

# Conclusions

## Monitoring progress in TB control

This report draws four main conclusions about progress in TB control, based on routine monitoring and surveillance data. The first is that NTPs worldwide narrowly missed the 2005 targets for case detection (60%/70%) and treatment success (84%/85%). However, both targets were met in the Western Pacific Region, and in 26 countries including China, the Philippines and Viet Nam. Second, while the total number of patients diagnosed and treated under DOTS approached target levels in 2005, the numbers known to be HIV-positive or carrying drug-resistant bacteria (MDR-TB) were far fewer than anticipated by the Global Plan in 2006. Therefore a major effort is needed to step up collaborative TB/HIV activities and the management of MDR-TB. Third, the global TB epidemic appears to be on the threshold of decline. The incidence rate (per capita) worldwide has evidently stabilized or begun to fall, following the earlier downturns in prevalence and mortality.<sup>1</sup> The incidence rate is now stable or falling in all WHO regions, including Africa and Europe. These findings, if robust, mean that MDG target 8 was met before 2005, and more than 10 years before the target date of 2015. However, the total number of new TB cases was still rising slowly in 2005, and in the African, Eastern Mediterranean and South-East Asia regions. In some Asian countries that report high rates of case detection and treatment success, incidence has not apparently been reduced as quickly as expected, for reasons that are not fully understood. This is linked to the fourth conclusion: that the global TB burden is not yet falling fast enough to satisfy the more demanding targets set by the Stop TB Partnership within the MDG framework. That is, at the current rate of progress, the 1990 prevalence and mortality rates will not be halved worldwide by 2015. The following sections discuss these conclusions in more detail.

## Case detection

The point estimate of the global case detection rate in 2005 is 60%, i.e. 10% below target. The data suggest that the target was reached in the Western Pacific Region and in seven HBCs. Calculations that attempt to allow for many of the uncertainties surrounding the point estimate indicate that case detection could have been as high as 69% or as low as 52%. It therefore seems unlikely that case detection exceeded 70%, both on the basis of these calculations and in view of much independent data showing why detection and/or reporting of patients is low in some places. For example, improving links among public health providers, and between public and private sectors, can substantially increase the number of patients reported to NTPs.<sup>2,3</sup>

While the case detection rate accelerated markedly between 2000 and 2004, the annual increases slowed between

2004 and 2005. Saturation in case-finding is expected where detection rates are high, but the deceleration began in South-East Asia, the Americas and the Western Pacific Region at rates of detection that were below the 70% target. Among HBCs, the slowdown was conspicuous in India, where the final stages of national DOTS expansion are taking place in states with the weakest health systems, such as Bihar and Jharkhand.

Case detection inevitably becomes more difficult at the limits of public health systems, but there are still some comparatively easy gains to be made. Several WHO reports in this series have emphasized that, in the Americas and Europe, many TB cases are reported through the public health system but from outside DOTS programmes. This implies that target rates of case detection could be achieved in these two regions by implementing the procedures required under DOTS, including the more frequent use of smear microscopy in the European Region. In other parts of the world, especially the African and the Eastern Mediterranean regions, case detection must be improved by finding more patients in total, for example by increasing the number and diversity of clinics and hospitals that report TB cases.

The acceleration in case detection since 2000 has been achieved both by improving detection within established DOTS areas and by expanding geographical coverage. However, "coverage" is now less useful as an indicator than in the early years of DOTS expansion, for two reasons. First, geographical coverage was high in most DOTS countries by 2005. Second, other determinants of case detection (e.g. diagnosis and treatment in the private sector, the efficiency of public health services) have, in many countries, become more important than recruiting new districts and provinces to DOTS programmes.

## Outcomes of treatment

DOTS programmes treated more than two million smear-positive patients in the 2004 cohort, and achieved a global success rate just below the 85% target. The target was met in the South-East Asia and Western Pacific regions, and in eight HBCs. However, the overall treatment success, coupled with the 54% case detection rate in 2004, means that less than half (46%) of all new smear-positive patients were known to have been successfully treated in that cohort.

<sup>1</sup> *Global tuberculosis control: surveillance, planning and financing. WHO report 2006.* Geneva, World Health Organization, 2006 (WHO/HTM/TB/2006.362).

<sup>2</sup> Lönnroth K et al. Public-private mix for DOTS implementation: what makes it work? *Bulletin of the World Health Organization*, 2004, 82:580-586.

<sup>3</sup> Lönnroth K et al. Hard gains through soft contracts: productive engagement of private providers in tuberculosis control. *Bulletin of the World Health Organization*, 2006, 84:876-883.

In the countries where treatment outcomes have been poor in recent years, little change was visible in the results for 2004. In the African and European regions, where high proportions of patients fail treatment or die, or are lost from DOTS cohorts, HIV/AIDS and MDR-TB are, respectively, major obstacles to TB control. But incomplete cohort data from these regions show that programme management also continues to be weak.

Clearly, NTPs must continue to improve case-finding and treatment success within the framework of the Global Plan, working towards the MDGs. To reach the targets of 70% case detection and 85% treatment success is a precondition for achieving a major impact with DOTS and the Stop TB Strategy.

### Epidemiological trends and the impact of TB control

Our conclusion that incidence, prevalence and mortality were falling globally by 2005 is based on the best available evidence, but needs to be verified with more and better information. Current point estimates of the key epidemiological indicators are, for many countries, derived by mathematical and statistical modelling, and from weak or indirect evidence. For example, it is uncertain whether the TB incidence rate is still increasing in subregion Africa – low HIV, given that HIV prevalence is thought to be in decline in this group of African countries (Figure 7).<sup>1</sup> In the Region of the Americas, TB prevalence and death rates had already fallen by 2005 to about half the 1990 values, 10 years ahead of the 2015 target year. But this conclusion is not based on direct measurements of prevalence, and is guided by limited information about TB deaths (Annex 3). Moreover, the fall in case notifications has, for unknown reasons, slowed or reversed in recent years in some Latin American countries, including Brazil, Mexico and Peru.

The ultimate goal is to measure incidence through reliable case notifications, prevalence via well-designed prevalence surveys, and deaths by comprehensive vital registration (Table 4). Most countries cannot yet measure all key indicators, and there is much scope for improving and validating methods such as verbal autopsy for counting TB deaths in the population at large (i.e. outside DOTS cohorts).

Notwithstanding this cautious note on evaluation, the trend in TB incidence in some countries is clear and, in a few instances, the fall in TB can be attributed to the implementation of good control programmes. In 10 countries in the Eastern Mediterranean Region, for example, case notification rates were falling at 2–10% annually between 1994 and 2005. For the majority of these countries, the trends in case reports probably reflect the underlying trend in incidence. The higher rates of reduction (e.g. Jordan, Lebanon) are likely to reflect some impact of DOTS programmes, although the size of this

impact is not easily quantified. New Caledonia is a more persuasive example, albeit on a small scale, of impact due to a good programme of drug treatment: the overall case notification rate fell at an average of 9% each year between 1990 and 2005.

In contrast, some countries are not showing the reductions in incidence expected after several years of DOTS implementation. Viet Nam has apparently had high and stable case detection and treatment success rates for a decade, and yet there are no indications that the total number of TB cases is falling. An examination of the notification trends by age and sex shows that case rates are falling among adults aged 35–64 years (especially women), but they are increasing among 15–24 year-olds (especially men) (data in Annex 2 and previous reports). In Figure 23 we have presented this phenomenon in another way: the average age of TB patients is falling among younger adults but increasing among the elderly. Such differences among and between younger and older adults can be seen in data from Bangladesh, China, Myanmar, Sri Lanka and Thailand. In Indonesia, exceptionally, the average age of older as well as younger TB patients is falling. In the United States of America, the average age is falling among younger men and women, but is not obviously increasing among older people. Among people 15–54 years old in Morocco, the average age of women with TB is falling, but for men it is increasing.

This analysis, based only on surveillance data, is not powerful enough to determine the direction of the TB epidemics in these countries, or to fully explain the patterns of change with age. The observations do, however, help to refine the epidemiological questions. In particular, they underline the importance of understanding how the epidemiology of TB among young men and women could be slowing the decline of the epidemic in the established market economies, and in those Asian countries that have most of the world's TB cases.

While the slow decline in TB incidence is a concern in Asia, any sign of a reduction in TB is welcome news in Africa. After more than a decade of rising case numbers, the increase in the case notification rate in eastern and southern African countries (sub-region Africa – high HIV) appears to have halted and may now be in decline. The upward shift in the average age of TB patients in Uganda and UR Tanzania is consistent with the flat or declining trend in case notifications, and follows the trend in HIV prevalence in these two countries. The stabilization or decline of TB in parts of sub-Saharan Africa is the main reason why the incidence rate has begun to fall globally.

Although incidence, prevalence and death rates now appear to be in decline, prevalence and death rates are not yet falling fast enough to achieve the 2015 targets. The decline will be accelerated by finding and curing more patients. The total number of patients diagnosed and treated in 2005 is in line with expectations for 2006, but the marked variations in case detection among WHO

<sup>1</sup> *AIDS epidemic update: December 2006*. Geneva, UNAIDS/WHO, 2006.

regions in 2005 will persist without remedial action. And there were major deficiencies in 2005 in the diagnosis and treatment of HIV-positive and MDR-TB patients, which are reflected in budgets for 2005–2007 (see **Financing TB control**). The present analysis leads to the conclusion that investment and implementation need to be stepped up especially, but not exclusively, in the African, Eastern Mediterranean and European regions.

## Stop TB Strategy: implementation and planning

Eight main themes emerge from this review of the transition from DOTS to the Stop TB Strategy during 2006.

### Strategic planning

The majority of HBCs have developed strategic plans that recognize most of the elements of the Stop TB Strategy but which are not yet in line with the Global Plan. The identification of extensively drug-resistant tuberculosis (XDR-TB) during 2006 has prompted many countries to review the quality of their TB control strategy, and to take the necessary steps to strengthen basic TB control. However, some country plans are modest in terms of the investments needed, especially to improve the quality of DOTS, to treat patients with MDR-TB, and to implement collaborative TB/HIV activities on a large scale (see **Financing TB control**).

### Human resource development

The strength and sustainability of NTPs depend on timely, adequate and ongoing training and deployment of personnel. The performance of staff depends on various factors such as motivation, training, supervision, salaries and working conditions, all of which must be included in carefully-formulated and implemented HRD policies.

With the transition from DOTS to the Stop TB Strategy, HRD is becoming more complex. Compared with previous years, NTPs are now producing more comprehensive HRD plans, and there is a growing recognition that HRD consists of more than training. Also needed are routine data to monitor staff turnover, improved working conditions, and motivation and retention strategies. The systematic development of human capacity is becoming central to TB control in many countries.

Monitoring missions have shown that many NTPs now have a system and structure for HRD. However, the quality of the system is often insufficient and the HR management capacity is often inadequate at provincial and district levels. One of the key challenges is to retain enough competent staff to cover TB control when general health service staff are overstretched. Few countries routinely report data related to HRD, or systematically review staffing and training during routine supervision. Such information would lead to improvements in training and recruitment.

HRD needs better advocacy and promotion, and NTP

staff need to understand its essential role in TB control. The lessons learnt by NTPs in countries such as India and Indonesia on how HRD should be organized and managed should be widely disseminated. Furthermore, there must be greater collaboration on HRD among government departments and ministries that service the whole health system.

### Quality-assured laboratory and treatment services

The prompt diagnosis and effective treatment of all types of TB underpin the Stop TB Strategy. Both functions require a strong laboratory network, but the quality of laboratory services has been given too little attention. DOTS, as a part of the Stop TB Strategy, requires high-quality sputum smear microscopy. Implementation of the strategy also requires the phased expansion of culture and DST facilities, but this is being done slowly in all regions except the Americas and Europe. Although all HBCs require more funds to develop their laboratory networks, India in particular needs substantial additional investment.

While there have been major improvements in the procurement, supply and use of quality-assured anti-TB drugs, NTPs must be prepared to confront new challenges, such as XDR-TB. Standardized, free-of-charge, short-course chemotherapy is now routinely used worldwide. Patient kits and FDCs are also being increasingly used. However, some weaknesses need to be rectified, such as the use of the WHO-recommended Category I regimen in only half of the countries in Europe. Of greater concern is the observation that all WHO regions had at least one country that experienced first-line drug stock-outs at some level during 2005, and seven HBCs reported first-line drug stock-outs at the peripheral level.

### Collaborative TB/HIV activities

The TB and HIV/AIDS control programmes in most countries have begun to respond to the challenge presented by the interaction between these two epidemics. But the majority of countries do not yet offer widely the essential diagnostic and treatment services: HIV testing, screening for TB among HIV-positive people, and the provision of CPT, ART and IPT. Low rates of HIV testing are, in most countries, currently the principal obstacle to providing ART to TB patients. The coverage of these services in 2005 was far less than anticipated by the Global Plan in 2006, the first year of its implementation. It is therefore clear that collaborative TB/HIV activities need to be stepped-up rapidly, to respond to the TB emergency declaration in Africa,<sup>1</sup> and to satisfy the needs of “universal access” as described in the Global Plan.

This report shows that there were in fact significant improvements between 2003 and 2005, at least in some

<sup>1</sup> See: [www.who.int/tb/features\\_archive/tb\\_emergency\\_declaration/en/](http://www.who.int/tb/features_archive/tb_emergency_declaration/en/)

aspects of diagnosis and treatment in some countries. For example, Kenya, Malawi and Rwanda are now testing a growing number of notified TB cases for HIV, providing CPT to around 80% of their HIV-positive TB patients, and ART to around 30%. The total number of reported patients beginning ART in the African Region increased about 40-fold between 2003 and 2005.

In 2005, CPT was more widely available to HIV-positive TB patients than ART. In part this is because CPT is cheaper and easier to distribute and administer than ART, which must be taken for life. But CPT is also provided at the periphery of health services, while ART is often available only in hospitals to which fewer patients have access. As the costs of diagnosis and treatment fall, and as experience in the care of HIV-positive TB patients grows, it will be easier to simplify and decentralize the provision of ART.

There has been less progress in screening HIV-positive people for TB, even though screening appears to be an efficient way of finding TB cases, and despite the demonstrated efficacy of preventive therapy (IPT) for those who have not (yet) progressed to active TB. Botswana, uniquely, has shown that IPT can be provided to HIV-positive people on a large scale.

The expansion of HIV testing among TB patients, and the recording and reporting of test results, will provide important information for monitoring and evaluation. With this information, TB epidemic trends can be monitored separately among HIV-positive and HIV-negative populations, so as to obtain a better understanding of the underlying epidemiology and impact of TB control. It will also be possible to monitor treatment outcomes according to HIV status, in particular mortality. Smear-positive patients treated under DOTS in Africa had higher death rates than in any other WHO region in 2004. This is presumably because of the high prevalence of HIV in the region, but the contribution of HIV to TB deaths in Africa has not yet been demonstrated directly on a large scale.

In this context, several countries including Brazil, Jamaica, Belize, Estonia and the Russian Federation, have developed their own recording and reporting systems to ensure that information on TB and HIV is systematically collected, compiled and analysed. The quality of information about TB and HIV will increase greatly as more countries follow the revised (2006) WHO guidelines on recording and reporting.<sup>1</sup>

### MDR-TB surveillance and control

The long-term vision for control of MDR-TB includes DRS and treatment of MDR-TB as standard components of all TB control programmes. True integration of surveillance and treatment of MDR-TB requires the scale-up of culture and DST services, which were the primary limiting factors for expansion in 2006.

Currently, few countries, with the exception of the established market economies and the subregions of

Central and Eastern Europe, are providing diagnostic services including culture and DST for all TB cases. In most countries, culture and DST are provided to a group of patients selected on a clinical basis, often treatment failures or contacts of known MDR-TB patients. Therefore, routine surveillance data and survey data obtained through the Global DRS Project are poorly correlated, with the exception of the European Region which provides wide access to culture and DST services.<sup>2</sup>

A total of 182 countries filled in the WHO standard data collection form for MDR-TB data for 2005, but only 104 countries reported at least one MDR-TB case, and the majority of countries reported less than 50 cases. It is expected that expansion of culture and DST, as well as treatment for MDR-TB as outlined in the Global Plan, will improve the routine surveillance of drug resistance, particularly among re-treatment cases. In the meantime, the Global DRS Project continues to play an important role in supplementing routine surveillance, and in monitoring trends in drug resistance. The Global Plan anticipates that 20 000 and 36 000 MDR-TB cases will be treated according to international standards in 2006 and 2007, respectively. In 2005, the total number of MDR-TB patients reported, and the number reported as being diagnosed in GLC programmes (probably overestimated), were far below the Global Plan proposal for 2006. However, the number of known MDR-TB patients is growing, and the proportion treated under the GLC is expected to increase from about a third (35%) in 2006 to a half (47%) in 2007.

The 2004 cohort of MDR-TB patients was the first for which data on treatment outcomes were collected. The treatment success rate for patients in GLC projects was 57% on average somewhat better than for patients treated outside GLC projects (50% treatment success).<sup>3</sup> In future, we expect treatment outcomes in GLC projects to improve as cohorts are likely to include fewer chronic cases and a higher proportion of new MDR-TB patients carrying bacteria that are typically resistant to fewer drugs. In addition, the GLC has in recent years approved more countries that do not have a history of second-line drug use. In such settings, MDR-TB control is likely to yield better treatment outcomes; susceptibility to the most

<sup>1</sup> *The revised TB recording and reporting forms – version 2006*. Geneva, World Health Organization, 2006. Available at [www.who.int/tb/dots](http://www.who.int/tb/dots)

<sup>2</sup> Data not presented in this report. This is a repeat of the analysis presented in *Global tuberculosis control: surveillance, planning and financing*. WHO report 2006. Geneva, World Health Organization, 2006 (WHO/HTM/TB/2006.362). The reanalysis gives essentially the same results.

<sup>3</sup> This is lower than reported in another publication from the same GLC-approved countries (Nathanson E et al. Multidrug-resistant tuberculosis management in resource-limited settings. *Emerging Infectious Diseases*, 2006, 12:1389–1397). The paper reported that an average of 70% of MDR-TB patients were successfully treated (higher among new, 77%, than among previously treated MDR-TB patients, 69%). In that source, the number of patients was higher because the data covered three years instead of one year in this report. The MDR-TB patients discussed in the article also included a high proportion of severe chronic cases, with 65% of patients resistant to both first- and second-line anti-TB drugs.

effective second-line drugs should be preserved, perhaps permitting shorter regimens with fewer, less toxic drugs.

The number of GLC-approved, MDR-TB control programmes is increasing rapidly, both as a result of more funding for TB control from the GFATM, and through the integration of MDR-TB management into general TB control efforts, as outlined in the Stop TB Strategy and described in the new guidelines for the management of drug-resistant TB.<sup>1</sup> The GLC is receiving a growing number of applications from low-income countries (as defined by the World Bank). By the end of 2006, 15 low-income countries had been approved by the GLC, among which 10 were approved during the past two years. In addition, applications from two low-income countries were under GLC review.

Although the number of GLC-approved MDR-TB treatments is increasing, with an estimated global incidence of over 400 000 MDR-TB cases, most patients remain undiagnosed and untreated. And many of those patients who have been identified are still treated inadequately, with inappropriate diagnostic and treatment procedures.

WHO and its partners will focus on assisting countries in planning, piloting and scaling-up procedures for the management of MDR-TB, following the new guidelines and in line with the Global Plan. Several HBCs and high MDR-TB prevalence countries have plans and resources to improve MDR-TB management. By the end of 2006, the newly-established UNITAID<sup>2</sup> also agreed to scale-up access to second-line anti-TB drugs by contributing significant financial resources for GLC-approved countries.

### Extensively drug-resistant TB

Although resistance to second-line TB drugs is not a recent development, it gained considerable attention during 2006, following a review of findings by supranational TB reference laboratories, and a highly-publicized occurrence of resistance to second-line drugs among HIV-infected TB patients in South Africa,<sup>3</sup> coupled with high mortality. The term extensively drug-resistant TB (XDR-TB) is defined as TB due to strains that are resistant to the two most important first-line drugs, isoniazid and rifampicin (MDR-TB), and further resistance to a fluoroquinolone and at least one second-line injectable agent (amikacin, kanamycin and/or capreomycin).<sup>4</sup> DST is not routinely carried out in most national reference laboratories. Therefore, to assess the magnitude of the XDR-TB problem, second-line testing must be conducted on isolates from MDR-TB patients identified in routine drug-resistance surveys. This is under way in at least 10 countries, and data will be available in 2007.

### Strengthening health systems, improving access to care

The Stop TB Strategy reinforces the natural linkages between TB control and general health systems. It highlights the need for NTPs to actively participate in efforts to

improve health policy, human resources, financing, management, logistics, service delivery and information systems.

Most HBCs have developed plans for TB control jointly with a range of stakeholders involved in health-care planning financing and health systems development. Several NTPs have actively engaged in SWAPs, MTEFs and PRSPs. However, this may not be sufficient in the context of the current, wide-ranging debate on health system strengthening. Most NTPs need to participate more actively in that debate, particularly in countries with ongoing health sector reforms.

Some of the innovative but well-tested approaches, which are integral components of the Stop TB Strategy, provide opportunities for NTPs to strengthen health systems while also enhancing TB control. These include community-based TB care (linking community and health services), PAL (TB care in the context of all respiratory problems) and PPM (exposing and sensitizing non-state health-care providers to public health through collaboration with NTPs).

So far, a few countries have initiated PAL, and some have begun scaling up. Countries, including those with a high prevalence of HIV infection, should actively consider starting PAL implementation and mobilize the required resources through, for example, applications to the GFATM. PPM has been shown in some settings not only to improve access to care for the poor but also to reduce costs to patients.<sup>5</sup> There has been a significant increase in the number and the scale of initiatives to actively engage all health-care providers through PPM approaches to TB care and control. This is being facilitated by two important tools launched during 2006: the *International Standards for Tuberculosis Care and Engaging all health care providers in TB control: guidance on implementing public-private mix approaches*. All regions have now included PPM in the regional TB control plans, and more

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

<sup>2</sup> UNITAID is a financing mechanism established in 2006 to facilitate access to high-quality drugs and diagnostics for HIV, TB and malaria, led by Brazil, Chile, France, Norway and the United Kingdom, and based primarily on a tax contribution to the price of airline tickets.

<sup>3</sup> Gandhi N et al. Extensively drug-resistant tuberculosis as a cause of death in patients co-infected with tuberculosis and HIV in a rural area of South Africa. *Lancet*, 2006, 368:1575–1580.

<sup>4</sup> Fluoroquinolones and injectable agents are the most effective second-line anti-TB drugs, and the only ones that have bactericidal effect. They are therefore recommended in the initial phase of any MDR-TB treatment regimen. Fluoroquinolones and aminoglycosides are the most common second-line anti-TB drugs, largely available also in most low-income countries. XDR-TB is therefore a term intended to describe a resistance pattern for which patients are much less likely to be successfully treated with existing second-line regimens. See: *Guidelines for the programmatic management of drug-resistant tuberculosis*. Geneva, World Health Organization, 2006 (WHO/HTM/TB/2006.361).

<sup>5</sup> Floyd K et al. Cost and cost-effectiveness of PPM-DOTS for tuberculosis control: evidence from India. *Bulletin of the World Health Organization*, 2006, 84:437–445.

countries are bringing PPM into the national planning and implementation process. All HBCs have some form of PPM activity in progress. Increased attention to PPM in countries also means a significant increase in the need for technical assistance in this area. Major challenges for PPM scale-up are skilled staff in countries and adequate external and internal technical assistance for country-level implementation.

### Working with people and communities

Community-based TB care has been shown to improve both access to services and adherence to treatment, and is in place in many countries.<sup>1</sup> However, it needs to be promoted actively and implemented more widely.

The wider involvement of communities in TB care and prevention – going beyond patient care – should be based on the assessment of possible synergies with existing community initiatives, and with a view to improving physical, social and economic access to services for TB care and control. The vision underlying principles for community empowerment is one of partnership between health systems and communities, aimed at establishing a patient-centred approach, with earlier and higher case detection, better treatment adherence throughout the period of treatment, and mitigation of the economic impact of the disease on patients and their families. So far, the approach to ACSM under the Stop TB Strategy has been uneven. WHO and partners, including a wide range of civil society organizations, will address these challenges by publishing guidelines for community empowerment early in 2007. These guidelines will serve as a basis for developing country-specific strategies, and should benefit all countries, especially those which have mobilized funding for ACSM activities from the GFATM.

### Research to improve TB control

Implementation of the various components of the Stop TB Strategy requires a greater and more systematic effort on the part of countries to plan, design and undertake research. This will be required as much for the rapid deployment of new and improved technology as for the implementation of innovative, programme-based approaches to TB control. The limited research activities reported by NTPs in 2006 included surveys of the prevalence of HIV infection among TB patients, surveys of drug resistance, studies on health-seeking behaviour and the effectiveness of FDCs, and the evaluation of PPM initiatives. The development and promotion of a set of research priorities, the harnessing and strengthening of research capacity at the regional, national and local levels, and the establishment of institutional mechanisms to support research are all needed to reinforce component 6 of the Stop TB Strategy.

<sup>1</sup> *Community contribution to TB care: practice and policy*. Geneva, World Health Organization, 2003 (WHO/CDS/TB/2003.312).

## Financing TB control

The financial analyses included in this report are based on data from 90 countries that together account for 90% of the global TB incidence, including all 22 HBCs and 84 of the countries considered in the Global Plan. These data show that NTP budgets in the 22 HBCs have increased substantially over the past six years, from just over US\$ 500 million in 2002 to US\$ 1.25 billion in 2007, while total costs (NTP budgets plus the cost of general health system staff and infrastructure used for the treatment of TB patients) have risen from US\$ 644 million in 2002 to US\$ 1.65 billion in 2007. When all 90 countries are considered, NTP budgets for 2007 amount to US\$ 1.65 billion, with total costs of US\$ 2.3 billion. In response to these growing budgets, funding for TB control has also increased, from US\$ 644 million in 2002 to US\$ 1.4 billion in 2007 in HBCs. Nonetheless, funding gaps reported by countries in 2007 amount to US\$ 307 million, of which US\$ 251 million is accounted for by the 22 HBCs. Moreover, despite increases in planned costs and available funding for TB control since 2002, these funding gaps would be larger still if country plans and assessments of funding requirements were in line with the Global Plan. For the 84 countries for which an assessment could be made, the Global Plan indicates that US\$ 3.1 billion is required in 2007, compared with planned costs based on country reports of US\$ 2.3 billion and available funding of US\$ 2.0 billion. Figures for the 22 HBCs specifically are US\$ 2.2 billion, US\$ 1.7 billion and US\$ 1.4 billion, respectively. The discrepancy is mostly explained by the higher costs for collaborative TB/HIV activities and ACSM that are included in the Global Plan (US\$ 832 million in the Global Plan compared with US\$ 128 million in country reports), especially in the African and South-East Asia regions.

### National budgets compared with the Global Plan

The Global Plan has set out what needs to be done to achieve the MDG and related Stop TB Partnership targets for TB control set for 2015. For this reason, it is important to understand why there are differences between country reports and the Global Plan.

For collaborative TB/HIV activities, the big difference between the Global Plan and NTP country reports has two possible explanations. The first is that the budgets reported by NTPs exclude national AIDS programme budgets for collaborative TB/HIV activities, as well as funding channelled through other mechanisms (e.g. via NGOs). For items such as ART for HIV-positive TB patients, these amounts could be large. The second is that the scale at which implementation of collaborative TB/HIV activities is planned is much less than described in the Global Plan.

The process of clarification and verification of the financial data reported by NTPs clearly demonstrated that NTP budgets do not include all of the budgets and

funding available for collaborative TB/HIV activities in some countries. Kenya and India are two examples. Planning for collaborative TB/HIV activities in Kenya is in line with and sometimes ahead of the Global Plan (for example, 57% of TB patients were tested for HIV in the first half of 2006 with a target of reaching 85% by the end of 2006, compared with the figure of 47% included in the Global Plan for 2006 as a whole). However, the NTP budget is lower than the funding requirements set out in the Global Plan because US\$ 7 million is being channelled through NGOs rather than the NTP, and the budget for antiretroviral drugs is part of the national AIDS programme budget (see Annex 1). In India, the only collaborative TB/HIV activity included in the NTP budget is HIV testing of TB patients, which is among the least expensive of the 12 recommended activities. The extent to which other activities are budgeted for and funded by the national AIDS programme is not known.

While NTP budgets are therefore undoubtedly an underestimate of total budgets and funding for collaborative TB/HIV activities, the figures presented in the TB/HIV sections of this report also show that, compared with the Global Plan, there is a large deficit in actual implementation in 2005 as well as in the planned level of implementation in 2006–2007. For example, country reports indicate plans to enrol about 80 000 HIV-positive TB patients on ART in 2006, which is 36% of the 220 000 proposed in the Global Plan. This means that the financing data, in which budgets reported by NTPs are about 10% of those included in the Global Plan, illustrate, but also overstate, a real deficit in both funding and implementation. If ART is considered a good marker for collaborative TB/HIV activities as a whole, then planned budgets for collaborative TB/HIV activities are about one-third rather than one-tenth of the total set out in the Global Plan.

In the case of ACSM, Global Plan estimates of funding requirements were based on a limited number of countries that had developed detailed ACSM plans in the context of applications for GFATM funding in round 5, with guidance from the Stop TB Partnership's ACSM secretariat. Funding requirements in other countries were extrapolated from this set of countries. Given that ACSM is a relatively new area for most NTPs, and that country-specific data were not available in most cases, it is not surprising that budgets reported by countries tend to be comparatively small.

In contrast to TB/HIV and ACSM, the funding available for MDR-TB treatment is higher than the requirement set out in the Global Plan. This is mostly due to the large budgets reported by the Russian Federation and South Africa; the combined total (US\$ 134 million) for these two countries is higher than the US\$ 129 million included in the Global Plan for the 84 countries that we were able to analyse for this report. The aggregated data for all countries conceal the fact that budgets, as well as the planned number of patients to be enrolled on treatment,

are lower than Global Plan expectations in many countries, including the two with the largest estimated number of cases (China and India).

These differences highlight a need for better alignment between country plans and budgets and the Global Plan. The existing evidence already demonstrates that this has been achieved in some countries – notable examples being Brazil, Kenya, the Philippines, Viet Nam and, with the exception of MDR-TB treatment, China. However, these countries remain a small minority.

If the 2015 targets are to be achieved, robust country-owned plans that include implementation of all components of the Stop TB Strategy at a scale consistent with the Global Plan are needed. In this context, WHO has developed a tool for planning and budgeting in line with the Global Plan and the Stop TB strategy at country level.<sup>1</sup> The tool was field-tested in a range of countries in 2006, and an early version was used to help develop strategic plans in Afghanistan and Brazil. The first major use of the final version will be as part of a planning and budgeting workshop for 15 priority African countries including all nine HBCs in the region, scheduled for the first half of 2007. The tool will be used to help develop strategic plans and budgets in priority countries in the European Region during the same period.

### Financing the Global Plan

Country plans that are in line with the Global Plan will have larger funding requirements and larger funding gaps, as illustrated by our comparisons with the Global Plan for 84 countries and by specific examples such as Kenya. Filling these funding gaps will require intensive resource mobilization. External grant funding to the 84 countries that could be compared with the Global Plan reaches about US\$ 300 million in 2007, with GFATM grants now in place in almost all of these countries and other grant funding stable during the period 2002–2007. Filling the likely funding gap of over US\$ 1 billion in 2007 is equivalent to an almost four-fold increase in grant financing. Existing domestic funding, including loans, is about US\$ 1.7 billion in 2007; filling the likely gap of around US\$ 1.1 billion would therefore need an increase of approximately 65% in existing domestic funding. These figures show that it is unlikely that the funding gap will be filled by donor agencies, and that domestic financing from national governments will be crucial.

Increasing domestic financing for TB control means a major shift from trends during the period 2002–2007, when almost all of the increase in domestic funding among the 22 HBCs was accounted for by three countries (China, the Russian Federation and South Africa). Data from HBCs show that while there is a clear relationship between a country's national income (measured as GNI

<sup>1</sup> This tool is available on a Sharepoint site, accessible by contacting [tbbudget@who.int](mailto:tbbudget@who.int)

per capita) and the share of funding for TB control that is provided by HBC governments, two countries with similar levels of income and burden of TB can have very different levels of domestic funding for TB control. This implies that there is real scope for increasing domestic funding in several countries including Indonesia (compared with the Philippines), Pakistan (compared with India), and Kenya (compared with several low-income countries). There should also be potential for increasing loan funding. In 2007, World Bank loans for TB control in the 22 HBCs are restricted to China, India and the Russian Federation.

Broader trends in funding for the health sector also offer an opportunity to increase domestic funding for TB control in India, to support the management of TB/HIV and MDR-TB, and to expand ACSM. The Government of India has pledged to increase public investment in health care by an amount equivalent to 1–2% of GDP over five years. Other than India, funding needs according to the Global Plan amount to about US\$ 650 million for low-income countries in 2007. This suggests that if 50% of needs in low-income countries were funded domestically, if middle-income countries financed their TB control entirely from domestic sources,<sup>1</sup> and if donor resources were channelled primarily to low-income countries, then much of the increased funding required for implementation of the Global Plan could be mobilized from domestic sources.

While some countries need to mobilize additional funding, others face the task of maintaining their funding for TB control. Viet Nam, which has achieved the implementation targets of a 70% case detection rate and 85% treatment success for several years, is the only one of the 22 HBCs where funding projected for 2007 is less than in 2002. This decrease in funding includes a reduction in government funding. Failure to maintain financial support for the NTP risks undermining TB control and could prevent implementation of the newer components of TB control included in the Stop TB Strategy.

Resource mobilization is more likely to be successful if it is based on a credible plan and related budget, if there is evidence that increased funding can be spent, and if there is proof that increased spending can be translated into improved TB control. For several of the countries with the largest numbers of TB cases, larger sums of money have been spent, and increased spending has been associated with an increase in the number of patients treated in DOTS programmes. Notable examples are Bangladesh, Brazil, China, India, Indonesia and the Russian Federation where, for a 100% increase in funding, there has been an increase in new smear-positive cases treated under DOTS of at least 61%. Similar figures also apply to five other

HBCs with smaller absolute increases in treated cases: DR Congo, Kenya, Myanmar, Nigeria and the Philippines. In other HBCs, the relationship between increased spending and increased cases treated in DOTS programmes was much weaker or could not be demonstrated due to a lack or apparent underreporting of expenditure data. Afghanistan and Pakistan both reported large increases in the numbers of cases treated in DOTS programmes between 2003 and 2005 and large funding gaps for 2007, but expenditure data appear to have been underreported. With better expenditure data, it would be easier to make a case for increased funding in these countries. Overall, the data also illustrate that, when assessing the impact of increased funding on the burden of TB, as will be done by the GFATM during 2007 and 2008, it is advisable to look first at the relationship between expenditures and outcome indicators (such as the number of patients treated or the number of patients successfully treated), prior to linking funding with impact indicators such as prevalence or mortality rates. In countries where there is no clear relationship, an in-depth analysis of how the increased funding was used and how the lack of a relationship with outcome indicators can be explained is warranted.

### Strengthening the financial monitoring system

The financial monitoring system itself has grown in strength between 2002 and 2007, yielding more data of higher quality year-on-year. Nonetheless, there is scope for improvement. Beyond the 90 countries included in our analyses, there were a further 66 countries that submitted incomplete financial data. In at least some of these, it is probably possible to provide a complete report. Better data are needed for Thailand, which reported only partial data because, in their decentralized system, financial data are not reported or aggregated at national level. The South African NTP illustrates how it might be possible to address this difficulty – in 2006, the NTP manager sent the WHO data collection form to each of the country's nine provinces for the first time, allowing an aggregated report to be prepared. Budgets and funding for collaborative TB/HIV activities that are included in national AIDS programmes need to be better understood, for example via better linkages with resource tracking work undertaken by UNAIDS.

In summary, there has been major progress in the financing of TB control during the six-year period 2002–2007, with big increases in budgets, available funding and expenditures. However, large funding gaps remain, and the gaps reported by countries for 2006 and 2007 would be larger still if country plans and assessments of funding requirements were fully aligned with the Global Plan. The Global Plan needs to be translated into country-owned plans and budgets, which should then underpin intensified efforts to mobilize the necessary resources.

<sup>1</sup> As indicated for health care as a whole in the report of the WHO Commission on Macroeconomics and Health. See: *Macroeconomics and health: investing in health for economic development. Report of the Commission on Macroeconomics and Health*. Geneva, World Health Organization, 2001, pp. 166–167.