de África en 2006 sea inferior a la real, dada la dificultad de separar el efecto de la mejora en los resultados de los programas del efecto de la epidemia de VIH en las notificaciones. Los trabajos analíticos como los realizados recientemente en Kenya y las nuevas encuestas de prevalencia de la enfermedad previstas en varios países africanos ayudarán a mejorar las estimaciones actuales.

30. La tasa de éxito terapéutico de los programas DOTS fue del 84,7% en 2005, prácticamente la meta del 85%. Se trata de la tasa más elevada desde que comenzaron las observaciones fiables, a pesar del aumento del tamaño de la cohorte evaluada a 2,4 millones de pacientes en 2005. Las tasas de éxito terapéutico fueron particularmente bajas en las Regiones de Europa (71%), África (76%) y las Américas (78%). Las Regiones de Asia Sudoriental y del Pacífico Occidental y 58 países alcanzaron la meta del 85%; la Región del Mediterráneo Oriental se acercó a ella (83%).

31. De acuerdo con los datos y las estimaciones actuales, la Región del Pacífico Occidental llegó tanto a la meta de detección de casos (70%) en 2006 como a la meta de éxito terapéutico (85%) en 2005, al igual que otros 32 países, incluidos cinco países con alta carga de morbilidad: China, Indonesia, Myanmar, Filipinas y Viet Nam.

32. El avance en la detección de casos se desaceleró en todo el mundo entre 2005 y 2006, se estancó en China y la India, y no llegó a la cifra del 65% fijada en el Plan Mundial para 2006. La Región de África, China y la India colectivamente albergan al 69% de los casos no detectados.

Avance hacia las metas de impacto

33. A escala mundial, la incidencia de la tuberculosis por 100 000 habitantes está disminuyendo lentamente (–0,6% entre 2005 y 2006), tras haber alcanzado un máximo en torno a 2003. En 2006, la incidencia era aproximadamente estable en la Región de Europa y disminuía lentamente en todas las demás regiones de la OMS (desde el 0,5% entre 2005 y 2006 en la Región de Asia Sudoriental hasta el 3,2% entre 2005 y 2006 en la Región de las Américas). La meta 6.C del ODM 6, detener e invertir la incidencia de la tuberculosis, se conseguirá bastante antes de la meta fijada para 2015 si se mantiene la tendencia mundial.

34. Las tasas de prevalencia y de mortalidad están disminuyendo, y más deprisa que la incidencia de la tuberculosis. A escala mundial, las tasas de prevalencia cayeron en un 2,8% entre 2005 y 2006, hasta 219 por 100 000 habitantes (en comparación con la meta de 147 por 100 000 habitantes en 2015). Las tasas de mortalidad se redujeron en un 2,6% entre 2005 y 2006, hasta 25 por 100 000 habitantes (en comparación con la meta de 14 por 100 000 habitantes en 2015). Estas estimaciones y metas incluyen casos y muertes en personas VIH-positivas.

35. Si se mantienen las tendencias de las tasas de prevalencia y de mortalidad de los últimos cinco años, las metas de la Alianza Alto a la Tuberculosis de reducir a la mitad esas tasas antes de 2015 en relación con las cifras de 1990 podrían conseguirse en las Regiones de Asia Sudoriental, el Pacífico Occidental y el Mediterráneo Oriental, así como en la Región de las Américas. No es probable, sin embargo, que se alcancen las metas a escala mundial, dado que las Regiones de África y Europa se encuentran alejadas de ellas. Por ejemplo, en la Región de África se estima una tasa de mortalidad de 83 por 100 000 habitantes en 2006, frente a la meta de 21 prevista para la región.

36. Mientras que los programas DOTS están reduciendo las tasas de mortalidad y de prevalencia, un nuevo análisis ecológico sugiere que aún no han ejercido un efecto importante en la transmisión de la tuberculosis ni en las tendencias de su incidencia en todo el mundo. Si esto es así, el reto consiste en demostrar que el diagnóstico de la tuberculosis activa puede hacerse con antelación suficiente, y que las tasas de éxito terapéutico pueden ser lo bastante altas como para tener un impacto considerable en la incidencia a una escala geográfica importante. Cuanto mayor sea el impacto del control de la tuberculosis en la incidencia, más probabilidad habrá de que las tasas de prevalencia y de mortalidad sean reducidas a la mitad antes del plazo de 2015 fijado en el ODM.

Introduction

This report is the twelfth annual report on global control of tuberculosis (TB) published by the World Health Organization (WHO) in a series that started in 1997. It is based on data reported to WHO via its standard data collection form by 202 out of 212 countries and territories in 2007, and on the series of data collected from these countries and territories annually since 1996.

Using these data, we present our latest assessment of the epidemiological burden of TB as well as progress towards targets for global TB control that have been established within the context of the Millennium Development Goals (MDGs) and by the World Health Assembly (WHA) and Stop TB Partnership.[1,2,3,4] The impact targets are to halt and reverse incidence by 2015 (MDG 6 Target 6.C) and to halve prevalence and death rates by 2015 compared with 1990. The outcome targets are to detect at least 70% of new smear-positive cases and to successfully treat 85% of those cases that are detected.

The Stop TB Strategy launched by WHO in 2006 describes the interventions that should be implemented to achieve the 2015 targets, and the Global Plan to Stop TB details the scale at which many of these interventions should be provided.[5,6] The report thus includes analysis of the extent to which the components and subcomponents of the strategy are being implemented, including comparisons with the Global Plan. With implementation of the Stop TB Strategy at the scale needed to achieve global targets dependent on accurate budgeting of the funding required backed up by resource mobilization and effective spending, the third major topic of the report is financing for TB control.

Following these three major themes, the report is structured in three chapters, as follows:

- *The global TB epidemic and progress in TB control*. This chapter includes estimates of incidence, prevalence and mortality in 2006 and of trends in incidence since 1990; case notifications reported for 2006; estimates of the case detection rate for new smear-positive cases as well as all types of case between 1995 (when reliable monitoring began) and 2006; treatment outcomes between 1994 and 2005 for new and re-treatment cases; and analysis and discussion of progress towards the MDG, Stop TB Partnership and WHA targets. All data are presented globally, for each WHO region and for each of the 22 high-burden countries (HBCs) that collectively account for 80% of TB cases globally.
- *Implementing the Stop TB Strategy*. This chapter describes and assesses implementation of each of the six major components of the strategy as well as their subcomponents. The major components are: (i) DOTS implementation; (ii) addressing TB/HIV, MDR-TB and other challenges; (iii) contributing to health system strengthening; (iv) engaging all care providers; (v) empowering patients, and communities; and (vi) promoting research. The chapter gives most attention to DOTS, collaborative TB/HIV activities, and the diagnosis of MDR-TB and treatment of MDR-TB patients, since the quantity and quality of data for these was comparatively high.
- *Financing TB control*. This chapter presents and discusses data on the following topics: (i) the budgets of national TB control programmes (NTPs) and available funding and funding gaps for these budgets between 2002 (when reliable monitoring began) and 2008 for the 22 HBCs, and for the 90 countries (with 91% of the world's estimated cases) that reported complete data for 2008; (ii) the total costs of TB control, which include NTP budgets plus the costs associated with use of general health system staff and infrastructure not usually included in NTP budgets, again for the 22 HBCs for 2002–2008 and for all 90 countries that reported complete data for 2008; (iii) comparisons of funding needs set out in the Global Plan with those based on country reports; (iv) per patient costs and budgets; (v) expenditures compared with available funding and changes in the number of patients treated; (vi) the contribution of the Global Fund to financing for TB control; and (vii) a discussion of why funding gaps for TB control persist.

1 The Millennium Development Goals are described in full at unstats.un.org/unsd

2 Resolution WHA44.8. Tuberculosis control programme. In: *Handbook of resolutions and decisions of the World Health Assembly and the Executive Board*. Volume III, 3rd ed. (1985–1992). Geneva, World Health Organization, 1993 (WHA44/1991/REC/1).

3 *Stop Tuberculosis Initiative. Report by the Director-General*. Fifty-third World Health Assembly. Geneva, 15–20 May 2000 (A53/5, 5 May 2000).

4 Dye C et al. Targets for global tuberculosis control. *International Journal of Tuberculosis and Lung Disease*, 2006, 10:460–462.

5 Raviglione MC, Uplekar MW. WHO's new Stop TB Strategy. *Lancet*, 2006, 367:952–955.

6 *The Global Plan to Stop TB, 2006–2015*. WHO and Stop TB Partnership, 2006.

Each chapter begins with a summary of the data reported to WHO in 2007, and ends with a short summary of major findings. The main part of the report finishes with a short summary of the major conclusions from all three chapters.

The remainder of the report consists of four annexes. Three of these annexes (Annex 1, Annex 3 and Annex 4) provide detailed regional or country-specific data. Annex 1 comprises 22 country profiles (one for each HBC); each profile includes epidemiological and financial data as well as an assessment of how the Stop TB Strategy is being implemented. Annex 3 includes country-specific data for 1990–2006 for surveillance and epidemiological indicators discussed in the main part of the report, i.e. case notifications and treatment outcomes, and estimates of incidence, prevalence and mortality. Annex 4 lists the surveys of the prevalence of TB disease and infection that have been conducted in the past and that are planned in the near future, as well as the countries for which mortality data are available in a central WHO database. Annex 2 explains the methods used to produce the main findings included in Chapters 1, 2 and 3.

In short, *Global tuberculosis control 2008* presents an overview of progress in reducing the burden of TB worldwide.

CHAPTER 1

The global TB epidemic and progress in control

The status of the TB epidemic and progress in control of the disease have been assessed by WHO annually since 1997. This assessment has included estimates of TB incidence, prevalence and mortality from 1990 onwards; analysis of case notification data from around 200 (of 212) countries and territories since 1995 (when reliable records began); and analysis of progress towards the global targets for case detection and treatment success established by the World Health Assembly in 1991. More recently, it has also included assessment of progress towards the newer impact targets related to incidence, prevalence and mortality that have been set within the framework of the Millennium Development Goals (MDGs) and by the Stop TB Partnership.

This chapter provides our current assessment of the state of the TB epidemic and progress towards targets, using the most recent data reported to WHO in 2007 as well as new analytical work on the broader determinants of the TB epidemic conducted in 2007. It is structured in eight major sections as follows:

- *Goals, targets and indicators for TB control*. This section explains the targets and related indicators for global TB control that have been set for 2005, 2015 and 2050.
- *Data reported to WHO in 2007*. This section describes the data on case notifications reported for 2006 and those for treatment outcomes reported for 2005, the years for which data were requested by WHO in 2007.
- *Incidence in 2006 and trends since 1990*. This section provides estimates of the number of new cases of TB in 2006, including estimates of the number of TB cases that were HIV-positive. It also includes analysis of the trend in incidence since 1990 and its relationship with trends in HIV prevalence in the general population.
- *Case notifications*. This section summarizes the total number of TB cases notified in 2006 at global as well as regional and country levels.
- *Case detection rates*. Combining case notification data for 2006 with the estimates of incidence for 2006, this section presents estimates of the rates of case detection in 2006, at global and regional levels. Trends since 1995, and their implications for progress towards the global target of 70%, are discussed.
- *Treatment outcomes in DOTS programmes*. This section covers results on outcomes of treatment for all new cases and re-treatment cases (2005 cohorts) and progress towards the global target of an 85% treatment success rate.
- *Progress towards targets for case detection and cure*. This section reports the number of countries and regions that have met both targets, as well as the number that have reached the milestones of a 50% case detection rate and a 70% treatment success rate.
- *Progress towards impact targets included in the Millennium Development Goals*. This section assesses the current status of progress towards targets for reductions in incidence, prevalence and mortality set for 2015, including a new (and still developing) analysis of the extent to which TB control efforts or broader determinants of TB epidemiology are driving the global TB epidemic.

Throughout the chapter, particular attention is given to the 22 high-burden countries (HBCs) that collectively account for around 80% of TB cases globally. This is because these countries are the focus of intensive efforts to implement the Stop TB Strategy (see also **Chapter 2**). However, additional data for all countries are provided in **Annex 3**. Further details for the HBCs are also available in **Annex 1**. The methods used to produce the results presented in this chapter are explained in **Annex 2**.

1.1 Goals, targets and indicators for TB control

Global targets and indicators for TB control have been developed within the framework of the MDGs as well as by the Stop TB Partnership and WHO's World Health Assembly (**Table 1.1**).[1,2,3] The impact targets are to halt and reverse TB incidence by 2015 and to halve prevalence and death rates by 2015 compared with a baseline of 1990. The incidence target is MDG Target 6.C, while the targets for reducing prevalence and death rates

[1] Dye C et al. Targets for global tuberculosis control. *International Journal of Tuberculosis and Lung Disease*, 2006, 10:460–462.

[2] *The Global Plan to Stop TB, 2006–2015*. Geneva, Stop TB Partnership and World Health Organization, 2006 (WHO/HTM/STB/2006.35).

[3] Resolution WHA44.8. Tuberculosis control programme. In: *Handbook of resolutions and decisions of the World Health Assembly and the Executive Board*. Volume III, 3rd ed. (1985–1992). Geneva, World Health Organization, 1993 (WHA44/1991/REC/1).

TABLE 1.1

Goals, targets and indicators for TB control

MILLENNIUM DEVELOPMENT GOAL 6

Combat HIV/AIDS, malaria and other diseases

Target 6.C:	Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases
Indicator 6.8:	Incidence, prevalence and death rates associated with tuberculosis
Indicator 6.9:	Proportion of tuberculosis cases detected and cured under DOTS (the internationally recommended strategy for TB control)

STOP TB PARTNERSHIP TARGETS

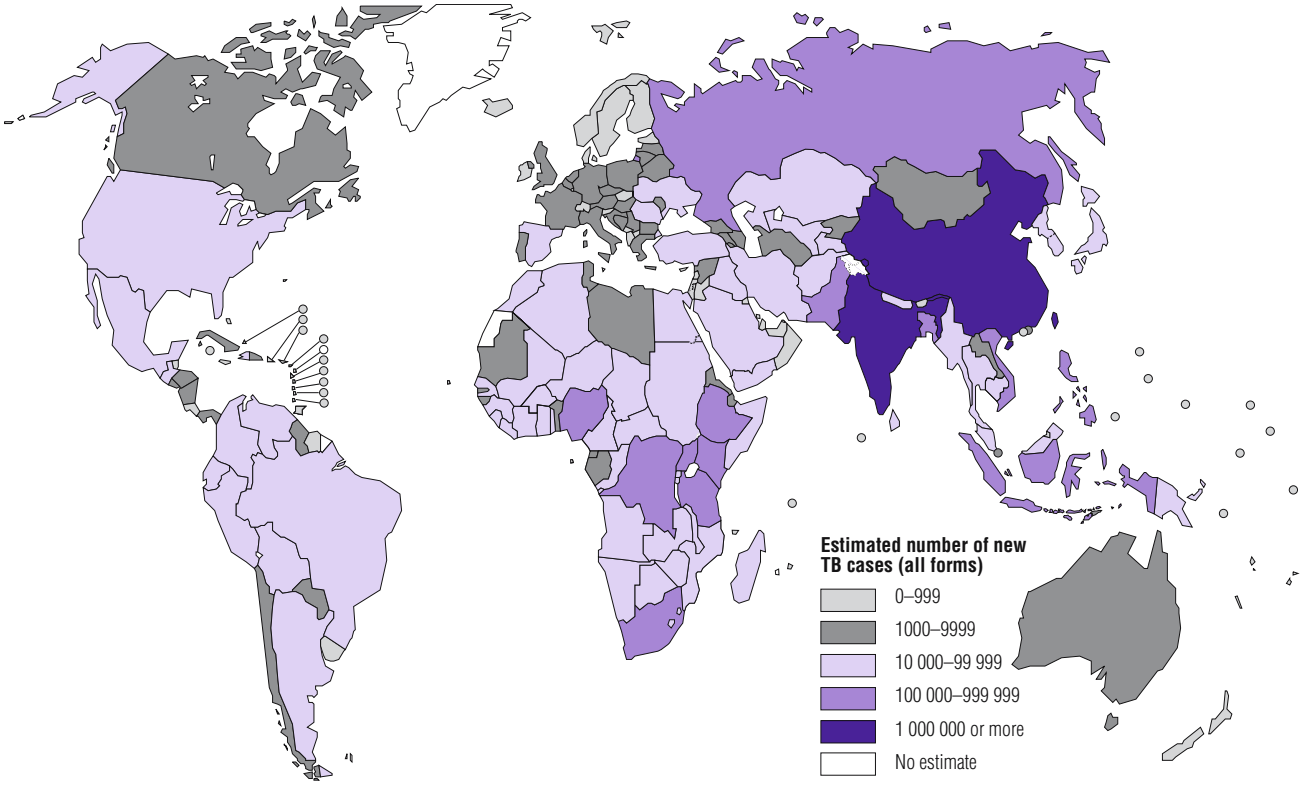
By 2005:	At least 70% of people with sputum smear-positive TB will be diagnosed (i.e. under the DOTS strategy), and at least 85% cured. These are targets set by the World Health Assembly of WHO.
By 2015:	The global burden of TB (per capita prevalence and death rates) will be reduced by 50% relative to 1990 levels.
By 2050:	The global incidence of active TB will be less than 1 case per million population per year.

were based on a resolution of the year 2000 meeting of the Group of Eight (G8) industrialized countries, held in Okinawa, Japan. The outcome targets, which are related to DOTS implementation, are to achieve a case detection rate of at least 70% under DOTS and to reach a treatment success rate of at least 85% in DOTS cohorts. These outcome targets were first established by the World Health Assembly in 1991. The ultimate goal of TB elimination by 2050, with the target of less than 1 case per million population, has been set by the Stop TB Partnership.

The Stop TB Strategy, launched by WHO in 2006, sets out the major interventions that should be implemented to achieve the MDG, Stop TB Partnership and World Health Assembly targets. These are divided into six broad components: (i) pursuing high-quality DOTS expansion and enhancement; (ii) addressing TB/HIV, MDR-TB and other challenges; (iii) contributing to health system strengthening; (iv) engaging all care providers; (v) empowering people with TB, and communities; and (vi) enabling and promoting research. The Global Plan to Stop TB, launched by the Stop TB Partnership in 2006, sets out how, and at what scale, the Stop TB Strategy should be implemented over the decade 2006–2015, and the funding requirements.[1] This means that in addition to the targets shown in **Table 1.1**, the Global Plan also

FIGURE 1.1

Estimated number of new TB cases, by country, 2006



[1] *The Global Plan to Stop TB, 2006–2015*. Geneva, Stop TB Partnership and World Health Organization, 2006 (WHO/HTM/STB/2006.35).

TABLE 1.2

Estimated epidemiological burden of TB, 2006

		INCIDENCE[a]				PREVALENCE		MORTALITY		HIV PREV. IN INCIDENT TB CASES[b]
		ALL FORMS		SMEAR-POSITIVE		ALL FORMS		ALL FORMS		
	POPULATION 1000s	NUMBER 1000s	PER 100 000 POP PER YEAR	NUMBER 1000s	PER 100 000 POP PER YEAR	NUMBER 1000s	PER 100 000 POP	NUMBER 1000s	PER 100 000 POP PER YEAR	%
1 India	1 151 751	1 933	168	867	75	3 445	299	325	28	1.2
2 China	1 320 864	1 311	99	590	45	2 658	201	201	15	0.3
3 Indonesia	228 864	534	234	240	105	578	253	88	38	0.6
4 South Africa	48 282	454	940	184	382	482	998	105	218	44
5 Nigeria	144 720	450	311	198	137	890	615	117	81	9.6
6 Bangladesh	155 991	351	225	158	101	610	391	70	45	0.0
7 Ethiopia	81 021	306	378	136	168	520	641	68	83	6.3
8 Pakistan	160 943	292	181	131	82	423	263	55	34	0.3
9 Philippines	86 264	248	287	111	129	373	432	39	45	0.1
10 DR Congo	60 644	237	392	105	173	391	645	51	84	9.2
11 Russian Federation	143 221	153	107	68	48	179	125	24	17	3.8
12 Viet Nam	86 206	149	173	66	77	194	225	20	23	5.0
13 Kenya	36 553	141	384	56	153	122	334	26	72	52
14 UR Tanzania	39 459	123	312	53	135	181	459	26	66	18
15 Uganda	29 899	106	355	46	154	168	561	25	84	16
16 Brazil	189 323	94	50	59	31	104	55	7.6	4.0	12
17 Mozambique	20 971	93	443	39	186	131	624	24	117	30
18 Thailand	63 444	90	142	40	62	125	197	13	20	11
19 Myanmar	48 379	83	171	37	76	82	169	6.1	13	2.6
20 Zimbabwe	13 228	74	557	30	227	79	597	17	131	43
21 Cambodia	14 197	71	500	31	220	94	665	13	92	9.6
22 Afghanistan	26 088	42	161	19	73	60	231	8.3	32	0.0
High-burden countries	**4 150 313**	**7 334**	**177**	**3 265**	**79**	**11 889**	**286**	**1 330**	**32**	**11**
AFR	773 792	2 808	363	1 203	155	4 234	547	639	83	22
AMR	899 388	331	37	165	18	398	44	41	4.5	6.4
EMR	544 173	570	105	256	47	826	152	108	20	1.1
EUR	887 455	433	49	194	22	478	54	62	7.0	3.0
SEAR	1 721 049	3 100	180	1 391	81	4 975	289	515	30	1.3
WPR	1 764 231	1 915	109	860	49	3 513	199	291	17	1.2
Global	**6 590 088**	**9 157**	**139**	**4 068**	**62**	**14 424**	**219**	**1 656**	**25**	**7.7**

[a] All estimates include TB in people with HIV. Estimates of incidence, prevalence and mortality in people with HIV are given by country and region in Annex 3, Table A3.1.
[b] Prevalence of HIV in incident TB cases of all ages.

includes input targets (funding required per year) and output targets (e.g. number of patients with MDR-TB who should be treated each year, number of TB patients to be tested for HIV, number of HIV-positive TB patients who should be enrolled on antiretroviral therapy (ART)).

This chapter focuses on the five principal indicators that are used to measure the outcomes and impact of TB control: case detection and treatment success rates (outcome indicators), and incidence, prevalence and death rates (impact indicators). An analysis of progress against other targets is provided in **Chapters 2 and 3**.

1.2 Data reported to WHO in 2007

By the end of 2007, 202 of 212 countries and territories had reported case notifications for 2006 and/or treatment outcomes for patients registered in 2005 (**Annex 3**). These countries include 99.6% of the world's population. Reports were submitted by all 22 HBCs. The 10 countries and territories that did not report were the Bahamas, the British Virgin Islands, Chad, Equatorial Guinea, Monaco, San Marino, Senegal, Seychelles, the United States Virgin Islands and Wallis and Futuna Islands.

1.3 TB incidence in 2006 and trends since 1990

1.3.1 Estimated incidence in 2006

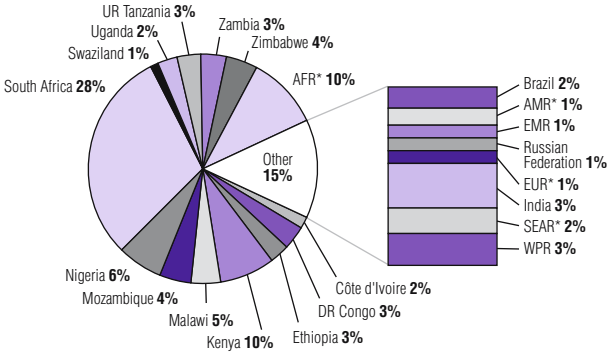
Based on surveillance and survey data (**Annex 3; Annex 4**), we estimate that 9.2 million new cases of TB occurred in 2006 (139 per 100 000), including 4.1 million (62 per 100 000) new smear-positive cases (**Table 1.2; Figure 1.1**). These numbers include TB in HIV-positive people. India, China, Indonesia, South Africa and Nigeria rank first to fifth in terms of incident cases; the estimated numbers of cases in these and other HBCs in 2006 are also shown in **Table 1.2**. Asia (South-East Asia and Western Pacific regions) accounts for 55% of global cases, and Africa accounts for 31%; the other three regions account for relatively small fractions of global cases.

Among the 9.2 million new cases of TB in 2006, we estimate that around 709 000 (7.7%) were HIV-positive. This estimate is based on the global estimates of HIV prevalence among the general population (all ages) published by the Joint United Nations Programme on HIV/AIDS (UNAIDS) and WHO in December 2007,[1] as well as

[1] *2007 AIDS epidemic update*. Geneva, Joint United Nations Programme on HIV/AIDS and World Health Organization, 2007 (UNAIDS/07.27E/JC1322E).

FIGURE 1.2

Geographical distribution of estimated HIV-positive TB cases, 2006. For each country or region, the number of incident TB cases arising in people with HIV is shown as a percentage of the global total of such cases. AFR* is all countries in the WHO African Region except those shown separately; AMR* excludes Brazil; EUR* excludes the Russian Federation; SEAR* excludes India.



data on the relative risk of developing TB in HIV-positive and HIV-negative people (see **Annex 2** for further details on methods). As in previous years, the African Region accounts for most HIV-positive cases: 85% in 2006 (**Figure 1.2**). Most of the remaining cases (6%) are in the South-East Asia Region, mainly in India. Some African countries account for a strikingly large number of cases relative to their population. South Africa, for example, has 0.7% of the world's population but 28% of the global number of HIV-positive TB cases and 33% of HIV-positive cases in the African Region.

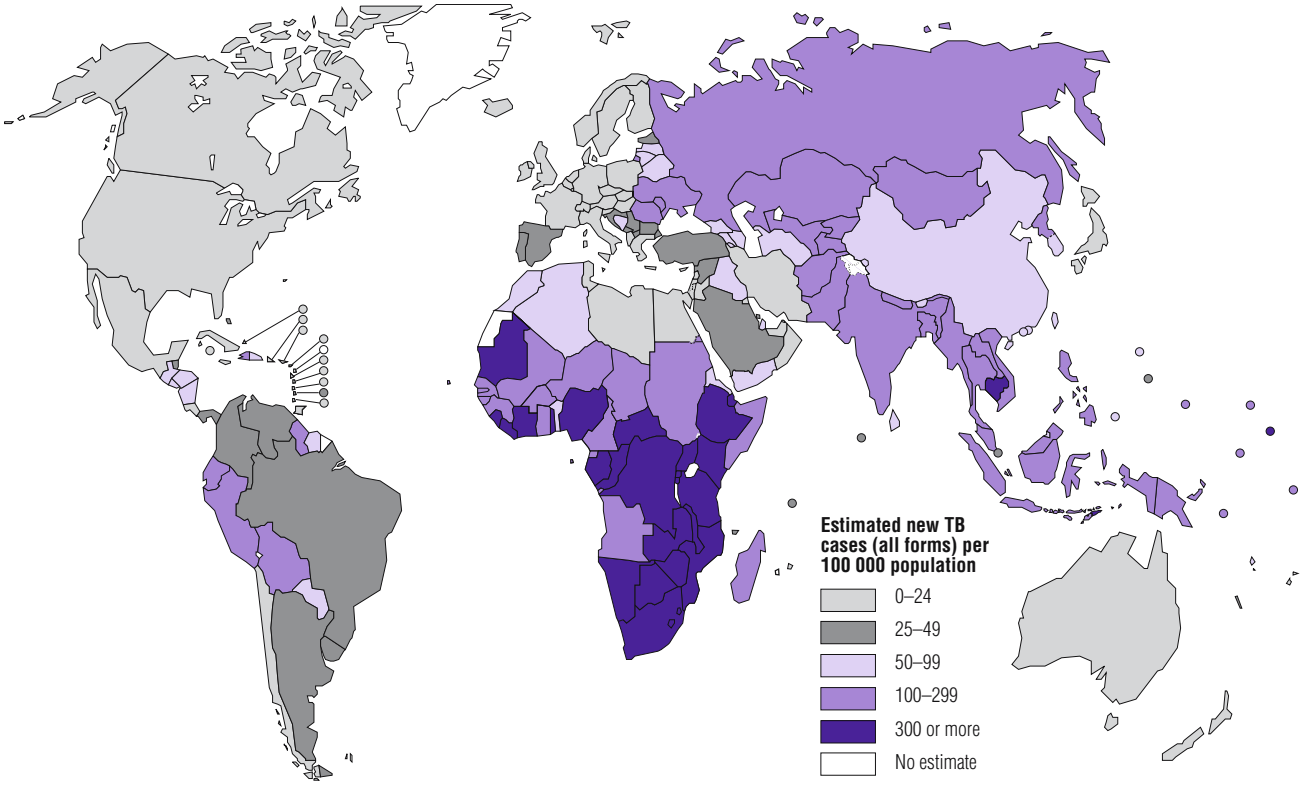
The magnitude of the TB burden within countries can also be expressed as the number of incident cases per 100 000 population (**Figure 1.3**). Among the 15 countries with the highest estimated TB incidence rates, 12 are in Africa (**Figure 1.4**). The high incidence rates estimated for the African countries in this list are partly explained by the relatively high rates of HIV coinfection. Where HIV infection rates are higher in adult populations, they are also estimated to be higher among new TB patients (**Figure 1.4**). **Figure 1.5** maps the distribution of HIV among TB patients, showing the relatively high rates in countries of eastern and southern Africa.

1.3.2 Trends in incidence

The estimated average change in TB incidence (all forms) per 100 000 population over the 10-year period 1997–2006, based on case notifications reported by 134 countries that were judged to have a reliable series of

FIGURE 1.3

Estimated TB incidence rates, by country, 2006



data, was between –10% and +10% in all countries except for New Caledonia (**Figure 1.6**). Data from 93 countries indicate that incidence per capita was falling, albeit slowly; in 66 of these 93 countries the rate of decline was between zero and 6% per year.

By using estimates of the proportion of cases detected in each country, and by matching countries without trend data to those with such data, we can build a picture of incidence trends (all forms of TB) for nine epidemiologically different subregions of the world for the 17-year period 1990–2006 (**Figure 1.7**). The global incidence of TB per capita peaked around 2003 and appears to have stabilized or begun to decline. Incidence per 100 000 population is approximately stable in the European Region and is falling in all the five other WHO regions. It is also falling in all nine subregions, with the possible exception of African countries with low HIV prevalence (Africa – low HIV). The downward trend was fastest in the Latin America and Caribbean subregion (–3.4% per year, 2001–2006).

Globally, the slow decline in incidence per capita is more than offset by population growth. This means that the number of new cases was still increasing between 2005 and 2006, from 9.1 to 9.2 million (an increase of 0.6%). The increases in numbers of new cases were in the African, Eastern Mediterranean, European and South-East Asia regions.

In subregion Africa – high HIV, the annual change in TB incidence runs almost parallel with the change in HIV prevalence in the general population. Since 1990, both

FIGURE 1.4

Fifteen countries with the highest estimated TB incidence rates per capita (all forms; grey bars) and corresponding incidence rates of HIV-positive TB cases (purple bars), 2006

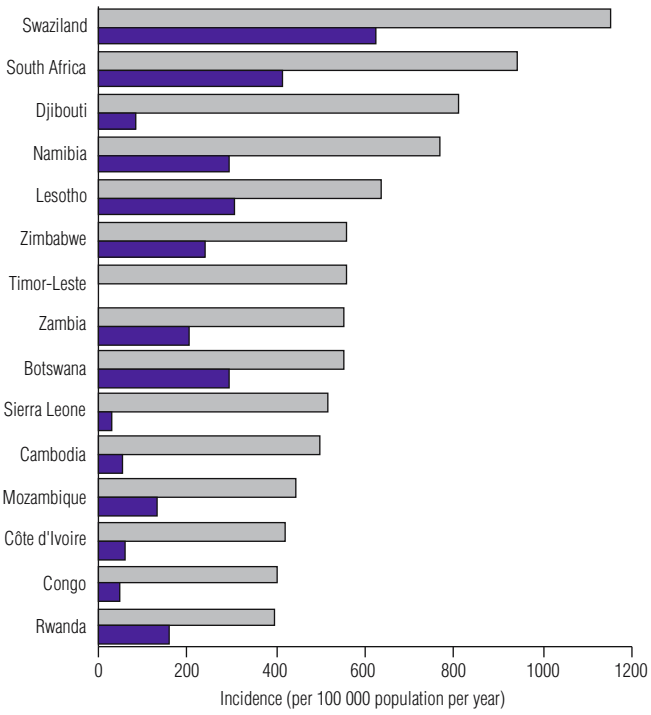


FIGURE 1.5

Estimated HIV prevalence in new TB cases, by country, 2006

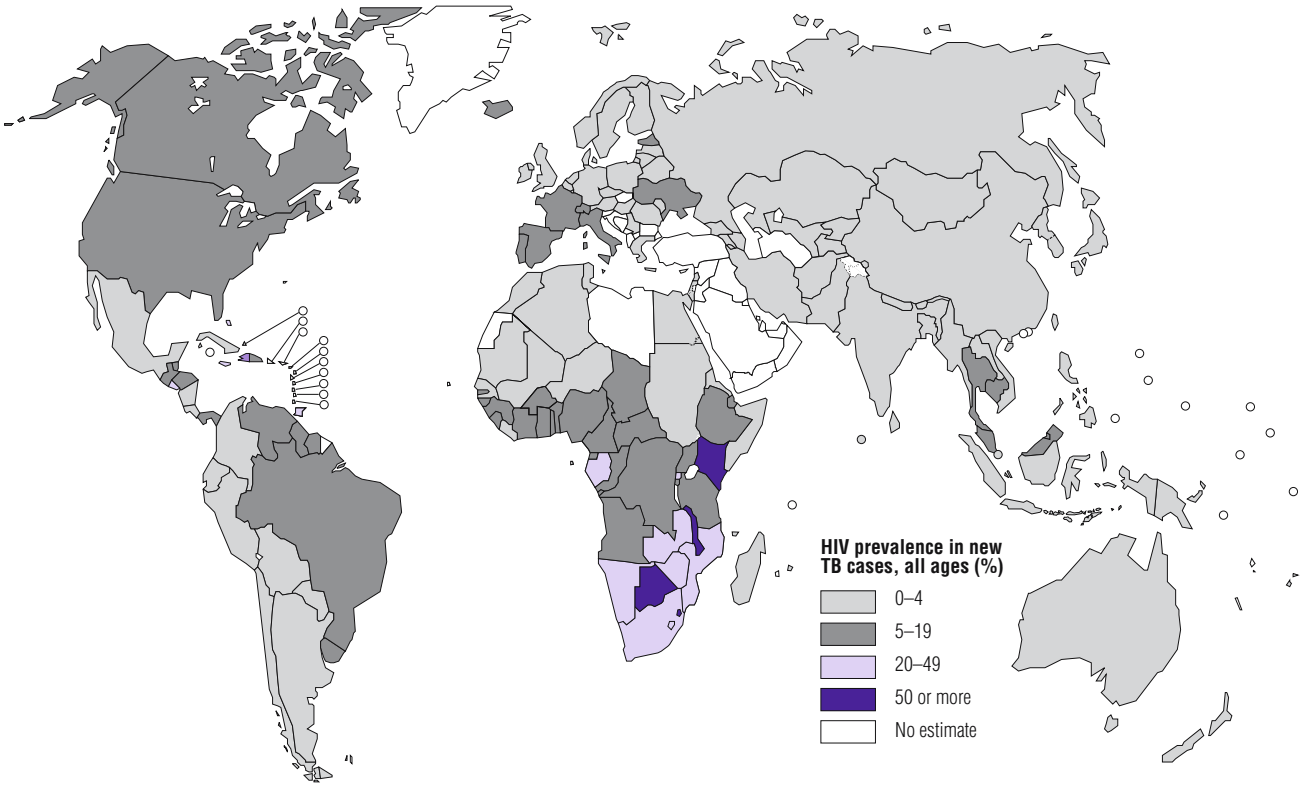
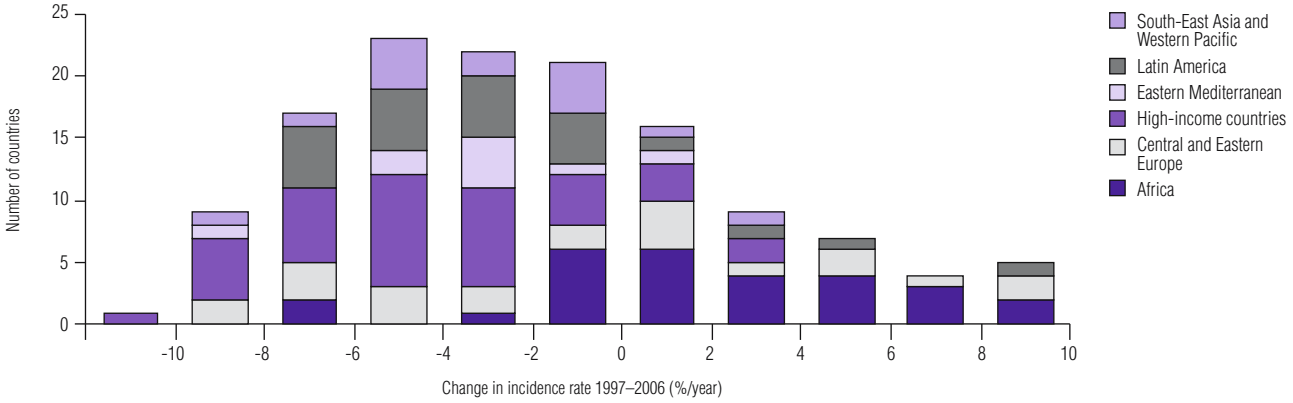


FIGURE 1.6

Frequency distribution of estimated changes in the TB incidence rate for 134 countries in 6 subregions, 1997–2006



HIV prevalence and TB incidence have been increasing more slowly each year and, by 2006, both indicators were falling (**Figure 1.8**). The correspondence between declining HIV prevalence in the general population and reported TB cases is especially close in data from Malawi, the United Republic of Tanzania and Zimbabwe (data not shown).

1.4 Case notifications

The 202 countries reporting to WHO notified 5.4 million new and relapse cases, of which 2.5 million (47%) were new smear-positive cases (**Table 1.3; Figure 1.9**). Of these notifications, 5.3 million were from DOTS areas, including 2.5 million new smear-positive cases. A total of 31.8 million new and relapse cases, and 15.5 million new smear-positive cases, were notified by DOTS programmes in the 12 years between 1995 (when reliable records began) and 2006.

Comparing different parts of the world, the African Region (23%), South-East Asia Region (36%) and Western Pacific Region (25%) together accounted for 83% of all notified new and relapse cases and for similar proportions of new smear-positive cases in 2006. Because DOTS has emphasized diagnosis by sputum smear microscopy, 47% of all new and relapse cases were new smear-positive (approximately 45% expected) in DOTS areas, compared with 30% elsewhere. Among new pulmonary cases reported by DOTS programmes, 58% were new smear-positive (a minimum of 65% expected), compared with 39% elsewhere (**Table 1.3**).

1.5 Case detection rates

1.5.1 Case detection rate, all sources (DOTS and non-DOTS programmes)

The 2.5 million new smear-positive cases notified in 2006 from all sources (i.e. DOTS and non-DOTS programmes) represent 62% of the 4.1 million estimated cases (**Table 1.2, Table 1.3; Annex 3**). This is a small increase from a figure of 60% in 2005, following a slow and linear increase from 35% to 43% between 1995 and 2001 and

FIGURE 1.7 (OPPOSITE)

AFRICA – COUNTRIES WITH HIGH HIV PREVALENCE: **Botswana**, **Burkina Faso**, Burundi, Cameroon, Central African Rep, Chad, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Equatorial Guinea, Ethiopia, **Gabon**, ***Kenya***, **Lesotho**, Liberia, **Malawi**, Mozambique, Namibia, Nigeria, Rwanda, ***South Africa***, **Swaziland**, **Uganda**, **United Republic of Tanzania**, **Zambia**, **Zimbabwe**.

AFRICA – COUNTRIES WITH LOW HIV PREVALENCE: Algeria, Angola, Benin, Cape Verde, Comoros, Eritrea, Gambia, **Ghana**, **Guinea**, Guinea-Bissau, **Madagascar**, **Mali**, Mauritania, Mauritius, Niger, Sao Tome & Principe, Senegal, Seychelles, **Sierra Leone**, **Togo**.

CENTRAL EUROPE: **Albania**, Bosnia & Herzegovina, Croatia, **Hungary**, Montenegro, **Poland**, Serbia, **Slovakia**, TFYR Macedonia, **Turkey**.

EASTERN EUROPE: Armenia, Azerbaijan, **Belarus**, **Bulgaria**, Georgia, **Kazakhstan**, **Kyrgyzstan**, **Latvia**, **Lithuania**, Rep Moldova, **Romania**, **Russian Federation**, **Tajikistan**, **Turkmenistan**, **Ukraine**, **Uzbekistan**.

EASTERN MEDITERRANEAN: Afghanistan, Djibouti, Egypt, **Iran (Islamic Republic of)**, Iraq, **Jordan**, **Lebanon**, Libyan Arab Jamahiriya, **Morocco**, **Oman**, Pakistan, Somalia, Sudan, **Syrian Arab Rep**, **Tunisia**, West Bank & Gaza Strip, Yemen.

HIGH-INCOME COUNTRIES AND TERRITORIES: Andorra, Antigua & Barbuda, **Australia**, Austria, Bahamas, Bahrain, Barbados, **Belgium**, Bermuda, British Virgin Is, Brunei Darussalam, Canada, Cayman Islands, **China Hong Kong SAR**, China Macao SAR, Cyprus, **Czech Rep**, Denmark, Estonia, **Finland**, France, French Polynesia, **Germany**, Greece, Guam, **Iceland**, **Ireland**, Israel, Italy, **Japan**, Kuwait, Luxembourg, Malta, Monaco, Netherlands, Netherlands Antilles, New Caledonia, **New Zealand**, Norway, **Portugal**, **Puerto Rico**, **Qatar**, **Rep. of Korea**, San Marino, **Saudi Arabia**, **Singapore**, **Slovenia**, Spain, **Sweden**, **Switzerland**, Trinidad & Tobago, Turks & Caicos Is, United Arab Emirates, **United Kingdom**, **United States**, US Virgin Is.

LATIN AMERICA: Anguilla, **Argentina**, Belize, **Bolivia**, ***Brazil***, **Chile**, **Colombia**, Costa Rica, **Cuba**, **Dominica**, Dominican Republic, Ecuador, **El Salvador**, **Grenada**, **Guatemala**, Guyana, Haiti, **Honduras**, **Jamaica**, **Mexico**, Montserrat, **Nicaragua**, Panama, **Paraguay**, **Peru**, **St Kitts & Nevis**, **St Lucia**, **St Vincent & the Grenadines**, Suriname, **Uruguay**, **Venezuela**.

SOUTH-EAST ASIA: Bangladesh, **Bhutan**, Democratic People's Republic of Korea, ***India***, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, Timor-Leste.

WESTERN PACIFIC: American Samoa, Cambodia, ***China***, Cook Is, Fiji, Kiribati, Lao PDR, **Malaysia**, Marshall Islands, Micronesia, Mongolia, Nauru, Niue, N Mariana Is, Palau, Papua New Guinea, Philippines, Samoa, Solomon Is, Tokelau, Tonga, Vanuatu, Viet Nam, Wallis & Futuna.

FIGURE 1.7

Trends in estimated TB incidence rates (per 100 000 population per year, all forms, black lines), and the estimated annual change in incidence rates (purple lines), for nine subregions and the world, 1990–2006. For each subregion, series are constructed with data from those countries and territories whose surveillance systems are reliable enough to determine the national and subregional trends in incidence over this period (shown in bold opposite), or for which changes in incidence are assessed on the basis of other data (e.g. death registrations: countries shown in bold italics).

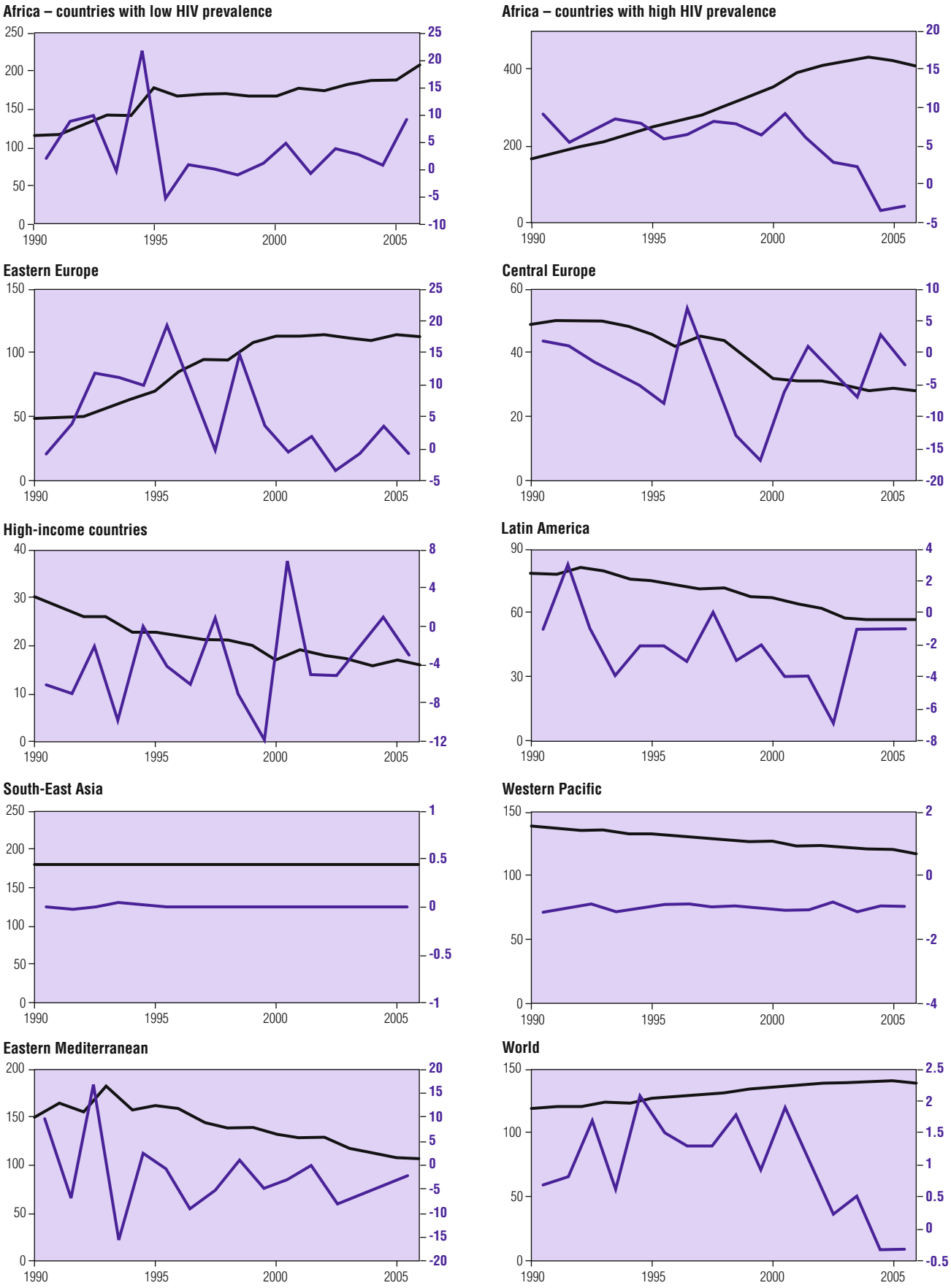
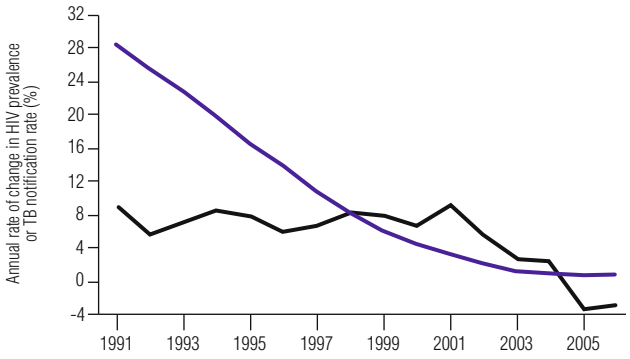


FIGURE 1.8

Annual changes (%) in estimated HIV prevalence rate in the general population, purple line) and the TB case notification rate (black line, see Figure 1.7) for sub-region Africa high-HIV, 1990–2006. Changes are relative to the preceding year. Estimates of HIV prevalence are from UNAIDS (personal communication).



a more rapid increase from 43% to 60% between 2001 and 2005 (Figure 1.10b). The improvement that occurred between 2002 and 2006 was attributable mostly to increases in the numbers of new smear-positive cases reported in the Eastern Mediterranean, South-East Asia and Western Pacific regions (Table 1.4).

The Region of the Americas and the European Region reported the largest numbers of new smear-positive cases from outside DOTS programmes. Counting all smear-positive cases from all sources, the case detection rate in the Region of the Americas was 76% (Table 1.4, Figure 1.11a). Counting all new cases (pulmonary and extrapulmonary) from all sources, the overall case detection rate in Europe was 70% (Figure 1.11b).

The 5.1 million new TB cases (all forms) that were notified from all sources in 2006 represent 56% of the 9.2 million estimated new cases. This is a further improvement from 2005, and continues the upward trend that began in 2002, following several years in which the detection rate had remained stable at 40–50% (Figure 1.10b).

TABLE 1.3

Case notifications, 2006

	NEW AND RELAPSE CASES		NEW CASES						RE-TREATMENT CASES EXCLUDING RELAPSE		OTHER[a]		% OF NEW PULMONARY CASES SMEAR-POSITIVE[b]	
			SMEAR-POSITIVE		SMEAR-NEGATIVE/ UNKNOWN		EXTRA-PULMONARY							
	DOTS	WHOLE COUNTRY	DOTS	WHOLE COUNTRY	DOTS	WHOLE COUNTRY	DOTS	WHOLE COUNTRY	DOTS	WHOLE COUNTRY	DOTS	WHOLE COUNTRY	DOTS	WHOLE COUNTRY
1 India	1 228 589	1 228 827	553 797	–	400 496	400 680	183 203	–	169 138	–	–	–	58	58
2 China	940 889	–	468 291	–	382 492	–	38 294	–	30 492	–	40 007	–	55	–
3 Indonesia	277 589	–	175 320	–	91 029	–	7 013	–	–	–	–	–	66	–
4 South Africa	303 114	–	131 099	–	93 348	–	47 849	–	38 051	–	–	–	58	–
5 Nigeria	70 734	–	39 903	–	25 782	–	2 975	–	3 491	–	–	–	61	–
6 Bangladesh	145 186	–	101 967	–	24 565	–	14 436	–	–	–	–	–	81	–
7 Ethiopia	122 198	–	36 674	–	40 234	–	43 255	–	811	–	–	–	48	–
8 Pakistan	176 678	–	65 253	–	82 519	–	25 745	–	2 389	–	–	–	44	–
9 Philippines	147 305	–	85 740	–	55 964	–	1 445	–	912	–	–	–	61	–
10 DR Congo	95 666	–	63 488	–	10 093	–	18 213	–	1 989	–	484	–	86	–
11 Russian Federation	102 997	124 689	29 989	–	56 713	73 252	9 502	12 059	12 472	27 576	–	–	35	31
12 Viet Nam	97 363	–	56 437	–	16 645	–	17 711	–	921	–	–	–	77	–
13 Kenya	108 342	–	39 154	–	48 338	–	17 443	–	6 892	–	–	–	45	–
14 UR Tanzania	59 282	–	24 724	–	20 120	–	12 621	–	2 818	–	–	–	55	–
15 Uganda	40 782	–	20 364	–	14 940	–	4 027	–	797	–	–	–	58	–
16 Brazil	61 127	77 632	32 463	–	17 688	22 585	8 374	10 656	4 342	5 661	–	–	65	65
17 Mozambique	35 257	–	18 275	–	10 618	–	4 929	–	375	–	–	–	63	–
18 Thailand	56 230	–	29 081	–	17 607	–	7 800	–	1 437	–	1 161	–	62	–
19 Myanmar	122 472	–	40 241	–	42 741	–	34 495	–	3 973	–	–	–	48	–
20 Zimbabwe	44 328	–	12 718	–	23 775	–	6 559	–	3 446	–	–	–	35	–
21 Cambodia	34 660	–	19 294	–	6 875	–	7 800	–	806	–	–	–	74	–
22 Afghanistan	25 475	–	12 468	–	6 809	–	5 066	–	–	–	–	–	65	–
High-burden countries	**4 296 263**	**4 334 698**	**2 056 740**	**2 067 794**	**1 489 391**	**1 511 011**	**518 755**	**523 594**	**285 552**	**301 975**	**41 652**	**41 652**	**58**	**58**
AFR	1 223 008	1 234 260	549 420	555 123	379 631	381 696	220 151	220 643	74 728	75 102	1 479	1 479	59	59
AMR	204 547	224 548	114 412	125178	48 830	54 670	29 824	32 392	9 377	10 803	463	465	70	70
EMR	318 973	322 306	131 820	131 882	113 401	115 040	64 921	66 543	3 474	3 474	17	17	54	53
EUR	310 156	359 735	100 102	109 901	142 303	170 786	45 579	56 363	41 548	61 126	141	3 091	41	39
SEAR	1 920 371	1 920 644	938 572	938 637	609 499	609 705	261 837	261 839	182 640	182 640	1 382	1 389	61	61
WPR	1 297 078	1 331 333	662 152	671254	488 956	506 031	79 672	86 136	36 571	40 752	40 997	44 288	58	57
Global	**5 274 133**	**5 392 826**	**2 496 478**	**2 531 975**	**1 782 620**	**1 837 928**	**701 984**	**723 916**	**348 338**	**373 897**	**44 479**	**50 729**	**58**	**58**

– Indicates zero, or all cases notified under DOTS; no additional cases notified under non-DOTS.
[a] Cases not included elsewhere in table.
[b] Expected percentage of new pulmonary cases that are smear-positive is 65–80%.

FIGURE 1.9

Tuberculosis notification rates, by country, 2006

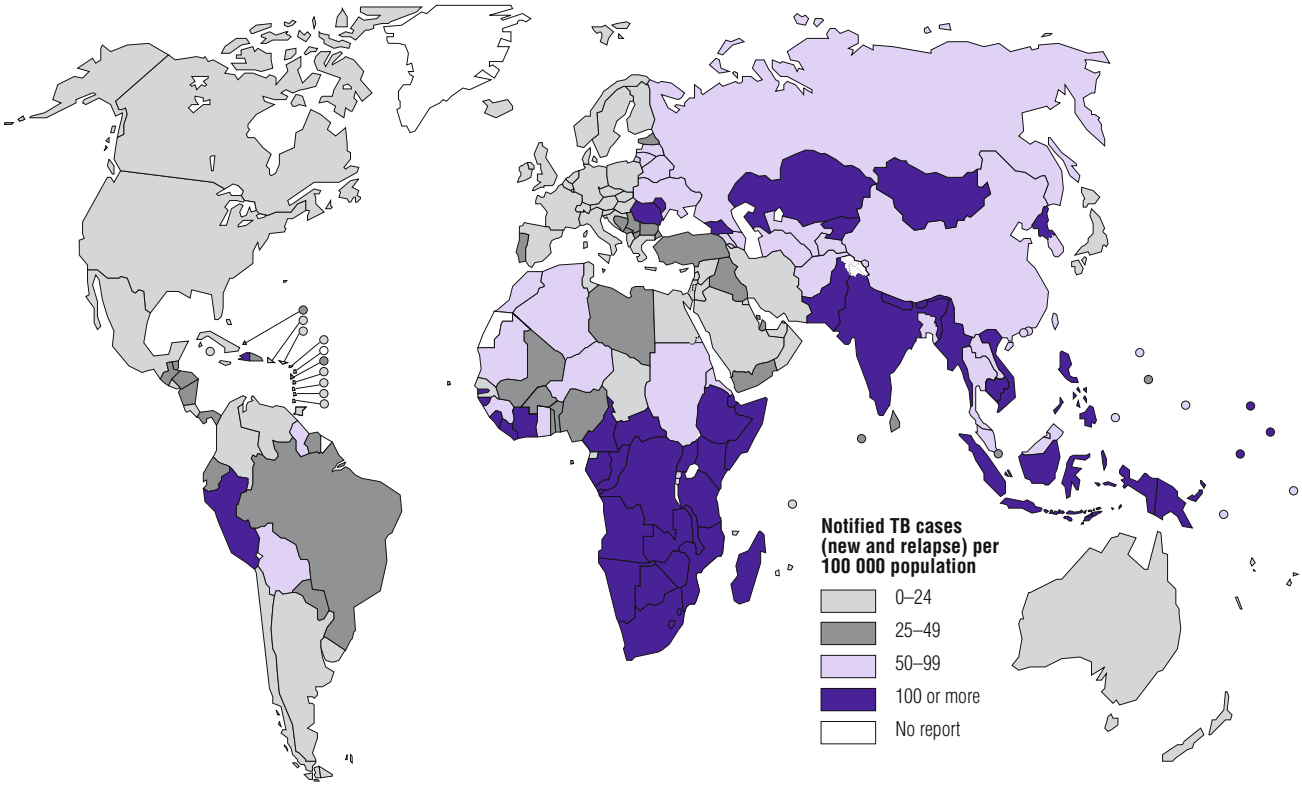


TABLE 1.4

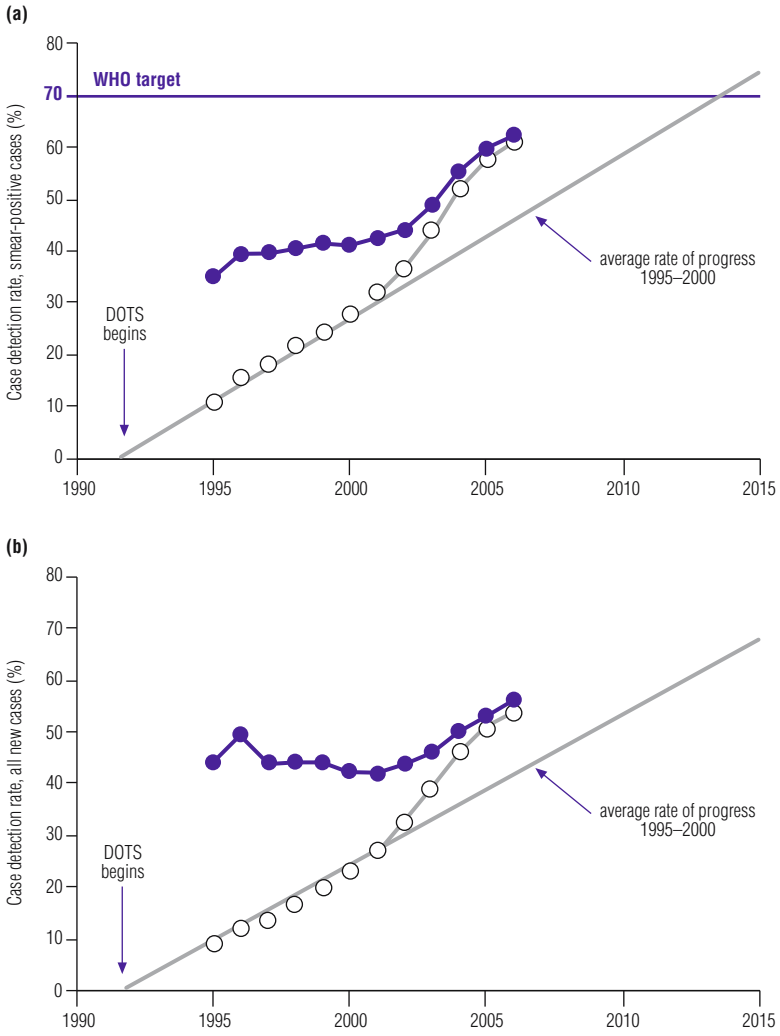
Case detection rate for new smear-positive cases (%), 1995–2006[a]

	DOTS PROGRAMMES												WHOLE COUNTRY											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1 India	0.3	0.9	1.0	1.6	6.8	12	23	30	43	55	59	64	37	40	37	37	45	44	48	49	52	58	60	64
2 China	15	29	32	32	30	31	31	30	43	64	80	79	22	34	39	34	33	34	34	33	45	65	*	*
3 Indonesia	1.3	4.4	7.4	12	19	20	21	30	37	52	65	73	12	*	*	*	*	*	*	*	*	*	*	*
4 South Africa	–	–	6.3	22	61	58	56	66	71	70	67	71	2	70	84	110	88	72	65	67	71	73	70	*
5 Nigeria	11	11	10	11	12	12	12	11	15	17	18	20	*	*	*	*	*	*	14	12	*	*	*	*
6 Bangladesh	6.4	14	18	23	23	24	26	30	35	40	54	65	14.4	21	23	26	25.5	26	27.0	31	*	*	*	*
7 Ethiopia	15	20	22	23	24	30	30	30	31	31	29	27	*	24	*	*	*	*	*	*	*	*	*	*
8 Pakistan	1.0	1.7	–	3.7	2.0	2.8	5.2	13	17	25	37	50	2	*	–	13	5	*	9	13	*	*	*	*
9 Philippines	0.4	0.5	3.2	10	20	48	56	61	67	72	74	77	96	87	82	70	71	64	*	*	*	*	*	*
10 DR Congo	41	47	44	54	51	48	50	49	55	62	63	61	43	*	*	*	*	*	*	*	*	*	*	*
11 Russian Federation	–	0.5	1.1	1.0	1.8	4.9	5.5	7.4	9.3	15	33	44	77	74	67	63	31	37	36	40	42	45	48	47
12 Viet Nam	30	59	78	82	83	82	83	87	85	89	84	85	59	77	84	85	83	*	*	*	*	*	*	*
13 Kenya	57	58	54	59	58	51	59	61	64	66	68	70	*	*	*	*	*	56	*	*	*	*	*	*
14 UR Tanzania	57	56	53	54	52	49	48	45	46	47	47	46	*	*	*	*	*	*	*	*	*	*	*	*
15 Uganda	–	–	56	56	56	48	44	44	44	45	44	44	48	53	*	*	*	*	*	*	*	*	*	*
16 Brazil	–	–	–	3.2	3.1	5.8	6.3	7.5	14	37	43	55	61	61	61	55	60	61	59	65	64	70	70	69
17 Mozambique	57	52	50	49	48	45	43	43	43	44	46	47	*	*	*	*	*	*	*	*	*	*	*	*
18 Thailand	–	0.3	5.1	22	40	47	74	67	73	73	76	73	57	47	36	*	*	*	*	*	*	*	*	*
19 Myanmar	–	26	27	29	33	49	58	68	76	86	100	109	26	29	29	*	*	*	60	*	*	*	*	*
20 Zimbabwe	–	–	–	50	47	45	45	46	41	44	41	42	48	53	56	*	*	*	*	*	*	*	*	*
21 Cambodia	40	34	45	48	54	50	48	57	62	62	68	62	*	43	*	*	*	*	*	*	*	*	*	*
22 Afghanistan	–	–	3.1	9.3	8.6	15	24	33	34	44	52	66	–	–	*	*	*	*	*	*	*	*	*	*
High-burden countries	**8.3**	**14**	**16**	**20**	**23**	**26**	**30**	**34**	**43**	**53**	**59**	**63**	**31**	**36**	**37**	**37**	**39**	**39**	**40**	**42**	**47**	**55**	**60**	**63**
AFR	23	25	29	34	35	35	36	42	44	46	45	46	33	41	40	45	41	40	41	43	45	47	46	46
AMR	25	25	27	31	34	41	40	43	47	56	60	69	65	66	70	68	69	69	71	71	72	73	74	76
EMR	11	9.6	11	18	20	24	26	31	33	38	45	52	24	26	23	32	31	26	29	31	33	38	45	52
EUR	2.6	3.5	4.6	11	11	12	14	22	23	26	36	52	64	63	58	58	45	47	43	42	52	48	50	57
SEAR	1.5	4.0	5.5	8.0	14	18	27	34	44	55	62	67	29	30	29	30	37	39	42	45	50	57	62	67
WPR	16	28	32	33	32	37	39	39	50	65	77	77	36	45	49	44	44	44	43	43	53	67	78	78
Global	**11**	**16**	**18**	**22**	**24**	**28**	**32**	**37**	**44**	**52**	**58**	**61**	**35**	**39**	**40**	**41**	**42**	**41**	**43**	**44**	**49**	**55**	**60**	**62**

– Indicates not available.
* No additional data beyond DOTS report, either because country is 100% DOTS, or because no non-DOTS report was received.
[a] Estimates for all years are recalculated as new information becomes available and techniques are refined, so they may differ from those published previously.

FIGURE 1.10

Progress towards the 70% case detection target. (a) Open circles mark the number of new smear-positive cases notified under DOTS 1995–2006, expressed as a percentage of estimated new cases in each year. The straight line through these points indicates the average annual increment from 1995 to 2000 of about 134 000 new cases, compared to the average increment from 2000 to 2006 of about 243 000 cases. Closed circles show the total number of smear-positive cases notified (DOTS and non-DOTS) as a percentage of estimated cases. (b) As (a), but for all new cases (excluding relapses).



1.5.2 Case detection rate, DOTS programmes

The principal WHO measure of case detection is the rate of case detection for new smear-positive cases in DOTS programmes, i.e. the number of new smear-positive cases detected by DOTS programmes divided by the estimated number of incident smear-positive cases. In 2006, DOTS programmes detected 2 496 478 new smear-positive cases (99% of all new smear-positive cases that were notified) out of an estimated 4.1 million new smear-positive cases, giving a case detection rate of 61% (**Table 1.4, Figure 1.10a**). The point estimate of a 61% case detection rate for 2006 is still below the 70% target set for 2005. There is, however, much uncertainty surrounding this estimate: the calculated 95% confidence limits range from 55% to 75%, but this does not account for all sources of random and systematic error.

New smear-positive case detection rates by DOTS programmes in 2006 were lowest in the African (46%) and European (52%) regions and highest in the Western Pacific Region (77%), the South-East Asia Region (67%) and the Region of the Americas (69%; **Table 1.4, Figure 1.11, Figure 1.12**). The Western Pacific is still the only region to have exceeded the 70% target, although the Americas (69%) and the South-East Asia regions (67%) fall just short on 2006 estimates. The particularly low figure for Europe compared with the overall case detection rate for all forms of TB of 70% (**Figure 1.11b**) suggests two major reasons for failing to reach the WHO target in this region: incomplete geographical coverage of DOTS and lack of emphasis on sputum smear microscopy (countries in the European Region report substantial numbers of cases in whom disease is diagnosed by methods other than sputum smear microscopy, and these cases are not necessarily smear-negative). In the Region of the Americas, the target of a 70% case detection rate for new smear-positive cases in DOTS programmes could be achieved simply by expanding the geographical coverage of DOTS programmes.

Although case detection of new smear-positive cases improved globally between 2005 and 2006, the rate of increase slowed compared with previous years: the increment between 2005 (58%) and 2006 (61%) was just 3%, the smallest reported annual increase since 1999–2000 (**Table 1.4, Figure 1.10a**). In the South-East Asia Region, the acceleration in case-finding after 2000 was

FIGURE 1.11

Proportion of estimated cases notified under DOTS (grey portion of bars) and non-DOTS (purple portion of bars) in 2006. The number of notified cases (in thousands) is shown in or above each portion or each bar. The grey portion of the bars is cases notified in DOTS programmes. The purple portion is the number notified outside DOTS prorammes.

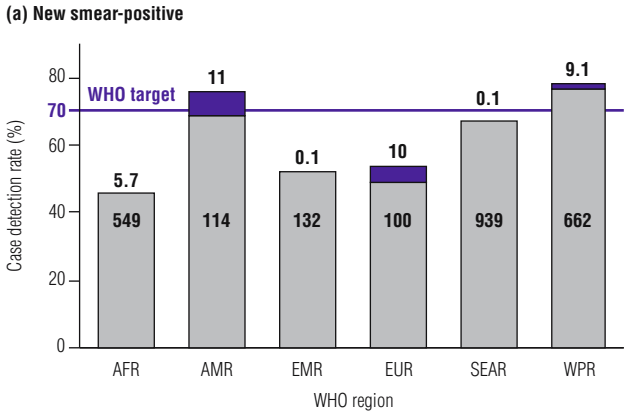


FIGURE 1.12

Smear-positive case detection rate under DOTS, by WHO region, 1995–2006. Heavy line shows global DOTS case detection rate.

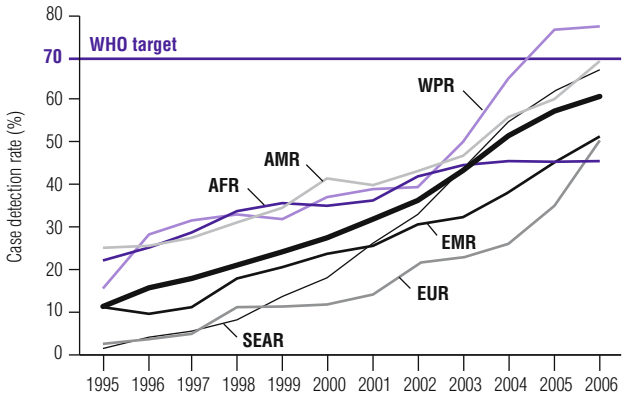
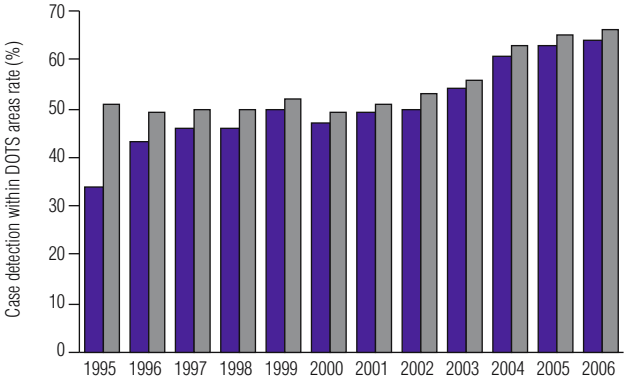


FIGURE 1.13

Smear-positive case detection rate within DOTS areas[a] for high-burden countries (purple) and the world (grey), 1995–2006



[a] Calculated as DOTS case detection rate of new smear-positive cases divided by DOTS coverage.

attributable mostly to progress in Bangladesh, India, Indonesia and Myanmar. The more recent deceleration in detection is mainly a result of slowing DOTS expansion into India's northern states, as the Indian national TB control programme (NTP) reaches full national coverage. The Western Pacific Region is dominated by China, where case-finding expanded rapidly between 2002 and 2005. However, China has made no progress in case-finding since reporting that the 70% target had been met in 2005 (**Table 1.3, Table 1.4; Annex 1**). The South-East Asia and Western Pacific regions are now slowing global progress in case detection.

DOTS programmes detected 4 990 374 new cases in 2006 (98% of all notifications) out of a total of 9.2 million estimated cases (**Table 1.2, Table 1.3**). This is equivalent to a case detection rate (all new cases) of 54%.

1.5.3 Case detection rate within DOTS areas

The case detection rate within DOTS areas (measured by the ratio of case detection to DOTS population coverage) changed little between 1995 and 2001, averaging 50% worldwide. Subsequently, it has increased to 66% in 2006 (**Figure 1.13**). This illustrates how increases in case detection rates in DOTS areas have made an important contribution to the overall improvement in case detection since 2001.

1.5.4 Number of countries reaching the 70% case detection target

National estimates of the case detection rate suggest that 77 countries met the 70% target by the end of 2006. Of the additional new smear-positive cases reported by DOTS programmes in 2006 (compared with 2005), 30% were in India and 33% were in Bangladesh, Pakistan and Indonesia (**Figure 1.14**).

While China and India have made big improvements in case detection in recent years, these two countries

FIGURE 1.14

Contributions to the global increase in the number of new smear-positive cases notified under DOTS made by high-burden countries, 2005–2006

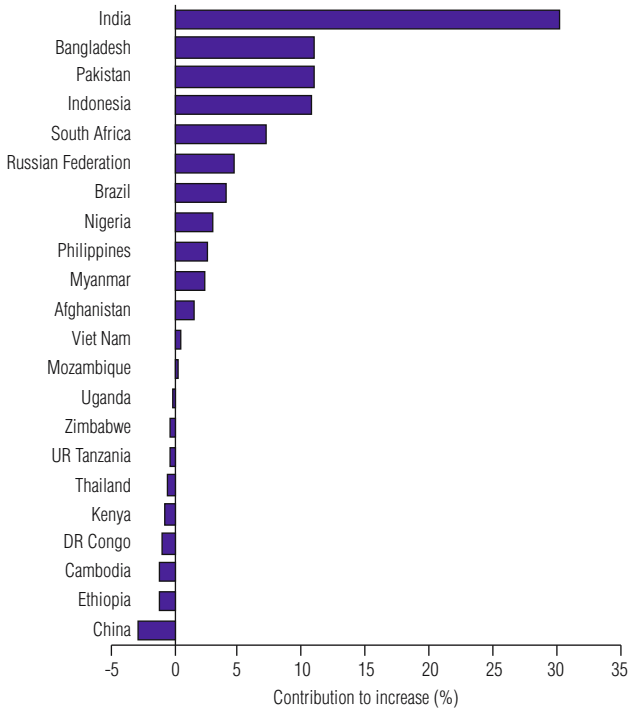
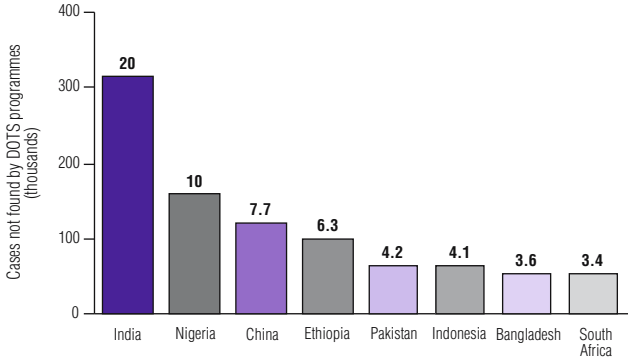


FIGURE 1.15

Smear-positive TB cases undetected by DOTS programmes in eight high-burden countries, 2006. Numbers indicate the percentage of all missed cases that were missed by each country.



still accounted for an estimated 28% of all undetected new smear-positive cases in 2006. In 2006, as in 2005, Nigeria succeeded China as the second largest reservoir of undetected cases (10%). These three countries are among eight that together accounted for 59% of all smear-positive cases not detected by DOTS programmes in 2006 (**Figure 1.15**).

1.5.5 Prospects for future progress

It is inevitable that progress in case-finding of new smear-positive cases will slow as HBCs reach nationwide DOTS coverage, but the rate of increase in case detection is decelerating before reaching the 70% target globally. To compensate for slower progress in the regions where case detection is above (Western Pacific) or close to (South-East Asia) the target, faster progress is needed where case detection is lower, namely in the African (46%), the Eastern Mediterranean (52%) and European (52%) regions. The African Region is the most important in absolute terms; based on the latest estimates, it accounts for 75% of the "missing" cases among these three regions, with Ethiopia and Nigeria alone accounting for more than one-quarter of missing cases in these three regions.

The implication that DOTS programmes in the African Region in particular need to improve case detection comes with an important caveat. Efforts to assess improvements in case detection in the African Region have been confounded by the upward trend in incidence linked to the spread of HIV infection, such that it has been difficult to disentangle the effect of better programme performance leading to better case-finding, and the impact of the HIV epidemic, on increases in case notifications. In this context, a detailed investigation of DOTS implementation in Kenya found that the rise in smear-positive notifications from 92 to 107 per 100 000 between 2000 and 2006 was mostly due to an increase in case detection, rather than an increase in TB incidence linked to HIV. Consequently, the case detection rate has increased to 70% in 2006 (see also **Annex 1**).[1] Similar investigations in other African countries may reveal that case detection is higher than stated in this report, and perhaps increasing more quickly than portrayed in **Table 1.4**.

1.6 Outcomes of treatment in DOTS programmes

1.6.1 New smear-positive cases

A total of 2 359 003 new smear-positive cases were registered for treatment in DOTS programmes in 2005, approximately the same number that were notified that year (**Table 1.5**). The biggest proportional discrepancies, where registered cases exceeded notifications, were in the Americas (Brazil), and in the Russian Federation and South Africa.

[1] Mansoer J et al. Estimating changes in the tuberculosis case detection rate in Kenya [submitted for publication].

TABLE 1.5

Treatment outcomes for new smear-positive cases treated under DOTS, 2005 cohort

	NOTIFIED	REGISTERED[a]	REGST'D (%)	TREATMENT OUTCOMES (%)[a] CURED	COMPLETED TREATMENT	DIED	FAILED	DEFAULTED	TRANS-FERRED	NOT EVAL'D	TREATMENT SUCCESS (%)	% EST[b] CASES SUCCESSFULLY TREATED UNDER DOTS
1 India	506 852	507 204	100	83	2.3	4.5	2.4	6.9	0.6	0.0	86†	51
2 China	472 719	472 719	100	92	1.9	1.7	0.9	0.8	0.9	1.9	94†	75
3 Indonesia	158 640	158 640	100	83	7.7	2.1	1.1	4.1	1.9	0.0	91†	59
4 South Africa	119 906	128 393	107	58	13	7.1	1.7	10	5.6	3.9	71	51
5 Nigeria	35 048	35 080	100	50	25	9.0	3.8	11	0.5	0.4	75	13
6 Bangladesh	84 848	84 848	100	91	0.9	3.5	0.6	2.1	1.8	0.5	91†	50
7 Ethiopia	38 525	39 430	102	64	14	5.4	0.6	4.3	4.6	7.1	78	23
8 Pakistan	48 319	48 205	100	71	13	2.8	0.7	9.5	3.7	0.0	83	31
9 Philippines	81 647	81 125	99	82	7.4	2.4	1.0	4.3	2.4	0.5	89†	66
10 DR Congo	65 040	65 066	100	80	5.2	5.7	1.2	4.4	2.5	1.3	85	54
11 Russian Federation	22 690	25 692	113	55	2.8	13	14	11	4.1	0.0	58	22
12 Viet Nam	55 492	55 492	100	90	2.1	3.3	1.0	1.5	1.9	0.0	92†	78
13 Kenya	40 389	40 436	100	71	12	5.0	0.3	7.7	4.6	0.0	82	56
14 UR Tanzania	25 264	25 324	100	79	3.5	9.5	0.3	3.5	4.5	0.0	82	39
15 Uganda	20 559	20 559	100	32	41	5.7	0.4	16	5.0	0.1	73	32
16 Brazil	26 224	33 527	128	32	44	5.1	0.7	9.0	4.4	4.3	77	42
17 Mozambique	17 877	17 877	100	78	1.1	12	1.1	5.4	1.7	0.8	79	37
18 Thailand	29 762	29 919	101	70	4.8	8.2	1.8	6.7	3.2	5.5	75	57
19 Myanmar	36 541	34 859	95	78	7.4	5.4	2.4	5.1	2.1	0.0	85	81
20 Zimbabwe	13 155	12 860	98	59	9.0	12	1.6	7.4	12	0.0	68	27
21 Cambodia	21 001	21 001	100	89	3.7	3.3	0.3	2.0	1.8	0.1	93†	63
22 Afghanistan	9 949	10 013	101	83	6.9	2.1	1.4	2.1	4.6	0.0	90†	47†
High-burden countries	**1 930 447**	**1 948 269**	**101**	**80**	**6.1**	**4.1**	**1.6**	**5.0**	**2.0**	**1.1**	**86†**	**52**
AFR	538 816	546 832	101	63	13	6.9	1.4	8.6	4.5	2.5	76	35
AMR	101 808	108 413	106	57	21	4.8	1.0	6.5	3.2	6.2	78	50
EMR	113 677	113 555	100	72	11	2.9	1.1	7.7	3.7	1.2	83	37
EUR[c]	72 316	73 768	102	60	10	8.3	8.4	7.7	2.9	2.2	71	27
SEAR	855 306	854 169	100	83	3.5	4.1	1.9	5.6	1.2	0.2	87†	54
WPR	661 322	662 266	100	89	3.2	2.2	0.9	1.5	1.3	1.9	92†	71
Global	**2 343 245**	**2 359 003**	**101**	**78**	**7.1**	**4.3**	**1.7**	**5.4**	**2.3**	**1.6**	**85**	**49**

† Treatment success ≥ 85% (treatment success for DR Congo 84.9%, for the world 84.7%).

[a] Cohort: cases diagnosed during 2005 and treated/followed-up through 2006. See Table A2.1 and accompanying text for definitions of treatment outcomes. If the number registered was provided, this (or the sum of the outcomes, if greater) was used as the denominator for calculating treatment outcomes. If the number registered was missing, then the number notified (or the sum of the outcomes, if greater) was used as the denominator.

[b] Est: estimated cases for 2005 (as opposed to notified or registered for treatment).

[c] Laboratory-confirmed notifications and treatment outcomes from Belarus, Bosnia & Herzegovina, Bulgaria, Israel and Italy included here; outcomes for smear-positive cases not available.

The cure rate among cases registered under DOTS worldwide was 77.6%, and a further 7.1% completed treatment (no laboratory confirmation of cure), giving a reported overall treatment success rate of 84.7%, very close to the 85% target (**Table 1.5**). This means that 49% of the smear-positive cases estimated to have occurred in 2005 were treated successfully by DOTS programmes. Among all the patients treated under DOTS, 9% had no reported outcome (defaulted, transferred, not evaluated). Treatment results for 12 consecutive cohorts (1994–2005) of new smear-positive patients show that the success rates have been 80% or higher in DOTS areas since 1998, even though the number of patients has increased 10-fold from 240 000 in 1994 to 2.4 million in 2005 (**Table 1.5, Table 1.6**).

The DOTS treatment success rate reached or exceeded 85% in ten HBCs (**Table 1.5**) and in 58 countries in total (**Annex 3**), and was reported to be 90% or more in cohorts of varying sizes in Afghanistan, Bangladesh, Cambodia, China, Indonesia and Viet Nam.

The global average treatment success rate was brought close to the target level by better outcomes in the South-East Asia and Western Pacific regions. The differences in treatment outcomes among WHO regions were similar to those reported in previous years, varying from 71% in Europe and 76% in Africa, to 87% in South-East Asia and 92% in the Western Pacific. The Western Pacific Region has always reported treatment success above the 85% target; South-East Asia has exceeded the target since 2002, and the Eastern Mediterranean Region has remained just below it (83% since 1999; **Table 1.5, Table 1.6**). Treatment success has been increasing in Africa, although cohorts of DOTS patients in this region continue to have high death and default rates: one or other of these indicators exceeded 10% in Mozambique, Nigeria, South Africa, Uganda and Zimbabwe.

In contrast to other regions, treatment outcomes deteriorated between 2004 and 2005 in the Region of the Americas and the European Region (**Table 1.6**). The treatment success rate of 71% in Europe in 2005 is the lowest recorded in that region since 1996 (albeit in an expanding cohort). In the Russian Federation, death and treat-

TABLE 1.6

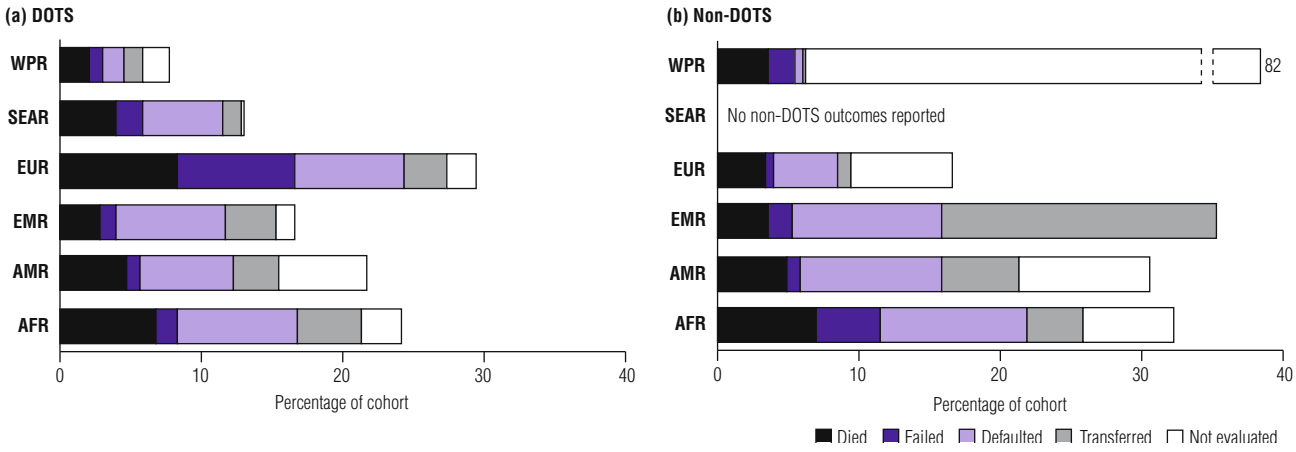
Treatment success for new smear-positive cases treated under DOTS (%), 1994–2005 cohorts[a]

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
1 India	83	79	79	82	84	82	84	85	87	86	86	86
2 China	94	96	96	96	97	96	95	96	93	94	94	94
3 Indonesia	94	91	81	54	58	50	87	86	86	87	90	91
4 South Africa	–	–	69	73	74	60	66	65	68	67	70	71
5 Nigeria	65	49	32	73	73	75	79	79	79	78	73	75
6 Bangladesh	73	71	72	78	80	81	83	84	84	85	90	91
7 Ethiopia	74	61	73	72	74	76	80	76	76	70	79	78
8 Pakistan	74	70	–	67	66	70	74	77	78	79	82	83
9 Philippines	80	–	82	83	84	87	88	88	88	88	87	89
10 DR Congo	71	80	48	64	70	69	78	77	78	83	85	85
11 Russian Federation	–	65	62	67	68	65	68	67	67	61	59	58
12 Viet Nam	91	91	90	85	93	92	92	93	92	92	93	92
13 Kenya	73	75	77	65	77	78	80	80	79	80	80	82
14 UR Tanzania	80	73	76	77	76	78	78	81	80	81	81	82
15 Uganda	–	–	33	40	62	61	63	56	60	68	70	73
16 Brazil	–	–	–	–	91	89	73	67	75	83	81	77
17 Mozambique	67	39	54	67	–	71	75	78	78	76	77	79
18 Thailand	–	–	78	62	68	77	69	75	74	73	74	75
19 Myanmar	–	66	79	82	82	81	82	81	81	81	84	85
20 Zimbabwe	–	–	–	–	70	73	69	71	67	66	54	68
21 Cambodia	84	91	94	91	95	93	91	92	92	93	91	93
22 Afghanistan	–	–	–	45	33	87	86	84	87	86	89	90
High-burden countries	**87**	**83**	**78**	**81**	**83**	**81**	**84**	**84**	**83**	**84**	**86**	**86**
AFR	59	62	57	63	70	69	72	71	73	73	74	76
AMR	76	77	83	82	81	83	81	82	83	83	82	78
EMR	82	87	86	79	77	83	83	83	84	83	83	83
EUR	68	69	72	72	76	77	77	75	76	75	74	71
SEAR	80	74	77	72	72	73	83	84	85	85	87	87
WPR	90	91	93	93	95	94	92	93	90	91	91	92
Global	**77**	**79**	**77**	**79**	**81**	**80**	**82**	**82**	**82**	**83**	**84**	**85**

– Indicates not available.
[a] See notes for Table 1.5.

FIGURE 1.16

Outcomes for those patients not successfully treated in (a) DOTS and (b) non-DOTS areas, by WHO region, 2005 cohort



ment failure rates were higher in 2005 than in any other HBC, and the treatment success rate of 58% was the lowest reported from that country since WHO records began in 1995. In the Region of the Americas in 2005, only 78% of patients completed treatment or were cured, the worst outcome since 1995.

Variation in treatment outcomes among regions raises important questions about the quality of treatment, the quality of the data and how quickly these will improve in future.

Poor outcomes in Africa and Europe are undoubtedly linked to high rates of HIV infection, drug resistance and weak health services.[1,2] Treatment results for individual African countries again point to the effects of HIV and inadequate patient support. The cohort death rate for the region as a whole was 7%, and higher still in Mozambique, Nigeria, South Africa, the United Republic of Tanzania and Zimbabwe (**Table 1.5**). Treatment interruption (default) and transfer without follow-up were also especially high in the African Region, at 8.6% and 4.5% respectively. More than 15% of patients had no known outcome in Ethiopia, South Africa, Uganda and Zimbabwe (**Table 1.5**). Cure was not confirmed (via a final, negative sputum smear) for large numbers of patients in Nigeria (25%) and Uganda (41%).

Death during treatment was 8.3% in the European Region, where a higher fraction of cases are drug resistant (Eastern Europe) or occur among the elderly (Western and Central Europe) (**Figure 1.16**). Treatment interruption was 7.7%, and the treatment failure rate was 8.4%, mainly because failure rates were high in Eastern Europe.

In the Region of the Americas, deteriorating outcomes are explained, at least in part, by the expansion of DOTS coverage, often into regions of countries with weaker health services. No outcome was reported for 16% of patients in the region as a whole (18% in Brazil) and in Brazil, 44% of patients completed treatment without cure being confirmed (via a final, negative sputum smear).

In 2005, as in previous years, treatment success was extraordinarily high in the Western Pacific Region (92%).

1.6.2 Re-treatment cases

A total of 531 232 patients were re-treated under DOTS in 2005 (**Table 1.7**). The re-treatment success rate in 2005 was 71%. As expected from the results of treating new patients, re-treatment success rates were lowest in the European Region (45%) and highest in the Western Pacific Region (87%).

[1] As argued in *Global tuberculosis control: surveillance, planning and financing. WHO report 2007.* Geneva, World Health Organization, 2007 (WHO/HTM/TB/2007.376).

[2] HIV may also have contributed to the high death rate in Thailand (12%) although, among Asian countries, Thailand has a relatively high proportion of elderly patients (Annex 3).

1.6.3 Comparison of treatment outcomes in HIV-positive and HIV-negative TB patients

Data on the outcomes of treatment for HIV-positive and HIV-negative TB patients were reported separately by between 25 and 47 countries, depending on the category of case (**Figure 1.17**; smear-negative and extrapulmonary cases are presented as one category, since separate analysis showed very similar treatment outcomes for these two types of case). These countries were almost exclusively in the Region of the Americas and the European Region. There were few data for African countries (only Comoros, Gabon, and Mauritius), even though Africa accounts for 85% of estimated HIV-positive cases. The data that were reported show lower treatment success rates among HIV-positive patients, due mainly to higher death rates and, to a lesser extent, higher default rates. A similar pattern existed for two regions that could be analysed separately (the Region of the Americas and the European Region; data not shown).

1.7 Progress towards targets for case detection and cure

Point estimates of case detection and treatment success indicate that the world as a whole failed to meet the targets for both indicators. However, measurement uncertainty allows the possibility that case detection exceeded 70% in 2006, and treatment success was only 0.3% below the target of 85% in the 2005 cohort. Both targets for case detection and treatment success were exceeded in the Western Pacific Region. South-East Asia achieved more than 85% treatment success, and case detection was just under 70%. The European Region performed worst on both indicators.

Data on both treatment success and case detection were provided by 202 countries that were implementing DOTS. In 99 countries, the rate of case detection exceeded 50% and the treatment success rate was over 70% (**Figure 1.18**). Of these countries, 32 appear to have reached both WHO targets. They include five HBCs: China, Indonesia, Myanmar, the Philippines and Viet Nam (**Figure 1.18, Figure 1.19**). Among 166 countries that provided data for both the 2004 and the 2005 cohorts, 98 (59%) showed higher treatment success rates for the 2005 cohort, and 56 of 177 (32%) improved case detection by more than 5% between 2005 and 2006.

Progress can also be directly compared with the expectations set out in the Global Plan (**Table 1.8**), which was designed to achieve the MDG, Stop TB Partnership and World Health Assembly targets set for 2015 (**Table 1.1**). The case detection rate for new smear-positive cases under DOTS in 2006, at 61%, lags behind the milestone of 65% in the Global Plan. This further reinforces the message that progress in DOTS implementation has decelerated between 2005 and 2006. The detection of smear-negative and extrapulmonary cases also lags behind the Global Plan, and by a larger amount (48% esti-

TABLE 1.7

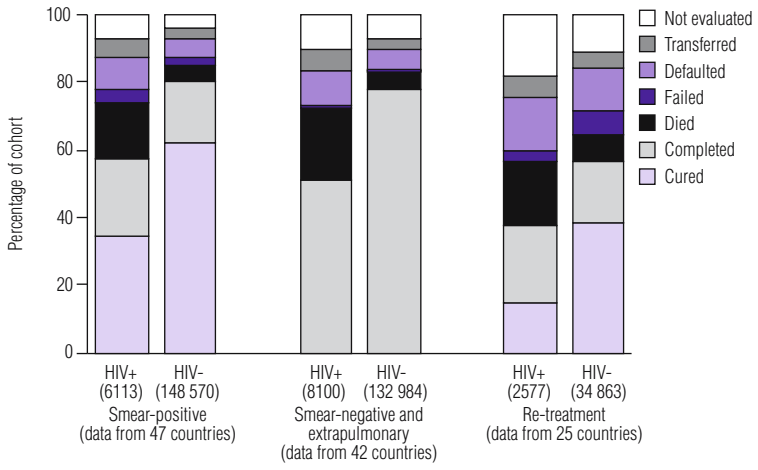
Re-treatment outcomes for smear-positive cases treated under DOTS, 2005 cohort[a]

	REGISTERED	TREATMENT OUTCOMES (%)							
		CURED	TREATMENT COMPLETED	DIED	FAILED	DEFAULTED	TRANS-FERRED	NOT EVAL'D	TREATMENT SUCCESS (%)
1 India	224 143	47	24	7.0	4.5	16	1.2	0.1	71
2 China	89 239	85	5.0	2.6	2.5	1.3	1.0	3.1	90†
3 Indonesia	4 812	63	15	3.4	3.8	8.3	6.5	0.0	78
4 South Africa	63 588	29	29	11	2.3	16	6.4	6.3	58
5 Nigeria	3 662	48	18	1.8	11	20	0.2	0.8	66
6 Bangladesh	3 876	73	6.4	3.9	2.3	4.9	4.1	5.2	80
7 Ethiopia	3 116	41	15	8.7	1.8	4.8	4.2	24	56
8 Pakistan	5 009	61	15	4.6	2.6	11	3.3	1.7	76
9 Philippines	–	–	–	–	–	–	–	–	–
10 DR Congo	5 448	71	3.7	10	4.5	6.1	3.2	2.0	74
11 Russian Federation	10 855	33	3.5	16	26	16	5.5	0.0	37
12 Viet Nam	7 374	79	3.8	5.4	5.8	3.0	2.8	0.3	83
13 Kenya	3 794	68	9.1	9.9	0.6	6.9	5.4	0.0	77
14 UR Tanzania	5 067	37	39	13	0.5	4.0	4.7	1.5	77
15 Uganda	–	–	–	–	–	–	–	–	–
16 Brazil	7 394	26	21	6.8	1.7	18	9.9	16	47
17 Mozambique	1 855	69	1.1	15	2.4	10.1	2.6	0.2	70
18 Thailand	2 285	52	5.9	12	4.9	6.8	4.5	13	58
19 Myanmar	6 039	59	13	9.2	5.9	7.4	4.7	0.0	73
20 Zimbabwe	4 667	13	46	16	0.3	13	11	0.0	60
21 Cambodia	1 306	49	27	8.7	2.1	2.7	4.3	6.7	76
22 Afghanistan	856	87	2.3	2.6	1.3	1.6	4.9	0.5	89†
High-burden countries	**454 298**	**53**	**19**	**7.1**	**4.1**	**12**	**2.6**	**2.2**	**72**
AFR	112 510	35	27	11	2.7	13	5.7	6.1	62
AMR	16 290	40	15	6.4	2.7	14	5.9	15	55
EMR	12 860	60	15	4.5	3.5	10	3.6	2.6	75
EUR	29 865	39	6.7	13	17	15	4.3	6.3	45
SEAR	253 864	49	22	6.8	4.7	15	1.6	0.3	72
WPR	105 843	81	5.8	3.0	2.7	1.7	1.8	3.7	87†
Global	**531 232**	**52**	**19**	**7.1**	**4.5**	**12**	**2.8**	**3.0**	**71**

– Indicates not available.
† Treatment success ≥ 85%.
[a] See notes for Table 1.5.

FIGURE 1.17

Treatment outcomes for HIV-positive and HIV-negative TB patients, 2005 cohort. The numbers under the bars are the numbers of patients included in the cohort.



mated for 2006 compared with the Global Plan milestone of 66%). More positively, progress in the treatment success rate is ahead of the Global Plan, at 85% compared with 83%. In addition, the absolute number of smear-positive patients treated in DOTS programmes in 2006 was higher than the number forecast in the Global Plan, due to the estimated incidence of TB in 2006 being higher than anticipated by the Global Plan.

1.8 Progress towards impact targets included in the Millennium Development Goals

1.8.1 Trends in incidence, prevalence and mortality

With the 9.2 million new incident TB cases in 2006, there were an estimated 14.4 million prevalent cases (219/100 000) on average (**Table 1.2**). An estimated 1.7 million people (25/100 000) died from TB in 2006, including those coinfected with HIV (231 000). The sequence of annual estimates up to 2006 suggests (as in the data up to 2005) that all three major indicators of impact – incidence, prevalence and mortality per 100 000 population – are falling globally. In our assessment, prevalence was already in decline by 1990, mortality peaked before the year 2000 and incidence began to fall in 2003 (**Figure 1.20**). TB prevalence continued to fall globally between 1990 and 2006 because, in Africa, the HIV epidemic caused a smaller increase in prevalence than in incidence or mortality.

The fall in the global incidence rate reinforces data presented in *Global Tuberculosis Control 2007*. If verified by further monitoring, the data show that MDG 6 Target 6.C was met by 2004, well ahead of the target date of 2015 (though as noted above, the total number of new cases continues to rise, due to population growth in the African, Eastern Mediterranean, European and South-East Asia regions). This turnover of the global epidemic is largely explained by stable or falling HIV prevalence in Africa and by the stabilization of TB incidence in the independent states that emerged from the dissolution of the Union of Soviet Socialist Republics. It is unlikely that either of these two phenomena is due primarily to the implementation of

FIGURE 1.18

DOTS status in 2006, countries close to targets. 99 countries reported treatment success rates 70% or over and DOTS detection rates 50% or over. 32 countries (including 2 countries out of range of graph) have reached both targets; 2 in the African Region, 5 in the Region of the Americas, 4 in the Eastern Mediterranean Region, 4 in the European Region, 5 in the South-East Asia Region and 12 in the Western Pacific Region.

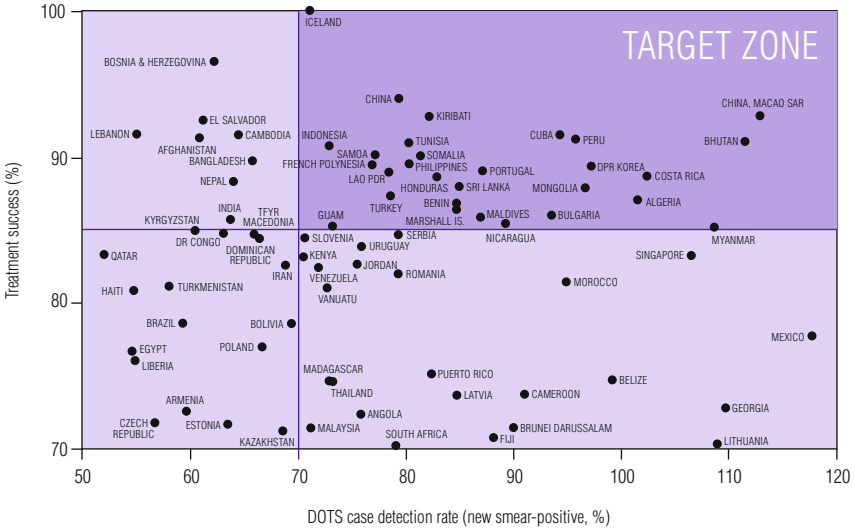


FIGURE 1.19

DOTS progress in high-burden countries, 2005–2006. Treatment success refers to cohorts of patients registered in 2004 or 2005, and evaluated, respectively, by the end of 2005 or 2006. Arrows mark progress in treatment success and DOTS case detection rate. Countries should enter the graph at top left, and proceed rightwards to the target zone. Countries from AFR, AMR and EMR are shown in purple, those from SEAR and WPR are shown in black.

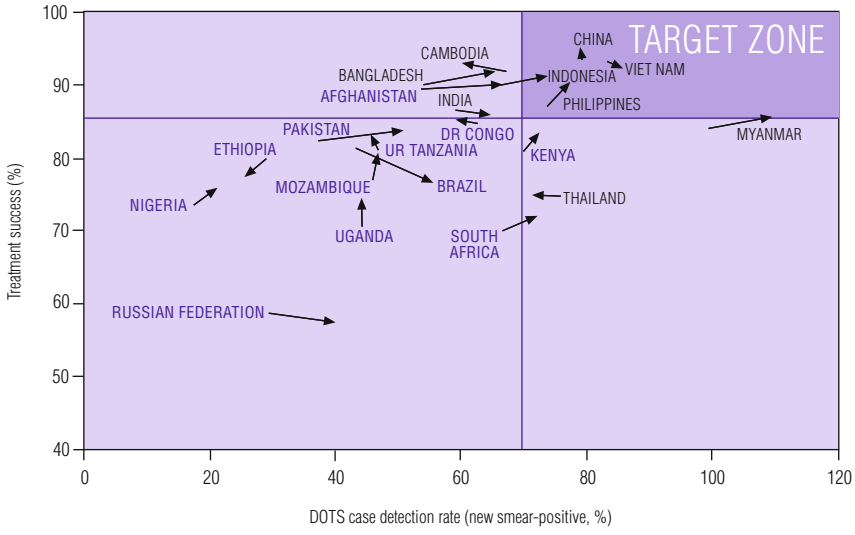


TABLE 1.8

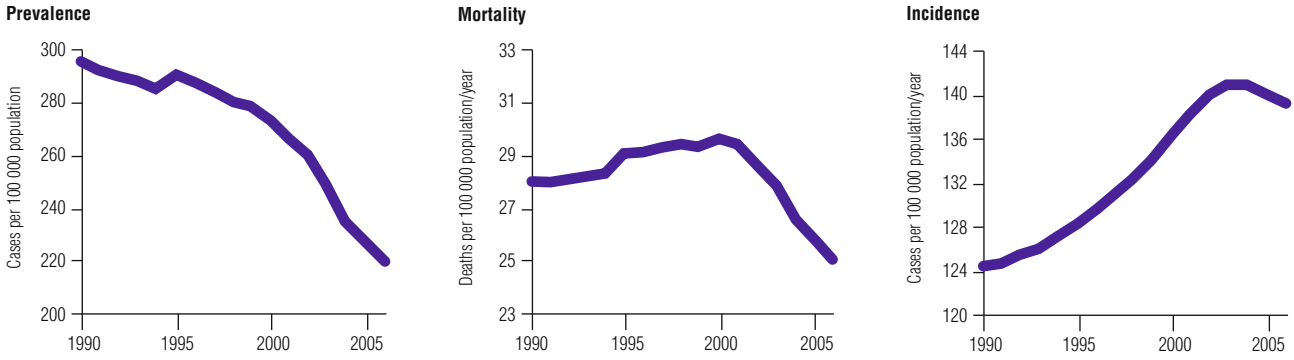
DOTS expansion and enhancement, 2006: country reports compared with expectations given in the Global Plan

	COUNTRY REPORTS[a]	GLOBAL PLAN
	(MILLIONS OR PERCENTAGES)	
Number of new smear-positive cases notified under DOTS	2.5	2.1
Estimated number of new smear-positive cases	4.0	3.3
New smear-positive case detection rate under DOTS	61%	65%
Number of new smear-positive cases successfully treated under DOTS	2.0	1.8
Number of new smear-positive cases registered for treatment under DOTS	2.3	2.1
New smear-positive treatment success rate, 2005	85%	83%
Number of new smear-negative and extrapulmonary cases notified under DOTS	2.4	3
Estimated number of new smear-negative and extrapulmonary cases	5.0	4.5
New smear-negative and extra-pulmonary case detection rate under DOTS	48%	66%

[a] Includes only those countries in the Global Plan, i.e. countries in sub-regions Central Europe and Established Market Economies are excluded here.

FIGURE 1.20

Estimated global prevalence, mortality and incidence rates, 1990–2006. Note the different scales on y-axes.



HIV/AIDS or TB control programmes (see next section 1.8.2 on determinants of TB dynamics), and there is little evidence, from regional trends in case notifications, that DOTS is accelerating the decline of the incidence of TB on a large scale in Asia.

The targets related to reductions in prevalence and deaths that have been set by the Stop TB Partnership – to halve 1990 prevalence and death rates by 2015 – are more demanding. If the estimated changes between 2001 and 2006 are correct, and if the average rates of change over this period persist, then prevalence and deaths per capita will fall quickly enough to meet the 2015 targets in the Region of the Americas and in the Eastern Mediterranean, South-East Asia and Western Pacific regions (**Figure 1.21**). They will not, however, be met in the African and European regions. In line with the trends in incidence (**Figure 1.6**), prevalence and death rates increased in the African and European regions between 1990 and 2006, most dramatically in Africa. For this reason, estimates for these two regions in 2006 are very much larger than the 2015 target values.

Based on progress between 2001 and 2006, and combining the results for all regions, the mortality and prevalence targets are unlikely to be met worldwide by 2015 (**Figure 1.21**).

1.8.2 Determinants of TB dynamics: comparisons among countries

A further assessment of the scale of the impact of DOTS around the world can be made by examining the national statistics that lie behind the regional and global summaries. The series of cases reported by 134 countries between 1997 and 2006 indicate that TB incidence rates per capita in most countries were changing at between –10% and +10% annually between 1997 and 2006, and falling slowly in the majority of these countries (**Figures 1.6 and 1.7**). It is possible that these variable rates of decline are attributable to the uneven success of TB control programmes. Alternatively, the differences among countries might be explained by other factors that affect transmission of and susceptibility to disease.

One way to distinguish between possible explanations is to identify, by comparing countries, which factors are more or less closely associated with changes in TB incidence. In a preliminary ecological analysis[1] of 30 possible explanatory variables (for methods, see **Annex 2**), trends in incidence per 100 000 population in the Latin America and Caribbean subregion are associated (p <0.05) with HIV prevalence (r^2 = 0.41, **Figure 1.22a**),

[1] A fuller analysis is in: Dye C et al, Determinants of trends in tuberculosis incidence: an ecologic analysis for 134 countries. Unpublished paper available from the authors.

with under-5 mortality (r^2 = 0.32), and with access to clean water (r^2 = 0.43) and adequate sanitation (r^2 = 0.50), among other variables. In the high-income countries of Western Europe and the United States of America, immigration is the single most important factor associated with TB dynamics (**Figure 1.22b**). In Central and Eastern Europe and in the Eastern Mediterranean Region, TB trends are linked to a variety of economic indicators including health expenditure per capita (**Figure 1.22c**) and expenditure in relation to GDP (**Figure 1.22d**). Only three of seven direct measures of TB control were significantly associated with trends in TB incidence, and the form of the association does not suggest any causal link. For example, smear-positive treatment success under DOTS (r^2 = 0.29), and the product of case detection (all forms of TB) and treatment success (r^2 = 0.32), were inversely correlated with TB decline in high-income countries.

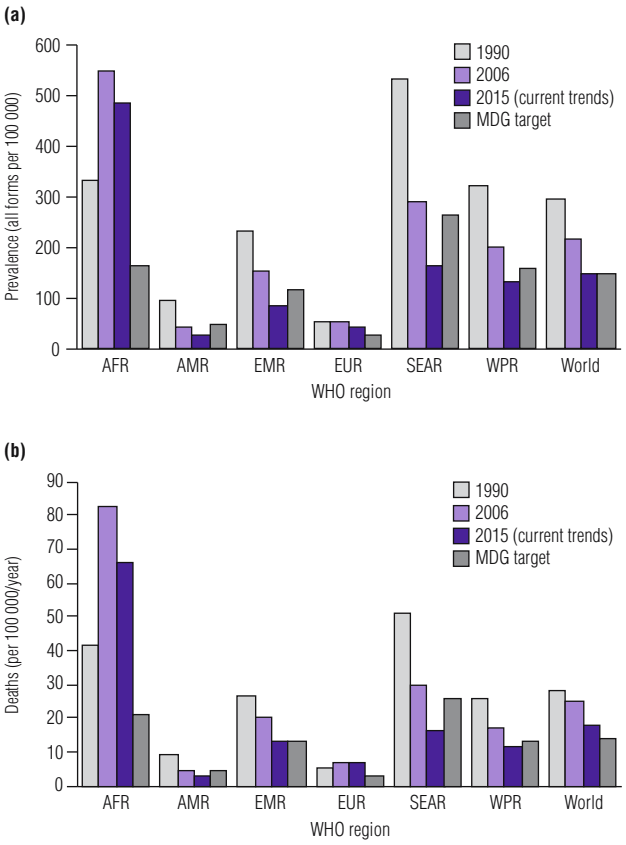
In multivariate analyses of this kind, the numerous explanatory variables tend to be inter-related, and some are more obviously linked to TB trends as covariates, rather than as primary epidemiological determinants. For example, in the African Region incidence was increasing more quickly in countries that spent more on TB control (r^2 = 0.49, **Figure 1.22e**). The likely explanation lies in the association between expenditure on TB per capita and HIV prevalence, with richer African countries that can spend more on health care also having higher HIV prevalence (r^2 = 0.53). Similarly, the decline in TB incidence in Central and Eastern Europe tends to be faster in countries where a higher proportion of women smoke (r^2 = 0.67, **Figure 1.22f**). The likely explanation is that smoking among women reflects affluence, which is linked to health and health services in ways that outweigh the importance of smoking as a risk factor for TB (correlation with GDP, r^2 = 0.67).

In brief, this ecological analysis provides no evidence that the standard, direct measures of DOTS implementation – case detection and treatment success in various combinations – can yet explain the variation in incidence trends among countries, despite the wide variation in DOTS implementation among countries. This observation suggests – subject to further investigation – that DOTS programmes have not yet had a major impact on TB transmission and incidence around the world.

All of the caveats attached to this proposition must be carefully examined before drawing firm conclusions. Key assumptions to be tested are that trends in case notifications reflect trends in TB incidence, and that there is measurable and meaningful variation among countries in incidence trends and their determinants. It is also possible that DOTS programmes have significantly cut transmission, but it is too soon to see the effects on incidence, or that the effects have been offset by the rise of other risk factors, such as diabetes. In addition, it is crucial to distinguish the well-established effects of DOTS on treatment outcome and mortality from the possible effects on transmission (under investigation here).

FIGURE 1.21

Estimated TB prevalence (a) and death rates (b), by WHO region, for the MDG baseline year 1990 and for 2006, compared with the MDG target for 2015 and with prevalence and death rates projected for 2015 based on current trends



1.9 Summary

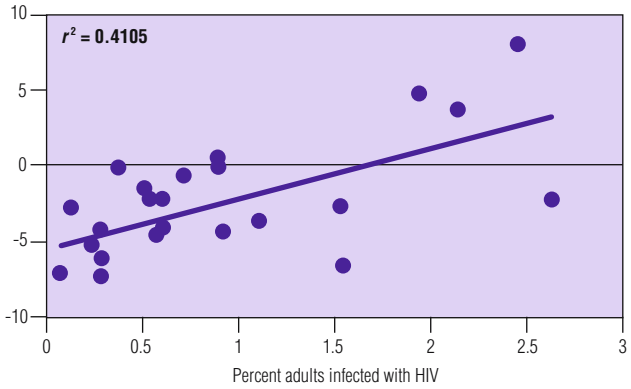
There were an estimated 9.2 million new cases of TB in 2006, of which 709 000 (8%) were HIV-positive. This is an increase from 2005, reflecting population growth in Asia, Africa and Europe. The countries that rank first to fifth in terms of absolute numbers of cases are India, China, Indonesia, South Africa and Nigeria, while Africa has the highest incidence rate per capita (linked to HIV) and accounts for 12 of the 15 countries with the highest TB incidence rates. There were an estimated 1.7 million deaths due to TB in 2006, of which 0.2 million were among HIV-positive people, and 14.4 million prevalent cases. These statistics show that TB remains a major global health problem.

More positively, the TB incidence rate per capita is declining globally, and in five out of the six WHO regions (it is approximately stable in Europe). The latest data indicate that the TB incidence rate has been falling globally since 2003. If this is confirmed by further monitoring, MDG 6 Target 6.C (to halt and reverse the incidence of TB) will be achieved well before the target date of 2015. Prevalence and deaths rates are also falling, and at a faster rate than TB incidence. Based on trends for the last five years, the Stop TB Partnership targets of halving prevalence and death rates by 2015 compared to 1990 could be achieved in the South-East Asia, West-

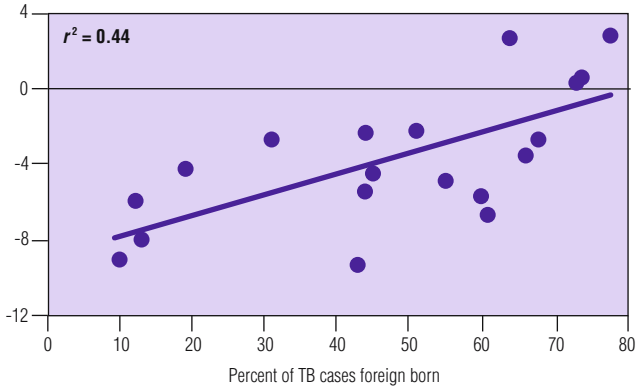
FIGURE 1.22

Correlates of the average annual change in TB incidence rate (vertical axes, %/yr), 1997–2006, in different subregions of the world

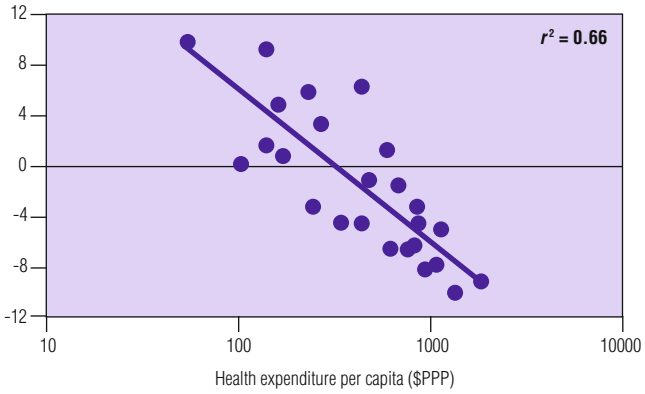
(a) Latin America



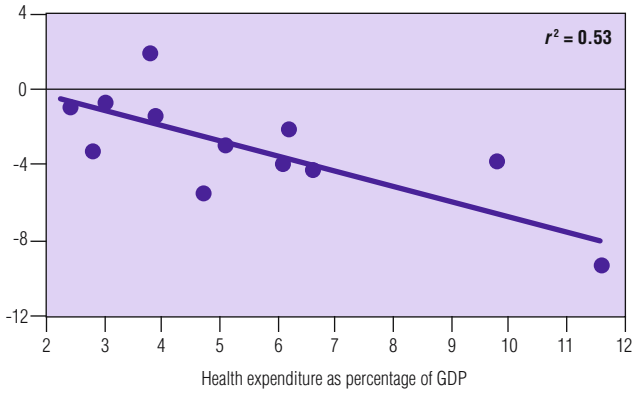
(b) High-income countries



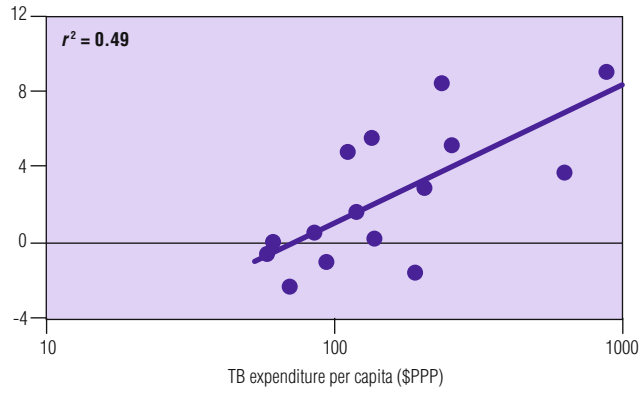
(c) Central and Eastern Europe



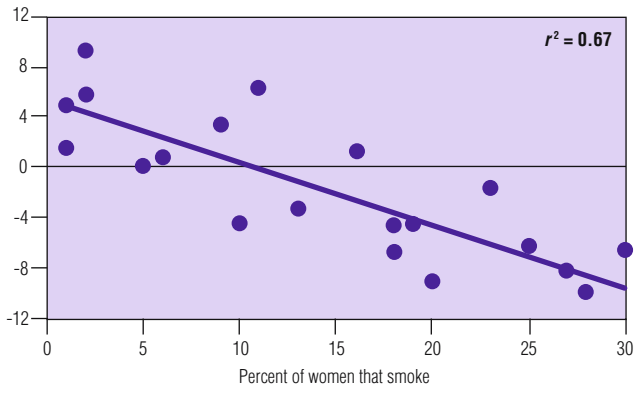
(d) Eastern Mediterranean



(e) Sub-Saharan Africa



(f) Central and Eastern Europe



ern Pacific and Eastern Mediterranean regions, and in the Region of the Americas. However, they are unlikely to be achieved globally based on current trends, due to two regions – the European and African regions – being far from the targets.

In addition to the impact indicators of incidence, prevalence and mortality, progress in TB control can also be assessed with reference to the outcome targets first set by the World Health Assembly in 1991: to detect at least 70% of new (incident) cases of smear-positive TB in DOTS programmes, and to successfully treat 85% of those cases that are detected. In 2005, the treatment success rate globally was 84.7%, just a fraction of one percent below the target, representing a further improvement from previous years despite a 10-fold increase in the annual number of patients treated in DOTS cohorts since 1994. This high average rate conceals the fact that treatment success rates remain well below the target in the European Region and in the Region of the Americas, and indeed the latest data show a worrying deterioration rather than progress in these two regions. With 5.3 million cases notified in DOTS programmes (98% of the total notified globally), of which 2.5 million were new smear-positive cases (99% of the total notified globally), the case detection rate for new smear-positive TB under DOTS is estimated at 61% globally (62% when notifications from non-DOTS programmes are included). The target of 70% has been exceeded in the Western Pacific Region and is close to being achieved in South-East Asia and the Region of the Americas. Increasing DOTS coverage in the Region of the Americas, and increasing both DOTS coverage and the use of smear microscopy in the European Region, could enable both of these regions to achieve the target for case detection. A total of 58 countries met the target for treatment success in 2005, 77 are assessed to have met the target for case detection in 2006, and 32 countries as well as the Western Pacific Region as a whole appear to have met both targets in 2005–2006.

While continued improvement in treatment success and case detection rates is encouraging, there has been a deceleration in the rate of progress in case detection globally, and the rate of 61% achieved in 2006 is behind the Global Plan milestone of 65%. China and India account for 28% of the estimated number of undetected cases, but there was almost no improvement in case detection in either country during 2006. Most of the remaining cases estimated to be undetected are in Africa. This suggests that further progress in case detection globally will depend to a great extent on progress in the African Region, and on further progress in China and India. For the African Region, there is an important caveat, however. It is possible that rates of case detection are currently underestimated, due to the difficulty of disentangling the effect of improved case-finding and the HIV epidemic on TB notifications. Further analytical work of the kind already done in Kenya, and new surveys conducted as part of the impact measurement work discussed in Chapter 2, will help to improve our current estimates of case detection in Africa.

New analytical work is also improving our understanding of the extent to which TB control programmes are driving trends in TB incidence, working with or against other biological, social and economic factors. The ecological analysis presented in this chapter suggests that while DOTS programmes have reduced deaths and prevalence, they have not yet had a major impact on TB transmission and incidence around the world. These observations lay down a challenge: to show that the diagnosis of active TB can be made early enough, and that cure rates can be high enough, to have a substantial impact on incidence on a large geographic scale. The greater the impact on incidence, the more likely it is that prevalence and deaths will be halved by the MDG deadline of 2015.

CHAPTER 2

Implementing the Stop TB Strategy

The Stop TB Strategy, launched by WHO in 2006, sets out the interventions that need to be implemented to achieve the MDG, Stop TB Partnership and World Health Assembly targets discussed in **Chapter 1**. The Global Plan to Stop TB, launched by the Stop TB Partnership in 2006, describes how, and at what scale, the strategy should be implemented over the decade 2006–2015 (see also **Chapter 1**). To monitor implementation of the strategy, WHO has asked countries to report on the implementation of TB control activities according to the strategy's major components and subcomponents (**Tables 2.1 and 2.2**) since 2006. In the 2007 round of data collection, countries were asked to report on activities implemented in 2006 and on activities planned for 2007 (see **Annex 2** for details on methods). In a few cases, data for 2008 were also requested.

This chapter summarizes the major findings and, wherever possible, presents these alongside comparable data reported in previous years to illustrate trends over time. It is structured in seven major sections. The first provides an overview of the completeness of reporting for each component of the Stop TB Strategy. The next six sections present results for the six major components of the Stop TB Strategy, as follows:

- *DOTS expansion and enhancement.* This section starts with an overview of DOTS implementation, including the number of countries in which DOTS is implemented, DOTS population coverage and the number of patients treated in DOTS programmes. It then discusses political commitment, case detection through quality-assured bacteriology, standardized treatment with supervision and patient support, drug supply and management systems, and monitoring and evaluation including impact measurement.
- *TB/HIV, MDR-TB and other challenges.* This section analyses the implementation of collaborative TB/HIV activities, the provision of diagnosis and treatment for cases of MDR-TB, TB control activities for prisoners, refugees and other high-risk groups, and TB control activities in special situations such as humanitarian emergencies.
- *Health system strengthening.* This section covers how the diagnosis of TB and treatment of TB patients are integrated into primary health care services, human resource development (HRD), and the links

TABLE 2.1

Components of the Stop TB Strategy

1. **Pursuing high-quality DOTS expansion and enhancement**
   a. Political commitment with increased and sustained financing
   b. Case detection through quality-assured bacteriology
   c. Standardized treatment with supervision and patient support
   d. An effective drug supply and management system
   e. Monitoring and evaluation system, and impact measurement
2. **Addressing TB/HIV, MDR-TB and other challenges**
   — Implement collaborative TB/HIV activities
   — Prevent and control MDR-TB
   — Address prisoners, refugees, other high-risk groups and special situations
3. **Contributing to health system strengthening**
   — Actively participate in efforts to improve system-wide policy, human resources, financing, management, service delivery and information systems
   — Share innovations that strengthen health systems, including the Practical Approach to Lung Health (PAL)
   — Adapt innovations from other fields
4. **Engaging all care providers**
   — Public–Public and Public–Private Mix (PPM) approaches
   — Implement International Standards for Tuberculosis Care
5. **Empowering people with TB, and communities**
   — Advocacy, communication and social mobilization
   — Community participation in TB care
   — Patients' Charter for Tuberculosis Care
6. **Enabling and promoting research**
   — Programme-based operational research
   — Research to develop new diagnostics, drugs and vaccines

TABLE 2.2

Technical elements of the DOTS strategy

Case detection through quality-assured bacteriology
Case detection among symptomatic patients self-reporting to health services, using sputum smear microscopy. Sputum culture is also used for diagnosis in some countries, but direct sputum smear microscopy should still be performed for all suspected cases.

Standardized treatment with supervision and patient support
Standardized short-course chemotherapy using regimens of 6–8 months for at least all confirmed smear-positive cases. Good case management includes directly observed treatment (DOT) during the intensive phase for all new smear-positive cases, during the continuation phase of regimens containing rifampicin and during the entirety of a re-treatment regimen. In countries that have consistently documented high rates of treatment success, DOT may be reserved for a subset of patients, as long as cohort analysis of treatment results is provided to document the outcome of all cases.

An effective drug supply and management system
Establishment and maintenance of a system to supply all essential anti-TB drugs and to ensure no interruption in their availability.

Monitoring and evaluation system, and impact measurement
Establishment and maintenance of a standardized recording and reporting system, allowing assessment of treatment results

between planning for TB control and planning for the health sector and public sector as a whole. It also covers implementation of the Practical Approach to Lung Health (PAL).

- *Engaging all care providers*. This section provides information on the implementation of public–private and public–public mix (PPM) approaches to TB control, including the use of the International Standards for Tuberculosis Care (ISTC).
- *Empowering people with TB, and communities*. This section assesses advocacy, communication and social mobilization (ACSM) activities, community participation in TB care and adoption of the Patients' Charter;
- *Enabling and promoting research*. This section summarizes operational research activities.

Further details about the implementation of all major components and subcomponents of the Stop TB Strategy are provided for each of the 22 HBCs in Annex 1.

2.1 Data reported to WHO in 2007

The data that were reported to WHO in 2007 are summarized in **Tables 2.3 and 2.4**. Reporting was best for questions about the existence and content of national strategic plans for TB control, ACSM and community TB care. Reporting was least complete for questions about collaborative TB/HIV activities that aim to reduce the burden of TB in HIV-positive people (intensified TB case-finding and provision of isoniazid preventive therapy, or IPT), TB control for special groups and populations, and PPM. Among the 22 HBCs, most of the data that were requested were provided.

2.2 DOTS expansion and enhancement

2.2.1 DOTS coverage and numbers of patients treated

The total number of countries implementing DOTS has increased steadily from 1995, reaching 184 countries by 2006 (**Figure 2.1**). All 22 HBCs have had DOTS programmes since 2000, many of which have been established for much longer.

DOTS coverage within countries has also increased since 1995 (**Table 2.5**). By the end of 2006, 93% of the world's population lived in counties, districts, oblasts and provinces of countries that had adopted DOTS. Population coverage was reported to exceed 90% in all regions except Europe (**Figure 2.2**). All but three HBCs (Brazil, Nigeria and the Russian Federation) reported that at least 90% of the population lived in areas where DOTS was being implemented. Population coverage in Brazil, Nigeria and the Russian Federation was 86%, 75% and 84% respectively (**Table 2.5**).

TABLE 2.3

Reporting on implementation of the Stop TB Strategy, non high-burden countries, 2006. Number of countries (out of 179 countries reporting) answering given percentage of questions on each sub-component of the strategy.

	COMPLETENESS OF REPORTING			
	<50%	50–75%	75–90%	>90%
1. DOTS expansion and enhancement				
National strategic plan for TB control	16	4	8	153
Case detection through quality-assured bacteriology	62	34	41	44
Standardized treatment, with supervision and patient support	30	121	30	0
Drug supply and management system	57	40	63	21
Monitoring and evaluation, including impact measurement	57	46	21	57
2. TB/HIV, MDR-TB and other challenges				
Collaborative TB/HIV activities				
Mechanisms for collaboration and policy development	57	16	52	56
HIV-testing for TB patients, provision of CPT and ART	69	37	12	63
Intensified TB case-finding and IPT for HIV-positive people	119	11	11	40
Management of MDR-TB				
Policy and stage of implementation	59	7	16	99
Diagnosis and treatment of MDR-TB	42	7	65	67
High-risk groups and special situations	120	46	0	15
3. Health system strengthening				
Practical Approach to Lung Health (PAL)	128	3	40	9
Human resource development	55	6	31	89
4. Engaging all care providers				
Public–private and public–public mix approaches (PPM)	128	10	11	32
International Standards for Tuberculosis Care	127	8	0	46
5. Empowering people with TB, and communities				
Advocacy, communication and social mobilization (ACSM)	61	0	0	120
Community participation in TB control	61	0	0	120
Patients' Charter for Tuberculosis Care	68	6	0	107
6. Enabling and promoting research				
Operational research	83	23	0	75

TABLE 2.4

Reporting on implementation of the Stop TB Strategy, high-burden countries, 2006. Number of countries (out of 22) answering given percentage of questions on each sub-component of the strategy.

	PERCENTAGE OF QUESTIONS ANSWERED			
	<50%	50–75%	75–90%	>90%
1. DOTS expansion and enhancement				
National strategic plan for TB control	0	0	3	19
Standardized treatment, with supervision and patient support	0	1	12	9
Case detection through quality-assured bacteriology	1	1	15	5
Drug supply and management system	0	1	10	11
Monitoring and evaluation, including impact measurement	1	7	10	4
2. TB/HIV, MDR-TB and other challenges				
Collaborative TB/HIV activities				
Mechanisms for collaboration and policy development	0	0	12	10
HIV-testing for TB patients, provision of CPT and ART	5	3	1	13
Intensified TB case-finding and IPT for HIV-positive people	11	5	6	0
Management of MDR-TB				
Policy and stage of implementation	0	1	4	17
Diagnosis and treatment of MDR-TB	2	1	5	14
High-risk groups and special situations	1	1	20	0
3. Health system strengthening				
Links with other planning initiatives	1	3	9	9
Practical Approach to Lung Health (PAL)	0	0	19	3
Human resource development	1	6	8	7
4. Engaging all care providers				
Public–private and public–public mix approaches (PPM)	0	2	9	11
International Standards for Tuberculosis Care	2	0	0	20
5. Empowering people with TB, and communities				
Advocacy, communication and social mobilization (ACSM)	3	1	2	16
Community participation in TB control	3	3	15	1
Patients' Charter for Tuberculosis Care	2	9	0	11
6. Enabling and promoting research				
Operational research	4	6	0	12

FIGURE 2.1

Number of countries implementing DOTS (out of a total of 212 countries), 1991–2006

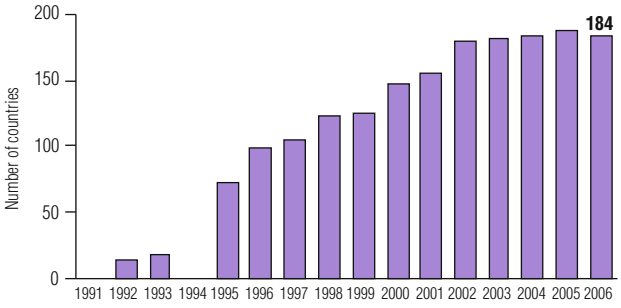


FIGURE 2.2

DOTS coverage by WHO region, 2006. The purple portion of each bar shows DOTS coverage as a percent of the population. The numbers in each bar show the population (in millions) within (purple portion) or outside (grey portion) DOTS areas.

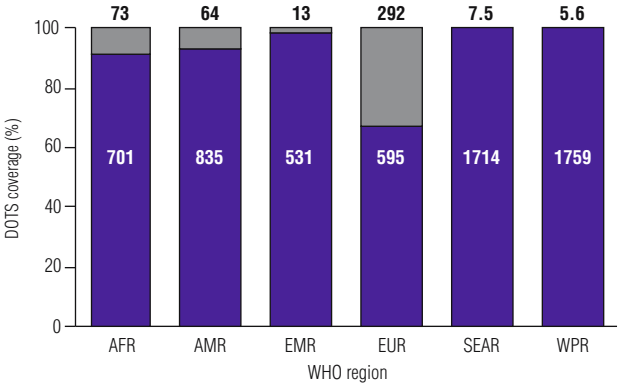


TABLE 2.5

Progress in DOTS implementation, 1995–2006

	PERCENT OF POPULATION COVERED BY DOTS											
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
1 India	1.5	2	2.3	9	13.5	30	45	51.6	67.2	84.0	91.0	100
2 China	49	60	64	64	64	68	68	78	91	96	100	100
3 Indonesia	6	13.7	28.3	80	90	98	98	98	98	98	98	98
4 South Africa	–	0	13	22	66	77	77	98	99.5	93	94	100
5 Nigeria	47	30	40	45	45	47	55	55	60	65	65	75
6 Bangladesh	40.5	65	80	90	90	92	95	95	99	99	99	100
7 Ethiopia	39	39	48	64.4	63	85	70	95	95	70	90	100
8 Pakistan	2	8	–	8	8	9	24	44	66	79	100	100
9 Philippines	4.3	2	15	16.9	43	89.6	95	98	100	100	100	100
10 DR Congo	47	51.4	60	60	62	70	70	70	75	75	100	100
11 Russian Federation	–	2.3	2.3	5	5	12	16	25	25	45	83	84
12 Viet Nam	50	95	93	96	98.5	99.8	99.8	99.9	100	100	99.9	100
13 Kenya	15	100	100	100	100	100	100	100	100	100	100	100
14 UR Tanzania	98	100	100	100	100	100	100	100	100	100	100	100
15 Uganda	–	0	100	100	100	100	100	100	100	100	100	100
16 Brazil	–	0	0	3	7	7	32	25	33.6	52	68	86
17 Mozambique	97	100	84	95	–	100	100	100	100	100	100	100
18 Thailand	–	1.1	4	32	59	70	82	100	100	100	100	100
19 Myanmar	–	59	60	60.3	64	77	84	88.3	95	95	95	95
20 Zimbabwe	–	0	0	100	11.6	100	100	100	100	100	100	100
21 Cambodia	60	80	88	100	100	99	100	100	100	100	100	100
22 Afghanistan	–	–	12	11	13.5	15	12	38	53	68	81	97
High-burden countries	**24**	**32**	**36**	**43**	**45**	**55**	**61**	**68**	**79**	**87**	**94**	**98**
AFR	43	46	56	61	56	71	70	81	85	83	88	91
AMR	12	48	50	55	65	68	73	73	78	83	88	93
EMR	16	12	18	33	51	65	71	77	87	90	97	98
EUR	5.4	8.2	17	22	23	26	32	40	42	47	60	67
SEAR	6.7	12	16	29	36	49	60	66	77	89	93	100
WPR	43	55	57	58	57	67	68	77	90	94	98	100
Global	**22**	**32**	**37**	**43**	**47**	**57**	**62**	**69**	**78**	**83**	**89**	**93**

Zero indicates that a report was received, but the country had not implemented DOTS. – Indicates that no report was received.

As reported in greater detail in **Chapter 1**, 4.9 million new cases of TB were notified by DOTS programmes in 2006, of which 2.5 million were new smear-positive cases. These numbers represented 98% and 99% of total TB case notifications (DOTS and non-DOTS programmes), respectively. The percentage of all estimated new cases of smear-positive TB detected by DOTS programmes – the case detection rate – was 61% globally in 2006; the case detection rate for all cases was 54%. A cumulative total of 31.8 million new and relapse cases have been treated in DOTS programmes in the 12 years from 1995 (when reliable records began) to 2006. Globally, the treatment success rate was 84.7% in the 2005 cohort, meaning that the target of 85% has almost been reached. The Western Pacific Region has reached both targets related to DOTS implementation (i.e. 70% case detection rate and 85% treatment success rate), and the South-East Asia Region and the Region of the Americas are close to doing so. The other three regions (African, European and Eastern Mediterranean regions) are much further from achieving these targets. This short summary of the data that are presented in much greater detail in **Chapter 1** is useful for setting the information provided in the rest of this chapter in context.

2.2.2 Political commitment

Continued political commitment is essential for sustaining DOTS as well as for introducing and then scaling up other components of the Stop TB Strategy. Two indicators of political commitment are the existence of a national strategic plan for TB control and the share of the total funding required for TB control that is being provided from domestic sources.

A national strategic plan for TB control was reported to exist in 155 countries, including all HBCs. Among HBCs, eight increased domestic funding for TB control between 2007 and 2008: Afghanistan, Brazil, Ethiopia, Mozambique, Myanmar, the United Republic of Tanzania, Viet Nam and Zimbabwe. In a further eight HBCs (Cambodia, China, the Democratic Republic of the Congo, India, Indonesia, Kenya, the Russian Federation and South Africa), domestic funding in 2008 was maintained at a level similar to 2007. The share of the NTP budget being funded from domestic sources averages 64% across the 22 HBCs for 2008, but varies from less than 20% in Afghanistan, Kenya, Myanmar and Uganda to 30–50% in eight countries (for example, Indonesia, Mozambique, Nigeria and Pakistan) to 50–69% in four countries (for example, China and the Philippines) to over 70% in five countries (Brazil, India, the Russian

TABLE 2.6

Stock-outs of laboratory reagents and of first-line anti-TB drugs, 2006

	LABORATORY REAGENTS AND SUPPLIES		FIRST-LINE ANTI-TB DRUGS	
	CENTRAL	PERIPHERAL	CENTRAL	PERIPHERAL
1 India	N	N	N	N
2 China	Y	Some units	N	N
3 Indonesia	N	N	N	N
4 South Africa	N	N	N	All units
5 Nigeria	N	–	N	N
6 Bangladesh	N	N	N	N
7 Ethiopia	N	N	N	N
8 Pakistan	N	Some units	N	N
9 Philippines	N	N	N	N
10 DR Congo	N	Some units	N	Some units
11 Russian Federation	N	N	N	N
12 Viet Nam	N	N	N	N
13 Kenya	N	N	N	N
14 UR Tanzania	N	N	N	All units
15 Uganda	N	Some units	Y	Some units
16 Brazil	Y	All units	N	N
17 Mozambique	N	N	N	N
18 Thailand	N	N	N	N
19 Myanmar	N	N	N	N
20 Zimbabwe	N	Some units	Y	Some units
21 Cambodia	N	N	N	N
22 Afghanistan	N	N	N	N
High-burden countries[a]	**2/22**	**6/21**	**2/22**	**6/22**
AFR (46)[b]	6/39	9/35	7/38	12/38
AMR (44)	3/35	8/29	6/35	9/27
EMR (22)	2/22	5/21	3/21	3/20
EUR (53)	3/37	6/35	2/35	4/35
SEAR (11)	1/10	2/11	1/10	1/11
WPR (36)	5/32	6/26	7/28	5/24
Global (212)	**20/175**	**36/157**	**26/167**	**34/155**

– Indicates information not provided.

[a] In the lower part of the table the numerator of each fraction is the number of countries reporting stock-outs; the denominator is the number of countries providing information.

[b] The number of countries in each region is shown in parentheses.

Federation, South Africa and Viet Nam). There were insufficient data to make an assessment for Thailand. Full details about financing for TB control, including discussion of how domestic funding is related to a country's income level, are provided in **Chapter 3**.

2.2.3 Case detection through quality-assured bacteriology

Sputum smear microscopy is being widely used for the diagnosis of TB: 85% of reporting countries (151/177) stated that it is used for all people with suspected pulmonary TB. This included 20 HBCs. Laboratory supplies are generally adequate, but six HBCs reported stock-outs at peripheral level in some units: Brazil, China, Pakistan, the Democratic Republic of the Congo, Uganda and Zimbabwe (**Table 2.6**). Among all countries, 20 reported some stock-outs at central level; 36 reported stock-outs at peripheral level (**Table 2.6**). More positively, almost all HBCs have established links with non-NTP laboratory services, including laboratories in the private sector and/or laboratory services provided by nongovernmental organizations (NGOs). This should help to expand diagnostic capacity in future, which is particularly needed in Ethiopia, Nigeria and Pakistan. In these three HBCs, the number of laboratories performing sputum smear microscopy is below the recommended benchmark of 1 per 100 000 population (**Table 2.7**) and case detection rates remain below the global target of 70%.

While coverage and use of sputum smear microscopy services are generally high, the availability of culture and DST remains limited in most HBCs (**Table 2.7**). Only seven HBCs had at least one culture laboratory for every 5 million population, which is the level recommended in the Global Plan. These were Brazil, Cambodia, China, the Russian Federation (with 34 culture laboratories for every 5 million population), South Africa, Thailand and Viet Nam. The same set of countries, plus Indonesia and Uganda, had one laboratory able to provide services for drug susceptibility testing (DST) per 10 million population. This leaves many countries with a major shortage of laboratories providing culture and DST services. Encouragingly, the need for expansion of culture and DST capacity has been widely recognized. Among the 22 HBCs, 17 have plans to establish or scale up culture and DST services.

National reference laboratories (NRLs) are essential for the expansion of quality-assured culture and DST services. Most HBCs listed increased NRL capacity and improved NRL performance as a priority activity for 2007. For this to be successful, there are several major challenges that need to be overcome. These include a shortage of adequately trained staff, insufficient funding, suboptimal biosafety standards and limited availability of sustained technical assistance.

Given the demand for improvement in diagnostic services, particularly for drug-resistant TB, the supranational reference laboratory network (SRLN) is also in

TABLE 2.7

Coverage of laboratory services, high-burden countries, 2006

			ACCESS TO DIAGNOSTIC SERVICES						LABORATORIES INCLUDED IN EXTERNAL QUALITY ASSURANCE (EQA) FOR SPUTUM SMEAR MICROSCOPY	
			SPUTUM SMEAR		CULTURE		DST			
	POPULATION THOUSANDS	NATIONAL REFERENCE LABORATORY (NRL)	NUMBER OF LABS	PER 100 000 POP	NUMBER OF LABS	PER 5 MILLION POP[a]	NUMBER OF LABS	PER 10 MILLION POP[a]	NUMBER	%
1 India	1 151 751	Y	11 968	1.0	8	*0.03*	8	*0.07*	9 422	79
2 China	1 320 864	Y	3 010	0.2	360	*1.4*	90	*2.7*	2 770	92
3 Indonesia	228 864	N	4 855	2.1	41	*0.9*	11	*1.8*	4 855	100
4 South Africa	48 282	Y	143	0.3	13	1.3	8	2.7	143	100
5 Nigeria	144 720	N	694	0.5	0	*0.0*	0	*0.0*	416	60
6 Bangladesh	155 991	Y	687	0.4	3	*0.1*	0	*0.2*	679	99
7 Ethiopia	81 021	Y	713	0.9	1	0.1	1	0.1	–	–
8 Pakistan	160 943	N	982	0.6	3	*0.1*	1	*0.2*	318	32
9 Philippines	86 264	Y	2 374	2.8	3	*0.2*	3	*0.3*	2 374	100
10 DR Congo	60 644	Y	1 069	1.8	1	0.1	1	0.2	1 069	100
11 Russian Federation	143 221	N	4 953	3.5	978	*34*	302	*68*	998	20
12 Viet Nam	86 206	Y	874	1.0	18	1.0	2	2.1	740	85
13 Kenya	36 553	Y	770	2.1	2	0.3	2	0.5	400	52
14 UR Tanzania	39 459	Y	690	1.7	3	0.4	1	0.8	690	100
15 Uganda	29 899	Y	726	2.4	3	0.5	2	1.0	515	71
16 Brazil	189 323	Y	4 044	2.1	193	*5.1*	38	*10*	2 100	52
17 Mozambique	20 971	Y	250	1.2	1	0.2	1	0.5	11	4.4
18 Thailand	63 444	Y	937	1.5	65	5.1	18	10	864	92
19 Myanmar	48 379	Y	391	0.8	2	0.2	1	0.4	50	13
20 Zimbabwe	13 228	Y	180	1.4	1	0.4	1	0.8	10	5.6
21 Cambodia	14 197	Y	186	1.3	3	1.1	1	2.1	186	100
22 Afghanistan	26 088	N	500	1.9	1	0.2	1	0.4	–	–

– Indicates information not provided; labs, laboratories; pop, population.

[a] To provide culture for diagnosis of paediatric, extrapulmonary and ss-/HIV+ TB, as well as DST for re-treatment and failure cases, most countries will need one culture facility per 5 million population and one DST facility per 10 million population. However, for countries with large populations (numbers shown in italics), one laboratory for culture and DST in each major administrative area (e.g. province) may be sufficient. See also footnote 3 in country profiles (Annex 1).

the process of global expansion. Currently, there are 26 SRLs: two in the African Region, five in the Region of the Americas, 11 in the European Region, one in the Eastern Mediterranean Region, two in the South-East Asia Region and five in the Western Pacific Region (**Figure 2.3**). All regions have plans to expand their SRL networks, and candidate laboratories will be assessed and evaluated in the near future. This should increase coverage of quality-assured culture and DST services at both national and global levels.

2.2.4 Standardized treatment, with supervision and patient support

The vast majority of reporting countries (96%, 173/181) use standardized short-course chemotherapy, including all HBCs. Treatment with the Category I regimen for 6 months is used in 122 countries worldwide, while 31 countries use an 8-month regimen without rifampicin in the continuation phase of treatment. Among countries using the 8-month regimen, 13 (including five HBCs) have plans to switch to the 6-month regimen.

Health-facility based, community-based or home-based directly observed therapy (DOT) was used during the initial phase of treatment in 166 countries, although only 123 of these stated that it was used for all patients in all DOTS units. Among HBCs, Brazil, China, Nigeria, Pakistan and Thailand reported that DOT was available only in some units and/or only for some patients.

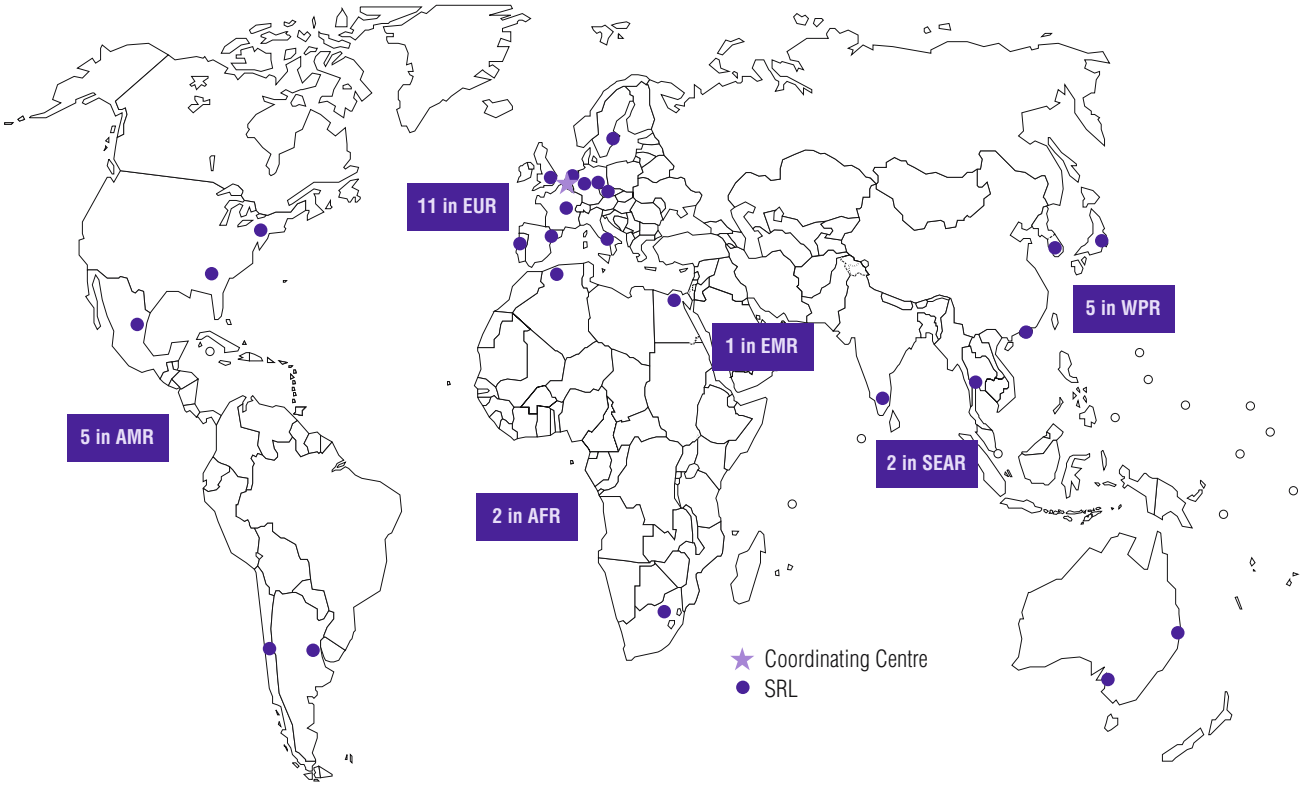
Almost all reporting countries (96%, 170/178), including all HBCs, provided anti-TB drugs free-of-charge to all patients being treated with the Category I regimen under DOTS. Incentives and enablers are used in some countries, mostly in the European Region. Examples include food parcels, tickets for public transport and provision of psychological counselling to ensure adherence to treatment.

2.2.5 Drug supply and management system

Uninterrupted provision of quality-assured anti-TB drugs is fundamental to effective TB control. However, despite the availability of funding from the Global Fund and the Global Drug Facility (GDF), as well as the option of procurement at highly competitive prices from the GDF, drug shortages continue to occur in all regions, at both central and peripheral levels (**Table 2.6**). This includes shortages in two HBCs (Uganda, and Zimbabwe) at central level, and in five HBCs (the Democratic Republic of the Congo, South Africa, Uganda, the United Republic of Tanzania and Zimbabwe) at peripheral level. Reported shortages were particularly common in the African Region and the Region of the Americas. Reporting on drug availability was relatively incomplete for the Region of the Americas as well the European and Western Pacific regions. This suggests that better monitoring of drug stocks is needed in some countries in these regions, for example via the revised recording and

FIGURE 2.3

Tuberculosis supranational reference laboratory network, 2006



reporting forms that have been developed by WHO and other partners.

During the past year, the availability of quality-assured and affordable anti-TB drugs has improved. For example, the prequalification process for paediatric formulations of fixed-dose combinations (FDCs) has been accelerated via mechanisms including pooled procurement by the GDF, the involvement of UNITAID and provision of technical assistance from the WHO prequalification project. A total of 71 countries including 12 HBCs ordered FDCs from the GDF in 2007.

Members of the Stop TB Partnership, including WHO and Management Sciences for Health, continue to hold training workshops in drug management in collaboration with the GDF. In 2007, two workshops were held, one in Benin and the other in Cape Town.

2.2.6 Monitoring and evaluation, including impact measurement

Global targets to reduce the epidemiological burden of TB have been set for 2015 within the context of the MDGs and by the Stop TB Partnership (see **Chapter 1**). Measuring progress towards these targets requires routine monitoring of case notifications and treatment outcomes, as well as evaluation of the impact of TB control on incidence, prevalence and mortality using routine surveillance data (TB case notification data and TB mortality data from vital registration systems) and, in some cases, special surveys of the prevalence of disease, infection or mortality. Questions related to impact measurement were asked on the WHO data collection form for the first time in 2007.

Out of 212 countries, 184 DOTS countries and seven non-DOTS countries routinely record and report data on case notifications and treatment outcomes. In addition, 119 (of 202) reporting countries (59%) stated that they publish an annual report of NTP activities and performance. Although some countries have been publishing an annual report for more than 20 years, most countries started to produce such reports in the 1990s. Among the 22 HBCs, all published annual reports except for the Democratic Republic of the Congo, South Africa and Thailand.

Plans to assess the impact of TB control were reported by 128 out of 202 (63%) countries (**Table 2.8**). Among HBCs, only Afghanistan, the Democratic Republic of the Congo and Mozambique did not report having a plan for impact measurement. The proportion of countries with a plan for impact measurement was particularly high in the South-East Asia Region (9 out of 11 countries).

In-depth analysis of routine surveillance data collected by NTPs was the most frequent method by which countries intended to assess the impact of TB control (116/128, 91%). Analysis of mortality data from vital registration systems (also a form of routine surveillance data) was also reported by a large number of countries (51 out of 128 reporting countries), with numbers in absolute terms highest in the European and Western

TABLE 2.8

Plans to assess the impact of TB control on the epidemiological burden of TB in the next 10 years

	PLAN TO ASSESS IMPACT EXISTS	IN-DEPTH ANALYSIS OF ROUTINE SURVEILLANCE DATA	PREVALENCE OF DISEASE SURVEY[a]	PREVALENCE OF INFECTION SURVEY[a]	MORTALITY SURVEY	ANALYSIS OF VITAL REGISTRATION DATA (MORTALITY RECORDS)
1 India	Y	Y	Y, sub-national	Y	Y	N
2 China	Y	Y	Y	Y	Y	Y
3 Indonesia	Y	N	Y	Y, sub-national	Y	Y
4 South Africa	Y	Y	Y	N	N	Y
5 Nigeria	Y	Y	Y	–	N	N
6 Bangladesh	Y	Y	Y	Y	N	N
7 Ethiopia	Y	Y	N	Y	Y	N
8 Pakistan	Y	Y	Y, sub-national	Y	N	N
9 Philippines	Y	N	Y	Y	N	N
10 DR Congo	N	N	N	N	N	N
11 Russian Federation	Y	Y	Y	Y	Y	Y
12 Viet Nam	Y	Y	Y	Y	N	N
13 Kenya	Y	Y	Y	Y	N	N
14 UR Tanzania	Y	Y	Y	Y	N	N
15 Uganda	Y	Y	Y	N	N	N
16 Brazil	Y	Y	N	N	Y	Y
17 Mozambique	N	N	N	N	N	N
18 Thailand	Y	Y	Y	N	Y	N
19 Myanmar	Y	Y	Y	N	Y	Y
20 Zimbabwe	Y	Y	Y	N	N	Y
21 Cambodia	Y	N	Y	Y	N	N
22 Afghanistan	N	N	N	N	N	N
High-burden countries[b]	**19**	**16**	**17**	**12**	**8**	**7**
AFR (46)[c]	27	22	18	9	5	4
AMR (44)	23	23	5	5	5	9
EMR (22)	15	13	12	10	2	3
EUR (53)	32	32	13	12	9	18
SEAR (11)	9	8	7	5	6	5
WPR (36)	22	18	14	11	7	12
Global (212)	**128**	**116**	**69**	**52**	**34**	**51**

– Indicates information not provided.
[a] National survey unless otherwise specified.
[b] The lower part of table shows the number of countries planning each type of assessment (including those planning sub-national surveys).
[c] The number of countries in each region is shown in parentheses.

Pacific regions and the Region of the Americas. Only four countries in the African Region (Comoros, Rwanda, SouthAfrica and Zimbabwe) reported plans to use mortality data from vital registration systems.

Surveys of the prevalence of disease were being planned by 69 countries, including 55 national and 14 sub-national surveys. Of the 44 countries that reported the year in which they were intending to start their national surveys, 8 (18%) were due to start in 2007, 17 (39%) in 2008, 7 (16%) in 2009 and the remainder in later years. Measurement of burden and impact is particularly well advanced in the Western Pacific Region, where all four HBCs have already undertaken at least one disease prevalence survey and where follow-up surveys are planned.

In December 2007, the WHO Task Force on TB Impact Measurement agreed a set of epidemiological criteria to guide the selection of countries that should undertake prevalence of disease surveys during the period up to 2015.[1] These criteria were used to identify countries with all or a combination of the following characteristics: (i) weak routine reporting systems; (ii) high TB prevalence; (iii) high TB burden (number of cases); and (iv) high HIV/AIDS prevalence. The Task Force also considered whether a country already had a plan to conduct a survey within the next 10 years and whether they had done a survey since the year 2000. Of the 57 countries that met the criteria, 30 reported plans to carry out a national (n=25) or sub-national (n=5) survey. Among HBCs, 20 met the criteria, of which 17 reported plans to carry out either a national survey (n=15) or a sub-national survey (n=2, India and Pakistan). Three HBCs met the criteria but did not report having a plan to conduct a survey within the next 10 years: the Democratic Republic of the Congo, Ethiopia and Mozambique. Of the 155 countries that did not meet the criteria, 39 reported having a plan to conduct either a national (n=30) or a sub-national (n=9) survey.

The Task Force also identified a shorter list of 21 countries[2] in which surveys should be prioritized in order

[1] *Report of the second meeting of the WHO Task Force on TB Impact Measurement. Geneva, 6–7 December 2007.* Geneva, World Health Organization, 2007 (unpublished).
[2] From among the longer list of 57 countries.

to produce credible regional and global assessments of whether the 2015 impact targets are achieved, as well as to assess progress in the period up to 2015. This list includes 15 HBCs and six other countries.[1] Among the 21 countries, 16 countries (including 12 HBCs) have reported plans to carry out national surveys and two (1 HBC) have reported plans to carry out a sub-national survey.

Most of the 52 countries that are planning prevalence of TB infection (tuberculin) surveys at national or sub-national levels also reported plans to conduct prevalence of disease surveys. It is important that these countries try to implement both surveys at the same time and in the same place.

Population-based mortality surveys (e.g. verbal autopsy studies) were being planned by only 34 countries. From the available data, it is not clear if these surveys will be limited to TB or whether they will be combined with collection of data for other diseases.

2.3 TB/HIV, MDR-TB and other challenges

2.3.1 Collaborative TB/HIV activities

Globally, there were an estimated 709 000 new HIV-positive TB cases in 2006 (see **Chapter 1** for further details). This estimate accounts for the revisions to the global estimates of HIV prevalence in the general population that were published by UNAIDS in December 2007.[2] The African Region accounts for 85% of estimated cases, India for 3.3%, the European Region for 1.8% and other countries for 9.4%.

Collaborative TB/HIV activities are essential to ensure that HIV-positive TB patients are identified and treated appropriately, and to prevent TB in HIV-positive people.[3] These activities include establishing mechanisms for collaboration between TB and HIV programmes (coordinating bodies, joint TB/HIV planning, monitoring and evaluation, HIV surveillance); for HIV-positive people, intensified TB case-finding and, for those without active TB, IPT; infection control in health-care and congregate settings; HIV testing for TB patients; and, for those TB patients infected with HIV, co-trimoxazole preventive therapy (CPT) and ART.

Mechanisms for collaboration and policy development

Among 63 countries that have been identified as priorities at global level[4] and which collectively account for 97% of estimated HIV-positive cases worldwide, around 40 had established coordinating bodies, developed a joint TB/HIV plan and were undertaking HIV surveillance by 2006 (**Figure 2.4**). Around 50 countries had policies for HIV counselling and testing among TB patients, as well as for provision of CPT and ART to those coinfected with HIV; these countries account for about 90% of the estimated number of HIV-positive TB cases globally. A relatively high number of countries also had policies for intensified case-finding among HIV-positive people. In contrast, a smaller number of countries had policies related to IPT (26 countries) and infection control (31 countries), with these countries accounting for only 66% and 41% respectively of the global number of HIV-positive TB cases. While there was variation in the extent to which mechanisms for collaboration or policies were in place in 2006, in all instances there was an improvement compared with 2005 (**Figure 2.4**).

When all countries that reported data are considered, the number of countries with policies is much higher, but the fraction of the global number of HIV-positive TB cases covered is almost the same (**Figure 2.5**).

HIV testing for TB patients

HIV testing for TB patients is a critical entry point to interventions for both treatment and prevention. There was a substantial increase in provision of HIV testing for TB patients between 2002 and 2006, with reported numbers increasing from 21 806 patients across 9 countries in 2002 (less than 1% of notified TB cases) to 687 174 patients across 112 countries in 2006 – equivalent to 12% of notified TB cases (**Figure 2.6**). In the African Region, 287 945 patients (22% of all notified cases) were tested (**Table 2.9**).

This increase in numbers of patients tested for HIV may be exaggerated by the increase in the number of countries reporting data and the share of the global number of HIV-positive TB cases accounted for by reporting countries (see numbers and percentages below the bars of **Figure 2.6**). Stronger and clearer evidence that HIV testing has increased since 2004 is presented in **Figure 2.7**. This shows the number of TB patients who were tested for HIV in 64 countries that reported data for all three years 2004–2006. The number of TB patients tested for HIV in 11 African countries representing 57% of estimated HIV-positive TB cases globally (and 66% of cases in the African Region, data not shown) increased almost five-fold in three years, while the percentage of all notified cases that were tested increased from 7.5% to 35%. Most of this increase was driven by two countries (Kenya and South Africa) and, to a lesser extent, by Malawi and Zambia (data not shown). Outside the African Region, the number of patients tested for HIV also increased, but by a much smaller amount in absolute terms. The percentage of TB patients tested outside Africa was, however, relatively high (e.g. 56% in 2006).

Across all reporting countries (n=101), testing led

[1] The list of 21 countries is: Bangladesh, Cambodia, China, Ghana, Indonesia, Kenya, Malawi, Mali, Mozambique, Myanmar, Nigeria, Pakistan, the Philippines, Rwanda, Sierra Leone, South Africa, Thailand, the United Republic of Tanzania, Uganda, Viet Nam and Zimbabwe.

[2] *2007 AIDS epidemic update*. Geneva, Joint United Nations Programme on HIV/AIDS and WHO, 2007 (UNAIDS/07.27E/JC1322E).

[3] *Interim policy on collaborative TB/HIV activities*. Geneva, World Health Organization, 2004 (WHO/HTM/TB/2004.330; WHO/HTM/HIV/2004.1).

[4] Refers to 41 countries that were identified as priorities at global level in 2002 and that account for 97% of estimated HIV-positive TB cases globally, plus 22 additional countries that UNAIDS has defined as having a generalized HIV epidemic.

FIGURE 2.4

Mechanisms for collaboration and policies for collaborative TB/HIV activities, 63 priority countries, 2005–2006. Numbers under bars are the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.

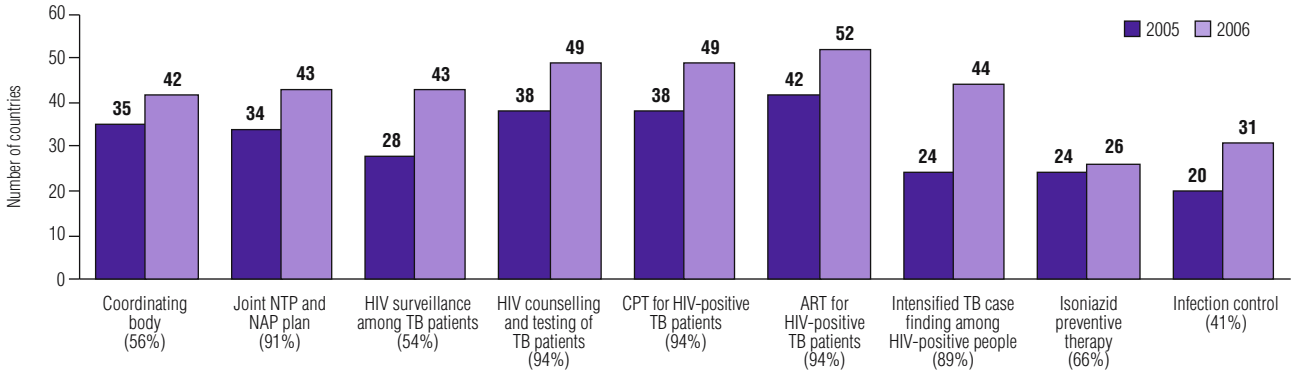


FIGURE 2.5

Mechanisms for collaboration and national policies for collaborative TB/HIV activities, all countries, 2006. Numbers under bars are the percentage of total estimated HIV-positive TB cases accounted for by countries with the respective mechanism or policy.

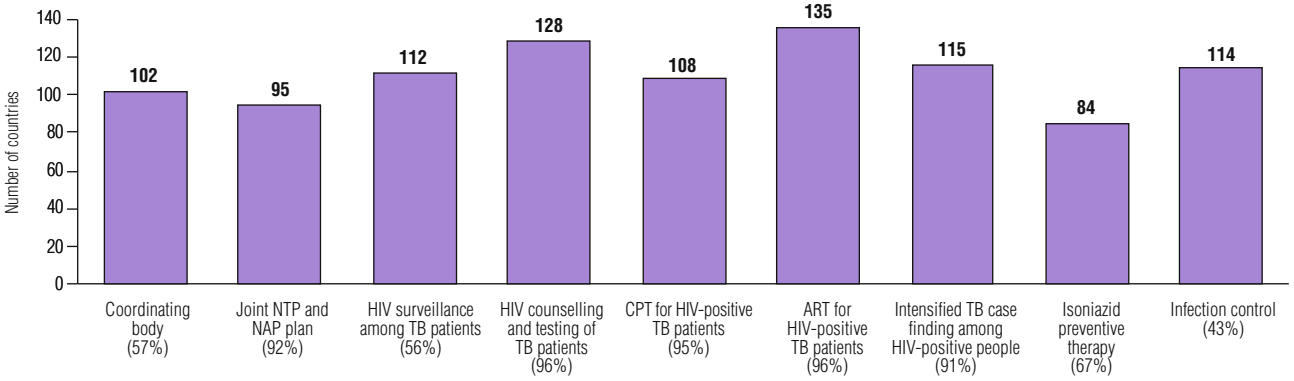


FIGURE 2.6

HIV testing for TB patients, all countries, 2006. Numbers under bars represent the number of countries reporting data followed by the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.

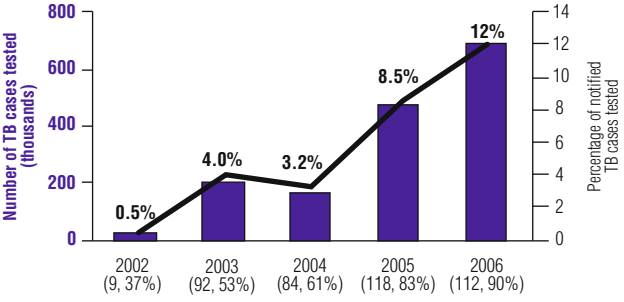


FIGURE 2.7

HIV testing in the 64 countries that reported data for each year 2004–2006. Numbers above bars are the percentage of notified TB cases that were tested for HIV.

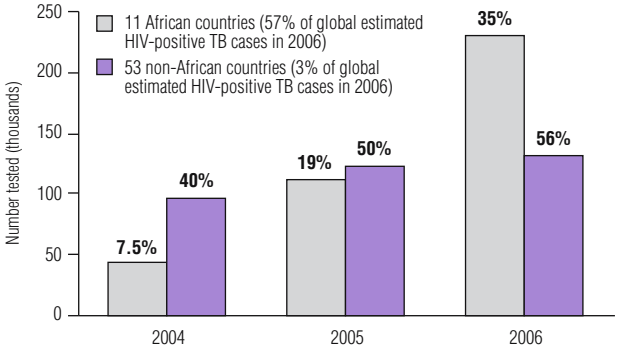


TABLE 2.9

HIV testing and treatment in TB patients, by WHO region, 2006

	% OF NOTIFIED TB PATIENTS TESTED FOR HIV	% OF TESTED TB PATIENTS HIV-POSITIVE	% OF ESTIMATED HIV-POSITIVE TB CASES[a] IDENTIFIED BY TESTING	% OF IDENTIFIED HIV-POSITIVE TB PATIENTS STARTED ON CPT	% OF IDENTIFIED HIV-POSITIVE TB PATIENTS STARTED ON ART	REGIONAL DISTRIBUTION OF ESTIMATED HIV-POSITIVE TB CASES
AFR	22	52	25	78	39	85
AMR	32	15	54	84	76	3.0
EMR	1.4	6.1	4.0	17	16	0.9
EUR	46	1.7	41	54	45	1.8
SEAR	4.1	18	40	66	33	5.6
WPR	2.7	6.9	12	66	35	3.2
Global	**12**	**27**	**26**	**78**	**41**	**100**

[a] Including estimated HIV-positive TB cases in countries which did not provide information on testing.

FIGURE 2.8

HIV testing for TB patients in selected countries, 2006

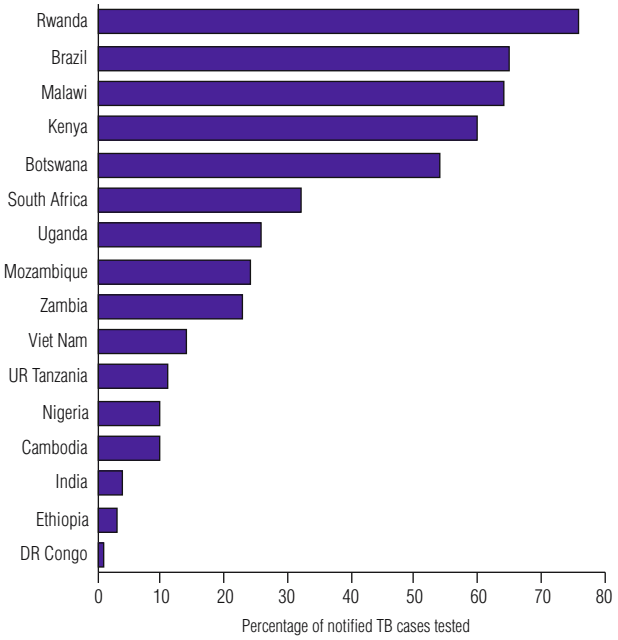
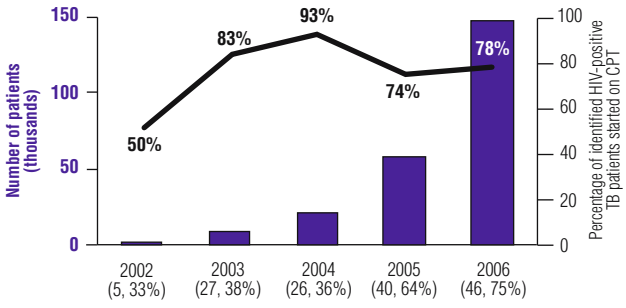


FIGURE 2.9

Co-trimoxazole preventive therapy for HIV-positive TB patients, 2002–2006. Numbers under bars represent the number of countries reporting data followed by the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.



to the detection of 186 217 HIV-positive TB patients. These detected cases represent approximately 26% of the number of HIV-positive TB cases estimated to exist in 2006 (**Table 2.9**). However, there is considerable variation among regions. In the South-East Asia and Western Pacific regions in particular, targeted HIV testing (of patients in specific geographical areas or of patients with specific risk factors) appears to result in a relatively high proportion of the estimated number of HIV-positive TB cases being identified through testing. In South-East Asia, only 4% of notified cases were tested, but this resulted in the detection of 40% of the region's estimated HIV-positive TB cases. In the Western Pacific Region, the figures were 3% and 12%, respectively.

This progress in the number of TB patients being tested for HIV is impressive. However, there is room for further improvement, as illustrated by the high variability in current testing rates among countries (**Figure 2.8**). The high testing rates achieved by a few countries show that there is scope for increasing testing rates elsewhere.

Provision of CPT and ART to HIV-positive TB patients

A major reason for promoting HIV testing in TB patients is to facilitate provision of CPT and ART to HIV-positive patients. This seems to be working. The benefits of testing can be seen in the high proportion of TB patients testing positive for HIV who were treated with CPT (78%) and ART (41%) in 2006. These proportions represent a slight improvement from 2005 (**Figure 2.9 and Figure 2.10**). In absolute terms, the improvement in provision of CPT and ART is much more marked. In 2006, almost 146 586 HIV-positive TB patients were treated with CPT in 46 countries that collectively account for 75% of the global number of HIV-positive TB cases, and 66 601 were started on ART across 54 countries that account for 75% of the global number of HIV-positive TB cases. As with HIV testing, trends are somewhat distorted by the variation in the number of countries reporting data (see figures below bars in both **Figure 2.9 and Figure 2.10**). However, there has been a large increase in the number of patients benefiting from both treatment interventions since 2004. In Africa specifically, the

proportion of patients in whom HIV infection was diagnosed who are started on CPT reached 78% in 2006; the figure for ART was 41% (**Table 2.9**).

Intensified TB case-finding and provision of IPT among HIV-positive people

Screening for TB among HIV-positive people attending HIV care services grew from 194 718 people in 2005 to 314 394 people in 2006 (**Figure 2.11**). Among those screened, 84 713 were found to have TB; this number is equivalent to 12% of the 709 000 HIV-positive TB cases estimated to exist globally. This high proportion suggests that if screening for TB was increased beyond its currently low levels (only 0.9% of the estimated 33 million HIV-positive people were screened in 2006), TB case-finding would improve.

Provision of IPT remains at very low levels, with reported numbers treated with IPT reaching only 27 056 in 2006 – equivalent to less than 0.1% of the estimated 33 million people estimated to be infected with HIV globally (**Figure 2.11**). The low number of people being treated with IPT is inconsistent with policy establishment: while 84 countries reported the existence of an IPT policy, only 25 reported any provision of IPT. Numbers on IPT are also dominated by Botswana, which accounted for 70% of the total number of people reported to be on IPT globally in 2006.

Progress against Global Plan targets

The Global Plan describes the progress required to implement collaborative TB/HIV activities for each year 2006–2015, within the framework of the goal of universal access to ART by 2010. The milestones or targets included for each year in the Global Plan provide a benchmark against which progress in practice can be assessed. A comparison of Global Plan expectations with implementation reported by countries is shown in **Table 2.10**. This shows that, among the 171 countries considered in the Global Plan, 541 415 TB patients were tested for HIV compared with 1.6 million specified in the Global Plan. The proportions of TB patients tested for HIV were 20% and 47% respectively. A total of 146 581 HIV-positive TB patients were started on CPT in 2006, compared with the 500 000 specified in the Global Plan. In terms of the percentage of TB cases found to be HIV-positive and that were enrolled on CPT, the comparison is much more favourable: 86% of TB cases in whom HIV infection was diagnosed were started on CPT in 2006 based on country reports, compared with the target of 46% for 2006 in the Global Plan. For ART, 66 542 diagnosed HIV-positive TB cases were reported to have been enrolled in 2006, compared with a target of 220 000 in the Global Plan. As for CPT, the figures are more impressive in terms of the percentage of diagnosed HIV-positive cases started on ART; 41% according to country reports compared with 44% in the Global Plan. The bigger differences between the absolute numbers of people

FIGURE 2.10

Antiretroviral therapy for HIV-positive TB patients, 2003–2006. Numbers under bars represent the number of countries reporting data followed by the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.

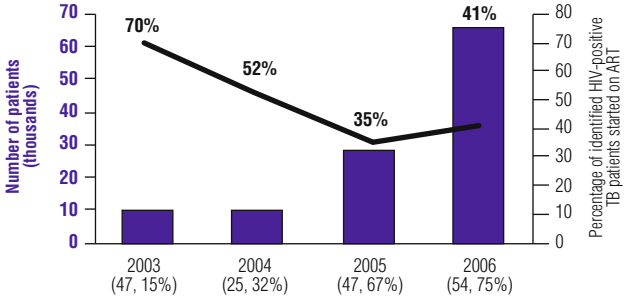


FIGURE 2.11

Intensified TB case finding, diagnosis of TB and IPT provision among HIV-positive people, 2006. Numbers above bars show the number of people receiving the intervention as a percentage of estimated HIV-positive people in reporting countries. Numbers under bars represent the number of countries reporting data followed by the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.

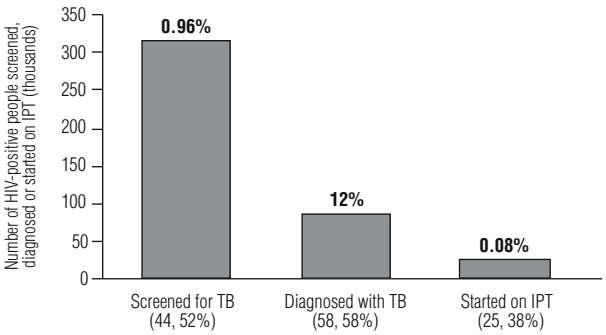


TABLE 2.10

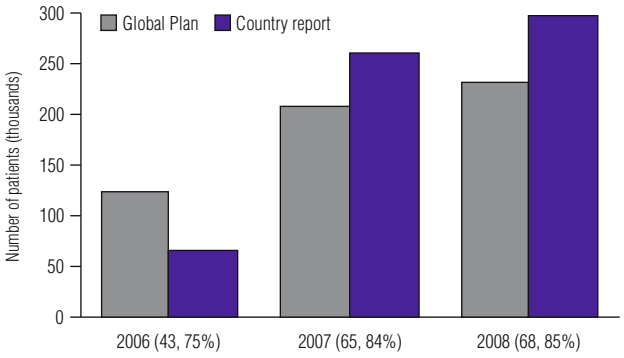
Collaborative TB/HIV activities, 2006: country reports compared with expectations given in *The Global Plan to Stop TB, 2006–2015*

	COUNTRY REPORTS AND LATEST ESTIMATES[a]	GLOBAL PLAN
	(MILLIONS OR PERCENTAGES)	
HIV-testing for TB patients, provision of CPT and ART		
Number of TB patients tested for HIV	0.5[b]	1.6
Total number of notified TB cases including new, re-treatment and other cases	3.6[c]	3.4
Proportion of all notified TB cases that were tested for HIV	20%[c,d]	47%
Number of diagnosed HIV-positive TB cases enrolled on CPT	0.2	0.5
Number of diagnosed HIV-positive TB cases	0.19	1.02
Proportion of all HIV-positive TB cases that enrolled on CPT	86%[e]	46%
Number of diagnosed HIV-positive TB cases enrolled on ART	0.07	0.22
Number of diagnosed HIV-positive TB cases eligible for ART	0.19	0.5
Proportion of all HIV-positive TB cases that enrolled on ART	41%[f]	44%
Intensified TB case-finding and IPT for people with HIV		
Number of HIV-positive people attending HIV services screened for TB	0.31	11
Number of HIV-positive people attending HIV services	7.3	18
Proportion of HIV-positive people attending HIV services that were screened for TB	8.5%[g]	61%
Number of eligible HIV-positive people offered IPT	0.03[h]	1.2
Estimated number of HIV-positive people eligible to receive IPT	28	30
Proportion of estimated number of HIV-positive people eligible for IPT that received IPT	0.3%[i]	4%

[a] Includes only those countries in the Global Plan, i.e. countries in sub-regions Central Europe and Established Market Economies are excluded here. Includes patients reported from DOTS and non-DOTS areas.
[b] Maximum number included for each country is the number of notified cases multiplied by the population coverage of collaborative TB/HIV activities anticipated by the Global Plan.
[c] The numbers of notified TB cases are weighted according to the population coverage of collaborative TB/HIV activities anticipated by the Global Plan.
[d] Only the 95 countries which provided both numerator and denominator are included in this percentage.
[e] Only the 43 countries which provided both numerator and denominator are included in this percentage.
[f] Only the 47 countries which provided both numerator are included in this percentage.
[g] Only the 37 countries which provided both numerator and denominator are included in this percentage.
[h] While the Global Plan includes only people newly diagnosed with HIV in this indicator, country reports include all HIV-positive people eligible for IPT, regardless of year of diagnosis.
[i] Only the 17 countries which provided the numerator are included in the denominator of this percentage.

FIGURE 2.12

Antiretroviral therapy for HIV-positive TB patients: country reports compared to the Global Plan, 2006–2008.
Data from country reports are notified cases (2006) and projections (2007–2008). Numbers under bars represent the number of countries reporting data followed by the percentage of total estimated HIV-positive TB cases accounted for by reporting countries.



receiving CPT and ART compared with similar numbers for the percentage of diagnosed HIV-positive TB cases started on such treatment in both country reports and the Global Plan are attributable to the shortfall in HIV testing. For patients to be treated with either CPT or ART, they must first be diagnosed with HIV, which means that a much higher percentage of TB patients must be tested for HIV.

For ART specifically among TB/HIV interventions, the WHO data collection form requests countries to provide projections of the number of HIV-positive patients who will be started on ART in 2007 and 2008, as well as actual provision of ART in 2006. These data are compared with the Global Plan targets for ART in **Figure 2.12**. About one-third of the countries reported ART projections for 2007 and 2008. Nonetheless, among those countries that did report, anticipated progress is encouraging, with projected numbers higher than the Global Plan targets for those countries in 2007 and 2008.

Activity in HIV care services (intensified case-finding and IPT) is far from Global Plan targets (**Table 2.10**). The Global Plan target for 2006 was to screen 11 million HIV-positive people for TB; the actual figure reported was 314 211. IPT provision remains at very low levels, although, as noted above, Botswana is an exception.

Overall, implementation of TB/HIV interventions falls short of the Global Plan targets. Importantly, however, data from individual countries show that these

TABLE 2.11

Number of MDR-TB cases estimated, notified and expected to be treated, 27 global priority countries and WHO regions

	ESTIMATED CASES, 2006		NOTIFIED	EXPECTED TO BE TREATED	
	% OF ALL TB CASES WITH MDR-TB	NUMBER OF MDR-TB CASES	2006	2007	2008
1 China	8.3	130 548	2	165	388
2 India	4.9	110 132	21	100	450
3 Russian Federation	19	36 037	3 949	24 100	24 000
4 Pakistan	5.0	15 233	–	0	0
5 Bangladesh	4.0	14 583	–	50	150
6 South Africa	2.6	14 034	6 716	4 843	5 252
7 Ukraine	22	13 429	–	–	–
8 Indonesia	2.2	12 142	59	–	100
9 Philippines	4.6	11 848	403	170	340
10 Nigeria	2.3	11 171	–	0	500
11 Uzbekistan	24	9 829	83	60	395
12 DR Congo	2.8	7 044	1	–	–
13 Kazakhstan	25	6 608	4 117	–	–
14 Viet Nam	4.0	6 421	–	100	–
15 Ethiopia	1.9	5 825	–	50	50
16 Myanmar	4.8	4 251	666	75	75
17 Tajikistan	20	3 204	0	0	–
18 Azerbaijan	29	2 397	398	50	150
19 Republic of Moldova	27	2 035	1 040	290	–
20 Kyrgyzstan	18	1 368	336	–	–
21 Belarus	16	1 096	651	–	–
22 Georgia	12	652	266	155	225
23 Bulgaria	13	451	53	50	50
24 Lithuania	17	425	332	–	–
25 Armenia	14	381	215	30	–
26 Latvia	14	218	143	130	115
27 Estonia	20	128	52	67	–
Global priority countries	**5.6**	**421 490**	**19 503**	**30 485**	**32 240**
AFR	2.2	66 711	7 074	7 673	7 993
AMR	3.4	12 254	2 088	6 736	5 301
EMR	4.2	25 475	295	901	928
EUR	16	82 042	12 498	27 243	27 358
SEAR	4.3	149 615	767	2 587	3 004
WPR	6.9	153 042	631	1 397	1 643
Global	**4.8**	**489 139**	**23 353**	**46 537**	**46 227**

– Indicates information not provided.

targets are achievable if currently less well-performing countries emulate targets that have already been reached or exceeded in several countries.

2.3.2 Diagnosis and treatment of MDR-TB

The most recent estimates suggest that, globally, there were about 489 000 cases of MDR-TB in 2006. These cases are very unevenly spread, with 27 countries (of which 15 are in Eastern Europe) accounting for 86% of the total (**Table 2.11**). These 27 countries have been identified as priorities for improved diagnosis and management of MDR-TB at global level.

The Global Project on Anti-tuberculosis Drug Resistance Surveillance (DRS) continues to increase the number of countries from which a direct measure of the number of cases of MDR-TB is available. This allows estimates of the number of cases to be refined over time. By 2007, the project had collected data from 117 countries covering areas that contain more than 50% of global smear-positive TB cases. Recently, new data have become available from new areas of three HBCs (China, India, and the Russian Federation) and from three HBCs for the first time: Ethiopia, the Philippines and the United Republic of Tanzania. Furthermore, 33 countries reported information on resistance to second-line drugs among MDR-TB cases in surveys or through routine surveillance systems. Full details are available in the fourth global report on anti-TB drug resistance surveillance.[1]

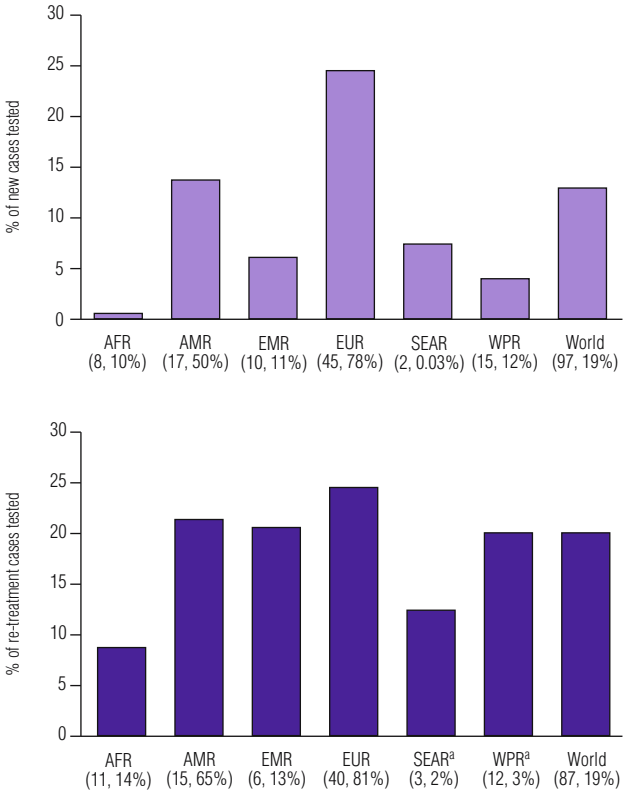
Diagnostic services

Diagnosis of MDR-TB depends on the extent to which DST services are available and used (see also section 2.2.3 above on Case detection through quality-assured bacteriology). In 2006, 118 732 diagnostic drug susceptibility tests were reported among 108 countries, with

[1] The WHO/IUATLD Global Project on Anti-tuberculosis Drug Resistance Surveillance. *Anti-tuberculosis drug resistance in the world. Fourth global report.* Geneva, World Health Organization, 2008 (WHO/HTM/TB/2008.394).

FIGURE 2.13

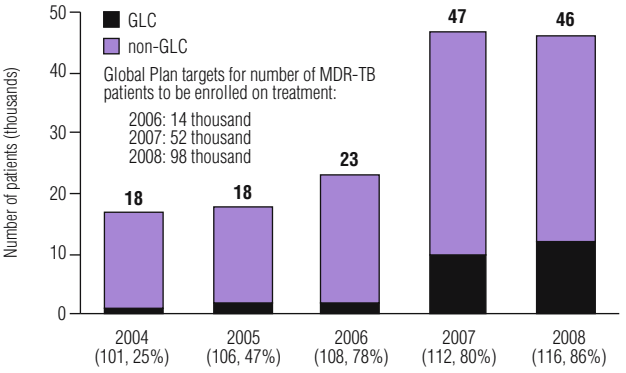
Diagnostic DST for new and re-treatment cases by WHO region, 2006. Numbers under bars represent the number of countries reporting data followed by the percentage of total estimated cases of MDR-TB accounted for by reporting countries.



[a] Data from India and China excluded because testing of only 26 (India) and 10 (China) re-treatment cases was reported.

FIGURE 2.14

Notified cases of MDR-TB (2004–2006) and projected patients to be treated (2007–2008). Numbers under bars represent the number of countries reporting data followed by the percentage of total estimated cases of MDR-TB accounted for by reporting countries.



74% of these tests conducted in the European Region. The proportion of new cases for whom DST was done was also highest in the European Region (24%), followed by the Region of the Americas at 14% (**Figure 2.13**). The percentage of the regional number of MDR-TB cases accounted for by reporting countries was also relatively high in these regions, particularly for the European Region. In other regions, the proportion of new cases for whom DST was done was low among reporting countries. Figures were higher for all regions for re-treatment cases, ranging from 9% in the African Region to 24% in the European Region.

Among those tested in 2006, 23 353 cases of MDR-TB were diagnosed, of which just over half were in Europe. A total of 2 032 cases (8.7% diagnosed cases) were reported from GLC projects. Among the 27 global priority countries, 19 503 cases were notified, which is only 4.6% of the estimated number of cases in these countries (**Table 2.11**).

Scaling-up management of MDR-TB

The small number of MDR-TB cases diagnosed compared with the number of cases that are estimated to exist shows that an enormous amount of work remains to be done to improve the availability and provision of diagnosis and treatment for MDR-TB.

For the 27 global priority countries, the latest status of progress in introducing and scaling-up treatment of patients with MDR-TB in mid-2007 is shown in **Table 2.12**. Six countries have conducted a survey of drug resistance, implemented a GLC-approved pilot project, developed national guidelines for the management of MDR-TB and conducted related training, have scaled-up or are in the process of scaling-up activities, and have fully integrated MDR-TB treatment within the NTP including reporting of data: China, the Democratic Republic of the Congo, Estonia, Kazakhstan, the Republic of Moldova and Uzbekistan. Besides these countries, four others have reported expansion of activities: Azerbaijan, Kyrgyzstan, the Russian Federation and South Africa. Among all countries, the biggest expansion that is projected in absolute terms is in the Russian Federation, which forecasts that the number of MDR-TB cases treated will reach 24 000 in 2008, compared with just under 4 000 notified cases in 2006 (**Table 2.11**). Elsewhere, the increase in treated cases anticipated by NTPs that report being in the process of scaling-up is small in absolute terms. China is a notable example: while it ranks first globally in terms of estimated cases (130 548), the number of patients projected to be treated in 2008 is 388 (up from 165 cases in 2007), which is only 0.3% of the estimated cases (**Table 2.11**). At the other end of the spectrum, no activities related to the management of MDR-TB have begun in Nigeria or Pakistan, and, besides a survey of drug resistance, no further activities were reported by Ethiopia (**Table 2.12**).

Across all countries, increased implementation of

TABLE 2.12

Management of drug-resistant TB, global priority countries and WHO regions, 2007

	DRUG RESISTANCE SURVEY CONDUCTED	APPLIED TO GLC	GLC-APPROVED PROJECTS PILOTED	NATIONAL GUIDELINES FOR MANAGEMENT OF DRUG-RESISTANT TB	TRAINING MATERIAL	TRAINING CONDUCTED	SCALING UP INITIATED	MANAGEMENT OF DRUG-RESISTANT TB FULLY INTEGRATED INTO ACTIVITIES OF NTP	MDR-TB DATA REPORTED
1 China	Y	Y	Y	Y	Y	Y	Y	Y	Y
2 India	Y	Y	Y	Y	Y	N	N	Y	Y
3 Russian Federation	Y	N	Y	N	N	Y	Y	Y	Y
4 Pakistan	N	N	N	N	N	N	N	N	–
5 Bangladesh	N	Y	Y	Y	N	N	N	N	–
6 South Africa	Y	N	N	Y	Y	Y	Y	Y	Y
7 Ukraine	Y	Y	Y	N	N	N	N	N	–
8 Indonesia	Y	Y	Y	N	N	N	N	N	Y
9 Philippines	Y	Y	Y	N	N	N	N	N	Y
10 Nigeria	N	N	N	N	N	N	N	N	–
11 Uzbekistan	Y	Y	Y	Y	Y	Y	Y	Y	Y
12 DR Congo	Y	Y	Y	Y	Y	Y	Y	Y	Y
13 Kazakhstan	Y	Y	Y	Y	Y	Y	Y	Y	Y
14 Viet Nam	Y	Y	Y	N	N	N	N	N	–
15 Ethiopia	Y	N	N	N	N	N	N	N	–
16 Myanmar	Y	N	N	N	N	N	N	N	Y
17 Tajikistan	N	N	N	N	N	Y	N	Y	–
18 Azerbaijan	Y	Y	Y	N	N	Y	Y	Y	Y
19 Republic of Moldova	Y	Y	Y	Y	Y	Y	Y	Y	Y
20 Kyrgyzstan	Y	Y	Y	N	N	N	Y	Y	Y
21 Belarus	Y	N	N	N	Y	Y	N	Y	Y
22 Georgia	Y	Y	Y	–	–	Y	–	Y	Y
23 Bulgaria	N	N	N	N	N	N	N	N	Y
24 Lithuania	Y	Y	–	–	–	–	–	–	Y
25 Armenia	Y	N	Y	N	N	Y	N	N	Y
26 Latvia	Y	Y	Y	N	Y	Y	N	Y	–
27 Estonia	Y	Y	Y	Y	Y	Y	Y	Y	–
Global priority countries[a]	**22**	**17**	**18**	**9**	**10**	**14**	**10**	**15**	**18**
AFR (46)[b]	19	10	5	15	8	7	5	16	14
AMR (44)	20	12	11	21	15	18	12	24	19
EMR (22)	11	5	4	9	5	4	4	13	12
EUR (53)	28	11	12	21	14	20	12	28	43
SEAR (12)	6	6	4	6	3	3	3	4	0
WPR (36)	17	4	5	8	4	6	3	10	14
Global (212)	**101**	**48**	**41**	**80**	**49**	**58**	**39**	**95**	**102**

– Indicates information not provided.
[a] The lower part of table shows the number of countries answering "yes" to each question.
[b] The number of countries in each region is shown in parentheses.

MDR-TB treatment was reported by 39 countries. Consistent with this, projections of the number of cases that would be diagnosed and treated globally in 2007 (46 537 cases) were much higher than the 23 353 cases notified in 2006 (**Figure 2.14**). Most of these cases are expected to be treated outside GLC projects, although the number enrolled for treatment in GLC projects is projected to increase more than five-fold by 2008, compared with 2005. Of all those cases notified in 2006 (within and outside GLC projects), it is not known what number were actually enrolled on treatment, and of those treated how many were treated according to WHO guidelines.[1] All that can be said for certain is that the 2032 patients who were enrolled on treatment in GLC projects were being treated according to WHO guidelines.

Role of the Green Light Committee

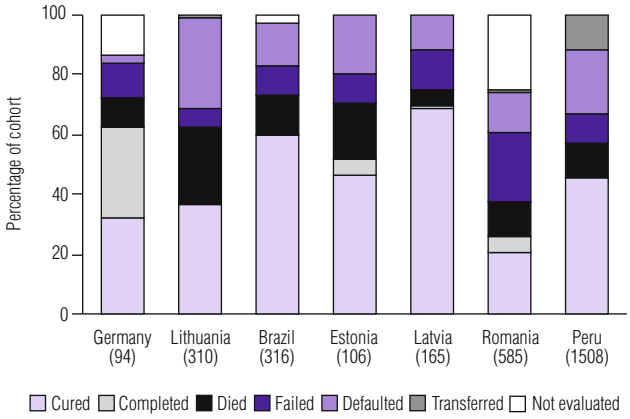
Although many cases of MDR-TB are notified outside GLC projects, the GLC has put in place specific mechanisms to promote more rapid expansion of MDR-TB diagnosis and treatment. These include building partnerships with major funding mechanisms such as the Global Fund and UNITAID, reshaping and streamlining GLC application processes during 2006 and 2007, and facilitating the development of WHO guidelines for the programmatic management of drug-resistant TB in 2006.

By the end of 2007, 67 projects in 52 countries had been approved by the GLC, such that these projects will have access to high-quality and competitively-priced drugs for a cumulative total of over 30 000 patients with MDR-TB. In 2006 specifically, the GLC reviewed and approved applications for a total of 12 604 patients – six times more than in 2005. In 2006–2007, treatment programmes for MDR-TB in 20 countries were newly-approved by the GLC: these countries were Armenia, Bangladesh, Belize,

[1] *Guidelines for the programmatic management of drug-resistant tuberculosis*. Geneva, World Health Organization, 2006 (WHO/HTM/TB/2006.361)

FIGURE 2.15

MDR-TB treatment outcomes in seven countries, 2003 cohort. Numbers under bars are the number of patients in the cohort.



Burkina Faso, Cambodia, China, the Democratic Republic of the Congo, Ecuador, Guatemala, Guinea, Kazakhstan, Lesotho, Mongolia, Paraguay, Rwanda, Samoa, Viet Nam, Uganda, Ukraine and Uruguay. At then end of 2007, most GLC-approved countries were in the Region of the Americas (14 countries) and the European Region (13 countries), followed by the African Region (7 countries), the Western Pacific Region (7 countries), the South-East Asia Region (6 countries) and the Eastern Mediterranean Region (5 countries).

These enhanced efforts by the GLC, however, cover less than 5% of patients with drug-resistant TB worldwide. There is an urgent need for countries to substantially increase the provision of treatment for patients with MDR-TB that meets the standards established in WHO guidelines.

Treatment outcomes

Given that it takes 18–24 months to treat patients with MDR-TB, the most recent year for which treatment outcome data were requested by WHO in 2007 was 2003. While 50 countries reported data, the size of the cohorts was too small (less than 40 in 42 countries; 28 of these countries had cohorts of fewer than 10 patients) to allow any useful analysis. The seven countries with larger cohorts are shown in **Figure 2.15**. The best treatment success rate (70%) was in Latvia, which has a GLC-approved project. Treatment success rates were also relatively high in Brazil (60%) and Germany (63%), neither or which has a GLC-approved project. In contrast, outcomes were especially poor in two other countries without GLC projects: Lithuania and Romania (36% and 26% treatment success rates, respectively, and high death and treatment failure rates). To improve our understanding of treatment outcomes for patients with MDR-TB, more data from more countries, both GLC-approved and outside the GLC framework, are needed.

Progress against Global Plan targets

As with collaborative TB/HIV activities, the Global Plan sets out the progress required in provision of treatment for MDR-TB cases for each year 2006–2015. During 2007, the targets for the number of patients to be diagnosed and treated for MDR-TB were reviewed, and revised to make the targets for 2010 comparable to the goal of universal access to ART by 2010.[1] The principal 2010 targets for MDR-TB are: (i) that diagnostic DST should be offered to all previously treated and chronic TB cases as well as to 90% of new TB cases with a high risk of having MDR-TB (e.g. contacts of MDR-TB cases, those for whom treatment is failing after 3 months); and (ii) that all those in whom MDR-TB is diagnosed should be enrolled in GLC-approved or equivalent treatment programmes. Despite the progress that has been made in some countries documented above, the number of MDR-TB patients notified in 2006 and country projections of the number of MDR-TB patients to be treated in 2007 and 2008 fall far behind the expectations of the Global Plan (**Figures 2.14 and Figure 2.16**). In 2007, the Global Plan indicates that 52 000 MDR-TB patients should be diagnosed and treated, while reports from countries representing 80% of MDR-TB cases globally indicate a figure of 46 537. In 2008, the Global Plan indicates that 98 000 patients should be diagnosed and treated, while reports from countries representing 86% of MDR-TB cases globally indicate a figure of 46 227 (little different to 2007).

Differences between Global Plan expectations and country projections vary by region, as shown for 2007 in **Figure 2.16**. In the African Region, the Eastern Mediterranean Region and the Region of the Americas, country forecasts are higher than Global Plan expectations, with relatively large numbers of patients expected to be treated in Brazil and South Africa in particular (see also **Chapter 3**, where the high number of patients expected to be treated in South Africa is also reflected in budget data). However, in the three regions with the greatest number of MDR-TB cases (the European, South-East Asia and Western Pacific regions), meeting the expectations of the Global Plan will require substantial efforts to scale-up diagnosis and treatment, especially in China and India.

2.3.3 High-risk groups and special situations

Vulnerable populations such as prisoners, refugees and other high-risk groups are considered in NTP plans in 138 (68%) of 202 reporting countries. Among the 22 HBCs, 19 have included such populations in their plans, including prisoners (20 HBCs), refugees and displaced people (10 HBCs), slum dwellers (9 HBCs), cross-border populations (8 HBCs), migrant workers (5 HBCs) and ethnic minorities (8 HBCs). Other vulnerable groups such as the homeless, alcohol dependent individuals, tobacco

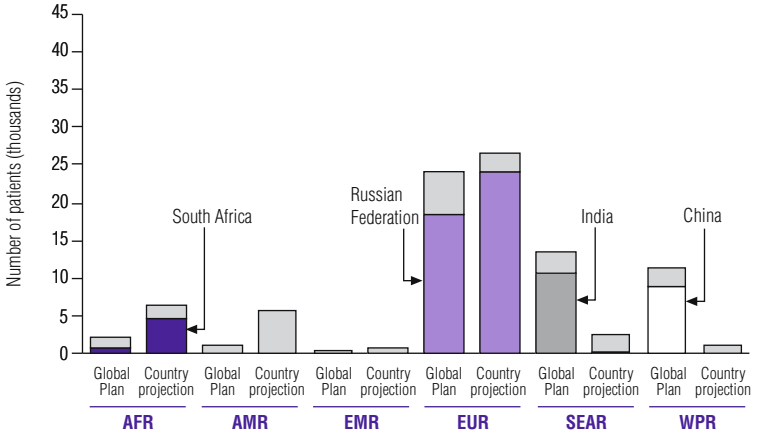
[1] *The Global MDR-TB and XDR-TB response plan 2007–2008.* Geneva, World Health Organization, 2007 (WHO/HTM/STB/2007.387).

smokers, injecting drug users and patients with diabetes have also been considered in a few HBCs.

It is noteworthy that major political instability notwithstanding, NTP structures in Iraq have been maintained at national and governorate levels. TB control services were provided whenever and wherever possible, depending on the security situation. Among other known troubled areas, TB control activities have been successfully implemented in collaboration with various international partners in secured areas of Afghanistan, the eastern region of the Democratic Republic of the Congo and in Somalia. In the earthquake-affected regions of Azad Kashmir in Pakistan, NTP services were re-established quickly and successfully in 2006.

FIGURE 2.16

Country projections of MDR/XDR-TB patients to be enrolled on treatment in 2007 compared with the Global Plan



2.4 Health system strengthening

Apart from PAL implementation and human resource development (HRD), questions about the strengthening of health systems were sent to HBCs only; findings in sections 2.4.1 and 2.4.3 below therefore refer only to HBCs.

2.4.1 Integration of TB control within primary health care

With a few exceptions, both TB diagnosis and TB treatment are fully integrated into the general health system. Laboratory services for TB diagnosis are integrated into general laboratory services in 15 of the 22 HBCs, and treatment is delivered through the general primary health care (PHC) network in all but two HBCs (China and the Russian Federation). General health-care staff are normally responsible for TB management in PHC settings, although seven HBCs have staff dedicated to TB control at PHC facilities such as clinics (Bangladesh, Brazil, China, Ethiopia, Mozambique, Myanmar and Nigeria). Distribution of anti-TB drugs is fully integrated into general drug distribution in 10 HBCs.

2.4.2 Human resource development

Optimum HRD for TB control requires at least seven components: (i) a recent HRD needs assessment; (ii) a comprehensive plan for HRD that addresses both training and staffing needs for all components of the Stop TB Strategy; (iii) up-to-date job descriptions; (iv) staff who are assigned to work on HRD at the national level; (v) inclusion of TB in the training curricula of doctors, nurses and laboratory technicians; (vi) training for existing staff at all levels of the health system; and (vii) systematic monitoring of recruitment and training needs, for example to account for staff turnover.

Only half of the HBCs have conducted a recent HRD needs assessment, and 13 HBCs reported having a comprehensive plan for HRD related to TB control (**Table 2.13**). Six HBCs are without comprehensive HRD plans or a recent HRD needs assessment: Cambodia, the Democratic Republic of the Congo, Mozambique, the Russian Federation, Uganda and Zimbabwe.

Among the HRD plans that do exist, several could be strengthened. Only 11 countries have considered staffing needs for all of the four following components of TB control: DOTS implementation, MDR-TB, collaborative TB/HIV activities and PPM (**Table 2.13**). Other plans address training needs but not staffing needs (e.g. Nigeria and the Philippines).

Job descriptions of staff involved in the implementation of the Stop TB Strategy were up-to-date or almost all up-to-date (in line with current policies and recommendations) in 17 HBCs; exceptions were the Russian Federation (none up-to-date), and the Democratic Republic of the Congo, Mozambique, Nigeria, and Zimbabwe (some up-to-date).

The number of staff assigned to HRD at national level remains limited. On the positive side, 15 of the 22 HBCs have a designated person for HRD at the central level of the NTP. However, a full-time member of staff was available in only four countries: Bangladesh, Brazil, China and South Africa. Staff working full-time on TB control are available at provincial (or equivalent) level in 20 HBCs. Monitoring of staff availability and turnover appears weak across HBCs. Only 10 HBCs provided at least some information about the availability of staff trained in TB control in primary health-care facilities.

Training related to TB control is included in the basic curricula of doctors in 18 HBCs, and in the curriculum of laboratory technicians in 15 HBCs. However, training of teaching staff in medical and nursing schools is available in only nine HBCs, and training for teachers of laboratory staff is being provided in just seven HBCs.

Among HBCs and other countries, around 87 reported having conducted a recent HRD needs assessment, and 90 countries reported having a comprehensive HRD plan (**Table 2.13**). The number of plans that considered staff-

TABLE 2.13

Human resource development (HRD), 2006

	HRD NEEDS ASSESSMENT	COMPREHENSIVE STRATEGIC HRD PLAN	HRD PLAN INCLUDES TRAINING NEEDS IN				HRD PLAN INCLUDES STAFFING NEEDS IN				JOB DESCRIPTIONS UP TO DATE
			DOTS	MANAGEMENT OF MDR-TB	COLLABORATIVE TB/HIV ACTIVITIES	PUBLIC–PRIVATE AND PUBLIC–PUBLIC MIX APPROACHES (PPM)	DOTS	MANAGEMENT OF MDR-TB	COLLABORATIVE TB/HIV ACTIVITIES	PUBLIC–PRIVATE AND PUBLIC–PUBLIC MIX APPROACHES (PPM)	
1 India	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	All
2 China	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	All
3 Indonesia	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Almost all
4 South Africa	Y	N	–	–	–	–	–	–	–	–	All
5 Nigeria	N	Y	Y	Y	Y	N	N	N	N	N	Some
6 Bangladesh	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	All
7 Ethiopia	Y	N	–	–	–	–	–	–	–	–	Almost all
8 Pakistan	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Almost all
9 Philippines	N	Y	Y	Y	Y	Y	N	N	N	N	Almost all
10 DR Congo	N	N	–	–	–	–	–	–	–	–	Some
11 Russian Federation	N	N	–	–	–	–	–	–	–	–	None
12 Viet Nam	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	All
13 Kenya	Y	N	–	–	–	–	–	–	–	–	Almost all
14 UR Tanzania	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Almost all
15 Uganda	N	N	–	–	–	–	–	–	–	–	All
16 Brazil	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	All
17 Mozambique	N	N	–	–	–	–	–	–	–	–	Some
18 Thailand	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Almost all
19 Myanmar	Y	Y	Y	N	Y	Y	Y	N	Y	Y	Almost all
20 Zimbabwe	N	N	–	–	–	–	–	–	–	–	Some
21 Cambodia	N	N	–	–	–	–	–	–	–	–	Almost all
22 Afghanistan	N	Y	Y	Y	Y	Y	–	Y	–	Y	All
High-burden countries[a]	**11**	**13**	**13**	**12**	**13**	**12**	**10**	**10**	**10**	**11**	**17**
AFR (46)[b]	18	20	20	17	18	14	16	14	12	8	22
AMR (44)	17	18	17	17	17	15	14	16	16	13	20
EMR (22)	13	16	15	13	11	12	14	14	11	12	14
EUR (53)	17	13	10	12	11	8	10	12	11	7	28
SEAR (11)	6	7	7	5	5	5	7	4	5	5	9
WPR (36)	16	16	15	14	16	12	15	10	14	10	24
Global (212)	**87**	**90**	**84**	**78**	**78**	**66**	**76**	**70**	**69**	**55**	**117**

– Indicates not applicable (no plan, or activity not implemented).
[a] Lower part of table shows the number of countries with affirmative answer (for last column, the number of countries where all or almost all job descriptions were up to date).
[b] The number of countries in each region is shown in parentheses.

ing and/or training needs for major components of TB control ranged from about 60 to 80 countries, depending on the component, while 117 countries reported having up-to-date or almost up-to-date job descriptions. In no region except the Eastern Mediterranean and the South East Asia did the number of countries reporting that a key component of HRD was in place exceed half of the number of countries in the region.

Overall, these data show that major strengthening of HRD for TB control is needed in many countries in all regions.

2.4.3 Links between planning for TB control and broader health or public sector planning initiatives and frameworks

Given the level of integration of TB control activities within primary health-care services described above, TB control requires a well-functioning health-care system including NTP participation in efforts to strengthen health systems. Contributing to health system strengthening is an explicit component of the national strategic plan for TB control in 20 of the 22 HBCs. Beyond this, five of the most important examples of national plans and frameworks to which plans for TB control should be aligned are national health development plans, poverty reduction strategy papers, national human resource plans for health, medium-term expenditure frameworks and sector-wide approaches (SWAps). Among HBCs that reported the existence of these plans and frameworks, the extent to which alignment of the national plan and budget for TB control was reported varied (**Figure 2.17**). The proportion of countries reporting alignment with medium-term expenditure frameworks and SWAps was high, but there is much scope to increase alignment with national plans for HRD as well as general plans for health-care development.

2.4.4 Practical Approach to Lung Health

PAL is included in the national plans of 73 countries including 10 HBCs. By the end of 2006, 26 countries including three HBCs had prepared detailed plans to develop and implement PAL activities. Of these, 24 had

established a national working group on PAL and 17 had produced national PAL guidelines. Seven countries were piloting or preparing for expansion, while eight countries were undertaking nationwide expansion of activities: Bolivia, Chile, El Salvador, Jordan, Kyrgyzstan, Morocco, South Africa and the Syrian Arab Republic. In 2007, five countries from the African Region including three HBCs (the Democratic Republic of the Congo, Ethiopia and Kenya) developed plans to initiate PAL implementation.

2.5 Engaging all care providers

2.5.1 Public–public and public–private mix approaches

Considerable progress has been made since the PPM initiative was launched by WHO in 2000. By 2007, 16 of the 22 HBCs had a focal person for PPM in the central NTP, 16 had undertaken a situational analysis for PPM implementation and 14 had developed national operational guidelines for PPM. The number of HBCs scaling up PPM interventions more than tripled between 2005 and 2007, from four to 14 countries.

Almost half of the HBCs have managed to involve all health institutions belonging to public sector health-care networks, such as public hospitals, medical college hospitals, army health facilities and prison health facilities (**Figure 2.18 and 2.19**). A large number of HBCs have also started to involve private practitioners, private hospitals and NGO health facilities in key activities such as referral of patients with TB symptoms, diagnosis according to programmatic guidelines and treatment with anti-TB drugs provided by the NTP (**Figures 2.18 and 2.19**). However, in most HBCs, only a small fraction of all eligible providers belonging to these categories has been involved to date.

Of the top five HBCs, three HBCs (Bangladesh, China and India) reported formal PPM activities in place in nearly 100% of their basic management units (BMUs). However, geographical coverage of formal PPM activities does not imply a high level of actual involvement or contribution to referral, diagnosis and treatment by non-NTP providers. To quantify the contribution of different providers to referral, diagnosis and treatment, PPM monitoring that is in line with existing WHO guidelines on recording and reporting for NTPs needs to be implemented. By 2007, only nine of the 22 HBCs had started to systematically record the source of referral and place of treatment of patients.

Among all countries, around 100 or more (depending on the category of provider) reported that all or some of the following types of provider were involved in referral and diagnosis: private practitioners, private hospitals, general public hospitals, medical colleges and prisons. Numbers were lower (mostly around 60 to 80 countries reporting the involvement of some or all providers) for

FIGURE 2.17

Alignment of NTP plans and budgets with other planning frameworks and initiatives, high-burden countries, 2006

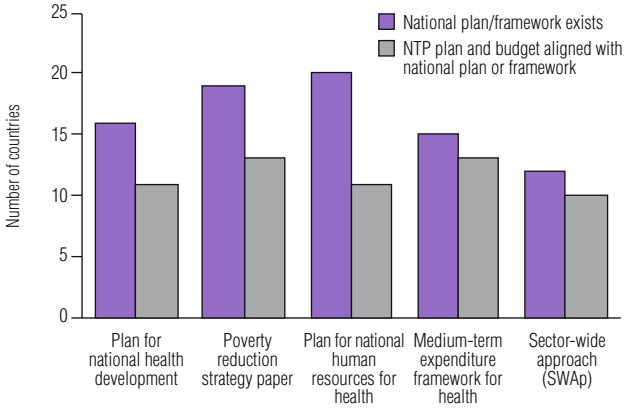


FIGURE 2.18

Engagement of different types of providers in referral of TB suspects, high-burden countries, 2006

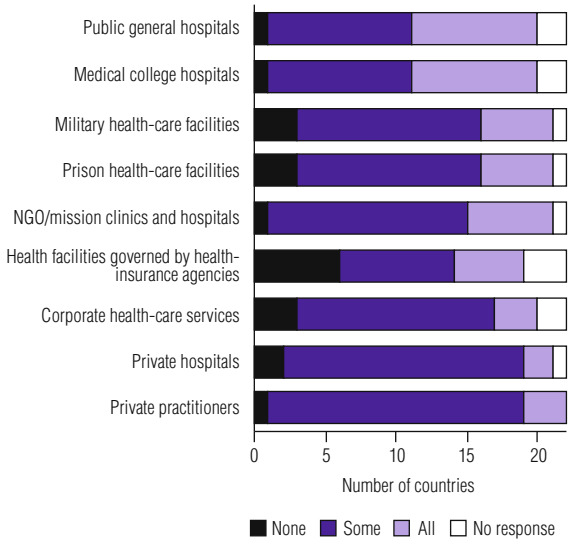
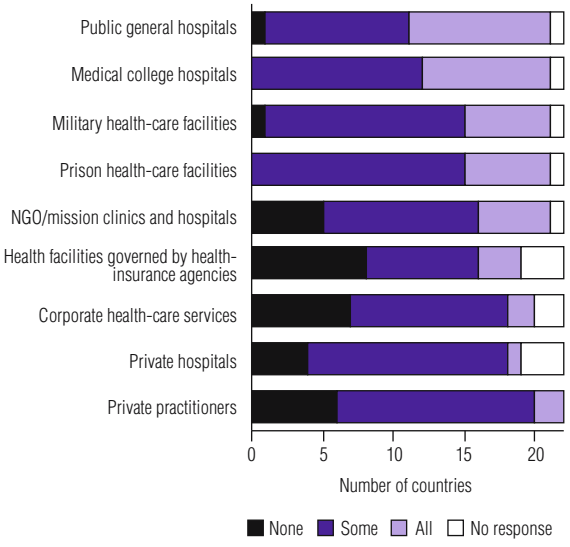


FIGURE 2.19

Engagement of different providers in free-of-charge TB treatment with recommended anti-TB drugs, high-burden countries, 2006



three categories: NGO and mission facilities, health and social insurance services, and the corporate sector. Figures were generally lower again for treatment. Around 70 countries reported that some or all providers in the following categories were involved in treatment: private practitioners, private hospitals, NGO and mission facilities, and health insurance services, although figures were higher for the involvement of medical colleges (100 countries) and general public hospitals (127 countries). Details of these data are not shown in this report, but are available upon request.

2.5.2 International Standards for Tuberculosis Care

The ISTC have been disseminated and used in seven HBCs and endorsed by national professional associations in six HBCs. Several HBCs have promoted and implemented the Standards in some settings: examples include Indonesia, India, Kenya, Thailand and the United Republic of Tanzania. Other HBCs including China, Kenya, Myanmar, Nigeria, Thailand and the United Republic of Tanzania have plans to either launch the ISTC nationally or to use them to target specific groups of care providers. Kenya plans to use the ISTC as a tool of accreditation. The ISTC have been particularly useful for convincing national professional societies and associations, as well as academic institutions, to support implementation of internationally recommended approaches to TB control.

2.6 Empowering people with TB, and communities

2.6.1 Advocacy, communication and social mobilization

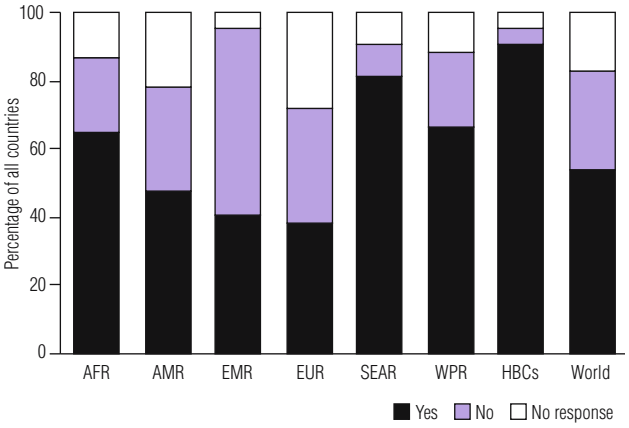
An ACSM strategy involves three distinct sets of activities: advocacy aimed at changing the behaviour of leaders or decision-makers, communication channelled to individuals and small groups, and social mobilization to secure support for efforts in TB control from civil society and the community as a whole. There has been progress in the effective implementation of ACSM activities at country level, often facilitated by grants from the Global Fund (grants for ACSM amounted to US$ 85 million in rounds 6 and 7). In general, however, progress remains uneven. Several HBCs have advanced in all three areas (advocacy, communication, and social mobilization), while 13 have conducted knowledge, attitudes and practice (KAP) surveys to better target their ACSM activities and 14 have involved patient-centred organizations or networks in advocacy and/or implementation of DOTS. Monitoring and evaluation of ACSM activities remains problematic, as countries continue to struggle to identify useful measures of implementation and impact.

Most HBCs still need to build local capacity to improve implementation of their ACSM strategy. For example, 20 of the 22 HBCs have requested assistance to refine their ACSM strategies in 2007–2008, and 17 have requested help to develop appropriate ACSM indicators.

Data collection in 2007 focused on the 22 HBCs and for this reason we do not provide information for other countries in this report.

FIGURE 2.20

Community participation in TB control, all countries, 2006.
Examples of community participation include identification and referral of TB suspects, and patient support. No response includes countries that did not report any data to WHO and countries that did not respond to questions on community participation in TB control.



2.6.2 Community participation in TB care

Among the 22 HBCs, 20 reported that there was community involvement in TB care (**Figure 2.20**). Only one (Ethiopia) stated that there was no involvement of communities in TB care, while one did not respond (Thailand). At regional level, community involvement was most common in the South-East Asia Region (82% of countries), followed by the Western Pacific Region (67% of countries) and the African Region (65% of countries). In the African Region, community involvement in TB care is recognized to be a key mechanism for expanding access to high-quality TB care as well as improving awareness and understanding of the disease. In the other three regions, community involvement was reported to exist in only around 40% of countries (**Figure 2.20**). This suggests that community involvement in TB care is not yet a strategic priority for many countries in these regions, even though in the Region of the Americas the level of community involvement in PHC services as a whole is high.

A better understanding of how communities are currently involved in TB control is required to make full use of their potential contribution. For example, despite the fact that 20 HBCs report community involvement in TB care, little is known about the specific roles or functions for which communities have taken responsibility.

2.6.3 Patients' Charter

The Patients' Charter provides the foundation for a human rights-based approach to the involvement of patients and communities in TB care and prevention. To

date, only four HBCs have used it. This probably reflects the fact that it was only published in 2006, and as such there has been limited time for its adoption and use.

2.7 Enabling and promoting research

A total of 49 countries including 19 HBCs reported that operational research activities were implemented in 2006. The countries with the largest programmes of operational research (in terms of the number of studies being done) were China and India. The most common topics were related to the following components of the Stop TB Strategy: DOTS (around 40 studies, with examples including how to improve diagnosis and patient care); TB/HIV, MDR-TB and other challenges (about 40 studies); and PPM (7 studies). Many countries also reported conducting surveys of drug resistance and prevalence of disease, as well as plans to conduct in-depth analysis of the impact of TB control using routine surveillance data (see also sections 2.2.6 and 2.3.2 above).

2.8 Summary

Implementation of the Stop TB Strategy varies among components and among countries. The first component and foundation of the strategy – DOTS – is the most widely implemented. It is also the component for which progress is closest to matching the expectations of the Global Plan. In 2006, 93% of the world's population lived in areas where DOTS was being implemented, and the global case detection rate was 61%. The treatment success target of 85% had almost been reached by the end of 2005. At the same time, there is much scope for improvement in the provision of laboratory culture and DST services, and, while impact measurement is advanced in some regions, it is at an early stage of development in others.

Besides DOTS implementation, diagnosis and treatment of MDR-TB and collaborative TB/HIV activities (both under component 2) are the other major parts of the Stop TB Strategy for which implementation can be best quantified. Although implementation still lags behind the Global Plan, there is clear evidence of major progress in the implementation of interventions such as HIV testing for TB patients and provision of CPT and ART to HIV-positive TB patients in the African Region. There is also progress in the diagnosis and treatment of MDR-TB, but here current and projected levels of implementation are far behind the Global Plan in the South-East Asia and Western Pacific regions, and within these regions in China and India in particular.

Among components 3–6, our understanding of implementation is more limited, because to date it is less well quantified. In the area of health system strengthening (component 3), considerable work on HRD is needed in many countries in all regions, although reported alignment with broader health sector planning frameworks as well as expansion of PAL to a larger number of countries are encouraging.

PPM and the ISTC (component 4) are being introduced and expanded in an increasing number of countries. However, the relative contribution of different providers to detection, referral or treatment of cases will remain unclear until the new routine recording and reporting forms recommended by WHO are more widely introduced.

ACSM (component 5) is still a new area for many countries and one where much more guidance and technical support are necessary. For this report, information on operational research (part of component 6) was comparatively superficial.

Overall, planning and implementation that covers all elements of the Stop TB Strategy and that is in line with the targets set in the Global Plan is already happening in some countries, but now needs to extend to many more.

CHAPTER 3

Financing TB control

Implementing the Stop TB Strategy at the scale required to achieve the MDG, Stop TB Partnership and World Health Assembly targets for global TB control (see also **Chapters 1 and 2**) requires accurate budgeting of the financial resources required, mobilization of the necessary funding and spending of available money such that TB control outcomes are improved. Analysis of budgets and funding for TB control was introduced into the annual WHO report on global TB control in 2002, and expenditures have been reported on since 2004.

In this report, we provide our latest assessment of financing for TB control. As with the previous two chapters, emphasis is given to the 22 HBCs, but analyses for all countries that have reported financial data are included. The chapter is structured in eight major sections, which are:

- *Data reported to WHO in 2007*. This section describes the number of countries that reported financial data and the share of the global number of TB cases accounted for by these countries.
- *NTP budgets, available funding and funding gaps*. This section analyses changes in NTP budgets in HBCs for the period 2002–2008, including presentation of budgets broken down by funding source and line item.
- *Total costs of TB control*. This section estimates the total costs of TB control, which include the resources used for diagnosis of TB and treatment of patients within the general health-care system (e.g. primary health-care staff and infrastructure) as well as the costs included in NTP budgets. Total costs in the years 2002–2008 are estimated for HBCs, and for all countries by WHO region in 2008.
- *Comparisons with the Global Plan*. In this section, total funding requirements for TB control based on country reports are compared with the total funding requirements estimated in the Global Plan. This is done for the period 2006–2008 for HBCs, and for 2008 for all countries.
- *Per patient costs and budgets*. Using the total budget and cost data provided in earlier sections of this chapter and forecasts of patients to be treated in 2008, this section provides a summary of per patient budgets and costs in each HBC in 2008.
- *Expenditures compared with available funding and changes in cases treated*. This section investigates the extent to which available funding was spent in 2006, as well as the relationship between changes in funding for TB control and changes in the number of new cases detected and treated in DOTS programmes.·
- *The Global Fund contribution to TB control*. With the Global Fund the largest single source of donor financing for TB control, this section includes the latest data on its contribution to funding for TB control.
- *How can funding gaps for TB control be closed?* This section discusses why funding gaps for TB control persist. It gives particular attention to the resources available from the Global Fund, and what is needed to close the gap between currently available funding and the funding needs set out in the Global Plan.

Further details about the financing of TB control in the 22 HBCs are provided in **Annex 1**.

3.1 Data reported to WHO in 2007

Financial data were received from 156 out of 212 (74%) countries and territories (**Table 3.1**), similar to the number that reported data in 2006.[1] Complete budget data for 2007 were provided by 94 countries (up from 87 for 2007 in last year's report), 90 countries provided complete budget data for 2008, and 80 provided complete expenditure data for 2006 (compared with 83 that provided complete expenditure data for 2005). The countries that provided financial reports accounted for 99% of the regional burden of TB in four WHO regions, with lower figures of 93% and 88% for the African and European regions respectively. Overall, countries that reported financial data account for 97% of the global burden of TB.

Data were received from all 22 HBCs (**Table 3.2**). Complete budget data for 2007 were provided by 20 countries (the exceptions were Thailand and the United Republic of Tanzania), and complete budget data for 2008 were provided by 21 countries (the exception was Thailand). It is now five years since the NTP in Thailand reported complete budget data, reflecting a decentralized system

[1] *Global tuberculosis control: surveillance, planning and financing*. Geneva, World Health Organization, 2007 (WHO/HTM/TB/2007.376).

TABLE 3.1

Budget, expenditure and utilization data received, all countries, 2008

	NUMBER OF COUNTRIES	FINANCIAL REPORTS RECEIVED	BUDGET 2007			BUDGET 2008			EXPENDITURE 2006			UTILIZATION OF HEALTH SERVICES	PROP. OF ESTIMATED REGIONAL TB INCIDENCE ACCOUNTED FOR BY COUNTRIES THAT REPORTED FINANCIAL DATA (%)
			COMPLETE	PARTIAL	NONE	COMPLETE	PARTIAL	NONE	COMPLETE	PARTIAL	NONE		
AFR	46	39	30	5	4	29	3	7	25	3	11	29	93
AMR	44	27	14	6	7	14	5	8	11	7	9	16	99
EMR	22	20	13	3	4	12	2	6	11	4	5	14	99
EUR	53	30	12	8	10	13	5	12	12	7	11	15	88
SEAR	11	10	8	2	0	8	1	1	8	1	1	6	99
WPR	36	30	17	5	8	14	8	8	13	4	13	17	99
Global	**212**	**156**	**94**	**29**	**33**	**90**	**24**	**42**	**80**	**26**	**50**	**97**	**97**

TABLE 3.2

Budget, expenditure and utilization data received, high-burden countries, 2008

	NUMBER OF COUNTRIES	FINANCIAL REPORTS RECEIVED	BUDGET 2007			BUDGET 2008			EXPENDITURE 2006		UTILIZATION OF HEALTH SERVICES
			COMPLETE	PARTIAL	NONE	COMPLETE	PARTIAL	NONE	COMPLETE	NONE	
AFR	9	9	8	1[a]	0	9	0	0	7	2[b]	9
AMR	1	1	1	0	0	1	0	0	1	0	1
EMR	2	2	2	0	0	2	0	0	2	0	2
EUR	1	1	1	0	0	1	0	0	1	0	1
SEAR	5	5	4	1[c]	0	4	1[c]	0	4	1[c]	4[c]
WPR	4	4	4	0	0	4	0	0	4	0	4
Global	**22**	**22**	**20**	**2**	**0**	**21**	**1**	**0**	**19**	**3**	**21**

[a] UR Tanzania.
[b] Mozambique and Uganda.
[c] Thailand.

in which financial data are not reported to or aggregated by the central unit of the NTP. For the past two years, the NTP in South Africa has demonstrated how this difficulty can be addressed. Until 2006, it also did not report financial data to WHO, as information was not reported to the central unit by any of the country's nine provinces. In 2006, the NTP manager sent the WHO data collection form to each of the country's nine provinces, allowing an aggregated report to be prepared. In 2007 this process was further strengthened, including via a planning and budgeting workshop at which provincial teams set out their plans and budget requirements for the period 2007–2011.

Complete expenditure data for 2006 were provided for 19 countries, with data missing for two African countries (Mozambique and Uganda) and Thailand. A total of 21 countries provided data on the utilization of health services and made projections of the number of patients who would be treated in 2007 and 2008.

Considerable clarification and verification of financial data by WHO are still required, but the quality of the data when first submitted continues to improve. This was especially the case for the African Region in 2007, probably facilitated by related work on planning and budgeting undertaken with 35 countries in the region in 2007 (see also section 3.4.3 below). Among HBCs, Brazil, the Democratic Republic of the Congo, Indonesia, Kenya, Myanmar and South Africa stood out as providing timely data that required almost no follow-up.

3.2 NTP budgets, available funding and funding gaps

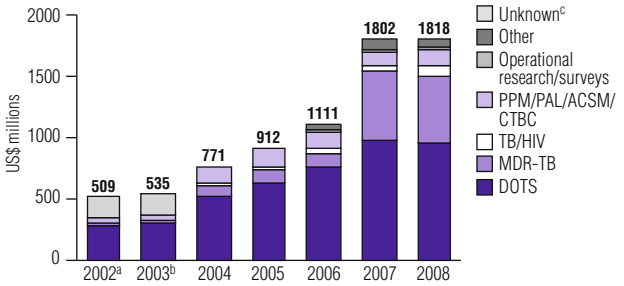
3.2.1 High-burden countries, 2002–2008

NTP budgets in 21 of the 22 HBCs have increased during the period 2002–2008, often by substantial amounts, but have stagnated in all but five countries (Brazil, Ethiopia, Mozambique, Nigeria and the United Republic of Tanzania) between 2007 and 2008 (**Figures 3.1 and Figure 3.2; Table 3.3; Annex 1**). There are insufficient data to make an assessment for Thailand. The total combined budget for the 22 HBCs in 2008 is US$ 1.8 billion, almost four times the US$ 509 million budgeted for in 2002, but just US$ 16 million higher than in 2007. The Russian Federation has by far the largest budget (US$ 722 million), followed by South Africa (US$ 352 million), China (US$ 225 million), India (US$ 67 million) and Brazil (US$ 64 million). These five countries account for 81% of the NTP budgets reported for 2008 by 21 HBCs. Three countries have budgets of around US$ 50 million (Indonesia, Nigeria and the United Republic of Tanzania), followed by Kenya with a budget of US$ 33 million. The remaining 13 HBCs have budgets of US$ 25 million or less in 2008.

In absolute terms, the budgetary increase in the Russian Federation far exceeds that in any other HBC, at US$ 560 million since 2002. The second largest increase is in South Africa (US$ 289 million), following comprehensive planning and budgeting for all components of the Stop TB Strategy during 2007, and likely more accu-

FIGURE 3.1

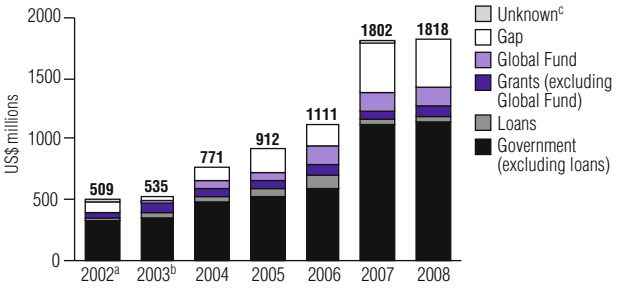
Total NTP budgets by line item, high-burden countries, 2002–2008



[a] Estimates assume budget 2002 equal to expenditure 2002 (Ethiopia), budget 2003 (Afghanistan, Bangladesh, Mozambique and Uganda) or expenditure 2003 (Russian Federation and Zimbabwe).
[b] Estimates assume budget 2003 equal to expenditure 2003 (Russian Federation and Zimbabwe) or budget 2004 (Thailand).
[c] "Unknown" applies to Afghanistan 2002–2004, Russian Federation 2002–2003 and Mozambique 2002–2003 as breakdown by line item not available.

FIGURE 3.2

Total NTP budgets by source of funding, high-burden countries, 2002–2008



[a] Estimates assume budget 2002 equal to expenditure 2002 (Ethiopia), budget 2003 (Afghanistan, Bangladesh, Mozambique and Uganda) or expenditure 2003 (Russian Federation and Zimbabwe).
[b] Estimates assume budget 2003 equal to expenditure 2003 (Russian Federation and Zimbabwe) or budget 2004 (Thailand).
[c] "Unknown" applies to Afghanistan 2004, DR Congo 2002, Nigeria 2002 and UR Tanzania 2007, as breakdown by funding source not available.

TABLE 3.3

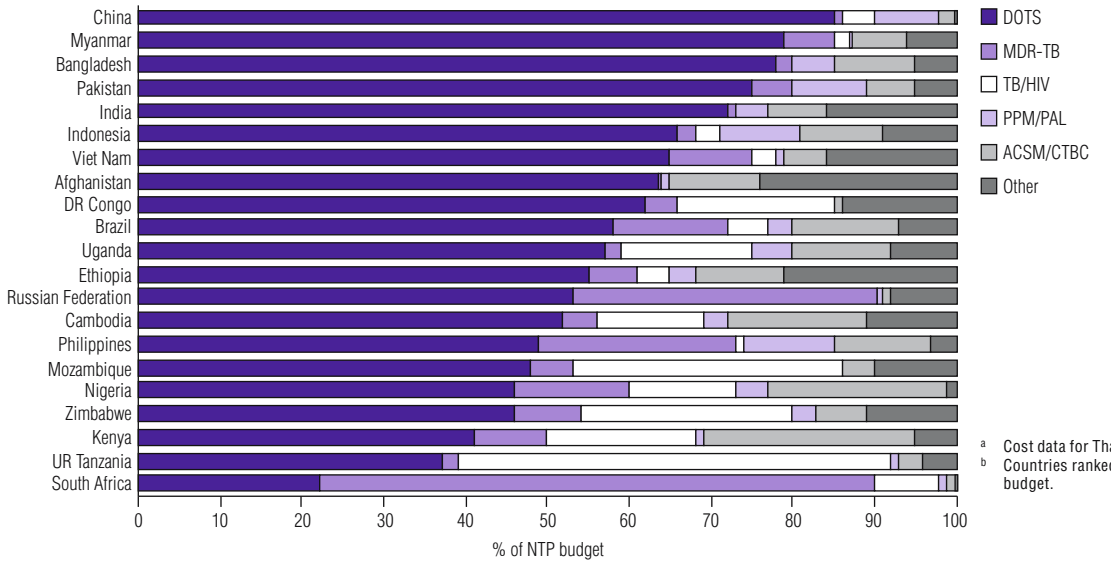
NTP budgets and available funding, high-burden countries, 2008

	TOTAL NTP BUDGET (US$ MILLIONS)	CHANGE SINCE 2002[a] (US$ MILLIONS)	CHANGE SINCE 2002 (%)	AVAILABLE FUNDING (US$ MILLIONS)				FUNDING GAP	CHANGE IN AVAILABLE FUNDING SINCE 2002 (US$ MILLIONS)				CHANGE IN FUNDING GAP SINCE 2002 (US$ MILLIONS)
				GOVERNMENT (EXCL. LOANS)	LOANS	GRANTS (EXCL. GLOBAL FUND)	GLOBAL FUND	(US$ MILLIONS)	GOVERNMENT (EXCL. LOANS)	LOANS	GRANTS (EXCL. GLOBAL FUND)	GLOBAL FUND	
1 India	67	31	86	7.7	31	8.3	20	0	1.4	6.7	2.8	20	0
2 China	225	127	130	139	13	0.7	20	53	86	13	-1.8	20	9.5
3 Indonesia	57	23	66	23	0	13	21	0	17	0	10	21	-25
4 South Africa	352	289	459	350	0	1.8	0	0	292	0	0.2	-3.6	0
5 Nigeria	49	37	290	5.8	0	2.2	11	30	3.9	0	-1.9	11	23
6 Bangladesh	17	10	149	3.0	0.6	0.9	13	0	-0.4	0	-2.6	13	0
7 Ethiopia	17	12	249	0.6	0	4.4	12	0	-0.5	0	0.6	12	0
8 Pakistan	25	19	359	10	0	0	6.2	8.3	7.1	0	-0.7	6.2	6.7
9 Philippines	18	1.9	11	8.2	0	0.1	8.0	2.0	-3.8	0	0.1	8.0	-2.4
10 DR Congo	21	10	98	1.6	0.8	5.7	7.9	4.6	0.6	0.8	0	7.9	0.9
11 Russian Federation	722	560	346	501	33	5.0	30	153	347	33	-2.6	30	153
12 Viet Nam	15	3.1	27	7.1	0	3.5	3.5	0.4	-1.6	-2	2.5	3.5	0.4
13 Kenya	33	28	538	1.6	0	12	5.6	15	0.02	0	9.1	5.6	13
14 UR Tanzania[b]	52	47	844	4.2	0	17	20	11	4.0	0	12	20	10
15 Uganda	13	8	150	0.5	0	0.5	3.7	8.4	0.4	-1.2	-0.1	3.7	5.1
16 Brazil	64	50	371	41	0	0	6.1	16	28	0	0	6.1	16
17 Mozambique	19	11	134	2.0	0	9.4	5.1	2.2	1.7	0	7.0	5.1	-3.1
18 Thailand[c]	8.8	–	–	5.6	0	0	1.4	1.8	–	–	–	–	–
19 Myanmar	14	11	384	1.0	0	2.6	0	10	0.6	0	2.4	0	7.7
20 Zimbabwe	6.4	4.7	279	1.4	0	1.7	1.9	1.4	1.3	0	0.1	1.9	1.4
21 Cambodia	9.0	4.7	109	0.6	0	1.5	2.2	4.8	-0.7	-0.7	0.3	2.2	3.6
22 Afghanistan	15	12	395	0.1	0	7.5	0.9	6.8	-0.2	0	6.2	0.9	5.3
High-burden countries	**1818**	**1299**	**249[d]**	**1116**	**78**	**97**	**200**	**328**	**784**	**50**	**44**	**195**	**227**

– Indicates not available.
[a] Figures assume budget 2002 equal to expenditure 2002 (Ethiopia), budget 2003 (Afghanistan, Bangladesh, Mozambique and Uganda) or expenditure 2003 (Russian Federation and Zimbabwe).
[b] For US$ 23 million of the available funding the exact split between the Global Fund and grants from other donors is not known. This table assumes a 50/50 split.
[c] Data for Thailand are partial.
[d] Median value.

FIGURE 3.3

NTP budgets by line item, 21 high-burden countries,[a,b] 2008



[a] Cost data for Thailand not complete.
[b] Countries ranked according to DOTS budget.

rate budgeting for individual provinces than was possible in previous years. In both countries, large budgets for the diagnosis and treatment of MDR-TB are particularly striking (**Figure 3.3**). The Russian Federation and South Africa account for most of the amount that has been budgeted for MDR-TB across HBCs (US$ 506 million out of a total of US$543 million, equivalent to 93%).

In relative terms, the most striking budgetary increase is the 844% increase reported by the United Republic of Tanzania (**Figure 3.4a; Table 3.3**). This larger figure follows a planning and budgeting process that was completed in late 2007. The plan for 2008–2012 covers all elements of the Stop TB Strategy, is in line with Global Plan targets and includes a comprehensive assessment of the budget required for collaborative TB/HIV activities (both those funded and provided though the NTP and those funded and provided via the national AIDS control programme). This has brought the budget developed by the NTP to a level very comparable to that estimated in the Global Plan (see also section 3.4.1 below and **Annex 1**). If the budget for collaborative TB/HIV activities likely to be funded and managed by the national AIDS control programme is removed, the budget in the United Republic of Tanzania is approximately halved.

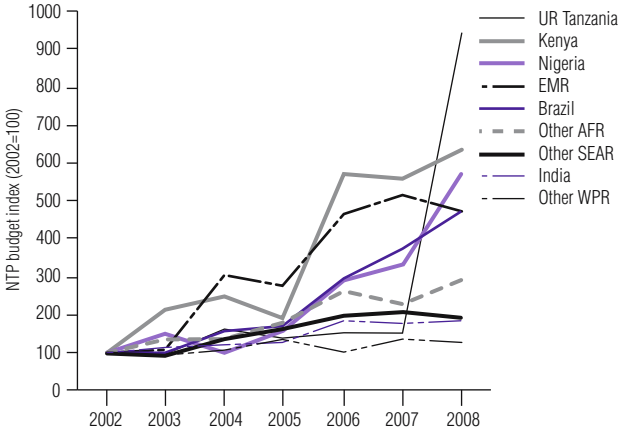
Other countries with large relative increases in their NTP budgets over the past seven years include Afghanistan, Brazil, Myanmar, Nigeria, Pakistan and South Africa. Countries with noticeably small increases in their budgets since 2002 are the Philippines and Viet Nam, reflecting the fact that both countries had already reached, or were close to achieving, the global targets for TB control in 2002.

DOTS accounted for easily the largest proportion of NTP budgets between 2002 and 2006, and in 2008 continues to account for much the largest share of the NTP budget in all of the 22 HBCs except the Russian Federa-

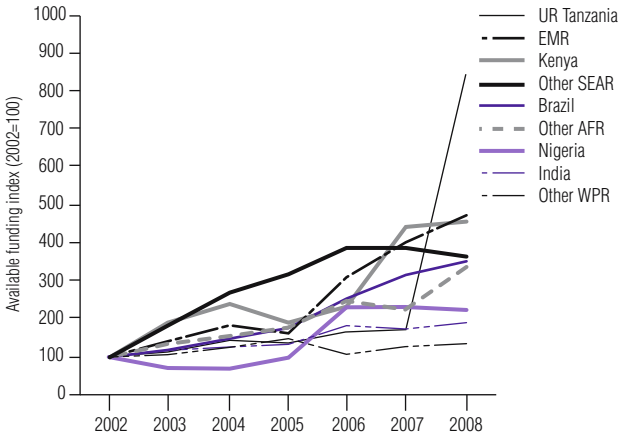
FIGURE 3.4

Trends in NTP budgets and funding, 19 high-burden countries,[a] 2002–2008

a. Total NTP budget



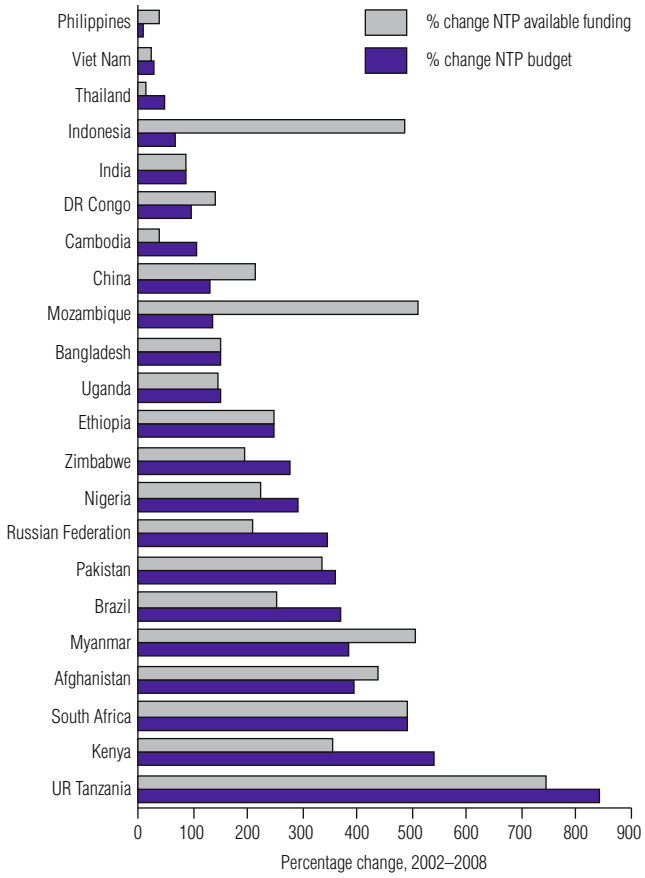
b. Available funding



[a] China, the Russian Federation and South Africa were excluded since patterns are clear from other figures and tables.

FIGURE 3.5

Changes in NTP budget and available funding, 21 high-burden countries,[a,b] 2002–2008



[a] Cost data for Thailand not complete.
[b] Countries ranked by percentage change in NTP budget.

tion, South Africa and the United Republic of Tanzania (**Figure 3.1; Figure 3.3**).[1] In contrast to earlier years, a much larger proportion (around 30%) of total NTP budgets across all HBCs is accounted for by diagnosis and treatment of MDR-TB in 2007 and 2008, with the Russian Federation and South Africa accounting for just over US$ 500 million of the total of US$ 540 million. Collaborative TB/HIV activities remain a comparatively small component of NTP budgets for the HBCs as a whole, but account for more than 50% of the budget reported by the NTP in the United Republic of Tanzania and for a relatively large proportion of the budgets reported by several other African countries including the Democratic Republic of the Congo, Kenya, Mozambique, Uganda and Zimbabwe (see also section 3.4.1 and **Annex 1**). High costs for collaborative TB/HIV activities in the United Republic of Tanzania follow a comprehensive costing analysis, as noted above.

The large budget increases described above have been accompanied by big improvements in available funding (**Figure 3.2, Figure 3.4b, Figure 3.5; Table 3.3**). For all HBCs, funding for NTP budgets has increased by just over US$ 1 billion since 2002, reaching US$ 1.4 billion of the US$ 1.8 billion needed in 2008. Funding has also increased in all individual HBCs, although the increases range from less than US$ 5 million in six countries (Cambodia, Myanmar, the Philippines, Uganda, Viet Nam and Zimbabwe) to around US$ 100 million in China, around US$ 300 million in South Africa and around US$ 400 million in the Russian Federation. As with NTP budgets, however, funding has stagnated between 2007 and 2008.

The extra US$ 1 billion of funding for NTPs in HBCs in 2008 (compared with 2002) has come mostly from HBC governments (including loans). This extra domestic funding amounts to US$ 0.8 billion (**Table 3.3**, columns 10–13) in total, an overall statistic that conceals the fact that most of the additional domestic funding has come from four countries only: Brazil, China, the Russian Federation and South Africa (an extra US$ 799 million including loans in 2008, compared with 2002). In other HBCs, increases in funding have come primarily from the Global Fund in 12 HBCs, from a combination of the Global Fund and grant funding in Indonesia, Kenya, Mozambique, and Pakistan, and mainly from donors other than the Global Fund in Afghanistan and Myanmar. Funding from the Global Fund in 2008 amounts to US$ 200 million compared with zero in 2002, and all HBCs except Myanmar have Global Fund grants. In relative terms, the most impressive improvements in funding overall (from all sources) have occurred in Indonesia, Mozambique, Myanmar, South Africa and the United Republic of Tanzania (**Figure 3.5**).

Among all HBCs, national governments will provide US$ 1194 million (66%) of the funding required by NTPs in 2008 and US$ 297 million (16%) will be funded by donor agencies (**Table 3.3**). This leaves a reported funding gap of US$ 328 million (18%). In absolute terms, the largest funding gaps are those reported by Brazil, China, Nigeria and the Russian Federation (US$ 252 million, or 77% of the total reported gap). Proportionally, the largest gaps are in Afghanistan, Cambodia, Kenya, Myanmar, Nigeria, Pakistan, the Russian Federation and Uganda (with gaps representing 31–73% of the required budget). Only five HBCs reported no funding gap, or a negligible funding gap: Bangladesh, Ethiopia, India, Indonesia and South Africa.

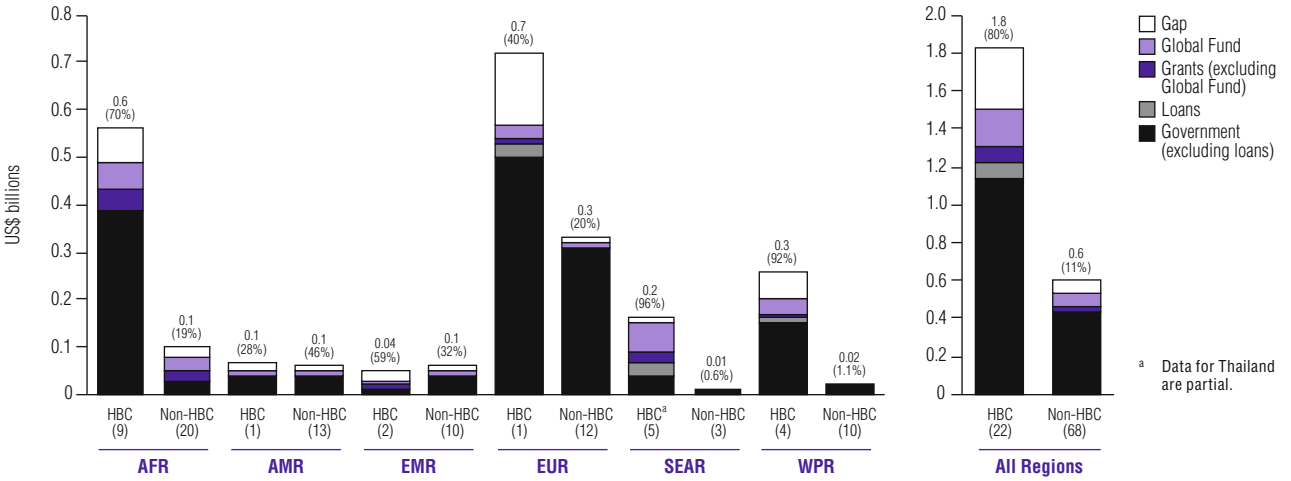
3.2.2 All countries by region, 2008

Data for all countries (in addition to the 22 HBCs) began to be collected in 2003 and were reported for the first time in 2004. There is variation in the set of countries that report complete data each year, making presentation of needs for all countries over time difficult. For this reason, **Figure 3.6** presents NTP budgets by source of funding for 2008 only. In 2008, 90 countries (22 HBCs and 68 other countries) submitted complete financial data. Globally, these countries account for 91% of TB cases (up from 90% in 2007); at regional level, they account for almost all TB cases in the African, Eastern Mediterranean, South-East

[1] See **Annex 2** for a definition of the budgetary line items included in the category DOTS.

FIGURE 3.6

Regional distribution of NTP budgets by source of funding, 22 high-burden countries and 68 non high-burden countries, 2008.
Numbers in parentheses above bars show the percentage of all estimated TB cases in the region accounted for by the countries included in the bar. Numbers below the bars show the number of countries contributing to each bar.



Asia and Western Pacific regions (89–97% depending on the region), for 74% of the regional total in the Region of the Americas, and for 60% of the regional total in the European Region.

NTP budgets in 2008 in these 90 countries total US$ 2.4 billion, up from US$ 1.6 billion in 2007 for countries accounted for 91% of TB cases globally, with a funding gap of US$ 385 million (also higher than the US$ 307 million gap reported in 2007).

Budgetary funding gaps as a proportion of the total budget were similar for HBCs and non-HBCs in the Region of the Americas and the Eastern Mediterranean Region, and much lower or non-existent in non-HBCs in the European, South-East Asia and Western Pacific regions. It is only in the African Region that funding gaps represent a higher share of the budget required in non-HBCs. Overall, NTP budgets per TB case (estimated annual incidence) were higher for HBCs compared with non-HBCs in the African Region, the European Region and the Region of the Americas, and much lower for HBCs compared with non-HBCs in the Eastern Mediterranean, South-East Asia and Western Pacific regions.

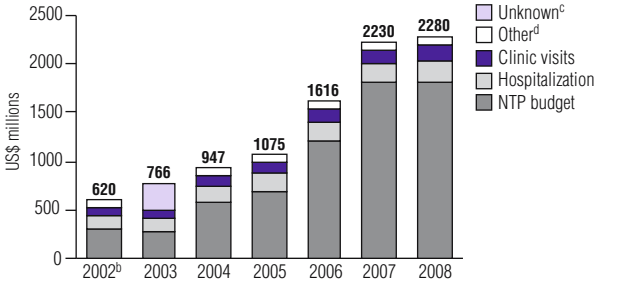
3.3 Total costs of TB control

3.3.1 High-burden countries, 2002–2008

NTP budgets include only part of the resources needed for TB control. In particular, they do not include the costs associated with general health-service staff and infrastructure, which are used when TB patients are hospitalized or make outpatient clinic visits for DOT and monitoring. For the 22 HBCs combined, the total cost of TB control is projected to be almost US$ 2.3 billion in 2008, compared with US$ 0.6 billion in 2002 (**Figures 3.7–3.9; Table 3.4**). As with NTP budgets, the total cost of TB control is expected to stagnate between 2007 and 2008, except in five countries (Brazil, Ethiopia, Mozambique, Nigeria and the United Republic of Tanzania).

FIGURE 3.7

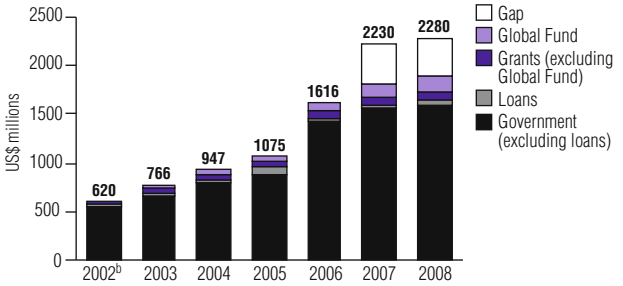
Total TB control costs by line item, high-burden countries,[a] 2002–2008



[a] Total TB control costs for 2002–2006 are based on expenditure data, whereas those for 2007–2008 are based on budget data.
[b] Estimates assume costs 2002 equal to costs 2003 for Afghanistan, Bangladesh, Mozambique, Nigeria, Uganda and Zimbabwe.
[c] "Unknown" applies to Russian Federation 2003 and Thailand 2002–2006.
[d] "Other" includes costs for hospitalization and fluorography in the Russian Federation not reflected in NTP budget or NTP expenditure data.

FIGURE 3.8

Total TB control costs by source of funding, high-burden countries,[a] 2002–2008



[a] Total TB control costs for 2002–2006 are based on expenditure data, whereas those for 2007–2008 are based on budget data.
[b] Estimates assume costs 2002 equal to costs 2003 for Afghanistan, Bangladesh, Mozambique, Nigeria, Uganda and Zimbabwe.

TABLE 3.4

Total TB control costs and available funding, high-burden countries, 2008

	TOTAL COSTS (US$ MILLIONS)	CHANGE SINCE 2002[a] (US$ MILLIONS)	CHANGE SINCE 2002 (%)	AVAILABLE FUNDING (US$ MILLIONS)				FUNDING GAP (US$ MILLIONS)	CHANGE IN AVAILABLE FUNDING SINCE 2002 (US$ MILLIONS)				CHANGE IN FUNDING GAP SINCE 2002 (US$ MILLIONS)
				GOVERNMENT (EXCL. LOANS)	LOANS	GRANTS (EXCL. GLOBAL FUND)	GLOBAL FUND		GOVERNMENT (EXCL. LOANS)	LOANS	GRANTS (EXCL. GLOBAL FUND)	GLOBAL FUND	
1 India	111	48	78	52	31	8.3	20	0	12	13	3.4	20	0
2 China	225	164	269	139	13	0.7	20	53	82	12	-2.6	20	53
3 Indonesia	62	41	199	28	0	13	21	0	9.2	0	11	21	0
4 South Africa	538	374	228	536	0	1.8	0	0	378	0	0.2	-3.6	0
5 Nigeria	80	70	717	36	0	2.2	11	30	30	0	-1.6	11	30
6 Bangladesh	24	13	129	9.3	0.6	0.9	13	0	2.5	0	-2.6	13	0
7 Ethiopia	29	21	304	12	0	4.4	12	0	9.1	0	0.6	12	0
8 Pakistan	28	23	465	13	0	0	6.2	8.3	10	0	-1.2	6.2	8.3
9 Philippines	28	6.2	28	18	0	0.1	8.0	2.0	-1.2	-2.2	-0.4	8.0	2.0
10 DR Congo	30	18	154	11	0.8	5.7	7.9	4.6	5.6	0.8	-0.4	7.9	4.6
11 Russian Federation	811	669	473	590	33	5.0	30	153	449	33	5.0	30	153
12 Viet Nam	25	6.7	36	18	0	3.5	3.5	0	1.5	-1.8	3.0	3.5	0.4
13 Kenya	35	30	555	3.3	0	12	5.6	15	0.5	0	9.1	5.6	15
14 UR Tanzania[b]	58	46	419	9.5	0	17	20	11	3.1	0	12	20	11
15 Uganda	14	11	386	1.1	0	0.5	3.7	8.4	0.1	-1.2	-0.1	3.7	8.4
16 Brazil	95	57	147	73	0	0	6.1	16	34	0	0	6.1	16
17 Mozambique	25	21	528	7.8	0	9.4	5.1	2.2	5.1	-0.8	9.1	5.1	2.2
18 Thailand[c]	8.8	–	–	5.6	0.0	0.0	1.4	1.8	–	–	–	–	–
19 Myanmar	15	12	403	2.8	0	2.6	0	10	0.6	0	1.7	0	10
20 Zimbabwe	11	5.5	92	6.3	0	1.7	1.9	1.4	2.0	0	0.1	1.9	1.4
21 Cambodia	11	6.5	133	3.0	0	1.5	2.2	4.8	0.2	-0.7	0	2.2	4.8
22 Afghanistan	17	15	942	1.4	0	7.5	0.9	6.8	1.1	0	6.2	0.9	6.8
High-burden countries	**2280**	**1660**	**269[d]**	**1578**	**78**	**97**	**200**	**328**	**1033**	**53**	**53**	**195**	**326**

– Indicates not available.

[a] TB control costs for 2007–2008 were estimated using budget data, whereas those for 2002–2006 were estimated using expenditure rather than budget data wherever possible. Estimates assume expenditure 2002 equal to available funding 2002 (Kenya and UR Tanzania), to expenditure 2003 (Afghanistan, Bangladesh, Mozambique, Nigeria and Zimbabwe) or to available funding 2003 (Uganda).

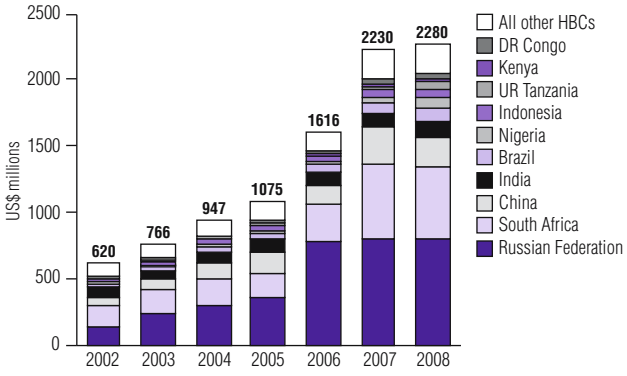
[b] For US$ 23 million of the available funding the exact split between the Global Fund and grants from other donors is not known. This table assumes a 50/50 split.

[c] Data for Thailand are partial.

[d] Median value.

FIGURE 3.9

Total TB control costs by country, high-burden countries,[a] 2002–2008



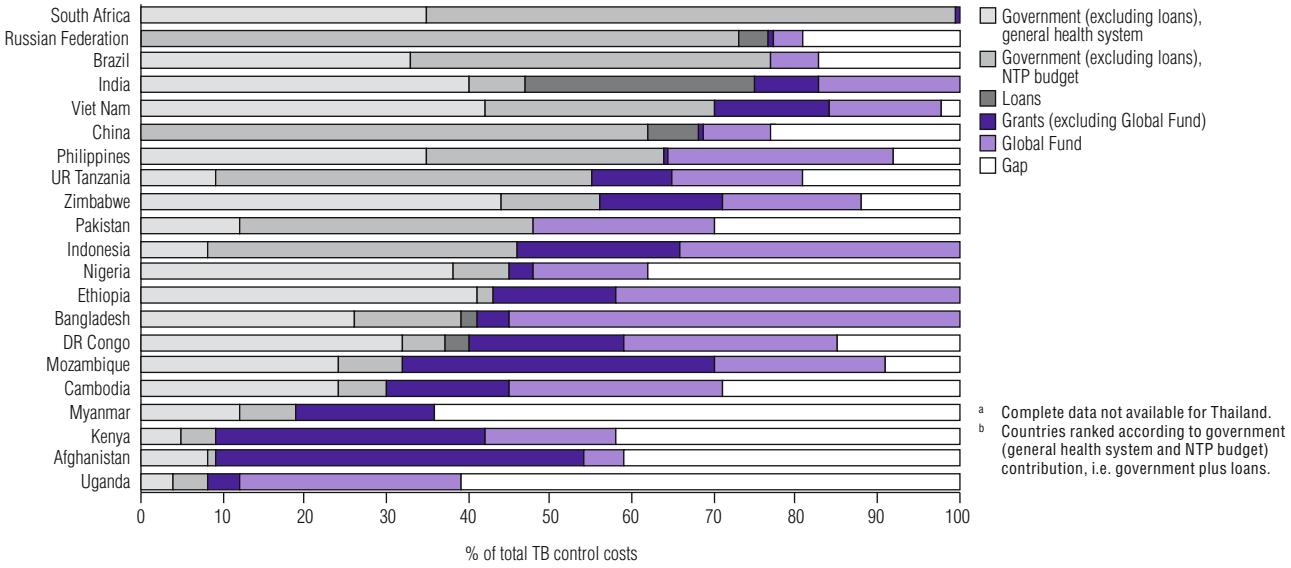
[a] Total TB control costs for 2002–2006 are based on expenditure data, whereas those for 2007–2008 are based on budget data.

Increases in projected costs during the period 2002–2008 arise because of the large increases in NTP budgets (described above) and, to a much lesser extent, because of the higher costs of clinic visits and hospitalization that are associated with treating more patients. As in previous years, the largest costs in 2008 are for the Russian Federation and South Africa, which together account for US$ 1.3 billion (59%) of the total of US$ 2.3 billion (**Figure 3.9; Table 3.4**). China (US$ 225 million), India (US$ 111 million), Brazil (US$ 95 million) and Nigeria (US$ 80 million) rank third to sixth. These six countries account for 82% of the total cost of TB control in the 22 HBCs in 2008. Of the remaining countries, 13 have costs of US$ 30 million or less in 2008, while three (Indonesia, Kenya, the United Republic of Tanzania) have costs in the range US$ 35 million to US$ 62 million (**Table 3.4**, column 2). The countries with by far the largest projected absolute increases in annual costs between 2002 and 2008 are the Russian Federation and South Africa, followed by China (**Figure 3.9; Table 3.4**).

In South Africa, there are two major reasons for the high cost of TB control anticipated in 2008. Firstly, the costs associated with general district hospital and specialized TB hospital infrastructure are relatively high, due to the number of beds (approximately 8000 across the country's nine provinces) as well as a unit price per bed-day that is higher in South Africa than in

FIGURE 3.10

Sources of funding for total TB control costs, 21 high-burden countries,[a,b] 2008



[a] Complete data not available for Thailand.
[b] Countries ranked according to government (general health system and NTP budget) contribution, i.e. government plus loans.

most other HBCs (around US$ 40 per day in TB hospitals to over US$ 100 in general district hospitals, reflecting the higher unit costs associated with a middle-income country). Secondly, there is a large budget for the diagnosis and treatment of MDR-TB (see also **Annex 2** and section 3.2 above). The largest components of the budget for MDR-TB in 2008 are renovation and construction of infrastructure in line with a new national policy of hospitalizing all patients with MDR-TB for at least six months, improvement of infection control in MDR-TB and XDR-TB units as well as in general district hospitals and provision of second-line anti-TB drugs for the enrolment of around 5000 patients on treatment.

High costs in the Russian Federation in 2008 reflect continued staffing and maintenance of an extensive network of TB hospitals and sanatoria, a large budget for second-line anti-TB drugs to treat many MDR-TB patients (US$ 267 million, with an estimated total of about 24 000 cases to be enrolled on treatment in 2008; see also **Figure 3.3 and Chapter 2**) and continued use of fluorography for mass population screening.

Funding for the general health-service staff and infrastructure used by TB patients during clinic visits and hospitalization is assumed to be provided by governments (see also **Annex 2**). This assumption, together with the implicit assumption that health systems have sufficient capacity to support the treatment of a growing numbers of patients in 2008,[1] means that the resources available for TB control are estimated to have increased from US$ 0.6 billion in 2002 to US$ 2.0 billion in 2008 (**Figure 3.8; Table 3.4**). For all HBCs, the estimated gap between the funding already available and the total cost of TB control is US$ 328 million in 2008, i.e. the NTP budget gap reported above.

The contribution by HBC governments to the total cost of TB control in 2008 is 73% on average, which is slightly larger than their contribution to NTP budgets but very similar to figures reported for earlier years in previous reports in this series. Also as in previous years, this high average figure conceals important variation among countries (**Figure 3.10**). Seven HBCs are dependent on grants to cover around 50% or more of the total costs of TB control (Afghanistan, Bangladesh, the Democratic Republic of the Congo, Ethiopia, Indonesia, Kenya and Mozambique), and a further six (Cambodia, Myanmar, Pakistan, Uganda, the United Republic of Tanzania and Zimbabwe) that are likely to rely on grant funding to a similar or greater extent to fill reported funding gaps.

The share of the total costs provided by HBC governments is closely related to average income levels (**Figure 3.11**), although the government contribution relative to income levels is comparatively high in the Democratic Republic of the Congo, Ethiopia, India, South Africa, Viet Nam and Zimbabwe, and comparatively low in Cambodia, Indonesia, Kenya, Uganda and the United Republic of Tanzania.

3.3.2 All countries, 2008

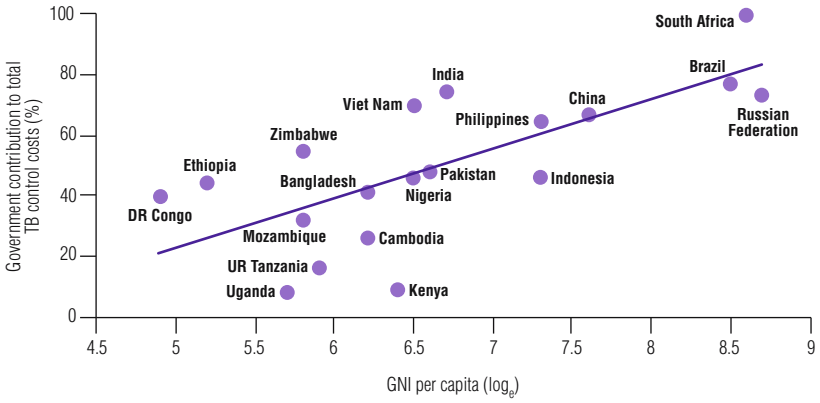
Total costs for 86 countries that submitted complete financial data to WHO, which account for 91% of TB cases globally and which were also included in the Global Plan, are shown for 2008 in **Figure 3.13**.[2] Overall, country reports indicate planned costs of US$ 3.1 billion in 2008, up from US$ 2.3 billion in 2007.

[1] Nonetheless, the capacity of health systems to manage an increasing number of TB patients warrants further analysis, particularly in countries where the number of patients will need to increase substantially to achieve the MDG and related Stop TB Partnership targets for TB control.

[2] Four of the 90 countries that reported complete data were not considered in the Global Plan cost estimates.

FIGURE 3.11

Government contribution (including loans) to total TB control costs by gross national income (GNI) per capita, 19 high-burden countries,[a] 2008



[a] Data on GNI per capita not available for Myanmar and Afghanistan. Cost data for Thailand not complete.

3.4 Comparisons with the Global Plan

The Global Plan sets out what needs to be done between 2006 and 2015 to achieve the MDG and related Stop TB Partnership targets for TB control (see also **Chapters 1 and 2**). To assess the extent to which planning and financing for TB control at country level are aligned with the Global Plan, the financial resources estimated to be required for TB control in the Global Plan can be compared with estimates that are based on the financial data reported by countries.

3.4.1 High-burden countries

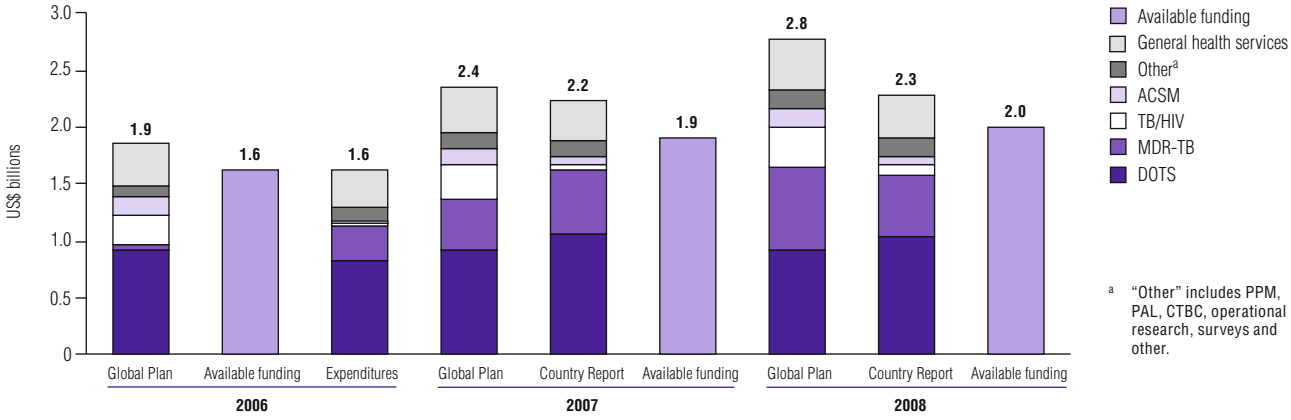
For the 22 HBCs as a whole, expenditures (2006), planned costs and available funding for 2006–2008 according to country reports are compared with those derived from the Global Plan in **Figure 3.12**.[1] In 2006, actual expenditures in HBCs were slightly lower than those estimated to be required in the Global Plan, particularly for collaborative TB/HIV activities and ACSM. Expenditures for DOTS and use of general health system resources for DOTS treatment were similar. These findings are in line with the progress in DOTS implementation, the shortfall in implementation of collaborative TB/HIV activities (e.g. HIV testing, CPT and ART for HIV-positive TB patients) and the need for guidance in implementation of ACSM discussed in **Chapter 2**.

In 2007 and 2008, planned costs based on country reports are higher than expenditures in 2006, mostly due to an increase in planned spending on DOTS implementation and MDR-TB treatment (almost entirely in the Russian Federation and South Africa). However, planned costs fall short of those estimated to be required in the Global Plan, with the gap widening between 2007 and 2008 from US$ 0.2 billion to US$ 0.5 billion. Moreover, the gap is bigger once the distortion caused by the high planned costs for MDR-TB treatment in just two countries is removed. If the "excess" costs for diagnosis and treatment of MDR-TB (compared with the Global Plan) in the Russian Federation and South Africa are excluded, then the gap between the financial resources estimated to be needed in country plans and the Global Plan reaches US$ 0.7 billion for the 22 HBCs in 2008. The shortfall in MDR-TB treatment applies in particular to China, India and Indonesia.

These aggregated comparisons conceal the fact that four HBCs have planned costs consistent with those detailed in the Global Plan in 2008: Afghanistan, Brazil, Kenya and the United Republic of Tanzania. In addition,

FIGURE 3.12

The Global Plan compared to planned costs, available funding and expenditures as reported by 22 high-burden countries, 2006–2008

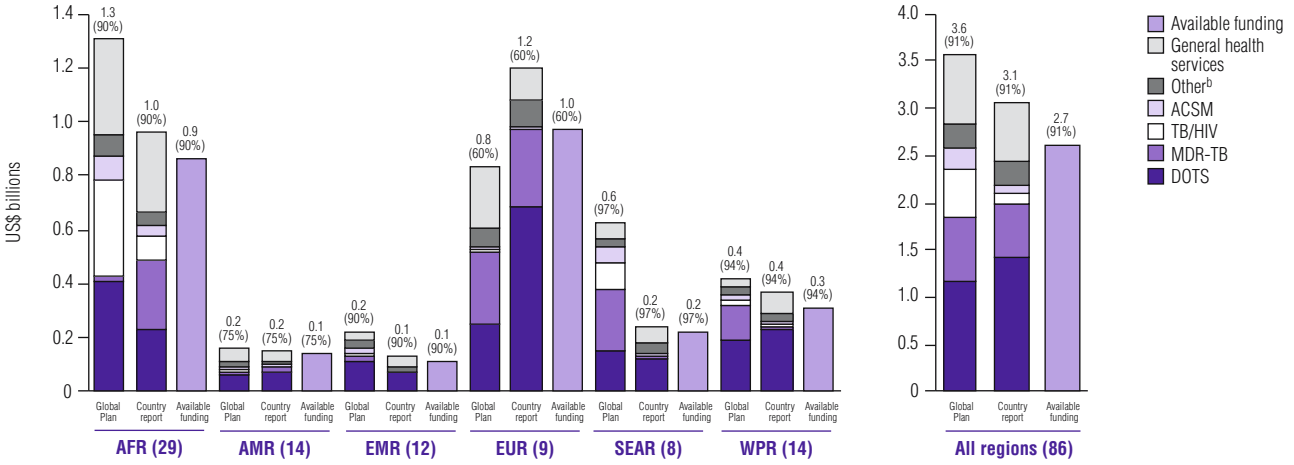


[a] "Other" includes PPM, PAL, CTBC, operational research, surveys and other.

[1] See **Annex 2** for explanation of how costs for individual countries were derived from the Global Plan.

FIGURE 3.13

Total TB control costs in 2008 in 22 high-burden countries and 64[a] other countries by region: country reports compared with the Global Plan. Numbers in parentheses above bars show the percentage of all estimated TB cases in the region accounted for by the countries included in the bar. Numbers in parentheses in the x-axis show the number of countries contributing to each bar.



[a] The Netherlands, Serbia, Slovakia, and Switzerland are excluded because they were not included in the Global Plan.
[b] "Other" includes PPM, PAL, CTBC, operational research, surveys and other.

there are four countries in which the discrepancy is due to the mid-2007 revision of the MDR-TB component of the Global Plan to include much more ambitious targets.[1] With the exception of MDR-TB, country plans are consistent with the Global Plan in China, Myanmar, the Philippines and Viet Nam (see **Annex 1**).

As noted in **Chapter 2**, the Russian Federation and South Africa are unusual in having plans to treat more patients with MDR-TB in 2008 than the numbers anticipated by the Global MDR-TB and XDR-TB Response Plan. For collaborative TB/HIV activities, the shortfall is mainly in Cambodia, the Democratic Republic of the Congo, Ethiopia, India, Mozambique, Nigeria, Uganda and Zimbabwe. For ACSM, examples of countries with shortfalls include the Democratic Republic of the Congo, Ethiopia, India and Pakistan; exceptions with ACSM budgets comparable to or larger than those indicated in the Global Plan include Afghanistan, Brazil, Cambodia, Kenya and the Philippines. These country-by-country comparisons with the Global Plan are presented in **Annex 1**.

3.4.2 All countries

The financial data submitted to WHO allow total TB control costs for 2008 to be estimated for 86 of the 171 countries that were included in the Global Plan (22 HBCs and 64 other countries).[2] These 86 countries account for 91% of all new TB cases arising each year.[3] A regional comparison of costs and available funding based on (a) country reports and (b) the Global Plan is shown for these 86 countries in **Figure 3.13**.

Overall, country reports indicate planned costs of US$ 3.1 billion in 2008 (up from US$ 2.3 billion in 2007), compared with US$ 3.6 billion in the Global Plan. The main discrepancy evident from **Figure 3.13** is the Global Plan's higher estimate of the cost of collaborative TB/HIV activities, which the regional analysis shows is primarily due to differences with country reports in the African and (to a lesser extent) South-East Asia regions. As noted above, however, the apparent similarity between the Global Plan and country reports for MDR-TB when data are aggregated for all countries is misleading. As **Figure 3.13** makes clear, costs for MDR-TB treatment based on country reports fall far short of Global Plan expectations in the South-East Asia and Western Pacific regions, by about US$ 350 million in 2008. Within these regions, as also illustrated in **Chapter 2**, the shortfall is primarily in China and India The funding gap reported by countries amounts to US$ 385 million in 2008, but the gap is US$ 0.9 billion if the available funding of US$ 2.7 billion is compared with the US$ 3.6 billion requirement included in the Global Plan. The total funding gap further increases to US$1.2 billion once the distortion caused by unusually high planned costs and funding for MDR-TB treatment in the Russian Federation and South Africa is removed.

3.4.3 Implications of differences between country reports and the Global Plan

The differences between the Global Plan and country reports highlighted above suggest that country planning, budgeting and financing is lagging behind the Global Plan for three major components of the Stop TB Strategy: collaborative TB/HIV activities, diagnosis and treatment of MDR-TB, and ACSM.

For collaborative TB/HIV activities, the difference between the Global Plan and country reports is exaggerated. The data presented in **Chapter 2 and Annex 1** show

[1] *The Global MDR-TB and XDR-TB response plan 2007–2008*. Geneva, World Health Organization, 2007 (WHO/HTM/STB/2007.387).
[2] Four of the 90 countries that reported complete data were not considered in the Global Plan cost estimates.
[3] All of the 171 countries included in the Global Plan accounted for 98% of TB cases globally in 2004.

that although implementation of collaborative TB/HIV activities lags behind the Global Plan (consistent with the data presented in **Figure 3.12 and Figure 3.13**), there are a few countries in which implementation in 2006 and plans for 2007–2008 are well aligned, as also noted in this chapter. Some of the shortfall in the budgets reported by countries is attributable to only partial inclusion of the costs of collaborative TB/HIV activities in NTP budgets. For example, budgeting for all TB/HIV activities in the United Republic of Tanzania led to estimates for 2008 that are almost the same as those in the Global Plan, in contrast to previous years when the TB/HIV budget reported by the NTP was much lower. In Kenya, implementation is in line with the Global Plan, but the NTP budget does not include the costs of activities funded by the national AIDS control programme or the cost of activities that are funded via NGOs. In India, the only TB/HIV-related costs included in the NTP budget are the costs of HIV testing for TB patients, which is a relatively inexpensive intervention; it is not known to what extent other activities are budgeted for and funded by the national AIDS control programme. More comprehensive assessments of the kind recently undertaken for the United Republic of Tanzania are needed to enable a more accurate assessment of the real gap between the Global Plan and country plans, and the associated funding requirements.

The shortfall in budgets for diagnosis and treatment of MDR-TB clearly mirror the shortfall in implementation and planning described in **Chapter 2**. The reporting of budgets for ACSM that are relatively small as well as different from those included in the Global Plan is consistent with the reality that ACSM represents new territory for most NTPs, and that it is a component of the Stop TB Strategy for which NTPs state that guidance is needed (see **Chapter 2**).

WHO has developed a planning and budgeting tool that is designed to help countries to align their plans and budgets with the expectations set out in the Global Plan, as well as to produce more accurate country-specific estimates of the financial resources that are required.[1] While the development of the tool was primarily motivated by a recognized need to assist countries to plan and budget in line with the Global Plan and the Stop TB Strategy, it is also intended to help with planning and budgeting for TB control in general. In 2007, 35 countries in the African Region were introduced to the tool through workshops and country missions, and several have used it to complete the task of setting out plans and budgets for a five-year period, starting in either 2007 or 2008. The countries that are most advanced include the Democratic Republic of the Congo, Gabon, Kenya, Malawi, Nigeria, South Africa, the United Republic of Tanzania and Zambia; progress has also been made in Ethiopia, Mozambique and Uganda. Outside Africa, the tool has been used in Afghanistan, Brazil, Indonesia and Uzbekistan, and will be introduced in all countries in the South-East Asia Region in 2008.

Review of finalized plans and budgets will increasingly inform and improve our comparisons of funding requirements reported by countries and those included in the Global Plan (e.g. as has been possible for Kenya, South Africa and the United Republic of Tanzania this year). For the 2009 report, this will include actual revision of the Global Plan estimates where appropriate, using up-to-date and country-specific data.

3.5 Budgets and costs per patient

Budgets and costs per patient in HBCs are shown in **Table 3.5**. The budget for first-line anti-TB drugs per patient is lowest in India (US$ 14) and Zimbabwe (US$ 12), and highest in Brazil (US$ 77), Mozambique (US$ 63) and the Russian Federation (US$ 286). In most countries, the budget is in the range US$ 20–40.

The budget per patient, including all line items, also varies. Three countries have budgets below US$ 100 per patient (Ethiopia, India and Zimbabwe). A total of six countries have budgets in the range US$ 100–200 per patient, five are in the range US$ 200–300 and three are in the range US$ 300–550.[2] The Russian Federation and South Africa are the only two countries with a budget exceeding US$ 1000 per patient (for reasons discussed in section 3.3.1), but budgets are also relatively high in Brazil and the United Republic of Tanzania. Brazil is a middle-income country, and comparatively high costs are expected; the high cost in the United Republic of Tanzania reflects the inclusion, for the first time, of the budget for the full range of collaborative TB/HIV activities, even when some of those activities are funded and provided by the national AIDS control programme (see also sections 3.2.1 and 3.3.2).

In 2008, the total cost per patient treated is estimated at under US$ 100 in only one country: India. It is in the range US$ 100–300 in 12 countries (as in 2007), and US$ 300–500 in three countries (also as in 2007). Five countries have much higher costs: Brazil, Mozambique, the Russian Federation, South Africa and the United Republic of Tanzania. As noted above, three of these countries are middle-income countries with generally higher prices for the inputs needed for TB control, while the Russian Federation and South Africa have large budgets for MDR-TB treatment as well as maintenance or upgrading of hospital infrastructure. Costs of US$ 774 in the United Republic of Tanzania and US$ 685 in Mozambique are due mainly to comprehensive budgeting for collaborative TB/HIV activities (see also sections 3.2.1 and 3.3.2 and **Annex 1**).

Among the low-income countries, there is no clear-cut relationship between the cost per patient treated and GNI per capita. For example, in India and Pakistan

[1] See http://www.who.int/tb/dots/planning_budgeting_tool/en/index.html

[2] Figures were not calculated for Thailand because the budget and health services utilization data reported to WHO were incomplete.

TABLE 3.5

Total TB control costs and NTP budgets per patient, high-burden countries, 2008

	2008 (US$)			CHANGES SINCE 2002, (FACTOR[a])		
	FIRST-LINE DRUGS BUDGET	NTP BUDGET	TOTAL COST	FIRST-LINE DRUGS BUDGET	NTP BUDGET	TOTAL COST
1 India	14	50	84	1.4	1.5	1.4
2 China	26	236	236	1.5	1.8	1.8
3 Indonesia	51	213	232	1.6	1.8	1.7
4 South Africa	55	1254	1917	0.9	4.3	2.5
5 Nigeria	30	258	419	0.6	1.8	21
6 Bangladesh	16	105	143	0.8	1.3	3.8
7 Ethiopia	19	70	119	0.7	1.6	1.9
8 Pakistan	31	119	135	0.5	2.6	1.4
9 Philippines	31	149	231	0.7	1.2	1.2
10 DR Congo	20	186	274	0.6	2.0	1.6
11 Russian Federation	286	5739	6389	4.6	4.6	5.8
12 Viet Nam	18	165	284	0.5	1.9	1.5
13 Kenya	33	301	319	0.9	5.8	4.8
14 UR Tanzania	21	703	774	0.5	8.6	4.2
15 Uganda	43	208	217	0.8	4.5	3.2
16 Brazil	77	748	1118	1.7	4.5	2.4
17 Mozambique	63	522	685	2.7	6.7	4.5
18 Thailand	–	–	–	–	–	–
19 Myanmar	28	100	114	1.6	4.8	2.1
20 Zimbabwe	12	92	163	0.4	3.2	1.6
21 Cambodia	19	243	308	0.5	1.8	1.5
22 Afghanistan	30	432	469	0.4	1.4	4.0
High-burden countries (median value)	**30**	**213**	**274**	**0.8**	**2.0**	**2.1**

– Indicates not available.
[a] Calculated as 2007 value divided by 2002 value.

the cost per patient treated is low relative to income levels, while in the Democratic Republic of the Congo and Mozambique the cost per patient treated is relatively high compared with GNI per capita (data not shown). Overall, budgets and costs per patient are generally increasing, with a median increase of 200% per patient for budgets and of 210% for total costs (though the median for first-line drugs shows a decrease of 20% since 2002).

3.6 Expenditures compared with available funding and changes in cases treated

For countries that have received large increases in funding, there are two important challenges: to spend the extra money, and to translate extra spending into improved case detection and treatment success rates. To date, we have been able to conduct analyses for the HBCs only.

The ability to mobilize resources can be assessed by comparing available funding with budgets, and the ability to use financial resources can be assessed by comparing expenditures with available funding (**Table 3.6; Figure 3.14**). There were seven countries in which the NTP spent 80–100% of the funds available to them (Afghanistan, Brazil, Cambodia, China, the Democratic Republic of the Congo, the Philippines and Viet Nam) and three where expenditures exceeded the level of funding reported prospectively to WHO in 2006 (Kenya, Pakistan and South Africa).[1] India spent 75% of the available funds, and Ethiopia spent 71%. The remaining six countries that reported expenditure data spent between 61% (Indonesia) and 69% (Myanmar) of the available funds. The data reported by the NTP in the United Republic of Tanzania indicate that only 24% of the available funding was spent; it seems likely that this is a problem with the expenditure report. No assessment could be made for Mozambique, Thailand and Uganda, as no expenditure data were reported; for these two African countries, as with the United Republic of Tanzania, reporting expenditure data to WHO has been a recurring problem. When country data are aggregated by region (**Figure 3.14**), the ability to mobilize and then spend financial resources in 2006 was best in the Region of the Americas, the European Region and the Western Pacific Region, and worst in the African Region (considering five countries that reported data, excluding South Africa where the magnitude of the budget and expenditures makes patterns in other countries hard to detect).

The ability to translate spending into improved case-finding can be assessed by comparing changes in expenditures 2003–2006 with changes in the number of patients treated 2003–2006 (**Figure 3.15**; 2006 is the most recent year for which both case notification and expenditure data are available). Of the 19 HBCs for which data were available, all of the 14 countries that increased spending between 2003 and 2006 also increased the number of new cases that were detected and treated in DOTS programmes (a similar pattern applied for new

[1] This explains why the value of expenditures in 2006 as a percentage of the available funding prospectively reported in 2006 (final column of Table 3.6) is above 100.

TABLE 3.6

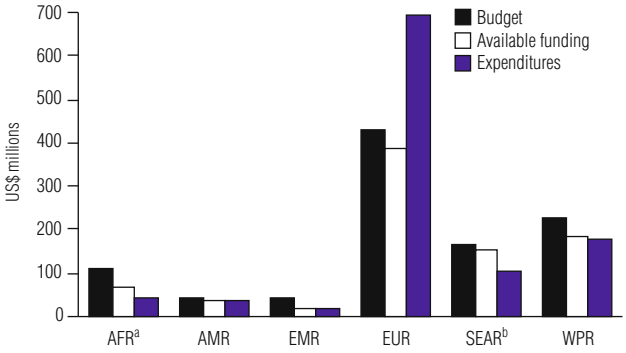
Budget, available funding and expenditures (US$ millions), high-burden countries, 2006

	BUDGET	AVAILABLE FUNDING[a]	EXPEND ITURES[b]	AVAILABLE FUNDING AS % OF NTP BUDGET	EXPENDITURES AS % OF AVAILABLE FUNDING[c]
1 India	66	66	50	100	75
2 China	194	156	149	80	96
3 Indonesia	57	57	35	100	61
4 South Africa	78	78	112	100	143
5 Nigeria	25	20	13	79	65
6 Bangladesh	22	22	14	100	64
7 Ethiopia	6.4	6.4	4.5	100	71
8 Pakistan	21	13	13	61	104
9 Philippines	17	13	12	77	96
10 DR Congo	26	12	9.3	44	80
11 Russian Federation	428	385	694	90	180
12 Viet Nam	10	10	10	100	98
13 Kenya	30	10	11	32	114
14 UR Tanzania	8.1	7.7	1.8	95	24
15 Uganda	10	5.7	–	57	–
16 Brazil	40	34	34	85	99
17 Mozambique	12	9.3	–	76	–
18 Thailand[d]	4.3	4.3	–	100	–
19 Myanmar	17	7.4	5.1	44	69
20 Zimbabwe	13	11	10.6	80	100
21 Cambodia	7.0	4.7	4.3	67	91
22 Afghanistan	19	3.5	2.8	19	80
High-burden countries	**1111**	**934**	**1184**	**77[e]**	**90[e]**

– Indicates not available.
[a] Based on budget data, reported prospectively in 2006.
[b] Based on actual expenditures reported in 2007.
[c] Figures can be above 100% when additional funds were mobilized after budget data were reported in 2006.
[d] Data for Thailand are partial.
[e] Average values.

FIGURE 3.14

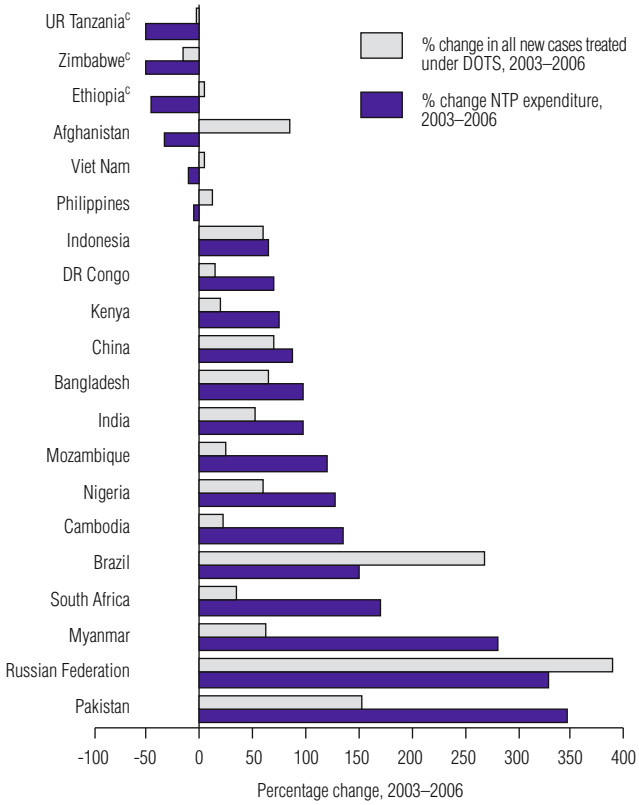
Budget, available funding and expenditures by WHO region, 19 high-burden countries,[a] 2006



[a] Expenditure data not available for Mozambique and Uganda. Data for South Africa not included.
[b] Data are partial for Thailand.

FIGURE 3.15

Change in NTP expenditure and change in all types of patients treated under DOTS, 20 high-burden countries, [a,b] 2003–2006



[a] Expenditure data are not available for Thailand and Uganda. Comparison for Kenya is with expenditure 2004 and for South Africa is with expenditure 2005. Comparison for Mozambique is expenditure 2005 with expenditure 2002.
[b] Countries ranked by percentage change in NTP expenditure.
[c] Expenditure data for Ethiopia, UR Tanzania and Zimbabwe appear incomplete.

smear-positive cases specifically; data not shown). However, the relationship was variable. In Brazil and the Russian Federation, the increase in the number of patients treated under DOTS exceeded the increase in expenditures, probably because increasing the number of cases treated under DOTS requires a substitution of DOTS for non-DOTS treatment rather than an increase in total notifications. There was an almost one-to-one relationship between increased expenditures and increased notifications of new cases under DOTS in Indonesia, and the percentage increase in cases treated under DOTS was more than 70% of the percentage increase in expenditures in Bangladesh and China. At the other end of the spectrum, six countries reported lower expenditures in 2006 compared with 2003 (Afghanistan, Ethiopia, the Philippines, the United Republic of Tanzania, Viet Nam and Zimbabwe), of which two reported a small decrease in the number of cases treated (the United Republic of Tanzania and Zimbabwe), one reported a large increase in the number of cases treated (Afghanistan), and two reported small changes in the number of cases treated (the Philippines and Viet Nam). While the data are plausible for the Philippines and Viet Nam (small changes in both cases and expenditures are unsurprising in countries that have achieved targets for case detection and treatment success rates), it seems likely that expenditures have been underreported in the other four countries. This is consistent with the considerable difficulty in providing expenditure data to WHO that have been observed for these four countries over the past five years.

3.7 Global Fund financing

3.7.1 High-burden countries

The Global Fund is the single most important source of external financing in HBCs, with 11 countries (Bangladesh, Cambodia, the Democratic the Congo, Ethiopia, India, Indonesia, Mozambique, Pakistan, the Philippines, Uganda and Zimbabwe) relying on it to fund more than 25% of their NTP budgets. Only one HBC (Myanmar) lacks a Global Fund grant. After seven rounds of proposals, the total value of approved proposals in the HBCs is US$ 1.4 billion and the amounts in the Phase 1 grant agreements (i.e. the grants that cover the first two years of the proposal) total US$ 547 million (data not shown).

By the end of 2007, US$ 502 million had been disbursed. Across all grants and countries, the actual disbursement rate is very similar to the expected rate,[1] though there is variation among countries with disbursements higher than those expected in 30 out of 53 grants and less than expected in 23 (data not shown). Countries for which disbursements are particularly low in relation to the expected disbursement of funds include Bangladesh (for one of the two principal recipients in round 5), Brazil (for one of the principal recipients in round 5), India (rounds 3 and 4), Indonesia (round 5, possibly linked to a temporary cessation of funding in 2007) and Kenya (round 2). The main delay in the initial flow of funds to countries is the time taken to sign the grant agreement after proposal approval; the median time is 11 months, which is in line with Global Fund expectations that it takes about one year to prepare and finalize the Phase 1 grant agreement and related documentation once proposals are approved by the Board. Once grant agreements are signed, disbursements are usually made within two months.

3.7.2 All countries

In seven funding rounds between 2002 and 2007, the Global Fund approved proposals worth a total of US$ 2.5 billion for TB control in 108 countries, out of total commitments for HIV, TB and malaria of around US$ 10 billion.[2] The African Region has the single largest share, at 37% (**Figure 3.16**), which is higher than its share of the global burden of TB (31%). The South-East Asia and Western Pacific regions have the second and third highest funding in absolute terms, but less than might be expected given their share of the global burden of TB. The share of total funding approved for the Eastern Mediterranean Region and the European Region (13% and 11% respectively) is double these regions' share of the global burden of TB (6% and 5%), while the share of funding for the Region of the Americans is in line with its share of the global burden of TB.

The value of approved proposals for TB control was relatively high in rounds 5 and 6 compared with rounds 1–4, as was the proposal approval rate (**Figure 3.17**), but fell in round 7.[3] The approval rate for TB proposals submitted to the Global Fund was 50% in round 5 and 64% in round 6, up from 37–40% in rounds 1–4, but fell to 51% in round 7.

3.8 Why do funding gaps for TB control persist?

The 22 HBCs have reported a combined funding gap of US$ 328 million for 2008, while the funding gap reported for 90 countries (the 22 HBCs plus 68 other countries) amounts to US$ 385 million. In the context of the Global Fund having issued seven calls for proposals since 2002 resulting in funding commitments of over US$ 10 billion for HIV, malaria and TB control programmes, it may seem surprising that funding gaps for TB control persist.

TB proposals submitted to the Global Fund must

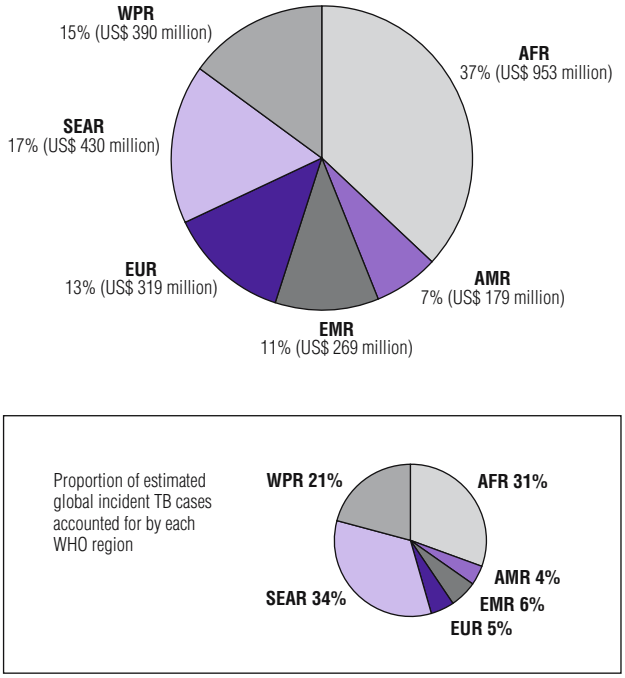
[1] The expected rate assumes that disbursements should be spread evenly over the two- or five-year period of the grant agreement following the programme start date.

[2] The Global Fund has committed US$ 10 billion in rounds 1–7; in round 7, US$ 1.1 billion was committed for a two-year period. See www.theglobalfund.org/en/media_center/press/pr_071112.asp

[3] Calculated as the number of proposals approved divided by the number of proposals reviewed by the Global Fund's Technical Review Panel.

FIGURE 3.16

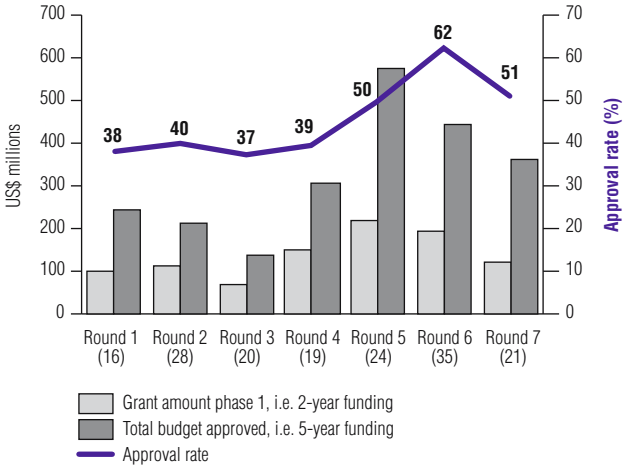
Global Fund funding for TB control by WHO region, as of end 2007[a]



[a] Refers to the total budgets approved in rounds 1–7.

FIGURE 3.17

Global Fund financing and proposal approval rate by round. Numbers under bars show the number of TB proposals approved in each round.



first be approved by its Technical Review Panel, and the number of proposals that can be approved for funding by the Board is limited by the total financial resources available. The US$ 2.4 billion committed thus far for TB control (see section 3.7) represents about one quarter of total commitments to date; if funds were split evenly among AIDS, TB and malaria, this would increase to US$ 3.3 billion. The Fund began to disburse funds in 2003, and current commitments extend to 2012; funds committed to date thus equate to approximately US$ 240 million per year, with a theoretical maximum of around US$ 330 million per year. This simple analysis demonstrates that even if TB control programmes were to increase their share of Global Fund commitments to 33%, the total reported funding gap of US$ 385 million would not be eliminated, although it could be reduced by about US$ 100 million. Excluding funding gaps in four middle-income countries with more domestic resources (Brazil, China, the Russian Federation and South Africa), the gaps reported by countries fall to about US$ 100 million among HBCs, and to about US$ 60 million in other countries. In this context, filling funding gaps via the Global Fund appears more feasible, but depends on (i) the submission of high-quality and sufficiently ambitious proposals including well-justified budgets, (ii) the criteria used by the Global Fund to define countries eligible to apply for funding and (iii) the criteria used to allocate funds among the three diseases. In round 7, there was a decrease in funding for TB control proposals, and a decrease in the proportion of proposals that were approved compared with the peak in round 6. The relative success of round 6 followed the organization of a series of proposal development workshops by the Stop TB Department in WHO; to maximize resource mobilization for TB control programmes in future rounds, this level of assistance with proposal preparation may be needed in future.

If gaps reported by countries are difficult to fill via the Global Fund, then closing the additional gap that will open up if all countries plan in line with the Global Plan via the Global Fund appears unrealistic. Filling funding gaps in the years up to the MDG target year of 2015 therefore depends on domestic resource mobilization and/or external resource mobilization from donors other than the Global Fund.

Increasing domestic financing for TB control would mean a major shift from trends during the period 2002–2008, when almost all of the increase in domestic funding among the 22 HBCs was accounted for by Brazil, China, the Russian Federation and South Africa. Two ways to assess the extent to which countries can mobilize more domestic funds are (i) to compare the percentage of funding currently being provided from domestic sources with a country's national income (measured as GNI per capita) to see if there are differences between countries with similar income levels and (ii) to compare costs and funding gaps per capita with total government health

TABLE 3.7

Financial indicators, high-burden countries, 2008

	NTP BUDGET PER CAPITA (US$)	TOTAL TB CONTROL COSTS PER CAPITA (US$)	FUNDING GAP PER CAPITA (US$)	GENERAL GOVERNMENT EXPENDITURE ON HEALTH PER CAPITA (US$)[a]	TOTAL EXPENDITURE ON HEALTH PER CAPITA (US$)[a]	GENERAL GOVERNMENT HEALTH SPENDING USED FOR TB CONTROL (%)	TB GAP AS PERCENTAGE OF GENERAL GOVERNMENT HEALTH SPENDING (%)
1 India	0.1	0.1	0	5.4	31	1.9	0
2 China	0.2	0.2	0.04	27	70	0.6	0.2
3 Indonesia	0.2	0.3	0	11	33	2.5	0
4 South Africa	7.4	11	0	158	390	7.2	0
5 Nigeria	0.4	0.6	0.2	7.0	23	8.9	3.3
6 Bangladesh	0.1	0.2	0	3.8	14	4.5	0
7 Ethiopia	0.2	0.3	0	2.9	5.6	13	0
8 Pakistan	0.1	0.2	0.05	2.7	14	6.7	2.0
9 Philippines	0.2	0.3	0.02	14	36	2.4	0.2
10 DR Congo	0.3	0.5	0.1	1.3	4.7	42	6.3
11 Russian Federation	5.1	5.7	1.1	150	245	3.7	0.7
12 Viet Nam	0.2	0.3	0.005	8.1	30	3.7	0.1
13 Kenya	0.9	1.0	0.4	8.6	20	12	5.1
14 UR Tanzania	1.3	1.4	0.3	5.2	12	29	5.5
15 Uganda	0.4	0.4	0.3	6.2	19	7.9	4.9
16 Brazil	0.3	0.5	0.1	157	290	0.3	0.1
17 Mozambique	0.9	1.2	0.1	8.4	12	15	1.4
18 Thailand[b]	0.1	0.1	–	57	88	0.2	–
19 Myanmar	0.3	0.3	0.2	0.6	4.5	51	33
20 Zimbabwe	0.5	0.9	0.1	13	27	7.1	0.9
21 Cambodia	0.6	0.8	0.3	6.1	24	14	5.6
22 Afghanistan	0.5	0.5	0.2	2.3	14	25	10
High-burden countries (mean value)	**0.9**	**1.2**	**0.2**	**30**	**64**	**12**	**3.8**

– Indicates not available.
[a] Latest data available are for 2004. Columns 6 and 7 will be overestimates if government health expenditure has increased since 2004.
[b] Data for Thailand are partial.

expenditure per capita (**Table 3.7**). Comparing countries with similar income levels and a similar TB burden suggests that there is scope for increasing domestic funding in several countries including Indonesia (compared with the Philippines), Pakistan (compared with India) and Kenya (compared with Mozambique). Comparing costs and funding gaps per capita with government health expenditure suggests that the countries with the most capacity to fund TB control from domestic resources are Brazil and China, followed by India, the Philippines, Indonesia and the Russian Federation. The countries with the least capacity to increase funding from domestic sources include the African countries (except South Africa), Afghanistan, Cambodia and Myanmar.

Besides grant funding from the Global Fund, the President's Emergency Plan for AIDS Relief is a major source of donor funding, at least for collaborative TB/HIV activities, for most of the African HBCs as well as Viet Nam. With billions of dollars available through this plan, it is important that collaborative TB/HIV activities and related aspects of TB control (e.g. laboratory strengthening) are supported as much as possible – for example, as in happening in Kenya. UNITAID[1] is also a relatively new source of donor funding for TB diagnostics and anti-TB drugs.

Overall, the importance of increasing both donor and domestic funding for TB control is highlighted in a recent publication.[2] This included an analysis of funding needs according to the Global Plan for least-developed, low-income, lower middle-income and upper middle-income countries separately. Combined with benchmarks for domestic contributions to funding for health care used by the Commission on Macroeconomics and Health,[3] this analysis suggested that domestic funding could increase to about US$ 5 billion per year by 2010 and that donor funding would need to increase to about US$ 1 billion per year (compared with approximately US$ 300 million in 2008).

3.9 Summary

The financial data reported to WHO in 2007 are the most complete since financial monitoring was initiated in 2002, with 90 countries that collectively account for 91% of the world's estimated TB cases providing the entire budget and funding data that were requested. Expenditure data continue to be more challenging to report, but 80 countries (77% of total cases globally) submitted a complete report.

NTP budgets in HBCs amount to US$ 1.8 billion in 2008, up from US$ 0.5 billion in 2002; NTP budgets for the 90 countries reporting complete data total US$ 2.3

[1] http://www.unitaid.eu/
[2] Floyd K, Pantoja A. Financial resources required for TB control to achieve global targets set for 2015. *Bulletin of the World Health Organization*, 2008 [in press].
[3] *Macroeconomics and health: investing in health for economic development. Report of the Commission on Macroeconomics and Health*. Geneva, World Health Organization, 2001:166–167.

billion in 2008. In HBCs, budgets are generally equivalent to about US$ 100–300 per patient treated, but range from below US$ 100 in India to above US$ 1000 in the Russian Federation and South Africa. DOTS accounts for the largest single share of NTP budgets in almost all countries, but budgets for the diagnosis and treatment of MDR-TB have become strikingly large in absolute and relative terms in the Russian Federation and South Africa. In several African countries as well as Cambodia, collaborative TB/HIV activities account for a comparatively high proportion of the NTP budget.

With a few exceptions, NTP budgets do not include the costs associated with using general health system resources such as staff and infrastructure for TB control. When these costs are added to NTP budgets, we estimate that the total cost of TB control in HBCs will reach US$ 2.3 billion in 2008 (up from US$ 0.6 billion in 2002), and US$ 3.1 billion across the 90 reporting countries. Costs per patient treated are generally in the range US$ 100–400, and below US$ 100 only in India.

For the 22 HBCs, NTP budgets and our estimates of the total costs of TB control have stagnated between 2007 and 2008 in all but five countries, four of which are in Africa. This trend is worrying, because it suggests that the deceleration in progress towards the case detection and treatment success targets highlighted in **Chapter 1** could persist into 2008.

Sustaining a trend evident since 2002, funding for TB control continues to grow, mainly from domestic financing in Brazil, China, the Russian Federation and South Africa and from Global Fund grants in other countries. Across HBCs in 2008, governments will cover 73% of the total costs of TB control and grants will cover 13% (including US$ 200 million from the Global Fund, out of total grant funding of US$ 297 million). For all countries, the figures are 75% and 12% respectively. Despite increases in funding, countries have reported funding gaps for 2008 that total US$ 328 million among HBCs (14% of total costs) and US$ 385 million across all reporting countries (13% of total costs). Only five HBCs reported that they had no funding gap for 2008.

Gaps reported by countries for 2007 and 2008 would be larger still if country plans and assessments of funding requirements were fully aligned with the Global Plan. In 2008, the gap between the total available funding based on country reports and the total funding requirements laid out in the Global Plan is US$ 0.8 billion in HBCs and US$ 0.9 billion across all 90 reporting countries. The discrepancy is mostly due to higher budgets for MDR-TB (South-East Asia and Western Pacific regions), collaborative TB/HIV activities (African and South-East Asia regions) and ACSM (all regions) in the Global Plan. These differences expressed in financial terms are consistent with results for the implementation and planning of interventions presented in **Chapter 2**.

More positively, there are several examples of countries with plans and budgets that are well aligned with the Global Plan, as well as a few that were well-aligned before the mid-2007 upward revision of targets for the treatment of MDR-TB. Many countries in Africa including all of the HBCs in the region have embarked upon, and in some cases completed, the development of medium-term plans and budgets using a WHO planning and budgeting tool that is designed to help countries to plan and budget in line with the Global Plan. Completion of this work as well as the development of country-owned plans and budgets based on Global Plan targets in further countries are now crucial and should form the basis for intensified efforts to mobilize the necessary resources from both domestic and donor sources.

Conclusions

This concluding section of the report highlights key findings from **Chapters 1, 2 and 3**, as well as common themes across all chapters.

The data and analysis presented in **Chapter 1** show that TB remains a major cause of illness and death worldwide, especially in Asia and Africa. Globally, there were an estimated 9.2 million new cases and 1.7 million deaths from TB in 2006, including 0.7 million cases and 0.2 million deaths in HIV-positive people. Population growth means that these numbers are higher than in 2005. More positively, and confirming a finding first reported in 2007, the data also show that the number of new cases per capita appears to have been falling globally since 2003, and in all six WHO regions except the European Region where rates are approximately stable. If this trend is sustained, MDG 6 Target 6.C, to halt and reverse the incidence of TB, will be achieved well before the target date of 2015. Four regions are also on track to halve prevalence and death rates by 2015 compared with a baseline of 1990, in line with targets set by the Stop TB Partnership. Africa and Europe are not on track to reach these targets, following large increases in the incidence of TB during the 1990s. At current rates of progress, these regions could prevent the targets being achieved globally.

The Stop TB Strategy is WHO's recommended approach to reducing the burden of TB in line with global targets, and the Stop TB Partnership's Global Plan has set out the scale at which the strategy needs to be implemented to achieve global targets. To date, **Chapter 2** shows that progress with implementation of the six components of the strategy is mixed.

- *DOTS expansion and enhancement*. This is the component for which progress is best. Globally, the percentage of estimated new cases of smear-positive TB that were detected in DOTS programmes reached 61% in 2006, compared with the global target of at least 70%. The rate of treatment success for smear-positive cases detected in DOTS programmes improved to 84.7% in 2005, just below the target of 85%.
- *Addressing TB/HIV, MDR-TB and other challenges*. There has been considerable progress in the African Region with the provision of TB/HIV interventions such as HIV testing for all TB patients and co-trimoxazole preventive therapy (CPT) and antiretroviral therapy (ART) for HIV-positive TB patients. However, planning for treatment of patients with MDR-TB falls far short of Global Plan targets in the European, South-East Asia and Western Pacific regions.
- *Contributing to health system strengthening*. Diagnosis of TB and treatment of patients are fully integrated into general health services in most countries. Links with general health sector or development planning frameworks are variable, but consistency with sector-wide approaches was comparatively good among reporting countries. The Practical Approach to Lung Health is being piloted or expanded nationwide in 15 countries, and is included in the plans of 72 countries. Many countries lack comprehensive plans for human resource development or a recent assessment of staffing needs.
- *Engaging all care providers*. Among the 22 HBCs that collectively account for 80% of TB cases globally, 14 are scaling up public–private and public–public mix approaches to involve the full range of care providers in TB control, and seven have used the International Standards for Tuberculosis Care to facilitate this process.
- *Empowering TB patients, and communities*. Several HBCs are implementing ACSM activities, and 13 have conducted KAP surveys. Nonetheless, many countries state that they need much more guidance and technical assistance in this area.
- *Promoting research*. Operational research activities were reported by 49 countries including 19 HBCs.

The data and analysis presented in **Chapter 3**, on financing for TB control, show that the funding available for TB control in 2008 reached US$ 3.3 billion across 90 countries (with 91% of global cases) that reported data. This is up from less than US$ 1 billion in 2002. Nonetheless, funding gaps totalling US$ 385 million in 2008 were reported by the 90 reporting countries, and only five of the 22 HBCs reported no funding gap. The gap between the funding reported to be available by countries and the funding requirements estimated to be needed for the same countries in the Global Plan is larger still: US$ 1 billion. This is mainly due to the higher funding requirements for collaborative TB/HIV activities, management of MDR-TB and ACSM in the Global Plan, compared with country reports. This finding is in line with the implementation and planning deficits described in **Chapter 2**.

Most of the funding deficit is for collaborative TB/HIV activities, management of MDR-TB and ACSM. Another example of consistency between the data included in **Chapter 2** and **Chapter 3** is the diagnosis and treatment of MDR-TB in the Russian Federation and South Africa. These two countries account for a large share of the patients with MDR-TB who are projected to be started on treatment in 2008, in line with fact that these two countries account for 93% of the total budgets for management of MDR-TB reported by HBCs.

Overall, there are several signs that global progress in TB control is slowing and that there are parts of the world where much more needs to be done to achieve the global targets that have been set. Progress in case detection decelerated globally in 2006 and began to stall in China and India. The percentage of estimated cases being detected in DOTS programmes in the African region remains low, at 46%. Incidence rates are falling slowly compared with the decline of 5–10% per year that is theoretically feasible. Budgets stagnated between 2007 and 2008 in all but five of the 22 HBCs. Renewed effort to increase the rate of progress in global TB control in line with the expectations of the Global Plan, backed up by intensified resource mobilization from domestic and international donors, is required.